# **Determinant of Banks Liquidity commercial banks Of Ethiopia:** *Evidence from Newly established commercial Banks of Ethiopia*

*A Research paper Submitted to the Department of Accounting and Finance in ırtial Fulfillment of the Requirements for the Award of the Bachelor Degree (BA)in Accounting and Finance*


*BY:*

**SISAY GIRMA**

*ADVISOR*:

**Mr KEFIYALEW B. (MSc)**


**WOLKITE UNIVERSITY**

**COLLEGE OF BUSINESS AND ECONOMICS**

**DEPARTMENT OF ACCOUNTING AND FINANCE**

**DECEMBER, 2020**

**WOLKITE, ETHIOPIA**

**Abstract**

*Liquidity is one of the major concerns for banks and thus achieving the optimum level of liquidity is crucial. The main objective of this study was to identify the determinants of liquidity of newly established commercial banks of Ethiopia. In order to achieve the research objectives, data was collected from a sample of eight newly established commercial banks of Ethiopia over the period from 2008 to 2018. Bank specific variables were analyzed by using the balanced panel fixed effect regression model. Bank's liquidity is measured by ratio: liquid asset to total asset. The findings of the study revealed that, bank size has negative and statistically significant impact on liquidity; while profitability and loan loss reserve have positive and statistically significant impact on liquidity of Ethiopian newly established commercial banks. However, capital adequacy has no statistically significant effect on the liquidly of Ethiopian newly established commercial banks.*

. Keywords: Determinants of Liquidity, Ethiopian newly established Commercial Banks, Liquidity Ratio, and Balanced Panel Fixed Effect Regression Model.

**Acknowledgements**

First and for most, I would like to thanks the almighty of GOD for all his assistance to accomplish my Project.

My sincere and deepest gratitude goes to my Advisor and Instructor, Kefiyalew B (Msc), for his constructive comments, valuable suggestions and good guidance. I equally thank him for his kindness and necessary encouragement.

I also want to give special thanks to my friend, ROBA, AB and ZED, for his valuable comments and guidance. My deepest gratitude goes to My mother and brothers, who have in one way or another assist me morally and economically to accomplish this work. At last but not the least, my great thanks go to all my friends and Classmates those who provided me all the necessary assistance when doing my thesis.

# CONTENTS

**List of Abbreviation and Acronyms**

AIB: ……...……. Addis International Bank

AIB: ……...……. Awash International Bank

BOA: …….……...Bank of Abyssinia

CAR: …….……...Capital Adequacy Ratio

CBO: …….…….…….... Cooperative Bank of Oromia

CLRM: …….…….…… Classical Linear Regression Model

DB: …….…... Dashen Bank

LIQ: ……... Liquidity

MoFED: …….……. Ministry of Finance Economic Development

NBEB: ……. ...National Bank of Ethiopia Bill

NBE:……...…. National Bank of Ethiopia

NIB: ……...…….……Nib International Bank

UB: ……. United Bank

WB…….....Wogagen Bank

BCBS:……Basel Committee for Banking Supervision

BIS……..Bank for International Settlement

CAP:……Capital adequacy

CBE:……Commercial Bank of Ethiopia

HP:……..Hypothese

MoFED:…….. Ministry of Finance and Economic Development

ROA:……Return on Assets

REM:……Random Effect Model

# Chapter One

This chapter provides the general overview of the study; therefore, it included the following sections: back ground of the study, statements of the problems, Objectives of the study, research hypotheses, Scope of the study, significance of the study and organization of the study.

## 1.1 Background of the study

Antwi et al. (2013)General Banking business involves the mobilization of funds from excess or surplus units of the economy and giving out to deficit units as loans and advances. It alsoplays intermediary function in the economy through channeling financial resources from depositor's economy units to borrower's economy unit; hence it remained and will continue to be an important institution for economy as they play the most fundamental role in the payments system. Especially in developing countries like Ethiopia, the role of capital market is small, and as a result commercial banks become the most dominant financial institutions in the financial system.

The performance of these functions by banks opens them to several risks; prominent among these is liquidity risk. Shumet (2016) over the past years, the subject of bank liquidity creation become more and more in focus of research in financial intermediation. The widely accepted view today is that banks create liquidity on both the asset and liability side of their balance sheets by transforming maturities of balance sheet items. This process allows banks to hold illiquid monetary items for the non-bank public and give out liquid monetary items to both depositors and borrowers. The idea of bank liquidity is therefore an extension of the classic maturity transformation, as the bank creates liquidity on both sides of the balance sheet by offering access to long term loans and contemporaneous access to short term deposits (Berger and Bouwman 2006). Liquidity risk is the risk of loss to a bank resulting from its inability to meet its needs for cash. The liquidity of a commercial bank is its ability to fund all contractual obligations as they fall due. These may include lending and investment commitments and deposit withdrawals and liability maturates, in the normal course of business (Amengor, 2010). In other words, bank liquidity refers to the ability to fund increases in assets and meet obligations as they fall due. Bank for International Settlements (2008) defines

liquidity as the ability of bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. Also Yeager and Seitz (1989) define Liquidity as the ability of a financial institution to meet all legitimate demands for funds. Thus, liquidity risk arises from the fundamental role of bank in the maturity transformation of short term deposits into long term loans. Therefore, banks have to hold optimal level of liquidity that can maximize their profit and enable them to meet their obligation.

As was pointed out by Diamond and Dybvig (1983), one of the key reasons why banks are fragile is their role in transforming maturity and providing insurance as regards depositors‟ potential liquidity needs. Also Gennaioli et al. (2012) argued by linking financial innovation with financial fragility in that neglect of risks can lead to over issuance of innovative.

Since the Ethiopian financial sector comprised of mainly banks which accounts for about 94% of the total assets with remaining held by insurance companies and micro finance institutions (MFIs) with 3% each (Pfister et al. 2008). Hence, the process of financial intermediation in the country depends heavily on banks. With the absence of secondary market, the banking sector in Ethiopia currently acts as the link that holds the country's economy together. Thus, keeping their optimal liquidity for banks in Ethiopia is not only important for the banking sector but also for the economy as a whole. However, on the area of factors affecting commercial banks liquidity unexplored part in Ethiopia. Therefore, empirical studies are essential to identify the determinants of liquidity in Ethiopian commercial banks.

## 1.2. Statement of the problem

Bank for International Settlements (2008), defines liquidity as the ability of bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses.

It is known that the banking sector is the main sector and plays an important role in the economic growth of a country. This is done through facilitating payments and match savers (surplus economic units) with borrowers (deficit economic units). However, this fundamental role of banks in the „maturity transformation‟ of short term deposits into long term loans make banks inherently vulnerable to liquidity risk, both of an institution specific nature and that which affects markets as a whole. This is due to the fact that loans are regarded as the most profitable service yet the most risky service provided by banks. It is most risky due to the likeliness of credit risk which may eventually end up in liquidity shortage. This indicated by; as default risk increases, liquidity risk also increases (Ericsson & Renault 2006).

This has caused banks to take measures like evaluating the type of borrowers and their creditworthiness. Also, liquidity creation is one of the preeminent function of banks but a major source of their vulnerability to shocks (e.g. Bryant 1980; Diamond and Dybvig 1983; Calomiris and Kahn 1991). Therefore, virtually every financial transaction or commitment has implications for abanks liquidity.

Liquidity risk has become one of the main concerns of financial institutions following the financial crisis of 2007. As it clearly indicated in the financial crisis, liquidity and liquidity risk is very up to date and important topic. Therefore, identifying the major determinants of banks‟ liquidity has become one of the

major activities and responsibilities of all banks and their regulators so as to keep a control on liquidity risk. Depending on the sources of their liquidity; the liquidity position of banks could be affected by bank specific factors, macroeconomic factors, and government/central bank regulations (Vodová 2012). Firm specific factors consisted; capital adequacy, nonperforming loan, bank size, profitability, and loan growth while the macro economic factors were consisted; gross domestic products/ real GDP growth, inflation rate, and interest rate margin. Hence, identifying the major determinants of commercial banks liquidity in Ethiopia is open for empirical analysis. In Ethiopia beginning from the last two decades the banking sector has been playing important role in the economic development of the country.

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

As it deeply indicated in the literature part most studies on the title of this study done in abroad (i.e. Vodová 2012; Valla et al. 2006), with some of them in Africa (i.e Chagwiza 2011; Laurine 2013) but in Ethiopia few or possible to say finger counted studies were made related to banks liquidity but most of them overlooked in studying on the determinants of banks liquidity directly and focused on to study points like the relationship between liquidity and performance of banks. Among this effort the studies conducted by Worku (2006) „liquidity and its impact on performance of commercial banks in Ethiopia and Tseganesh (2012) tried to investigate determinants of banks liquidity. However, the previous researchers was no one separately studies by used bank specific variables only and not used loan loss reserve variables. Therefore, this study designed to investigate the determinants of banks liquidity (evidenced from newly established commercial bank of Ethiopia).

## 1.3. Objective of the study

There are many factors that determine bank's liquidity. This study is mainly focused on the determinants of bank liquidity on Ethiopian newly established commercial banks which enables them to determine their liquidity requirement and ensures their ability to meet up the depositor's demand or their financial obligations and maximizing their shareholders value.

### 1.3.1. General Objective

This study is to identify the determinants of bank's liquidity in Ethiopian newly established commercial banks.

### 1.3.1. Specific Objectives

Specifically, this study intended to address the following objectives;

To investigate the impact of capital adequacy on the liquidity of newly established commercial banks in Ethiopia.

To identify the impact of bank size on liquidity of newly established commercial banks in Ethiopia.

To identify the impact of profitability on the liquidity of newly established commercial banks in Ethiopia.

To examine the impact of LLR on the liquidity of newly established commercial banks in Ethiopia.

At the end, it intended to know the relationship between determining variables and liquidity of newly established commercial banks in Ethiopia.

## 1.4. Hypotheses of the Study

The purpose of this study is mainly focuses on to identify the determinants of bank's liquidity in Ethiopian newly established commercial banks. In order to evaluate and identify the determinants and the major hypotheses was tested in the case of Ethiopian newly established commercial banks.

H1o: Bank size has positive and significant impact on bank's liquidity

H2o: Profitability has negative and significant impact on bank's liquidity

H3o: Capital adequacy has positive and significant impact on bank's liquidity

H4o: Loan Loss Reserve Ratio has positive and significant impact on bank's liquidity

## 1.5. Scope of the Study

This study was identifying the determinants of bank's liquidity on Ethiopian newly established commercial banks. The scope of the study was limited to see the impact of capital adequacy, profitability, loan loss reserve, Bank size, on banks liquidity from the period 2008 to 2018 for eight commercial banks in the sample.

The rationale behind taking eleven years' data (i.e. started from 2008 to 2018) have that to include newly established commercial banks Ethiopia.

## 1.6. Significant of the Study

The issue of liquidity management has now got great attention in the Ethiopian banking industry. Moreover, the supervisory authority has required banks to have their own liquidity policy which enforces them to monitor their funding structure and their ability to handle short term liquidity problems and provide them with a better means of assessing the present and future liquidity risk associated.

Thus, this study will have great contribution to the Ethiopian commercial banks to assess their liquidity requirement and to produce their liquidity policy and to give due attention on those factors which have significant impact on bank's liquidity.

It will have also a great contribution to the exits knowledge in the area of factors determining commercial banks liquidity.

Therefore, the study as a whole was great contribution to the supervisory authority, policy makers, commercial banks and other researchers to gain knowledge about their impact the bank specific factors and liquidity of commercial banks.

## 1.7. Organizations of the Research

This research report is organized in five chapters. Chapter one provides the general introduction about the whole report. Chapter two describes the review of related literatures. Chapter three provide detail description of the methodology employed by the research. Chapter four contains data presentation, analysis and interpretation. Finally, the last chapter concludes the total work of the research and gives relevant recommendations based on the findings.

# Chapter Two

# Review of Related Literature

## Introduction

This chapter was providing information about liquidity and its implication which was made to introduce liquidity in depth, theoretical perspective of liquidity, the concepts and measurements of liquidity risk from different literatures used by different researchers in their study, the empirical findings for the determining factors of liquidity (both bank specific and macroeconomic determinants), and finally conclusion and knowledge gap were drown.

## 2.1. Theoretical perspectives of Bank Liquidity

### 2.1.1 The Need for Liquidity

According to Anyanwu (1993) liquidity simply means the ability to convert an asset to cash with minimum delay and minimum loss/cost. In the portfolio of commercial banks, liquidity assets play a very crucial role because banks operate largely with the funds borrowed from depositors in form of demand and time deposits. These liquidity assets are the essential balance sheet items which have the capacity to maintain the confidence of depositors which is the most valuable intangible asset of the commercial banking business (Spindt, 1980).

According to Nwankwo (1991), adequate liquidity enables a bank to meet three risks. First is the funding risk – the ability to replace net outflows either through withdrawals of retail deposits or nonrenewal of wholesale funds. Secondly, adequate liquidity is needed to enable the bank to compensate for the non-receipt of inflow of funds if the borrower or borrowers fail to meet their commitments. The third risk arises from calls to honour maturity obligations or from request for funds from important customers. Adequate liquidity is also needed to avoid forced sale of asset at unfavorable market conditions and at heavy loss. Adequate liquidity serves as vehicle for profitable operations specially to sustain confidence of depositors in meeting short run obligations. Finally, adequate liquidity guides against involuntary or non-voluntary borrowing from the regulatory authorities where there is a serious liquidity crisis, the bank is placed at the mercy of the Central Bank, and hence the control of its destiny may be handed over. Having adequate or sufficient liquidity to meet all commitments at all times at normal market rates of interest is indispensable for both large and small banks (Nwankwo, 1991). Liquidity is the life blood of a banking setup.

### 2.1.2 Theories of Liquidity and Liquidity Management

The liquidity management theory focuses on the liability side of bank balance sheet. This contends that supplementary liquidity could be derived from the liabilities of a bank. According

to Nwankwo (1991) the theory argues that since banks can buy all the funds they need, there is no need to store liquidity on the asset side (liquidity asset) of the balance sheet.

### 2.1.2.1 Anticipated Income Theory

This theory holds that a bank's liquidity can be managed through the proper phasing and structuring of the loan commitments made by a bank to the customers. Here the liquidity can be planned if the scheduled loan payments by a customer are based on the future of the borrower. According to Nzotta (1997) the theory emphasizes the earning potential and the credit worthiness of a borrower as the ultimate guarantee for ensuring adequate liquidity. Nwankwo (1991) posits that the theory points to the movement towards self-liquidating commitments by banks.

### 2.1.2.2 Shiftability Theory

This theory posits that a bank's liquidity is maintained if it holds assets that could be shifted or sold to other lenders or investors for cash. This point of view contends that a bank‟s liquidity could be enhanced if it always has assets to sell and provided the Central Bank and the discount Market stands ready to purchase the asset offered for discount. Thus this theory recognizes and contends that shiftability, marketability or transferability of a bank's assets is a basis for ensuring liquidity. This theory further contends that highly marketable security held by a bank is an excellent source of liquidity. Dodds (1982) contends that to ensure convertibility without delay and appreciable loss, such assets must meet three requisites. Liability Management Theory Liquidity management theory according to Dodds (1982) consists of the activities involved in obtaining funds from depositors and other creditors (from the market especially) and determining the appropriate mix of funds for a particularly bank. This point of view contends that liability management must seek the answer the following questions how do we obtain funds from depositors? How do we obtain funds from other creditors? What is the appropriate mix of the funds for any bank? Management examines the activities involved in supplementing the liquidity needs of the bank through the use of borrowed funds.

### 2.1.2.3 Commercial Loan Theory

This theory has been subjected to various criticisms by Dodds (1982) and Nwankwo (1992). From the various points of view, the major limitation is that the theory is inconsistent with the demands of economic development especially for developing countries since it excludes long term loans which are the engine of growth. The theory also emphasizes the maturity structure of bank assets (loan and investments) and not necessarily the marketability or the shiftability of the assets. Also, the theory assumes that repayment from

the self-liquidating assets of the bank would be sufficient to provide for liquidity. This ignores the fact that seasonal deposit withdrawals and meeting credit request could affect the liquidity position adversely. Moreover, the theory fails to reflect in the normal stability of demand deposits in the liquidity consideration.

This obvious view may eventually impact on the liquidity position of the bank. Also the theory assumes that repayment from the self-liquidating assets of a bank would be sufficient to provide for liquidity. This ignores the fact that seasonal deposit withdrawals and meeting credit request could affect the liquidity position adversely.

## 2.2. Liquidity and its implication

There are several studies on bank liquidity. Adrian and Shin (2008) showed that in chaoticeconomic times, the liquidity position is important changes in it can change the whole bank reserves Indeed; Aikaeli (2006) said the determinants of excess bank liquidity. He noted that the credit risk, the right level of funding, preference of cash, the volatility of deposits is fundamental determinants of excess liquidity. On the other hand, the Basel committee (2009) explained that the viability of commercial banks depends on the position of the liquidity. Valla and SaerEscorbia (2006) studied the liquidity measures for banks in England. They found that profitability, Growth in the credit, GDP, monetary policy, interest rates have a negative impact on bank liquidity. In addition, Vodova (2011) showed that bank specific and macroeconomic variables determine significantly the bank liquidity.

After the global financial crisis, banks have begun to examine the Problems of liquidity and its importance to the overall performance of the banking sector and financial Markets. Moreover, Rauch et al.(2010) studied the determinants of bank liquidity. They found that the size of bank, profitability, and the interest rate of monetary policy are negatively associated with bank liquidity, while the value of delayed liquidity is positively associated with bank liquidity. *International Journal of Economics and Financial Issues,* On the other hand, Saxegard (2006) studied the pattern of excess liquidity in the African countries of sub-sahrienne using SVAR (structure of VaR), this result shows that excess liquidity alter transmission monetary policy so that the monetary authority could not control the demand for the currency. Gauley (2004) showed that the absorption of liquidity by monetary and authority encouraged to use the tools of monetary instruments such as the title of the central bank that have a major interest. This leads to inefficient transmission of monetary policy. Brio (1997, 2001) argued that the balance of extant liquidity before the intervention of the central bank should be different from the exposit liquidity on the balance after the intervenance of central bank.

Edlin and Jaffee (2009) claimed that the excess liquidity is due to credit crunch and banks are reluctant to allocate credits.

Lei and Song (2013) showed that the performance of bank and the creation of liquidity are negatively related to the on large banks in China, while they are positively related to small banks. Chen and Phuong (2013) showed that securitization and synergy credits, deposits reduce the incentives for the bank to have liquid assets in its balance sheet. Monetary policy has a negative effect on excess liquidity. On the other hand, they showed that the decrease in the flow of money in proportion to deposits of the banking sector lead to decrease of the ratio (loans / deposits). Kamau et al.(2013) showed that 42.2% of the variation in the liquidity of 27 commercial banks in Kenya is explained by the change of several factors (profitability, obligation, policy management, credit rating, monetary policy), 57.8% is explained by others factors.

Choon et al. (2013) studied the determinants of liquidity of 15 commercial banks in Malaysian period (2003-2012). They used specific factors (size of bank, capital adequacy, profitability, credit), macroeconomic factors (GDP, interbank rate, financial crisis). They used panel data (fixed effect model with annual data). The empirical results show that all factors included are significant except interbank rate. Factors that positively influence bank liquidity are (non-performing loans, profitability, GDP). Others factors negatively affecting the liquidity (bank size, capital adequacy, financial crisis).

Hovarth et al. (2012) studied a sample of Czech banks between 2000 and 2010. They observed a negative relationship between the creation of liquidity and bank capital. This shows that Basel III reduces liquidity creation, but the creation of high liquidity can reduce bank solvency. Indeed, Berger and Bouwman (2009) Showed 2 assumptions related to the motivation of the bank's capital to create liquidity. The idea of creating liquidity of the bank predicts that the capital increase improves the ability of the bank to create liquidity. But the hypothesis of financial fragility predicted that the increase in capital reduces liquidity creation (Diamondand Rajan, 2001). On the other hand, Lartey et al. (2013) have shown positive relationship between liquidity and profitability of listed banks in Ghana. Shachera (2012) studied the relationship between liquidity and profitability of banks in Iran over the period (2002-2009), he found a nonlinear relationship between profitability and possession of liquid assets.

### 2.1.4 Measurement of Liquidity in Commercial Banking

As of Nwankwo (1991) the ability of banks to meet their financial obligation is usually measured by examining their balance sheet and relating same to its current assets to some or all of their current liabilities.

Fundamentally, a firm‟s liquidity rests not so much on its balance sheet as on whether or not it is doing well and earning money. A strong balance sheet with a large current ratio simply postpones liquidity problems for a short while if the firm is losing money. Therefore, the complexity of devising an appropriate measure arises from the uncertainties surrounding both size of the prospective needs for liquidity at any given time, and the availability of sources of liquidity sufficient to meet them. There is also the impact of active asset and liability management on liquidity management. An accurate measurement of liquidity therefore requires going beyond the technical liquidity indicated by the stock flow approach to an assessment of the stock of circumstances under which a bank could come under pressure likely to affect worthiness in the market place. Liquidity can be measured either as a stock at a point in time or as a flow over time. The most widely used is the stock approach. One of these is the loan/deposit ratio which is the most popular and commonly used measure in commercial banking. According to Nwankwo (1991), under this measure, all bank loans are lumped together on the basis that they are the most liquid of all bank assets. These are then compared with the total deposit as a proxy for the liquidities that banks could be called upon honor. An increase in the ratio indicates a less liquid position and vice versa.

## 2.3. Determinants of newly established commercial banks liquidity

### 2.3.1. Bank specific factors

#### Bank Size and Bank Liquidity

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 (Iannotta et al. 2007). 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 (Vodova, 2011). 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 17 the liquidity demands of customers (Kiyotaki and Moore, 2008). Therefore, “too big to fail” status of large banks could lead to moral hazard behaviour and excessive risk exposure and thus there can be negative relationship between bank size and liquidity. In agreement for positive relationship between bank size and liquidity (Rauch et al ,2009 and Berger and Bouwman (2009), state that smaller bank tend to emphasis on intermediation processes and transformation activities and they do have smaller amount of liquidity. Hence, there can be positive relationship between bank size and liquidity.

**Profitability**

Profitability is the ability of a bank to generate revenue in surplus of cost, in relation to the bank's capital base. However, as indicated in the literature; there have been varying reports on the relationship between bank liquidity and profitability. The first argument is that banks holding more liquid assets benefit from a betterview in funding markets, dropping their financing costs and increasing profitability, which indicated the positive relationship between liquidity and profitability. On the other hand other researchers argue that, holding liquid assets imposes an opportunity cost on the bank given their low return relative to other assets which indicated the inverse relationship between liquidity of bank and profitability. Hence, this study supported the second argument that there was a negative relationship between liquidity and profitability. To proxy profitability return on asset (i.e. the ratio of Net income after tax to total asset) was used as of (Molyneux and Thornton 1992).

**Capital adequacy and bank liquidity**

(2002) has defined banks' capital as common stock plus surplus plus undivided profits plus reserves for contingencies and other capital reserves. In addition, since a bank's loan-loss reserves also serves as a buffer for absorbing losses, a broader definition of bank capital include this account. Opposing to the standard view of liquidity creation in which banks create liquidity by transforming liquid liabilities into illiquid assets, the recent theories indicate the creation of liquidity by changing asset mixes. Raghavan (2003) showed that banks can create more or less liquidity by simply changing their funding mix on the liability side. (Maness and Zietlow, 2004), shows that capital may also affect banks asset portfolio composition, thereby affecting liquidity creation through a change in the asset mix. Capital adequacy ratios (CAPs) are a measure of the amount of a bank's core capital expressed as a percentage of its total asset.

Loan losses reserves are the amount of funds that banks are required to keep on deposit in accounts designated for such purpose by the central bank. Loan Losses reserves constitute a monetary policy instrument which a central bank uses to varying degrees depending on the conditions of the financial system. The degree of monetary policy contraction using this instrument is determined by the Loan Losses reserve ratio, which may be identical or differentiated, and by the reserving base to which the ratio is applied.

To this effect, Loan Losses reserve requirement may be applied to either total or part of deposits, or reservable liabilities may include other categories, such as liabilities in respect of loans and proceeds derived

from securities issued. By changing the Loan Losses reserve ratio, the central bank induces a reduction or expansion of commercial banks' lending potential, and withdrawal and/or creation of liquidity. In market economies, Loan Losses reserve ratio is used as an instrument for regulating bank credit potential rather than bank liquidity. Reserve ratio LLR As the ratio of nonearning assets to total deposits for bank i in year t.

**H4: Loan Losses Reserve ratio hassignificant and positive impact on banks liquidity**

## 2.4. Review of Related Empirical Studies

## Related Empirical Studies in Emerging Economies

Bank specific and macroeconomic determinants of liquidity of English banks were studied by (Aspachs et al, 2005). The researchers used unconsolidated balance sheet and profit and loss data for a panel of 57 UK-resident banks, on a quarterly basis, over the period 1985 to 2003. They assumed that the liquidity ratio as a measure of the liquidity was dependent on the following factors: Probability of obtaining the support from LOLR, which should lower the incentive for holding liquid assets, interest rate margin as a measure of opportunity costs of holding liquid assets expected to have negative impact, bank profitability which is according to finance theory negatively correlated with liquidity, loan growth, where higher loan growth signals increase in illiquid assets, size of the bank expected to have positive or negative impact, gross domestic product growth as an indicator of business cycle negatively correlated with bank liquidity, and short term interest rate, which should capture the monetary policy effect with expected negative impact on Liquidity.

The study made on bank specific determinants of liquidity on English banks studied (Valla et al.2006) and assumed that, the liquidity ratio as a measure of the liquidity should be dependent on the following factors: bank profitability and loan growth had negatively correlated with liquidity while size of the bank is ambiguous. Liquidity created by Germany's state-owned savings banks and its determinants has been analyzed by (Rauch et al. 2009). In the first step they attempted to measure the liquidity creation of all 457 state owned savings banks in Germany over the period 1997 to 2006 and they analyzed the influence of monetary policy on bank liquidity creation. The study made on bank specific determinants of liquidity on English banks studied (Valla et al.2006) and assumed that, the liquidity ratio as a measure of the liquidity should be dependent on the following factors: bank profitability and loan growth had negatively correlated with liquidity while size of the bank is ambiguous. Liquidity created by Germany's state-owned savings banks and its determinants has been analyzed by (Rauch et al. 2009). In the first step they attempted

tomeasure the liquidity creation of all 457 state owned savings banks in Germany over the period 1997 to 2006 and they analyzed the influence of monetary policy on bank liquidity creation.

To measure the monetary policy influence, the study developed a dynamic panel regression model. According to this study, the following factors determine bank liquidity: monetary policy interest rate, where tightening monetary policy expected to reduces bank liquidity, level of unemployment, which is connected

With demand for loans having negative impact on liquidity, savings quota affect banks liquidity positively, size of the bank measured by total number of bank customers have negative impact, and bank profitability expected to reduce banks liquidity.

## Related Empirical Studies in African Countries

Chagwiza (2011) made a study on Zimbabwe, regarding the commercial banks liquidity and its determinants. The main objective of his study was to identify the determinants of liquidity in Zimbabwean commercial banks. The result of his study revealed that, there is a positive link between bank liquidity and capital adequacy, total assets, gross domestic product and bank rate. While the adoption of multi-currency, inflation rate and business cycle have a negative impact on liquidity. The other studies made by Laurine (2013) in Zimbabwe regarding Zimbabwean Commercial Banks Liquidity Risk Determinants after dollarization. The aim of his paper was that empirically investigating the determinants of Zimbabwean commercial banks liquidity risk after the country adopted the use of multiple currencies exchange rate system. To attain the intended objective, panel data regression analysis was used on monthly data from the period of March 2009 to December 2012. The result of the study revealed that, capital adequacy and size have negative and significant influence on liquidity risk whereas spread and non-performing loans have a

positive and significant relationship with liquidity risk. Reserve requirement ratios and inflation were also significant in explaining liquidity during the studied period.

## Related Empirical Studies in Ethiopia

As to the author's knowledge, the first study was conducted by Tseganesh (2012). She studied the determinants of banks liquidity and their impact on financial performance on commercial banks in Ethiopia

including both public and private banks. Her study focused on two stapes; first, to identify determinants of commercial banks liquidity in Ethiopia and then to see the impact of banks liquidity up on financial performance through the significant variables explaining liquidity. The data was analyzed by using balanced fixed effect panel regression model for eight commercial banks in the sample covered the period from 2000 to 2011 and the result of her study indicate that capital adequacy, bank size, share of non-performing loans in the total volume of loans, interest rate margin, inflation rate and short term interest rate had positive and statistically significant impact on banks liquidity. Whereas, Real GDP growth rate and loan growth had statistically insignificant impact on banks liquidity.

## 2.5. Conclusion and knowledge Gap

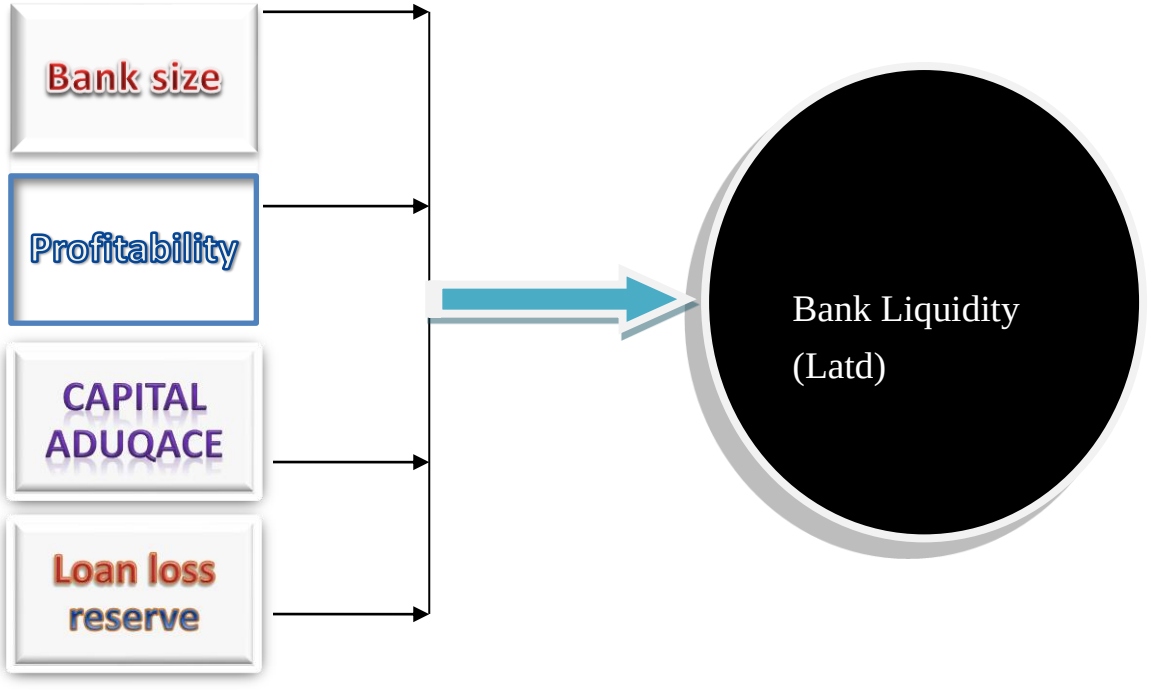
In line with the above theoretical and empirical review; liquidity is important to all business specially for banking industry since their function is creations of liquidity on both the asset and liability side of their balance sheet. It suggested that commercial banks liquidity can be affected by different factors such as bank specific, macroeconomic and regulatory factors. As it is evident in different literature (for instance Vodová 2011; 2013) the most important task is to choose the appropriate explanatory variables. Hence, the selection of variables for this study was on the basis of previous studies that reviewed in the literature and the idea of the researcher and, so it focused on bank specific variables that determine the liquidity of commercial banks in Ethiopia. The banking system came under severe stress, which necessitated central bank action to support both the functioning of money markets and, in a few cases, individual institutions. As it was discussed in the literature review part, liquidity of banks can be affected by bank specific as well as macroeconomic factors. It was also discussed that some factors which have significant impact on liquidity of banks in one country may not have the same impact on another country. Thus it is important to identify the determinants of liquidity of Ethiopian commercial banks.

As to the knowledge of the researcher, there is some numbers of study was made one of them is Tseganesh (2012) on the determinants of bank's liquidity on Ethiopian commercial banks including public banks. While there is no study made to identify the determinants of liquidity by taking onlybank specific variables and no any researcher used loan loss reserve variables.

Therefore, the objective of this study is to identify the determinants of liquidity of Ethiopian newly established commercial banks.

## 2.6. Conceptual Framework

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



# Chapter Three

# Research Methodology

This section discusses on the research hypothesis, approach and techniques adopted for the study with the aim of achieving the research objectives. The process of research usually entails problem identification, making hypothetical statements, collecting relevant data and then analyzing the data using the relevant and appropriate statistical tools. This section explains the research design and provides details regarding the population, sample and sampling technique, the research instruments used in collecting data for the study and the data collection and data analysis methods. It also discusses about the model and the components of the model both the dependent and the independent variables.

## 3.1. Research Design

The research methodology begins by show the overall research design, as the research design renders an important framework & guidelines on how to collect and analyze data. The choice is suitablyresearch design will support the researcher to satisfy the research objectives. So, it is a predominant to properly define and evaluate the research design before conducting the research. According to Creswell (2009), there are three basic research approaches; these are quantitative, qualitative and mixed research approaches. The quantitative data research depends on the measurement and analysis of statistical data to produce quantifiable conclusions. Quantitative research is a means for testing objective theories by examining the relationship among variables (Creswell, 2009). Therefore, for this study quantitative research approach is use to see the relationship between the bank liquidity of newly established commercial banks and the bank specific variables affecting banks liquidity in Ethiopia by establishing causal relationship. This study also adopted an explanatory approach by using balanced panel research design to meet the research objective. As explained by Bhattacherjee (2012), explanatory research attempts to identify causal factors and outcomes of the target phenomenon. According to Brooks (2008), a panel of data will embody information across both time and space and it measures some quantity about them over time. The advantage of using panel data is to address a broader range of issues and tackle more complex problems than would be possible with pure time-series or pure cross-sectional data alone. Panel data has also the advantage of giving more informative data as it consists of both the cross sectional information, which captures individual variability, and the time series information, which captures dynamic adjustment (Brooks 2008 pp 488).

## 3.2 Source and Method of Data Collection

In order to carry out any research activity information should be gathered from proper sources. Consistent and reliable research indicates that research conducted by using appropriate data collection instruments increase the credibility and value of research findings (Koul, L 2006). The sources of data for this research are secondary sources. Bank specific data wascollected from audited financial statements (i.e. Balance Sheet and Profit & Loss Statement) of each newly established commercial banks included in the sample from the NBE.

## 3.3. Study Population & Sampling Frame

The study population includes newly established commercial banks in Ethiopia. According to NBE report, at the end of June 30, 2017 there are eighteen commercial banks. The sampling frame for drawing the sample includes those newly established commercial banks having eleven years of experience as of June 30, 2015. As a result of it ten years of data (2008 to 2018) has been taken. The rationale for using years of data is to increase the number of observation.

## 3.4. Sampling Technique & Sample Size

For some researches, it is possible to collect data for the entire population as it can be manageable and data is available, while for some other researches data is collected on sample base. Sampling provides a valid alternative when it is impractical to survey the entire population and when there is budget and time constraint to surveying the entire population (Saunders et al, 2009). There are two types of sampling techniques; probability or representative sampling and non-probability or judgmental sampling. In the probability sampling, the chance or probability, of each case being selected from the population is known and is usually equal for all cases while in the non-probability sampling, the probability of each case being selected from the total population is not known (Saunders. et al, 2009). According to Bhattacherjee (2012), non-probability sampling is sampling technique in which some units of the population have zero chance of selection or where the probability of selection cannot be accurately determined rather samples are selected based on certain non-random criteria, such as quota or convenience. The sampling technique was used in this research is a non-probabilistic sampling and among the non-probabilistic sampling methods, this research uses purposive sampling. As stated by Saunders et al (2009), purposive sampling is often used when working with small samples and when we wish to select cases that are particularly informative. The researcherwas used purposive sampling by considering the availability of full data for the selected time period. The sample included those newly established commercial banks having ten years working experience in Ethiopia (i.e. from 2008 to 2018). In Ethiopia there are eighteen commercial banks having

eleven years' experience which include: Lion international Bank, Oromia International Bank, Zeman Bank, Bunna International Bank, Birhan international Bank, Abbay Bank, Addis International Bank and Dobub Global Bank.

Therefore, eight newly established commercial banks are selected and it will possible to draw a relationship among variables using 88 observations (8 banks x 11year's data).

## 3.5. Methods of Data Analysis

Later than the data are collect, it will organize and financial ratios are calculating for each bank and for each bank specific variables. And then, the next step will be analyzing and interpreting them accordingly to achieve the state objectives. In this study two kind of statistical analysis will use to test the proposed hypotheses. These are descriptive statistics and inferential statistics/multiple regression analysis to see the effect (relationship) of explanatory or independent variables on the dependent variable. The descriptive statistics of both dependent and independent variables will be work out over the sampled periods. This helps to translate the raw data in to a more meaning full form which enables the researcher to understand the ideas clearly. And then interpret with statistical description including standard deviation, mean, and minimum & maximum. Then, correlation analyses between dependent and independent variables will be made and finally a multiple linear regression and t-test analysis will use to determine the relative importance of each independent variable in influencing liquidity of Ethiopian newly established commercial banks. To conduct this, the researcher will use statistical tools E-views software. The researcher will be also perform analytical tests to ensure whether the assumptions of the classical linear regression model (CLRM) are violated or not.

## 3.6. Variable Definition & Hypotheses of the Study

This study is focus on to identify the determinants of bank's liquidity in Ethiopian newly established commercial banks through testing the hypotheses regarding to the relationships between liquidity of banks and bank specific affecting it. It is apparent that the most significant task is to select the appropriate explanatory variables. As it was discussed in the literature review part, some determinant factors which have optimistic relation with liquidity in one country may have pessimistic relation with other country and some determinant factors which have significant impact on liquidity in one country may not have significant impact on liquidity in another country. Though various bank specific and microcosm variables were conducted in the previous studies made worldwide, in this study some variables (bank specific ) are included .The study also consider which determinate factors could influence the liquidity of banks in the Ethiopia newly established commercial banks context. Therefore, the following variables are selected based on

Ethiopian context and previous relevant studies. The description and operational definition of selected variables is discussed here under.

### 3.6.1. Dependent Variables

Liquidity of Banks: Bank for International Settlements (2008) defines liquidity as "the ability of bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses". Liquidity can also be defined as a measure of the relative amount of asset in cash or which can be quickly converted into cash without any loss in value available to meet short term liabilities. As it was discussed in the literature, there are two methods of measuring liquidity of banks which are liquidity ratios (stock approach) and liquidity gap (flow approach). The liquidity gap is the difference between assets and liabilities whereas liquidity ratios are various balance sheet items ratios which identify liquidity trends. The liquidity measure provides suggestions about the level of liquidity on which the commercial banks are operating. The first approach, liquidity ratio, uses diverse balance sheet ratios and it is simple to work out whereas, the second approach, funding gap, is the difference between inflows and outflows which is complex to measure because it is more data intensive and there is no standard technique to predict inflows and outflows. Most academic literatures prefer liquidity ratio due to a more standardized method and therefore, this study is intended to use liquidity ratios, to measure liquidity of commercial banks, due to the availability of data. For the purpose of this study, the following three types of liquidity ratios, which are most of the time used by the National Bank of Ethiopia and which were previously used by Vodova(2011, 2012, 2013), Tseganesh(2012), Rafique & Malik (2013) and Chagwiza, (2014) are adopted.

### Liquid Asset to Total Asset Ratio (L):

The liquid asset to total asset ratio gives information about the general liquidity shock absorption capacity of a bank. In general, when the ratio is high, it tells us that the bank has a capacity to absorb liquidity shock and that the bank is in a better position to meet its withdrawals. While, the higher this ratio may indicate inefficiency since liquid assets, most of the time non-earning assets, yield lower income. As a result maintaining optimum level of liquidity is required to optimize the trade-off between liquidity and profitability by investing excess liquid asset to generate higher return.

$$\boldsymbol{L = \frac{\text{Liquid Asset}}{\text{Total asset}}}$$

## 3.6.2. Independent Variables

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

**Size of the Bank (SIZE)**

The bank's total asset is another bank specific variable that affects the liquidity of a bank. Bank size measures its general capacity to undertake its intermediary function. There are two opposing arguments regarding to the relationship between bank liquidity and bank size. The first view is the "too big to fail" hypothesis which considers negative relationship between bank size and liquidity whereas; the second view considers there is a positive relationship between bank size and liquidity. In this study, bank size is measured by the natural logarithm of total asset of the bank and it is expected positive relationship between bank size and liquidity and then draws the following hypothesis.

***H1: Bank size has negative and significant impact on bank's liquidity***

**Profitability of the Bank (ROA):**

Liquidity needs constrain a bank from investing its entire available fund. Banks need to be both profitable and liquid which are inherently conflicts between the two and the need to balance them. As more liquid asset is investing on earning assets such as loans & advances, profitability will increase by the expense of liquidity. As a result, banks should always strike a balance between liquidity and profitability to satisfy shareholders' wealth aspirations as well as liquidity requirements. The study made by Owolabi, et al (2011) evidence that, there is a trade-off between profitability and liquidity in that, the Increase in either one would decrease the other. The other study made by Vodova (2013), suggest a negative influence on bank profitability (measured by return on equity) and bank liquidity. Most commonly, profitability is measured by return on asset (ROA) and return on equity (ROE). For the purpose of this study, the proxy of profitability is return on asset that

measures the overall financial performance of banks and the return on asset (ROA) is measured by the ratio of net profit before tax to total asset.

$$\boldsymbol{ROA = \frac{Net\ profit\ after\ tax}{\text{Total asset}}}$$

Accordingly, the following hypothesis is drawn,

**H2: Profitability has negative and significant impact on bank's liquidity**

## Capital Adequacy of Banks (CAP)

Capital is the amount of own fund available to support the bank's business and act as a buffer in case of adverse situation (Athanasoglou et al**.** 2005). Capital of a bank includes paid up capital, undistributed profit (retained earnings), legal reserve or other reserves and surplus fund which are kept aside for contingencies. Regulators in most countries define and monitor CAP to protect depositors, thereby maintaining confidence in the banking system. Though capital adequacy ratio is measured by the ratio of total capital to risk weight asset, in some literatures it can be also measured by the ratio of capital to total asset and then in this study, the proxy for capital adequacy is the ratio of total capital of the bank to total asset of the bank. This ratio measures how much of bank's asset are funded with owner's funds and is a proxy for the capital adequacy of a bank by estimating the ability to absorb losses. As it is discussed in the literature review part, there are two opposing theoretical views regarding to the relationship between banks liquidity and capital adequacy. Some previous studies such as the "financial fragility-crowding out" theories predict that higher capital reduces liquidity creation (Diamond and Rajan (2000, 2001) and hence, there is negative relationship between capital adequacy and bank liquidity whereas, Al-Khouri (2012) found that, bank capital increases bank liquidity through its ability to absorb risk and thus the higher is the bank's capital ratio, the higher is its liquidity creation. This study considered there is a positive relationship between capital adequacy & liquidity and draws the following hypothesis.

$$\boldsymbol{CAR = \frac{\text{Total Equity}}{\text{Total Asset}}}$$

**H3: Capital adequacy has positive and insignificant impact on bank's liquidity**

## LLR: Loan Losses Reserve Ratio

LLR is a significant accrual and bank managers havesignificant discretion in the determination of LLR estimates and such discretion can be exploited to meet opportunistic financial reporting objectives rather than solely for credit risk purposes (Wahlen, 1994), (iv) bank LLR estimate is a crucial micro-prudential surveillance tool that bank supervisors use to assess the quality of banks' loan portfolio, (v) bank LLR is also

a crucial indicator of the in formativeness of bank accruals from an accounting standard-setting perspective, and (vi) bank LLR has become the most debated accounting number in bank financial reporting after bank profitability and derivatives since the 2008 global financial crisis. Bank LLRs play a crucial role for bank stability and soundness while fulfilling their lending function to individuals, firms and governments; therefore, bank regulators require banks to keep adequate (or sufficient) LLRs to mitigate expected losses although there is no agreement among banks for what constitutes 'adequate' or 'sufficient' loan loss

Provisioning. Moreover, despite the growing concern that bank managers can opportunistically exploit their discretion to overstate LLRs when expected credit risks are actually low, bank supervisors still require banks to maintain higher LLRs persistently as a safety net for present or future loan. Loan Losses measured by loan losses reserve ratio to total loan.

**H4**:**Loan loss Reserve ratio has Positive and significant impact on banks liquidity.**

**Table: 3.1. Description of the variables and their expected relationship**

| Variables | Symbol | Operational definition | Source | Expected sign |
|---|---|---|---|---|
| Dependent | | | | |
| Liquidity (L) | L | The ratio of liquid asset to total asset | Annual report | NA |
| Capital Adequacy | CAP | Share of equity on total asset | Annual report | + |
| Profitability | ROA | The ratio of net profit before tax to total asset | Annual report | – |
| Bank Size | SIZE | Natural logarithms of total asset | Annual report | + |

| | | | | |
|---|---|---|---|---|
| Loan Loss Reserve Ratio | LLR | Loan Losses Reserve/ Total Loan | Annual report | + |

## 3.7. **Model Specification**

As it was discussed in the research design section of this study, the nature of data used is balanced panels data will be deeming to have advantages over simple cross sectional and time series data. Panel data involves the pooling of observations on the cross sectional over several time periods (Brooks 2008). The panel data or longitudinal data comprises of both cross-sectional elements and time-series elements; the cross-sectional element is reflecting by the sample of Ethiopian newly established commercial banks and the time-series element is reflecting in the period of study (2006-2018). This study, considered whether the use of the particular variable makes economic sense in Ethiopian newly established commercial banks context. The regression model used for this study will be adopt from Vodova(2011,2102, 2013), Tseganesh(2012), Rafique & Malik (2013). Thus, the following equation indicated the general model for this study.

$$Lit = \alpha + \beta Xit + \delta i + \varepsilon it$$

where *Lit* is one of the three liquidity ratios for bank *i* in time *t*, *Xit* is a vector of explanatory variables for bank *i* in time *t*, $\alpha$ is constant, $\beta$ are coefficient which represents the slope of variables, $\delta i$ denotes fixed effects in bank *i* and $\varepsilon it$ is t he error term. The subscript *i* denote the cross-section and *t* representing the time-series dimension.

Therefore the general models which incorporate all of the variables to test the determinants of bank's liquidity were:

$$L1it = \alpha + \beta 1\ (CAPit) + \beta 2\ (ROAit) + \beta 3\ (LLRit) + \beta 4\ (BSit) + \delta i + \varepsilon it$$ **……(Model )**

**Where:**

***Lit*:** represents the bank's liquidity measured by liquid asset to total asset ratio of i**th** bank on year "t**"**

***CAPit*:** is capital adequacy ratio of ithbank on the year "t"

***ROAit**:* is the return on asset of ith bank on the year "t".

***BSit*:** is the size of ith bank on the year "t"

***LLRt*:** is the Loan Loss Reserve Ratio of ith bank on the year "t".

*δi*: denotes fixed effects in bank "i"

***εit*:** is a random error term.

The bank specific variables are both cross-sectional and time variant whereas the  are only time variant but are convert into panel data type. Among the above model, in which liquidity is measured by liquid asset to total asset was used as a benchmark in this study while the other two ratios are used for strength check. This ratio is also favored by the National Bank of Ethiopia in which the liquidity requirement directive is issued basedonthisratio.

# Chapter Four

# Data Presentation and Analysis

## 4.1 Introduction

In this chapter the collected data were presented and important correlation and regression results were discussed accordingly, first fixed vs. random effect model test was made this help to identify which model is appropriate for the data, next the classical liner regression model/CLRM test or Diagnostic tests were made, correlation analysis between study variables and the descriptive statistics of dependent and independent variables were followed. The results of fixed effect panel data regression model were presented, and finally the most important part; that was detail discussion of results based on the findings and empirical literatures reviewed for the study were made.

## 4.2 Descriptive Statistics of the variables

This section provides the descriptive statistics of dependent and independent variables which helped to have the overall look at variables being studied. It indicated the result of all variables

calculated as mean, median, standard deviation, minimum and maximum values with the number of observations under the study was demonstrated in tabular form.

***Hence, table 4.6***below presented the descriptive statistics values of the study variables that were both dependent and independent variables for the study period and all variables comprised 88 observations. The study used the dependent variable which measures the liquidity of sampled commercial banks and four independent variables were included onlybank specific variables. Bank specific variables were capital adequacy, bank size, profitability, and loan loss reserve variables are they study. Mean value shows the average value of all sampled banks in each variable; whereas the minimum and maximum values of each variable from all sampled banks were shown in the minimum and maximum statistics respectively. Sample variation from the mean was shown in the standard deviation statistics which is the square root of variance and normally good if it is low.

| | L | BS | ROA | CAR | LLR |
|---|---|---|---|---|---|
| | | | | | |
| Mean | 31.14933 | 3.959559 | 2.886123 | 0.002999 | 0.019733 |
| Maximum | 63.52646 | 4.742475 | 4.941177 | 0.013518 | 0.098273 |
| Minimum | 13.56117 | 2.759013 | -0.197349 | -0.000944 | 0.000000 |
| Std. Dev. | 12.91159 | 0.407135 | 0.947979 | 0.002667 | 0.019242 |
| Observations | 88 | 88 | 88 | 88 | 88 |

**Table 4.1: Summary of descriptive**

**Source**: E-views **8**output from financial statements of sampled banks and own computation

Liquidity is the ability of commercial bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses which measured in terms of the ratio of financing gap to total asset, financing gap is the deference between bank's loan and customer deposit. The higher the financing gap ratio the higher the liquidity problem since liquidity risk is the result when banks cannot accommodate decrease in liability which is deposit or increase in asset which is loan. Table 4.6 presented the mean value of financing gap ratio was 31.149 %. The maximum and minimum value of LIQ was 65.526 and 13.56% respectively with the standard deviation of 12.911%. The positive sign of financing gap ratio indicated the excess of loan over deposit.

The asset size of bank was measured by natural logarithm of total asset (LnTA) which has the mean value of 3.95 % and the standard deviation from the mean was 0.401% which revealed some variation from its mean. Since, natural logarithm is used to reduce the variation of maximum and minimum value; the values were 4.74%and 2.75% respectively. And hence, the maximum and minimum value refer to to CBE and LIB respectively; since LIB is one of the recently established private owned commercial bank in Ethiopia. In terms of bank size CBE be more important than some newly established private banks more than 100%.

Return on asset (ROA) was used to proxy profitability of commercial banks which was the ratio of net income after tax to the total asset. The mean value or average return on asset of selected

banks over a period between 2008 up to 2018 was 2.88%, which mean that per one-birr investment a bank generates 2.88% cents profit between years from 2007 up to 2013. The maximum and minimum values were 4.94% and -0.197% respectively. The most profitable observation of 35.39% indicated that a bank generates 35.39 cents return per one-birr investment whereas the least profitable observation of -0.197%, indicated that a loss of 0.194 cents per one-birr investment. The standard deviation of 0.94% implies that there was little variation in profitability among Ethiopian commercial banks.

As a proxy for capital adequacy, the ratio of equity to total assets was used. Hence, according to table 4.6 the mean value of capital adequacy was 0.197%. This indicated that from the total asset only 0.197% was covered by equity shareholders whereas the remaining 99.803% was covered/ financed by external funds. This implies that as there is high dependency on external funds that get up from higher deposit mobilization. Also the mean value of 0.197% was below the international standard for capital adequacy i.e. 8% (Reporter, 13 March 2010) with the maximum and minimum values of 1.35% and -0.0944 % respectively. The standard deviation for capital adequacy was 0.2667% revealed that there was little spreading towards the mean among commercial banks in Ethiopia. In general, although the bank with minimum capital adequacy ratio of 0.2667% would be exposed to liquidity risk, the capital adequacy of Ethiopian commercial banks was at a good position since the mean capital ratio of 0.197% was less than the National Bank of Ethiopia (NBE) requirement.

## 4.3 CLRM Assumptions and Diagnostic tests

Diagnostic test is made to make sure that the classical linear regression model assumption violated or not. In this study an attempt is made to test heteroscedasticy, Autocorrelation, normality and Multicollinearity the result of which are presented and discussed as follows.

### 4.4.1 Heteroskedasticy

This was the second assumption of CLRM and stated that the variance of the errors is constant; which is known as the assumption of Homoscedasticity. If the residuals of the regression have systematically changing variability over the sample, (i.e. the errors do not have a constant variance) that a sign of Heteroscedasticity is observed. To test this assumption, the white test was used having the null hypothesis of Heteroscedasticity. Hence, according to table **4.3 below** the p-

value was in below of 0.05, therefore it is possible to say that there was evidence for the presence of Heteroscedasticity.

**Table 4. 3 Heteroscedasticity Test: Breusch-Pagan Test**

| Heteroscedasticity Test: White | | | |
|---|---|---|---|
| F-statistic | 2.445248 | Prob. F(14,73) | 0.0070 |
| Obs*R-squared | 28.09333 | Prob. Chi-Square(14) | 0.0138 |
| Scaled explained SS | 20.20215 | Prob. Chi-Square(14) | 0.1239 |

**Source:** E-views **8** output from financial statements of sampled banks and own computation

## 4.4.2 Autocorrelation

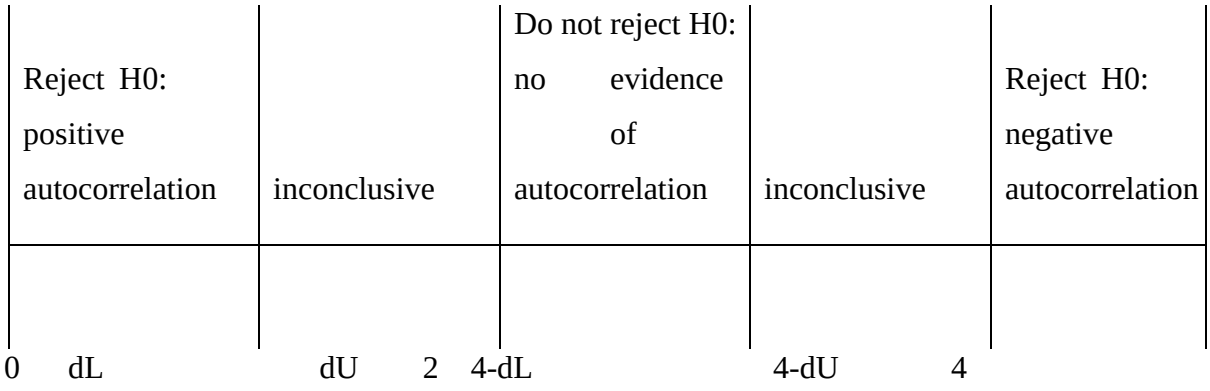
This was the third assumption of CLRM for this study and states that CLRM‟s disturbance term is the covariance between the error terms over time (or cross-sectionals, for that type of data) is zero. In other words, it is assumed that the errors are uncorrelated with one another. Besides if the errors are not uncorrelated with one another it would be stated that they are „auto correlated‟ or that they are „serially correlated‟ (Brooks 2008).

This test was made by using Durbin and Watson test. Durbin-Watson (DW) is a test for first order autocorrelation i.e. it tests only for a relationship between an error and its immediately previous value. DW is approximately equals to $2(1 - \hat{\rho})$, where $\hat{\rho}$ is the estimated correlation coefficient between the error term and its first order lag (Brooks 2008).

Therefore, from table 4.7 fixed effect regression result the value of Durbin-Watson stat (i.e. 1.92385) this revealed that there was no serious evidence of autocorrelation in the data since the DW test result approaches two 1.92385 because as per Brook (2008) stated above there is no autocorrelation problem if the *DW* is near 2. To make it more convincible for the absence of autocorrelation problem a formal test so called Breusch-Godfrey was made because as stated

above the Durbin-Watson tests‟ only for the first order autocorrelation or (i.e. it test only for one lag- value). Hence, the BG- test was made for ten lag-values and the result was given below in table 4.4, besides the full result was attached in the appendix B4. Since the p-value of F-stat was 0.7936, we fail to reject the null hypotheses in that the p-value was above 5% which indicated that there is no autocorrelation problem.

**Figure 4.1 Rejection, non-rejection, and inconclusive regions for DW test**




**Source:** Eviews **8** output from research data, (2008-2018)

According to Brooks (2008) the following is the decision rule to reject and not to reject the null hypothesis null hypothesis is rejected and the existence of positive autocorrelation presumed if DW is less than the lower critical value dL;

The null hypothesis is also rejected and the existence of negative autocorrelation presumed if DW is greater than 4 minus the lower critical value dL;

The null hypothesis is not rejected and no significant residual autocorrelation is presumed if DW is between the upper critical value dU and 4 minus the upper critical value dU.

The null hypothesis is neither rejected or fails to be rejected if DW is between lower critical value dL and the upper critical value dU or if DW is in between4 minus the upper critical value dUand4 minus the lower critical value DL.

***Figure 4.2 DW test result***


| Test | DW test statistics |
|---|---|
| DW result | Liquidity |
| | 1.92385 |

This study has Four explanatory variables (k) with 88 observations and the dL and dU values are 1.411 and 1.603**,** respectively. The DW value of LATD and LTA lies in the no evidence of autocorrelation region where the null hypothesis of no autocorrelation should not be rejected.

### 4.4.3 Normality

The other classical linear regression model assumption is normally distribution of the residual.

The classical normal linear regression model assumes that each ui is distributed normally with mean and standard deviation values are near to 0 and 1 respectively Gujarati (2004).

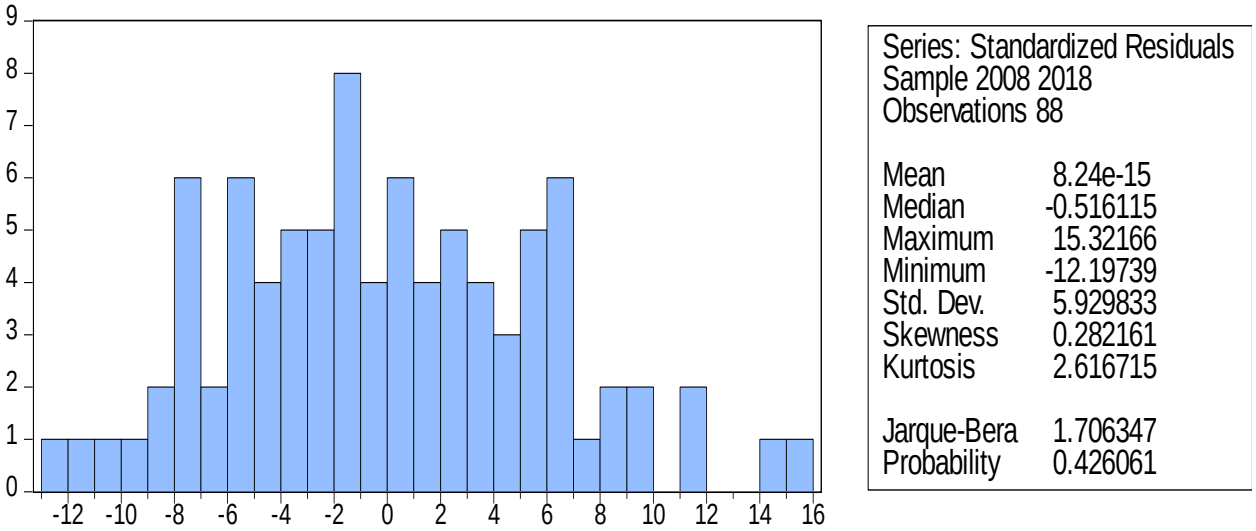
To test the normality assumption in this study the researcher applied the Jarque-Bera (JB) test.

As noted by Brooks (2008) JB uses the property of a normally distributed random variable that the entire distribution is characterized by the first two moments -- the mean and the variance.

The standardized third and fourth moments of a distribution are known as its skewness and kurtosis. Skewness measures the extent to which a distribution is not symmetric about its mean value and kurtosis measures how fat the tails of the distributed. If the residuals are normally distributed, the histogram should be bell-shaped and the Jarque-Bera statistic would not be significant. This means that the p-value given at the bottom of the normality test screen should be bigger than 0.05 to not reject the null of normality at the 5% level.

As clearly plotted in figure 4.1 the normality test for this study shows a p-value of Jarque-Bera 0.43 which is greater than 0.05 and the histogram is also bell-shaped implying that the residuals of this study is normally distributed.

**Figure 4. 1 Normality Test: Residual**




Source: Eviews 8 output from research data, (2008-2018)

## 4.4.4 Multicollinearity

As referred by Brooks (2008), an implicit assumption that is made when using the OLS estimation method is that the explanatory variables are not correlated with one another. If there is no relationship between the explanatory variables, they would be said to be orthogonal to one another. However, a problem occurs when the explanatory variables are very highly correlated with each other, and this problem is known as multicollinearity.

Malhotra (2007) stated that multicollinearity problems exists when the correlation coefficient among explanatory variables should be greater than 0.75. However, Brooks (2008) mentioned that if the correlation coefficient along with the independent variables is 0.8 and above, multicollinearity problems will be existed.

Table4. 7 Correlation Matrix between independent variables

| | BS | CAR | ROA | LLR |
|---|---|---|---|---|
| BS | 1 | | | |
| CAR | -0.686991 | 1 | | |
| ROA | 0.171229 | 0.315254 | 1 | |
| LLR | -0.286411 | 0.248121 | 0.065969 | 1 |

The method used in this study to test the existence of multicollinearity was by checking the Pearson correlation between the independent variables. The correlations between the independent variables are shown in table 4.8 above. All correlation results are below 0.75, which indicates that multicollinearity is not a problem for this study.

## 4.5 Correlation analysis among variables

Correlation is a way to index the degree to which two or more variables are associated with or related to each other. Correlation coefficient between two variables ranges from +1 (i.e. perfect positive relationship) to -1 (i.e. perfect negative relationship). If it is stated as *y* and *x* are correlated, this 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 (Brooks 2008). Hence, table 4.5 indicated the correlation between dependent and independent variables of the study.

| | L | BS | CAR | ROA | LLR |
|---|---|---|---|---|---|
| L | 1 | | | | |
| BS | -0.771147 | 1 | | | |
| CAR | 0.617060 | -0.686991 | 1 | | |
| ROA | 0.049274 | 0.171229 | 0.315254 | 1 | |
| LLR | 0.623231 | -0.286411 | 0.248121 | 0.065969 | 1 |

According to table 4.5 above, capital adequacy was positively correlated with liquidity indicated by the correlation of 61.7%This correlation showed that as the bank's capital strength decreases, liquidity increase The LnTOA which measured the size of banks was negatively correlated with liquidity, with the correlation coefficient of -77.1%. This indicated that as the banks size decreases, liquidity also decreases. On the other hand, ROA and LLR were positively correlated with liquidity, with the coefficient of 4.9% and 62%. This shown that as the above-mentioned variables increase, liquidity move to equivalent direction.

## 4.6 Model Selection Test: Random Verses Fixed effect Model

The collected data were estimated based on the panel model, which included cross sectional and time series observations for eight commercial banks that ranges over 2008 to 2018. Fixed effects and random effects models are commonly used models for the panel data. In order to choose fixed or random effect model a formal test so called hausman test was used which was based on the null hypothesis in favor of random effect model estimator. When the test is made it is important to see the p-value because the decision was made on the basis of this value, accordingly if p value is higher than 0.05 (i.e. it is insignificant) hence random effects is

preferable whereas if p value is lower than 0.05 (i.e. it is significant) fixed effect is preferable (Gujarati 2004). Hence according to hausman test for this panel data model shown in table 4.1

below, the model is better off if random effects model is used since the p-value for the model is 0.2177, which is more than 0.05(significant).

**Table 4.1** Tests for choosing fixed versus random effect model

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
|---|---|---|---|
| Cross-section random | 5.761033 | 4 | 0.2177 |

**Source:** E-views 8 output from the financial statements of sampled banks and own computation

## 4.4. Results of Regression Analysis

This section presents a Random effect model regression result to examine the impact of explanatory variable (L BS, CAR, ROA, and LLR) on the Liquidity of commercial banks. Table 4.8 displays Random effect model regression estimation result.

Dependent Variable: L

Method: Panel EGLS (Cross-section random effects)

Date: 01/03/21 Time: 23:48

Sample: 2008 2018

Periods included: 11

Cross-sections included: 8

Total panel (balanced) observations: 88

Swamy and Arora estimator of component variances

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 103.8511 | 10.65780 | 9.744139 | 0.0000 |
| BS | -21.10778 | 2.717252 | -7.768060 | 0.0000 |
| ROA | 1.747084 | 0.882512 | 1.979672 | 0.0511 |
| CAR | 77.89189 | 419.3877 | 0.185728 | 0.8531 |
| LLR | 28.37772 | 35.84403 | 7.916999 | 0.0000 |
| | Effects Specification | | | |
| | | | S.D. | Rho |
| Cross-section random | | | 0.775065 | 0.0167 |
| Idiosyncratic random | | | 5.953954 | 0.9833 |
| | Weighted Statistics | | | |
| R-squared | 0.791233 | Mean dependent var | | 28.59777 |
| Adjusted R-squared | 0.781172 | S.D. dependent var | | 12.86213 |
| S.E. of regression | 6.016786 | Sum squared resid | | 3004.742 |
| F-statistic | 78.64299 | Durbin-Watson stat | | 1.924382 |
| Prob(F-statistic) | 0.000000 | | | |

The above table shows the results of the regression analysis on the determinant of the dependent variable (liquidity) which was measured by the ratio of liquid assets to total and the independent variables which includes only banks specific variables the sample of eight commercials banks.

The coefficient of determination in this model is given by R-squared of 79 % and Adjusted R-squared of 78 % which means 79% of variation of Ethiopian commercial liquidity (Latd) can be explained by the variation on size, return on asset, ROA and LLR.

The remaining 21 % of changes was explained by other determinants which are not included in this model. Thus, the explanatory power of the model is high. The value of F-statistics is 78.6% with p-value of 0.000000 which is used to measure the overall significance of the model. Thus, the p-value of F-statistics is zero at six digits, the null hypothesis is rejected and the model is significant even at 1% significant level.

As it is shown on table above, bank size, return on asset (ROA) and LLR had statistically significant factors affecting liquidity of Ethiopian commercial banks which is measured by Latd. Among the statistically significant variables, ROA and LLR had positively related with liquidity (Latd) whereas Bank size have negatively related with liquidity (Latd).

The above table also depicts that, bank size, and LLR had statistically significant influence on Ethiopian commercial banks' liquidity (Latd) at 1% significant level. The other statistically significant variables, return on asset (ROA) had statistically significant impact on liquidity (LATD) at 5% significant level. The other variable CAR was statistically insignificant impact on liquidity (Latd). On the other hand, the coefficient signs of bank size, and return on asset were contrary to our expectations whereas the coefficient sign of CAR and LLR was in-line with our expectations.

**Determinants of Bank Liquidity Measured by Model –**The empirical model used in this study to identify the statistically significant determinants of Ethiopian private commercial banks liquidity measured by loan to deposit & short term borrowing ratio was:

$$Lit = \alpha + \beta 1\,(BSit) + \beta 2(ROAit) + \beta 3\,(CAPit) + \beta 4\,(LLRit) + \delta i + \varepsilon it \ldots\ldots\ldots \textbf{(Model )}$$

Lit=103.85-21.1BS+1.74ROA+77.89CAR+28.37LLR

The following table shows the regression result of the determinants of commercial banks liquidity measured by the Liquid to Total Asset Ratio.

## Bank Size and liquidity

Natural logarithm of the total asset as a proxy of bank size was used to know the effect of bank size on liquidity of Ethiopian commercial banks in this study. Bank size found to be a negative and statistically significant at 1 % level of significance with a p value of 0.0000 and this was in line with the hypotheses of this study (H). The coefficient value of – 21% indicated that one-birr

decrease in the total asset, resulted in the fall of -21% birr in liquid assets of Ethiopian commercial banks, holding other variables constant.

This finding was consistent with the findings of Malik and Rafique (2013); Vtyurine et al.(2012); Chagwiza(2011); Subedi and Neupene (2011). And also it was supported the argument‟s that; small banks focus on the traditional intermediation and transformation activities and hold less liquid assets. This is to mean that small banks has little cash and cash equivalent reserves in other banks (central bank and other commercial banks) and hold less liquid assets (i.e. since they have little dealing with other types of investment instruments than loans). Besides the finding of this study showed that big banks (i.e. Commercial banks of Ethiopia, etc) have better trust by customers and good deposit attraction capacities that makes them more liquid than small banks i.e. LIB. Therefore, fail to reject the hypotheses stated; there was positive and statistically significant relationship between bank size and liquidity.

## Profitability and Bank's Liquidity

Profitability in this study is measured by the return on asset (ROA). The regression result shows that, profitability had positive and statistically significant impact on liquidity measured by LatD at 10% level of significant. This positive relation was inconsistent with our expectation and finance theory which emphasizes their negative relationship. The coefficient of 1.7% revealed that, taking other independent variables constant, a one percent change on return on asset had a 1.7% change on liquidity of Ethiopia commercial banks measured by LatD in the same direction. This positive relation shows that, higher profitability leads to increase banks liquidity. However, as the major profitability of banks comes from loans and advances and in return the increase on loans leads to decrease in liquid asset, the result should have been in the opposite direction. In general, the result of this study was consistent with the findings of Vodova(2011) on Hungary commercial banks but opposite to Vodova (2011, 2013) on Poland and Slovakia commercial banks respectively. Therefore, the hypothesis stated; profitability has positive and significant impact on bank‟s liquidity should be rejected.

## Capital adequacy and liquidity

Capital adequacy which was measured by the ratio of equity to total asset was statistically significant variable that affected liquidity of Ethiopian commercial banks at 1% significant level

with the p-value of 0.0085%. And has a positive coefficient value of 77 .89% which indicated that when the ratio of capital to total asset rises by 1%, the liquidity of Ethiopian commercial banks decreases by 77.89%, holding other variables constant. This finding was opposite to the hypotheses of this study (H) and in line with the findings of Vodová (2012); Subedi and Neupane (2011); and Laurine (2013). The negative and statistically significant impact of capital adequacy on liquidity of Ethiopian commercial banks were supported the arguments of the financial fragility-crowding out hypotheses. According to this argument, bank capital tends to impede liquidity creation through two distinct effects: the financial fragility structure and the crowding-out of deposits. The financial fragility structure is characterized by lower capital, tends to favor liquidity creation; this theory was supported by (Diamond and Rajan 2001), and hence they model a relationship bank that raises funds from investors to provide financing to an entrepreneur. The entrepreneur may withhold effort, which reduces the amount of bank financing attainable. More importantly, the bank may also withhold effort, which limits the bank's ability to raise financing. A deposit contract mitigates the bank's holdup problem because depositors can run on the bank if the bank threatens to withhold effort and therefore maximizes liquidity creation. Providers of capital cannot run on the bank, which limits their willingness to provide funds, and hence reduces liquidity creation. Thus, the higher a bank's capital ratio, the less liquidity it will create.

The second theory was concerned to a higher capital ratio may reduce liquidity creation through the crowding out of deposits. This argument was supported by Gorton and Winton (2000), and

they stated that deposits are more effective liquidity hedges for investors than investments in

## LLR: Loan Losses Reserve Ratio

Loan Losses Reserve which was measured by the Loan Losses Reserve to total Loan was statistically significant variable that affected liquidity of Ethiopian commercials banks at 1% significant level with the p-value of 0.0000. And has a positive coefficient value of 28% which indicated that when the ratio of Loan Losses Reserve to total loan rises by 1%, the liquidity of Ethiopian commercial banks increase by 28%, holding other variables constant.

The ratio of loan loss reserve account to total loans is used as a proxy of asset quality and negatively associated with credit risk as high value of this ratio requires lower capital to meet expected losses, but it reflects also more problematic loans called for a higher reserve account. The main business of banks is investing depositors' money on securities and loans. Indeed, the majorities of invested securities are issued by government and are less risky, whereas loans hold unexpected losses since banks cannot asses precisely the amount of unrepaid loans and this is why loan loss reserve account is required. Another reason to set up this reserve account is the need to have an accurate evaluation of bank's balance sheet. In other words, considering the amount of loans on the balance sheets as it is without adjustments is misleading to the board of directors and all bank's stakeholders, so uncertain loans must be viewed and a reserve account is needed to meet the expected losses (Walter, 1991). It is evident that bank capitalization has negative relations with risks. In other words, high value of this ratio reflects high value of liquidity and stability in the face of financial troubles. Mehmed (2014) investigates the determinants of liquidity risk in Bosnia and Herzegovina and finds that LLR has positive and a significant impact on liquidity ratio

**Table 4.8** Summary of actual and expected sign of explanatory variables on dependent variable with the decision of hypotheses

| | **Expected sign & impact on liquidity** | **Actual sign & impact on liquidity** | Decision |
|---|---|---|---|
| Bank Size | +ve & sig. | -ve & sig. | Accepted @1% |
| Profitability , | -ve & sig. | +ve & sig. | Accepted @ 5% |
| Capital adequacy | +ve & sig. | +ve &insig. | Rejected |
| Loan Loss Reserve Ratio | +ve & sig. | +ve & sig. | Accepted @1% |

Source: Own design

**Note**: sig. = statistically significant

Insig. = Statistically insignificant

# Chapter Five

# Conclusion and Recommendation

On the basis of the findings of the study; this chapter provided the summary, conclusion and the recommendations parts. Accordingly, it was organized as follows; the first section deals with the summary of the study, the second section provided the conclusion part for the main findings of the study, and the last section deals with recommendations which followed by the room for further research.

## 5.2 Conclusion

On the basis of Random effect regression result, the following conclusions were made; An important role of banks in the economy is to provide liquidity by funding long term, illiquid assets with short term, liquid liabilities. Through this function of liquidity providers, banks create liquidity as they hold illiquid assets and provide cash and demand deposits to the rest of the economy. The "preference for liquidity" under uncertainty of economic agents to justify he existence of banks: banks exist because they provide better liquidity insurance than financial markets. However, as banks are liquidity insurers, they face transformation risk and are exposed to the risk of run on deposits. More generally, the higher is liquidity creation to the external public, the higher is the risk for banks to face losses from having to dispose of illiquid assets to meet the liquidity demands of customers. The main purpose of this study was to identify determinants of bank liquidity of Ethiopia commercials banks. The study was used the panel data for eight commercial banks in Ethiopia which had continuous eleven years banking service from 2008 to 2018. Data was presented by using descriptive statistics correlation analysis and balanced random effect regression analysis for liquidity ratios measured. Test for OLS regression the models were conducted for the classical linear regression model assumptions The study were consider four bank specific factors only. The results of models enable us to make following conclusions.

The coefficient sign for capital adequacy revealed positive and insignificant impact on liquidity as per Liq. 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. Therefore, the study failed to reject one hypothesis that indicate the relationship between bank liquidity and capital adequacy these hypostasis indicating the relationship between bank liquidity and the variables are insignificant. Three of the statistically significant variables affecting banks liquidity. These are the share of bank size; Loan Losses reserve ratio and profitability (ROA). Bank size had negative and significant impact on liquidity of banks.ROA and Loan Losses Reserve ratio had positive and significant impact on Banks liquidity.

Therefore, it can be concluded that the impact of banks specific variables on 'bank liquidity was non-linear (positive and negative).

## 5.3 Recommendation

Based on the findings of the research the following recommendations were given:

Due to limited studies done in Ethiopia, more researchers are encouraged to conduct research on liquidity issues faced by banks. This would actually benefit the policy makers to setup a better and new workable policy. Researchers have examined the relationship between dependent variable (bank liquidity) and independent variables (bank size, profitability capital adequacy, Loan Losses reserve ratio,). Therefore, future research is recommended to use more challenging independent variables (for example, Ownership, political influence, unemployment, government implications and others) to explain the dependent variable of bank liquidity ratio. Besides, future researchers are also recommended to use a more complex econometric model or dynamic panel model where it could capture the possible effect of independent variable on dependent variable that lags behind.

The Results suggested that there is a nonlinear relationship exists between liquidity and banks specific variables in Ethiopian Banking sector, whereby Liquidity was improved for banks that hold some liquid assets, however, there was a point beyond which holding further liquid assets diminishes a banks "Liquidity, all else equal.

Conceptually, this result is consistent with the idea that funding markets reward a bank, to some extent, for holding liquid assets, thereby reducing its liquidity risk. However, this benefit is can eventually be outweighed by the opportunity cost of holding such comparatively low-yielding liquid assets on the balance sheet. At the same time, estimation results provide some evidence that liquid assets depends on the bank's business model and the risk of funding market difficulties. There researchers recommended that adopting a more traditional i.e., deposit and loan-based business model allows a bank to optimize Liquidity asset.

## Reference


Aspachs, O, Nier, E and Tiesset, M 2005, „Liquidity, Banking Regulation and then Macroeconomy: Evidence on bank liquidity holdings from a panel of resident banks", *Bank of England Working Paper*, Available at: http://www.bis.org/bcbs/events/rtf05AspachsNierTiesset.pdf

Bank for International Settlements 2008, liquidity regulation and bank supervision

Basel Committee on Banking Supervision 1997, *Core principles for effective banking Supervision;* Bank for International Settlements, Basel, Switzerland

Basel Committee on Banking Supervision 2000, *Sound practices for managing liquidity in banking organizations;* BIS, Basel, Switzerland

Basel Committee on Banking Supervision 2008, *Principles for sound liquidity risk management and supervision BIS*

Berger, NA and Bouwman, HS 2006, *The Measurement of Bank Liquidity Creation and the Effect of Capital,* Weatherhead School of Management, Case Western Reserve University, pp.1-42

Berger, A and Bouwman, C 2007, „Bank Liquidity Creation", Working Paper.

Berger, AN and Bouwman, C 2008, Financial Crises and Bank Liquidity Creation; Working Paper, Wharton Financial Institutions Center, pp. 8-37

Berger, AN and Bouwman, C 2009, „Bank liquidity creation, *Review of Financial Studies,* Vol. 22, No.9, pp.3779-3837

Bhattacharya, S & Thakor, A.V 1993, Contemporary banking theory; *Journal of Financial Intermediation,* No. *3*, pp. 2-50

Bloem, M.A and Gorter N.C 2001, „Treatment of Non-Performing Loans in Macroeconomic Statistics", International Monetary Fund, Working Paper, pp. 209

Bologna, P 2011, Is there a role for funding in explaining recent US bank failures? An occasional paper

Bordo, M, Eichengreen, B, Klingebiel, D and Martinez-Peri, M 2001, „Is the Crisis Problem Growing More Severe?:*Economic Policy*", Vol.16, No. 32, pp.51-82

Bordeleau, E & Graham, C 2010, The impact of liquidity on bank liquidity; Bank of Canada, working paper

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

Bryant, J 1980, „A model of reserves, bank runs, and deposit insurance", *Journal of Banking and Finance*, Vol. 4, pp. 335-344

Chagwiza, W 2011, Zimbabwean Commercial Banks Liquidity And Its Determinants, *International Journal of Empirical Finance*, Vol. 2, No. 2, PP.52-64

Chen, B, Cheng, X and Wu, L 2005, „Dynamic interactions between interest rate, credit, and liquidity risks: Theory and evidence from the term structure o defau swap spreads", *Working Paper Series*

Chen, N & Mahajan, A 2010, Effects of macroeconomic condition on banks liquidity, *International Research Journal of Finance and Economics;* No.35, pp. 1129 edn., Thomson South-Western, USA

Comptroller"s Handbook 1998, „Loan portfolio management", Comptroller of the Currency

Administrator of National Banks, USA

Comptroller‟s Hand book 2001, safety and soundness for liquidity; Washington, DC

Comptroller‟s Hand book 2012, Liquidity comptroller of the Currency Administrator of National Banks, USA

Creswell, J.W 2002, *Research design: Qualitative, quantitative, and mixed methods approaches,* Sage Publications, New York

Creswell, J.W 2003, *Qualitative, quantitative, and mixed methods approaches,* 2nd ed.‟ Thousand Oaks, CA: Sage

Creswell, J.W 2009, *Research design: Qualitative, quantitative, and mixed methods approaches,* 3rd ed., Sage Publications, New York Crockett, A 2008,‟ Market liquidity and Financial stability‟, In *Banque de France Financial Stability Review*, Paris: Banque de France, pp. 13-17

Diamond, D W and Dybvig, P H 1983, „Bank runs, deposit insurance, and liquidity‟, *Journal of Political Economy,* Vol. 105, No. 91, pp. 401-419

Diamond, D W 1984, Financial intermediation and delegated monitoring, Review of Economic Studies, Vol. 51, pp.393-414

Diamond, DW and Rajan, RJ 1998, Liquidity Risk, Liquidity Creation and Financial Fragility: A Theory of Banking, NBER Working Paper Series, Cambridge, No. 7430, pp. 3-40

Diamond, D W and Rajan, RG 2000, „Theory of bank capital‟, *Journal of Finance,* Vol.100, No. 55, pp. 2431-2465

Diamond, D W and Rajan, R G 2001, "Liquidity risk, liquidity creation, and financial fragility: a theory of banking", *Journal of Political Economy*, Vol. 109, No. 2, pp.287

Diamond, D W. and Rajan, R G 2005, „Liquidity shortages and banking crise", *Journal of Finance*,Vol. 60, No. 2, pp.615-647

Ericsson, J & Renault, M 2006, Liqudity and credit risk, *Journal of finance;* McGill University,

Gennaioli, N, Shleifer, A, and Vishny, R 2012, „Market institution, financial market risk and financial crisis,"*Journal of financial economics, Cambridge;* Vol. 104, No.3,

Tseganesh, T. (2012) *Determinants of Banks Liquidity and their Impact on Financial Performance:*
*empirical study on commercial banks in Ethiopia* (Doctoral dissertation, \ aau).

Vodova, P. (2011). Determinants of commercial banks' liquidity in the Czech Republic. Ratio, *50*(3).

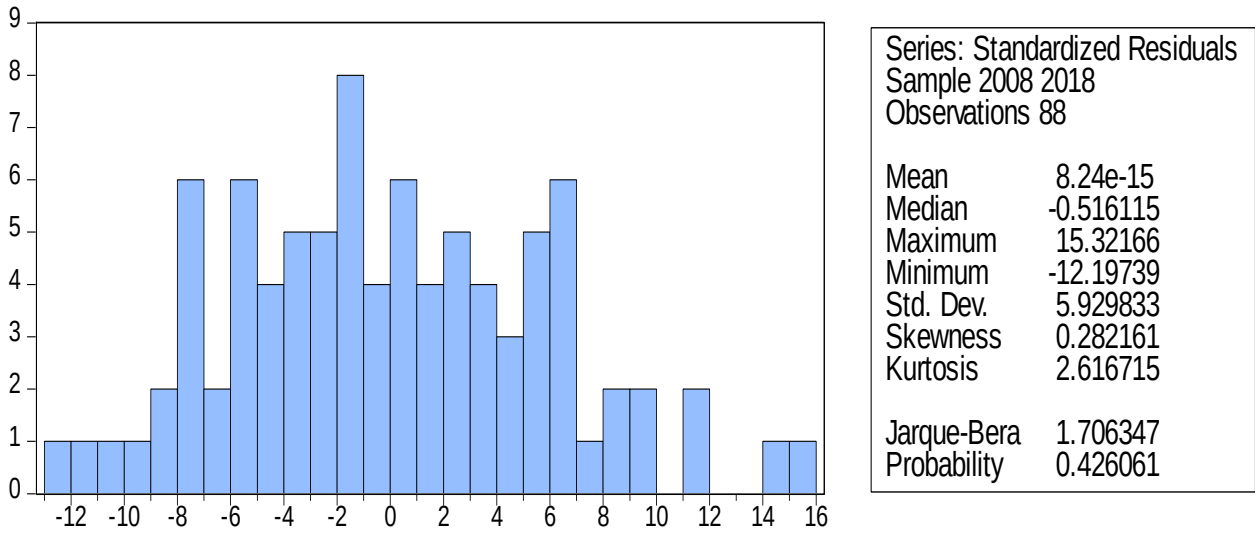
Vodova, P. (2012). Determinants of commercial banks' liquidity in Poland. *Ratio,* 50, 2.

Vodova, P. (2013). Determinants of commercial bank liquidity in Hungary. *E-Finance*, *9*(3), 64-71.

APPENDICES

# 1:Appendix

**Figure 4. 1 Normality Test: Residual**




# 2:appendix

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
|---|---|---|---|
| Cross-section random | 5.761033 | 4 | 0.2177 |

## 3: Appendix Results of Regression Analysis

Dependent Variable: L

Method: Panel EGLS (Cross-section random effects)

Date: 01/03/21 Time: 23:48

Sample: 2008 2018

Periods included: 11

Cross-sections included: 8

Total panel (balanced) observations: 88

Swamy and Arora estimator of component variances

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 103.8511 | 10.65780 | 9.744139 | 0.0000 |
| BS | -21.10778 | 2.717252 | -7.768060 | 0.0000 |
| ROA | 1.747084 | 0.882512 | 1.979672 | 0.0511 |
| CAR | 77.89189 | 419.3877 | 0.185728 | 0.8531 |
| LLR | 28.37772 | 35.84403 | 7.916999 | 0.0000 |

| | Effects Specification | | |
|---|---|---|---|
| | | S.D. | Rho |
| Cross-section random | | 0.775065 | 0.0167 |
| Idiosyncratic random | | 5.953954 | 0.9833 |

| | Weighted Statistics | | |
|---|---|---|---|
| R-squared | 0.791233 | Mean dependent var | 28.59777 |
| Adjusted R-squared | 0.781172 | S.D. dependent var | 12.86213 |
| S.E. of regression | 6.016786 | Sum squared resid | 3004.742 |

| | | | |
|---|---|---|---|
| F-statistic | 78.64299 | Durbin-Watson stat | 1.92382 |
| Prob(F-statistic) | 0.000000 | | |

## 4: appendix

Heteroscedasticity Test: White

| | | | |
|---|---|---|---|
| F-statistic | 2.445248 | Prob. F(14,73) | 0.0070 |
| Obs*R-squared | 28.09333 | Prob. Chi-Square(14) | 0.0138 |
| Scaled explained SS | 20.20215 | Prob. Chi-Square(14) | 0.1239 |