ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

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Effect of liquidity risk on the performance of banks in Ethiopia: The case of selected private commercial banks.

A Thesis Submitted to the School of Graduate studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of

Master of Science in Accounting and Finance.

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Statement of Declaration

I declare that the thesis entitled: “Impact of liquidity risk on the performance of banks in Ethiopia: The case of selected private commercial banks”, hereby submitted by me in partial fulfillment of the requirements for the Degree of Master of Science in Accounting and Finance at Addis Ababa University, is my original work and has not been presented for the award any degree in any other university or institution. I have undertaken it independently with the advice of my advisor, Abebe Yitayew (PhD). In performing the thesis, I have used different sources and material which have been properly acknowledged.

Name: Berhanu Legesse

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Statement of Certification

This to certify that this thesis titled “Impact of liquidity risk on the performance of banks in Ethiopia” carried out by Berhanu Legesse Aredo. The work is original in nature and is suitable for the submission for the Master of Science Degree in Accounting and Finance.

Advisor name: Abebe Yitayew (PhD)

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This is to certify that the thesis prepared by Berhanu Legesse, entitled: Impact of liquidity risk on the performance of banks in Ethiopia: The case of selected private commercial banks. And submitted in partial fulfillment of the requirements for the degree of Master of Science in Accounting and Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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External examiner: Azime Adem(Phd) Signature _____ Date _____

Advisor: Abebe Yitayew(Phd) Signature_____ Date_____

Abstract

The main role of banks in any economy is maturity transformation from short term deposit in to long term loan. This function makes banks inherently exposed to liquidity risk both of an internal and external factor. The purpose of this study was to observe effect of liquidity risk on financial performance of Ethiopian private commercial banks. To achieve the research objectives, descriptive research design and quantitative research approach was used and data was collected from a sample of nine Ethiopian private commercial banks for the period covered from 2011 to 2019 years. To indicate the effect of liquidity risk on the performance of banks, financing gap ratio, liquid asset to total asset ratio, total loan to total asset ratio cash reserve ratio and bank size and GDP growth rate were used in this study while the financial performance of commercial banks was measured by the return on asset. by applying panel data method, using secondary data source, Radom Effect Model and descriptive statistics, correlation and multiple regression analysis, the selected six variables were analyzed. The effect of analysis indicates that the ratio of financing gap, liquid asset over total asset and Cash reserve and bank size had statistically significant impact on Ethiopian commercial banks performance and except bank size all had positive relationship with dependent variable. Whereas, the ratio of total loan over total asset and GDP growth rate had positive relationship but had no significant impact on performance of Ethiopian commercial banks. Therefore, liquidity risk was positively affecting the financial performance of Ethiopian commercial banks. The study suggests that commercial banks should maintain enough liquidity fund to overcome the uncertain situation of liquidity shortage and carefully monitoring the quality of the asset, bank should identify their optimal level of liquid asset holdings by weighting the marginal costs and marginal benefits of holding and the bank management should trade off conserving money and investing it depending on its funding needs.

Key words: Liquidity risk, Financing gap, Commercial Bank, Panel data, and Random effect model

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List of Acronyms

AIB: Awash Bank

BOA: Bank of Abyssinia

BCBS: Basel Committee on Banking Supervision

CBO: Cooperative Bank of Oromia

CC: Correlation Coefficients

CI: Condition index

CLRM: Classical Linear Regression Model

CRR: Cash Reserve Ratio

DB: Dashen Bank

FGR: Financing gap ratio

FEM: Fixed Effect Model

GDP: Gross Domestic Product

LATA: Liquid asset to total asset ratio

LCR: Liquidity Coverage Ratio

LIB: Lion International Bank

LR: Liquidity Ratio

NBE: National Bank of Ethiopia

NIB: Nib International Bank

OIB: Oromia International Bank

OLS: Ordinary Least Square

REM: Random Effect Model

ROA: Return on Asset

ROE: Return on Equity

TLA: total loan to total asset ratio

UB: United Bank

VIF: Variance Inflation Factor

WB: Wegagen Bank

ZB: Zemen Bank

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Banks are the most important financial institutions that are performs a central role in the economic system thru channeling financial resources from surplus economic units to deficit economic units. In turn, banks facilitate the saving and capital formation in the economy. Commercial banks are fundamental economic institutions in the financial system and the economy as a whole, they receive demand deposits and make loans and provide other offerings for the public. (Leykun,2016).

In doing this financial intermediary role, banks are dependent upon public confidence and requirement to meet increasing customers' needs and expectations. The bank might also lose the self-confidence of its clients if funds are no longer supplied to them well in time. (Ahmadyan, 2017). To attain these expectations banks' liquidity position plays a significant role. The primary function of bank is liquidity creation however, it also a major source of vulnerability. (Ben Moussa & Boubaker, 2020).

Bank Liquidity means the ability of a financial institutions to fund extend in assets and meet its duties as they come due, at reasonable cost. Therefore, banks have to preserve most fulfilling stage of liquidity that can maximize their earnings and enable them to meet their responsibility. (BCBS, 2008). Hence, liquidity is the first product or provider of each banking establishment.

Taking into account the considerable position of liquidity in the banking activities, there used to be a critical interest granted to the liquidity risk. This risk threatens financial institution stability and leads to financial organization fragilities and screw ups. (Zaghdoudi & Hakimi, 2017). When a bank does not have enough liquidity to fulfill its obligation, the bank is said to face liquidity risk.

Liquidity risk is the probability of loss arising from a situation where, there will not be enough cash and/or equivalents to meet the needs of depositors and borrowers, and/or, Sale of illiquid assets will yield less than their face value, and/or, illiquid assets will not be sold within the desired time due to lack of buyers.

Liquidity risk arises from the banks main activity that is transforms current or non-permanent deposit in to illiquid asset or long-term commitment/loan. (BCBS, 2008). Such scenarios could occur when funding needed for illiquid asset positions is not available to the bank on acceptable terms.

Scannella (2016) as defined liquidity risk the exposure of a bank's financial conditions to a sudden need for resources that may be caused by an unusual or unexpected flow of financial resources into the bank. This financial need may have a negative impact on the financial soundness and viability of the bank, through assets, liabilities and off-balance sheets positions related to liquidity concerns. In a wider perspective, liquidity is the possible of a monetary institution to meet obligations as they come due, barring incurring unacceptable losses.

liquidity risk as Scandella described divided in to two categories: Such as, Funding and Market liquidity risk. Funding liquidity risk when the hazard that the bank will no longer be in a position to meet successfully both expected and surprising current and future money go with the flow and collateral desires barring affecting both daily operations or the economic circumstance of the firm.

Market liquidity risk when the chance that a financial institution cannot without difficulty offset or dispose of a position at the market rate because of insufficient market depth or market disruption. This classification helps determine the main drivers of liquidity risk in banking: asset and liability mismatching, customers' behavior and financial markets fluctuations. (Scandella, 2016).

Liquidity risk can adversely have an effect on each bank's earnings and the capital. Liquidity threat can affect now not only bank performance then again also bank recognition. (Zaghdoudi et al., 2017).

Therefore, it becomes the pinnacle priority of a bank's administration to make certain as far as possible that it will always have sufficient liquidity to meet its liabilities when due, under both normal and stressed conditions without incurring unacceptable losses or risking damage to the bank's reputation. "Effective risk management estimates future cash flow requirements under both normal and stressed conditions." (BCBS, 2008).

The global financial crisis in the past years clearly highlight the importance of liquidity in the financial systems across the world, in order for banks to be resilient in withstanding adverse circumstances. The financial failure severely disrupted economic activities and the banking sectors.

Experience of failure of many traditional or conventional banks from the past and the current grant the witness to this claim. Financial crisis around the globe has proven that liquidity is one of the important determinants of bank's survival. In the 2008 financial crisis, excessive lending to subprime mortgage and mismatch of asset and liabilities maturities led many banks to failure during the crisis. (Lama, 2018).

It is evident that liquidity and its related risk is very recent and important issue. Therefore, banks and their supervisory body are keen to maintain a control on liquidity position of banks. The aim of the study is therefore to examine the effect of liquidity risk on performance of private commercial banks in Ethiopia.

1.2 Statement of the problem

Banking sector is the backbone of financial system of an economy. (Uddin, Ali Reza & Das, 2016). However, the duty of the bank is now not besides problems, due to the fact banks have essential function in the maturity transformation of temporary deposits into long-term credits that inherently exposed for liquidity risk.

BCBS (1997) The threat of liquidity arises from the lack of ability of a financial institution to accommodate decreases in liabilities or to fund will increase in belongings. In such incidence, banks will be exposed to liquidity problem and may create frustration to their customers and may affect the financial sector in general. Therefore, banks have operated to make sure its profitability and to fulfill the monetary desires of its clients with the aid of maintaining most efficient stage of liquidity.

Financial crisis around the world has proven that liquidity is one of the vital elements of bank's survival. After the monetary crisis of 2007, liquidity threat has end up one of the fundamental concerns of monetary institutions at some point of the world. For instance, During the world economic disaster many banks struggled to maintain adequate liquidity. (Vodova, 2013).

Marzova (2015) also explain at some point of the recent global monetary crisis numerous banks experienced some difficulties due to the fact they failed to control liquidity in a prudent manner. Thus, the crisis emphasized the significance of liquidity to the appropriate functioning of economic markets and the banking area.

Shen, Chen, Kao, & Yeh, (2009) describe the U.S sub-prime mortgage crisis has now not solely threatened to the U.S. economy into a recession, however affected the global economic system. Moreover, it brings a big undertaking to momentary and long-term development for global banking industry. Furthermore, the liquidity crisis significantly affected banks' operational environment. In response to the catastrophe, financial bodies such as the Basel Committee for bank supervision advocated for the active management of liquidity risk.

(Ndoka, Islami, & Shima, 2017) The crisis indicated the significance of adequate liquidity risk measurement and management. Liquidity management is simply bank's effort to minimize the liquidity risk (Lama,2019).

Over the previous twenty years, Ethiopian private commercial banks have been enjoying a vital position in the financing of the economic system and development of the country. However, the rules of Ethiopian bank system do now not enable foreign countries or enterprises to absolutely or partially accumulate share of Ethiopian banks.

In Ethiopia economic quarter is dominated by banking sector rather than capital market and as such the manner of economic intermediation in the country relies upon actually on banks. indeed, the banking region in Ethiopia is at present acts as the linkage that holds the country's financial system together.

Therefore, retaining their most desirable liquidity position is very essential to fulfill their current and plausible clients demand and to meet its profitability target. In addition, the National Bank of Ethiopia has required banks to have their very own liquidity policy, which enforces banks to display their funding structure and their capability to manage short time period liquidity issues and furnish them with a better ability of assessing the current and future liquidity threat related with their future liquidity position. (Bank Risk Management Guideline, 2010). Hence, maintaining the optimum level of liquidity is vital importance.

Ben moussa & Boubaker (2020), Tabari et al (2013), Kalid et al (2019), Musiega et al (2017), Muriithi and Waweru (2017), Uddin et al (2016) chen et al (2018) and Zaghdoudi & Hakimi (2017) shows that the liquidity risk affects the financial performance of the banks. However, the independent variables of one study vary from other study.

The issue related to effect of liquidity risk on the performance of commercial Banks was studied by different researcher in Ethiopia. There are some studies which are conducted in Ethiopian Such as Eyob (2019), Sirak (2016), Workneh (2015), Berhanu (2015), and Tseganesh (2012).

The study of Sirak (2016) was prepared to examine impact of liquidity on profitability of Banks. However, the study focused on single commercial bank (Nib International Bank).

Tseganesh (2012) and Berhanu (2015), which tries to examine two objectives: one, to identify commercial banks liquidity determinants. Second to decide they have an effect on financial institutions liquidity on economic performance using bank specific and Macroeconomic variables.

However, many of the study variables of Tseganesh focused on macroeconomic variables and Berhanu used NIM as a dependent variable to measure bank performance.

Eyob (2019) and Workneh (2015), studies were prepared to examine the impact of liquidity on performance of commercial banks. However, Workneh used to measure only bank specific internal factors and Eyob used ROE as a dependent variable to measure bank performance.

There are variety of factors have contributed to increase of liquidity problems in various countries and posed great challenges to banks. These issues have attracted much attention from researchers and policy makers back to the links between liquidity risk, regulation, supervision and bank performance. (Ly, 2015).

Since liquidity is very essential to the existence of banks and so factors that affect banks liquidity and posed great challenge to bank performance should be identified, therefore there has to be further research on the area of factors that affecting liquidity of banks. Therefore, this paper aims to investigate the effect of liquidity risk on bank performance by using alternative liquidity risk measure financial gap ratio besides liquidity ratio as used (Tabari, et al, 2013) and (Chen et al, 2009) in their study following Saunders and Cornett (2006). liquidity risk measures in the past focused on the use of liquidity ratios. In recent times, there are many strategies furnished to determine bank liquidity risk without traditional liquidity ratios. (Chen et al, 2009).

1.3 Research objective

The aim of this paper is to examine the relations of liquidity risk and bank performance through analyzing internal and external factors affecting banks liquidity on performance. Specifically, the study attempts:

i. To investigate the effect of Financing gap ratio on performance of Ethiopian private commercial banks (ROA).
ii. To examine the effect of liquid asset to total asset ratio on performance of Ethiopian private commercial banks (ROA).
iii. To study the effect of Total loan to Total asset ratio on performance of Ethiopian private commercial banks (ROA).

iv. To investigate the effect of cash reserve ratio on performance of Ethiopian private commercial banks (ROA).
v. To study the effect of Bank size on performance of Ethiopian private commercial banks (ROA).
vi. To examine the effect of Growth rate of gross domestic product on performance of Ethiopian private commercial banks (ROA).

1.4 Research Hypothesis

The following research hypotheses is formulated in order to address the research questions. Therefore, this study attempts to test the following hypothesis.

H1: Financial gap over total asset have negative and significant effect on performance of Ethiopian private commercial Banks (ROA).
H2: Liquid asset to total asset have positive and significant effect on performance of Ethiopian private commercial Banks (ROA).
H3: Total loan over total asset have positive and significant effect on performance of Ethiopian private commercial Banks (ROA).
H4: Cash reserve over deposit have positive and significant effect on performance of Ethiopian private commercial Banks (ROA).
H5: Bank size have positive and significant effect on performance of Ethiopian private commercial Banks (ROA).
H6: GDP growth rate have positive and significant effect on performance of Ethiopian private commercial Banks (ROA).

1.5 Scope of the study

The scope of the study about used to be restrained to see solely the effect of banks liquidity risk (The liquidity ratios are financing gap ratio, Liquid asset to total asset ratio and total loan to total asset ratio) and Bank specific or internal factors (cash reserve ratio and Bank size) and macroeconomic variable or external factors (GDP growth rate) on commercial banks performance thru evaluating liquidity risk effect on performance the period covered from 2011 to 2019 for the selected nine commercial banks in Ethiopia and The bank performance measure has been defined by: return on asset (ROA).

1.6 Significance of the study

The result of the research project would be of relevance to financial sector regulators in developing guiding principles and regulations in respect of liquidity risk in the banking sector of Ethiopia. The result of the study would also help experts in the banking sectors to have evidence on the association between liquidity risk and financial performance of commercial banks in Ethiopia. The recommendation and findings of the study would also be useful in developing credit policies and operating procedures in respect of liquidity. The result of the study would not only build on of the existing knowledge, it would also help scholars that may want to conduct studies related topic.

Therefore, the most important beneficiaries from this study are each commercial bank, the academic personnel of the country, regulatory bodies and for other researchers that gain knowledge about the effect of liquidity risk on performance of commercial banks.

1.7 Organization of the Study

The study is divided into five different chapters, which are, Chapter one contains the introduction that gives the general idea about the research topic. Hence, it deals with the subject matter of the research work. This chapter focuses on the background of the study, problem statement, research hypothesis, research objective, scope and limitation and significance of the study. Chapter two include two parts which is a review of theoretical and empirical literature on the concept of liquidity and liquidity risk, measures of liquidity risk, measure of performance and the effect of liquidity risk on bank financial performance. The third chapter contains the topic that clearly indicates how this research is carried out. In doing so, it includes the topic called research design method, sources of data, econometric specifications, justification of variables, population and sampling method, data collection, presentation and analysis method, and model specification. Chapter four presented data into an organized form to find out the major conclusions of the research work. It contains the analysis, interpretations of the estimations and findings. Chapter five provides the last part of the report which is primarily concerned with the summary, conclusions and implications. The summary relates the major findings. Discussions are based on the interpretation of data for the purpose of solving the research problem. Moreover, the study is accompanied by references and annexes in supplementary section of the report.

Chapter Two

Literature Review

This chapter is centering on reviewing literature relating to liquidity risk in the banking system and its influence on performance. The literature review is organizing as follows. The theoretical aspect of banks liquidity and its risk, theory of liquidity and liquidity risk management, liquidity risks and bank performance measurement and then liquidity risk influence on bank performance discussed in the first section. And then review of related empirical studies outside and in Ethiopia covered on the second and third sections respectively. The chapter summary and gap discussed on the chapter four and finally section five presented the conceptual frame work of the study.

2.1 Review of related literature

2.1.1 Banks and Liquidity

Modern financial theories have long recognized that banks exist because they perform two crucial roles in the economy: liquidity creation and risk transformation (Berger & Bouwman, 2009 as cited in Golubeva, Duljic & Keminen, 2019). Indeed, banks play a central role of deposit mobilization and credit extension.

Bank for International Settlements (2008) describes liquidity as bank's capacity to finance will increase in belongings and meets its responsibilities barring losses. It is necessary to the ongoing sustainability of any banking business. Hence, managing liquidity is among the most essential activities carried out by way of banks.

According to Hangli, Ajorsu, & Bakpa (2019) The term Liquidity commonly referred to the ability of an entity to change their assets into cash within the shortest possible time without losing its value. In other word, liquidity also describes the ability of an organization to strategically manage and focuses on maintaining efficient levels of current assets and current liabilities to enable the firm to have a constant flow of cash to meet its short-term obligations thus continue to exist in the foreseeable future. Zaghdoudi et al., (2017) defined as the inability of a bank to meet short term financial demands.

Liquidity can be described in the context of how convenient a security can be traded and in the context of how convenient one can acquire funding to exchange a security, the former being known as market liquidity and the latter being funding liquidity. (Marozva, 2015).

The idea of liquidity in finance in most cases lies in two areas, the liquidity of monetary gadgets in the monetary market and the liquidity associated to solvency. Liquidity and solvency are closely correlated concepts, but they are not the same thing. Liquidity is the ability to promptly and economically cope with cash outflows. Solvency is the ability to service banks' debts and meet other obligations, in the long term. (Scandella, 2016).

Liquidity of a bank simply means the capability of the financial institution to hold adequate money to pay for its maturing obligations. It is the bank's capability to without delay meet cash, cheques, different withdrawals responsibilities and legitimate new loan demand whilst abiding by way of existing reserve requirements. (Ibe, 2013). Relating to the provision of liquidity, banks take delivery of funds from depositors and extend such funds to the sector whilst offering liquidity for any withdrawal of deposits.

As per Ben Moussa & Boubaker (2020) also liquidity of a bank means the potential of the financial institution to maintain adequate funds to pays for its maturing duties.

Diamond and Rajan (2005) as cited in Leykun (2016) have suggested that liquidity is one of the critical necessities for the fine functioning of the banking system. Without sufficient liquidity, banks are now not able to operate some of their core functions inclusive of settlement of their inter-bank obligations. additionally, in the banking system too much liquidity on ordinary basis fosters an expectation of falling interest rates; too little liquidity increases the expectation of higher interest rates. Maintaining easy money flows and decreasing short-term interest charge volatility produces a steady environment where individuals and business can make greater informed selections about savings, investment and other expenditures.

Another key aspect of liquidity is that it performs an important role in the existence of every firm and proper management is needed to ascertain continues cash flows for the day-to-day operation of the firms. (Hangli et al., 2019).

Banks are subjected to a diversity of risks. Generally, banking risks can be distinguished into four risk categories: market risk, operational risk, credit risk and liquidity risk.

Liquidity risk in banking has assumed such importance during the last decade in relation to the financial crisis and the new financial regulation. It has become increasingly important to measure, manage and assess the impact of liquidity risk on the economics of banking. In the recent past, liquidity risk has been crucial for financial institutions and for the stability of the financial system. The financial crisis has promoted the adoption of much more advanced liquidity risk management policies and liquidity risk measurement methodologies. (Scannella, 2016).

"liquidity risk is the risk that a business will not have sufficient cash to meet its financial commitments in a timely manner. Without proper cash flow management and sound liquidity risk management, a business will face a liquidity crisis and ultimately become insolvent." (Wirija, 2020).

Adalestinsson (2014) as cited in Ben Moussa et al (2020) point out liquidity can be achieved in 3 different ways: The sale of assets, borrow money from credits in financial markets, and relied on the repayment of debts from debtors.

2.2 Theories of Bank Liquidity and Liquidity Management

The major role of a commercial bank is to create liquidity and remaining financially stable. However, there are a number of dimensions in the way banks concretely manage their liquidity risk. In other words, there are competing theories of liquidity management.

There are several competing liquidity theories. This section would find out five theories that are considered relevant to research topic.

2.2.1. Liquid Asset Theory

This theory center on the balance sheet left side or asset side and argues that banks must hold large amount of liquid assets in opposition to viable demand or payment cushion of effectively marketable short term liquid assets towards unexpected circumstances. (Ngwu, 2006 cited in Ahmadyan, 2018).

2.2.2 Commercial Loan Theory

This theory argues that the liquidity of commercial bank would be assured provided that the assets were held in short-term loan that would be liquidated in the usual business operation. That by extending working capital loans, bank liquidity is assured as such inventory would eventually be sold for cash. (Barus, J., Muturi, W., Kibati, P. & Koima, J., 2017)

As per Edem (2017) This is also called real bill doctrine. Its views are that bank funds should be invested in short term self-liquidated loans for working capital purposes. It supports the financing of movement of goods through all the stages of production cycle. This theory has shortcomings such as exclusion of long-term loans, inconsistency with the demand for economic development, much emphasis on maturity of bank assets instead of marketability, exclusion of stability of demand deposit which helps banks to undertake long term lending among others.

This theory states that whenever commercial banks make short term self-liquidating productive loans, the central bank should lend to the banks on the security of such short-term loans. (Ben Mossa et al, 2020). This principle assures that the appropriate degree of liquidity for each bank and appropriate money supply for the whole economy.

Ibe (2013) 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.

2.2.3 The Shiftability Theory

This theory was proposed by H.G. Moulton in 1915 who insisted that if the commercial banks continue a substantial amount of assets that can be moved to other banks for cash without any loss of material.

This theory emphasizes on marketability of bank assets as a better option for investing funds. The theory views long term financing as a more permanent type of funding by banks. It recognizes decreasing significance of short-term self-liquidating loan. (Edem, 2017).

The shiftability theory suggests that liquidity of a monetary unit is maintained on condition that holds assets that can be transferred or sold to secondary market or other investors/lenders for cash. The theory includes marketable securities as part of liquidity. (Barus et al, 2017).

The shiftability theory further contends that short term market investments, like treasury bills and bills of exchange which can be directly sold whenever there is a need to raise funds by banks is an excellent source of liquidity. But in general circumstances when all banks require liquidity, the shiftability theory need all banks to acquire such assets which can be shifted on to the central bank which is the lender of the last resort.

2.2.4 Anticipated Income Theory

This theory was proposed by H.V. Prochanow in 1944 on the basis of the practice of extending term loans by the US commercial banks. This theory states that irrespective of the nature and feature of a borrower's business, the bank plans the liquidation of the term-loan from the expected income of the borrower. A term-loan is for a period exceeding one year and extending to a period less than five years.

According to Ibe (2013) 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.

Anticipated income theory argues that banks liquidity can be estimated. (Barus et al, 2017). According to the theory, banks liquidity can be influence by the maturity pattern of the loans and

investment portfolio, short-term business and customer installment loans which would have more liquidity than those secured by real-estate. (Taye, 2014 in Barus et al, 2017).

2.2.5 Liabilities Management Theory

This theory was developed further in the 1960s. This theory advocate that, there is no need for banks to lend self-liquidating loans and maintain liquid assets as they can borrow reserve money in the money market whenever necessary. A bank can hold reserves by building additional liabilities against itself via different sources.

These sources comprise of issuing and borrowing, time certificates of deposit and other business banks and the central banks, raising of capital funds through issuing shares, and by ploughing back of profits.

The liquidity management theory focuses on the liability side of bank balance sheet. This theory contends that supplementary liquidity could be derived from the liabilities of a bank. (Ibe, 2013).

2.3 Measurements of liquidity risk

Before going to the process of measuring liquidity risk, it is important first understand some of the possible sources of liquidity risk and ways of mitigating them.

According to Vodova (2011) the reasons for banks vulnerable to liquidity shock is arising mainly from the liability side of their balance sheets, this is due to banks collect demandable deposits and invest these funds in long-term and illiquid assets, such as loans.

Rochet (2008) as cited in Vodova (2011) highlights three main sources of liquidity risk: On the liability side: - there is a massive uncertainty on the extent of withdrawals of deposits or the renewal of rolled-over inter-bank loans, particularly when the bank is underneath suspicion of insolvency or when there is a transient aggregate liquidity shortage, On the asset side: - there is an uncertainty on the extent of new requests for loans that a bank will obtain in the future, Off-balance sheet operations: - like credit lines and other commitments, positions taken by banks on derivative markets.

One of the key elements of measuring and managing liquidity risk is the ability to identify the warning signs of a liquidity crisis. Beyond the identification of these signs, a business must also be able to measure risk magnitude so that it can take immediate and appropriate action to stop a downward spiral.
Banks can achieve liquidity needs in multiple ways; these consists of Shorten asset maturities, issue more equity, improve the average liquidity of assets, obtain liquidity protection.

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. (Ibe, 2013).

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. (Ibe, 2013).

Good liquidity management means performing financial ratios analysis, understanding what these ratios mean, and taking the necessary best course of action. Financial ratios provide a business with current indicators of liquidity risk based on its past performance, allowing it to make the required financial and operational tweaks to ensure it attains desired future financial and operational outcomes. Different scholars measure liquidity risk in different ways. Some of the measurements are the below;

Financial Gap ratio

Poorman and Blake (2005) as indicated that measuring liquidity risk using liquidity ratios was not enough and it was not a solution. formerly, the liquidity risk measurement has targeted on the use of liquidity ratios. Over and above ordinary liquidity ratios, banks should develop a new view of liquidity measurement. Now a day, there are many techniques supplied to investigate bank liquidity risk without ordinary liquidity ratios. For instance, a large Southeast regional bank, for measurement of liquidity have used more than thirty liquidity ratios. However, it eventually failed because of liquidity risk. (Chen et al, 2009). Therefore, Financial gap ratio as used by (Chen, et al 2009 & Tabari, et al 2013) following Saunders and Cornett (2006), is used in this study. They expressed that liquidity risk criterion is determined based on financial gap.

Bank managers mostly assume core deposits as stable source of funds which can permanently finance the supply of banking loans. Generally, core deposits are regarded as loan resources with the least cost. Financial gap is defined as the difference between loan and bank's core deposits. If financial gap is positive, the bank should fill this gap by its cash funds through selling cash assets and borrowing from money market. Therefore, financial gap can be estimated by subtracting the borrowed funds from the cash assets. This financial gap represents financial needs of the bank after selling its cash assets. When the economy is under stagnation and financial market increasingly demands for Cash funds, it is when the banks are more exposed on liquidity risk. Therefore, in this study, it seems that financial gap is a more appropriate alternative for liquidity risk of the bank. For standardization of financial gap, the variable of financial gap is divided by total asset. (Tabari, et al 2013).

liquid asset over total asset ratio

Liquid asset over total asset measures the ability of a bank to absorb liquidity shocks. A high ratio means a high ability to absorb shocks. Liquid assets are the assets which are in the form of cash or cash equivalents or can be converted in to cash with in a very short period. This ratio indicates the proportion of liquid assets to the total assets. The higher this ratio, the better the bank liquidity because it means that banks hold more liquid assets out of total assets. Some of the authors such as (Tran, et al 2019), (Barus et al, 2017), (Ahmadyan, 2018) and (Vodova, 2013) used this ratio to assess liquidity risk.

Total loan over Total asset ratio

Total loan over total assets measures the share of loans in total assets. It shows the percentage of the bank's assets related to illiquid loans. When this ratio is high, it means that the bank is less liquid. (Ahmedyan, 2017). Loan is one of the main sources of revenue of a bank and may have a positive effect on bank performance. The more deposit of a bank is changed to loans; the more revenue is generated. It may have negative effect due to illiquidity risk. (Gaber, 2018).

Cash reserve ratio

Cash reserve ratio (CRR) is generally defined as a particular minimum amount of deposits that needs to be maintained as a reserve by every commercial bank. according to the requirement of the Central Bank. The economics times define legal reserve as a percentage of deposits which commercial banks are required to keep as cash according to the directions of the central bank.

According to Gray (2011) there are three main reasons for the imposition of legal reserve by central bank. These are: Prudential: - when commercial banks 'ability to take deposits and issue their own banknotes was constrained by a requirement to hold proportionate reserve balances either directly, or at central bank, which in turn held gold reserves. These reserves provided some protection against both liquidity and solvency risks.

Monetary control: - this takes two forms: First, if reserve money cannot easily be increased, reserve ratio may restrict commercial bank balance sheet growth. Second, the central bank could vary the level of (unremunerated) reserve ratio in a way intended to influence the spread between deposit and lending rates, in order to impact the growth of monetary aggregates and thus inflation by using reserve ratio.

Liquidity management: - This may be active or passive. Using reserve ratio actively, a central bank immobilizes surplus reserves by administrative fiat, so that the impact of a surplus on bank behavior (low interest rates, demand for foreign exchange) does not in turn lead to inflation or depreciation. Similarly, if demand for reserves exceeds supply, the central bank could lower reserve ratio in response. A passive approach can be adopted, if reserve ratio can be met on average over a period: short–term liquidity management by the commercial banks is facilitated, with a consequent reduction in short–term interest rate volatility.

Bank Size

The size of the bank is the independent variable of the model and it's measured by the bank's total assets. The size variable is expected to have a negative influence on the probability. That is, as the size of the banks increase it is less likely that they will earn more. Larger banks have the advantage of more access to additional financing sources, but dealing with liquidity problems and diversifying risk is another issue. This is probably due to the fact that larger banks benefit from fail policy plans and are believed to be more likely to survive than smaller banks. Therefore, in order to focus on the study issue of performance relative to assets size are used in the regression model. (Aldwan, 2015). It is evidenced that a growing size effect on performance is positive to a certain extent. However, the effect of bank size may be negative in term of extremely large banks (Athanasoglou et al., 2008 in Ly, 2015).

GDP Growth

Gross domestic product tracks the health of a country's economy. It denotes outputs of all goods and services produced in a country over time. As point out Shen et al. (2010) GDP is one of macroeconomics variable to capture the macroeconomic factors. GDP is expected to influence numerous factors related to the supply and demand for loans and deposit and as its growth slows down specifically all through recessions, credit score quality deteriorates, and defaults increase, hence reducing financial institution returns. With GDP as a measure of total economic activity in an economy, greater economic growth encourages banks to lend extra and lets in them to charge greater margins, and improve the quality of their assets.

2.4 Measurements of Bank performance

Bank performance refers to how successful a bank utilizes its operating resources to earn income. Purpose of any firms include banks is to have reserve and create wealth for its shareholders, and this can only happen when bank's return on equity (ROE) is greater than its cost of equity. Generally, Performance is a relationship between the profits generated by the enterprise and investments that contributed to the achievement of these profits, and profitability ratios measure the efficiency with which a company turns business activities into profits. Return on assets measures the ability to use assets to produce net income. (Akinleye et al., 2019).

Similar to other business, profit of bank through earning more money than they pay in expenses, the most important supply of bank earnings from service fees and interest. Two aspects are

concerned with profitability, the revenues generated and the cost. Thus, the away of improving, profitability includes enhancing revenues and minimizing costs. (Ben Moussa et al, 2020)

"In general, the performance is defined as the achievement of the objectives set forth by the bank within the agreed time and with minimal costs while using the available resources. The measure of performance is, as any function of control and management, a way to guide the behavior of the actors of an organization and motivate them. Therefore, improvement cannot take place unless there is a way to get feedback on performance, because measure is the first step to improvement. There are two basic types of measurement of bank performance. The first type is related to the results (the second one financial measure) focuses on the determinants of the results (nonfinancial measures) such as quality, flexibility, use of resources, and innovation. This stipulates that, as part of performance, measurement can be established around the concepts of outcomes and determinants." (Hajer & Anis, 2016).

Majority of research paper on the same subject had taken ROA-return on assets and ROE-return on equity as the measurement of bank profitability. In principle, ROA is used to understand how a bank is successful in utilizing its assets to generate profit. while, it may be influenced because of off-balance-sheet activities whereas, ROE is used to understand how the bank is able to provide return to shareholders on their invested money, the drawback of ROE is that different banks have different capital. As such bank with lower capital will have higher ROE. (Lama, 2019).

2.5 liquidity risk and Bank performance relationship

In recent years, especially after the financial crisis 2007-2009, a wide range of factors have contributed to increase of liquidity problems in many countries and posed great challenges to banks. (Ly, 2015). Liquidity risk reduces the capability of the bank to achieve its monetary duties as they come due. When this risk remains unchecked, banks will lose customers thereby reducing the volume of deposits. When deposits reduce, the bank will have insufficient funds for other investments; this significantly reduces the level of profitability. Again, a high liquidity risk causes a run on the bank. This run is caused by the panic withdrawal of deposits from the bank. This, adversely, affects the potentials of the bank by keeping away would-be-customers and potential investors from the bank. Consequently, the bank's operations reduce drastically and results in a significant reduction in profit. (Ndifon Ojong, et al, 2014 cited in Ahmadyan, 2017).

2.6 Review of related empirical studies

2.6.1 Empirical studies on Bank liquidity risk and performance

There are many researches that studies the relationship between bank liquidity and bank profitability. (Ben moussa, 2020).

Musiega et al (2017) they studied a sample of 30 commercial banks in Kenya over the period 2006 to 2015. To determine liquidity risk effect on commercial Banks's performance. Secondary data was used in the study. The population for secondary data were the 44 commercial banks in Kenya. Descriptive statistics, correlation analysis, random and fixed effects were used using E-views software, they found that liquidity risk measured by Liquid assets to total assets ratio had a positive and significant relationship with performance (ROA). Also, they found that liquid asset to deposit ratio had a negative and insignificant relationship with performance. when banks size is included in the model as a control variable and also the variable for bank size (DTA) is not significant. It can be concluded that bank size has no control effects on the performance of commercial banks in Kenya.

Hakimi and Zaghdoudi (2017) they studied liquidity risk impact on the performance of Tunisian bank and a sample of ten banks in Tunisia over the period from 1990 to 2013. For analysis purpose used panel data and random effect regression method, to this end, the result of the study was (liquidity measured by total over total deposits) has a negative effect on bank profitability (NIM). Liquidity risk decrease significantly Tunisian banks performance. Also, findings show that international financial crisis and inflation act negatively and significantly on bank performance.

Ben Moussa and Boubaker (2020) studied a sample of 18 commercial banks in Tunisia over the period 2000 to 2017. To examine the impact of liquidity on bank profitability in the Tunisian context. They found that liquidity measured by liquid assets / total asset and total credits / total deposits have a positive and significant impact on return on assets (ROA) whereas current assets / current liabilities have not significant impact on ROA. Also, they found that liquid assets / total assets, and total credits / total deposits have a negative and significant impact on ROE (return on equity). Whereas current assets / current liabilities have not significant impact on ROE.

Barus, Muturi, Kibati & Koima (2017) studied liquidity effect on performance of savings and credit societies in Kenya. A study period covered from 2011-2015 for a sample size of eighty-three SACCO in Kenya. using explanatory research design, using descriptive and inferential analysis, using both primary and secondary data sources, by applying multiple linear regression analysis. They found that liquidity measured by liquid asset over total asset and cash deposit ratio have positive and significant effect on the financial performance of SACCO.

Munithi and Waweru (2017) studied 41 commercials of banks in Kenya. To examine the effect of liquidity risk on financial performance of commercial banks in Kenya. They measured liquidity by liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) while profitability is measured by ROE (return on equity). Panel data and random effect regression analysis and GMM were used to purge time invariant observed specific effect and to mitigate potential indigeneity problems. Findings indicate that Net stable funding ratio had negative relation with bank performance while LCR had insignificant relation with the performance of commercial banks.

Tabari, Ahmadi, & Emami (2013) studied to find out liquidity risk effect on the performance of commercial banks of Iran. The study used panel data methods and a sample of 15 Iran banks for the period 2003- 2010. In the model both bank specific and macroeconomic variable were used. They found that bank specific variables (bank's size and bank's asset) and macroeconomic variables (gross domestic product and inflation) had positive effect on the performance of Iran banks. whereas, liquidity risk measured in financing gap to total asset and credit risk had negative effect on the performance of banks.

Chen, Shen, Kao, & Yeh (2009) studied 12 advanced economies commercial banks over the period 1994-2006. To determine the relationship between bank liquidity risk and performance. unbalanced panel dataset was used. alternative liquidity risk (financing gap to total asset) measures were employed for the study. The finding of the study was liquidity risk FGR had negative and significant effect on bank performance (ROA and ROE). However, positive relation with net interest margins (NIM). the study organized based on countries types of financial system as bank-based or market-based financial system. Findings showed that liquidity risk of countries used market-based financial system had non-linear relation with bank performance. However, countries used bank-based financial system had no relation liquidity risk and bank performance.

2.6.2 Review of Related Empirical Studies in Ethiopia

Different researchers were conducted some related studies in Ethiopia. Eyob (2019) studied a sample of nine commercial banks over the period of 2007 to 2016. To find out liquidity risk effect on profitability of Ethiopian commercial banks. Using fixed effect panel data methods and secondary data source were used. Eight factors affecting financial performance of Ethiopian commercial banks were selected and analyzed. The study found that, liquidity risk measured by (liquidity coverage ratio and net stable funding ratio), loan to deposit ratio and liquidity ratio measured in liquid asset over total asset had non-linear relation and significant effect on Ethiopian commercial banks financial performance (ROE). Cash reserve ratio, portion of nonperforming loan from the total bank loan, CPI and GDP growth rate had negative but statistically insignificant/ has no any impact on financial performance (ROE) of Ethiopian commercial banks for the tested period. Therefore, the study concluded that liquidity risk was negatively affecting the financial performance of Ethiopian commercial banks.

The other study made by Sirak (2016) the study aimed that to determine the influence of liquidity on financial performance of Nib international bank. The study uses both qualitative and quantitative data and the time series data taken from during 1999-2015 and analyzed using multiple regressions. The measured liquidity by liquidity ratio and loan to deposit ratio, NBE Bills purchase (NBE), deposit interest rate (IR) and the general inflation rate (INF). The study found that Liquidity ratio; NBE Bills and annual inflation rate had significant positive impact on profitability and finally conclude that liquidity had significant impact on profitability (ROA) of NIB.

Workneh (2015) studied a sample of eight private commercial banks for the period of 2009/10 to 2013/14. To examine liquidity impact on performance of Ethiopia private commercial banks. using random effect model, multilevel linear regressions analysis, quantitative research approach and secondary data source applied to find out impact of liquidity on bank performance. The result of the study showed that liquidity measure in loan over deposit ratio, loan over asset ratio, and liquid asset over deposit ratio had statically significant effect on the performance measure Net interest margin and liquid asset to deposit ratio and loan to asset ratio had negative relation with NIM. Whereas, liquid asset to deposit ratio and loan to asset ratio had positive and significant relationship with ROE. Loan to asset ratio had negative relation with ROA. Therefore, liquidity effect on financial performance had both positive & negative result.

Berhanu (2015) studied a sample of eight commercial banks for the period of 2002/03 to 2013/14. To investigate liquidity determinates and liquidity impact on profitability of commercial banks. Using panel data regression analysis. The study found that liquidity measured by Liquide asset to total Asset has non-liner relation and statistically significant impact on bank size and Loan growth. GDP growth rate, inflation rate, non-performing loan, reserve ration and short-term interest rate had linear and significant effect on liquidity measure liquid asset to total asset. However, bank size had linear and significant impact on Profitability measured in NIM. Whereas, among liquidity determinant variables GDP growth rate, Actual reserve rate and Non-performing loans had non-linear relation and significant effect on NIM.

Tseganesh (2012) studied a sample of eight commercial banks for the period covered from 2000 to 2011. to investigate liquidity determinants and the impact of banks liquidity impact on financial performance. Using balanced fixed effect panel regression analysis. The study finding showed that liquidity of a bank measured by liquid asset over total asset and loan over deposit and short-term financing impact on financial performance measured in ROA was non-linear. Explanatory variable Capital sufficiency, inactive loan, margin Interest rate, rate of short-term interest, rate of inflation and bank size had linear/positive and significant effect on bank liquidity, whereas, among bank liquidity determinant capital adequacy and bank size had positive relation on bank performance ROA. On the other hand, nonperforming loan and short-term interest rate had non-linear/negative and significant impact on financial performance.

The study made by Leykun (2016) studied a sample of eleven Ethiopia commercial banks both state and private banks for the period of 2005 to 2014. To investigate liquidity risk determinants. using fixed effect unbalanced panel data estimation technique. The study found that capital adequacy ratio, total loan to total asset ratio and total deposit to total asset ratio were a key factor affecting liquidity position of commercial banks and had negative and statistically significant effect.

2.7 Summary on the Literature Review and Knowledge Gap

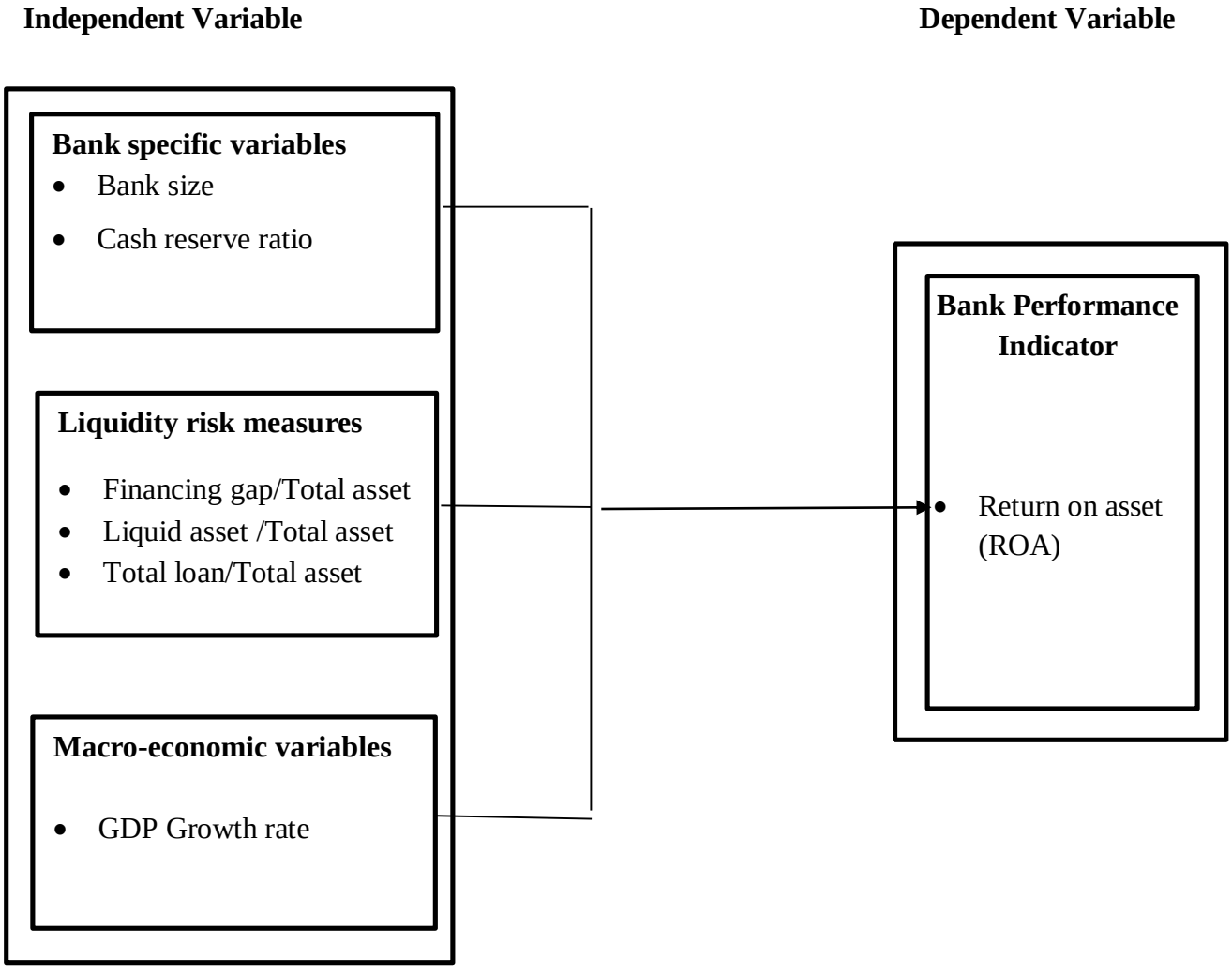
The chapter summary has detailed relevant theoretical and empirical literature review relating to liquidity risk and its impact on bank performance. The major issue has been discussed including measurement of liquidity risk and bank performance, bank specific and macroeconomic control variable and how they relate to performance, theory of liquidity and the relation of liquidity risk and performance. Bank liquidity denotes that its ability to meet all contractual obligations as they fall due. The central functions of a commercial banks are mobilizing surplus deposits to deficit economic units in other word creation of liquidity. Therefore, liquidity is important to the smooth functions of the banking sector and the economy as a whole.

The liquidity risk arises when banks are unable to accommodate the increase in the assets or decrease in the liabilities due to insufficient funds. In line with the review, many of the empirical studies done on the area of liquidity risk effect on the performance banks were following financial crisis around the globe, it has proven that liquidity is one of the important determinants of bank's survival. In the 2008 financial crisis, excessive lending to subprime mortgage and mismatch of asset and liabilities maturities led many banks to failure during the crisis. Many banks were found violating the standard liquidity ratio as prescribed by the central bank. As a result, those banks were hit hard during the bank run. Therefore, it is evident that liquidity is a crucial factor that impacts the bank's sustainability and soundness.

A number of studies has been made on the issue of liquidity risk and its effect on bank performance, the study empirical results were mixed. This study thus capitalizes on the gaps in the literature to take into consideration liquidity risk and its effect on performance of commercial banks in Ethiopia. ROA used as a measurement of bank performance by controlling for other variables. This study introduces financial gap ratio for a measure of liquidity risk as indicated by (Tabari, et al 2013) and (Chen, et al 2009).

2.8 Conceptual Framework

The conceptual framework shows a diagrammatic interaction between the dependent and independent variables. The dependent parameters would be financial performance, which is determined by ROA. The independent parameters would be liquidity risk, measured by financing gap ratio, liquid asset to total asset ratio and total loan to total asset and internal and external factors the following conceptual framework is formulated to illustrate the effects of liquidity risk on financial performance of Ethiopian commercial banks.



Source: Compiled by researcher

Chapter Three

Research Methodology and Research design

This chapter has presented the research methodology, the research design, sampling design, data collection methods and data analysis methods. the research design presented in 3.2 section. Sampling design is presented in 3.3 section. The section 3.4 is presenting data collection methods and data analysis method is presenting in 3.5 section. In section 3.6 model specification and data properties are presenting.

3.1 Research methodology

Quantitative research approach was used to meet the overall objective of the study and to test hypotheses under it.

3.2 Research Design

Research design is the blueprint for fulfilling research objectives and answering research questions (Cooper & Schindler, 2014). The study main objective is to investigate liquidity risk and its effect on Ethiopia commercial banks performance. So, the study used a descriptive study design based on the research questions. Since the research intends to describe the situation at present about the factors that are associated with the linkage between the liquidity risk and the bank's performance descriptive and inferential statistics research design was used to analyze the data.

3.3 Sampling Design

3.3.1 Relevant population

For this study, the target population consists of all Sixteen registered and fully operating Ethiopia private commercial banks. According to Cooper and Schindler (2014), population refers to the gathering of all elements about which the research wishes to make inferences. Such as, Awash International Bank (AIB), Abay Bank (AB), Addis International Bank (AIB), Bank of Abyssinia (BOA), Berehan International Bank (BIB), Bunna International Bank (BUIB), Cooperative Bank of Oromia (CBO), Dashen Bank (DB), Debub Global Bank (DGB), Enat Bank (EB), Lion International Bank (LIB), Nib International Bank (NIB), Oromia International Bank (OIB), United Bank (UB), Wegagen Bank (WB), and Zemen international Bank (ZIB).

Sampling Frame: Since, the focus of the research was liquidity risk effect on bank performance, the relevant population for this study was selected based on non-probability sampling on the basis of level of profit and years of establishment (NBE annual report 2018/19), from the total target population, nine of them were considered relevant to the purpose of the study. Therefore, the lists of samples are: Awash International Bank (AIB), Bank of Abyssinia (BOA), Cooperative Bank of Oromia (CBO), Dashen Bank (DB), Lion International Bank (LIB), Nib International Bank (NIB), United Bank (UB), Wegagen Bank (WB), and Zemen international Bank (ZIB). From the total populations more than 50% a sample population were considered for the study. They have been operated for more than 9 years with in the industry

3.4 Source and Methods of Data Collection Procedure

The data was collected mainly through the secondary sources. The secondary data for this study obtained from commercial bank's financial statements filed with National Bank of Ethiopia from 2011 to 2019. In addition, scholarly articles and relevant textbooks were also used to facilitate the study.

3.5 Data Analysis Methods

The data analysis in this study involved the use of descriptive and inferential statistics in order to help the study establish the relationship between the six independent variables (Financing gap ratio, Liquid asset to total asset ratio, total loan to total asset ratio, Cash reserve ratio, bank size and GDP growth rate) and the dependent variables (ROA) representing bank performance. Stata software version 14.2 output used for the data analysis. For the test of hypothesis of the study regression analysis technique was used.

3.5.1 Descriptive Statistics

Descriptive statistics refer to methods of organizing and summarizing data, for this study measures of central tendency (means), dispersion (standard deviation), Minimum and Maximum were used. Data was also organized into tables for easy reference and better communication.

3.5.2 Inferential Statistics

Inferential statistics refer to methods of drawing conclusions from sample data about a population. For this study, regression and correlation analysis were used to determine both the nature and the strength of the relationship between two variables. Correlation analysis is usually used together

with regression analysis to measure how well the regression line explains the variation of the dependent variable.

There are a variety of approaches for the measurement of liquidity and performance variables. For the measure of liquidity risk, bank specific and macroeconomic variables such as total deposit, total loan, liquid asset, total assets, cash reserve, and GDP are applied to calculate total loan to total asset ratio, ratio of financing gap to total asset, liquid asset to total asset, cash reserve. For the measurement of bank's performance, return to assets (ROA) applied. Therefore, the variables for this study discussed as below.

3.5.2.1 Dependent Variables

The dependent variable in this study returns on asset (ROA). These dependent variables are the measure of profitability.

Return on Asset (ROA)

Return on Assets (ROA) is an indicator of how well or how efficient a company utilizes its assets or investment resources, by determining/measures how successful/profitable a company is relative to its size (Total assets). It gives an information as to how efficient a company's management is at using its assets or investment resources to generate earnings/profits. Higher ROA indicates more asset efficiency. It is measured as:

$$\textbf{ROA} = \frac{\boldsymbol{profit\ after\ Tax}}{\boldsymbol{Total\ Assets}}$$

3.5.2.2 Independent variable

The independent variable in this study is financing gap, liquid asset to total asset, loan to asset, cash reserve, bank size and GDP growth rate.

Financing gap measure (FGR)

In this model Financing gap ratio considered as liquidity risk measure. (Chen, et al 2009 & Tabari, et al 2013) indicated that banks can measure liquidity risk exposure by determining their financing gap. "Banks with higher financing gap ratio must use its cash, selling liquid assets and much external funding to fund this gap, and face larger liquidity risk". Bank managers often regard the average core deposit as stable source of funds; thus, it can permanently fund a bank's average

loans. The financing gap is defined as the difference between a bank's loans and core deposits. The proxy for financing gap is:

$$\textbf{FGR}= \frac{\boldsymbol{Financing\ gap}}{\boldsymbol{Total\ asset}}$$

H1: Financial gap ratio has negative and significant effect on performance of commercial banks.

Liquid asset over Total asset ratio (LATA)

In this study, the ratio of liquid asset over total asset used as a measure of liquidity risk and which indicates the shock absorption capacity of a bank. As a general rule, the higher this ratio indicates that the bank is liquid and has sufficient liquidity shock absorption capacity. (Vodova,2013). Nevertheless, the higher ratio may have interpreted as inefficiency of a bank. as liquid asset bears lower yield and comes with opportunity cost Hence, it is crucial to maintain liquidity and profitability. The proxy of LATA is:

$$\textbf{LATA}= \frac{\boldsymbol{Liquid\ asset}}{\boldsymbol{Total\ asset}}$$

H2: *Liquid asset to total asset ratio has positive and significant effect on financial performance of commercial banks.*

Loan to Assets Ratio (TLA)

This ratio is also other liquidity risk measure for the study. It indicates the bank liquidity in terms of total assets owned. It states the percentage of bank total asset has tied up in form of credit. The higher ratio of loan to asset also specifies capacity of the bank to meet its demand because this ratio measures the extent of total asset are tied up in the illiquid asset. if a bank lean towards to increase risk by having a higher TLA ratio, it may negatively affect the profits. However, the higher capacity of a bank for profitability. The proxy of TLA is:

$$\textbf{TLA}= \frac{\boldsymbol{Total\ Loans}}{\boldsymbol{Total\ Assets}}$$

H3: Loan to asset ratio has positive and significant effect on financial performance of commercial banks.

Cash reserve ratio (CRR)

Cash reserve is a particular minimum amount of deposits that needs to be maintained as a reserve by every commercial bank according to the requirement of the financial institution supervisory body. Required reserves represent a financial policy instrument which a central bank makes use of to various levels depending on the stipulations of the financial system. every bank maintains the necessary CRR, the overall liquidity will be administered and managed thoroughly. This, in turn, will benefit each bank also. A bank will always have the right amount of cash and not fall short of funds when depositors or customer require funds for their various personal needs. This is a very good advantage for any bank's operations. However, one needs to note that when the CRR maintained is high, the liquidity will be low in the economic system. It works vice versa wherein the lower the CRR maintained, the higher will be the overall liquidity of the financial system. The proxy for cash reserve is cash reserve at national bank to deposit ratio.

$$\textbf{CRR=}\ \frac{\boldsymbol{Cash\ Reserve}}{\boldsymbol{Total\ deposit}}$$

H4: Cash reserve has negative and significant effect on financial performance of commercial banks

Bank size (SIZE)

Bank size (SIZE) is equal to the logarithm of total bank assets, which is a common proxy for bank's size in research about bank performance (Goddard et al., 2004 in Ly, 2015). It is proved that the impact of a growing size on performance is positive to a certain degree. However, the effect of bank size may be negative in term of extremely large banks (Athanasoglou et al., 2008 in Ly, 2015). The first view is too big to fail which considers negative relationship between size and liquidity while; the traditional transformation view suggests positive relationship. As per (chen et al, 2009) "large banks usually hold more loans and thus have larger financing gap ratio. However, the largest banks will face less liquidity risk because of too big to fail argument. Therefore, the size of a bank effect on bank liquidity risk is non-linear." According to (Aladwan, 2015) the size variable is expected to have a negative influence on the probability. That is, as the size of the banks increase it is less likely that they will earn more. Larger banks have the advantage of more access to additional financing sources, but dealing with liquidity problems and diversifying risk is another

issue. This is probably due to the fact that larger banks benefit from fail policy plans and are believed to be more likely to survive than smaller banks. a positive relationship between impact of bank size and bank performance is predicted. The proxy is: **Size = Ln (Total asset).**

H5: Bank size has positive and significant effect on performance of commercial banks.

Gross domestic product (GDP)

Gross Domestic Product is defined as the sum of all goods and services produced in a country over time, without double counting products used in other output. The gross domestic product is one of the most important economic indicators used by economic decision makers and government in planning and formulate the policies. Gross domestic product (GDP) is the most important economic indicator that tells us overall health of the economy. It is a comprehensive measure, covering the production of consumer goods and services, even government services, and investment goods. (Hamza & Khan, 2014).

The greater economic development encourages banks to lend better and permits them to cost higher margins, and enhancing the high-quality of their assets. (Chen et al, 2009). GDP is expected to have a direct influence on the supply of deposits and customer's demand for bank loans that in turn impacts the generation of cash flows and profitability. (Kanwal & Nadeem, 2013). (Sufian & Habibullah ,2010 in Kanwal & Nadeem, 2013) stated that favorable conditions in an economy will positively impact the level of financial transactions, and well managed banks will earn from loans and sale of securities. Thus, a positive relationship between banks liquidity and bank performance is predicted.

H6: GDP growth rate has positive and significant effect on performance of commercial banks.

Table 3. 1 Summary of independent variable and their expected result on dependent variable

Independent Variable	Definitions	Expected result
Financing gap ratio	Financial gap is defined as the difference between loan and bank's core deposits.	Negative and Significant
Liquid asset holding	It indicates bank shock absorption capacity. Higher the ratio higher the shock absorption capacity. Whereas, too high ratio could be interpreted as inefficient as liquid asset bear lower yield and comes with opportunity cost.	Positive and significant
Loan to asset ratio	It represents the portion of total asset tied up in the illiquid loans. Higher the ratio lesser liquid the bank.	Positive and Significant
Cash reserve ratio	The ratio of cash reserve held on NBE on total deposit	Positive and significant
Bank Size	Natural logarithm of total assets of the bank	Positive and Significant
GDP growth rate	Growth rate of real GDP	Positive and significant

3.6. Model specification

In this study, the types of data set used allowed to use panel of data or longitudinal data model, thus the study was used panel/longitudinal data model. It has data comprising both time series and cross-sectional elements.

According to (Brook, 2008) suggest that using panel data have important advantages. One of the advantages of using panel data set, providing a wide issue coverage and help to solve difficult problems using panel data than using only time-series or cross-sectional data.

Second advantage of panel data usage, to determine the relationship of a variables, the change of variables through time. By only using pure time-series data could not be examining relationship between variable and change overtime. Due to time series data would necessitate a long run of data to be able to conduct any significant hypothesis tests. However, using both cross-sectional and time series data, one can increase the number of degrees of freedom, and can also help to mitigate Multicollinearity problems.

Third, as will become apparent below, helping the regression model organizing in the right way, facilitate the influence of biasness of omitted variables in regression results. The regression model is as described in the following equation.

$$\mathbf{yi\ t = \alpha + \beta xi\ t + ui\ t}$$

Where; Yit is the explained variable,

α is the intercept parameter,

β (is a q×1 vector) parameters estimating on the independent variables, and

xit (is a 1 × q vector) observations on the independent variables,

Uit is the error term which represents all those factors not includes

i denote the study variable and t representing the time of the study

To find out the relationship of banks liquidity and bank performance, a regression model is employing in order to analyze the relation between independent and dependent variables:

$$Yit = \beta 0 + \beta 1Xit + uit$$

As the study has more than one independent variable a multiple regression model should be employed. The regression equation will be: Yit = β0 + β1Xit+ β2Xit+ β3Xit +.....+ βnXit + uit
Based on the above equation and the variables used in this study, the econometric equation for the model is specified as following:

ROAit = β0+ β1(LATAit)+ β2(FGRit) + β3(TLAit) + β4(CRRit) + β5(SIZEit)+ β6(GDPit)+ +uit

Where:
ROA = coefficients of dependent variable that indicates the performance of the bank *i* at time *t*;
ROAit is the return on total assets ratio of bank *i* at time *t*,
B0= constant term

β1 – β6= coefficients of independent variables;

uit= error term

FGR it = The ratio of financing gap of bank i at time t; Financing gap defined as the difference between a bank's loans and customer deposit;

$$\textbf{FGR}= \frac{\textbf{Financing gap}}{\textbf{Total asset}}$$

LATAR it = Liquid asset to total asset ratio of bank i at time t, this proxy is the ratio of total liquid asset to total asset.

$$\textbf{LATAR}= \frac{\textbf{Liquid asset}}{\textbf{Total asset}}$$

TLAit = Total loan to total asset ratio of bank i at time t. the proxy is the ratio of total loan to total assets.

$$\textbf{TLA}= \frac{\textbf{Total loan}}{\textbf{Total assets}}$$

CRR it = cash reserve ratio of Bank i at time t, the proxy is the percentage of cash required to be kept in reserves, vis-a-vis a bank's total deposits

$$\textbf{CRR} = \frac{\textbf{Cash reserve}}{\textbf{Total Deposit}}$$

SIZEit = The size of bank i at time t. The proxy is natural logarithm of total bank assets.

$$\textbf{Size= ln (Total asset)}$$

GDP t = GDP growth rate at time t. The growth rate is measured by percentage change in GDP.

Chapter Four

Data analysis and Discussion of results

This chapter deals with analysis, interpretation and discussion of the finding on the impact of liquidity on performance and it has presented in three parts. The descriptive information as well correlation analysis on the study variable presented in the first section; classical linear regression model assumption test in the second part; Then the result of regression analysis and discussions of the main finding is presented in the third section.

4.1 Descriptive statistics

Table 4.1 provides descriptive statistics of the explained and explanatory variables as used in the study. The table shows the mean of a variable, minimum value, maximum value, standard deviation of a variable and the total number of observations for the explained variable is return on asset (ROA) and independent variables (Total loan to total asset, Financing gap ratio, Liquid asset to total asset ratio, cash reserve ratio, bank size, GDP growth rate).

Table 4.1 descriptive statistics of explained and explanatory variables

Variable	Observation	Mean	Standard Dev.	Minimum	Maximum
ROA	81	3.14136	0.8146529	1.38	6.30
LATA	81	26.3152	11.47084	10.72	54.89
FGR	81	-29.7270	6.102972	-47.13	-16.55
SIZE	81	23.3235	0.7297999	21.20	24.75
CRR	81	10.7401	5.378343	4.86	24.81
TLA	81	47.8016	6.596023	32.00	63.32
GDP	81	8.92556	1.379177	6.13	10.41

Source: Sample commercial banks financial statements and computation of STATA output.

As indicated in the above table that the total number of observations for each variable is 81. ROA has a mean of 3.14% which implies that commercial banks in Ethiopia generate on average 0.0314 birr in profit for every one birr in asset and a standard deviation of 0.81%. This show that the value

of ROA dispersed moderately. The highest and lowest value of ROA was 6.30 and 1.38 respectively. The highest value of ROA was for Zemen international bank (ZIB) on the year 2011.

Liquid assets holdings are shown to has a mean and standard deviation of 26.32% and 11.47% respectively. The minimum and maximum values for liquid assets holdings are 10.72% and 54.89% respectively. This indicates that 26.32 percent of the total assets of Ethiopian commercial banks are liquid asset which is easily convertible in to cash.

The mean value for financing gap ratio was -29.73% and a standard deviation was 6.10%. The minimum and maximum values for financing gap ratio was -47.13% and -16.55 respectively. financial gap represents financial needs of the bank and therefore, the bank has 29.73 percent cash asset to finance its borrowed fund.

Bank size has a mean value of 23.32% and a standard deviation of 0.73% an indication that the size of commercial banks was dispersed moderately. The minimum and maximum value was 21.2% and 24.75% respectively.

Cash reserve ratio has a mean and standard division of 10.74% and 5.38% respectively. The minimum value for CRR is 4.86% while the maximum value was 24.81%. Which implies that the Ethiopian commercial banks deposit 10.74 percent of their cash balance at National bank reserve account which was high as compared to National bank reserve standard (5%).

Total loan to Total asset ratio has a mean and standard deviation of 47.8% and 6.60% respectively. The minimum value for total loan to total asset is 32% while the maximum value was 63.32%. which implies that on average 47.8% of the bank total asset has invested for loans.

GDP growth rate has a mean and standard division of 8.93% and 1.38% respectively. GDP mean value specifying that the country ‘s average economy growth rate for the previous nine years. In the year 2014 the recorded 10.41% economy growth was the maximum economy growth rate and the smallest growth of economy was 6.13% recorded in the year 2019.

4.2 Correlation Analysis

Correlation analysis was conducted to understand the relationship between the explained and explanatory variables. The Karl Pearson's product-moment correlation was used to analyze the association between the independent and the dependent variables. The Pearson correlation coefficient is a measure of a linkage between observed and predicted variables. In Pearson correlation matrix, the correlation coefficient values range from negative one to positive one. A coefficient of positive one shows that a perfect positive correlation exists between two variables; whereas, a coefficient of negative one shows that a perfect negative correlation exists between two or more variables. Alternatively, a correlation coefficient of zero specify that no linear relationship has between two variables. A value greater than zero indicates a positive association, and A value less than zero indicates a negative association. Results are as shown below.

Table 4.2 Correlation Matrix between Dependent and Independent Variables

	ROA	LATA	FGR	SIZE	CRR	TLA	GDP
ROA	1						
LATA	0.6422	1					
FGR	-0.2309	-0.6762	1				
SIZE	-0.6587	-0.6775	0.4605	1			
CRR	0.5673	0.7169	-0.5018	-0.4594	1		
TLA	-0.4817	-0.8128	0.7947	0.6914	-0.6127	1	
GDP	0.3357	0.3147	-0.3603	-0.4536	0.298	-0.5266	1

Source: Sampled commercial banks financial statement and computation through STATA.

From the finding in the table above, the study found that there was positive correlation coefficient between return on assets/ROA and Liquid asset to total asset/LATA, as shown by correlation factor of 0.6422, This correlation showed that as liquid asset to total asset increases, Return on asset increases.

Financing gap ratio/FGR was negatively correlated with return on asset as shown by correlation coefficient of -0.2309, This correlation revealed that as financing gap increases, return on asset decreases.

The bank size was correlated negatively with return on asset as shown by correlation coefficient of -0.6587. This correlation showed that the banks size inversely related with return on asset, the one increased the other decreased.

Cash reserve ratio was positively correlated with return on asset as shown by correlation coefficient of 0.5673. This revealed that as the aforementioned variable increase, return on asset move to same direction.

Total loan to total asset ratio was negatively correlated with return on asset, with the correlation coefficient of -0.4817. This indicated that as total loan to total asset decreases, return on asset increases.

The macroeconomic factor GDP rate was positively correlated with return on asset as indicated by correlation coefficient of 0.3357. This correlation revealed that as the variable real GDP growth rate increase, return on asset also increases.

4.3 Testing assumptions of CLRM

OLS is the best procedure for estimating a linear regression model only under certain assumptions. Thus, the model of this study was tested under classical linear regression model assumptions, which are discussed below

1. The errors have zero mean (E (ut) = 0)

The error term accounts for the variation in the dependent variable that the independent variables do not explain. For the study model to be unbiased, the average value of the error term must equal zero.

The first assumption required is that the average value of the errors is zero. In fact, if a constant term is included in the regression equation, this assumption will never be violated. (Brook ,2008). If the regression did not include an intercept, and the average value of the errors was nonzero, several undesirable consequences could arise. Therefore, since the constant term (i.e., α) was included in the regression equation, the average value of the error term in this study is expected to be zero.

2. No heteroskedasticity (homoskedasticity) (var (ui) = σ2 <∞)

The error term observations come from the same probability distribution with a constant variance. If the variance of the distribution of the error term changes for each observation or range of observations, then we have what's called heteroskedasticity.

Brooks (2008) as specified; it has been assumed that the variance of the errors is constant. this is known as the assumption of homoscedasticity. If the errors do not have a constant variance, this violation is termed as heteroscedasticity. This study used white test to examine for presence of heteroscedasticity across the range of independent variables.

H0: The variance of the errors is homoscedasticity

H1: The variance of the errors is heteroscedasticity

Here heteroscedasticity is not a problem, since the P value is greater than 0.05 that is 0.2531 as shown the below table 4.3 and Therefore, as showed summary of the test result no proof for presence of heteroscedasticity then concluded that the null hypothesis is accepted.

Table 4.3. Heteroscedasticity test using white test

```
. estat imtest, white

White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(27)     =     24.00
         Prob > chi2  =    0.6305

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	24.00	27	0.6305
Skewness	14.56	6	0.0240
Kurtosis	0.50	1	0.4816
Total	39.05	34	0.2531

Source: Financial statement of sampled commercial banks and STATA output

3. Test for Multicollinearity

This 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. If the explanatory variables were orthogonal to one another, adding or removing a variable from a regression equation would not cause the values of the coefficients on the other variables to change." (Brooks, 2008).

When the explanatory variable is an exact linear relationship of the other explanatory variables, then we conclude that the model has perfect collinearity.

Perfect Multicollinearity will usually be observed only when the same explanatory variable is inadvertently used twice in a regression.in this case, it is not possible to estimate all of the coefficients in the model. (Brooks 2008). When the explanatory variables are very highly correlated with each other a problem occurs and this problem is known as Multicollinearity.

As per Brooks (2008) Perfect Multicollinearity occurs when there is an exact relationship between two or more variables. If the Multicollinearity occurs, the regression model is unable to tell which explanatory variables are influencing the dependent variable.

To test the presence of Multicollinearity problem in a regression model, this study used high pair-wise correlation coefficients method. Because it shows the correlation of independent variables between each other one by one. Even if this assumption allows the explanatory variables to be correlated, they must not be perfectly correlated. However, the extent of correlation coefficient causes Multicollinearity is not clearly defined. Brooks (2008) mentioned that if the correlation coefficient along with the independent variables is 0.8 and above, Multicollinearity problems will be existed. While Hair et al (2006) argue that correlation coefficient below 0.9 may not cause serious multi collinearity problem.

This indicates as there is no consistent argument on the level of correlation that causes multi collinearity. Therefore, in this study correlation matrix for six of the explanatory variables shown below in the table had been estimated. The results in the following correlation matrix show that the highest correlation of 0.8128 which was between liquid asset to total asset and total loan to total asset.

As per Gujarati (2004), the standard for statistical method for testing data for multicollinearity is analyzing:

- The explanatory variables correlation coefficients (CC);
- Condition index (CI) and
- Variance inflation factor (VIF).

Table 4.4 Correlation Matrix between Explanatory variables

	LATA	FGR	SIZE	CRR	TLA	GDP
LATA	1					
FGR	-0.6762	1				
SIZE	-0.6775	0.4605	1			
CRR	0.7169	-0.5018	-0.4594	1		
TLA	-0.8128	0.7947	0.6914	-0.6127	1	
GDP	0.3147	-0.3603	-0.4536	0.2980	-0.5266	1

Source: Financial statement of sampled banks and STATA computation output

In this study to test the presence of multicollinearity using Pearson correlation method among the explanatory variables. Table 4.4 above have shown the correlations of explanatory variables. The correlation result of all variables is below 0.90 as shown in the table. Thus, Multicollinearity not a problem for the study.

The other detection mechanism of multi collinearity is variance inflation factor (VIF). VIF measures how much the variance of an estimated regression coefficient increases if your predictors are correlated (Multicollinearity). When VIF is greater than 10, then the regression coefficients are poorly estimated and imperfect Multicollinearity. On this study hence multi collinearity was not a concern with this data set because the average VIF was 3.26.

Table 4.5 Summery of VIF of explanatory variables

Variable	VIF	1/VIF
TLA	6.05	0.165343
LATA	4.6	0.217214
FGR	2.9	0.344389
SIZE	2.32	0.431331
CRR	2.11	0.47466
GDP	1.56	0.642379
Mean VIF	3.26	

Source: Financial statement of sampled commercial banks and STATA output

4. Test of normality (ut ∼N (0, σ2)

One of the most commonly applied tests for normality is the Bera—Jarque. (Brook, 2008). If the residuals are normally distributed, the histogram should be bell-shaped and the Bera--Jarque 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 0.05 level (Brook, 2008). This means that Jarque Bera formalizes this by testing the residuals for normality and testing whether the coefficient of skeweness and kurtosis are approximately 0 and 3 respectively. Skewness measures the extent to which a distribution is not symmetric about its mean value and kurtosis measures how fat the tails of the distribution are. (Brook, 2008).

The hypothesis for the normality test was formulated as follow:

H0: residual is normally distributed

H1: residual is not normally distributed

The test result for the models provides a p-value of greater than 0.05 evidencing that residuals are normally distributed. As per the below table 4.6 The Jarque-Bera statistic has a P-value of 0.1232. This result implies that the p-value for the Jarque-Bera test is greater than 0.05 which indicates that there was no evidence for the presence of abnormality in the data. Thus, the null hypothesis that the data is normally distributed fail to reject since the p-value was in excess of 0.05.

Table 4.6 Summary of normality test: Bera—Jarque

```
. sktest uhat

                    Skewness/Kurtosis tests for Normality
                                                          ------ joint ------
    Variable |        Obs  Pr(Skewness)  Pr(Kurtosis) adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------------------
        uhat |         81      0.0727        0.3656        4.19          0.1232
```

Source: Financial statement of sampled commercial banks and STATA output

5. Model Selection (Random Effect versus Fixed Effect Models)

There are broadly two classes of panel estimator approaches that can be employed in financial research: fixed effects models and random effects models. (Brook ,2008). Fixed effects models allow the intercept in the regression model to differ cross-sectional but not over time, while all of the slope estimates are fixed both cross-sectional and over time. Whereas random effects model proposes different intercept terms for each entity and again these intercepts are constant over time, with the relationships between the explanatory and explained variables assumed to be the same both cross-sectional and temporally. (Brook, 2008).

One of the biggest issues here is appropriate model selection. According to Gujarati and Porter (2004) a challenge facing a researcher is appropriate model selection either fixed effect model (FEM) or random effect model (REM)? The choice between both approaches is done by running a Hausman test. Thus, to determine whether the fixed effects models and random effects models this study run the Hausman test.

The hypothesis for the model selection test was formulated as follow;

H0: Random effects model is appropriate.

H1: Fixed effects model is appropriate.

Table 4.7 Hausman Test (Choosing Random effect (RE) versus fixed effect (FE) models)

Variables	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
LATA	0.0370556	0.03639	0.0006683	0.0033239
FGR	0.0463765	0.04683	-0.0004488	0.0108163
SIZE	-0.7509142	-0.5348	-0.2161399	0.0994348
CRR	0.0211783	0.03316	-0.0119822	0.0060015
TLA	0.0332529	0.02419	0.0090626	0.0131774
GDP	0.054132	0.07173	-0.0175962	0.0145537
chi2(6)			3.64	
Prob>chi2			0.7256	

Source: Financial statement of sampled commercial banks and STATA output

The Hausman model selection test has the P-value of 0.7256, which are greater than P-value 0.05 significance level. Therefore, the alternative hypothesis of the fixed effect model is rejecting at 0.05 level of significant. This indicating that, random effect model is more appropriate than fixed effect model.

4.4 Multiple Regression Analysis

The regression analysis empirical findings on the impact of liquidity risk on bank performance presented in this section. The below Table 4.8 reports regression results between the explained variable and independent variables. Under the following regression outputs, the beta coefficient may be negative or positive; beta indicates that each variable's level of influence on the dependent variable. The positive beta coefficient means that variable has a positive impact on the dependent variable, and negative beta has a negative impact on the dependent variable. P-value indicates at what percentage or precession level of each variable is significant. R2 values indicate the explanatory power of the model or measure how well the regression model actually fits the data and adjusted R2 value which takes into account the loss of degrees of freedom associated with adding extra variables were inferred to see the explanatory powers of the models.

Regression outcomes

The empirical model used in the study in order to find out the impact of bank liquidity on the performance of private commercial banks through the significant factors explaining financial performance which were measured by Return on asset (ROA).

$$ROA_{it} = \beta 0 + \beta 1(LATA_{it}) + \beta 2(FGR_{it}) + \beta 3(SIZE_{it}) + \beta 4(CRR_{it}) + \beta 5(TLA_{it}) + \beta 6(GDP_{it}) + \varepsilon_{it}$$

Therefore, based on the finding in below Table, the model was developed to identify liquidity risk impact on bank performance as follow.

$$ROA_{it} = 13.90 + 0.036LATA + 0.047FGR - 0.535SIZE + 0.033CRR + 0.024TLA + 0.072GDP + \varepsilon$$

Table 4.8: random effect model regression results

```
. xtreg ROA LATA FGR SIZE CRR TLA GDP, re

Random-effects GLS regression                   Number of obs     =         81
Group variable: Banks1                          Number of groups  =          9

R-sq:                                           Obs per group:
     within  = 0.6595                                         min =          9
     between = 0.4652                                         avg =        9.0
     overall = 0.6219                                         max =          9

                                                Wald chi2(6)      =     129.77
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000

------------------------------------------------------------------------------
         ROA |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        LATA |   .0363873   .0107946     3.37   0.001     .0152302    .0575444
         FGR |   .0468253   .0171828     2.73   0.006     .0131476     .080503
        SIZE |  -.5347742   .1302615    -4.11   0.000     -.790082   -.2794664
         CRR |   .0331604   .0156188     2.12   0.034     .0025481    .0637728
         TLA |   .0241903   .0226198     1.07   0.285    -.0201437    .0685244
         GDP |   .0717282   .0514654     1.39   0.163    -.0291421    .1725985
       _cons |   13.89589   3.348352     4.15   0.000     7.333243    20.45854
-------------+----------------------------------------------------------------
     sigma_u |  .14266695
     sigma_e |  .47240504
         rho |  .08358175   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Source: Financial statement of sampled commercial banks and STATA output

The explanatory power of the above model is high with the value of adjusted R2 of 62%. This specifies that the changes in the independent variables i.e., liquidity risk, bank size, cash reserve,

and GDP collectively explain 62% of the changes in the dependent variable ROA and the rest of unexplained percentage i.e., thirty-eight percent indicates that factors not considered in the. Thus, these variables collectively, are good explanatory variables of the impact of liquidity on performance of commercial banks in Ethiopia. Prob (F-Statistic) 0.0000 indicates strong statistical significance, which enhanced the reliability and validity of the model.

Among all explanatory variables which affect the financial performance of Ethiopian commercial banks, four of them had statistically significant: namely liquid asset to total asset ratio, financing gap ratio had positive impact at 1% level of significance and bank size and cash reserve ratio had negative impact at 1% and positive impact at 5% level of significance respectively on financial performance. The rest two explanatory variables such as total loan to total asset ratio and GDP had statistically insignificant and positive impact on financial performance of Ethiopian commercial banks.

4.5 Discussion of regression results

This section contains the regression results and the findings of liquid asset to total asset, financing gap ratio, loan to total assets ratio, cash reserve, size of a bank and GDP growth rate.

Impact of Liquidity asset holding on financial performance

Liquidity asset holding ratio used as a measure of liquidity risk in this study. The regression analysis result shows that 0.001 P value of liquid asset holding less than P-value of 0.05 has a significant impact at 1% significant level on bank performance. Therefore, the finding was similar to hypothesis of the study (H2) and the 0.036 positive coefficient value of liquid asset holding which specified that a one percent or one birr increased in liquid asset, caused 3.6% or 0.036birr increase in performance of Ethiopian commercial, keeping other variables as it is. the result is similar to (Ben Moussa and Boubaker ,2020) & (Musiega et al, 2017) it has positive and statistically significant effect on the performance of commercial banks of Ethiopia.

Impact of financing gap ratio and financial performance

Financing gap used as a measure of liquidity risk in this study which was measured by financing gap (the difference of total loan and total deposit) over total asset the regression result showed that financing gap 0.006 P-value less than P-value 0.05 has a statistically significant impact on bank performance at 1% significant level. Thus, the hypothesis of financing gap stated that the ratio has

negative and significant effect, However, the regression results significant effect but positive in relation and the positive 0.047 coefficient value of financing gap ratio specified that a one percent or one-birr increment in financing gap, produced 4.7% or 0.047birr increment in bank performance. holding other variables constant. Liquidity is the base for traditional bank activities. Banks have adequate liquidity directed to advantages of growing in income resulting from loan activity. Accordingly, bank performance increased due to increased interest revenue of loan. Moreover, when a bank has enough liquidity, it is able to obtain the sufficient funds. To compensate the demands and needs, Therefore, the level of loans and investments portfolio increases. This causes to increase the performance of banks. The result was inconsistence with the findings of Tabari et al (2013) and Zaghdoudi et al (2017). This finding is consistent with previous study Chen et al (2018) and (Golvbeva, 2019). liquidity risk (FGR) is positively and significantly related to financial performance. It indicates that when banks loan level increase in other word the level of liquid asset decrease may collect more interest revenue than banks with less illiquid assets.

Impact of Bank size on financial performance

The size of a bank which represented by total asset was used in this study to identify the impact of bank size on bank performance. The regression result of bank size showed that P-value of bank size is 0.000 less than P-0.05 and at 1% level of significant a bank size has a significant impact on bank profitability. Therefore, the hypothesis of bank size was supported and accepted. The negative 0.535 coefficient value a bank size implied that a one percent or one birr increases in size, caused a 5.35% or 0.0535birr decreases in bank performance, keeping other variables as it is. Scholars suggest that the negative relationship between size and profitability captures the diseconomies of scale in the banking sector. Nguyen et al. (2017), (Aladwan, 2015) and Chen et al. (2018) have also found that total assets (as a proxy for a bank size) have a significant and negative impact on liquidity risk. This provides that large banks believe too big to fail argument. Thus, they have incentive to increase risk-taking and hold more loans and consequently, have a bigger financing gap ratio. Though, the negative effect of size caused by the level of size passes over limit point. Therefore, size impact is non-linear, either negative or positive. Chen et al. (2018).

Impact of Cash reserve ratio on financial performance

Cash reserve ratio measured by percentage of cash reserved held at national bank of Ethiopia to total cash and near cash items of Ethiopian commercial banks have in this study. The coefficient signs of cash reserve ratio had positive and statistically significant with p-value of 0.034 and coefficient value of 0.033. The coefficient values indicate that if 1% or 1-birr deposit/withdrawal from reserve account held at national bank of Ethiopia result in 3.3% or 0.033birr rise/decline in financial performance of Ethiopian commercial banks. Based on the result the researcher accepts the null hypothesis saying cash reserve ratio has significant relationship with banks financial performance of Ethiopian commercial banks. This result suggested that Ethiopian commercial banks reserve on average 10.74% their cash at national bank of Ethiopia. This was double from standard which was 5% set by national bank of Ethiopia under directives number SBB/55/2013. This result also suggested that as Ethiopian commercial bank held cash reserve at national bank of Ethiopia their profitability become increases because Ethiopian commercial banks can invest the reserve amount and get more interest income. This result was consistent with Uremadu (2012) shows the positive influence of cash reserve ratio on the profitability of bank. This implies that changes in CRR will have same impact on banks profitability.

Impact of Total loan to Total asset on financial performance

Loan to asset used as measure of liquidity risk in this study, the regression analysis indicated that loan to asset ratio a P-value 0.285 greater than P-0.05 has insignificant effect on bank performance. Therefore, the hypothesis (H3) loan to asset ratio has positive and significant on bank performance not supported and rejected. This indicates that if an increase or decrease of TLA will not affect the performance of the bank calculated by ROA.

Impact of GDP Growth rate on financial performance

Gross domestic product (GDP) is the most important economic indicator that tells us overall health of the economy. GDP measures the monetary value of final goods and services that is, those that are bought by the final user produced in a country in a given period of time. It counts all of the output generated within the borders of a country.

For the study purpose, GDP is measured by percentage changes of a year of gross domestic product. The coefficient Sign of GDP had positive, similar to hypothesis (H6) and statistically

insignificant with p-value of 0.163 at the 95% confidence level and coefficient value of 0.072. The coefficient values indicate that if GDP growths by one percent results in 0.072birr rise in financial performance of Ethiopian commercial banks. Bank's performance increases during economic growth, and deceases in recession's period. Consequently, grow in GDP has an effect in loans and deposits of a bank to grow and improve bank's net interest income and loans. (Combey & Togbenou, 2017). The positive coefficient but in significate effect of gross domestic product could be in case of the level of inflation rate. (Tseganesh, 2012).

Therefore, the hypothesis of the study is not supported and rejected, which is the effect of GDP on bank performance has significant relationship assumptions. Kanwal and Nadeem (2013) examined macroeconomic variables effect on Pakistan commercial banks profitability results also show an insignificant positive effect of real GDP on return on assets. This study finding agree with Milhem & Abadeh (2018) which was suggested that there is no a statistically significant impact of GDP on ROA in Jordanian Islamic banks through years (2005-2015).

Chapter Five

Summary of major findings and recommendations

The previous chapter presented data analysis and discussion result, while this chapter based on the findings of the study deals with summary of the findings and recommendations. Accordingly, the chapter is organized into two subsections: Summary of findings and recommendations.

5.1 Summary of findings

As it was specified in the previous chapter of this study, the main role of banks in any economy is maturity transformation from short term deposit in to long term loan. This role of banks makes inherently exposed to the risk of liquidity both of an internal and external cause factors. The goal of the study has been planned to examine liquidity risk effect on banks performance through the variable explaining liquidity risk.

Nine commercial banks which operating the banking service in Ethiopia for nine years were selected based on their performance and years of establishment. Six variables that affect financial performances of Ethiopian commercial banks were chosen and analyzed. The panel data was used from 2011 to 2019 for the sample of nine commercial banks in Ethiopia and a sum of Eighty-one observations.

The study data was presented by descriptive statistics. Correlation matrix and regression analysis was conducted. Prior to running regression analysis, the study model specification test was used to select the appropriate model for regression analysis. Therefore, the model attained all classical linear regression model test assumption. Based on the result of model specification test, random effect model was used for the study.

The results regression using classic linear regression model enables us to make the following conclusions. From the total six independent variables four of them are significant namely: Liquid asset to total asset ratio, financing gap ratio, Bank size and cash reserve ratio. However, there are two independent variables which were statistically insignificant namely: Total loan to total asset ratio and GDP growth rate.

Liquid asset to total asset ratio, financing gap ratio, cash reserve ratio, total loan to total asset and GDP growth rate had positive coefficient whereas, bank size had negative coefficient. Therefore,

it can be concluded that the effect of liquidity risk was positively affect the financial performance of commercial banks in Ethiopia.

5.2 Recommendation

Starting from the result of the findings this study was given the following recommendations: Liquid asset to total asset helps understand the bank's liquidity shock absorption. Higher the ratio indicates the higher absorption capacity. Banks have to find a most effective stage of liquid asset preserving by weighting the marginal prices and marginal benefits of maintaining them, as too high a ratio of liquid asset to total asset means lower yield. The opportunity cost of such illiquid asset will also be high.

The data suggests that the ratio of liquid asset to total asset has a positive and significant effect on bank performance meaning banks have sufficient liquidity shock absorption capacity and ability to invest more and generate income, Therefore, the bank management should invest liquid money on the market and generate high amount of profit by maintaining optimum liquidity.

Another important way to look at the soundness of the bank's liquidity is to look at its total liquid fund in relation to its deposit. Banks should also maintain enough liquidity fund in itself to overcome the uncertain situation of liquidity shortage. At times banks may tempted to overflow most of the deposits to loans to earn higher but due to the lack of maturity mismatching, this might be a disastrous step. Instead, a proper portion should be invested marketable securities which not only reduces the opportunity cost but also earn some yield as well as become a protective shield against uncertain liquidity crisis.

The data suggested that financing gap ratio had positive and significant impact on bank performance meaning the bank loan interest rate deviation higher than deposit interest rate thus, bank generate high amount of interest from loan. Therefore, in addition to loan from deposit the bank management should invest other income generation means and earn some revenue in addition.

The data suggested that bank size had negative and significant effect on banks performance, since bank size had significant effect in determining bank performance, banks should have considered their size and find their optimum limit point and carefully monitoring the quality of the asset.

Cash reserve has an advantage to the bank by decreasing the possibility of monetary distress, when the bank meets it financial obligation then permits to invest based on investment policy, and minimize costs by using existing liquid asset instead of raising outside funding sources. The main fee of holding cash is the opportunity cost of the capital invested in liquid assets. The finding suggested that cash reserve had positive and significant effect on bank performance. Therefore, the banks management should trade-off conserving money and investing it depending on its funding needs.

Scope for Further Research: The finding of the study is not free from limitations. This study has been done taking a few indicators of performance, nine years of data and some liquidity measure variables. Future study should be designed taking more indicators, more variables and more data for ensuring robust relationship between liquidity and performance in banking sector of Ethiopia. And also extend to cover the qualitative factors and other macro-economic factors that may influence the liquidity risk position.

Table 5.1: Summary of the independent on the dependent variables actual and expected result

Explanatory Variable	**Expected impact on Performance (ROA)**	**Actual Impact on Performance (ROA)**
FGR	Negative and Significant	Positive and Significant
LATA	Positive and Significant	Positive and Significant
TLA	Positive and Significant	Positive and insignificant
CRR	Positive and Significant	Positive and Significant
Size	Positive and Significant	Negative and Significant
GDP Growth rate	Positive and Significant	Positive and insignificant

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Appendixes

Appendixes I

Summary of descriptive statistics of all dependent and independent variables

```
. sum ROA LATA FGR SIZE CRR TLA GDP

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
         ROA |         81    3.141358    .8146529       1.38        6.3
        LATA |         81    26.31519    11.47084      10.72      54.89
         FGR |         81   -29.72716    6.102972     -47.13     -16.55
        SIZE |         81    23.32346    .7297999       21.2      24.75
         CRR |         81    10.74005    5.378343       4.86      24.81
-------------+---------------------------------------------------------
         TLA |         81     47.8016    6.596023         32      63.32
         GDP |         81    8.925556    1.379177       6.13      10.41
```

Source: Stata output

Appendix II

Summary of correlation matrix between dependent and independent variables

```
. corr ROA LATA FGR SIZE CRR TLA GDP
(obs=81)

             |      ROA     LATA      FGR     SIZE      CRR      TLA      GDP
-------------+---------------------------------------------------------------
         ROA |   1.0000
        LATA |   0.6422   1.0000
         FGR |  -0.2309  -0.6762   1.0000
        SIZE |  -0.6587  -0.6775   0.4605   1.0000
         CRR |   0.5673   0.7169  -0.5018  -0.4594   1.0000
         TLA |  -0.4817  -0.8128   0.7947   0.6914  -0.6127   1.0000
         GDP |   0.3357   0.3147  -0.3603  -0.4536   0.2980  -0.5266   1.0000
```

Source: Stata output

Appendix III

Summary of test for homoscedasticity assumption using white test

```
. reg ROA LATA FGR SIZE CRR TLA GDP

      Source |       SS           df       MS      Number of obs   =        81
-------------+----------------------------------   F(6, 74)        =     20.50
       Model |  33.1478011         6  5.52463351   Prob > F        =    0.0000
    Residual |  19.9449496        74  .269526345   R-squared       =    0.6243
-------------+----------------------------------   Adj R-squared   =    0.5939
       Total |  53.0927506        80  .663659383   Root MSE        =    .51916

------------------------------------------------------------------------------
         ROA |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        LATA |   .0362682   .0108572     3.34   0.001     .0146348    .0579015
         FGR |   .0460528   .0162065     2.84   0.006     .0137607     .078345
        SIZE |  -.4622775   .1211007    -3.82   0.000    -.7035759   -.2209791
         CRR |   .0372675   .0156645     2.38   0.020     .0060553    .0684796
         TLA |   .0198823   .0216411     0.92   0.361    -.0232387    .0630032
         GDP |    .072587   .0525097     1.38   0.171     -.032041    .1772149
       _cons |   12.33935   3.088975     3.99   0.000     6.184429    18.49426
------------------------------------------------------------------------------

.
```

```
. estat imtest, white

White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(27)     =     24.00
         Prob > chi2  =    0.6305

Cameron & Trivedi's decomposition of IM-test

---------------------------------------------------
              Source |       chi2     df      p
---------------------+-----------------------------
  Heteroskedasticity |      24.00     27    0.6305
            Skewness |      14.56      6    0.0240
            Kurtosis |       0.50      1    0.4816
---------------------+-----------------------------
               Total |      39.05     34    0.2531
---------------------------------------------------
```

Source: STATA output

Appendix IV

Summary of test for absence of series Multi collinearity assumption

```
. corr ROA LATA FGR SIZE CRR TLA GDP
(obs=81)

             |      ROA     LATA      FGR     SIZE      CRR      TLA      GDP
-------------+---------------------------------------------------------------
         ROA |   1.0000
        LATA |   0.6422   1.0000
         FGR |  -0.2309  -0.6762   1.0000
        SIZE |  -0.6587  -0.6775   0.4605   1.0000
         CRR |   0.5673   0.7169  -0.5018  -0.4594   1.0000
         TLA |  -0.4817  -0.8128   0.7947   0.6914  -0.6127   1.0000
         GDP |   0.3357   0.3147  -0.3603  -0.4536   0.2980  -0.5266   1.0000
```

```
. vif

    Variable |       VIF       1/VIF
-------------+----------------------
         TLA |      6.05    0.165343
        LATA |      4.60    0.217214
         FGR |      2.90    0.344389
        SIZE |      2.32    0.431331
         CRR |      2.11    0.474660
         GDP |      1.56    0.642379
-------------+----------------------
    Mean VIF |      3.26
```

Source: STATA OUT PUT

Appendix V

Summary of test for normality assumption using Bera—Jarque

```
. predict uhat, residual

. sktest uhat

                    Skewness/Kurtosis tests for Normality
                                                          ------ joint ------
    Variable |        Obs  Pr(Skewness)  Pr(Kurtosis) adj chi2(2)   Prob>chi2
-------------+-------------------------------------------------------------
        uhat |         81      0.0727        0.3656        4.19         0.1232
```

```
. predict uhat, residual

. hist uhat, normal
(bin=9, start=-.9738344, width=.26676683)

. sum uhat, detail

                        Residuals
-------------------------------------------------------------
      Percentiles      Smallest
 1%    -.9738344      -.9738344
 5%    -.7233921      -.9079116
10%    -.6264714      -.8821513       Obs                  81
25%     -.322062      -.8101231       Sum of Wgt.          81

50%    -.0533405                      Mean           1.84e-10
                       Largest       Std. Dev.      .4993114
75%     .2464807       .9580356
90%     .6046473       1.136297       Variance       .2493119
95%     .9393295       1.299789       Skewness        .471754
99%     1.427067       1.427067       Kurtosis       3.308969
```

Source: STATA output

Appendix VI

Summary of Choosing Random Effect (RE) versus Fixed Effect (FE) Models

```
. hausman fe re

                ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |       fe           re         Difference          S.E.
-------------+------------------------------------------------------------
        LATA |    .0370556     .0363873        .0006683        .0033239
         FGR |    .0463765     .0468253       -.0004488        .0108163
        SIZE |   -.7509142    -.5347742       -.2161399        .0994348
         CRR |    .0211783     .0331604       -.0119822        .0060015
         TLA |    .0332529     .0241903        .0090626        .0131774
         GDP |     .054132     .0717282       -.0175962        .0145537
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        3.64
                Prob>chi2 =      0.7256
                (V_b-V_B is not positive definite)
```

Source: STATA Out put

Appendix VII

Summary of Random Effect regression model result

```
. xtreg ROA LATA FGR SIZE CRR TLA GDP, re

Random-effects GLS regression                   Number of obs     =         81
Group variable: Banks1                          Number of groups  =          9

R-sq:                                           Obs per group:
     within  = 0.6595                                         min =          9
     between = 0.4652                                         avg =        9.0
     overall = 0.6219                                         max =          9

                                                Wald chi2(6)      =     129.77
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000

------------------------------------------------------------------------------
         ROA |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        LATA |   .0363873   .0107946     3.37   0.001     .0152302    .0575444
         FGR |   .0468253   .0171828     2.73   0.006     .0131476     .080503
        SIZE |  -.5347742   .1302615    -4.11   0.000     -.790082   -.2794664
         CRR |   .0331604   .0156188     2.12   0.034     .0025481    .0637728
         TLA |   .0241903   .0226198     1.07   0.285    -.0201437    .0685244
         GDP |   .0717282   .0514654     1.39   0.163    -.0291421    .1725985
       _cons |   13.89589   3.348352     4.15   0.000     7.333243    20.45854
-------------+----------------------------------------------------------------
     sigma_u |  .14266695
     sigma_e |  .47240504
         rho |  .08358175   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Source: STATA Out put