DEBRE BERHAN UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ACCOUNTING AND FINANCE

DETERMINANTS OF LIQUIDITY RISK IN SELECTED PRIVATE BANKS OF ETHIOPIA

By: Aleyanesh Shewandagn

Supervisor: Giday G. (Ph.D.)

JULY 2021

DEBRE BERHAN, ETHIOPIA

DEBRE BERHAN UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ACCOUNTING AND FINANCE

DETERMINANTS OF LIQUIDITY RISK IN SELECTED PRIVATE BANKS OF ETHIOPIA

A Thesis Submitted to Department of Accounting and Finance, Debre Berhan University in Partial Fulfilment of the Requirements for the Master of Science Degree in Accounting and Finance.

By: Aleyanesh Shewandagn

Supervisor: Giday G. (Ph.D.)

JULY 2021

DEBRE BERHAN, ETHIOPIA

DEBRE BERHAN UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ACCOUNTING AND FINANCE

Statement of Declaration

I, the undersigned , have undertaken independently a research work on **"Determinants of liquidity risk in selected private banks in Ethiopia"** in partial fulfillment of the requirement of the Master of Science program in Accounting and Finance at Debre Berhan University with the guidance and support of the research advisor. This study is my original work that has not been submitted for any degree or diploma program in this or any other institution. In performing the thesis I have used different sources and material which have been properly acknowledged.

Aleyanesh Shewandagn   _____   _____

Name of Student   Signature   Date

Advisor's Approval

This Thesis has been submitted for examination with my approval as a University advisor.

Giday Gebrehiwot (Ph.D)   _____   _____

Name of advisor   Signature   Date

DEBRE BERHAN UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ACCOUNTING AND FINANCE

Statement of Certification

This is to certify that the thesis prepared by Aleyanesh Shewandagn, entitled: "**Determinants of Liquidity Risk in selected private banks in Ethiopia**" and submitted in partial fulfillment of the requirements for the Degree of Master of Science in Accounting and Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Approved by:

Advisor: <u>Giday Gebrehiwot (Ph.D.)</u>   Signature _____ Date _____

Internal examiner: _____ Signature _____ Date _____

External examiner:_____ Signature _____ Date _____

Acknowledgements

Table of Contents

List of Tables

List of Figure

List of Appendixes

List of Acronyms (Abbreviations)

AbB: Abay Bank

AdIB: Adiss International Bank

AIB: Awash International Bank

BrIB: Birhan International Bank

BIS: Bank for International Settlement

BS: Bank size

BOA: Bank of Abyssinia

BuIB: Bunna International Bank

CBE: Commercial Bank of Ethiopia

CBO: Cooperative Bank of Oromia

CF: Cost of Funding

DB: Dashen Bank

DGB: Debub Global bank

EB: Enat Bank

GDP: Gross Domestic Product

LIB: Lion International bank

LIR: Lending Interest Rate

LQ: Liquidity risk

MS: Money supply

NBE: National Bank of Ethiopia

NIB: Nib International Bank

NPL: Non- Performing Loan

OIB: Oromia International Bank

OLS: Ordinary Least Square

PR: Profitability

QA: Quality of Assets

RD: Rate of deposit

RBI: Reserve Bank of India

ROA: Return on Asset

ROE: Return on Equity

UB: United Bank

WB: Wegagen Bank

ZB: Zemen bank

Abstract

The main trigger of all the negative events during the recent financial crisis is a result of lack of liquidity in the banking industry. Thus, in Ethiopia as Banks dominate the financial sector of the country, each Ethiopian private bank should require having their own liquidity policy to keep the optimal liquidity position and to meet the demand of their present and potential customers. The main objective of this study is to examine the determinants of liquidity risk in selected private commercial banks of Ethiopia. In order to achieve the stated objective, the study used both descriptive and explanatory type of research design and adopts a quantitative research approach with secondary data sources that are collected from annual report of each selected private banks and NBE. The study identifies some of bank specific, industry specific and macroeconomic determinants that affect liquidity risk of Ethiopian private commercial banks based on empirical literatures. The study used a balanced panel data of fourteen private commercial banks with audited financial statements that covered the period from 2012 to 2020 and used liquid asset to total asset ratio as a proxy for liquidity risk. The study also applied a random effect regression model and correlation analysis with a descriptive statistics to analyze the data using the econometric package STATA version 13 software. The random effect regression revealed that from bank specific explanatory variables; bank size, profitability (ROA), quality of asset, lending interest rate, money supply growth and GDP growth rate have a significant effect on liquidity risk of private commercial banks. Among these statistically significant variables, bank size, quality of assets, lending interest rate and GDP growth rate have negative effect whereas profitability (ROA) and money supply have statistically positive effect on liquidity risk of Ethiopian private commercial banks. Other variables such as rate of deposit and cost of fund have insignificant effect on liquidity risk of private commercial banks in Ethiopia. Finally based on the finding of the study it has been suggested that the Ethiopian private commercial banks needs to give an emphasis on *liquidity management policy to ensure the ability of meeting the financial demands of their customers by maintaining optimum level of liquidity.*

Keywords: Bank specific, industry specific, liquidity risk, macro-economic, private commercial banks of Ethiopia.

CHAPTER ONE

1. INTRODUCTION

1.1. **Background of the Study**

The health of financial sector is a cornerstone for the overall economic development of a country. Banks health reflects to a large extent the health of their borrowers, which in turn reflects the health of the economy as a whole (Das & Ghosh, 2007). A strong financial system promotes investment by financing productive business opportunities, mobilizing savings, efficiently allocating resources and makes easy the trade of goods and services.

The banking sector is the driving engine of the economic growth for the emerging market economies. Financial stability and security are the important and crucial components of the banking sector. Banking in modern economies is all about risk management because the economic repercussions of a bank failure could be catastrophic on the entire financial system. (Thiagarajan et, al., 2014). Banks are playing a pivotal role in channeling funds from depositors to investors constantly (Jenkinson, 2008). It is known that the banking sector plays an important role in the economic growth of a country through matching surplus economic units with deficit economic units. This is made through increasing funds in assets and meeting their obligations without incurring any losses. This is called liquidity of banks.

According to Bank for International Settlements (2008), liquidity is defined as "the ability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses". In this regard, when banks transform short term deposits to long term loans, a maturity mismatch is occurred and makes banks vulnerable to liquidity problem.

In modern periods, many banks in the world have faced liquidity problems mainly due to mismanagement of liquidity. The liquidity position of banks as a major issue became apparent in the aftermath of the worldwide financial crunch, which resulted in a number of major commercial banks with serious liquidity issues went bankrupt (Bhati, Zoysa, &Jitaree, 2012). Both investors and borrowers are concerned about liquidity (Diamond et al., 2015). Lacking liquidity can bring about investor's loss of certainty. To guarantee investor's certainty,

administrative bodies need to settle some base breaking points of liquidity of banks (Bagh, 2017).

Liquidity risk is considered as the determinant for other risks and profitability. However after the unexpected fallen of world economy in 2007/08, liquidity risk is considered as one of the main risks of banks (Basel 2008, Al- Harbi 2017). Afterward it gets the attention of researchers, bank supervisors, managers and policy makers.

Liquidity risk of bank can be affected by various bank specific, industry specific and macroeconomic variables. To investigate determinants of banks liquidity risk many researchers have made around the globe and use accounting ratio measurement method. For instance, Munteanu (2012) used total net loan to total asset ratio and ratio of liquid asset to total deposit to measure liquidity risk. And also Amin, Mohamad, and Shah (2017), Elahi (2017), Alzobi (2017), Vodova (2011) and Feng (2017) uses total net loan to total asset ratio as a proxy for liquidity risk and Wójcik-Mazur and Szjit (2015) and Fentaw (2016) measured liquidity risk as the ratio of liquid asset to total deposit.

Since the Ethiopian financial sector is largely bank-based as the secondary market is still not established in the country, keeping the optimal liquidity position of banks is very important to meet the demand of present and potential customers. So, it is very important to study the determinants that can affect the liquidity of Ethiopian commercial banks.

The focus of many empirical studies carried out on the commercial banking industry of Ethiopia is on examinations of factors influencing the profitability of banks, and limited attention is given to consider determinants of banks liquidity risk. Although there is some existing works of literature on determinants of banks liquidity, they didn't show the main factors that affect the liquidity risk of Ethiopian private commercial banks accurately. Moreover, the liquidity analysis of banks in Ethiopia is made by previous researchers is largely on long aged banks and less attention is given to the banks that are emerged on later periods and could not assess the internal and external determinant factors of liquidity of Ethiopian private commercial banks. Therefore, the current study aimed at investigating the effect of bank specific, industry specific and macro-economic determinant factors of liquidity of Ethiopian private commercial banks by giving equal attention to newly emerged and long aged banks.

1.2. Background of the Sector

The history of modern banking in Ethiopia dates, when, in 1906, the Bank of Abyssinia was established under the reign of Emperor Menelek II. At the time, the Bank of Abyssinia was given a 50 years concession and was engaged in issuing notes, collecting deposits and granting loans.. Up to 1931, when, the Bank of Abysinia replaced by Bank of Ethiopia, it was opened its branches in different areas of the country such as; in Harar, Dire Dawa, Dessie and Djibouti. In 1931, a new bank, the Bank of Ethiopia, a fully government owned bank which provide both central and commercial banking services was established by Emperor Haile Selassie with a capital of £750,000 which was the first indigenous bank in Africa. In 1943, after Ethiopia regains its independence from fascist Italy, the State Bank of Ethiopia commenced full operation through two departments performing the separate functions of an issuing bank and a commercial bank. After twenty years operation, when, in 1963, these functions were formally separated and the National Bank of Ethiopia (the central and issuing bank) formed in January, 1964 and the Commercial Bank of Ethiopia took over the commercial banking activity as of December, 1963.

Following the overthrown of the Dergue regime, when, in 1991, the Ethiopian People's Revolutionary Democratic Front (EPRDF) declared a liberal economy system. Subsequently, the Monetary and Banking proclamation No. 83/1994 and the Licensing and Supervision of Banking Business No. 84/1994 was issued in 1994 which lead to the introduction of many new private banks in our financial markets.

Banks, insurance companies and microfinance institutions are the main financial institutions in Ethiopia. According to annual report of national bank of Ethiopia, by the end of 2019/20, the number of banks reached 18(16 private and 2 public), insurance companies 18 (one public and 17 private) and microfinance institutions 41 (with 11 public, 13 private and 17 NGOs). Banks opened 947 new branches in 2019/20; thereby raising the number of their branches to 6,511 from 5,564 a year ago. As a result, bank branch to population ratio stood at 1:15, 7024 people. About 34.1 percent of the bank branches were located in Addis Ababa. Major branch expansion was undertaken by Commercial Bank of Ethiopia which opened 247 branches, followed by Abyssinia Bank (226 branches), Awash Bank (58 branches), United Bank (57 branches), Nib International Bank (47 branches), Wegagen Bank (44 braches), Berhan International Bank (39 branches), Oromia International Bank (37 branches) and Lion international Bank (37 branches). Thus, share

of private banks in total branch network slightly increased to 70.5 percent from 69.7 percent last year. At the same time, total capital of the banking industry increased by 11.2 percent and reached Birr 112.9 billion by the end of June 2020.

1.3. Statement of the Problem

As banks have become one of the most vital components of any financial system, ensuring stability of the banking sector has gained significant importance as a policy initiative worldwide. Banking stability as an economic indicator can be used to determine whether an economy is robust enough to withstand both the internal and external shocks. Banking stability in itself is a function of several health parameters of individual banks, e.g., asset quality, liquidity risk, capital adequacy, performance, etc. (Reserve Bank of India, 2013).

Banks play a central role in all modern financial systems. To perform it effectively, banks must be safe and be perceived as such. The single most important assurance is for the economic value of a bank's assets to be worth significantly more than the liabilities that it owes. The difference represents a cushion of "capital" that is available to cover losses of any kind. However, the recent financial crisis underlined the importance of a second type of buffer, the "liquidity" that banks have to cover unexpected cash outflows. A bank can be solvent, holding assets exceeding its liabilities on an economic and accounting basis, and still die a sudden death if its depositors and other funders lose confidence in the institution (Akter and Mahmud, 2014).

The failure of bank to manage its liquidity results in liquidity risk which further increases the probabilities of default in the banking industry. This risk can adversely affect both banks' earnings and the capital and therefore, it becomes the top priority of a bank's management to ensure the availability of sufficient funds to meet future demands of providers and borrowers, at reasonable costs (Moore, 2009).

In Ethiopia, since the last two decades, the private banking sector has been playing an 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. Thus, each private commercial bank required to have their own liquidity policy (NBE, 2010) 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.

In fact the main trigger of all the negative events during the recent financial crisis is a result of lack of liquidity in the banking industry. Since banks dominate the financial sector in Ethiopia, each private commercial banks of Ethiopia should keep their optimal level of liquidity position to meet the demand of their potential customers. So, it is very important to study on the determinants that affect liquidity risk of Ethiopian private commercial banks.

As stated by Emawayeh (2017), the NBE conducted a survey in 2009 aimed to identify status of risk management practice to address weaknesses. Questionnaires were distributed for a sample of fifteen Ethiopian commercial banks. The report revealed that credit, liquidity and operational risks were key bank risks over the past years and would continue to be so over the next five years. But, the study did not identify the factors that affect liquidity risk of Ethiopian banks.

 Another scholars such as Akhtar, et al., (2011), Belaid, et al., (2016), Cucinelli, (2013) and Yaacob, et al., (2016) have studied about determinants of liquidity risk but in Ethiopia few studies (Zagwe, 2018; Samuel, 2015 and Tseganesh, 2012) were made. Most of them overlooked studying on the determinants of banks liquidity risk directly, since the approach was to study points like the relationship between liquidity and performance of banks. A study by Tsion (2015) assessed the liquidity risk management practice using primary data (questionnaires and interview) and the studies disregard the determinants of liquidity risk. A study by Emawayeh (2017) on by the determinants of financial risk on private Ethiopian commercial banks, Belete (2015) on factors affecting liquidity of selected commercial banks and another study by Liza (2018) on determinants of liquidity risk of commercial banks of Ethiopia and proxy used by those researchers is liquidity ratios.

And also Kinfe (2019) studied on determinants of liquidity risk in Ethiopian private commercial banks is restricted to the assessment of the bank specific and macro-economic factors affecting banks liquidity risk of private commercial banks. It includes six bank specific and three macroeconomic determinants by considering eighteen fiscal years i.e. from 2000 to 2017 for thirteen private commercial banks with unbalanced panel data. However it is not possible to incorporate all factors that affect liquidity risk in one study, employing additional variables in the model and increasing the sample size can help the researcher to have full information on

determinant factors of liquidity risk of banks. Since liquidity risk of banks is affected by lots of internal (bank specific) and external (macro-economic) variables, this study can investigate major liquidity risk determinants directly from a wide range of variables and including both samples of private commercial banks that are more experienced and include young banks those have less than ten years of experience.

Therefore, this study seek to fill the gap by providing full information about the bank specific, industry specific and macroeconomic factors that affect the selected Ethiopian private commercial bank's liquidity risk by incorporating the untouched ones and by including fourteen private commercial banks of Ethiopia that have a full nine years data with a balanced panel data to have a clear cut on the determinants of liquidity risk in Ethiopian private commercial banks.

1.4. Objectives of the Study

1.4.1. General Objectives

The general objective of the study is to identify the determinants of liquidity risk in selected private banks of Ethiopia.

1.4.2. Specific Objectives

Specifically, this study addresses the following objectives:-

- ✓ To examine the effect of bank size on liquidity risk of Ethiopian private commercial banks.
- ✓ To examine the effect of profitability level (ROA) on liquidity risk of Ethiopian private commercial banks.
- ✓ To examine the effect of rate of deposit on liquidity risk of Ethiopian private commercial banks.
- ✓ To examine the effect of quality of assets on liquidity risk of Ethiopian private commercial banks.
- ✓ To examine the effect of cost of fund on liquidity risk of Ethiopian private commercial banks.
- ✓ To examine the effect of lending interest rate on liquidity risk of Ethiopian private commercial banks.

✓ To examine the effect of money supply growth on liquidity risk of Ethiopian private commercial banks.

✓ To examine the effect of GDP on liquidity risk of Ethiopian private commercial banks.

1.5. Research Questions

1. How bank size determines liquidity risk of private Commercial Banks in Ethiopia?
2. How profitability level (ROA) determines liquidity risk of Ethiopian private commercial banks?
3. How deposit rate determines liquidity risk of Ethiopian private commercial banks?
4. How quality of assets determines liquidity risk of Ethiopian private commercial banks?
5. How costs of funding affect liquidity risk of Ethiopian private commercial banks?
6. How lending interest rate determines liquidity risk of Ethiopian private commercial banks?
7. How money supply growth determines liquidity risk of Ethiopian private commercial banks?
8. How GDP determines liquidity risk of Ethiopian private commercial banks?

1.6. Hypothesis of the Study

The following Hypotheses are developed from prior empirical studies and theoretical framework on the topic. The hypotheses of this study stands on the prior empirical studies and theories related to determinants of liquidity risk of Ethiopian private banks that has been developed over the years. Prior studies and theories proposed the researcher to formulate the following research hypothesis.

Hp1: Bank size has a significant negative influence on liquidity risk.

Hp2: Profitability level (ROA) has a significant positive effect on liquidity risk.

Hp3: Rate of deposit has a significant negative effect on liquidity risk.

Hp4: Quality of assets has a significant positive effect on liquidity risk.

Hp5: Cost of funding has a significant negative effect on liquidity risk.

Hp6: Lending interest rate has a significant negative effect on liquidity risk.

Hp7: Money supply growth has a significant negative effect on liquidity risk.

Hp8: GDP has a significant positive effect on liquidity risk.

1.7. Scope/ Delimitations of the study

The scope of the study is restricted to the assessment of the bank specific, industry specific and macro-economic factors affecting banks liquidity risk of private commercial banks registered by NBE. In this study the researcher consider fourteen commercial banks which have a full nine fiscal years data (2011/12-2019/20) and which have a common characteristics and operation objectives are selected. These are; Awash Bank (1994), Dashen Bank(1995), Bank of Abyssinia (1996), Wegagen bank (1997), united bank (1998), Nib international bank (1999), Cooperative bank of Oromia (2004), lion international bank (2006), Oromia international bank (2008), Zemen bank (2009), Bunna International bank (2009),and also Berhan international bank (2010), Abay bank S.C (2010) and Addis international bank(2011) are selected for the study to include young banks that start operation after 2010. Even though the concept of liquidity risk is important to all types of banks, the study don't include government owned bank and focuses only on private commercial banks in Ethiopia due to the rest government banks have different business motive and they may have outlier effect on the result. In addition, since it is not possible to incorporate all factors that affect liquidity risk in one study, five bank-specific, one industry specific and two macroeconomic determinants are included in this study.

1.8. Significance of the Study

The study has contributions to the researcher; it serves for the academic purpose. For other researchers, it serve as a reference material for anyone who undertaken a further study on the same or related topic and it help the private banks to identify major factors that can determine their liquidity and to give attentions for factors that increase liquidity risk and it enables them to take corrective actions. It also provide a valuable information for the regulatory body (NBE) to its policy framing regarding with liquidity position of private commercial banks and contributes to the well-being of the financial sector (whether the country's financial system is safe and sound), the economy and the society as a whole.

1.9. Limitation of the Study

Even though the concept of liquidity risk is important to all types of banks, the study don't include government owned bank and focuses only on private commercial banks in Ethiopia due

to the rest government banks have different business motive and the government policy is different for private and state owned banks though operating in the same environment. As a result, exclude CBE from the sample selection because it is not enforced to government bond purchase and giant bank in the country, in most parameter which constitute more than 50% of market share.

1.10. Organization of the Paper

The paper is organized in five chapters, the first chapter includes introduction, the second chapter Review of literatures, the third chapter Research Methodology, the fourth chapter Data Analysis and presentation and the fifth chapter includes the Conclusion and related recommendation on the paper.

1.11. Definition of Key Terms

Private commercial banks - are banking institutions that are owned and established by private investors. Private Banks are banks owned by either an individual or a general partner with limited partner. Private Banks are not incorporated. Today, the term "private bank" can also refer to the financial institution specializing in financial advice and services for high-net-worth individuals.

Liquidity - Liquidity of an asset is its ease of convertibility into cash or a cash equivalent asset. The term liquidity means the capacity of the bank to give cash on demand. In other words, it is the ability of the banker to satisfy the demand of customers for cash in exchange for deposits.

Liquidity risk - liquidity risk can be defined as the risk of being unable to liquidate a position timely at a reasonable price (Muranaga and Ohsawa 2002).

Bank specific variables - are the internal factors those individual bank characteristics which affect the bank's performance. These factors are basically influenced by the internal decisions of management and board

Macro-economic variables - are external factors that are sector wide or country wide factors which are beyond the control of the company and affect the liquidity of banks.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter covers the literature review on determinants of liquidity risk on private commercial banks and is divided in to two parts. These are theoretical literatures and empirical literatures. The theoretical framework on determinates of liquidity risk will encompass concepts, theories, and definition, while the empirical literature reviews several studies results highlighting the knowledge gap.

2.2 Theoretical Review

There have been several theoretical studies on determinants of liquidity risk and determinant. Majority of this theoretical frameworks relating to credit risk emphasize on risk concept, macroeconomic policies as well as structural and governance failures. Highlighted below are some of related definitions, theories and concepts

2.2.1 Concept of Banks Liquidity and Liquidity Risk

Liquidity in the context of banking may be explained as the capacity of a bank to fund asset growth and meet both expected and unexpected cash and collateral obligations at reasonable cost and without incurring unacceptable losses (BIS, 2008). Liquidity risk is the bank's inability to meet such obligations as they become due, without adversely affecting the bank's financial condition (RBI, 2012). Effective liquidity risk management helps in ensuring a bank's ability to meet its obligations as they become due and reduces the probability of a liquidity crisis. This further assumes significance on account of the fact that a liquidity crisis, in the banking sector can have grave systemic implications in emerging economies, where banks act as a predominant financial intermediary.

Duttweiler (2009) argues that one of the main causes of liquidity risk is the mismatch of duration between asset and bank's liability, i.e., mobilizing and borrowing short-term funds while lending and granting credit at long-term duration. The imbalance between the maturity of assets and debt leads to the imbalance between the source and the use of capital, which is one of the reasons for the loss of liquidity. The second source of liquidity risk arises from liabilities. Liquidity risk may

occur whenever the bank has a mismatch between liabilities and assets, which forces banks to borrow more or sell assets to meet liquidity need. Due to the fire sale of property, its price may be lower than the actual value. Therefore, a number of properties will be converted into cash with lower value than its true value if they have enough time to sell.

Liquidity, according Schwarz (2010), cited by Liza can be decomposed into market, balance sheet, funding and macroeconomic liquidities. Market liquidity is the ability to transform financial assets into cash at current market prices and the balance sheet liquidity focuses on institution's cash holdings. The institution should be able to convert the underlying assets into cash and this is referred to as the funding liquidity. Lastly, we have the macroeconomic liquidity which focuses on the availability of cash in the economy.

2.2.2 Theories of Bank Liquidity

This section discusses about the existing liquidity theories which mainly focus on sources of liquidity risk and mechanisms to measure those risk.

Inventory Management Theory

Baumol's (1952) inventory management model and Miller and Orr's (1966) model which recognized the dynamics of cash flows are some of the earlier research efforts attempted to develop models for optimal liquidity and cash balances, given the organization's cash flows the focus was on using quantitative models that weighed the benefits and costs of holding cash (liquidity). These earlier models help financial managers understand the problem of cash management, but they rest on assumptions that do not hold in practice. The model postulates that firms identify their optimal level of cash holdings by weighting the marginal costs and marginal benefits of holding cash. The benefits related to cash holdings are: reducing the likelihood of financial distress, allows the pursuance of investment policy when financial constraints are met, and minimizes the costs of raising external funds or liquidating existing assets. The main cost of holding cash is the opportunity cost of the capital invested in liquid assets. Firms will therefore trade-off holding cash and investing it depending on its investment needs.

The Liability Management Theory

The liability management theory holds that banks can meet their liquidity requirement by bidding in the market for additional funds to meet loan demand and deposit withdrawal. The

large money markets started the practice which later spread throughout U.S. The roots of the theory can be traced to the rejuvenation of federal funds markets in the 1980's and development of negotiable time deposits as a major money market instrument. Banks in U.S rely for liquidity on federal funds market, Euro dollar market or sale of loan participation certificates. Such borrowing came to be called to be known as liability management (Mugenyah, 2015).

Keynes -Liquidity Preference Theory

The economics and finance literature analyze possible reasons for firms to hold liquid assets. Keynes (1936) identified three motives on why people demand and prefer liquidity. The transaction motive, here firms hold cash in order to satisfy the cash inflow and cash outflow needs that they have. Cash is held to carry out transactions and demand for liquidity is for transactional motive. The demand for cash is affected by the size of the income, time gaps between the receipts of the income, and the spending patterns of the cash available. The precautionary motive of holding cash serves as an emergency fund for a firm. If expected cash inflows are not received as expected cash held on a precautionary basis could be used to satisfy short-term obligations that the cash inflow may have been bench marked for. Speculative reason for holding cash is creating the ability for a firm to take advantage of special opportunities that if acted upon quickly will favor the firm.

Demand for Money Theory:

Miller and Orr (1966) model of demand for money by firms suggests that there are economies of scale in cash management. This would lead larger firms to hold less cash than smaller firms. It is argued that the fees incurred in obtaining funds through borrowing are uncorrelated with the size of the loan, indicating that such fees are a fixed amount. Thus, raising funds is relatively more expensive to smaller firms encouraging them to hold more cash than larger firms. Firms with more volatile cash flows face a higher probability of experiencing cash shortages due to unexpected cash flow deterioration. Thus, cash flow uncertainty should be positively related with cash holdings. Barclay and Smith (1995), however provide evidence that firms with the highest and lowest credit risk issue more short-term debt while intermediate credit risk firms issue long-term debt. If we consider that firms with the highest credit rating have better access to borrowing, it is expected that these firms will hold less cash for precautionary reasons, which would cause debt maturity to be positively related to cash holdings.

Liquidity Measurement Theory:

Banks generally face liquidity risk which increases in times of crisis and then endanger the functioning of financial markets. Vento and Ganga (2009), defined three methods to measure liquidity risk: the stock approach, the cash-flows based approach and the hybrid approach. The first approach looks at liquidity as a stock. This approach aims to determine the bank's ability to reimburse its short-terms debts obligations as a measurement of the liquid assets' amount that can be promptly liquidated by the bank or used to obtain secured loans. The idea behind this model is that each financial institution is exposed to unexpected cash outflows that may occur in the future due to unusual variations in the timing or extent therefore needs a quantity much higher than the cash amount required for banking projects. The second approach aims to safeguard the bank's ability to meet its payment obligations and calculating and limiting the liquidity maturity transformation risk, based on the measurement of liquidity-at-risk figures. The last approach combines elements of the stock approaches and of the cash flows based approaches.

2.2.3. Determinants of Bank Liquidity

In most of the literatures, there are two ways of classifying the determinants of bank Liquidity risk. Moore (2009), for instance, classified the determinants as bank specific (internal) and macroeconomic (external) variables. The internal factors are individual bank characteristics which affect the bank's performance. These factors are basically influenced by the internal decisions of management and board .The external factors are sector wide or country wide factors which are beyond the control of the company and affect the liquidity of banks. Other studies, Kiyotaki, and Moore, (2008), attempted to integrate sector specific factors like bank ownership, bank size and concentration as a specific determinant of bank Liquidity. This approach seems to segregate the external factor determinants in to sector specific and macroeconomic variable. And most of the researchers used both internal and external variables in their studies as follow.

Bank Size

Bank size is defined broadly as the banks net total asset. It measures its general capacity to undertake its intermediary function. This variable is included to capture the economies or diseconomies of scale. There is consensus in academic literature that economies of scale and synergies arise up to a certain level of size. Beyond that level, financial organizations become

too complex to manage and diseconomies of scale arise (Ezirm, 2005). When bank size grows it will help them to overcome the risk but it should be noted that it may leads also to failure. According to the "too big to fail" argument, large banks would benefit from an implicit guarantee, thus decrease their cost of funding and allows them to invest in riskier assets (Moore et, al, 2005). If big banks are seeing themselves as "too big to fail", their motivation to hold liquid assets is limited. In case of a liquidity shortage, they rely on a liquidity assistance of Lender of Last Resort (Ezirim, 2005). Thus, large banks are likely to perform higher levels of liquidity creation that exposes them to losses associated with having to sale illiquid assets to satisfy the liquidity demands of customers (Kiyotaki and Moore, 2008). Therefore, "too big to fail" status of large banks could lead to moral hazard behavior and excessive risk exposure and thus there can be negative relationship between bank size and liquidity. But, Melese (2015), Mehdi and Abderrassoul (2014), Malik (2013) and Shaha, Khan, and Tahir (2018) found out that size of banks has a positive effect on the bank's liquidity.

Profitability (ROA)

Profitability is considered by different researchers as one of the determinants of banks liquidity. For providing information concerning the performance and survival of many businesses, liquidity and profitability are key variables. Profitability measured by return on asset (ROA) has a positive impact on the liquidity of banks (Singh & Sharma, 2016; Roman & Sargu, 2015; Melese, 2015, Kinfe 2019) which is inconsistent with standard economic theory. But, Mehdi and Abderrassoul (2014) found out that the return on asset has a negative impact on the liquidity position of banks. Therefore, the effect of profitability on the liquidity of banks is negative and statistically significant but positive on liquidity risk. Another study by Ahmed, et al., (2011) has found that profitability has positive but insignificant impact on liquidity risk. Nigist (2016) a study on liquidity determinants has found negative association between profitability and liquidity position of commercial banks in Ethiopia.

Rate of Deposit

Deposit is highly determining the position of the banks' liquidity. The demand for liquidity may arrive at an inconvenient time and force the fire-sale liquidation of illiquid assets. The study of Shah, Khan, Shaha & Tahir (2018) indicated that deposit measured by share of deposit to total asset has a statistically negative effect on the level of liquidity. This means it has positive effect

on liquidity risk. The study of Sopan & Dutta (2018) indicated that deposit measured by the ratio of deposits over total liabilities has a positive relationship with Liquidity. i.e., the increase in amount of deposits held by a bank relative to its total liabilities can increased liquidity position, and other studies also revealed that deposits had a positive and statistically significant effect on bank liquidity; i.e. as demand deposits increase, liquid assets holdings also increase (Mazreku, Morina, Misiri, Spiteri, & Grima, 2019).

Quality of Asset

Asset Quality is taken as one of the influencing factors of banks liquidity. It determines the quality of bank loans. Good asset quality is essential for the build-up of liquidity as this enhances the banks' capability to fulfill its obligations on the liability side in a timeous manner. The study of Assfaw (2018) and Melese (2015) measured it by the ratio loan loss provision to total loan provided and the lower the loan loss provision to total loan ratio indicate the quality of the asset of the bank is relatively better than the other banks and also there is a negative relationship between asset quality measured by non-performing loan/total loan and liquidity. This shows that the growth of nonperforming loan reduces the level of liquid assets of banks (Mazreku, Morina, Misiri, Spiteri, &Grima, 2019; Tibebu, 2019).

Cost of Funding

Funding cost which is related to financial expenses for depositors and borrowings and computed as by dividing interest expenses to total liabilities had positive relationship with the liquidity of bank (Moussa, 2015). Contrary to the Moussa (2015) and Abadi and Ahangarani (2014), Singh and Sharma (2016) argued that Indian banks may maintain adequate liquid buffer or capital from other sources as their result of study revealed that funding cost had insignificant effect on liquidity. If liability cost increases, then banks, instead of relying on interbank market, tends to rely more on liquid assets that act as a source of liquidity (Berger and Bouwman, 2009). In order to avoid the funding cost related to borrowing from the inter-bank market and the central bank, banks would hold more liquidity themselves.

Lending Interest Rate

Lending interest rate is the bank rate that usually meets the short and medium term financing needs of the private sector. This rate is normally differentiated according to creditworthiness of borrowers and objectives of financing. The terms and conditions attached to these rates differ by

country, however, limiting their comparability. According to Vodova (2013) a study determinants of commercial banks in Hungary reveals that lending interest rate has significant positive relationship with liquidity within 5% level of significance. This factors lead to higher lending activity of banks and thus reduce bank liquidity with higher correlation coefficient. The interest rate on interbank transaction has a negative impact on bank liquidity, too; however, the researcher came to the conclusion that the level of the interest rate is not the main factor which influences the incentives of banks to hold liquidity in the form of interbank deposits.

Money Supply

Abdulganiyy (2017) found a negative relationship between liquidity risk and money supply using correlation analysis. As the OLS regression reveals that money supply has positive and significant influence on liquidity risk in Sudan where as insignificant negative influence in Malaysia. According Thong (2013), change in money supply through various instruments employed by the central bank can influence the liquidity of commercial banks, or in other words, a loose monetary policy may increase liquidity. On his study of factors affecting liquidity risk in the system of Vietnamese commercial banks, the regression result reveals that money supply have negative and insignificant effect on liquidity risk.

GDP

Real gross domestic product is an indicator of the financial health of a country. It is also a macroeconomic factor that affects bank liquidity. The theory of bank liquidity and financial fragility stated that when the economy is at boom, banks became optimistic and upsurge their long term investment and reducing their holding of liquid assets while in the period of recession the reverse is true. But, sometimes banks prefer high liquidity due to lower confidence in reaping profits during an economic downturn. That means a real gross domestic product has a significant positive impact on a bank's liquidity (Sheefeni & Nyambe, 2016, Boadi et al., 2016, Mazreku, Morina, Misiri, Spiteri, &Grima, 2019). Conversely, the study of Vodova (2013), Vodová (2011), Mehdi and Abderrassoul (2014) and Singh & Sharma (2016) presented that liquidity is inversely related to GDP.

2.2.4. Managing Liquidity Risk

 Liquidity risk management is an essential component of the overall risk management framework of the financial services industry, concerning all financial institutions (Guglielmo, 2008). Ideally,

a well-managed bank should have a well-defined mechanism for the identification, measurement, monitoring and mitigation of liquidity risk. A well-established system helps the banks in timely recognition of the sources of liquidity risk to avoid losses. The balance sheets of banks are growing in complexity and dependence upon the capital markets has made the liquidity risk management more challenging (Goodhart, 2008). Moore (2005) further argues that the banks having enhanced exposure in the capital markets must have a deep understanding of the risks involved. He said banks should develop the mechanism required for proper risk measurement and management.

According to Gatev and Strahan (2003), the deposits provide a natural hedge to banks against the liquidity risk. Under the stressed market conditions, the banks are perceived as a haven for investors who do not intend to issue funds against their loan commitments. The cash flows in any bank complement each other. The inflows of funds give a natural hedge to banks for outflows due to loan advancements. Therefore, banks use deposits to hedge the liquidity risk. This argument also finds support from the work of Guilielmo et, .al (2008) who provided a rationale of risk management to define the features of a commercial bank, commonly labeled as "financial intermediary" combining demand deposits with loan commitments.

One possible counter measure to reduce liquidity pressure is the transformation of illiquid assets in to cash. In times of immense funding pressure, securitization techniques are usually employed by the banking system for liquidation of assets like mortgages (Jenkinson, 2008). A bank should respond to funding shortfall by acting on the assets side of the balance sheet if it is facing restrictions on raising liquidity. It will be forced to squeeze the advancement of loans to its customers to reduce funding requirements. Despite its features to support funding and increase liquidity, Basel (2011) has narrated two main drawbacks of the above stated policy. First, this strategy needs a bit longer period to be matured. Many of the lending decisions are taken in advance and hard to be reversed instantly, thereby not generating liquidity drainage quickly. Second, reduced lending affects a large part of the economy. In the non-availability of funds to companies and households, it becomes difficult to support long-term investment and consumption in the economy.

2.3. Empirical Literature Review

Review of empirical evidences on factors affecting liquidity based on area (location) of researches conducted. Firstly, reviews researches conducted in the World, then in Africa, and finally in Ethiopia in the subsequent discussion.

2.3.1. Studies in the World

Vodová (2013) aimed to identify determinants of commercial banks" liquidity in Hungary over the data cover the period from 2001 to 2010 by using four bank specific factors and nine macroeconomic factors and employed panel regression model on four liquidity ratios. Results of panel data regression analysis show that bank liquidity decreases with the size of the bank: big banks rely on the interbank market or on a liquidity assistance of the Lender of Last Resort, small and medium sized banks hold buffer of liquid assets which is fully in accordance with "too big to fail" hypothesis. Furthermore, liquidity is negatively influenced also by interest margin and monetary policy interest rate. Both factors lead to higher lending activity of banks and thus reduce bank liquidity. The interest rate on interbank transaction has negative impact on bank liquidity, too; though level of interest rate is not the main factor which influences the incentives of banks to hold liquidity in the form of interbank deposits. On contrary, bank liquidity increases with higher capital adequacy of banks, higher interest rate on loans and higher bank profitability. As expected, solvent banks are liquid, too.

However, the positive impact of interest rate on loans and bank profitability is very surprising and can be explained only by the fact that a simple increase in interest rate on loans may not have a direct impact on bank lending (and thus on bank liquidity) –interest margin is more important. In addition, Vodová (2013) identified positive relationship between liquidity and profitability. The variables like unemployment, share of nonperforming loans and financial crisis have no statistically significant effect on the liquidity of Hungarian commercial banks. Finally, the relation between the growth rate of GDP and bank liquidity is ambiguous.

The research by Wojick Mazur and Szajt (2015) on determinants of liquidity risk in commercial banks in the European Union through classifying those countries as old European Union (Austria, Belgium, Germany, Denmark, Spain, Finland, France, the United kingdom, Greece, Ireland, Italy, Portugal) and new European Union (Bulgaria, the Czech Republic, Hungary, Poland, Romania, Slovenia, Slovakia) and employed unbalanced panel regression on collected

data from sample of 443 banks from old and 84 banks from new European Union. The results of findings revealed that the determinants of liquidity risk characteristic for banks operating in countries of the so called old European Union are slightly different from those for banks operating in the countries of the so called new European Union. Furthermore, the relationships between micro- and macro-economic determinants are also dependent on the liquidity predictor. The performed estimation indicates that the interbank market interest rate in the old European Union countries clearly have an impact on the level of liquidity. The positive relation between the actual increase in the interest rate for O/N deposit transactions in the unsecured interbank deposit market and the increase in the level of liquidity in the banks operating in the old European Union means that the increase in interest rates encouraged banks to increase money market engagement. On the other hand, in countries belonging to the group of the new European Union the increase in this rate is not identical to the total increase in liquid assets.

Naser, Mohammed and Ma'Someh (2013) aimed to examine the effect of liquidity risk on the profitability of commercial banks using of panel data related to commercial banks of Iran during the years 2003 to 2010. In the estimated research model, two groups of bank-specific variables and macro-economic variables are used. The results of research show that the variables of bank's size, bank's asset, gross domestic product and inflation will cause to improve the profitability of banks while credit risk and liquidity risk will cause to weaken the performance of bank.

Cucinelli (2013) studied the Determinants of Bank Liquidity Risk within the Context of Euro Area with objective to analyze the type of relationship that exists between liquidity risk, measured with the liquidity coverage ratio and the net stable funding ratio, and some specific bank structure variables (size, capitalization, assets quality and specialization) over sample composed of 1080 listed and non-listed Euro zone banks and the methodology applied in the analysis is OLS regression based on panel data. The results highlighted that bigger banks have a higher liquidity risk exposure, while banks with higher capitalization present a better liquidity on long horizon. The assets quality impacts only on the measure of the short term liquidity risk. With regard to the specialization, banks more specialized on the lending activity show a more vulnerable funding structure. Finally, during the crisis, the liquidity risk management changes only on the short term horizon.

In another study from Pakistan, Akter and Mahmud (2014) examines bank specific and macroeconomic determinants of commercial bank liquidity in Pakistan. Their study period covers from 2007 to 2011. They have used two models of liquidity. The first model L1 is based 28 on cash and cash equivalents to total assets. The second model L2 is based on advances net of provisions to total assets. Their results suggest that, Non-Performing Loan (NPL) and Return on Equity (ROE) have a negative and significant effect with L1. Capital adequacy (CAP) and inflation (INF) are negatively and significantly correlated with L2, Additionally there is a significant and positive impact of financial crisis on the liquidity of commercial banks. The central bank regulations greatly affect the liquidity of commercial banks which means tight monetary policy can regulate the undesirable effect of inflation on liquidity.

2.3.2. Studies in Africa

Moussa (2015) analyzed a sample of 18 banks in Tunisia data for the period of 2000-2010 with the aims to identify the factors that influence bank liquidity in Tunisian context by estimating two measures of liquidity (liquid assets / total assets; and total loans / total deposits). Through the method of static panel and method of panel dynamic, the author found that (financial performance, capital / total assets, operating costs/ total assets, growth rate of GDP, inflation rate, delayed liquidity) have significant impact on bank liquidity while (size, total loans / total assets, financial costs/ total credits, total deposits / total assets) does not have a significant impact on bank liquidity.

Ferrouhi (2014) analyzed the relationship between liquidity risk and financial performance of Moroccan banks and to define the determinants of bank's performance in Morocco during the period 2001–2012 with the aim of first evaluate Moroccan banks" liquidity positions through different liquidity and performance ratios then analyze 5 bank specific determinants and 5 macroeconomic determinants of bank performance through applying a panel date regression to identify determinants of Moroccan banks performance by using 4 bank's performance ratios, 6 liquidity ratios. Results shown that Moroccan bank's performance is mainly determined by 7 determinants: liquidity ratio, size of banks, logarithm of the total assets squared, external funding to total liabilities, share of own bank's capital of the bank's total assets, foreign direct investments, unemployment rate and the realization of the financial crisis variable. Banks" performance depends positively on size of banks, on foreign direct investments and on the

realization of the financial crisis and negatively on external funding to total liabilities, on share of own bank's capital of the bank's total assets and on unemployment rate while the dependence between bank performance and liquidity ratios and bank performance and logarithm of the total assets squared depend on the model used.

Fadare (2011) studied the determinants of Banking Sector liquidity in Nigeria and assesses the extent to which the recent financial crises affected liquidity in deposit money banks in the country. The paper makes some interesting findings. First, we find that only liquidity ratio, monetary policy rate and lagged loan-to-deposit ratio are significant for predicting Banking Sector liquidity. Secondly, we find that a decrease in monetary policy rates, 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.

Ferrouhi and Lehadiri (2013) studied liquidity determinants of Moroccan Banking Industry using data over the period 2001 – 2012 with the aims to analyze the evolution of bank's liquidity in Moroccan banks and to explain the impact of the financial crisis on bank's liquidity in Morocco. Results show that in Morocco, liquidity is mainly determined by eleven 11 determinants: size of banks, share of own bank's capital of the bank's total assets, external funding to total liabilities, return on assets, foreign direct investment, monetary aggregate , foreign assets, growth rate of gross domestic product, public deficit, inflation ratio and the effects of financial crisis.

 Thus, liquidity of Moroccan banking industry is positively correlated with bank's size, share of own bank's capital of the bank's total assets, external funding to total liabilities, monetary aggregate , foreign assets, foreign direct investment and negatively correlated with return on assets, inflation rate, growth rate of gross domestic product, public deficit and financial crisis. However, bank's returns on equity, equity to total assets and unemployment rate have no impact on Moroccan bank's liquidity.

2.3.3. Studies in Ethiopia
It is possible to say few or finger counted studies in Ethiopia concerning to liquidity risk but most of them disregard studying determinants of liquidity risk directly, rather studying on points

like the relationship between liquidity risk and performance of banks in Ethiopia such as financial risk and profitability (Samuel, 2015 and Sori, 2014) and risk management practices (Tirualem, 2009). Emawayeh (2017) studied the determinants of financial risk on private Ethiopian commercial banks and Belete (2015) on factors affecting liquidity of Ethiopian commercial bank, the measurement used by the researchers for liquidity risk was only liquidity ratios like loan to deposit ratio and liquid asset to total asset ratio. As Shen, et al., (2009) stated there are another ways can be used to assess bank liquidity risk besides traditional liquidity ratios and measuring liquidity risk based on the traditional liquidity ratios only was not enough.

Liza (2018) on determinants of liquidity risk of commercial banks of Ethiopia made on only four banks taking 5 years data (2012 to 2016) using traditional liquidity ratios. Nigist (2015) study on determinants of liquidity of Ethiopian measuring liquidity using financing gap ratio but as stated by Shen, et al., (2009) banks with higher financing gap ratio, the more liquidity risk the banks will suffer. However, Nigist use this ratio with the revers meaning and also the study fails to disclose the impact of some important variables on Ethiopian banks liquidity risk. Both bank specific and macroeconomic variables are analyzed by employing the balanced panel fixed effect regression model and the result of the study revealed that capital adequacy, profitability, and real GDP growth rate have negative and statistically significant impacts on liquidity of Ethiopian commercial banks while bank size has positive and statistically significant impact on liquidity. Whereas nonperforming loan, loan growth, inflation rate, and interest rate margin were found to be statistically insignificant/ has no any impact on liquidity of Ethiopian commercial banks for the tested period.

And Kinfe (2019), studied determinants of liquidity risk in Ethiopian private commercial banks over the period of 2000-2017 on a sample of thirteen private commercial banks with unbalanced panel data. He used Financing gap to total asset ratio as proxy for liquidity risk and the random effect regression revealed that from bank specific explanatory variables loan growth, return on asset, leverage and operational inefficiency have significant influence on private commercial banks liquidity risk. Lending interest rate and money supply growth also have significant impact on liquidity risk of Ethiopian private commercial banks from macroeconomic variable. However, according to the study size of the bank, tangibility and real GDP growth rate are not power full variable to influence liquidity risks of Ethiopian private commercial banks.

Conclusion and Knowledge Gap

Most of the researches done in Ethiopia consider sample commercial banks with above ten years working experience which ignore young banks and assessed some determinate variables of liquidity risk. Since Ethiopian banking industry is on the growth stage, it is important to notify the important determinants of liquidity risk by making empirical investigation on established private commercial banks. Therefore, the objective of this study is to examine the determinant factors that affect liquidity risk of private commercial banks in Ethiopia by selecting fourteen private commercial banks and including banks that have less experience with the more experienced banks.

2.4. Conceptual Framework:

Based on aforementioned theoretical and empirical assessments the following conceptual framework can be developed to describe the relationship of independent variables and the dependent variable (liquidity risk). Originally these are not the only variable selected based on empirical review.

Figure 2.1 Relations between liquidity risk and its determinants
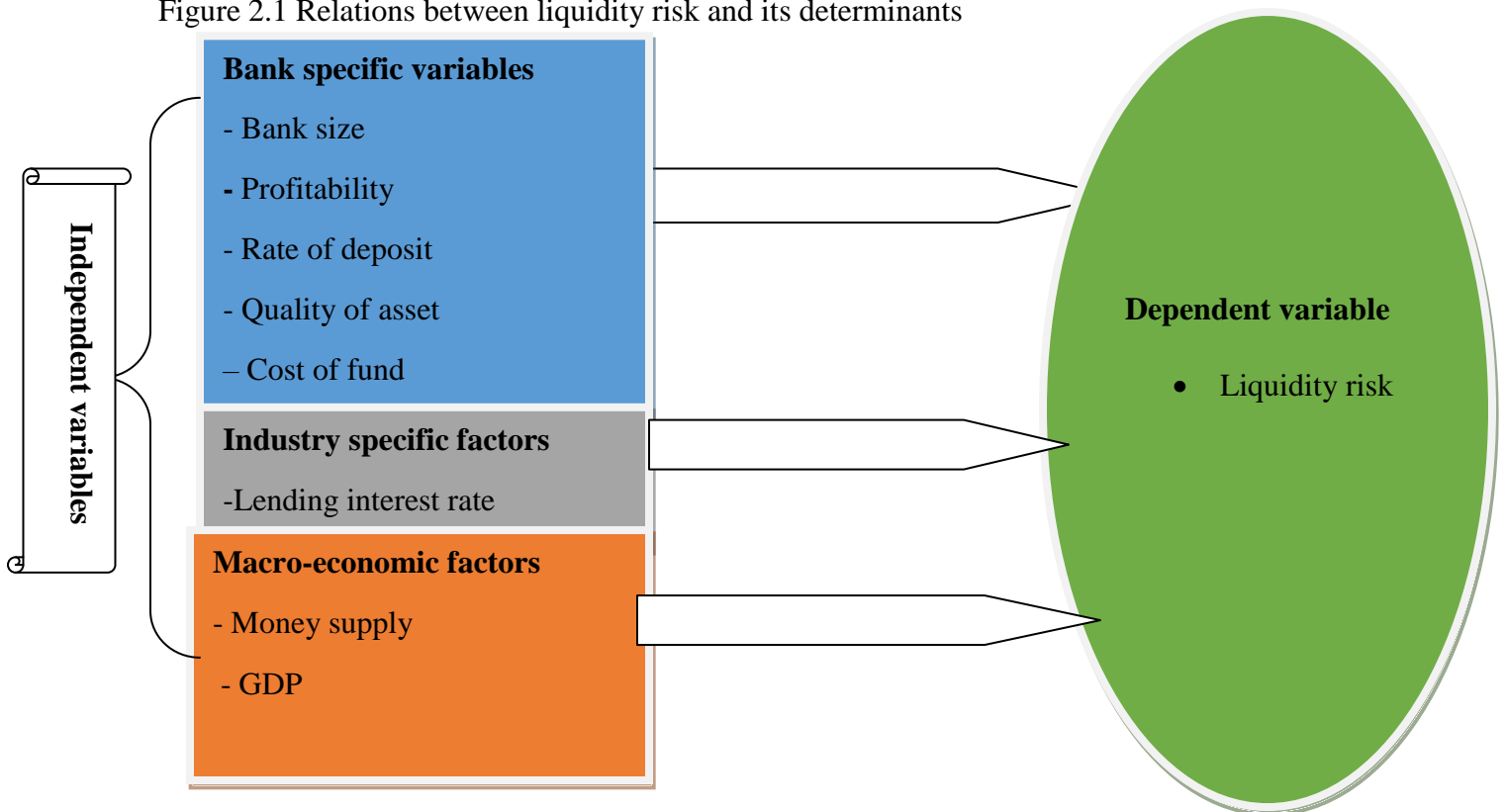
Source: Researchers' own design

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Research Design

The researcher used both descriptive and explanatory type of research design. According to Muranaga and Ohsawa (2002), a descriptive and explanatory types of research design is important for a research types if the dependent variable affected by several independent variables. Based on this, liquidity risk which is the dependent variable can be affected by several bank specific, industry specific and macroeconomic determinate factors in this study. So it is recommended to use both the descriptive and explanatory type of research.

3.2. Research Approach

Quantitative research is the systematic empirical investigation of observable phenomena via statistical, mathematical or computational techniques (Creswell 2009). A quantitative strategy is best suited as the research has a large focus on numbers and the use of hypothesis and statistical tools to analyze them. In this study, the researcher used this approach and it enables to see the relationship between the liquidity risk and the major bank specific, industry specific and macroeconomic factors affecting liquidity risk of banks in Ethiopia by establishing relationship.

3.3. Data Type and Source

Conducting appropriate data gathering instruments helped researchers to combine the strengths and amend some of the inadequacies of any source of data to minimize risk of irrelevant conclusion. Consistent and reliable research indicates that research conducted by using appropriate data collection instruments increase the credibility and value of research findings (Koul 2006).

To achieve the objectives of the study the quantitative data is collected from the secondary data sources. In order to increase the credibility and reliability of the study, bank specific data is collected from audited financial statements (balance sheet, income statement and statement of cash flow) of the selected private commercial banks and the industry specific and macroeconomic data is gathered from annual reports of National bank of Ethiopia for the years of 2011/12 to 2019/20.

3.4. Population and Sample Size

3.4.1. Population of the Study

The study population/participants are all private commercial banks that have been in operation up to the fiscal year of 2019/20. According to National bank of Ethiopia annual report of 2019/20, there are sixteen private commercial banks in the fiscal year of 2019/20. These are; Awash International Bank S.C (AIB), Dashen Bank S.C (DB), Bank of Abyssinia S.C (BOA), Wogagen Bank S.C (WB), United Bank S.C (UB), Nib International Bank S.C (NIB), Cooperative Bank of Oromia S.C (CBO), Lion International Bank S.C (LIB), Oromia International Bank S.C (OIB), Zemen Bank S.C (ZB), Buna International Bank S.C (BuIB), Berhan International Bank S.C (BrIB), Abay Bank S.C (AbB), Addis International Bank S.C (AdIB), Debub Global Bank S.C (DGB), and Enat Bank S.C (EB)

3.4.2. Sample Size

Sample size can be defined as the number of units in a population to be studied. Currently, there are sixteen private commercial banks operating in Ethiopia and the researcher believe that, for meaningful analysis, there is no need to sample from those population as they are already few in number to collect information over the period of 2012-2020. But the population included in this study has new banks that didn't have required data for the sample period, their year of service is below nine, and thus they were excluded from the sample to make the balanced data structured, i.e. every cross section follows the same regular frequency with the same start and end dates. Hence, the researcher used purposive sampling technique for this study and a sample of below listed fourteen private commercial banks that has been in operation before 2012 is selected.

Table 3.1: List of Sample of Private Commercial Banks

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

7	Cooperative Bank of Oromia	2005
8	Lion International Bank	2006
9	Oromia International Bank	2008
10	Zemen Bank	2009
11	Bunna International Bank	2009
12	Berhan International Bank	2010
13	Abay Bank S.C	2010
14	Addis International Bank	2011

Source: National Bank of Ethiopia

3.4.3. Sampling Technique

Under purposive or judgmental sampling the organizers of the inquiry purposively choose the particular units of the universe for constituting a sample on the basis that the small mass that they so select out of a huge one is typical or representative of the whole (Kothar, 2004). In this study, the researcher used purposive sampling in which the banks service year is set as criteria and all private commercial banks that meet this criterion are selected as a sample and nine years is assumed to be relevant in this study because five years and above is the recommended length of data to use in most finance literatures.

3.5. Methods of Data Analysis

The researcher used both descriptive and inferential/multiple regression data analysis techniques to see the effect of independent variables on the dependent variable. The descriptive statistics which is calculated over the sampled periods helps to convert the raw data in to a more meaning full form which enables the researcher to understand the ideas clearly. It includes mean, maximum, minimum and standard deviation of each variable. In addition to this the researcher used inferential statistics to analyze and interpret the data collected and employed STATA version 13 package to show the relationship between the variables. Among the most common methods of estimating categorical variable model, the researcher used a multiple regression model to specify the findings through econometrics model. The researcher has also performed diagnostic tests to ensure whether the assumptions of the classical linear regression model (CLRM) are violated or not.

3.6. Model Specification

The nature of data used in this study enables the researcher to use panel data model which is deemed to have advantages over cross section and time series data methodology. In that As Brook (2008) stated it can address a broader range of issues and tackle more complex problems with panel data than would be possible with pure time-series or pure cross-sectional data alone. It can increase the number of degrees of freedom, by employing information on the dynamic behavior of a large number of entities at the same time and also help to mitigate problems of multicollinearity among explanatory variables that may arise if time series are modeled individually. Thus, the general form of the panel data model can be presented as;

$$Y_{it} = \alpha + \beta x_i\, t + \varepsilon_{it}$$

The subscript i representing the cross-sectional dimension and t denote the time-series dimension. The left hand side equation represents the dependent variable in the model, which is the liquidity risk and the right side represents the set of independent variables in the estimated model and ε is error term. The study used the following econometrics model on the bases of the selected variables.

$$LR_{it} = \alpha + \beta 1\,(BS_{it}) + \beta 2\,(ROA_{it}) + \beta 3\,(RD_{it}) + \beta 4\,(QA_{it}) + \beta 5\,(CF_{it}) + \beta 6\,(LIR_{it}) + \beta 7\,(MS_{it}) + \beta 8\,(GDP_{it}) + \varepsilon_{it}$$

Where, LR = is liquidity risk, measured by Liquid Assets to Total Assets ratio.

BS_{it}= size of ith bank on the year "t"

ROA_{it} = profitability of ith bank on the year "t"

RD_{it} =rate of deposit of ith bank on the year "t"

QA_{it} = quality of asset of ith bank on the year "t"

CF_{it} = cost of fund of ith bank on the year "t"

LIR_{it} = average lending interest rate of ith bank on the year "t"

MS_{it}= money supply growth of Ethiopia on year "t".

GDP_{it} = gross domestic product growth of Ethiopia on the year "t".

α = denote the intercept, β1 – β8: the slope coefficient of the explanatory variables, ε = is error term, i=bank and t=time.

3.7. Description of Variables and Measurements

3.7.1. Dependent Variable
Liquidity Risk (LR)

According to Sopan & Dutta (2018) Liquidity in the banking sector can be measured through various ratios such as Liquid Assets to Total Assets, Deposits to total assets, Deposits maturing within one year to Total Deposits etc. After an extensive review of relevant literature, it has been observed that there is a unanimous agreement among researchers over the use of Liquid Assets to Total Assets ratio as a proxy for measuring the liquidity of banks. So, in this study the researcher will use liquid assets to total assets ratio to measure liquidity risk.

3.7.2. Independent Variables

3.7.2.1 Bank Specific Variables
The existing literature provides evidence that suggests a strong association between liquidity risk and several bank specific variables.

Bank Size

Bank size is defined broadly as the banks net total asset. It measures its general capacity to undertake its intermediary function. This variable is included to capture the economies or diseconomies of scale. It is an important bank specific determinant of liquidity risk which is calculated by taking natural logarithm of the total assets of a bank. According to (Ezirm, 2005), When bank size grows it will help them to overcome the risk. Lucchetta (2007) and Vodova (2011) also suggested that the greater the total assets, the lower the liquidity risk. Large banks could have many advantages. For example, it is easier for these banks to raise capital from customers, lend in the interbank market, or receive support from the central bank as the lender of last resort. However, Bunda and Desquilbet (2008) found opposite results. In particular, these authors report that large commercial banks typically enjoy implicit advantages and low cost in mobilizing capital. Therefore, these banks often invest aggressively in many venture projects,

especially providing loans that are exposed to high risk but also have high expected returns. As a result, the liquidity risk of large banks is also higher, comparing to that of smaller banks.

The studies of Melese (2015), Mehdi and Abderrassoul (2014), Malik (2013) and Shaha, Khan, and Tahir (2018) found out that size of banks has a positive effect on the bank's liquidity i.e. larger banks are more liquid than smaller banks. Thus the study has expected a negative effect.

Profitability

It measures how well a bank manages its assets and liabilities. For providing information concerning the performance and survival of many businesses, liquidity and profitability are key variables. Profitability measured by return on asset (ROA) has a positive impact on the liquidity of banks (Singh & Sharma, 2016; Roman & Sargu, 2015; Melese, 2015) which is inconsistent with standard economic theory. But, Mehdi and Abderrassoul (2014) found out that the return on asset has a negative impact on the liquidity position of banks. So, it has a positive effect on liquidity risk which is in line with the study of Kinfe (2019). And also another author Akhtar, at al., (2011) on liquidity risk management study on Pakistan Islamic banks have found that return on asset has a positive and statistically significant effect on liquidity risk. This result is also supported by another study by Mazur & Szajit (2015) on determinants of liquidity risk in commercial banks in the European Union. They can found that ROA has positive and significant relationship with liquidity risk. And also this study has expected a positive effect of profitability on liquidity risk.

Rate of Deposit

Deposit is highly determining the position of the banks' liquidity. The demand for liquidity may arrive at an inconvenient time and force the fire-sale liquidation of illiquid assets. The study of Shah, Khan, Shaha &Tahir (2018) indicated that deposit measured by share of deposit to total asset has a statistically negative effect on the level of liquidity. This means it has positive effect on liquidity risk. The study of Sopan & Dutta (2018) also indicated that deposit measured by the ratio of deposits over total liabilities has a positive relationship with Liquidity. i.e., the increase in amount of deposits held by a bank relative to its total liabilities can increased liquidity position and reduces the liquidity risk of banks.

This study has expected a negative and statistically significant effect of rate of deposit on liquidity risk of banks and used the ratio of deposits over total liabilities as a measurement.

Quality of Asset

Asset Quality can determine the quality of bank loans. Good asset quality is essential for the build-up of liquidity as this enhances the banks' capability to fulfill its obligations on the liability side in a timeous manner. But there is a negative relationship between asset quality measured by non-performing loan/total loan and liquidity. This means the growth of nonperforming loan reduces the level of liquid assets of banks (Mazreku, Morina, Misiri, Spiteri, &Grima, 2019; Tibebu, 2019). The study used non- performing loan to total loans ratio as a proxy of measurement and expect a positive significant effect on liquidity risk of selected private banks.

Cost of Funding

The cost of funds is defined as the ratio of the total interest expended to average deposits and other borrowings. Total Interest Expense/Total Liability considered as a measurement of cost of fund. According to Sopan & Dutta (2018) it expected to have a negative effect on the liquidity risk in the study. In this study the researcher expected a negative effect of cost of funding on liquidity risk.

3.7.2.2. Industry Specific Variables
Lending Interest Rate

It is the bank rate that usually meets the short and medium term financing needs of the private sector. According to Vodová (2011) which is in line with the study of Kinfe (2019), the results revealed that there is a negative link between liquidity risk and interest rates on loans and on interbank transaction. Since, a high interest rate on loan does not encourage banks to lend more they left with high liquidity. Emawayih (2017) also indicated that liquidity risk is negatively affected by the increase in interest rate. The hypothesis on impact of lending interest rate on liquidity risk in this study also in line with those findings and the average interest rate on lending can be used as a measurement of lending interest rate.

3.7.2.2. Macro-economic Variables
Money Supply

Money supply is the total value of monetary assets available in an economy at specific time. This includes cash, checking deposits, saving deposits, money market securities, mutual funds and other time deposits. Knife (2019) indicated that a higher money supply growth may increase liquidity position and then decrease liquidity risk of private commercial banks and found that a negative and significant impact of money supply on liquidity risk and the finding is contradicted with the study of Thong (2013), found that a negative and insignificant relationship with liquidity risk. And Nguyen and Tran (2019) found that money supply has a positive relationship with bank liquidity. The study expected that it has a significant negative effect on liquidity risk and used a proxy of the current year broad money less broad money previous year divided by previous year broad money to measure money supply.

GDP

It shows the total amount of goods and services produced in a country. It is as a proxy for economic cyclicality. The proxy used to measure Real GDP growth rate is annual real GDP growth rate. Studies like Vodová (2011) and Shen et al. (2009) argue that the demand for loan increase with economic expansion which grind down the liquidity buffer of banks thereby increase liquidity risk. In addition, during economic expansion bank deposit is less attractive than investment which also increase financing gap. According to Vodová (2011) during economic downturn, lending opportunities are not so good so banks hold higher share of liquid assets. Both arguments are very convincing. Farther more, the result of both studies proves this argument. And also Nigist (2016) and Kinfe (2019) found that, real GDP growth rate has significant negative relationship with liquidity which implies positive relation with liquidity risk. This study also expects similar result.

3.8. Ethical Considerations

The researcher considered the ethics of research in this study. The secondary data are collected to achieve the objective of the study from the annual reports of national bank of Ethiopia and from audited annual reports of each private commercial banks of Ethiopia. These data are forwarded in the will of the banks management and the banks are confidential in that the researcher used those data only for academic purpose. The study believed that it didn't have any negative side influence on those samples used in the study.

CHAPTER FOUR

4. DATA ANALYSIS AND PRESENTATION

In the preceding chapters, important literatures related to the topic that may give enough understanding about the subject matter and the methodology selected to meet research hypotheses had been discussed. In this chapter, detail analysis about the descriptive statistics and regression results has been made to address the broad research objectives and to answer the research questions that had discussed in the previous sections.

The chapter has included seven sections. The first section presents the descriptive statistics of the dependent and independent variables. Then second section that presents results of the correlation analysis. The third Section presents the test for the validity of assumptions for classical linear regression model/CLRM. The fourth section has presented selection of model (fixed effect versus random effect model). Section five has presented panel data regression results and finally, discussions of the results of the regression analyses in detail are made.

4.1. Descriptive Statistics

This section presents the descriptive statistics of dependent and independent variables used in the study. The dependent variable used in this study is liquidity risk (LR) while independent variables are bank size (BS), profitability (ROA), rate of deposit (RD), quality of assets (QA), cost of funds (CF), lending interest rate (LIR), gross domestic product (GDP) and money supply (MS). Table 4.1 below presents a summary of descriptive statistics of the dependent and independent variables for fourteen Ethiopian private commercial banks for the period of 9 years from year 2011/12-2020 with a total of 126 observations. The descriptive statistics include: mean, standard deviation, maximum and minimum. It generated to give an overall description of data used in the model.

Table 4.1: Summary of descriptive statistics for dependent and independent variables

Variable	Obs	Mean	Std. Dev.	Min	Max
LR	126	.219	.087	.067	.52
Log-BS	126	10.046	.456	8.6	10.9
ROA	126	.034	.009	.018	.068

RD	126	.877	.08	.092	.95
QA	126	.023	.008	.007	.052
CF	126	.025	.003	.017	.032
LIR	126	.127	.008	.119	.142
MS	126	.245	.045	.17	.303
GDP	126	.089	.014	.061	.104

Source: STATA13 summery result for sample private commercial banks of Ethiopia

The descriptive statistics from Table 4.1 is based on 126 annual observations from a fiscal year of 2011/12 to 2019/20. Over the study period, liquidity risk which is the dependent variable measured by the ratio of liquid assets to total assets ranges from a minimum value of 6.7% in the year 2019 for UB up to 52.0% for ZB in the year 2015 with the mean of 21.9% and standard deviation of 8.7%. The standard deviation shows that there is a substantial variation of liquidity risk between the selected private banks during sample periods.

Among the bank specific independent variables, bank Size has a mean value of 10.046. The standard variation from the mean is 45.6% which shows a very high variation from the mean and the minimum and maximum values are 8.6 and 10.9 respectively. The minimum value belongs to AdIB during the first operation year and the highest one is for AIB and BOA in the year 2020.

Profitability (ROA), ratio of net income before tax to total asset is used as a proxy for profitability. The average return on asset of selected banks over a period between 2011/12 up to 2020 is 3.4 %. This implies sample Ethiopian private commercial banks that were included in this study earned an average of 3.4 cents of net income for a single birr investment in their asset years from 2011/12 up to 2020. The least profitable observation is 1.8% for CBO in the fiscal year of 2019 which implies that the bank generates 1.8 cent returns per one birr invested whereas the most profitable observation is 6.8% where a bank generates 6.8 cent returns per one birr investment in banks which belongs to AbB in the year of 2012. The standard variation statistics implies the variation in profitability among selected banks is 0.9% which indicates that the variation of the profitability between the selected banks was very small.

The rate of deposit measured by the ratio of total deposits to total liabilities ranges from a minimum of 92% to a maximum value of 95% with mean value of 87.7% % and standard deviation of 8% respectively.

The other bank specific factor affecting liquidity of Ethiopian private commercial banks is asset quality of banks. The mean value of the percentage of non-performing loans in the total amount of loans and advances is 23% with the maximum and minimum values of 52% and 0.7%, respectively. The maximum value of 52% indicates the presence of high credit risk in some of the banks and standard deviation of 0.8% showed that there is a minimum variation of NPL among the sampled private banks in Ethiopia.

The mean of funding cost, which is measured by dividing total interest expenses to total liabilities, is 2.5% with the minimum and the maximum of 1.7% and 3.2%, respectively. It means that banks are in average paid 0.25 cents for one Birr mobilized of deposits and borrowings sources. The standard deviation is 0.3% i.e. the funding cost incurred by the private commercial banks in Ethiopia is relatively close to each other.

The industry specific variable in the study is lending interest rate. It shows the average interest rate charged on loan by banks. Lending interest rate exhibit a maximum value of 14.2% over the study period whereas, the lowest observation is 11.9% interest rate. In general it shows a lowest variation 0.8% with a mean interest rate of 12.7% between periods 2012 up to 2020.

Among the macro economic variables, money supply has a mean value of 24.5% with a maximum and minimum value of 30.3% and 17.0% respectively. As per the result money supply had a standard deviation of 4.5% shows that there is small variation from its mean.

The other macro-economic variable, real GDP growth in Ethiopia for the sample period has a mean value of 8.9% with a maximum and a minimum value of 10.4% and 6.1 % respectively. There is a small variation of real GDP growth towards its mean value over the periods under study with the value of standard deviation of 1.4%.

4.2 Correlation Analysis among Variables

Prior to regression result, it is important to check the correlation between different variables on which the analysis is built. A correlation is the way to index the degree to which two or more variables are associated with or related to each other. This section of the study deals with the

correlation analysis of the studied variables. The purpose of undertaking correlation analysis is to check whether there is multicollinearity problem in the model and to indicate whether the variables move together or not in the same direction and the correlation coefficient indicates the strength of a linear relationship between two variables. Values of the correlation coefficient are always ranged between positive one and negative one. A correlation coefficient of positive one indicates that a perfect positive association between the two variables; while a correlation coefficient of negative one indicates that a perfect negative association between the two variables. A correlation coefficient of zero, on the other hand, indicates that there is no linear relationship between the two variables.

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

Table 4.2 Correlation matrix of variables

Variables	LR	BS	ROA	RD	QA	CF	LIR	MS	GDP
LR	1.000								
BS	-0.749	1.000							
ROA	0.486	-0.367	1.000						
RD	-0.116	0.101	-0.151	1.000					
QA	0.279	-0.480	0.091	0.031	1.000				
CF	-0.214	0.191	-0.123	0.140	-0.168	1.000			
LIR	-0.544	0.638	-0.320	0.078	-0.375	0.205	1.000		
MS	0.369	-0.341	0.108	-0.168	0.234	-0.067	-0.505	1.000	
GDP	0.240	-0.361	0.118	0.019	0.166	-0.062	-0.774	0.349	1.000

Source: NBE and sample private Bank's annual report computed through STATA 13

The correlation matrix presents correlation analysis of liquidity risk (LR) with independent variables. Based on the above correlation matrix, liquidity risk (LR) has a positive correlation with ROA, quality of asset, money supply and GDP. Whereas, bank size, rate of deposit, costs of fund and lending interest rate have a negative correlation with liquidity risk. From those

variables, bank size has a relatively strong negative correlation with liquidity risk. In general, there is no perfect correlation between dependent and independent variables as there is no +1 or -1 correlation between variables.

4.3 Testing Assumptions of Classical Linear Regression Model (CLRM)

The researcher has conducted diagnostic tests before the regression analysis is carried out to make sure that the regression model is fitted. In the way to make sure the model is valid, consistent and reliable the researcher has applied the following tests and the results of the tests are presented in the following sections.

4.3.1 Test for whether average value of the error term is zero

The first assumption required is that the average value of the errors is zero. In fact, if a constant term is included in the regression equation, this assumption will never be violated. Thus, since the constant term α is included in the regression equation, the average value of the error term involved in this study expected to be zero.

4.3.2 Normality Test

According to Brooks (2014), if the residuals are normally distributed, the distribution will have a coefficient of excess kurtosis of zero. One of the most commonly applied tests for normality is the Bera-Jarque (BJ) test. According to Bera-Jarque normal data test the data is not normal if the p value is less than 0.05. If p value is greater than 0.05 the null hypothesis would be accepted, the error term of the model is normally distributed. The hypotheses for the normality test formulated are as follow: H0: the data is normally distributed,   H1: the data is not normally distributed.

Table 4.3 Normality Test

Skewness/Kurtosis tests for Normality

------- joint ------

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj_chi2(2)	Prob>chi2
Residuals	126	0.381	0.195	2.500	0.287

Source: STATA13 result for Skewness/Kurtosis test

According to Bera-Jarque Skewness/Kurtosis test for normal data the error term is normally distributed since p value is 0.287 which is above 0.05. And both the probability of skewness and kurtosis is above 5%. In this case we have enough evidence to say the error term of the model is normally distributed and the data is consistent with a normal distribution assumption. Thus, the null hypothesis that the data is normally distributed should not be rejected since the p-value is in excess of 5 percent significance level. It can conclude that there is no problem of normality.

4.3.3 Heteroskedasticity Test

It has been assumed that the variance for the error terms is constant. This is known as the assumption of homoscedasticity. If the errors do not have a constant variance, they are said to be heteroskedastic. To test this assumption, the researcher used the White's test.

Table 4.4: Heteroskedasticity Test

White's test for Ho: homoskedasticity

against Ha: unrestricted heteroskedasticity

chi2 (44)   =   32.04

Prob > chi2 =   0.9099

Cameron & Trivedi's decomposition of IM-test

Source	chi2	Df	P
Heteroskedasticity	32.040	44	0.910
Skewness	7.460	8	0.488
Kurtosis	1.290	1	0.256
Total	40.790	53	0.890

Source: STATA13 result for white's test

Generally, as shown from the above table, white's test confirms that there is absence of heteroskedasticity in the model. The p value in white's test of heteroskedasticity is 0.909 since the p-value is considerably in excess of 0.05 we couldn't reject the null hypothesis of homoscedasticity.

4.3.4 Test for Autocorrelation

It is assumed that the error terms are uncorrelated with one another. If the errors are not uncorrelated (correlated) with one another, it would be stated that they are "auto correlated" or

that they are "serially correlated". The consequences of ignoring autocorrelation when it is present are similar to those of ignoring heteroskedasticity. Breusch– Godfrey tests allow examination of the relationship between error term and several of its lagged values at the same time. Therefore, to check the presence of autocorrelation in this study, the researcher used the popular Breusch-Godfrey tests to test up to the rth order.

The hypothesis for the autocorrelation test was formulated as follow:

H0: There is no autocorrelation problem in the model.

H1: There is autocorrelation problem in the model.

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

Table 4.5: Test for autocorrelation

Breusch-Godfrey LM test for autocorrelation

chi2	Df	Prob>Chi2
43.810	31	0.063

Source: STATA13 result for Breusch-Godfrey LM test

As showed on the above table the p value in Breusch-Godfrey LM test for autocorrelation is 0.063 which is higher than the significance level of 5%. Thus, it can be concluded that there is no autocorrelation problem in the model and couldn't reject the null hypothesis.

4.3.5 Multicollinearity Test

This assumption is concerned with the relationship exist between explanatory variables. If an independent variable is an exact linear combination of the other independent variables, then we say the model suffers from perfect collinearity, and it cannot be estimated by OLS (Brooks 2008). In order to detect the degree of multicollinearity of independent variables, variable inflation factor (VIF) or tolerance value is used. Variable inflation factor (VIF) or tolerance

value is used interchangeably. According to Ahmad and Ariff (2007) and Gujarati, (2004) if the variable inflation factor (VIF) is more than 10 and tolerance level less than 0.10 it indicates a serious multicollinearity problem. The tolerance value is between zero and one if it approaches zero it indicates collinearity problem and when it approaches 1 no multicollinearity problem. According to Table 4.6 below, variable inflation factor (VIF) of each independent variable is below 10 and has a mean VIF value of 2.019. So this test showed that there is no multucollinearity problem among variables.

Table 4.6: Multicollinearity test

Variance inflation factor

	VIF	1/VIF
LIR	4.904	.204
GDP	2.927	.342
BS	2.095	.477
MS	1.402	.713
QA	1.388	.721
ROA	1.253	.798
CF	1.097	.912
Rd	1.087	.92
MeanVIF	2.019	.

Source: STATA13 result for Variable inflation factor test

4.4. Selection of Model (Fixed Effect versus Random Effect Model)

The econometrics model used to identify the effect of bank specific and macroeconomic factors on liquidity risk of private commercial banks in Ethiopia is a balanced panel data regression model which should be either fixed effects or random effect model. In order to analyze this panel data the study employ either fixed or random effect model based on Hausman test. Hausman test is based on the null hypothesis in favor of random effect model estimator. If p value is higher than 0.05 (insignificant) random effects is preferable and if p value is lower than 0.05 (significant) use fixed effect is preferable. H0: Random effects model is appropriate. H1: Fixed

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

Table 4.7: Hausman test

Hausman (1978) specification test

	Coef.
Chi-square test value	10.094
P-value	.258

Source: STATA13 result for Hausman test

As shown on the above table of Hausman specification test, the P-value of the test is 0.258, which is more than 5% level of significance. Hence, the null hypothesis is failed to reject at 5 percent of significant level. Therefore, Random effect model is appropriate for this study.

4.5 Panel Data Regression Result

This section discussed the empirical findings from the econometric results on the determinants of liquidity risk of private commercial banks in Ethiopia. In this section, the relationship between the dependent variable and independent variables are discussed on the basis of the findings on this empirical study of random effect regression model. The dependent variable, liquidity risk of Ethiopian private commercial banks, is measured by ratio liquid assets to total assets of banks.

The following empirical model is used in order to identify the determinants that can affect the liquidity risk of private commercial banks of Ethiopia.

$LR_{it} = \alpha + \beta_1 (BS_{it}) + \beta_2 (ROA_{it}) + \beta_3 (RD_{it}) + \beta_4 (QA_{it}) + \beta_5 (CF_{it}) + \beta_6 (LIR_t) + \beta_7 (MS_{it}) + \beta_8 (GDP_{it}) + \varepsilon_{it}$

The following table presents the regression result of the determinants of Ethiopian private commercial banks liquidity risk measured by the ratio of liquid asset to total assets.

Table 4.8 Random effect panel model regression result of liquidity risk

Variable	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
BS	-.121	.017	-7.32	0	-.153	-.089	***
ROA	1.783	.587	3.04	.002	.632	2.933	***
RD	.026	.06	0.43	.665	-.092	.145	
QA	-1.45	.72	-2.01	.044	-2.861	-.039	**
CF	-1.353	1.73	-0.78	.434	-4.744	2.038	
LIR	-2.27	1.263	-1.80	.072	-4.745	.205	*
MS	.243	.119	2.03	.042	.009	.477	**
GDP	-1.352	.597	-2.27	.023	-2.521	-.183	**
Constant	1.767	.227	7.79	0	1.323	2.212	***

Mean dependent var	0.219	SD dependent var	0.087	
Overall r-squared	0.653	Number of obs	126.000	
Chi-square	214.400	Prob > chi2	0.000	
R-squared within	0.624	R-squared between	0.713	

*** *p<.01, ** p<.05, * p<.1*

Source: STATA13 result for random effect regression

Multiple regression analysis is conducted to establish the relationship between liquidity risk and the independent variables. The multiple regression equation is stated below.

LRit = 1.767 - 0.121(BSit) + 1.783 (ROAit) + 0.026 (RDit) - 1.45 (QAit) - 1.353 (CFit) - 2.27 (LIRt) + 0.243 (MSit) - 1.352 (GDPit) + εit

The panel random effect estimation regression result in the above table 4.8 shows a coefficient intercept (α) is 1.767. This means, when all explanatory variables took a value of zero, the average value LR would take 1.767 unit and statistically significant at 1% of significance level.

The above table also showed the result of random effect estimation on determinants of liquidity risk which is measured by liquid asset to total assets and the independent variables which includes bank specific, industry specific and macroeconomic variables on 126 observations taken from fourteen Ethiopian private commercial banks over nine years span with balanced panel data. As shown on appendix III, the coefficient of determination in this model is given by R-squared, which is the goodness of fit of the model is 65.3% and Adjusted R-squared of 62.97%, which means 65.3% of variation of Ethiopian private commercial banks liquidity risk can be explained by the variation on bank size, return on asset, rate of deposit, quality of asset, cost of fund, lending interest rate, money supply and Gross domestic product growth rate. The remaining 34.70% of changes was explained by other determinants which are not included in this model. So, the explanatory power of the model is substantially good.

And the overall test of significance, Prob > chi2 is 0.0000 shows jointly statistical significance of coefficients and linearity in parameters. This implies the overall model is statistically significant even at 1% level of significance since p-value is 0.000

As it is shown on table 4.8 above, out of eight explanatory variables bank size, return on asset, quality of asset, lending interest rate, money supply growth and GDP growth rate have a significant effect on liquidity risk of private commercial banks. Among these statistically significant variables, bank size and return on asset are significant at 1% level of significance. And the other variables, i.e., quality of assets, money supply growth and GDP growth rate had a statistically significant effect at 5% level of significance and lending interest rate has a significant effect on liquidity risk at 10% level of significance. The other variables such as rate of deposit and cost of fund have insignificant effect on liquidity risk of private commercial banks in Ethiopia.

In assessing the coefficients of the independent variables, return on asset, rate of deposit and money supply growth have a positive or direct relationship with liquidity risk of private commercial banks which suggest that, increase in these independent variables result in increasing in liquidity risk and decrease in these explanatory variables result decrease in liquidity risk of

Ethiopian private commercial banks. While the rest; bank size, quality of assets, cost of fund, lending interest rate and GDP growth rate have a negative coefficient which shows that these explanatory variables have an inverse relation with liquidity risk of private commercial banks. i.e., increase in these independent variables result in decreasing in liquidity risk and vice versa.

And also the coefficient sign of bank size, return on asset, cost of fund and lending interest rate is in-line with the expected sign whereas the coefficient sign of rate of deposit, quality of asset, money supply and GDP is in contrary with the expected sign.

4.6. Discussions for Results of Panel Data Regression Analysis

In this section, the relationship between the dependent variable and each independent variable is discussed on the basis of the findings on the study.

Bank Size

The proxy for bank size in this study is the natural logarithm of total asset and hypothesized as bank size has positive and significant impact on banks liquidity risk. The result in this study found that bank size had a negative and statistically significant impact on liquidity risk of Ethiopian private commercial banks with the p-value of 0.000 which is in line with the null hypothesis, so it has accepted. And a coefficient of - 0.121 indicated that an increase in an asset of banks by birr 1, being other factors held constant, results in a 12 cents decrease in banks liquidity risk. The studies of Melese (2015), Mehdi and Abderrassoul (2014), Malik (2013) and Shaha, Khan, and Tahir (2018) found out that size of banks has a positive effect on the bank's liquidity i.e. larger banks are more liquid than smaller banks. This showed that a bank with a large size or Amount of assets can overwhelm the liquidity risk and has less liquidity risk.

Profitability (ROA)

Profitability in this study is measured by the return on asset (ROA). The regression result shows that, profitability has a positive and statistically significant effect on liquidity risk at 1% level of significant and a positive coefficient of 1.783 interpreted that, taking other independent variables constant, a one unit increase/decrease in return on asset leads to a 1.783 unit increase/decrease in liquidity risk of Ethiopian private commercial banks in the same direction..

The positive coefficient (direct relationship) is supported by financial theory which is higher profit is the return of higher risk. As loans and advances are the major sources of profitability through interest income, the increase on loans leads to decrease in liquid asset so; the private banks with higher return on asset face higher liquidity risk. Therefore, the hypothesis stated on effect of profitability on liquidity risk is in line with the regression result so, the hypothesis is accepted.

Rate of Deposit

The measurement used to measure rate of deposit in this study is ratio of total deposits to total liabilities. As the result of random effect regression on Table 4.8 revealed that, rate of deposit is insignificant variable with a p value of 0.665 and a positive coefficient of 0.026. The positive sign of the coefficient indicates that the banks deposit and liquidity risk has direct relationship; that means a one unit increase in deposit rate leads to 0.06 unit increase in liquidity risk of Ethiopian private commercial banks and vice versa. The study of Sopan & Dutta (2018) is in contrary with this study, indicated that deposit measured by the ratio of deposits over total liabilities has a positive relationship with Liquidity. i.e., the increase in amount of deposits held by a bank relative to its total liabilities can increased liquidity position and reduces the liquidity risk of banks.

But, banks relying more heavily on deposit could face larger liquidity shocks (Algers, 1999). Thus, given an increase in demand deposits, banks might tend to invest more in loans than in liquid assets. And also the rate of deposit has a controversial effect on the liquidity of banks on the side of the types of depositors. For instance, if the majority of the depositors of the bank are business firms, corporations, schools, college etc., the bank will have to maintain high liquidity because of unpredictable. This is similar to the findings of Shah, Khan, Shah, and Tahir (2018), Ibish Mazreku, Fisnik Morina, Valdrin Misiri, Jonathan V. Spiteri (2019) and Lastuvkova (2017). Conversely, if the deposits are mostly made by individual customers and are of personal nature, the bank can operate with less liquid cash. Thus, the hypothesis rate of deposit has a significant negative effect on liquidity risk is rejected.

Quality of Asset

The proxy for quality of asset is the share of non-performing loans on total volume of loans & advances. The regression result of the model indicates that quality of asset has a negative and statistically significant effect on liquidity risk of Ethiopian private commercial banks at 5% level of significance. A negative coefficient of (-1.45) indicated that, taking all other things constant, a one unit increase on asset quality of banks leads to a 1.45 unit decrease on liquidity risk and vice versa. This means banks with a better assets quality are more likely to manage liquidity on short horizon and thus can reduce liquidity risk. The negative and statistically significant effect of ratio of non-performing loans to total loans on liquidity risk is consistent with the result of Malik and Rafique (2013) on Pakistan commercial banks and Vodova (2011) on Czech Republic commercial banks. The hypothesis formulated is in contrary with the regression result so the hypothesis on quality of asset is rejected.

Cost of Fund

As the result of random effect regression on Table 4.8 revealed that, cost of fund that is measured by the ratio of total interest expense to total liability is insignificant variable with a p value of 0.434 and a coefficient of -1.353. Thus, the null hypothesis of funding cost has a negative significant effect on liquidity risk should be rejected. A negative sign of the coefficient indicates that cost of fund and liquidity risk of Ethiopian private banks have an inverse relationship mean that, a one unit change in cost of fund leads to 1.353 units change in liquidity risk of private banks of Ethiopia in opposite direction. i.e., one unit increase in funding cost tends to increase liquidity by 1.353 units and decrease liquidity risk by1.353 units and vice versa even if the effect is insignificant at 10%. When the Ethiopian private commercial banks increase their funding cost then the depositors tends to save their excess money in banks in order to gain more interest income, in turn the position of liquid assets is increased and decreased risk of liquidity.

Lending Interest Rate

Lending interest rate shows average interest rate charged on loan by banks and it is found to be significant at 10% level of significance with p-value of 0.072 and with high coefficient of (-2.27). The negative coefficient is interpreted as holding other variables constant, one unit increase in lending interest rate results 2.27 units decrease in liquidity risk of private commercial banks in Ethiopia. Thus the null hypothesis is in line with this result and it supports the fact that higher lending interest rates discourage banks to lend more which results a higher liquidity

position and in turn reduced liquidity risk. This result is in line with the findings of Vodova (2013) and Kinfe (2019) as regression result reveals positive significant relationship between lending interest rate and liquidity and the reverse is true for liquidity risk but different from the findings of Nigist (2015) and Liza (2018) who gets insignificant relationship between average lending interest rate and liquidity position of commercial banks of Ethiopia.

Money supply

The current year broad money less broad money previous year divided by previous year broad money is a proxy used to measure money supply in this study. The regression result of the model indicates that money supply has a positive and statistically significant effect on liquidity risk of Ethiopian private commercial banks at 5% level of significance which is in contrary with the expected hypothesis so, the hypothesis should be rejected and different from the result of Kinfe (2019) who found that a negative relation between money supply and liquidity risk. And as shown on table 4.8, the positive coefficient of 0.243 showed that, money supply and liquidity risk have a direct relationship meaning that a 1 unit increase in money supply leads to a 0.243 units increase in liquidity risk and vice versa.

Any increase in supply of money tends to cause all interest rates and yields in general in the demand of money to fall. For a given real interest rate, a higher rate of money growth directly lowers the return to money relative to other assets. This resulted in lower payments to relocated agents and therefore a lower amount of insurance to depositors (Edgar A. Ghossoub, 2010). Thus the increase in money supply growth rate decreases the level of liquidity position of banks which in turn increases liquidity risk.

Gross Domestic Product

GDP is one of the macroeconomic variables that affect liquidity risk of private commercial banks in Ethiopia and it is measured by the real growth rate. As per the regression result, GDP has a negative and statistically significant effect on liquidity risk with a p- value of 0.023 and coefficient of -1.352. Thus, the null hypothesis, that real GDP has a positive significant effect on liquidity risk should be rejected. A negative sign of the coefficient indicates that, 1% increase in growth rate of GDP of the country; other factors remain constant, resulted around 135.2 % increase in liquidity position of banks and a decrease in liquidity risk of banks. This could be due

to the fact that the increase in real GDP growth rate increases the consumer income and thus savings can be boost to increase the liquid assets available in banks. Thus it can reduce the liquidity risk of banks.

Generally as it has seen from the above regression result, it is clearly identified that among those determinant variables of liquidity risk; bank size, profitability (ROA), quality of asset, Lending interest rate, money supply and GDP had statistically significant effect on liquidity risk of Ethiopian private commercial banks Whereas rate of deposit and cost of fund are not the main determinant factors for Ethiopian private commercial banks liquidity risk measured by liquid asset to total assets ratio in the study .

Table 4.9: Summary of explanatory variables, hypothesis test and decisions

Explanatory Variables	Expected sign	Actual sign	Decision
Bank Size	Negative & significant	Negative & significant	Accepted at 5%
Profitability(ROA)	Positive & significant	Positive & significant	Accepted at 5%
Rate of Deposit	Negative and significant	Positive & insignificant	Rejected
Quality of Asset	Positive & significant	Negative & significant	Rejected
Cost of Fund	Negative & insignificant	Negative & insignificant	Rejected
Lending Interest Rate	Negative & significant	Negative & significant	Accepted at 10%
Money Supply	Negative & significant	Positive & significant	Rejected
Real GDP growth rate	Positive and significant	Negative and significant	Rejected

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter deals with the summary of findings, major conclusions and recommendations based on the findings of the study discussed in the previous chapter. The chapter is organized in to four sub-sections, the first section presented the summery of findings, the second section presented major conclusions of the study, the third section deals with the recommendations drawn from the study and the last section presents suggestions for further research area.

5.1. Summary of Finding

The main objective of the paper is to examine the bank specific, industry specific and macroeconomic determinants of liquidity risk of Ethiopian private commercial banks. The study used a balanced panel data of fourteen private commercial banks with 126 observations for the period 2012 to 2020 for analysis. To comply with the objectives of the study, five banks specific, one industry specific and two macroeconomic variables are used. The bank specific variables included in this study are; bank size, profitability, rate of deposit, quality of asset and cost of fund, the industry specific variable in this study is only lending interest rate and also from macroeconomic variables; money supply and gross domestic product are included in the study. The bank specific data are mainly collected from annual audited financial reports of the selected sample private banks and the industry specific and the macroeconomic data are collected from annual reports of national bank of Ethiopia.

The data in the study is presented and analyzed by using descriptive statistics and correlation analysis and also a random effect panel regression model by using STATA 13 package is employed to identify the effect of independent variables on liquidity risk of Ethiopian private commercial banks which measured by liquid asset to total assets.

5.2 Conclusions

To achieve the objectives of the study, the researcher used eight explanatory variables and the regression result of the study revealed that, about 65.3% of variation of Ethiopian private commercial banks liquidity risk can be explained by the variation of these eight independent variables such as bank size, return on asset, rate of deposit, quality of asset, cost of fund, lending

interest rate, money supply and Gross domestic product growth rate. The remaining 34.70% of changes is explained by other determinants which are not included in this model.

The result of the study also showed that among the bank specific variables, bank size, return on asset and quality of asset have a significant effect on liquidity risk of private commercial banks. From these bank specific variables except ROA which has a positive effect on liquidity risk, both bank size and quality of asset have a negative effect on liquidity risk of private commercial banks of Ethiopia over the study period. And the industry specific factor, lending interest rate has a negative effect on liquidity risk and statistically significant at 10% level of significance. This result supports that the higher lending interest rate do not encourage banks to lend more which results in a higher liquidity position and which lower liquidity risk in the bank.

With respect to macroeconomic variables both money supply and GDP growth rate have statistically significant effect on liquidity risk at 5% level of significance. Among these two variables, Money supply has a positive effect and GDP has a statistically negative effect on liquidity risk of private commercial banks of Ethiopia in that the increase in money supply in the country reduces the interest rates and it in turn discourages depositors to deposit more in the bank rather than hold it on hand this case decreased the liquidity position of banks and raised liquidity risk. But, the increase in real GDP growth rate increases the consumer income and savings. Thus it increased the liquid assets available in banks and can reduce the liquidity risk of banks.

Therefore, the study reached on conclusion that bank size, Profitability, quality of asset, Lending interest rate, money supply and GDP are significant determinants of liquidity risk of Ethiopian private commercial banks. Whereas rate of deposit and cost of fund are not the main determinant factors for liquidity risk of private commercial banks of Ethiopia.

Finally, When it is viewed from the general hypothesis, the coefficient sign of bank size, return on asset, cost of fund and lending interest rate is in-line with the expected sign of the hypothesis but the coefficient sign of rate of deposit, quality of asset, money supply and GDP is in contrary with the expected sign of the hypothesis, so these hypothesis are rejected.

5.3. Recommendations

As shown on the findings of the study, it can be identified that from the determinant factors used in this study the researcher found that; bank size, profitability (ROA), quality of asset, lending interest rate, money supply and GDP growth rate are significant drivers of liquidity risk in Ethiopian private commercials banks during the study period. So, focusing and taking the necessary action on these indicators can reduce the probability of liquidity risk in Ethiopian private commercial banks. Based on the findings of the study the following possible recommendations are forwarded:

The negative sign of bank size indicates that a bank with a large size or Amount of assets can overwhelm the liquidity risk and has less liquidity risk. Thus, big banks needs to manage their liquidity position and shall give due attention on resource mobilization and liquidity management. And also the researcher would like to recommend that for small size banks to increase their volume of assets and thus it enables them to increase the liquidity position of the bank.

Profitability (ROA) is a powerful bank specific driver of liquidity risk of private commercial banks in Ethiopia. But the positive sign showed that a positive relationship between profitability and liquidity risk. So, the banks needs to control loans and advances which are the major sources of their profitability through interest income since the increasing of loans and advances to increase return on loan could reduce the amount of liquid assets in banks.

As assets quality has statistically significant and negative relation with liquidity risk, Ethiopian private commercial banks shall give priority so as to maintain the banks with a better assets quality and more likely to manage liquidity on short horizon.

The negative sign of lending interest rate shows that there is a negative relation between lending interest rate and liquidity risk in which higher lending interest rate discourages banks to lend more which results higher liquidity position which is lower liquidity risk. So, banks ensure that this policy is always implemented.

From macro-economic variables included in this study, both money supply and GDP growth rate have statistically significant effect on liquidity risk at 5% level of significance. Among these two variables, Money supply has a positive effect and GDP has a statistically negative effect on

liquidity risk of private commercial banks of Ethiopia. Thus, banks in Ethiopia not only be concerned about internal structures and procedures, and they also consider both the internal environment and the external environment together in developing their strategies to efficiently manage their liquidity position.

Generally, it is compulsory to Ethiopian private commercial banks to have better 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.

5.4. Suggestions for Further Researches

As this study identifies only limited bank specific, industry specific and macroeconomic variables for a sample of fourteen private commercial banks in Ethiopia, there have to be further researches which include more determinant factors that affect the liquidity risk of Ethiopian private commercial banks. And also it is recommended to assess bank's liquidity policies and procedures to overcome and manage their liquidity risk.

REFERENCES

Abadi, A., and Ahangarani, M., (201) "Evaluating Factors Affecting on Liquidity Risk of Banks

    Listed at Tehran Stock Exchange", *International Journal of Management and Humanity* Sciences 3(4): 1707-1718.

Abdul Gainyy, A., Zainol Z., & Ahmed N.H. (2017) "Determinants of liquidity risk in dual and

    Fully Islamic banking system", *Evidence from Malaysia and Sudan. Islamic Business School* ISSN: 2321-8819.

Abdu Mohammed (2019) "Firm-Specific and Macroeconomic Determinants of Banks Liquidity"

    Empirical Investigation from Ethiopian Private Commercial Banks, Journal of Accounting, Finance and Auditing Studies 5(2):123-145.

Abraheem. N., Yahiya, Muhammad and Ab Razak,(2020) "Liquidity Creation & Competition in

    The Banking Industry Pre and Post Arab Spring in MENA Region", *Academy of Accounting and Financial Studies Journal* 24(1): 1528-2635.

Akhtar, M. F., Ali, K., and Sadaqat, S. (2011) "Liquidity risk management a comparative study

    Between conventional and Islamic banks of Pakistan", *Interdisciplinary Journal of Research in Business* 1(1): 35-44.

Akter.A. and Mahmud .K. (2014) "Liquidity-Profitability Relationship in Bangladesh Banking

    Industry", *International Journal of Empirical Finance* 2(4):143-151.

Alzoubi, T. (2017): Liquidity Risk in Islamic Banks. *Banks and Bank Systems, 12(3).*

Al-Harbi, A. (2017) "Determinants of banks liquidity: evidence from OIC countries", *Journal of*

    Economic and Administrative Sciences 33(2), 164 - 177.

Amin, S. I. M., Mohamed, S., & Shah, M. E. (2017) "Do Cost Efficiency Affects Liquidity Risk

    In Banking?" *Evidence from Selected OIC Countries, Journal of Economic Malaysia,* 51(2):55-71.

Annual reports of National bank of Ethiopia for the years of 2011/12 to 2019/20.

Annual reports of each selected private commercial banks of Ethiopia.

Assfaw, A. M. (2018) "Determinants of the Financial Performance of Private Commercial Banks

    In Ethiopia", Bank Specific Factors Analysis, *Global Journal of Management and Business Research: C Finance, 18(3).*

Bagh, T. (2017) "The Causative Impact of Liquidity Management on Profitability of Banks in
Pakistan", an Empirical Investigation, *International Journal of Academic Research in Economics and Management Sciences,* 6(3).

Bank for International Settlement (2008): Principles for Sound Liquidity Risk Management and
Supervision: Basel Committee on Banking Supervision.

Barclay, M. & Smith, C. Jr.(1995)"The maturity structure of corporate debt" *Journal of Finance
,* 50, 609–631.

Baumol, W. (1952): "The Transactions Demand for Cash: Inventory Theoretic Approach", *The
Quarterly Journal of Economics* 66(4-11): 545-556.

Belaid, F., Bellouma, M., Omir, A. , (2016) "Determinants of liquidity risk", Evidence From
Tunisian bank *International Journal of Emerging Research in Management and Technology* ISSN: 2278-9359, 5(9): 95-104.

Belete, F., (2015): Factors Affecting Liquidity of Selected Commercial Banks in Ethiopia, MSC
Thesis, Addis Ababa University.

Berger, A., and Bouwman, C., (2009): Bank Liquidity Creation, Published by Oxford University
Press on behalf of The Society for Financial Studies, doi:10.1093/rfs/hhn104, downloaded from http://rfs.oxfordjournals.org/ at Addis Ababa University Libraries on May 18, 2016

Berhanu (2015): Determinants of Banks Liquidity and their Impact on Profitability: Evidenced
From eight commercial banks in Ethiopia*,* MSc Thesis, Addis Ababa University.

Bhati, S., Zoysa, A. De, & Jitaree, W. (2012) "Determinants of liquidity in nationalized banks of
India", *School of Accounting, Economics and Finance University of Wollongong,* NSW2522 Australia, pp.1–11.

Bitar, M., Saad, W., & Benlemlih, M. (2016) "Bank risk and performance in the MENA region:
The importance of capital requirements", *Economic Systems, 40*(3), pp.398-421.

Boadi, E. K., Li, Y., & Lartey, V. C. (2016) "Determinants of Liquidity of Rural and Community
Banks in Ghana", *British Journal of Economics, Management & Trade*, 12(3), pp.1–15.

Brooks, C. (2008) Introductory Econometrics for Finance. 2nd ed., New York: Cambridge
University Press.

Brooks, C. (2014) Introductory Econometrics for Finance, 3rd ed., New York: Cambridge
     University Press.

Bunda, I., & Desquilbet. J.-B. (2008) "The bank liquidity smile across exchange rate regimes of
     36 emerging countries commercial banks", *International Economic Journal* 22(3): 361-
     386.

Creswell, J W, (2009) Research design: Qualitative, quantitative, and mixed methods
     Approaches, 3rd ed., New York: *Sage Publications.*

Cucinelli, D. (2013) "The determinants of bank liquidity risk within the context of euro area",
     Interdisciplinary Journal of Research in Business 2(10): 51-64

Das, A., & Ghosh, S. (2007) "Determinants of credit risk in Indian state owned banks, an
     Empirical investigation*", Economic Issue 12(2).*

Diamond, D. W., & Rajan, R. G. (2015) Liquidity Risk, Liquidity Creation, and Financial
     Fragility *: A Theory of Banking*, 109(2), 287–327.

Duttweiler, R. (2009) Managing Liquidity in Banks: A Top down Approach. John Wiley and
     Sons Ltd. *https://doi. org/10.1002/9781119206415*

Edem, D. (2017) "Liquidity Management and Performance of Deposit Money Banks in Nigeria,
     An Investigation", *International Journal of Economics, Finance and Management
     Sciences,* 5(3), 146–161.

Edgar, A. G., (2010) "Liquidity Risk and Banks' Asset Composition: Implications for Monetary
     Policy", Southern Economic Journal 77(2): 465-481.

Elah M. (2017) "Factors Influencing Liquidity in Leading Banks a Comparative Study of Banks
     Operating in UK and Germany Listed on LSE", *Imperial Journal of Interdisciplinary
     Research* (IJIR). 3(2), 2454-1362, http://www.onlinejournal.in.

Emawayih T.,(2017): Determinants of Financial Risks of Private Commercial Banks in Ethiopia.
     MSc Thesis, Addis Ababa University.

Ezirim F. (2005) "Impact of Bank Lending on Liquidity of Banks in Nigeria", IJJS *Publication
     Journal Vol 2: 44-56.*

Feng W. (2017): Analysis of Factors Affecting Bank Liquidity. *International Conference on*

Financial Management, Education and Social Science.

Fentaw, L. (2016) "Determinants of Commercial Bans Liquidity Risk", *Evidence from Ethiopia.*

Research journal of finance and accounting, 7 (15), 47- 61

Ferrouhi, E., and Lehadiri A., (2013) "Liquidity Determinants of Moroccan Banking Industry",

International Research Journal of Finance and Economics 2/118, 1450-2887.

Ferrouhi, E., (2014) "Bank Liquidity and Financial Performance", Evidence *from Moroccan*

Banking Industry, Verslas: Teorija ir praktika / Business: Theory and Practice Issn 1648-0627. http://www.btp.vgtu.lt, 15(4): 351–361.

Goodhart, C. (2008) "Liquidity risks management", *Financial Stability Review*, Vol. 11 No. 6.

Guglielmo, M.R. (2008) "Managing liquidity risk", Bank Accounting & Finance, Vol. 8.

Gujarati, D. (2004) Basic Econometrics, 4th ed. Boston: Mc Graw Hill.

Gurpreet Kaur and Renuka Sharma (2017) "Study of Determinants of Liquidity Risk in Context

To Indian Banking Industry" *International Journal of Applied Business and Economic Research,* 22(15): 153-163.

Jenkinson, N. (2008) "Strengthening regimes for controlling liquidity risk – some lessons from

The recent turmoil", *BIS Review*, 1–9.

Keynes, J. (1936) The General Theory of Employment, Interest and Money, United Kingdom:

Palgrave Macmillan.

Kinfe (2019): Determinants of liquidity risk: evidence from Ethiopian private commercial banks.

MSc thesis in Accounting and Finance, Addis Ababa University.

Kiyotaki, N. and Moore, J. (2008) Liquidity, Business cycles and monetary policy, Princeton

University, unpublished.

Koul, L (2006) Method of educational research, 5th edn., New Delhi : Vikas publishing House.

Laurine, C. (2013)"Zimbabwean commercial banks liquidity risk determinants after dollarization

Journal of Applied Finance & Banking, 3(6): 97–114.

Liza (2018): Determinants of bank liquidity risk of commercial banks of Ethiopia. MSc

Thesis in Accounting and Finance, Addis Ababa University.

Lucchetta, M., (2007) "What do data say about monetary policy, Bank Liquidity and Bank Risk

Taking?" Economic Notes: *Review of Banking, Finance and Monetary Economics* 36(2):189-203.

Mazreku, I., et, al. (2019) "Exploring the Liquidity Risk Factors in the Balkan Region Banking System", *European Research Studies Journal,* XXII (1), 96–108.

Mazur, A, W., & Szajt, M., (2015) "Determinants of liquidity risk in commercial banks in the European Union", *Argumenta economics 2(35)* ISSN 1233-5835.

Melese,N.(2015) "Determinants of banks liquidity : Empirical evidence on Ethiopian commercial Banks*", Journal of Economics and Sustainable Development* 6(15): 36–47.

Miller, M., & Orr, D. (1966) "A model of the demand for money by firms", *Quarterly Journal of Economics (80): 413-435.*

Moore, (2009) "How do financial crises affect commercial bank liquidity?" *Evidence from Latin America and the Caribbean. Department of Economics. University of the West Indies, Barbados.*

Moussa, M. 2015) "The Determinants of bank liquidity: Case of Tunisia", *International journal Of Economics and Financial Issues* 5(1): 249-259, ISSN: 2146-4138.

Mugenyah, L.O., (2015): Determinants of liquidity risk of commercial banks in Kenya. *MBA* Thesis, University of Nairobi.

Munteanu, I. (2012) "Bank liquidity and its determinants in Romania", Procedia - *Social and Behavioral Sciences,* 3(12), 993–998.

Muranaga, J. and Ohsawa, M. (2002) "Measurement of liquidity risk in the context of market Risk calculation", *working paper, Institute for Monetary and Economic Studies*, Bank Of Japan, Tokyo.

Naser.A, Mohammed A.and Masomeh. E. (2013) "The effect of liquidity risk on Performance of Commercial banks", *International research journal of applied and basic science* 4(6): 1624-1631.

National Bank of Ethiopia (2010): Bank Risk Management Guidelines.

Nigist.M, (2015) Determinants of Banks Liquidity: Empirical evidence on Ethiopian commercial Banks. MSc thesis in Accounting and Finance, Addis Ababa University.

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

Reserve Bank of India (2012) Liquidity Risk Management by Banks. Retrieved from https://rbid
    ocs.rbi.org.in/rdocs/notification/PDFs/CLRMB071112_F.pdf

Reserve Bank of India (2013) Banking Stability - A Precursor to Financial Stability (*Working
    Paper No. 01).* Mumbai: Rabi N. Mishra, S. Majumdar and Dimple Bhandia.

Roman, A., & Sargu, A. C. (2015) "The Impact of Bank - Specific Factors on Commercial Banks
    Liquidity", *Empirical Evidence from CEE Countries. Procedia Economics and Finance*
    20(15): 571–579.

Samuel, A., (2015): Determinants of commercial banks profitability: The case of Ethiopian
    Commercial banks. MSc thesis in Accounting and Finance, Addis Ababa University.

Sekoni, A. (2015) "The Basic Concepts and Feature of Bank Liquidity and Its Risk.*" MPRA
    Paper, (67389).*

Shamas, G., & Zainol, Z.(2018)"The Impact of Banks Determinants on Liquidity Risk : Evidence
    From Islamic Banks in Bahrai"*, Journal of Business & Management 6(1).*

Sheefeni, J. P. S., & Nyambe, J. M. (2016) "Macroeconomic determinants of commercial banks'
    Liquidity in Namibia", *European Journal of Business, Economics, and Accountancy*,
    4(5): 19–30.

Shen, C., Chen, Y.K., Kao, L.F., & Yeh, C (2009) Bank liquidity risk and performance retrieved
    From www.finance.nsysu.edu.tw.

Singh, A., & Sharma, A. K. (2016) "An empirical analysis of macroeconomic and bank-specific
    Factors affecting liquidity of Indian banks", Future *Business Journal, 2(1), 40-53*

Sopan & Dutta (2018) "Determinants of liquidity risk in Indian banks: a panel data analysis",
    Asian Journal of Research in Banking and Finance 8(6): 47-59.

Sudirman, I. M. S. (2015) Determinants of Bank Liquidity in Indonesia: Dynamic Panel Data
    Analysis. isssn, 1–16. https://doi.org/10.2139/ssrn.2583985

Syed, S. A., Imran, K., & Shaha, M (2018)"Factors Affecting Liquidity of Banks", Empirical
    Evidence from the Banking Sector of Pakistan. Colombo Business Journal 9(1): 1–18.

Thiagarajan, S., Ayyappan, S. & Ramachandran A., (2011) "Credit risk determinants of public

And private sector banks in India", *European Journal of Economics, Finance and Administrative Science ISSN 1450-2275 Issue 34.* Retrieved from www.eurojournals.com

Thong, T. Q., (2013) "Factors affecting liquidity risk in the system of Vietnamese commercial Banks", Economics *Article, University of Economics HCMC.*

Tibebu, K. (2019): Determinants of Banks Liquidity: The Case of Private Banks in Ethiopia. *Research Journal of Finance and Accounting, 10(3), 32–40.*

Tirualem, M., (2009): Assessment of liquidity risk management of commercial banks of Ethiopia. MSc thesis in Accounting and Finance, Addis Ababa University.

Tseganesh, T. (2012): Determinants of Banks Liquidity and its Impact on Financial Performance: Empirical study on commercial banks in Ethiopia. MSc thesis In Accounting and Finance, Addis Ababa University.

Tsion, F., (2015): Risk management practice of Ethiopian commercial banks. MSc thesis in Accounting and Finance, Addis Ababa University.

Tran,T, Yen T. N., Thuy T. H. Nguyen, & Long Tran,(2019) "The determinants of Liquidity risk Of commercial banks in Vietnam", *Journal of Banks and Bank Systems*14 (1): 94-110.

Vento, G. and Ganga, P. L. (2009) "Bank Liquidity Risk Management and Supervision", *journal Of Money, Investment and Banking* 10(2): 79-126.

Vodova, P. (2011) "Liquidity of Czech commercial banks and its determinants", *International Journal of mathematical models and methods in applied sciences 5(6):1060-1067*

Vodova, P. (2013) "Determinants of commercial bank liquidity in Hungary", Financial Internet Quarterly, ISSN 1734-039X, 9(3): 64-71.

Wojcik-Mazur, A., & Szajt, M. (2015) "Determinants of liquidity risk in commercial banks in The European Union", Argumenta economic 2(35): 25-47.

Wubayehu (2017): Factors Affecting Liquidity of commercial banks in Ethiopia. MSc thesis in Accounting and Finance, Addis Ababa University.

APPENDIXES

Appendix I: Pooled OLS Regression Result

```
. regress lr bs roa rd qa cf lir ms gdp
```

Source	SS	df	MS
Model	.624084496	8	.078010562
Residual	.331104493	117	.002829953
Total	.955188988	125	.007641512

```
Number of obs =     126
F(  8,   117) =   27.57
Prob > F      =  0.0000
R-squared     =  0.6534
Adj R-squared =  0.6297
Root MSE      =   .0532
```

lr	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
bs	-.1185702	.0151099	-7.85	0.000	-.1484947	-.0886458
roa	2.05562	.5927016	3.47	0.001	.8818053	3.229434
rd	.0348509	.0617618	0.56	0.574	-.0874651	.157167
qa	-1.388384	.7267036	-1.91	0.059	-2.827582	.0508147
cf	-1.68969	1.702472	-0.99	0.323	-5.061347	1.681967
lir	-2.136056	1.246824	-1.71	0.089	-4.605325	.3332131
ms	.25032	.1237005	2.02	0.045	.0053375	.4953024
gdp	-1.298858	.6103826	-2.13	0.035	-2.507689	-.0900275
_cons	1.709033	.230552	7.41	0.000	1.252437	2.165629

Appendix II: Hausman test for Fixed versus Random Effect

```
. hausman fixed .
```

	Coefficients			
	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
bs	-.1436956	-.1210094	-.0226862	.0399312
roa	.8690418	1.782723	-.9136815	.1395538
rd	-.0110573	.0261936	-.0372509	.
qa	-1.872569	-1.450036	-.4225331	.1515532
cf	.175514	-1.353087	1.528601	.8669341
lir	-2.176858	-2.269639	.0927812	1.897606
ms	.2156625	.242579	-.0269164	.
gdp	-1.416442	-1.352113	-.0643289	.4118165

```
                   b = consistent under Ho and Ha; obtained from xtreg
        B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

               chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                       =        10.09
            Prob>chi2 =      0.2585
            (V_b-V_B is not positive definite)
```