ST. MARY UNIVERSITY

SCHOOL OF GRADUATE STUDIES

FACTORS AFFECTING LIQUIDITY IN SELECTED PRIVATE COMMERCIAL BANKS IN ETHIOPIA

BY:
RAHEL AWEKE TEKLE

JANUARY, 2019

ADDIS ABABA, ETHIOPIA

ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES

FACTORS AFFECTING LIQUIDITY

IN SELECTED PRIVATE COMMERCIAL BANKS IN ETHIOPIA

BY:

RAHEL AWEKE TEKLE

A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY, SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF MBA IN ACCOUNTING AND FINANCE

JANUARY, 2019

ADDIS ABABA, ETHIOPIA

DECLARATION

I, Rahel Aweke, declare that this thesis is my original work, prepared under the guidance of Ass. Professor Asmamaw Getie. All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

Name: Rahel Aweke Tekle Signature:

St. Mary's University, Addis Ababa January, 2019

APPROVED BY BOARD OF EXAMINERS

Dean, Graduate Studies	**Signature and Date**
Advisor	**Signature and Date**
External Examiner	**Signature and Date**
Internal Examiner	**Signature and Date**

ACKNOWLEDGMENTS

My sincere and deepest gratitude goes to my advisor and instructor Asmamaw Getie (Asst. Professor) for providing all the necessary constructive feedbacks and guidance throughout the study.

I would also like to extend my heartfelt appreciation to my family, for their unconditional love, encouragement and support throughout my life. I would also like to thank my beloved husband for his encouragement and constant mentorship.

Finally, special thanks to my friends, classmates and everyone who supported me throughout this journey.

Rahel Aweke Tekle

ACRONYMS AND ABBREVIATIONS

AIB:	Awash International Bank S.C.
BOA:	Bank of Abyssinia S.C.
CAP:	Capital Adequacy
CLRM:	Classical Linear Regression Model
CPI:	Consumer Price Index
DB:	Dashen Bank S.C.
DEPG:	Deposit Growth
DW:	Durbin-Watson
FEM:	Fixed Effect Model
FERF:	Foreign exchange Rate fluctuations
GDP:	Gross Domestic Product
HP:	Hypotheses
INF:	General inflation rate
IRS:	Interest Rate Spread
LG:	Loan growth
MoFED:	Ministry of Finance and Economic Development
NBE:	National Bank of Ethiopia
NIB:	Nib International Bank S.C.
NPL:	Non-performing loans
OLS:	Ordinary Least Square
REM:	Random Effect Model
ROA:	Return on Assets
RR:	Reserve Requirement
TBP:	Treasury Bill Purchase
UB:	United Bank S.C.
WB:	Wegagen Bank S.C.

ABSTRACT

Liquidity creation is the main concerns of commercial banks because banks are mainly involved in deposit mobilizing and lending which have direct impact on their liquidity. Hence, this study examines the bank specific, industry specific and macro-economic factors that affect liquidity of Ethiopian commercial banks. The data covered the period from 2000-2017 GC for the sample of selected six private commercial banks. Quantitative research approach and explanatory design were adopted in carrying out this research. Secondary data were collected from the selected six private commercial banks using purposive sampling technique. The fixed effect regression technique was used by econometric package EViews9. The findings of the study shows that, Bank size, Capital adequacy ratio, Reserve requirement, Interest rate spread, Loan growth, and NBE bill purchase have negative and statistically significant impact on liquidity. On the contrary, Deposit growth, Profitability, Non-performing loan, Foreign exchange rate fluctuations and Inflation have positive and statistically significant impact on liquidity. The researcher recommends, banks should not only be concerned with internal policy rather, they have to consider both internal and external factors to improve operational efficiency and optimize their liquidity position. On the other side the policy maker, NBE has to consider the existing economic conditions and promote favorable environment to the development of the financial sector.

Key words: Ethiopian private commercial banks, factors of liquidity, fixed effect regression, purposive sampling.

List of Tables

CONTENTS

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The economy of a nation is directly allied to the performance and strength of financial intermediaries in that specific nation; banks are major players of a country's economy. In their traditional role as financial intermediaries, banks ensure the transmission of funds from surplus to deficit areas and serve to meet the demand of those who are in need. Banks facilitate spending and investment, which stimulate growth in the economy. (Douglas, 2014)

Liquidity for a bank means the ability to meet its financial obligations as they come due, without incurring unacceptable losses. In other word, Liquidity can be defined as the ability of a financial institution to meet all legitimate demands for funds. Hence, liquidity risk arises from the fundamental role of banks in the maturity transformation of short-term deposits into long-term loans. Therefore, banks have to hold optimal level of liquidity that can maximize their profit and enable them to meet their obligation. According to (Aspachs et. al. and Tiesset, 2005), during global financial crisis, many banks struggled to maintain adequate liquidity. In order to sustain the financial system, unprecedented levels of liquidity support were required from central banks (Černohorská, 2010). Even with such extensive support, a number of banks failed, and forced into mergers or required resolution (Teply, 2011). However, as was pointed out by (Diamond and Dybvig, 1983) one of the key reasons why banks are fragile, is their role in transforming maturity and providing insurance as regards depositors' potential liquidity needs.

Generally, banks strive to strike a balance between profitability and liquidity because the provision of sufficient liquidity to customers at all times is an essential feature of banking. (Niresh, 2012) To achieve this goal, banks ensure that sufficient provision of cash and other near cash securities are made available to meet withdrawal obligations and new loan demand by customers in need of liquidity. For aforementioned reason, any bank operating in Ethiopia shall statutorily require to comply with the reserve and liquidity requirement directive of the National Bank of Ethiopia (NBE) as a means of effectively managing the liquidity positions of banks. As a matter of fact, the first strategy to liquidity management in Ethiopia is compliance with these statutory reserve requirement and liquidity ratios as stipulated by the NBE directives. To this regard, strategic

measures has been employed by the NBE to improve banking system liquidity, stability and a steady flow of credit to the real sector of the economy includes the continuous reduction of the statutory reserve requirement and liquidity ratio. For instance, NBE has reduced statutory reserve requirement from 15 percent to 10 percent and then to 5 percent and liquidity ratio requirement from 25 percent to 20 percent and then to 15 percent under Directives No. 45/592 (NBE, 2008), SBB/46 (NBE, 2012), SBB/55 (NBE, 2013), Directives No. SBB/45 (NBE, 2012) and SBB/57 (NBE, 2014) respectively.

As per NBE's lastly replacement liquidity requirement directives No. (NBE, Licensing and supervision of Banking Business Directive No. 57, 2014), "liquid assets" includes cash, deposits with the National Bank and other local and foreign banks having acceptance by the National Bank, and "current liabilities" refers to the sum of demand (current) deposits, savings deposits and time deposits and similar liabilities with less than one month maturity.

To summarize, the issue of banks liquidity is crucial to the financial sector of Ethiopia with the absence of secondary market which is dominated by banking sector. This study enables banks and regulators to keep control to the issue of liquidity which is very important to the well-being of their operation as well as the economy as a whole in the country.

1.2 Statement of the Problem

The fundamental role of a bank is to channel funds from surplus economic unit to deficit economic units. They also provide a channel for policy makers to conduct monetary policies that control the price and foreign exchange stability. However, the activity of the bank is not without problems, since banks have fundamental role in the maturity transformation of short-term deposits into long-term loans that inherently exposed for liquidity risk. In such circumstance, banks will be exposed to liquidity problem and may frustrate their costumers and may affect the financial sector as a whole. On the other hand, when banks hold excess liquid asset which are non-earning assets such as cash and non-interest bearing deposits, the bank's profitability will be affected. Hence, every bank has to ensure that it operates to satisfy its profitability target and at the same time to meet the financial demands of its customers by maintaining optimum level of liquidity.

In Ethiopia, during the last two decades, the private banking sector has been playing important role in the economic development of the country. As banks dominate the financial sector in Ethiopia,

the process of financial intermediation in the country depends heavily on banks. Hence, keeping their optimal liquidity for banks in Ethiopia is very important to meet the demand by their present and potential customers. Furthermore, the NBE has required banks to have their own liquidity policy (NBE, 2012) which enforces banks to monitor their funding structure and their ability to handle short term liquidity problems and provide them with a better means of assessing the present and future liquidity risk associated with their future liquidity position. Hence, maintaining the optimum level of liquidity position is of utmost importance. However, the question comes next in mind is that, what are the factors that determine bank's optimum liquidity level.

In Ethiopian context, to the knowledge of the researcher, there appear to be few researches that make an effort to assess or provide an indication on the factors of the banks' liquidity which was mainly based on bank specific and macro-economic factors in the existing private and publicly owned banks. From those researches, (Tseganesh, 2012), analyzed both bank specific and macroeconomic variables from year 2000 to 2011 for the sampled commercial banks and the result was, capital adequacy and loan growth have positive and insignificant relationship with liquidity and on the contrary NPL, GDP and INF have negative and insignificant relationship and finally bank size IRM, STIR have negative and significant relationship to banks liquidity. However, the study didn't include the effect of industry specific factors like Reserve requirement, NBE bill purchase.

(Mekibeb, 2016) also analyzed the determinant factors of liquidity both for industry specific and macroeconomic variables from year 2000 to 2015 for the sampled commercial banks which stated that, from the bank specific factors banks size, loan growth, non performing and profitability have a significant impact on banks liquidity and among the macro economic variables only inflation had statically significant impact on liquidity it would have been better if the study considers the other macroeconomics factors.

Therefore, as described in the above paragraph, the existing local studies did not considered the industry specific factors such as reserve requirement and NBE bill purchase, and some macroeconomic factors like exchange rate fluctuations and interest rate spread which have direct impact on banks liquidity positions. Hence, this study will fill the gap by enumerating the three major factors of liquidity i.e. bank specific, industry specific and macroeconomic factors in six selected private banks which have 18 years of operational experience from 2000 to 2017 GC.

1.3 Research question

In line with the statement of the problem, the following research questions are administered.

- What are the significant bank specific factors of bank's liquidity in selected private commercial banks of Ethiopia?
- What are the significant industry factors of bank's liquidity in selected private commercial banks of Ethiopian?
- What are the significant macroeconomic factors of bank's liquidity in selected private commercial banks of Ethiopian?

1.4 Objective of the study

There are different factors that affects bank's liquidity. This study is focused on identifying the three major factors of liquidity bank specific, industry specific and macroeconomic factors on Ethiopian selected private commercial banks.

The General objective of this study is:

- To investigate all the three factors of bank's liquidity in selected private commercial banks of Ethiopian.

The specific objectives are:

- To measure the bank specific factors of bank's liquidity in selected private commercial banks of Ethiopian.
- To measure the industry factors of bank's liquidity in selected private commercial banks of Ethiopian.
- To measure the macro-economic factors of bank's liquidity in selected private commercial banks of Ethiopian.

1.5 Hypotheses of the study

A hypothesis is an expectation of what the researcher beliefs that he/she might find in the data. It provides a directly testable relational statement and facilities extension of knowledge. Hypothesis should always be in declarative sentence form, and should relate either generally or specifically variables to variables. Hypotheses are formulated usually either from a research problem statement, an existing theory or the findings of previous studies. Thus, basing all these, the researcher has formulated the below hypotheses to show the relationship between the dependent and independent variables concerned for this study. Therefore, the following major hypotheses will be tested in the case of Ethiopian private commercial banks.

To addresses bank specific objectives the researcher has formulated the following six hypothesis those are:

H1: Capital adequacy has negative impact on bank's liquidity.
H2: Deposit growth has positive impact on bank's liquidity.
H3: Non-performing loans has negative impact on bank's liquidity.
H4: Profitability has positive impact on bank's liquidity.
H5: Loan growth has negative impact on bank's liquidity.
H6: Size of the Bank has positive impact on bank's liquidity.

To addresses industry specific objectives the researcher has also formulated the following two hypothesis those are:

H7: Reserve requirement has negative on bank's liquidity.
H8: NBE bill purchase has negative impact on bank's liquidity.

To addresses macroeconomic specific objectives the researcher has finally formulated the following four hypothesis those are:

H9: Foreign exchange rate fluctuations have negative impact on bank's liquidity.

H10: Interest Rate Spread has negative impact on bank's liquidity.

H11: Inflation has negative impact on bank's liquidity.

H12: Real GDP growth has positive impact on bank's liquidity.

1.6 Scope of the study

This paper is restricted in identifying the three major factors of bank's liquidity on Ethiopian private commercial banks. Though there are sixteen private and one publicly owned commercial bank in Ethiopia, the study selected only six privately owned commercial banks that have at least eighteen years of experience at the end of June 30, 2017.

1.7 Significance of the study

(Creswell J. W., 2003), suggested that this section elaborates on the importance and implications of a study for researchers, practitioners, and policy makers. According to him, in designing this section, one might include three or four ways in which the study adds to the scholarly research and literature in the field, helps improve practice and why the study will improve policy. Thus, the researcher suggests the potential benefits for potential audiences as below.

The study as a whole will have great contribution to the supervisory authority, policy makers, commercial banks and other researchers to gain knowledge about the impact and relationship between the bank specific, industry and macro-economic factors that affect liquidity of commercial banks.

Moreover, the study would also have a great contribution to the existing knowledge in the areas of factors affecting commercial banks liquidity. Hence, the supervisory authority has required banks to have their own liquidity policy which enforces them to monitor their funding structure and their ability to handle short term liquidity problems, this study will provide them with a better means of assessing the present and future liquidity risk associated. Thus, this study will have great contribution to the Ethiopian commercial banks to assess their liquidity requirement and to produce their liquidity policy and to give due attention on those factors which have significant impact on bank's liquidity.

1.8 Limitation of the Study

This study is designed to examine the factors affecting liquidity of the selected private commercial banks in Ethiopia by using quantitative approach with secondary data due to the time constraint. The study would be better generalized; if one could see these factors with mixed approach both quantitative and qualitative approach by incorporating the primary data as well which can further explains the research finding.

1.9 Organizations of the paper

This research is organized in five chapters. The first chapter discusses to provide the general overview of the study. The second chapter reviewed the related literatures on the major factors of bank's liquidity. The third chapter focuses on the methodology of the study. The fourth chapter provides data analysis and discussion. The final chapter presents conclusion and recommendations and at the end references and appendixes are attached.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction `

This chapter discusses the overview of banking in Ethiopia, theoretical and empirical literature on factor affecting liquidity positions of a bank. It summarizes the information from other researchers that have carried out their research in the same field of the study and it specifies objective, methodology and findings of other researchers. At the end of the chapter, it summarizes theoretical and empirical relationship and the gap to be researched.

2.2 What is liquidity at a bank?

Liquidity can be defined as the ability of a financial institution to meet all legitimate demands for funds (Yeager, 1989). According to (Zewadi, 2013) Liquidity indicates the ability of the bank to meet its financial obligations in a timely and effective manner. There should be adequacy of liquidity sources compared to present and future needs, and availability of assets readily convertible to cash without undue loss. (Rudolf, 2009), emphasizes that, the liquidity expresses the degree to which a bank is capable of fulfilling its respective obligations. And also Liquid assets are those that can be converted to cash quickly if needed to meet financial obligations; examples of liquid assets generally include cash, deposit in central bank or to other banks and government debt.

As per (Douglas, 2014) liquidity at a bank is a measure of its ability to readily find the cash it may need to meet demands upon it. Liquidity can come from direct cash holdings in currency or on account at the Federal Reserve or other central bank. More commonly it comes from holding securities that can be sold quickly with minimal loss. This typically means highly creditworthy securities, including government bills, which have short-term maturities. In the portfolios of commercial banks, liquid assets play a very vital role since the banks operate mainly with the funds borrowed from depositors in either forms of demand and time deposits. In view of the fact that these deposits represent the obligations of the banks to be paid whenever they are requested, the banks should always allocate their funds in such a way that their portfolios should always contain an adequate level of liquid assets. All in all, it can be inferred that liquid assets are viewed as the

essential balance sheet items which have the capacity to maintain the confidence of depositors which is the most valuable intangible asset of the commercial banking business. Banks, deliberately or not, fail to maintain adequate levels of liquid assets in their portfolios are likely to create a fear or a loss of confidence among depositors over the safety of their deposits, and this fear is contagious (Friedman, M and Schwarz, A, 1963), it spreads among the banks through deposits withdrawals or through correspondent relations.

Furthermore, literature suggests that commercial banks are highly leveraged financial institutions and vulnerable to runs of deposits, they should be discouraged from taking excessive risks in their lending and investing activities. Excessive risk takings, in turn, produce substantial increases in holdings of illiquid assets in the banks' portfolios. Inevitably, aggressive behavior of the unhampered banks adversely affects the level of liquid assets. These behavioral changes in the commercial banking sector during the instable periods eventually cause a fear to emerge among depositors over the safety of their money (Mehmet, 1987).

(McKinney and McCracken, 1974), , argued that the problem of bank liquidity is essentially that of being able to raise sufficient amounts of cash quickly and easily at going market rates of interest (Leykun, 2016). They suggested reserves of short-term assets as traditional sources of liquidity which can be run off when credit is needed (asset liquidity) and the ability to purchase funds directly in the money market (liability liquidity). In addition, inflationary demand has caused asset liquidity to fall sharply in recent years as banks have run down their cash assets to make way for less liquid but more profitable business loans liability liquidity - a bank's unused borrowing capacity or its ability to tap the market for additional funds - is more difficult to evaluate. If it is presumed that banks, like other borrowers, tend to wear out their welcome the more they borrow, then higher levels of actual borrowing would tend, ceteris paribus, to reduce liability liquidity.

Why do we care about it? (Douglas, 2014)**,** we care about bank liquidity levels because banks are important to the financial system and they are inherently fragile if they do not have sufficient safety margins. The financial crisis demonstrated in extreme form the harm that an economy can suffer when credit dries up in a crisis. Capital is arguably the most important safety buffer, since it provides the resources to recover from substantial losses of any nature and also gives those dealing with the bank confidence in its safety. However, the adjacent cause of a bank’s fleeting is usually a liquidity problem that makes it impossible to survive a classic “bank run” or, nowadays, a modern

equivalent, such as an inability to access the debt markets for new funding. It is entirely possible for the economic value of a bank's assets to be more than sufficient to cover all of its claims and yet for that bank to go bust because its assets are illiquid and its liabilities have short-term maturities.

Why are banks prone to runs? (Douglas, 2014), banks have always been prone to runs because one of their principle social purposes is to perform maturity transformation, also known as time intermediation.

In other words, they take demand deposits and other short-term funds and lend them back out at longer maturities. Maturity transformation is useful because households and businesses often have a strong preference for a substantial degree of liquidity, yet much of the useful activity in the economy requires assured funding for multiple years.

Therefore, banks can lend out the funds for longer periods with a fair degree of assurance that the deposits will remain available or that equivalent deposits can be obtained from others as needed, perhaps with a modest boost in deposit rates. The problem is that sometimes depositors lose confidence in a bank, or in the banking system, and withdraw their funds in bulk. This is the classic "bank run" that has killed many a bank over the centuries. The only sure way to counter a bank run is to restore confidence, as no bank that engages in a normal level of maturity transformation can survive a bank run unaided.

How can banks achieve adequate liquidity? According to (Douglas, 2014), banks can increase their liquidity in multiple ways, each of which ordinarily has a cost, including: shorten asset maturities, improve the average liquidity of assets, lengthen liability maturities, issue more equity, reduce contingent commitments and obtain liquidity protection shorten asset maturities.

This can help in two fundamental ways. First, if the maturity of some assets is shortened by enough that they mature during the period of a cash crunch, then there is a direct benefit. Second, shorter maturity assets generally are more liquid. Improve the average liquidity of assets. Assets that will mature beyond the time horizon of an actual or potential cash crunch can still be important providers of liquidity, if they can be sold in a timely manner without an excessive loss.

(Saidu and Tumin, 2011), suggested that revising the determinants factors of the liquidity of banks is an essential subject matter which could help in banks' appreciation of the contemporary conditions of the banking industry and the critical factors to be considered in fashioning out plans and policies towards improvement, profitability and growth. Before, liquidity risk was not the main focus of banking regulation. However, the 2007-2009 financial crises showed, how rapidly market condition can change exposing several liquidity risks in institution, many times unrelated to capital level. Until February 2008, though the Basel Committee (1998) had set out regulatory standards for the management of both Credit and market risks in the Basel I Accord and that for operational risk in the Basel II Accord in 2004, regulatory standards for liquidity risk were seldom mentioned.

(Landskroner, 2008) also indicated that there has been extensive academic and regulatory discussion on major banking risks including credit risk, market risk and operational risk while little attention has however been paid to liquidity risk that has also become one of the major risks faced by banks and other financial institution in recent years. Now, there is wide agreement that insufficient liquidity buffers were a roof cause of this crisis and on-going disruption of the world financial system, making the importance of liquidity risk analysis and supervision a key issue for the years to come. The fundamental role of banks in the maturity transformation of short-term deposit into long-term loans makes banks inherently vulnerable to liquidity risk, both of an institution-specific nature and that which affects market as a whole.

Liquidity creation itself is seen as the primary source of economic welfare contribution by banks but also as their primary source of risk (Bryant, 1980); (Diamond and Dybvig, 1983) or (Calomiris, 1991). Therefore, virtually every financial transaction or commitment has implication for a bank’s liquidity.

Globally, the adequacy of liquidity plays very crucial roles in the successful functioning of all business firms. However, the issue of liquidity though important to other business, is most paramount to banking institution and that explains why banks showcase cash and other liquid securities in their balance sheet statement annually. Unlike other conventional firms, bank assets are arranged in terms of the most liquid assets beginning with cash. With respect to finance and financial institution, liquidity may be defined as the bank’s ability to meet maturing obligation without incurring unacceptable losses.

In order to avoid liquidity crisis, management of business and financial institution in particular need to have a well-defined policy and established procedures for measuring, monitoring, and managing liquidity (Longworth, 2010 2008). It is evident that liquidity and liquidity risk is very up-to-date and important topic, therefore banks and more so their regulators are keen to keep a control on liquidity position of banks.

Liquidity in general is vulnerable and could be drained suddenly from a bank. Shortage in liquidity of a bank could spread out to other banks as by way of interbank transactions and create systemic risk. Shock in the financial market could spur spiral liquidity that deplete the liquidity in the market and create a financial crisis. Historically, banking crisis usually emerges from liquidity crisis that form banks default for the majority of their liabilities.

Goodhart (1987) stated that there is no difference between illiquid bank and insolvent bank. Essentially, banks which need liquidity from the lender of the last resort could be suspected in the process of insolvency. Accordingly, banking industry in Ethiopia has its own unique features that distinguish them from other countries financial market. One of the feature is the regulation of the country is not allowed foreign nations or organization to fully or partially acquire share of Ethiopian banks.

The Ethiopia financial sector is largely bank-based as the secondary market is still not established in the country and as such the process of financial intermediation in the country depends heavily on banks. In fact the banking sector in Ethiopia is currently acts as the link that holds the country's economy together. Hence, keeping their optimal liquidity for banks in Ethiopia is very important to meet the demand by their present and potential customers.

This literature review part establishes the framework for the study and clearly identifies the gap in the literature that help to formulate the research hypotheses for the study. The rest part of this chapter is organized as follows:

2.3 Theories of bank liquidity

2.3.1 Bank liquidity creation

According to the theory of financial intermediation, an important role of banks in the economy is to provide liquidity by funding long term, illiquid assets with short term, liquid liabilities. Through

this function of liquidity providers, banks create liquidity as they hold illiquid assets and provide cash and demand deposits to the rest of the economy.

(Diamond and Dybvig, 1983) Emphasize the "preference for liquidity" under uncertainty of economic agents to justify the existence of banks: banks exist because they provide better liquidity insurance than financial markets. However, as banks are liquidity insurers, they face transformation risk and are exposed to the risk of run on deposits. More generally, the higher is liquidity creation to the external public, the higher is the risk for banks to face losses from having to dispose of illiquid assets to meet the liquidity demands of customers.

A natural justification for the existence of deposit-taking institutions, thereby giving also an explanation for the economically important role of banks in providing liquidity, was initially modeled by (Diamond and Dybvig, 1983) They showed that by investing in illiquid loans and financing them with demandable deposits, banks can be described as pools of liquidity in order to provide households with insurance against idiosyncratic consumption shocks. However, this structure is also the source of a potential fragility of banks since in case of an unexpected high number of depositors deciding to withdraw their funds for other reasons than liquidity needs, a bank run will result.

The (Diamond and Dybvig, 1983) models have been subject to a large number of follow-up papers, extending or testing the models. Of particular relevance for this study are the papers by (Calomiris, 1991) and (Diamond and Rajan, 2001), which develop and emphasize the point that demandable debt has interesting incentive implications for disciplining the bank management. The argument goes like this: on their asset side banks have illiquid loans whose market prices would be below their internal/book values in case of a fire sale. Having to sell or to call loans prematurely would involve a loss. The greater part of the activities which banks undertake – and need to undertake – to monitor their loans, which includes their active involvement in the governance of borrowing corporations, are not really observable for outsiders.

However, at least a certain part of a bank's liability are call or sight deposits which are by definition and by law to be paid back on demand and on a first-come first-serve basis. This rule of distribution makes depositors wary that they might be late or stand too far behind in the waiting line in the case a bank encounters problems, and it makes them even aware of what little

information they may have on the monitoring activity of the bank. This situation can lead to a bank run, and the danger of a run is what induces banks to do what their depositors want them to do, namely to be active delegated monitors in the spirit of (Diamond and Dybvig, 1983) Based on this argument (Diamond and Rajan, 2001), raised the question whether or not financial fragility where small shocks lead to can have large effects on assets prices is a desirable state for banks. They argue that the existence of the fragility itself gives banks the right incentives to create liquidity. According to them, any kind of regulation, such as capital standards, impair this liquidity creation and should thus be avoided.

(Kashyap, et. al, 2002), also conducted a related analysis justifying the existence of banks‟ liquidity creation. They argue that because banks carry out lending and deposit taking under the same roof, synergies must exist between these two tasks. These synergies can be found in the way deposits and loan commitments are secured through the holding of liquid assets as collateral against withdrawals. They regard these liquid assets as costly overheads. These overheads can be share by the two separate functions, hence the synergy. A detailed analysis of the link between liquidity shortages and systemic banking crises is given by ((Diamond and Rajan, 2005).
It is argued that the failure of a single bank can shrink the pool of available liquidity to the extent that other banks could be affected by it. A contagion effect is the result. However, as solvency and liquidity effects interact it is hard to determine the root of a crisis. Generally, liquidity risk arises from the fundamental role of banks in the maturity transformation of short-term deposits into long term loans.

According to Joint Forum of the Basel Committee (2006), banks liquidity risk includes two types of risk: funding liquidity risk and market liquidity risk. Funding liquidity risk is the risk that the bank will not be able to meet efficiently both expected and unexpected current and future cash flow and collateral needs without affecting either daily operations or the financial condition of the firm. Market liquidity risk is the risk that a bank cannot easily offset or eliminate a position at the market price because of inadequate market depth or market disruption. There are strong interactions between funding liquidity risk and market liquidity risk, especially in periods of crisis. (Drehmann.M and Nikolaou.K, 2009), pointed to the fact that shock to funding liquidity can lead to asset sales and may lead to decrease of asset prices. Lower market liquidity leads to higher margin which increase funding liquidity risk.

Events in the second half of 2007 and early 2008 highlight the crucial importance of liquidity to the functioning of markets and the banking sector as well as links between funding and market liquidity risk, interrelationships of funding liquidity risk and credit risks, reputation effects on liquidity, and other links among liquidity and other typical banking features. Liquidity risk is not an „isolated risk" like credit or market risks (although credit risk often arise as a liquidity shortage when the scheduled repayments fall due), but a "consequential risk", with its own intrinsic characteristics, that can be triggered or exacerbated by other financial and operating risks within the banking business (Chen, et al, 2005).

2.3.2 Sources of bank's liquidity

Financial institution can mobilizes resources through new deposits, maturing assets, borrowed funds and/or using the discount window (borrowing from the central bank). However, financial institution may encounter liquidity risk. According to (Rochet, 2008), the three sources of liquidity risk are; on the liability side, there is a large uncertainty on the volume of withdrawals of deposits or the rolled-over of inter-bank loans, on the asset side, there is an uncertainty on the volume of new requests for loans that a bank will receive in the future, and off-balance sheet items, like credit lines and other commitments taken by the bank.

Some of the mechanisms to insure liquidity crises are: banks hold buffer of liquid assets on the asset side of the balance sheet such as cash, balances with central banks and other banks, debt securities issued by governments and similar securities or reverse repo trades reduce the probability that liquidity demands threaten the viability of the bank. The second strategy is, banks can rely on the interbank market where they borrow from other banks in case of liquidity demand. The last strategy is that, the central bank typically acts as a Lender of Last Resort/LOLR to provide emergency liquidity assistance to particular illiquid institutions and to provide aggregate liquidity in case of a system-wide shortage (Aspachs et. al. and Tiesset, 2005).

The two most widely used approaches to measure liquidity of banks are by liquidity gap approach (flow perspective) or liquidity ratio approach (stock perspective). The liquidity gap/flow approach treats liquidity reserves as a reservoir which the bank assesses its liquidity risk by comparing the variability in inflows and outflows to determine the amount of reserves that are needed during the period.

The liquidity gap approach adapts the variation between assets and liabilities both current and future period. A positive liquidity gap means for deficit, requiring for liabilities to be increased (Bassis, 2009). The liquidity ratio/stock approach, in contrast, employs various balance sheet ratios to identify liquidity trends. The various ratios label for immediate viable source of funding. This indeed entitles portfolio of assets that can be sold off without any fuss and also adequate amounts of stable liabilities. Various authors like (Moore, 2010) or (Praet and Herzberg, 2008), have also provided similar understandings with liquidity ratios such as liquid assets to total assets, liquid assets to deposits, loans to total assets and loans to deposits. In short, the liquidity ratio carries varies balance sheet ratios to identify liquidity needs. Though both approaches are intuitively appealing, the flow approach is more data intensive and there is no standard technique to forecast inflows and outflows.

As a result, the stock approaches are more popular in practice and the academic literatures, due to the availability of more standardized method (Crosse and Hempel, 1980); (Yeager, 1989). According to (Crosse and Hempel, 1980), the most popular stock ratios are liquid asset to deposit, loan-to-deposit ratio and the liquid asset-to-total asset ratio. When the higher the loan-to-deposit ratio (or the lower liquid asset to deposit ratio and the liquid asset-to-total asset ratio) the less able a bank to meet any additional loan demand (indicate for less liquidity). Both indicators have their shortcomings: the loan-to-deposit ratio does not show the other assets available for conversion into cash to meet demands for withdrawals or loans, while the liquid assets ratio ignores the flow of funds from repayments, increase in liabilities and the demand for bank funds. Nevertheless, according to (Crosse and Hempet, 1980), these ratios likely to move in parallel trend.

Hence, to meet the objectives of this study, the liquidity ratio/stock approach was chosen over the flow/liquidity gap approach. The researcher chooses to employ Liquid asset-to-total assets ratio.

2.4 Factors affecting Liquidity position of commercial banks

Theoretically factors affecting bank liquidity are mainly divided into two categories, such as internal and external variables. The internal (bank-specific factors) are factors that are related to internal efficiencies and managerial decisions. Such factors include bank profitability, bank capital adequacy, bank size, asset quality, growth of loan and the like.

The external or macro determinants are variables that are not related to bank management but reflect the economic and legal environment that affects the operation and liquidity positions of institutions. The macroeconomic factors that can affect bank liquidity include GDP, interest rate margin and inflation rate, reserve requirement among others.

2.4.1 Internal factors of liquidity position of banks

Internal factors of liquidity positions are factors which can be managed and controlled by the bank itself. There are different internal/bank specific factors that affect bank's liquid asset.

Profitability and bank liquidity: Profitability accounts for the impact of better financial soundness on bank risk bearing capacity and on their ability to perform liquidity transformation (Rauch, C, Steffen, S, Hackethal, 2008).

A sound and profitable banking sector is better able to withstand negative shocks and contribute to the stability of the financial system (Athanasoglou et. al, 2005). One of the highest yielding assets of a bank is loans and advances that provide the largest portion of operating revenue. In this respect, banks are faced with liquidity risk since loans and advances are funds from deposit of customers. The higher the volume of loans and advances extended to customers, the higher the interest income and highest profit potentials for banks but it affects liquidity of the bank. Thus, banks need to strike a balance between liquidity and profitability.

The relationship between profitability and liquidity varies among different literatures. According to (Bourke P, 1989), banks holding more liquid assets benefit from a superior perception in funding markets, reducing their financing costs and increasing profitability. On the other hand, the studies made by (Molyneux. P. and Thornton. J., 1992); (Goddard, Molyneux, and Wilson, 2004), argued that holding liquid asset imposes an opportunity cost on the bank and has an inverse relationship with profitability.

Further, (Myers, 1998) emphasized the adverse effect of increased liquidity for financial institutions stating that, "although more liquid assets increase the ability to raise cash on short-notice, they also reduce management's ability to commit credibly to an investment strategy that protects investors" which, finally, can result in reduction of the "firm's capacity to raise external finance" in some cases. Thus, this indicates the negative relationship between bank profitability and liquidity. The trade-offs that generally exist between return and liquidity risk are demonstrated

by observing that a shift from short term securities to long term securities or loans raises a banks‟ return but also increases its liquidity risks. As a result of the two opposing views, the management of banks faced with the dilemma of liquidity and profitability.

Non-performing loans and bank liquidity: Non-performing loans are loans and advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with the contractual repayment term of the loan or advance is in question (NBE, 2008). According to (Ghafoor, 2009), non-Performing loans are loans that a bank customer fails to meet his/her contractual obligations on either principal or interest payments exceeding the scheduled repayment dates. Thus, NPLs are loans that give negative impact to banks in developing the economy. Rise of non-performing loan portfolios significantly contributed to financial distress in the banking sector. The banking systems play the central role of mobilizing and allocating resources in the market by channeling fund from surplus economic units to deficit economic units. This activity of transforming short term deposit to long term loans and advances will generate most profits for banks. However, it involves high risk and eventually if not managed properly will leads to high amount of non-performing loans. The increased on non-performing loan reflects deteriorated asset quality, credit risk and its inefficiency in the allocation of resources. According to (Bloem and Gorter, 2001), though non-performing loans may affect all sectors, the most serious impact is on financial institutions which tend to have large loan portfolios. On the other hand, large volume of non-performing loans portfolio will affect the ability of banks to provide credit and leads to loss of confidence and liquidity problems. Therefore, the amount of non-performing loans has a negative impact on bank's liquidity.

Capital adequacy and bank liquidity: Capital can be defined as common stock plus surplus fund plus undivided profits plus reserves for contingencies and other capital reserves. Besides, a bank's loan loss reserves which serve as a buffer for absorbing losses can be included as bank's capital (Patheja, 1994). The primary reason why banks hold capital is to absorb risk including the risk of liquidity crunches, protection against bank runs, and various other risks. According to (Fakhris, and Moh‟d, KA.L , 2013), bank's capital plays a very important role in maintaining safety and solidarity of banks and the security of banking systems in general as it represents the buffer gate that prevents any unexpected loss that banks might face, which might reach depositors funds given that banks operate in a highly uncertain environment that might lead to their exposure to various

risks and losses that might result from risks facing banks. The recent theories suggest that, bank capital may also affect banks‟ ability to create liquidity. These theories produce opposing predictions on the relationship between capital and liquidity creation. Under the first view, the "financial fragility-crowding out" theories predicts that, higher capital reduces liquidity creation and lower capital tends to favors liquidity creation (Diamond and Rajan, 2001). They stated that, depositors will be charged a nominal fee for the intermediary service of loaning out their respective deposits. However, this fee differs according to the borrowers‟ capability of repayment. For those with higher risk borrowing but are reluctant to incur higher cost, will provoke depositors to withdraw their funds. Furthermore, (Goddard, Molyneux, and Wilson, 2004) show that a higher capital ratio may reduce liquidity creation through another effect: "the crowding out of deposits". They consider that deposits are more effective liquidity hedges for agents than investments in bank equity.

Deposit growth and bank liquidity (Moussa, 2015) found an insignificant effect of deposits on bank liquidity. (Bonner and Zymek, 2013), and (Kashyap, et. al, 2002) argued that as demand deposits increase, liquidity asset holdings also increase. Alger and Alger (1999) provided empirical insights into liquid assets held by Mexican banks. This study summarized 10 predictions based on various theories and applied panel data estimates from January 1997 to March 1999. They assumed that at a given level of deposits, if there is more risk for borrowers as in the case of economic recession, liquid assets should also be increased by banks. (Pilbeam, K, 2005), studied emerging economies for the period of 1994 to 2004 and found that as the deposit rate increases bank liquidity decreases.

Loan growth and bank liquidity. The loans and advances portfolio is the largest asset and the predominate source of revenue of banks. According to (Diamond and Rajan, 2005), lending is the principal business activity for banks. Since loans are illiquid assets, increase in the amount of loans means increase in illiquid assets in the asset portfolio of a bank. The amount of liquidity held by banks is heavily influenced by loan demand and it is the base for loan growth (Pilbeam, K, 2005). If demand for loans is weak, then the bank tends to hold more liquid assets whereas, if demand for loans is high they tend to hold less liquid assets since long term loans are generally more profitable. Therefore, loan growth has negative relationship with bank liquidity.

Bank size and bank liquidity: The size of the bank also plays a role on how the banks will not only perform but also in attaining dominance in the banking industry (Ahmend and Ahmed, 2010). Large banks may exploit economies of scale and this enables them acquire more client and undertaking in more transactions which translate to more returns. Additionally, the large banks tend to be more trusted by the customers and this implies more clients will opt to invest in them as opposed to the smaller ones. Also, in case risk occurs, the larger banks are in a position to mitigate it and be affected minimally whereas the smaller banks will be highly prone to dissolution and insolvency. This has seen most small banks to endeavor to expand their business and market values. Therefore asset size a positive impact on the liquidity of commercial banks.

2.4.2 External factors that affects liquidity position of banks

Those factors are external factors which cannot be managed and controlled by the banks itself. Those factors are Industry factors and Macro-economic factors.

2.4.2.1 Industry Factors

Reserve requirement: These costs in our case will be calculated as the proportion of required reserves put in the national bank to total assets. A positive correlation with the dependent variable is expected, because a higher level of reserves (remunerated in lower interest rates) will affect the banks behavior to setting higher loan rates for compensating the missing profit of investing these funds.

Few studies have observed the influence of funding cost and funding sources on bank liquidity (Bunda and Desquilbet, 2008). (Alger and Alger, 1999), and Munteanu (2012) further explained that if refinancing cost increased, banks tended to invest more in liquid assets. This means that if liability cost increases, then banks, instead of relying on interbank market, tend to rely more on liquid assets that act as a source of liquidity.

NBE Treasury bill purchase: Apparently, national bank bills can seriously affect a bank's liquidity. Government regulation which forced private banks exclusively to make investment on bonds that amounts 27 percent of the total loans provided by the banks to customers is currently affecting the Ethiopian private banks liquidity since huge amount of loan able funds tied up in this

bond (NBE Bills). Study presents a negative impact of national bank bill on bank liquidity. NBE Bill purchase is peroxide by natural logarithm of total NBE bill Purchase.

2.4.2.2 Macro-economic factors

The external or macro factors are variables that are not related to bank management but reflect the economic and legal environment that affects the operation and liquidity positions of institutions. The macroeconomic factors that can affect bank's liquidity include factors such as GDP growth rate; inflation rate and short term interest rate among others.

GDP growth and bank liquidity: Gross Domestic Product (GDP) is one of the macroeconomic factors that affect liquidity of banks. A major recession or crises in business operations reduces borrowers‟ capability to service obligations which increases banks‟ NPLs and eventually banks insolvency (Gavin and Hausmann, 1998). During economic boom, the demand for differentiated financial products is higher and may improve bank's ability to expand its loans and securities at higher rate and thus reduce liquidity. The other study made by (Painceira 2010) stated that, banks liquidity fondness is low in the course of economic boom where banks confidentiality expects to profit by expanding loanable fund to sustain economic boom while restricted loanable fund during economic downturn to prioritize liquidity.

In line with this argument the loanable fund theory of interest states that, the supply for loan increases when the economy is at boom or going out of recession (Pilbeam, K, 2005). (Aspachs et. al. and Tiesset, 2005), has also inferred that, banks prioritize liquidity when the economy plummets, during risk lending opportunities, while neglecting liquidity during economic boom when lending opportunities may be favorable. On the other hand, the studies made by Bordo et al. (2001) suggested that during recession, it is likely for an increase in the number of loan default. This causes depositors to perceive high solvency risk and immediately tend to withdraw deposits held at financial institutions.

Inflation and bank liquidity: Inflation reflects a situation where the demand for goods and services exceeds their supply in the economy. Existing monetary theories agree that, inflation increases the opportunity cost of holding liquidity and thus distorts the allocation of resources which require liquidity in transaction. There theories which emphasize the importance of informational asymmetries in credit markets and demonstrate how increases in the rate of inflation

adversely affect credit market frictions with negative repercussions for financial sector performance and therefore long-run real activity (Huybens, E and Smith, 1998, 1999).

The feature of these theories is that, there is an informational friction whose severity is endogenous. Given this feature, an increase in the rate of inflation drives down the real rate of return not just on money, but on assets in general. According to (Huybens, E and Smith, 1998, 1999), the implied reduction in real returns worse the credit market frictions which leads to the rationing of credit, hence credit rationing becomes more severe as inflation rises.

As a result, the financial sector makes fewer loans, resource allocation is less efficient, and intermediary activity diminishes with adverse implications for capital/long term investment. Further, the amount of liquid assets held banks will rise with the rise in inflation. High inflation rate and sudden changes of inflation have a negative impact on real interest rates and bank's capital. In this respect, the bank's non-performing loans will expand, collateral security values deteriorate and value of loan repayments on banks loans declines. This way, it has been found that inflation rate significantly determines bank liquidity (Heffernan; 2005).

Exchange rates fluctuation and bank liquidity: The value of a local currency against a unit of the foreign currency is termed as the exchange rate. The exchange rate is not fixed asset tends to vary based on the particular currencies and also the particular time or period. Certain currencies will have a higher value than others, but when the value decreases it is termed as to depreciate. There are many factors that result in changes in the exchange rates and this includes mainly the balance between demand and supply in the foreign market. These changes occur spontaneously and always seem almost difficult to predict. The changes result in the organizations performance and liquidity as well. This is however limited largely to those organization undertaking mainly in international transactions or currencies as the locally based ones will be impacted minimally (Nyandema and Langat, 2016). As such high exchange rates will make most foreign investors shun from making any transactions at that particular time. The banks will be affected in the similar way as depreciation in the local currency will mean reduced transactions such as savings and borrowing resulting in reduced returns and it has negatively affect liquidity of commercial banks.

Interest rate spread and bank liquidity: The interest rates comprise the amount charged by the banks during lending. This varies with the type of bank and the amount being borrowed (Manyo

et al, 2016). High interest rates tend to discourage people from borrowing and opting to invest more while low interest rates tend to encourage more loans being acquired. This may be exploited by the regulatory bodies when they want to either increase or decrease cash inflow by the banks. In a similar way, the interest rates may also determine the currency values. The interest rates are directly proportional to the demand in that increase in demand will tend to increase the value of the currency which implies that liquidity of commercial bank depends on the spread of interest rate.

2.5 Review of Related Empirical Studies

This section gives a brief review of the previous studies made on the determinants/factors of bank's liquidity from both developed and developing nations. Moreover, most of the studies undertaken on bank liquidity consider both bank specific and macroeconomic factors to examine the determinants of liquidity of banks. So, the studies conducted in related to bank's liquidity are reviewed as follows.

2.5.1 Empirical literature on factors of liquidity

Empirical findings suggested many of bank-specific and macroeconomic determinants of liquidity of commercial banks in the world (Valla and Saes, 2006); (Bunda, I. and J. B. Desquilbet,, 2008); (Lucchetta, 2007); (Fielding and Short land, 2005); (Rauch, C, Steffen, S, Hackethal, 2008). (Valla and Saes, 2006), examine both bank specific and macroeconomic determinants of English banks and found that the liquidity ratio as a measure of the liquidity is influenced by probability of obtaining the support from lender of last resort, interest margin, and bank profitability, size of the bank, GDP growth, and short term interest rate.

A study by (Bunda, I. and J. B. Desquilbet,, 2008) examined the determinants of liquidity risk of banks from emerging economies with panel data regression analysis and find that the liquidity ratio as a measure of bank's liquidity assumed to be dependent on individual behavior of banks, their market and macroeconomic environment and the exchange rate regime. Bank size, the realization of a financial crisis and the lending interest rate as a measure of lending profitability affects liquidity ratio. i.e. on following factors: total assets as a measure of the size of the bank, the lending interest rate as a measure of lending profitability, and the realization of a financial crisis, which could be caused by poor bank liquidity expected to have negative impact on banks

liquidity whereas, the ratio of equity to assets as a measure of capital adequacy, the presence of prudential regulation, which means the obligation for banks to be liquid enough, the share of public expenditures on gross domestic product as a measure of supply of relatively liquid assets, the rate of inflation, which increases the vulnerability of banks to nominal values of loans provided to customers, and the exchange rate regime, where banks in countries with extreme regimes (the independently floating exchange rate regime and hard pegs) were more liquid than in countries with intermediate regimes are expected to have positive impact on banks liquidity.

The result of the study by (Bunda, I. and J. B. Desquilbet,, 2008), showed there is positive and statistically significant effect of capital adequacy, lending interest rate, public expenditure to GDP, and growth on liquidity of banks under five liquidity measures. On the other hand, the presence of prudential regulation and financial crises showed negative and significant impact on bank liquidity position. It also reviled that in hard pegs and in pure floats, commercial banks are more liquid than in intermediary regimes (bank liquidity smile). However, the effect of bank size is insignificant.

(Lucchetta, 2007), test empirically the hypothesis that interest rates affect banks' risk taking and the decision to hold liquidity across European countries. This author suggest that the liquidity measured by different liquidity ratios is positively and significantly influenced by behavior of the bank on the interbank market – the more liquid the bank is the more it lends in the interbank market, interbank rate as a measure of incentives of banks to hold liquidity and bank size measured by logarithm of total bank assets, and negatively related to monetary policy interest rate as a measure of banks' ability to provide loans to customers, share of loans on total assets and share of loan loss provisions on net interest revenues, both as a measure of risk-taking behavior of the bank, where liquid banks should reduce the risk-taking .

Besides, (Rauch, C, Steffen, S, Hackethal, 2008), examined the effects of the financial crisis on the liquidity of commercial banks in Latin America and Caribbean countries and suggested that Liquidity is negatively affected by cash requirements of customers, captured by fluctuations in the cash-to deposit ratio and money market interest rate as a measure of opportunity costs of holding liquidity, and is positively affected by current macroeconomic situation, where a cyclical downturn should lower banks' expected transactions demand for money and therefore lead to decreased liquidity. Fielding and Short land, 2005), investigated the liquidity position created by Germany's state-owned savings banks and its determinants. The result of this study suggested that monetary

policy interest rate, where tightening monetary policy reduces bank liquidity, level of unemployment, which is connected with demand for loans, size of the bank measured by total number of bank customers and bank profitability affect liquidity ratio significantly and negatively, Whereas, savings quota and level of liquidity are found to have a positive and significant effect on liquidity position of the bank under consideration.

In addition to the above, (Vodova, 2011) aimed to identify important factors affecting commercial banks liquidity of Czech Republic. In order to meet its objective the researcher considered bank specific and macroeconomic data over the period from 2001 to 2009 and analyzed them with panel data regression analysis by using EViews7 software package. The study considered four firm specific and eight macroeconomic independent variables which affect banks liquidity. The expected impact of the independent variables on bank liquidity were: capital adequacy, inflation rate and interest rate on interbank transaction/money market interest rate were positive and for the share of non-performing loans on total volume of loans, bank profitability, GDP growth, interest rate on loans, interest rate margin, monetary policy interest rate/repo rate, unemployment rate and dummy variable of financial crisis for the year 2009 were negative whereas, the expected sign for bank size was ambiguous (+/-). The dependent variable (i.e. liquidity of commercial banks) was measured by using four liquidity ratios such as liquid asset to total assets, liquid assets to total deposits and borrowings, loan to total assets and loan to deposits and short term financing.

The study revealed that bank liquidity was positively related to capital adequacy, interest rates on loans, share of non-performing loans and interest rate on interbank transaction. In contrast, financial crisis, higher inflation rate and growth rate of gross domestic product have negative impact on bank liquidity. The relation between the size of the bank and its liquidity was ambiguous as it was expected. The study also found that unemployment, interest margin, bank profitability and monetary policy interest rate/repo rate have no statistically significant effect on the liquidity of Czech commercial banks.

An empirical study made by (Fadare 2011), on the banking sector liquidity and financial crisis in Nigeria with the aim of identifying the key determinants of banking liquidity in Nigeria, and assessing the relationship between determinants of banking liquidity and financial frictions within the economy. It was employed a linear least square model and time series data from 1980 to 2009.

The study found that only liquidity ratio, monetary policy rate and lagged loan-to deposit ratio were significant for predicting banking sector liquidity. Secondly, it showed that a decrease in monetary policy rate, liquidity ratios, volatility of output in relation to trend output, and the demand for cash, leads to an increase in current loan-to-deposit ratios; while a decrease in currency in circulation in proportion to banking sector deposits; and lagged loan-to-deposit ratios leads to a decline in current loan-to-deposit ratios. Generally, the result suggested that during periods of economic or financial crises, deposit money banks were significantly illiquid relative to benchmarks, and getting liquidity monetary policies right during these periods is crucial in ensuring the survival of the banking sector.

(Moore, 2010), investigated the effects of the financial crisis on the liquidity of commercial banks in Latin America and Caribbean countries. The study had three main goals: discussing the behavior of commercial bank liquidity during crises in Latin America and the Caribbean; identifying the key determinants of liquidity, and; to provide an assessment of whether commercial bank liquidity during crises is higher or lower than what is consistent with economic fundamentals. Liquidity which was measured by loan-to-deposit ratio should depend on: cash requirements of customers, captured by fluctuations in the cash-to-deposit ratio expected to have negative impact, the macroeconomic situation, where a cyclical downturn should lower banks' expected transactions demand for money and therefore lead to decreased liquidity expected to have positive impact on liquidity, and money market/short term interest rate as a measure of opportunity costs of holding liquidity expected to have negative effect on liquidity.

Liquidity created by Germany's state-owned savings banks and its determinants has been analyzed by (Rauch, C, Steffen, S, Hackethal, 2008). The study had twofold goals: first, it attempted to measure the liquidity creation of all 457 state owned savings banks in Germany over the period 1997 to 2006.

In a second step, it analyzed the influence of monetary policy on bank liquidity creation. The study measure the created liquidity using the calculation method set forth by (Berger and Bouwman 2007 and Deep and Schaefer 2004). To measure the monetary policy influence, the study developed a dynamic panel regression model. According to this study, following factors can determine bank liquidity: monetary policy interest rate, where tightening monetary policy expected to reduces bank liquidity, level of unemployment, which is connected with demand for loans having negative

impact on liquidity, savings quota affect banks liquidity positively, level of liquidity in previous period has positive impact, size of the bank measured by total number of bank customers have negative impact, and bank profitability expected to reduce banks liquidity.

To perform the tests of measuring liquidity and analyzing influential factors on bank liquidity the researcher used bank balance sheet data and general macroeconomic data. The control variable for the general macroeconomic influence shows that there is a positive relationship between the general health of the economy and the bank liquidity creation. The healthier the economy is the more liquidity is created. It was also found that banks with a higher ratio of interest to provision income create more liquidity. Other bank-related variables, such as size or performance revealed no statistically significant influence on the creation of liquidity by the banks. Meanwhile, the risk-free interest rate is positively correlated with loans investment and bank risk-taking behavior. Bank-specific and macroeconomic determinants of liquidity of English banks were studied by (Aspachs et. al. and Tiesset, 2005). The researchers used unconsolidated balance sheet and profit and loss data, for a panel of 57 UK-resident banks, on a quarterly basis, over the period 1985 to 2003.

They assumed that the liquidity ratio as a measure of the liquidity should be dependent on following factors: Probability of obtaining the support from LOLR (Lender of last resort), which should lower the incentive for holding liquid assets, interest margin as a measure of opportunity costs of holding liquid assets expected to have negative impact, bank profitability, which is according to finance theory negatively correlated with liquidity, loan growth, where higher loan growth signals increase in illiquid assets, size of the bank expected to have positive or negative impact, gross domestic product growth as an indicator of business cycle negatively correlated with bank liquidity, and short term interest rate, which should capture the monetary policy effect with expected negative impact on liquidity.

2.5.2 Related Ethiopian Empirical Studies on Liquidity

As to the knowledge of the researcher, there appear to be few researches that make an effort to assess or provide an indication on the determinants of the banks' liquidity which was mainly based on bank specific and macro-economic factors in the existing private and publicly owned banks. From those researches the first study, conducted by (Tseganesh, 2012) were concentrated on two

major parts; identifying the determinants of commercial banks liquidity in Ethiopia basically the banks specific and Macro-economic and then tried to show the impact of banks liquidity up on financial performance through the significant variables explaining liquidity. The data was analyzed by using balanced fixed effect panel regression model for eight commercial banks in the sample covered the period from 2000 to 2011 and the result of her study indicated that capital adequacy, bank size, share of non-performing loans in the total volume of loans, interest rate margin, inflation rate and short term interest rate had positive and statistically significant impact on banks liquidity. Whereas, Real GDP growth rate and loan growth had statistically insignificant impact on banks liquidity. And (Mekibeb, 2016), studied again both the two factors, bank specific and Macro-economic factors which he had used three equation to calculate the liquidity ratio and the results were as follows among the bank specific factors banks size, loan growth, nonperforming and profitability have a significant impact on banks liquidity and among the Macro economic variables only inflation had statically significant impact on liquidity.

The last but not the least is (Nigist Melese, Laximikantham, 2015), analyzed the bank specific factors that affect liquidity of Ethiopian commercial banks from the period 2007-2013 for the sampled commercial banks in Ethiopia. The result of the study revealed that, capital adequacy and profitability have statistically significant impacts on liquidity of Ethiopian commercial banks while bank size has positive and statistically significant impact on liquidity. Nonperforming loan and loan growth were found to be statistically insignificant/ has no any impact on liquidity of Ethiopian commercial banks for the tested period.

2.6 Summary and knowledge Gap

In line with the above theoretical as well as empirical reviews, liquidity is important to all business specially for banking industry since their function is creation of both on the asset and liability side of their balance sheet. Virtually every financial transaction or commitment has implications for a bank's liquidity. Effective liquidity risk management helps to ensure a bank's ability to meet cash flow obligations, which are uncertain as they are affected by external events and other agents' behavior.

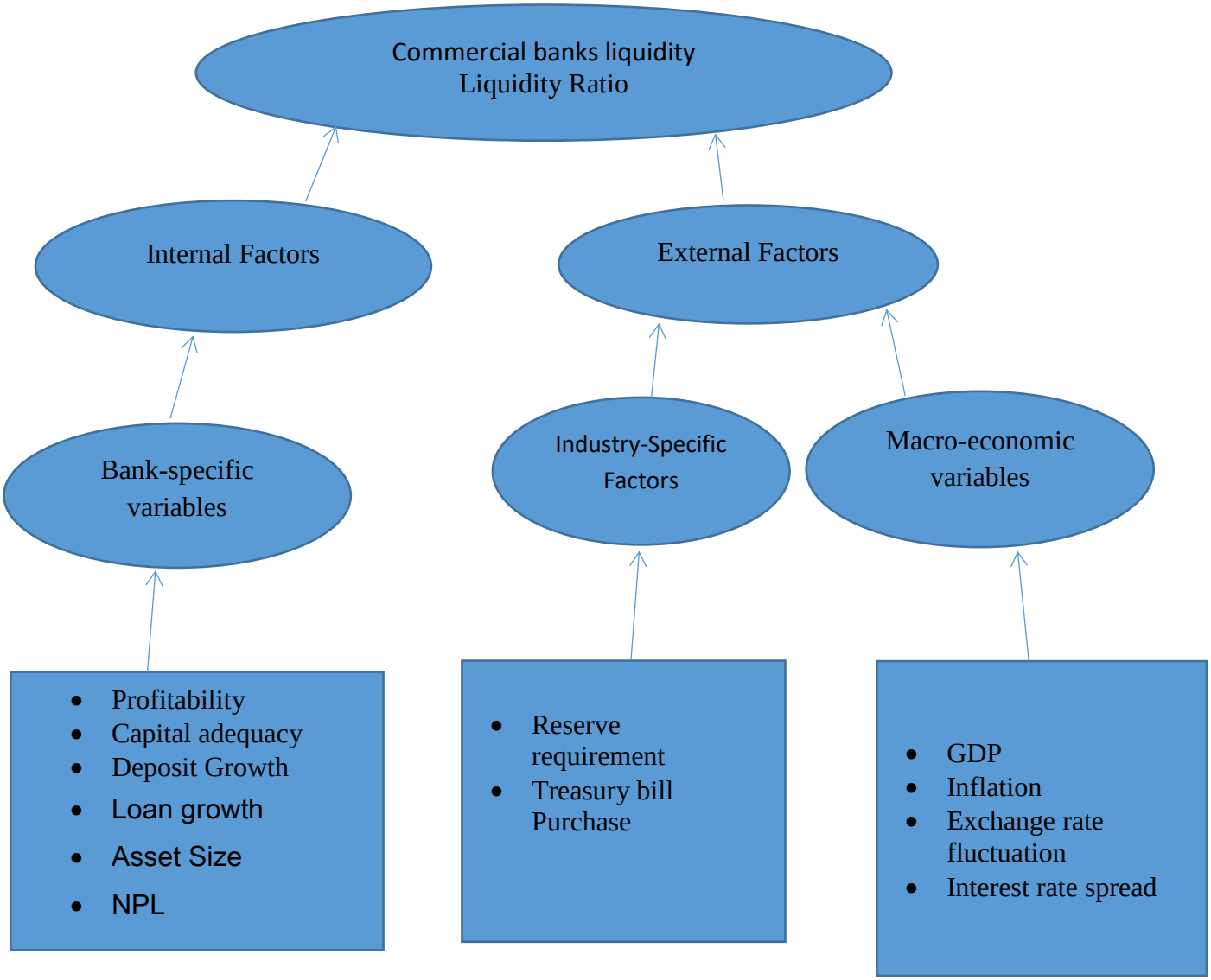
As it was discussed in the literature review part, liquidity of banks can be affected by bank specific, macroeconomic factors as well as Industry factors. It was also discussed that some factors which

have significant impact on liquidity of banks in one country may not have the same impact on another country. Thus it is important to identify the factors of liquidity of selected Ethiopian commercial banks.

In addition, as we see from the empirical studies all the researchers were focused on bank specific and macro-economic factors of liquidity. Therefore, the industry specific factors were not considered like the impact of the National Bank of Ethiopia directives has ignored but it has direct influence on bank's liquidity position such as reserve requirement and treasury bill purchase and also this research incorporates one new bank specific factor other than the study made by others which is deposit growth. Again in addition to the listed variables, this research has also accommodate new variable in macro-economic perspectives those are Interest Rate Spread **(**Lending Rates – Deposit rates**)** and Exchange Rates Fluctuation (USD/Birr Exchange Rate) which has significant impact on liquidity of commercial banks.

2.7 Conceptual Framework

On the basis of the hypotheses that developed from the literature part and the regression model of the study, the following conceptual frame work was developed:



Source: Summary of the conceptual frame work

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research approach

Research approach is a plan and procedure that consists of the steps of broad assumptions to detailed method of data collection, analysis and interpretation. This study is used a quantitative research approach to see the relationship between the liquidity positions of selected private commercial banks and the bank specific, industry and macro-economic factors that affects bank's liquidity by establishing causal relationship. This study also adopted an explanatory approach by using balanced panel research design to meet the research objective. As explained by (Bhattacherjee, 2012), explanatory research attempts to identify causal factors and outcomes of the target phenomenon.

According to (Brooks, 2008), a panel of data has embody information across both time and space and it measures some quantity about them over time. Hence, the advantage of using panel data model has the ability to acknowledge both time and cross-sectional variations and also it gives more informative data as it consists of both the cross sectional information, which captures individual variability, and the time series information, which captures dynamic adjustment, (Brooks, 2008).

3.2 Research Design

Research design is defined as a framework of methods and techniques chosen by a researcher to combine various components of research in a reasonably logical manner so that the research problem is efficiently handled. It provides insights about "how" to conduct research using a particular methodology. The research methodology begins by presenting the overall research design, as the research design provides an important framework and guidelines on how to collect and analyze data so, the choice of appropriate research design has helped the researcher to answer the research questions and to satisfy the research objectives. Therefore, it is a paramount to properly define and evaluate the research design before conducting the research. According to (Creswell, 2009), there are three basic research approaches; these are quantitative, qualitative and mixed research approaches. The quantitative research approach relies on the measurement and

analysis of statistical data to produce quantifiable conclusions. Quantitative research is a means for testing objective theories by examining the relationship among variables (Creswell, 2009).

3.3 Source and Method of Data Collection

In order to carry out any research activity information should be gathered from reliable sources. Consistent and reliable research indicates that research conducted by using appropriate data collection instruments increase the credibility and value of research findings (Koul, L , 2003). The sources of data for this research are secondary sources. Bank specific data were collected from audited financial statements which is from Balance Sheet and Profit and Loss Statement of each selected commercial banks included in the sample and industry and macro-economic data is collected from NBE Annual Report 2016/2017. The data is collected from 2000 to 2017 on annual base and the figures for the variables were on June 30th of each year under study.

3.4 Study Population and Sampling Frame

In this study the population (N) includes all private commercial banks in Ethiopia. According to NBE report, at the end of June 30, 2017 there are sixteen privately owned commercial banks and one publicly owned commercial bank. The sampling frame for drawing the sample includes those privately owned commercial banks having at least eighteen years of experience as of June 30, 2017. As a result, eighteen years of data from 2000 to 2017 GC has been taken. The rationale for using eighteen years of data was to increase the number of observation and to give more accurate conclusions.

3.5 Sampling Technique and Sample Size

Sampling provides a valid alternative when it is impractical to survey the entire population and when there is budget and time constraint to surveying the entire population (Saunders et al, 2009). And there are two types of sampling techniques; probability or representative sampling and non-probability or judgmental sampling. In the probability sampling, the chance or probability, of each case being selected from the population is known and is usually equal for all cases (Saunders et al, 2009). `

According to (Bhattacherjee .A., 2012), non-probability sampling is sampling technique in which some units of the population have zero chance of selection or where the probability of selection

cannot be accurately determined rather samples are selected based on certain non-random criteria, such as quota or convenience. The sampling technique used in this research is a non-probabilistic sampling and among the non-probabilistic sampling methods, this research uses judgmental/purposive sampling. As stated by (Saunders et al, 2009), purposive sampling is often used when working with small samples and when we wish to select cases that are particularly informative. Thus the researcher used purposive sampling by considering the availability of full data for the selected time period.

Currently in Ethiopia, there are seventeen commercial banks of which one of them are publicly owned and sixteen of them are privately owned. Among the sixteen private commercial banks, six of them have more than eighteen years of operational experience and have data. These banks are; Awash International Bank (AIB), Dashen Bank (DB), Bank of Abyssinia (BOA), Wegagen Bank (WB), NIB International Bank (NIB) and United Bank (UB). In order to have balanced panel data for eighteen years, those private commercial banks which have less than eighteen years of operation are not selected for this study. Therefore, six private commercial banks were selected and it was possible to draw a relationship among variables using 108 observations (6 banks x 18 year's data).

3.6 Methods of data analysis technique

To meet the objective of the study, the paper was based on panel data, which was collected through structured document review. Thus, the collected panel data was analyzed using descriptive statistics and multiple regression analysis to see the effect (relationship) of explanatory or independent variables on the dependent variable.

The descriptive statistics of both dependent and independent variables were calculated over the sampled periods. This helps to convert the raw data in to a more meaning full form which enables the researcher to understand the ideas clearly. And then interpret with statistical description including standard deviation, mean, and minimum and maximum. Then, correlation analyses between dependent and independent variables were made and finally a linear regression was used to determine the relative importance of each independent variable in influencing liquidity of Ethiopian private commercial banks. To conduct this, the researcher uses statistical tools E-views9

software. The researcher has also performed diagnostic tests to ensure whether the assumptions of the classical linear regression model (CLRM) are violated or not.

3.7 Variable Definition

This study is focused to measure factors of bank's liquidity in selected Ethiopian private commercial banks. As it was discussed in the literature review part, some factors which have positive relation with liquidity in one country may have negative relation with other country and some factors which have significant impact on liquidity in one country may not have significant impact on liquidity in another country. Though various bank specific and macroeconomic variables were conducted in the previous studies made worldwide, in this study some new variables are included in bank specific, industry specific and macroeconomics factors.

The study also considered which factors could influence the liquidity of banks in the Ethiopia private commercial banks context. Therefore, the following variables were selected based on Ethiopian context and previous relevant studies. The description and operational definition of selected variables is discussed here under.

3.7.1. Dependent Variables

Liquidity of Banks: liquidity of a bank is peroxide by the ratio of total liquid assets to total assets as it is the most popular indicator for bank liquidity (Vodova, 2012), defines liquidity as "the ability of bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses". Liquidity can also be defined as a measure of the relative amount of asset in cash or which can be quickly converted into cash without any loss in value available to meet short term liabilities. As it was discussed in the literature, there are two methods of measuring liquidity of banks which are liquidity ratios (stock approach) and liquidity gap (flow approach). The liquidity gap is the difference between assets and liabilities whereas liquidity ratios are various balance sheet items ratios which identify liquidity trends.

The liquidity measure provides suggestions about the level of liquidity on which the commercial banks are operating. The first approach, liquidity ratio, uses different balance sheet ratios and it is easy to compute whereas, the second approach, funding gap, is the difference between inflows and outflows which is difficult to measure because it is more data intensive and there is no standard technique to forecast inflows and outflows. Most academic literatures prefer liquidity ratio due to

a more standardized method and therefore, this study is intended to use liquidity ratios, to measure liquidity of commercial banks, due to the availability of data. This ratio is used in different researchers like (Anamika Singhn , Anil Kumar Sharma, 2015, 2016), (Mekibeb, 2016) and (Vodova, 2011).

$$\text{Liquidity} = \frac{\text{Total Liquid asset}}{\text{Total Asset}}$$

According to NBE establishment proclamation (No. 591) liquidity asset of banks includes cash on hand, deposit in other bank, and short term government securities that are acceptable by NBE as collateral (for instance Treasury bill).

3.7.2 Independent Variables

This section describes the independent variables that are used in the econometric model to estimate the dependent variable i.e. liquidity of commercial banks.

3.7.2.1 Bank Specific independent variables

A. Size of the Bank (SB): Size of the bank is measured by Natural log of total assets of private commercial banks. (Bonner and Zymek, 2013), and (Delechat .C, Henao.C, Mathoora .P and Vtyurina .S., 2012), stated that bank size negatively affects liquidity, yet its impact is significant. Large sized banks are able to arrange funds from external sources whereas small banks need to maintain sufficient liquidity. It means that with an increase in bank size, liquid buffer of banks decreases. Large banks may exploit economies of scale and this enables them acquire more client and undertaking in more transactions which translate to more returns which leads more liquid.

B. **Capital Adequacy of Banks (CAR):** Capital is the amount of own fund available to support the bank's business and act as a buffer in case of adverse situation (Athanasoglou et. al, 2005). Capital of a bank includes paid up capital, undistributed profit (retained earnings), legal reserve or other reserves and surplus fund which are kept aside for contingencies. The proxy for capital adequacy is the ratio of total capital and reserve of the bank to total asset of the bank.

C. Deposit Growth (DG): Deposits are the major source of funds for banks. However, banks are required to maintain adequate liquidity to meet customer demand (Bonner and Zymek, 2013).

And (Kashyap, et. al, 2002), stated that as demand deposits increase, liquidity asset holdings also increase. The proxy for deposit growth is annual growth rate of deposit.

D. **Loan Growth of the Bank (LG):** According to NBE directive No. SBB/43/2008, loans and advances means any financial asset of a bank arising from a direct or indirect advances fund by a bank to a person that is conditioned on the obligation of the person to repay the fund on a specified date or on demand with interest. For this study loan growth is measured by the annual growth rate of outstanding gross loans and advances of the bank.

E. **Non-performing Loans (NPL):** This variable is calculated by provision for Non-performing loans to total loans and advance ratio (NPL)**.** Non-performing loans means loans and advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with the contractual repayment term of the loan or advance is in question (NBE directive No SBB/43/2008). For the purpose of this study, the proxy for non-performing loans is the share of non-performing loans on total volume of loans and advances. (Provision for Non-performing loan and advances / Total loan and advances)

F. **Profitability of the Bank (ROA):** Liquidity needs constrain a bank from investing its entire available fund. Banks need to be both profitable and liquid which are inherently conflicts between the two and the need to balance them. As more liquid asset is investing on earning assets such as loans and advances, profitability will increase by the expense of liquidity. As a result, banks should always strike a balance between liquidity and profitability to satisfy shareholders‟ wealth aspirations as well as liquidity requirements. For the purpose of this study, the proxy of profitability is return on asset that measures the overall financial performance of banks and the return on asset (ROA) is measured by the ratio of net profit after tax to Average total asset. (Net income after tax/Average total asset)

3.7.2.2 Industry Specific Independent variables

A. **Reserve requirement:** These costs in this case will be calculated as the proportion of required reserves put in the national bank to total assets. A negative correlation with the dependent variable is expected, because a higher level of reserves will affect a decrease in banks liquidity. (Total RR at NBE / Total Asset)

B. **NBE Treasury bill purchase:** Apparently, national bank bills can seriously affect a bank's liquidity. Government regulation which forced private banks exclusively to make investment on bonds that amounts 27 percent of the total loans provided by the banks to customers is currently affecting the Ethiopian private banks liquidity since huge amount of loan able funds tied up in this bond (NBE Bills). Study presents a negative impact of national bank bill on bank liquidity. NBE Bill purchase is peroxide by natural logarithm of total NBE bill Purchase. Log (NBE Bill Purchase).

3.7.2.3 Macro-Economic Independent variables

A. Foreign exchange Rate fluctuations: Foreign exchange Rate fluctuations (Ethiopia Birr changes against the United States Dollar). There are many factors that result in changes in the exchange rates and this includes mainly the balance between demand and supply in the foreign market which affects liquidity of Ethiopian private commercial banks.

B. Interest rate spread: Interest Rate Spread measured by deference of lending and deposit interest rate. The interest rates comprise the amount charged by the banks during lending. This varies with the type of bank and the amount being borrowed (Manyo et al, 2016). High interest rates tend to discourage people from borrowing and opting to invest more while low interest rates tend to encourage more loans being acquired.

C. Inflation: Another important macroeconomic variable which may affect liquidity of banks is the inflation rate. Inflation (INFLA) is the rate at which the general price level of goods and services rises and, as a result, purchasing power of currency falls. (Vodova, 2011), (Moussa, 2015) and (Bhati et al. 2015) advocated that banks maintain high liquidity as inflation rates fall and vice versa because this helps maintain economy stability and flow of liquidity in the system. And during inflation, the central bank can raise the cost of borrowing and reduce the credit creating capacity of commercial banks. For the purpose of this study, inflation is measured by the annual general consumer price index and a negative relationship between inflation rate and banks liquidity is expected.

D. Gross Domestic Product Growth (GDP): GDP is an indicator of the economic health of a country as well as the gauge of a country's standard of living. It is the measurement of level of

economic activity of a country. GDP is measured by the annual real growth rate of gross domestic product and it is hypothesized to affect banking liquidity negatively.

3.8 Model Specification

As it was discussed in the research design section of this study, the nature of data used is a balanced panel data which was deemed to have advantages over simple cross sectional and time series data. Panel data involves the pooling of observations on the cross sectional over several time periods (Brooks, 2008). The panel data or longitudinal data comprises of both cross-sectional elements and time-series elements; the cross-sectional element is reflected by the sample of Ethiopian private commercial banks and the time-series element is reflected in the period of study (2000-2017).

This study, considered whether the use of the particular variable makes economic sense in Ethiopian private commercial banks context. The regression model used for this study was adopted from (Vodova, 2011), (Tseganesh, 2012), (Malik, M. F., & Rafique, A., 2013). Therefore, the general models which incorporate all of the variables to test the factors of bank's liquidity were depicted here below:

Operational model: the operational panel regression model used to find the statistically significant factors of banks liquidity in Ethiopian private commercial banks was:

$$LIQ_{it} = \alpha_i + \beta_1 * CAR_{it} + \beta_2 * DG_{it} + \beta_3 * NPL_{it} + \beta_4 * ROA_{it} + \beta_5 * LG + \beta_6 * SB + \beta_7 * BILL_{it} + \beta_8 * RR_{it} + \beta_9 * FERF_{it} + \beta_{10} * IRS + \beta_{11} * GDP_t + \beta_{12} * INF_t + \epsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.1)$$

- β_1 =Capital Adequacy (CAR), β_2= Deposit Growth (DG), β_3= Non-Performing Loan (NPL), β_4= Profitability(ROA), β_5= Loan Growth (LG) and β_6= Size of the Bank (SB) are Bank Specific independent variables
- β_7= NBE Bill Purchase (BILL), and β_8= Reserve requirement (RR), are Industry specific independent variables and
- β_9= Foreign exchange Rate fluctuations (FERF), β_{10} =Interest Rate Spread (IRS), β_{12} = GDP Growth rate (GDP), and β_{12}= Inflation (Consumer Price Index) are Macro-Economic independent variables and € = Error term.

3.9 Diagnostic Tests

Diagnostic tests were performed to check for the validity of the parameters. The researcher is to test for normality, multicollinearity, heteroscedasticity and autocorrelation.

3.9.1 Normality

One assumption of classical linear regression model (CLRM) is the normal distribution of the residual part of the model. As noted by (Gujarati, 2004), OLS estimators are BLUE regardless of whether the error terms are normally distributed or not. If the disturbances are independently and identically distributed with zero mean and constant variance and if the explanatory variables are constant in repeated samples, the OLS coefficient estimators are asymptotically normally distributed with means equal to the corresponding $\beta's$.

However, as per the central limit theorem, if the disturbances are not normally distributed, the OLS estimators are still normally distributed approximately if there are large-sample data. Thus, since the sample size for this study is large enough, it is approximately considered as normally distributed. This implies that residuals are asymptotically normal in this study.

3.9.2 Multicollinearity

The term multicollinearity refers to the existence of a "perfect," or exact, linear relationship among some or all explanatory variables of a regression model (Gujarati, 2004). If it exists the remedy is to drop a variable with a high R-square or do nothing. The correlation matrix was used to detect the presence of severe multicollinearity. A correlation coefficient is high if it is in excess of 0.8.

3.9.3 Heteroscedasticity

According to (Gujarati, 2004) this is a situation whereby the error variances are not constant. This is a violation of one important assumption of the classical linear regression assumptions. To detect heteroscedasticity, the research employed the Whites test for heteroscedasticity. The problem of continuing to use data that suffers heteroscedasticity is that whatever conclusion or inferences, they will be misleading.

3.9.4 Autocorrelation

The violation of the basic assumption that residuals are mutually independent results in serial autocorrelation. In time series data the successive residuals tend to be highly correlated. Autocorrelation can also be extended to cross section data where the residuals are correlated with those of the neighboring units (Maddala, 1977). The Durbin-Watson method is used to test for autocorrelation. A Durbin Watson statistic around two is generally accepted though there are zones of indifference and zones of both positive and negative correlation.

3.10 Data Presentation and Analysis

Descriptive statistics of the variables (both dependent and independent) were first calculated over the sample period. This is in line with (Malhotra, 2007), which states that using descriptive statistics methods helps the researcher in picturing the existing situation. Then, a diagnostic test includes multicollinearity; heteroscedasticity, autocorrelation, and normality were to ensure that the data are suitable for ordinary least square (OLS) analysis. Before moving to interpretation of regression results the suitability of fixed model over random effects model need to be determined based on number of cross-section, number of observations and nature of omitted variables.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1. Introduction

This chapter presents the results of factors affecting private commercial banks' liquidity which is the diagnostics test results of multicollinearity, heteroscedasticity, autocorrelation, and normality. And also this chapter presents results of the regression analysis and discusses the study results.

4.2. Descriptive Statistics

This section presents the descriptive statistics of dependent and explanatory variables used in this study. The dependent variable used in this study was liquidity (response variable), Bank Size (BS), Capital Adequacy (CAR), Reserve Requirement (RR), Deposit Growth (DG), Non- Performing Loan (NPL), Profitability (ROA), NBE Bill Purchase (BILL),loan Growth (LG), GDP Growth rate (GDP), Inflation (INF), Foreign Exchange rate Fluctuation (FERF) and Interest Rate spread (IRS).

4.2.1. Summary Statistics

Table 1 shows the summary descriptive results for all the variables used in the study such as mean, maximum, minimum, standard deviation, skewness, kurtosis and number of observation.

Table 1: Summary of descriptive statistics of study variables over the period of 2000-2017

	Liquidity (LIQ)	Size of the Bank (SB)	Capital Adequacy (CAR)	Reserve Requirment(RR)	Deposit Growth (DG)	GDP Growth rate (GDP)	Inflation (INF)	Interest Rate Spread (IRS)	Loan Growth (LG)	NBE Bill Purchase (BILL)	Non-Performing Loan(NPL)	Profitablity (ROA)	Exchange Rate fluctuations (FERF)
Mean	0.214	8.319	0.145	0.131	0.311	0.088	0.116	0.075	0.310	3.090	0.033	0.027	13.072
Median	0.216	8.511	0.137	0.108	0.271	0.104	0.089	0.072	0.254	0.000	0.028	0.028	9.830
Maximum	0.404	10.645	0.294	0.410	1.667	0.126	0.364	0.120	2.559	9.014	0.098	0.049	22.400
Minimum	0.079	4.963	0.064	0.011	-0.033	-0.021	-0.106	0.038	-0.100	0.000	0.000	0.002	8.140
Std. Dev.	0.075	1.313	0.044	0.082	0.215	0.039	0.112	0.020	0.307	3.913	0.018	0.010	5.176
Skewness	0.121	-0.448	1.062	1.339	2.967	-1.620	0.641	0.360	4.200	0.488	1.072	-0.499	0.536
Kurtosis	2.186	2.418	4.591	4.431	17.328	4.605	3.447	2.217	29.042	1.278	4.312	2.862	1.602
Jarque-Bera	3.244	5.141	31.678	41.460	1082.233	58.843	8.298	5.089	3369.423	17.626	28.445	4.574	13.972
Probability	0.198	0.077	0.000	0.000	0.000	0.000	0.016	0.079	0.000	0.000	0.000	0.102	0.001
Sum	23.140	898.438	15.620	14.140	33.557	9.556	12.486	8.152	33.521	333.734	3.518	2.969	1411.783
Sum Sq. Dev.	0.605	184.500	0.203	0.716	4.948	0.161	1.334	0.042	10.113	1638.456	0.036	0.010	2866.167
Observations	108	108	108	108	108	108	108	108	108	108	108	108	108

Source: Own estimation of research data (2018)

As shown in the table 1 above, bank liquidity is proxy by total liquid asset to total asset. The mean value of bank liquidity was around 21.43 percent of the total asset for sampled private commercial banks in Ethiopia. It can be noticed that the bank liquidity fluctuates between 7.91 to 40.36 percent.

Bank Size had a minimum of Birr 4.9628 (143.9936 Million) and maximum of 10.6448 (41.97502 Billion) with standard deviation of 1.3131 (3.717 million) and a mean of 8.3189 (4.10052 Billion). Capital Adequacy ratio is measured using total capital and reserve divided by total assets and its value ranges from a minimum of 6.43 percent to maximum of 29.44 percent with a mean value and standard deviation of 14.46 percent and 4.36 percent respectively. The mean value of bank deposit growth was around 31.07 percent for sampled private commercial banks in Ethiopia. It can be noticed that the bank deposit growth fluctuates between 166.67 percent increase and -3.3 percent decrease. However, 31.07 percent average deposit growth achieved from depositors for the period of 2000-2017. The standard deviation among banks in terms of bank deposit growth was 21.50 percent; this confirms that there were lower variations of deposit growth among commercial banks during the study period. Loan growth ranges from 9.99 percent decrease to 255.93 percent. It has a mean of 31.04 percent with 30.74 percent variation. Non-Performing Loan measured by ratio of provision for Non – Performing Loan to total loan and advance ranges from zero to 9.8 percent. It has a mean of 3.26 percent with 1.8 percent variation. As far as profitability ratios concerned, the ROA value ranges from a minimum of 0.2 percent to a maximum of 4.86 percent with a mean value and standard deviation of 2.7 percent and 1.03 percent respectively. The result suggests that the selected private commercial banks show low performance with regard to ROA during the study period.

Exposure of private commercial banks in NBE bill is measured by natural logarithm of total bill purchased by private banks which are considered as a sample in the period under consideration. With reference to table 1 the mean value of NBE bill purchased by private commercial banks was 3.090 (21.98 million). The natural logarithm of total bill purchased by private commercial banks range from 0 to 9.014 (8.21728 Billion) with standard deviation of 3.913 (50.056 million). The reason being minimum value zero was that private commercial banks were not exposed to the requirement of 27 percent bill purchase before. Reserve Requirements ratio is measured using total deposit with NBE by total assets and its value ranges from a minimum of 1.15 percent to maximum

of 40.95 percent with a mean value and standard deviation of 13.09 percent and 8.18 percent respectively.

The descriptive analysis obtained from the study variables over the study period are shown by Table 1. The exchange rate had an average of Birr 13.0721 per USD with minimum of 8.14 Birr per USD, and maximum of Birr 22.40 Birr per USD and the standard deviation of Birr 5.17 per USD. Interest Rates spread had a minimum of 3.8 percent, maximum of 12.03 percent, standard deviation of 1.98 percent and a mean of 7.55 percent. The inflation or average price of goods and service on the basis of inflation in the country over the sample period was recorded an average of 11.56 percent. The rate of inflation was highly dispersed which exhibits higher dispersion larger than its mean value over the periods under study towards its mean with standard deviation of 11.17 percent. This clearly shows that there was a bit more variations in terms of cost of living as it measured by inflation consumer price index. The other external factor is economic growth showed the mean GDP in Ethiopia during 2000-2017 of 8.85 percent, with a maximum of 12.60 percent in 2010 and a minimum of -2.10 percent in 2003 and the standard deviation for was 3.88 percent during the period of 2000 to 2017.

4.2.2. Correlation Matrix

Correlation is a way to index the degree to which two or more variables are associated with or related to each other. The sample size is the key element to determine whether or not the correlation coefficient is different from zero/statistically significant. The values of the correlation coefficient are always between -1 and +1. A correlation coefficient of +1 indicates that the two variables are perfectly related in a positive linear sense; while a correlation coefficient of -1 indicates that two variables are perfectly related in a negative linear sense. A correlation coefficient of 0, on the other hand indicates that there is no linear relationship between two variables (Brooks, 2008). The correlation matrix in table 2 predicts the likely relationship among variables in the study.

Table 2: Correlation Matrix (With Dependent Variable)

Probability	Liqudity (LIQ)	Size of the Bank (SB)	Capital Adequacy (CAR)	Reserve Requirment(RR)	Deposit Growth (DG)	GDP Growth rate (GDP)	Inflation (INF)	Interest Rate Spread (IRS)	Loan Growth (LG)	NBE Bill Purchase (BILL)	Non-Performing Loan(NPL)	Profitablity(ROA)	Exchange Rate fluctuations(FERF)
Liqudity (LIQ)	1.00000												

Size of the Bank (SB)	-0.73301	1.00000											
	0.00000	-----											
Capital Adequacy (CAR)	0.04385	-0.08629	1.00000										
	0.65230	0.37450	-----										
Reserve Requirment(RR)	0.00133	0.11566	-0.04536	1.00000									
	0.98910	0.23330	0.64110	-----									
Deposit Growth (DG)	0.17851	-0.51827	0.12803	-0.08515	1.00000								
	0.06450	0.00000	0.18670	0.38090	-----								
GDP Growth rate (GDP)	-0.36495	0.49935	-0.04178	0.28934	-0.18122	1.00000							
	0.00010	0.00000	0.66770	0.00240	0.06050	-----							
Inflation (INF)	-0.15876	0.36535	0.03745	0.50510	-0.22084	0.30871	1.00000						
	0.10080	0.00010	0.70040	0.00000	0.02160	0.00120	-----						
Interest Rate Spread (IRS)	-0.53540	0.73295	0.31304	-0.08255	-0.34871	0.30313	0.20699	1.00000					
	0.00000	0.00000	0.00100	0.39570	0.00020	0.00140	0.03160	-----					
Loan Growth (LG)	-0.08137	-0.37109	0.11931	-0.30907	0.79202	-0.18076	-0.24117	-0.24837	1.00000				
	0.40250	0.00010	0.21880	0.00110	0.00000	0.06120	0.01190	0.00950	-----				
NBE Bill Purchase (BILL)	-0.62780	0.78273	0.20382	-0.25934	-0.36419	0.22016	0.14496	0.82261	-0.14498	1.00000			
	0.00000	0.00000	0.03440	0.00670	0.00010	0.02200	0.13440	0.00000	0.13440	-----			
Non-Performing Loan(NPL)	0.42958	-0.22946	-0.42996	0.35195	-0.11865	0.03985	0.17583	-0.40547	-0.28035	-0.53445	1.00000		
	0.00000	0.01690	0.00000	0.00020	0.22130	0.68220	0.06870	0.00000	0.00330	0.00000	-----		
Profitablity(ROA)	-0.24047	0.37178	0.29329	0.24420	0.03195	0.58601	0.37010	0.29096	0.11666	0.22381	-0.20405	1.00000	
	0.01220	0.00010	0.00210	0.01090	0.74270	0.00000	0.00010	0.00230	0.22920	0.01990	0.03420	-----	
Exchange Rate fluctuations(FERF)	-0.66561	0.84958	0.19637	-0.18697	-0.38429	0.26346	0.12020	0.86303	-0.17873	0.96711	-0.50736	0.22389	1.00000
	0.00000	0.00000	0.04170	0.05270	0.00000	0.00590	0.21530	0.00000	0.06420	0.00000	0.00000	0.01980	-----

Source: Own estimation of research data (2018)

The above correlation analysis shows only the direction and degree of associations between variables, it does not allow the researcher to make cause and effect inferences regarding the relationship between the identified variables, is simply stated that there is evidence for a linear relationship between the two variables, and that movements in variables are on average related to an extent given by the correlation coefficient. Thus, in examining the effects of selected independent variables on bank liquidity. The econometric regression analysis which is discussed in the forthcoming section of the paper gives assurance to overcome the shortcomings of correlation analysis.

4.3. Econometric Analysis

The researcher conducted diagnostic tests to guard against the possibility of obtaining and interpreting spurious regression results. The results of the tests are presented in the following sections.

4.3.1. Multicollinearity Test

The result of the test for existence multicollinearity between independent variable are presented in the test analysis using only independent variables in Table 3:-

Table 2: Correlation Matrix (Only Independent Variables)

	Size of the Bank (SB)	Capital Adequacy (CAR)	Reserve Requirment(RR)	Deposit Growth (DG)	GDP Growth rate (GDP)	Inflation (INF)	Interest Rate Spread (IRS)	Loan Growth (LG)	NBE Bill Purchase (BILL)	Non-Performing Loan(NPL)	Profitablity(ROA)	Exchange Rate fluctuations(FERF)
Size of the Bank (SB)	1.0000	-0.0863										
Capital Adequacy (CAR)	-0.0863	1.0000										
Reserve Requirment(RR)	0.1157	-0.0454	1.0000									
Deposit Growth (DG)	-0.5183	0.1280	-0.0851	1.0000								
GDP Growth rate (GDP)	0.4994	-0.0418	0.2893	-0.1812	1.0000							
Inflation (INF)	0.3654	0.0374	0.5051	-0.2208	0.3087	1.0000						
Interest Rate Spread (IRS)	0.7330	0.3130	-0.0825	-0.3487	0.3031	0.2070	1.0000					
Loan Growth (LG)	-0.3711	0.1193	-0.3091	0.7920	-0.1808	-0.2412	-0.2484	1.0000				
NBE Bill Purchase (BILL)	0.7827	0.2038	-0.2593	-0.3642	0.2202	0.1450	0.8226	-0.1450	1.0000			
Non-Performing Loan(NPL)	-0.2295	-0.4300	0.3519	-0.1187	0.0399	0.1758	-0.4055	-0.2803	-0.5344	1.0000		
Profitablity(ROA)	0.3718	0.2933	0.2442	0.0319	0.5860	0.3701	0.2910	0.1167	0.2238	-0.2041	1.0000	
Exchange Rate fluctuations(FERF)	0.8496	0.1964	-0.1870	-0.3843	0.2635	0.1202	0.8630	-0.1787	0.8671	-0.5074	0.2239	1.0000

Source: Own estimation of research data (2018)

According to Lewis-Beck (1993) suggestion in order to find out the multicollinearity problem, the bivariate correlations among the independent variables should be examined and the existence of correlation of about 0.80 or larger indicates a problem of multicollinearity. Hair et al (2006) argued that correlation coefficient below 0.9 may not cause serious multicollinearity problem. I.e. if pair-wise or zero-order correlation coefficient between two regressors is out of the recommended range of multicollinearity which is -0.9 or 0.9. In the above correlation matrix there is no pair-wise relation that exceeds 0.90 which suggests for not rejecting the+ null hypothesis (H_0) which states that there is no perfect pair-wise relation among regressors.

Therefore, it can be concluded that in this study that there is no problem of multicollinearity or the results showed that the problem of multicollinearity did not exist between variables in the model. Hence all the variables were retained for use in the estimations.

4.3.2. Heteroscedasticity Test

It has been assumed that the variance of the errors is constant. This is known as the assumption of Homoscedasticity. If the errors do not have a constant variance, they are said to be Heteroscedasticity. The Breusch-Pagan-Godfrey test was used to check for the presence of heteroscedasticity in the residuals (see Table 4).

Table 3: -Heteroscedasticity Test: Breusch-Pagan-Godfrey (Summary)

Version of Test	Value	df	Probablity
F-statistic	0.849074	Prob. F(12,95)	0.6004
Obs*R-squared	10.46117	Prob. Chi-Square(12)	0.5756
Scaled explained SS	6.410217	Prob. Chi-Square(12)	0.8940

Source: Own estimation of research data (2018)

As shown in Table 4 both F-statistic and Obs*R-squared version of test give the same conclusion that there is no evidence for the presence of heteroscedasticity since the p-values in all of the cases were above 0.05. The third version of the test statistics "Scaled explained SS", which is, as the name suggests, based on a normalized version of the explained sum of squares from the auxiliary regression also give the same conclusion.

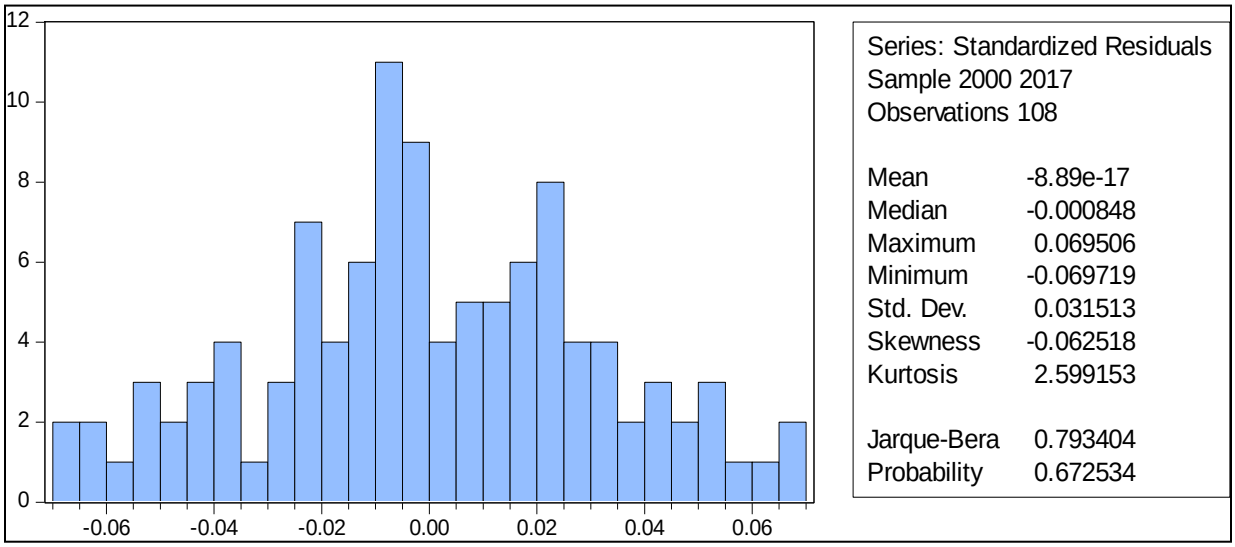
Generally, in the regression models used in this study it was proved that the test statistics is not significant and the variance of the error term is constant or homoscedastic and there is sufficient evidence to accept the null hypothesis of Homoscedasticity. The linear model is also correctly specified.

4.3.3. Normality Test

A normal distribution is not skewed and is defined to have a kurtosis coefficient of 3. Bera-Jarque 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 are. The Bera-Jarque probability statistics/P-value is also expected not to be significant even at 10 percent significant level (Brooks, 2008). According to (Gujarati, 2004), the BJ is a large sample test and the sample of 108 was equal to the frame was large; the study considered the BJ test also.

Figure 1-Normality Test result



Source: Own estimation of research data (2018)

As shown in the histogram in the figure 1 skewness and kurtosis approaches to zero (i.e. -0.062518) and Three (i.e. 2.5991) and the Jarque-Bera statistics (i.e. 0.793404) was not significant even at 10 percent level of significance as per the P-values shown in the histogram in the appendix was 0.672534). Hence, the null hypothesis that the error term is normally distributed should not be rejected. Even though, this is contradictory to what Table 1 shows i.e. Jarque-Bera probability for most of variables suggest lack of normality this would not have any effect as the sample size is large. Therefore, it is possible to say that error terms follow normal distribution.

4.3.4. Autocorrelation test

This is an assumption that the errors are linearly independent of one another (uncorrelated with one another). If the errors are correlated with one another, it would be stated that they are auto correlated.

A. Breusch-Godfrey serial correlation LM Test

Breusch-Godfrey Serial Correlation LM Test, this is another test for autocorrelation in residuals. The Breusch-Godfrey test is much more general in that it allows for both AR and MA error structures as well as the presence of lagged regress and as an explanatory variable (Gujarati, 2004). The null hypothesis is that there is no serial correlation. The summary statistic is depicted here below:

Table 4: Breusch-Godfrey Serial Correlation LM Test (Summary)

Version of Test	Value	df	Probablity
F-statistic	2.339301	Prob. F(2,93)	0.102
Obs*R-squared	5.172976	Prob. Chi-Square(2	0.0753

Source: Author Estimation of Research Data (2017)

Table 5 shows that the Breush-Godfrey Serial Correlation LM Test gives an F-statistic of 2.339301 with a probability of 0.102 and chi-square version gives statics of 5.17297 with probability of 0.0753 hence, from both versions of the test, the researcher didn't reject the hypothesis of no autocorrelation in the residuals at 1 percent significant level.

4.4. Statistical Distinguish Between Models

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

According to (Gujarati, 2004), if T (the number of time series data) is large and N (the number of cross-sectional units) is small, there is likely to be little difference in the values of the parameters estimated by fixed effect model/FEM and random effect model/REM. Hence, the choice here is based on computational convenience. On this score, FEM may be preferable since the number of time series (i.e. 18 year) is greater than the number of cross-sectional units (i.e. 6 private commercial banks). According to (Brooks, 2008); Verbeek, 2004 and Wooldridge, 2004), it is often said that the REM is more appropriate when the entities in the sample can be thought of as having been randomly selected from the population, but a FEM is more plausible when the entities

in the sample effectively constitute the entire population/sample frame. The sample for this study was not selected randomly rather purposively and as such FEM is more appropriate than REM.

According to (Richard, 2015), the nature of the variables that have been omitted from the model affects the selection of the models i.e. if we think there are no omitted variables–or if we believe that the omitted variables are uncorrelated with the explanatory variables that are in the model, then a random effects model is probably best. However, if there are omitted variables that are correlated with the variables in the model, fixed effects models may provide a means for controlling for omitted variable bias. In a fixed-effects model, subjects serve as their own controls. In this study, the researcher identified variables that are omitted such as quality of management, management style, and differences in the skills of the workforce and others which were correlated to explanatory variables. Thus, the FEM is more preferable.

Considering the above theoretical backgrounds in to consideration, the researcher has adopted fixed effects regression technique instead of random effect models.

4.5. Results of Regression Analysis and its Interpretation

4.5.1 Results of Regression Analysis

This section presents the regression result of fixed effect model that examines factors affecting banks liquidity for the selected private commercial banks in Ethiopia.

Operational model: the operational panel regression model used to find the statistically significant factors of banks liquidity in Ethiopian private commercial banks was:

$$LIQ_{it} = \alpha_i + \beta_1 * CAR_{it} + \beta_2 * DG_{it} + \beta_3 * NPL_{it} + \beta_4 * ROA_{it} + \beta_5 * LG + \beta_6 * SB + \beta_7 * BILL_{it} + \beta_8 * RR_{it} + \beta_9 * FERF_{it} + \beta_{10} * IRS + \beta_{11} * GDP_t + \beta_{12} * INF_t + \epsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.1)$$

- β_1 = Capital Adequacy (CAR), β_2= Deposit Growth (DG), β_3= Non-Performing Loan (NPL), β_4= Profitability(ROA), β_5= Loan Growth (LG) and β_6= Size of the Bank (SB) are Bank Specific independent variables β_7= NBE Bill Purchase (BILL), and β_8= Reserve requirement (RR), are Industry specific independent variables and β_9= Foreign exchange Rate fluctuations (FERF), β_{10} =Interest Rate Spread (IRS), β_{11} = GDP Growth rate (GDP), and β_{12}= Inflation (Consumer Price Index) are Macro-Economic independent variables and € = Error term.

Table 5: Results of fixed effect regression model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Size of the Bank (SB)	-0.093897	0.011353	-8.27086	0.000*
Capital Adequacy (CAR)	-0.327134	0.126848	-2.57894	0.0114**
Reserve Requirment(RR)	-0.198314	0.063555	-3.12035	0.0024*
Deposit Growth (DG)	0.095693	0.0294	3.254814	0.0016*
GDP Growth rate (GDP)	-0.261178	0.139284	-1.87515	0.0638***
Inflation (INF)	0.137517	0.051908	2.649231	0.0094*
Interest Rate Spread (IRS)	-0.851987	0.381063	-2.23582	0.0277**
Loan Growth (LG)	-0.188976	0.021965	-8.60353	0.000*
NBE Bill Purchase (BILL)	-0.014025	0.004942	-2.838	0.0056*
Non-Performing Loan(NPL)	1.13186	0.263392	4.297241	0.000*
Profitablity(ROA)	3.70635	0.597474	6.203368	0.000*
Foreign exchange Rate fluctuations(FERF)	0.023772	0.005403	4.399844	0.000*
C	0.762926	0.066256	11.51475	0.0000
	Effects Specification			
R-squared	0.783683	Mean dependent v		0.16782
Adjusted R-squared	0.756359	S.D. dependent va		0.065392
S.E. of regression	0.032277	Sum squared resid		0.098975
F-statistic	28.68093	Durbin-Watson sta		1.513898
Prob(F-statistic)	0.00000			

Note: * significant at 1%, ** signficant at 5% and *** insignificant

Source: Own estimation of research data (2018)

Based on the regression result, the relationship between the variables included in the model can, therefore, be represented as follows;

$$LIQ_{it} = 0.763 - 0.327 * CAR + 0.09 * DG + 1.13 * NPL + 3.706 * ROA - 0.189 * LG - 0.094 * SB - 0.014 * BILL - 0.198 * RR + 0.023 * FERF - 0.852 * IRS - 0.261 * GDP + 0.137 * INF + \epsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.1)$$

4.5.2 Interpretation of adjusted R-squared

As shown in Table 6. an adjusted R-squared coefficient of 0.756359 obtained from the estimated model; revealing that 75.64 percent of the variables for liquidity (LIQ) are explained by the selected explanatory variables Size of the Bank (SB), Capital Adequacy (CAR), Deposit Growth (DG), Non-Performing Loan (NPL), Profitability(ROA), NBE Bill Purchase (BILL), Reserve requirement(RR), GDP Growth rate (GDP), Loan Growth (LG) Foreign exchange Rate fluctuations (FERF), Interest Rate Spread (IRS), and Inflation (INF).

The R-square result makes sense because there might be other factors which are not included in the model but could help in explaining liquidity in private Ethiopian commercial banks. Those factors can account for the remaining 24.36 percent.

4.5.3 Interpretation of F-Statistics

The F-statistics tests the fitness of the model and a recommended F-statistics should be greater than 5 for it to be considered fit. The regression F-statistic takes a value of 28.68093 which is greater than 5 hence the model was fit for estimation.

Furthermore, F-statistics tests for the joint impact of all explanatory variables on the dependent variables. A corresponding p-value of zero attached to the test statistic shows that the null hypothesis that all of the slope parameters are jointly zero should be rejected even at 1 percent level of significance. This implies that all selected explanatory variables can affect the level of liquidity jointly.

4.5.4 Interpretation results of the regressors values

I. Bank specific factors

Under this section the researcher has addressed internal (Bank Specific) research objectives those includes:

A. Size of the bank and liquidity

In this study natural logarithm of total asset was used as a proxy of bank size, used to know the effect of bank size on liquidity of Ethiopian private commercial banks. Bank size found to be a negative and statistically significant at 1 percent level of significance with a p value of 0.0000. The coefficient value of 0.0938 indicated that one unit increases in the total asset results a 0.0938 unit decrease in liquidity of Ethiopian selected private commercial banks, holding other variables constant. This finding was consistent with the findings of (Choon, 2013), (Malik, M. F., & Rafique, A., 2013); Vtyurinenetal. (2012); Chagwiza (2011); Subedi and Neupene (2011). Moreover, the result of this study about Banks liquidity and Bank size are also relevant with the empirical findings of (Vodova, 2011); Hackethal et al., (2010); Rajan and stein, (2002); (Alger and Alger, 1999) and Vento and Ganga, (2009) in which bank size has found a significant negative relationship with

liquidity. Hence on the basis of this hypothesis large banks tend to hold less liquid assets and invest in riskier assets through implicit guarantee. In case of liquidity shortage, large banks access to Lender of the Last Resort (Central Bank) for advances to overcome the liquidity shortage while central bank also provide loan to small banks but on small scale and higher interest rate Therefore, the hypotheses stated; there was positive and statistically significant relationship between bank size and liquidity failed to accepted.

B. Capital adequacy ratio and liquidity

Capital adequacy which was measured by the ratio of equity and reserve to total asset was statistically significant variable that affected liquidity of Ethiopian commercial banks at 5 percent significant level with the p-value of 0.0114. And has a negative coefficient value of 0.327 which indicated that holding other variables constant one unit increase in capital adequacy ratio, results in a 0.327 unit decrease in liquidity of Ethiopian private commercial banks and in line with the findings of (Vodova, 2012); Subedi and Neupane (2011); and Laurine (2013). The negative and statistically significant impact of capital adequacy on liquidity of Ethiopian commercial banks were supported the arguments of the financial fragility-crowding out hypotheses. The first research hypothesis is not rejected, there is negative and significant relationship between capital adequacy and bank liquidity.

C. Deposit growth and liquidity

As it is evident in the table, the coefficient of the deposit growth was positive and statistically significant at 1 percent. The result shows that a one unit increase in deposit growth, results in a -0.0956 unit increase in banks' liquidity which means that the growth of deposits has positive effect on the liquidity by the private commercial banks in Ethiopia. This result is in line with what is expected and what is found by the previous studies in this field which indicated that the deposits have a positive impact on the volume of liquidity. In this study shows that deposits have a positive association with bank liquidity. (Bonner and Zymek, 2013), also had similar findings. However, Alger and Alger (1999); Dinger (2009) and (Kashyap, et. al, 2002), found a negative relationship between deposits and bank liquidity. This finding implies that with an increase in deposits, banks should also increase their liquidity holding so that a bank run can be avoided in case of high deposit

withdrawal. So, the second research hypothesis is not rejected; there is positive and significant relationship between deposit growth and bank liquidity.

D. Non-performing loans and liquidity

Non-performing loan (NPL) is measured by the ratio of provision for non-performing loans to total loans and advances. The regression result found to be positive and statistically significant impact on liquidity. The coefficient value of the variable is 1.1318 which indicates a unit increase in NPL results in a 1.1318 unit increase in liquidity of selected Ethiopian private commercial banks. This result is consistent with (Angela Romana,*, Alina Camelia Sargub, 2013), Sargub (2013) which stated that, the banks operating in the Czech Republic registered an increase of their impaired loans ratio during the analyzed period results an increase in liquidity because the new regulations adopted by the Czech Republic National Bank demanded an increase of the overall banks liquidity level for the banks that registered a deterioration of their loans portfolio, this also determines the positive and statistically significant link between the liquidity indicator and NPL.

Again, In the case of the Lithuanian banks, the increase of the impaired loans ratio had a tremendous impact on their overall liquidity. In order to avoid the collapse of the banking system the Lithuanian National Banks has undertaken a series of reforms, among which an increase of the minimum liquidity level that banks must maintain. So, as banks registered an increase of their impaired loans ratio the Central Bank required an even higher level of liquidity, thus the positive and statistically significant link between the liquidity indicator and the impaired loans ratio is valid.

Since, the commercial banks in Ethiopia are highly regulated by the central bank (NBE), they are very strict in NPL management. Therefore, whenever their NPL is higher they have to offset with additional loan and advance and in order to avail new loan they have to increase their liquidity otherwise, increase in amount of nonperforming loans (NPL) leads the banking sector to efficiency problem and the banking system into failure, as per the finding of this study NPL has positive and statistically significant impact on the liquidity position of selected private Ethiopian commercial banks. Therefore, the hypotheses stated; there was negative and statistically significant relationship between nonperforming loan (NPL) and banks liquidity was not accepted.

E. Profitability and liquidity

The regression result shows that, profitability had positive and statistically significant impact on liquidity at 1 percent level of significant. This means that a one unit increase in ROA results in a 3.706 unit increase in liquidity of Ethiopian private commercial banks. This positive relation shows that, higher profitability leads to increase banks liquidity. In general, the result of this study was consistent with the findings of (Choon, 2013), (Vodova, 2012) and Lartey, Antwi, and Boadi, 2013 but opposite to (Delechat .C, Henao.C, Mathoora .P and Vtyurina .S., 2012) Valla, Saes-Escorbiac, and (Tiesset, 2006) claimed that profitability had negatively affected bank's liquidity. Therefore, the hypothesis stating positive and significant relationship between profitability and banks liquidity should be accepted.

F. Loan growth and liquidity

As it is evident in the table, the coefficient of the loan growth was negative and statistically significant even at 1 percent. The result shows that a one unit increase in loan growth, results in a -0.1889 unit decrease in banks' liquidity which means that the growth of loan negatively affect the liquidity of the private commercial banks in Ethiopia. The negative impact of loan growth on banks liquidity was in line with the hypothesis which is based on the argument of taking loans as illiquid assets of banks. According to this argument when the amount of loans provided by banks increase, the amount of illiquid assets in the total assets portfolio of banks increase and lead to the reduction in the level of liquid assets held by banks. Therefore, this finding reveal that larger amount of loans was provided from periodic deposits with affecting the amount of liquid assets held by the commercial banks in Ethiopia. Therefore, the hypothesis stating negative and significant relationship between loan growth and banks liquidity should be accepted.

II. Industry specific factors

Under this section the researcher has addressed industry specific research objectives those include:

A. National bank bill and liquidity

According to regression result investment in NBE-Bills proxy by logarithm of total NBE bill purchase is negatively related with liquidity of the private commercial banks in Ethiopia with a coefficient estimate of 0.014 holding other factors constant, a 1 percent increase in NBE Bill will

decrease liquidity of the selected private commercial banks in Ethiopia by 1.402 percent and the p value of BILL 0.0056 reveals that it is statistically significant at 1 percent level of significance. This is consistent with the researchers' prior expectation, which forces banks to invest 27 percent of total loans disbursed on bonds (NBE Bills) on which banks have no right to use it for payment and settlement purposes when the need arises. For 1 birr loan and advance to customer they must purchase 27 cents of national bill, Hence, the hypothesis stating NBE Bill has negative and significant impact on bank liquidity should be accepted.

B. Reserve requirement and liquidity

The obligatory reserve coefficient is negative and statically significant at 1 percent level, indicating lower liquidity for banks with a higher reserve requirement (RR). Even though, the reserve requirement held by NBE is for reliability issue for depositors but it has negative impact on the banks liquidity. So, the result shows that a one unit increase in obligatory reserve, results in a -0.198 unit decrease in liquidity of selected private commercial banks in Ethiopia.

Therefore, the hypothesis stating reserve requirement has negative and significant impact on bank liquidity shouldn't be rejected.

III. Macroeconomic specific factors

Under this section the researcher has addressed macroeconomic factors those include:

A. Foreign exchange rate fluctuations(FERF) and liquidity

Concerning to foreign exchange rate fluctuations and bank's liquidity the model coefficient obtained of 0.0237. which implies that a 1 unit increase in foreign exchange rate (Ethiopia Birr changes against the United States Dollar) results in a 0.0237 (P-value, 0.0.00) unit increase in bank liquidity of private commercial banks and statistical significant at 1 percent level. This implies that an increases in the exchange rate will highly affect foreign currency generation. Thus it is directly related with liquidity of commercial banks. Generally, the hypothesis stating to foreign exchange rate fluctuations has negative and significant impact on bank liquidity should be rejected.

B. Interest rate spread (IRS) and liquidity

The results show also the negative impact of the interest rate spread, which is increase in interest rate spread stimulates the bank to focus more on lending activity and as a result, the share of liquid assets is decreasing. The model coefficient obtained of -0.8519 which implies that a 1 unit increase in interest rate spread results in a 0.8519 (P-value, 0.0277) unit decrease in banks liquidity of private commercial banks and statistical significant at 5 percent. Monetary policy interest rate can be considered a measure of a bank's ability to provide loans to customers (Gianni De Nicolò and Marcella Lucchetta, 2010). Therefore, the hypothesis stating interest rate spread has negative and significant impact on liquidity of private commercial banks didn't rejected.

C. GDP and liquidity

Business cycles occur in the economy. At times the economy can experience a boom or a recession. These cycles alternate from time to time. Business cycles are measured by the changes in the growth of the gross domestic product of an economy. High GDP levels resemble a boom in the economy and low GDP show that the economy is experiencing difficulties at that time. The coefficient on GDP is negative and insignificant even at 5 percent significant level, this result is consistent with Valla et al. (2006), Dinger (2009), (Vodova, 2011) and (Aspachs et. al. and Tiesset, 2005), which established negative relationships between the two. According to (Aspachs et. al. and Tiesset, 2005), UK banks seemed to hold smaller amounts of liquidity when GDP increased and vice versa. This implies that in a recession of the economy private commercial banks is more liquid than in the boom time. It has also statistically insignificant impact on liquidity. Hence, the hypothesis stating; real GDP growth rate has positive and significant impact on banks liquidity should not be accepted.

D. Inflation and liquidity

Inflation refers to changes in the price level in an economy. The general inflation rate peroxide by yearly rate of change of the consumer price index has been significant at 1 percent significant level and the coefficient having a positive sign i.e 0.1375. This shows that the general performance of the price index plays a very crucial role in liquidity. High inflation is expected to result in the non-normalization of prices in the economy which in turn result in high costs of doing business. This

positive relation was based on the theory that during inflationary economy, commercial banks are refraining from long term investment and prefer to hold risk free liquid asset.

During inflation, it is expected that, banks will make fewer loans and the amount of liquid or short term assets held by economic agents including banks will rise. The positive relation was consistent with the findings of (Vodova, 2011) on Poland commercial banks and (Tseganesh, 2012) on Ethiopian commercial banks. The positive coefficient of 0.1375 indicates that a one unit change on inflation rate of the country, other things being constant, liquidity of Ethiopian commercial banks leads to a 0.1375 unit change in the same direction. Therefore, the hypothesis that Inflation (Consumer Price Index) has negative and significant impact on liquidity of private commercial banks should not be accepted.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

The study established the factors that determine liquidity in Ethiopia private banking sector during the period from 2000-2017 GC. Findings indicated that bank liquidity are influenced by Size of the Bank (SB), Capital Adequacy (CAR), Deposit Growth (DG), Non-Performing Loan (NPL), Profitability (ROA), NBE Bill Purchase (BILL), Reserve requirement (RR), GDP Growth rate (GDP), Loan Growth (LG) Foreign exchange Rate fluctuations (FERF), Interest Rate Spread (IRS), and Inflation (INF). This chapter outlines the summary and conclusions of the study in accordance with the study results. It also gives an insight on the policy recommendations as well as suggestions for future studies.

5.2. Summary of the Study

The thrust of the study was in identifying the factors affecting liquidity in selected private commercial banks operating in Ethiopia. An explanatory research design adopted to explain the casual relationships between the variables. The study employed quantitative methods on secondary data sourced from financial statements of banks, and NBE publications for macro-economic variables.

Banks should remain liquid at all times to prevent falling into liquidity crisis, which cause distress among the stakeholders and tremor in the overall economy. Thus, this study attempts to identify the factors affecting liquidity of selected private commercial banks in Ethiopia. This research also provides summary of previous studies on similar topics. Twelve variables affecting the selected private commercial banks liquidity were chosen and analyzed. Panel data was used for the sample of six commercial banks in Ethiopia from the year 2000 to 2017 GC and estimate using fixed effect model (FEM). Data was presented by using descriptive statistics. The balanced correlation and regression analysis for liquidity conducted. Before performing OLS regression the models were tested for the classical linear regression model assumptions. Fixed effect model/FEM used based on convenience. Analysis made for twelve factors affecting selected private commercial banks liquidity. From the list of possible explanatory variables, almost all of them proved to be

statistically significant. Based on the results from the regression analysis estimated by fixed effect regression model the following conclusions was made.

5.3. Conclusions

The result of this study confirmed that, all bank specific variables, all industry specific variables and all macroeconomic variables except GDP had statistically significant impact on the determination of liquidity for selected Ethiopian private commercial banks.

Concerning Profitability (ROA) and foreign exchange rate fluctuations (FERF), the researcher found that both are significant and positively related with banks liquidity and it was consistent with the hypothesis. Similarly deposit growth (DG) result is in line with what is expected and what was found by the previous studies in this field which indicates that, deposit growth (DG) has positive and significant impact on the level of liquidity.

Likewise, Inflation and Non-Performing Loan (NPL) has positive and significant effect on the liquidity of selected private commercial banks in Ethiopia which is against the hypothesis formulated by the researcher and concluded to reject the hypothesis. Since, the commercial banks in Ethiopia are highly regulated by the central bank (NBE), they are very strict in NPL management. Therefore, whenever their NPL is higher they have to offset with additional loan and advance and in order to avail new loan they have to increase their liquidity otherwise, increase in amount of nonperforming loans (NPL) leads the banking sector to efficiency problem and the banking system into failure. Moreover, in the inflationary economy, economic units including banks refraining from long term investments due to the decline in the real value of their investments that aggravate the credit market rationing and prefer to hold risk free liquid assets.

Reserve Requirement (RR), Loan Growth (LG), Capital Adequacy (CAR) and NBE Bill Purchase (BILL) have negative and statistically significant impact on the determination of liquidity of Ethiopian selected private commercial banks and it was in line with the hypothesis. Liquidity is negatively influenced also by the interest rate spread. The factors lead to higher lending activity of banks and thus reduce bank liquidity.

Size of the Bank (SB) had negative and statistically significant impact on Ethiopian banks liquidity. GDP Growth rate has negative impact on the liquidity of private commercial banks but it is statistically insignificant.

5.4. Recommendations

The empirical findings of the research have prompted the researcher to suggest the following policy recommendations:

5.4.1. Improving on bank efficiency

- **Bank size:** Big banks needs to manage their liquidity position and shall give due attention on resource mobilization and liquidity management.
- **Profitability**: Private commercial shall have liquidity management policy to ensure that they are operating to satisfy their profitability target as well as the ability of meeting the financial demands of their customers by maintaining optimum level of liquidity.
- **Loan growth**: Private commercial banks shall give due attention to aggressive deposit mobilization so as to maintain the optimum level of loan growth as it negatively affects liquidity.
- **Deposit growth:** This finding implies that with an increase in deposits, banks should also increase their liquidity holding so that, a bank run can be avoided in case of high deposit withdrawal.

Generally, commercial banks have to consider external factors affecting liquidity in addition to their internal factors in addressing their liquidity strategy.

5.4.2. Regulatory body

- **Capital and reserve requirement:** While issuing new directives or amending the existing policies, NBE shall take into account that the increase of capital and statutory reserve requirements policy has stood pressure on the banks liquidity. Since both capital and reserve requirement have negative and significant impact on banks liquidity.
- **NBE Bill purchase:** Since huge amount of loanable fund from the commercial banks is tied up in NBE with very minimal interest rate (3%) and as it contributes negatively to the banks liquidity. NBE shall revise the policy by either increasing the interest rate provided

on the bill purchase or to decrease the percentage of obligatory bill purchase by the commercial banks. Currently, the interest rate is raised to 5% for the Treasury bill purchased by the commercial banks however, it has still gaps when we compare it with the deposit rate of 7%.

5.4.3. Improving economic environment

- External factors have influence on liquidity of Ethiopian banks so all private commercial banks in Ethiopia cannot ignore the macroeconomic indicators while targeting to improve their liquidity position. Thus, banks in Ethiopia should not only be concerned about internal structures, policies and procedures, but they must consider both the internal environment and the macroeconomic environment together in developing their strategies to efficiently manage their liquidity position.

- At the regulatory or supervisory level, the result of the study will assist policy makers to understand the impact of the policies regarding market environment for commercial banks and help them to contribute their role as a financial intermediaries.

5.5. Suggestions for future studies

The prime focus of this research was on identifying factors affecting liquidity in the case of selected private commercial banks in Ethiopia using selected variables. However, there might be variables that were not included in this study. Thus, future researchers are recommended to undertake similar study by considering additional variables on the same banks which will be useful to validate findings of the current study.

Furthermore, it is suggested that researchers consider the newly emerging banks in doing the same research.

REFERENCES

Ahmend and Ahmed. (2010). The determinants of bank liquidity risk within the context of euro area.

Alger and Alger. (1999). Liquid Assets in Banks: Theory and Practice. *Boston College Department of Economics*.

Anamika Singhn , Anil Kumar Sharma. (2015, 2016). An Empirical analysis of macroeconomic and bank-specific factors affecting liquidity of Indian banks .

Angela Romana,*, Alina Camelia Sargub. (2013). The impact of bank-specific factors on the commercial banks liquidity: empirical evidence from CEE countries. *Procedia Economics and Finance 20 (2015) 571 – 579* .

Aspachs et. al. and Tiesset. (2005). Liquidity, Banking Regulation and the Macroeconomic.

Athanasoglou et. al. (2005). Bank specific, industry specific and macroeconomics determinats of banks liquidity. *international Financial Market Vol 18 No. 2*.

Bhattacherjee .A. (2012). Social Science Research: Principles, Methods and Practices, 2nd edition. *University of South Florida*.

Bhattacherjee, A. (2012). Social Science Research: Principles, Methods and Practices, . *2nd edition. University of south Florida*.

Bloem and Gorter. (2001). Treatment of Non-Performing Loans in Macroeconomic Statistics. *International Monetry Fund Working paper*.

Bonner and Zymek. (2013). Banks' Liquidity Buffers and the Role of Liquidity Regulation. . *Journal of Financial Services*.

Bourke P. (1989). Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of banking and finance no 13*.

Brooks, C. (2008). Introductory Econometrics of Finance, 2nd ed.,. *the ICMA Center,University of Reading, CAMBRIDGE University press*.

Bryant. (1980). A model of reserve, bank runs, and deposit insurance. *Jornal of banking and finance Vol 4*.

Bunda, I. and J. B. Desquilbet,. (2008). Bunda, I. and J. B. Desquilbet, 2008, The Bank Liquidity Smile Across Exchange Rate Regimes. *International Economic Journal, vol. 22*.

Calomiris, K. a. (1991). The role of demandable debt in structuring optimal bank arrangement. *Americal Economics Reviews Vol. 81*.

Černohorská, L. (2010). Implications of the 2008 Financial Crisis for World.

Chen, et al. (2005). Dynamic interactions between interest rate, credit and liquidity risk. *Working paper series*.

Choon, L. K. (2013). The Impact of Bank-Specific Determinants on Commercial Banks' Liquidity in Namibia. *Business, Management and Economics Vol. 2*.

Creswell. (2009). Research Design: Qualitative, Quantitative and Mixed MethodsApproaches, 3rd edition. . *SAGA Publications, Inc.*

Creswell, J. W. (2003). Research Design: Qualitative, Quantitative and mixed methods approchs. *Sage Publication, New York*.

Crosse and Hempel. (1980). Management Policies for Commercial Banks, 3rd ed., Prentice.

Crosse and Hempet. (1980). An Empirical Study on Liquidity Risk and its Determinants in Bosnia and Herzegovina. *SSRN Electronic Journal*.

Delechat .C, Henao.C, Mathoora .P and Vtyurina .S. (2012). The Determinants of Bank‟s Liquidity Buffers in Central America: . *IMF working paper* .

Diamond and Dybvig. (1983). 'Bank runs, deposit insurance, and liquidity'. *Journal of Political Economy*.

Diamond and Rajan. (2001). Liquidity risk, liquidity creation and financila fragility: a theory of banking. *Political Economy Vol 109*.

Diamond and Rajan. (2005). Liquidity Shortage and banking crises.

Douglas, J. E. (2014). Bank liquidity requirment: an introduction and overview.

Drehmann.M and Nikolaou.K. (2009). Funding liquidity Risk: Definition and Measurement:. *CESifo Conform Center, Munich*.

Fakhris, and Moh‟d, KA.L . (2013). Determinants of capital adequacy in Jordanian commercial banks;. *International journal of academic research in economics and Management Vol 2*.

Friedman, M and Schwarz, A. (1963). Monetary history of the United States, . *Princeton University Press: Princeton.*

Ghafoor, A. (2009). Comparison of Islamic and conventional banking in Pakistan‟,. *Department of Economics, Islamia University, Bahawalpur-Pakistan, Vol. 23, No. 2,*.

Gianni De Nicolò and Marcella Lucchetta. (2010). Systemic Risks and the Macroeconomy . *IMF working paper*.

Goddard, Molyneux, and Wilson. (2004). Dynamics of growth and profitability in banking;. *Journal of Money credit and banking no. 36*.

Gujarati. (2004). Basic Econometrics, Fourth Edition Front Matter Preface .

Huybens, E and Smith. (1998, 1999). “Inflation, financial markets, and long-run real activity“. *Journal of Monetary Economics, Vol. 43*.

Kashyap, et. al. (2002). Banks as liquidity providers: An explanationfor the coexistence of lending and deposit taking.

Koul, L . (2003). Method of educational research, 5th edn., . *Vikas publishing House, New Delhi*.

Landskroner, P. a. (2008). Liquidity Risk and Competition in Banking. *New York University*.

Leykun, F. (2016). Determinants of Commercial Banks’ Liquidity Risk: Evidence from Ethiopia. *Department of Accounting and Finance, Bahir Dar University, Bahir Dar, Ethiopia*.

Longworth, B. (2010 2008). Bank of Canada Liquidity Facilities: Past, Present, and Future, Remarks. *Howe Institute*.

Lucchetta, M. (2007). What Do Data Say About Monetary Policy, BankLiquidity and Bank Risk Taking?,. *Economic Notes by Banca Montedei Paschi di Siena SpA, vol. 36, no. 2*.

Malik, M. F., & Rafique, A. (2013). Commercial Banks Liquidity in Pakistan: From Specific and Macroeconomic Factor. . *The Romanian Economic Journal*.

Maudos, J., & Guevara, F. (2004). Factors Explaining the Interest Margin in the Banking. *Journal of Banking and Finance, 28*(9), 2259–2281.

McKinney and McCracken. (1974). The Painful Squeeze on Bank Liquidity Challenge, Vol. 17.

Mekibeb, S. (2016). Determinants of Liquidity in Commercial Banks of Ethiopia. *AAU*.

Molyneux. P. and Thornton. J. (1992). Determinants of European Bank Profitability; . *Journal of Banking and Finance Vol. 16*.

Moore, W. (2010). How do financial crises affect commercial bank liquidity?: Evidence from Latin American and Caribbean. *MPRA paper No 214*.

Moussa, M. A. (2015). The Determinants of bank liquidity: Case of Tunisia:. *International Journal of Economics and Finance Issues. Vol. 5, No. 1, .*

Myers. (1998). The paradox of liquidity: . *Quarterly Journal of Economics, Vol. 113*.

NBE. (2008). Licensing and supervision of banking business proclamation No. 45/592. *National Bank of Ethiopia Directive*.

NBE. (2012). Licensing and supervision of Banking. *National Bank of Ethiopia*.

NBE. (2012). Licensing and supervision of Banking Business Directive 45. *National Bank of Ethiopia*.

NBE. (2013). Licensing and supervision of Banking Business. *Directive No. 55*.

NBE. (2014). Licensing and supervision of Banking Business Directive No. 57. *National Bank of Ethiopia*.

NBE. (2015). Reserve Requirment SBB/55/2013. *6th replacement*.

Nigist Melese, Laximikantham. (2015). Determinants of Banks Liquidity: Empirical Evidence on Ethiopian Commercial Banks. *Collage of Business and Economics, AAU*

Niresh. (2012).

Patheja, A. (1994). Financial management of commercial banks, . *South Asia Publications: Delhi*.

Pilbeam, K. (2005). Finance and Financial markets, 2nd ed., Palgrave Macmillan: New York.

Praet and Herzberg. (2008). Market liquidity and banking liquidity: linkages, vulnerabilities and the role of disclosure: Banque de France Financial stability Review,.

Rauch, C, Steffen, S, Hackethal. (2008). Determinants of bank liquidity creation evidence from saving banks. *Working paper, Germen*.

Rochet, J. C. (2008). Liquidity regulation and the lender of last resort: Financial Stability review, special issues in liquidity.

Rudolf. (2009).

Saidu and Tumin. (2011). Investigated the performance and financial ratios.

Saunders et al. (2009). Research methods for business students, 5th edition. *FT Prentice Hall*.

Teply. (2011). The determinants of conventional banks' liquidity in Turkey.

Tiesset, M. (2006). Bank liquidity and financial stability,.

Tseganesh, T. (2012). Determinants of Banks Liquidity and their impact on Financial Performace. *AAU*.

Vodova. (2011). Determinants of Commercial Banks liquidity in the Czech Republic. *International journal of mathematical models and methods in applied science*.

Vodova. (2012). Determinates of Commercial Banks liquidity in Slovakia. *International journal of mathematical models and methods in applied science*.

Yeager, N. F. (1989). Financial Institution Management text and cases. *Eglewood Cliffs, New Jersy*.

Zewadi, A. (2013). Comparative Analysis of Financial Performance of Commercial Banks in Tanzania.

APPENDIXES

Appendix 1-Raw Data

Bank Year	LIQUDITY	ASSET_SIZE	CAR	D_NBE	DG	GDP	INF	IRS	LG	NBE_BILL	NPL	ROA	USD_BIRR1
AIB - 00	0.326746	6.632002	0.123847	0.041699	0.368056	0.034	0.054	0.078016	0.18254	0	0.03132	0.023166	8.14
AIB - 01	0.248071	6.810142	0.114664	0.097239	0.270728	0.074	-0.003	0.061658	0.255034	0	0.033868	0.013205	8.33
AIB - 02	0.289568	7.013915	0.117806	0.080238	0.238349	0.016	-0.106	0.064579	0.135472	0	0.037677	0.011887	8.54
AIB - 03	0.352605	7.244942	0.097787	0.048548	0.251613	-0.021	0.109	0.050163	0.255887	0	0.055	0.011142	8.58
AIB - 04	0.312429	7.478735	0.087571	0.129927	0.282646	0.117	0.073	0.051788	0.1825	0	0.077167	0.016399	8.63
AIB - 05	0.208897	7.707962	0.102426	0.116617	0.299397	0.126	0.061	0.055342	0.363636	0	0.062016	0.019019	8.6518
AIB - 06	0.234259	7.990915	0.102911	0.091506	0.323196	0.115	0.106	0.054485	0.451163	0	0.049145	0.030116	8.681
AIB - 07	0.225078	8.25062	0.113185	0.153302	0.21231	0.118	0.158	0.065467	0.34188	0	0.043392	0.042158	8.7943
AIB - 08	0.193949	8.480576	0.123884	0.210261	0.243421	0.112	0.253	0.064283	0.089919	0	0.046375	0.033016	9.24
AIB - 09	0.220427	8.76757	0.116761	0.31506	0.282433	0.1	0.364	0.077698	-0.00909	0	0.054986	0.025433	10.42
AIB - 10	0.299776	8.98027	0.118358	0.231204	0.230438	0.1057	0.028	0.071055	0.159486	0	0.047147	0.034461	12.89
AIB - 11	0.175639	9.221852	0.129322	0.251529	0.268237	0.114	0.181	0.071962	0.26728	7.37086	0.036352	0.039936	16.1
AIB - 12	0.169504	9.387371	0.134906	0.103124	0.188613	0.087	0.341	0.090522	0.380825	7.818028	0.027049	0.035771	17.3
AIB - 13	0.166152	9.606349	0.13535	0.082312	0.362964	0.099	0.135	0.086552	0.400644	8.05484	0.023047	0.037884	18.3
AIB - 14	0.131473	9.904926	0.126091	0.139138	0.198841	0.103	0.081	0.087064	0.19019	8.310603	0.022695	0.035428	19.1
AIB - 15	0.08897	10.08036	0.129469	0.080108	0.231434	0.104	0.077	0.082593	0.360239	8.587674	0.01739	0.029401	20.1
AIB - 16	0.086728	10.29585	0.128861	0.120582	0.232803	0.08	0.097	0.09019	0.237841	8.712278	0.015257	0.027815	21.1
AIB - 17	0.090717	10.64483	0.11111	0.08732	0.339825	0.109	0.072	0.09019	0.462143	8.836883	0.0146	0.02743	22.4
BOA - 00	0.13649	6.57647	0.171309	0.113924	0.639456	0.034	0.054	0.041359	1.039063	0	0.015326	0.0217	8.14
BOA - 01	0.265782	6.79794	0.164063	0.063197	0.350622	0.074	-0.003	0.063329	0.316092	0	0.026201	0.023544	8.33
BOA - 02	0.319615	7.040536	0.123468	0.068695	0.396313	0.016	-0.106	0.059756	-0.0262	0	0.056801	0.001963	8.54
BOA - 03	0.325581	7.195187	0.111778	0.05899	0.183718	-0.021	0.109	0.051545	0.209268	0	0.076638	0.004848	8.58
BOA - 04	0.330599	7.36834	0.121767	0.071282	0.184944	0.117	0.073	0.078087	0.189122	0	0.075884	0.026045	8.63
BOA - 05	0.244193	7.629004	0.123481	0.241625	0.276078	0.126	0.061	0.064806	0.282744	0	0.049433	0.033498	8.6518
BOA - 06	0.109033	7.949444	0.141849	0.193008	0.338045	0.115	0.106	0.065222	0.590762	0	0.031075	0.034758	8.681
BOA - 07	0.173439	8.130354	0.138398	0.139005	0.249885	0.118	0.158	0.065585	0.174223	0	0.046855	0.021509	8.7943

BOA - 08	0.145637	8.359356	0.1017	0.214138	0.278121	0.112	0.253	0.062744	0.222192	0	0.088946	0.003803	9.24
BOA - 09	0.258216	8.608243	0.113152	0.347526	0.292262	0.1	0.364	0.076909	-0.0384	0	0.098273	0.020615	10.42
BOA - 10	0.215936	8.745051	0.115625	0.273223	0.143443	0.1057	0.028	0.058276	0.164004	0	0.074067	0.023916	12.89
BOA - 11	0.216173	8.892606	0.115648	0.195111	0.182222	0.114	0.181	0.085269	0.051516	6.705639	0.03332	0.02669	16.1
BOA - 12	0.198681	9.016696	0.136283	0.114204	0.114596	0.087	0.341	0.096862	0.175444	7.286876	0.025684	0.02788	17.3
BOA - 13	0.119122	9.223194	0.130704	0.083246	0.2547	0.099	0.135	0.081267	0.206462	7.645086	0.019893	0.023552	18.3
BOA - 14	0.153864	9.330466	0.175268	0.094476	0.070659	0.103	0.081	0.110319	0.076335	7.905195	0.01794	0.041804	19.1
BOA - 15	0.175131	9.52278	0.153816	0.0943	0.22225	0.104	0.077	0.111177	0.166808	8.128169	0.015066	0.023392	20.1
BOA - 16	0.088587	9.730803	0.147669	0.105785	0.226368	0.08	0.097	0.10382	0.356699	8.334657	0.01373	0.023647	21.1
BOA - 17	0.079645	10.13954	0.153587	0.063212	0.518215	0.109	0.072	0.10382	0.760621	8.541144	0.012619	0.025371	22.4
DB - 00	0.254335	6.76273	0.089017	0.137752	0.289979	0.034	0.054	0.056998	0.770764	0	0.033771	0.014295	8.14
DB - 01	0.240909	7.003065	0.084545	0.089567	0.464463	0.074	-0.003	0.063051	0.339587	0	0.032213	0.021374	8.33
DB - 02	0.274563	7.303843	0.0821	0.078113	0.344244	0.016	-0.106	0.058076	0.221289	0	0.030963	0.018561	8.54
DB - 03	0.256655	7.596392	0.064792	0.079379	0.361041	-0.021	0.109	0.046213	0.452982	0	0.038674	0.015531	8.58
DB - 04	0.241688	7.892452	0.064251	0.096401	0.343615	0.117	0.073	0.050406	0.33386	0	0.037278	0.023993	8.63
DB - 05	0.184503	8.137396	0.071053	0.127932	0.300735	0.126	0.061	0.054226	0.32071	0	0.032258	0.02329	8.6518
DB - 06	0.146722	8.422003	0.08491	0.121014	0.303212	0.115	0.106	0.058338	0.417563	0	0.026549	0.033392	8.681
DB - 07	0.134084	8.706325	0.121089	0.162652	0.316631	0.118	0.158	0.061109	0.26043	0	0.024824	0.035326	8.7943
DB - 08	0.145974	8.965537	0.123862	0.255629	0.265484	0.112	0.253	0.069505	0.098796	0	0.023174	0.034472	9.24
DB - 09	0.129582	9.183234	0.119041	0.391961	0.288333	0.1	0.364	0.072503	0.015862	0	0.022972	0.028458	10.42
DB - 10	0.169158	9.421685	0.117165	0.201601	0.280036	0.1057	0.028	0.071132	0.134187	0	0.021808	0.029344	12.89
DB - 11	0.130188	9.592864	0.125995	0.218685	0.167251	0.114	0.181	0.069623	0.231478	6.878326	0.01989	0.033366	16.1
DB - 12	0.20137	9.771101	0.141547	0.139628	0.187849	0.087	0.341	0.08134	0.306597	7.613325	0.021473	0.040523	17.3
DB - 13	0.193696	9.890766	0.134322	0.119997	0.126953	0.099	0.135	0.084276	0.090906	7.980304	0.022462	0.032564	18.3
DB - 14	0.184899	9.997078	0.150718	0.119015	0.115453	0.103	0.081	0.088567	0.064014	8.316417	0.01746	0.034164	19.1
DB - 15	0.13334	10.11714	0.147514	0.095359	0.120622	0.104	0.077	0.08901	0.222423	8.66766	0.01571	0.031209	20.1
DB - 16	0.136866	10.26034	0.142946	0.110966	0.148601	0.08	0.097	0.087309	0.101338	8.840816	0.017051	0.027261	21.1
DB - 17	0.108114	10.4523	0.14152	0.047826	0.2208	0.109	0.072	0.087309	0.4244	9.013973	0.0202	0.023927	22.4
NIB - 00	0.403611	5.062595	0.253165	0.113924	0	0.034	0.054	0.038027	0	0	0	0.012658	8.14

NIB - 01	0.142758	5.817111	0.184524	0.052632	1.666667	0.074	-0.003	0.066438	2.559322	0	0	0.048583	8.33
NIB - 02	0.303371	6.280396	0.185393	0.011494	0.658654	0.016	-0.106	0.060521	0.542857	0	0.012346	0.029885	8.54
NIB - 03	0.230508	6.785588	0.141243	0.056378	0.704348	-0.021	0.109	0.048565	0.697531	0	0.04	0.018323	8.58
NIB - 04	0.291179	7.128496	0.138733	0.058161	0.414966	0.117	0.073	0.053218	0.429091	0	0.038168	0.032833	8.63
NIB - 05	0.211316	7.457032	0.12933	0.065794	0.469952	0.126	0.061	0.053633	0.441476	0	0.041483	0.030883	8.6518
NIB - 06	0.251215	7.614312	0.140602	0.049481	0.187244	0.115	0.106	0.049815	0.301853	0	0.038644	0.030859	8.681
NIB - 07	0.230561	7.865955	0.171461	0.120414	0.294077	0.118	0.158	0.05855	0.231864	0	0.034122	0.032801	8.7943
NIB - 08	0.16783	8.202512	0.172793	0.230166	0.314491	0.112	0.253	0.074156	0.163354	0	0.037858	0.036132	9.24
NIB - 09	0.297159	8.477725	0.160784	0.214332	0.334608	0.1	0.364	0.091429	0.050371	0	0.046045	0.036341	10.42
NIB - 10	0.249475	8.694587	0.163195	0.17301	0.252033	0.1057	0.028	0.082847	0.146758	0	0.039002	0.037281	12.89
NIB - 11	0.275456	8.869472	0.17339	0.257646	0.249616	0.114	0.181	0.097162	0.086557	6.33328	0.041244	0.037675	16.1
NIB - 12	0.259283	9.021078	0.193362	0.108524	0.13199	0.087	0.341	0.0909	0.340636	7.099202	0.027116	0.037204	17.3
NIB - 13	0.191469	9.120912	0.191513	0.057857	0.139957	0.099	0.135	0.097792	0.22489	7.555433	0.025022	0.03437	18.3
NIB - 14	0.182508	9.282408	0.188615	0.096224	0.190539	0.103	0.081	0.082158	0.190347	7.895849	0.020958	0.029899	19.1
NIB - 15	0.155997	9.492215	0.170659	0.06559	0.233593	0.104	0.077	0.098074	0.274848	8.236026	0.015023	0.028086	20.1
NIB - 16	0.182589	9.669686	0.166858	0.077346	0.271012	0.08	0.097	0.120318	0.089634	8.386079	0.017674	0.026802	21.1
NIB - 17	0.156135	9.953216	0.140538	0.06004	0.321453	0.109	0.072	0.120318	0.425895	8.536133	0.016535	0.028029	22.4
UB - 00	0.287668	4.962845	0.27972	0.045662	1.054054	0.034	0.054	0.064593	1.378378	0	0.011364	0.027397	8.14
UB - 01	0.316128	5.365976	0.294393	0.145658	0.697368	0.074	-0.003	0.066007	0.522727	0	0.007463	0.028011	8.33
UB - 02	0.334395	5.749393	0.280255	0.140152	0.465116	0.016	-0.106	0.072548	0.216418	0	0.01227	0.015152	8.54
UB - 03	0.251599	6.150603	0.19403	0.140485	0.518519	-0.021	0.109	0.044611	0.779141	0	0.024138	0.012771	8.58
UB - 04	0.360534	6.51323	0.142433	0.08224	0.853659	0.117	0.073	0.049636	0.324138	0	0.039063	0.012248	8.63
UB - 05	0.325256	6.978214	0.116496	0.154551	0.62594	0.126	0.061	0.057918	0.544271	0	0.038786	0.035489	8.6518
UB - 06	0.191995	7.377134	0.11945	0.214072	0.410405	0.115	0.106	0.046947	0.693086	0	0.028884	0.032934	8.681
UB - 07	0.282703	7.688226	0.194273	0.074574	0.263115	0.118	0.158	0.060568	0.404382	0	0.030142	0.033849	8.7943
UB - 08	0.252403	8.086397	0.17195	0.20816	0.585558	0.112	0.253	0.066309	0.318909	0	0.026757	0.033516	9.24
UB - 09	0.248164	8.444987	0.1319	0.336951	0.479836	0.1	0.364	0.073363	0.157325	0	0.030879	0.023688	10.42
UB - 10	0.258997	8.682068	0.137715	0.33137	0.306742	0.1057	0.028	0.073967	0.21437	0	0.036475	0.033078	12.89
UB - 11	0.191372	8.952297	0.14668	0.202316	0.283812	0.114	0.181	0.079534	0.253806	6.693324	0.027696	0.034038	16.1

UB - 12	0.22905	9.081012	0.15928	0.102956	0.114031	0.087	0.341	0.097555	0.246698	7.343426	0.02331	0.036077	17.3
UB - 13	0.160015	9.208105	0.141805	0.049615	0.19326	0.099	0.135	0.097036	0.153079	7.689427	0.018589	0.022781	18.3
UB - 14	0.133646	9.382306	0.149334	0.064861	0.10436	0.103	0.081	0.110023	0.076179	7.961193	0.014409	0.018145	19.1
UB - 15	0.147036	9.572262	0.137008	0.04664	0.325591	0.104	0.077	0.105516	0.353174	8.306893	0.012226	0.021444	20.1
UB - 16	0.121059	9.756719	0.139636	0.052357	0.104477	0.08	0.097	0.103331	0.24406	8.395399	0.013004	0.021436	21.1
UB - 17	0.103963	9.9944	0.132282	0.048915	0.266	0.109	0.072	0.103331	0.4056	8.483905	0.012461	0.019693	22.4
WB - 00	0.342412	6.242223	0.097276	0.138636	0.462745	0.034	0.054	0.061703	0.336735	0	0.026718	0.006818	8.14
WB - 01	0.286449	6.368187	0.099485	0.107566	0.203753	0.074	-0.003	0.072603	0.312977	0	0.043605	0.010939	8.33
WB - 02	0.252322	6.4708	0.099071	0.105777	0.146993	0.016	-0.106	0.064613	0.180233	0	0.049261	0.009764	8.54
WB - 03	0.291339	6.790097	0.104612	0.071661	0.36699	-0.021	0.109	0.049407	0.406404	0	0.050788	0.014332	8.58
WB - 04	0.275439	7.038784	0.113158	0.093642	0.244318	0.117	0.073	0.068883	0.292469	0	0.058266	0.031543	8.63
WB - 05	0.345297	7.387709	0.111386	0.044993	0.47032	0.126	0.061	0.06276	0.357724	0	0.050898	0.034833	8.6518
WB - 06	0.215139	7.722678	0.112882	0.090323	0.380435	0.115	0.106	0.055645	0.58982	0	0.048336	0.036645	8.681
WB - 07	0.285345	8.154788	0.147989	0.113957	0.531777	0.118	0.158	0.065652	0.352793	0	0.044084	0.039031	8.7943
WB - 08	0.232383	8.324794	0.180437	0.222184	0.08916	0.112	0.253	0.071287	0.088993	0	0.059166	0.036513	9.24
WB - 09	0.199838	8.540579	0.198707	0.409537	0.256902	0.1	0.364	0.088175	-0.09988	0	0.060895	0.039084	10.42
WB - 10	0.261183	8.655551	0.222062	0.16118	0.052145	0.1057	0.028	0.080637	0.171129	0	0.039713	0.04113	12.89
WB - 11	0.275453	8.994798	0.206005	0.278294	0.518682	0.114	0.181	0.091377	0.176314	6.802395	0.04542	0.046842	16.1
WB - 12	0.265058	9.029675	0.23246	0.0705	-0.03345	0.087	0.341	0.099573	0.225297	7.375882	0.024315	0.040985	17.3
WB - 13	0.170128	9.248964	0.209138	0.107453	0.311293	0.099	0.135	0.101996	0.315359	7.765986	0.022395	0.036638	18.3
WB - 14	0.122142	9.327463	0.217843	0.038463	0.11043	0.103	0.081	0.115851	-0.01828	8.019541	0.016698	0.028184	19.1
WB - 15	0.079075	9.52598	0.20179	0.109199	0.177288	0.104	0.077	0.111086	0.318716	8.333954	0.016616	0.028248	20.1
WB - 16	0.122808	9.692097	0.196514	0.074187	0.122339	0.08	0.097	0.105519	0.236219	8.435406	0.016534	0.025124	21.1
WB - 17	0.096476	9.9499	0.1744	0.084187	0.2655	0.109	0.072	0.105519	0.3635	8.536859	0.0139	0.02866	22.4

Appendix 2 - Heteroskedasticity Test: Breusch-Pagan- odfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey

Version of Test	Value	df	Probablity
F-statistic	0.849074	Prob. F(12,95)	0.6004
Obs*R-squared	10.46117	Prob. Chi-Square(12)	0.5756
Scaled explained SS	6.410217	Prob. Chi-Square(12)	0.8940

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 11/24/18 Time: 06:17
Sample: 1 108
Included observations: 108

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000919	0.002292	0.400684	0.6896
Size of the Bank (SB)	-0.000195	0.000398	-0.489078	0.6259
Capital Adequacy (CAR)	3.53E-05	0.00465	0.007584	0.994
Reserve Requirment(RR)	0.001212	0.002207	0.549074	0.5842
Deposit Growth (DG)	-0.000711	0.001077	-0.660005	0.5108
GDP Growth rate (GDP)	-0.009701	0.004455	-2.177584	0.0319
Inflation (INF)	0.000444	0.001668	0.265895	0.7909
Interest Rate Spread (IRS)	0.007434	0.013979	0.531792	0.5961
Loan Growth (LG)	9.54E-05	0.000811	0.117637	0.9066
NBE Bill Purchase (BILL)	-9.74E-05	0.000158	-0.617	0.5387
Non-Performing Loan(NPL)	0.008967	0.009713	0.923167	0.3583
Profitablity(ROA)	0.033022	0.021848	1.511469	0.134
Foreign exchange Rate fluctuations(FERF)	8.08E-05	0.000182	0.444982	0.6573

R-squared	0.096863	Mean dependent var	0.00098
Adjusted R-squared	-0.017218	S.D. dependent var	0.001239
S.E. of regression	0.001249	Akaike info criterion	-10.41969
Sum squared resid	0.000148	Schwarz criterion	-10.09684
Log likelihood	575.6632	Hannan-Quinn criter.	-10.28878
F-statistic	0.849074	Durbin-Watson stat	2.222414
Prob(F-statistic)	0.600366		

Appendix 3 - Breusch-Godfrey Serial Correlation LM Test:

Version of Test	Value	df	Probablity
F-statistic	2.339301	Prob. F(2,93)	0.102
Obs*R-squared	5.172976	Prob. Chi-Square(2	0.0753

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 11/24/18 Time: 06:47
Sample: 1 108
Included observations: 108
Presample missing value lagged residuals set to zero.

Variable	Coefficien	Std. Error	t-Statistic	Prob.
Size of the Bank (SB)	0.001302	0.01053	0.12366	0.9019
Capital Adequacy (CAR)	0.00733	0.122613	0.059784	0.9525
Reserve Requirment(RR)	-0.03278	0.060227	-0.54424	0.5876
Deposit Growth (DG)	0.005973	0.02851	0.209511	0.8345
GDP Growth rate (GDP)	0.006929	0.117493	0.058975	0.9531
Inflation (INF) Not	0.005147	0.044021	0.11693	0.9072
Interest Rate Spread (IRS)	0.058563	0.369994	0.158281	0.8746
Loan Growth (LG)	-0.0054	0.021513	-0.25083	0.8025
NBE Bill Purchase (BILL)	-0.0025	0.004323	-0.57781	0.5648
Non-Performing Loan(NPL)	-0.01502	0.257038	-0.05844	0.9535
Profitablity(ROA)	-0.02381	0.576151	-0.04132	0.9671
Foreign exchange Rate fluctuations(FERF)	0.001236	0.004837	0.255471	0.7989
C	-0.02081	0.061169	-0.34014	0.7345
RESID(-1)	0.233172	0.112522	2.072231	0.041
RESID(-2)	0.025168	0.106216	0.236946	0.8132

R-squared	0.047898	Mean dependent v	2.07E-16
Adjusted R-squared	-0.09543	S.D. dependent va	0.031448
S.E. of regression	0.032914	Akaike info criteric	-3.86158
Sum squared resid	0.100751	Schwarz criterion	-3.48906
Log likelihood	223.5253	Hannan-Quinn crit	-3.71054
F-statistic	0.334186	Durbin-Watson sta	1.991015
Prob(F-statistic)	0.987742		

Appendix 4 - List of Commercial Bank in Ethiopia

No.	Bank Name	Year of Establishment	Ownership
1.	Commercial Bank of Ethiopia	1963	Public
2.	Awash International Bank	1994	Private
3.	Dashen Bank	1995	Private
4.	Bank of Abyssinia	1996	Private
5.	Wegagen Bank	1997	Private
6.	United Bank	1998	Private
7.	Nib International Bank	1999	Private
8.	Cooperative bank of Oromia	2004	Private
9.	Lion International Bank	2006	Private
10.	Oromia International Bank	2008	Private
11.	Zemen Bank	2008	Private
12.	Bunna International Bank	2009	Private
13.	Birhan International Bank	2009	Private
14.	Abbay Bank	2010	Private
15.	Addis International Bank	2011	Private
16.	Debub Global Bank	2012	Private
17.	Enat Bank	2013	Private