



# **The Impact of Liquidity on Performance: Empirical Study on Ethiopian Private Commercial Banks**

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This is to certify that the research project prepared by Workneh Yirdaw, entitled: *Liquidity and its Impact on Performance: An Empirical Study on Ethiopian Private Commercial Banks* and submitted in partial fulfillment of the requirements for the Degree of Executive Master of Business Administration complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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## ABSTRACT

➤ *Recent financial shocks have generated a lot of debates over the issue of liquidity risk and strategies to mitigate its effects on financial institutions, particularly banks as majors' players in the funding liquidity markets. The purpose of this study is to investigate the impact of liquidity on performance of banks in Ethiopia by using data of eight private commercial banks from year 2009/10 to 2013/14. The study used quantitative research approach and secondary financial data which is analyzed by using multilevel linear regressions models for the three bank performance measures; Return on Asset (ROA), Return on Equity (ROE), and Net Interest Margin (NIM). The random effect multilevel regression model was applied to investigate the impact of liquidity measures; loan to deposit ratio (LDR), loan to asset ratio(LAR), and liquid asset to deposit ratio(LADR) on major bank performance measures i.e., (ROA), (ROE), and (NIM) separately. Eight private banks are randomly selected and considered in the sample out of sixteen private banks representing 50% in number. The study used trend analysis using graphs for each of the variables in the study to observe the trend on them throughout the observation period. The empirical results show that the performance (profitability) measure, NIM, has significant relationship with liquidity measures of LDR, LAR and LADR. The other performance measure, ROE has positive and significant relationship with LADR; but ROA has positive and significant relationship with LADR. Hence, the impact of liquidity on financial performance of private commercial banks in Ethiopia is both positively & negatively related and the significant relationship varies from measure to measure. Finally, there has to be further research apart from bank specific measures considered in this study on the relationship between liquidity and performance of private commercial banks in Ethiopia by incorporating regulatory factors and other bank specific and macroeconomic factors. Further research is recommended on how to achieve the optimal liquidity level in commercial banks.*

**Key words:** *Liquidity, Liquidity Risk, Performance, Private Banks*

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## **List of Acronyms & Abbreviations**

<b>AIB</b>	<b>Awash International Bank</b>
<b>BOA</b>	<b>Bank of Abyssinia</b>
<b>CBO</b>	<b>Cooperative Bank of Oromia</b>
<b>DB</b>	<b>Dashen Bank</b>
<b>ECB</b>	<b>European Central Bank</b>
<b>GDP</b>	<b>Gross Domestic Product</b>
<b>ICC</b>	<b>Intra-class Correlation</b>
<b>LADR</b>	<b>Liquid Asset to Deposit Ratio</b>
<b>LAR</b>	<b>Loan to Asset Ratio</b>
<b>LDR</b>	<b>Loan to Deposit Ratio</b>
<b>LIB</b>	<b>Lion International Bank</b>
<b>NBE</b>	<b>National Bank of Ethiopia</b>
<b>NIB</b>	<b>NIB International Bank</b>
<b>NIM</b>	<b>Net Interest Margin</b>
<b>OECD</b>	<b>Organization for Economic Cooperation &amp; Development</b>
<b>ROA</b>	<b>Return on Asset</b>
<b>ROE</b>	<b>Return on Equity</b>
<b>SBB</b>	<b>Supervision of Banking Business</b>
<b>UB</b>	<b>United Bank</b>
<b>US</b>	<b>United States</b>
<b>WB</b>	<b>Wegagen Bank</b>

## **CHAPTER ONE**

### **1. INTRODUCTION**

#### **1.1 Background of the Study**

Banks play an important function in the economy of any country. They are the main intermediaries between those with excess money (depositors) and those individuals and businesses with viable projects but requiring money for their investment (creditors). Banks have at least the following functions: lending money, depositing others' money, transferring money locally or globally and working as paying agent (Simeneh Terefe, 2012).

In the 2008 financial crisis in the U.S. and other developed economies financial intermediaries encountered specific liquidity problems (withdrawal of funds) as well as “evaporation” of liquidity in the markets that created solvency problems. They were provided with liquidity by the Federal Reserve, bailed out by the government, or became insolvent and had to sell themselves or file for bankruptcy. This demonstrated that liquidity is a major risk in banking and that liquidity management should be a top priority for bank management and regulators. In the past few years, greater market integration and financial innovation have led to rapid growth in bank loans. These developments increased the reliance of banks on wholesale volatile funding including securitization. More stable sources of funding such as retail deposits declined in importance. These developments resulted in banks' greater exposure to liquidity risk.

Liquidity for a bank means the ability to meet its financial obligations as they come due. Bank lending finances investments in relatively illiquid assets, but it funds its loans with mostly short term liabilities. Thus one of the main challenges to a bank is ensuring its own liquidity under all reasonable conditions.

Commercial banks differ widely in how they manage liquidity. A small bank derives its funds primarily from customer deposits, normally a fairly stable source in the aggregate. Its assets are mostly loans to small firms and households, and it usually has more deposits than it can find creditworthy borrowers for. Excess funds are typically invested in assets that will provide it

with liquidity such as Fed funds loaned and U.S. government securities. The holding of assets that can readily be turned into cash when needed, is known as *asset management* banking.

In contrast, large banks generally lack sufficient deposits to fund their main business - dealing with large companies, governments, other financial institutions, and wealthy individuals. Most borrow the funds they need from other major lenders in the form of short term liabilities which must be continually rolled over. This is known as *liability management*, a much riskier method than asset management. A small bank will lose potential income if gets its asset management wrong. A large bank that gets its liability management wrong may fail.

Banks are financial institutions that play intermediary role in the economy through channeling financial resources from surplus economic units to deficit economic units. In turn, they facilitate the saving and capital formation in the economy. Bank for International Settlements/BIS (2008) defines liquidity as the ability of bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. Hence, liquidity risk arises from the fundamental role of banks in the maturity transformation of short-term deposits into long-term loans. Therefore, banks have to hold optimal level of liquidity that can maximize their profit and enable them to meet their obligation.

The Banking sector acts as the life blood of modern trade and economic development to provide them with a major source of finance. The concept of liquidity is more important both for the non-financial and financial institutions and banks are the part of them. Banks largely depend on competitive marketing strategy that determines their success and growth. Bank performance has been one of the main concerns of management experts, investors, and economic analysts. This concern closely relates to the significant impact of the profitability of financial organizations in general, and commercial banks in particular, on the potential growth of the economy as a whole. Due to this, the protocols of the banking business have changed a lot in the new millennium compared to the way they used to be in the years by gone (Hussain and Bhatti, 2010).

Bank performance gets a great deal of attention in the finance literature considering that banks serve a pivotal role in the economy. The performance of banks is expressed in various terms, such as competition, concentration, efficiency, productivity, and profitability. Firms with better performance are better able to resist negative shocks and contribute to the stability of the financial system (Athanasoglou et. al., 2008). Liquidity in the banking system has been one of the hot issues in financial environment since the bank industry plays a major role in the financial system of the country and it supports the competitiveness of the financial institution. Given the relation between the well-being of the banking sector and the growth of the economy (Levine, 1998), knowledge of the underlying factors that influence the financial sector's performance is therefore essential not only for the managers of the banks, but also for numerous stakeholders such as the central banks, bankers associations, governments, and other financial authorities. Knowledge of these factors would be useful in helping the regulatory authorities and bank managers formulate future policies aimed at improving the performance of the banking sector.

In Ethiopia, commercial banks play important primary role as financial intermediaries in the economic growth process, channeling funds from savers to borrowers for investment. As financial intermediaries, banks play an important role in the operation of an economy. In such away, commercial banks are key providers of funds and their stability is of paramount importance to the financial system. As such, an understanding of determinants of their liquidity and the drivers of bank liquidity for that matter is essential and crucial to the stability of the economy. However, substantial studies have not been conducted to investigate the impact of liquidity risk in the Ethiopian banking system. This research would examine liquidity and its impact on performance of eight Ethiopian private commercial banks for the last five years from 2009/10-2013/14.

In reality, commercial banks liquidity is of utmost importance. Hence, the question tugged at mind - What are the factors that allow a bank to maintain its liquidity level? No doubt, there are internal and external factors of liquidity. According to past research, factors found to significantly affect liquidity position of a bank include bank specific factors and macroeconomic factors.

According to Naser Ail Yadollahzadeh Tabari & others (2013), in banking industry, liquidity risk has an opposite effect on profitability. Some studies such as Molyneux & Thornton (1992) and Barth et al. (2003) supported the positive effect of risk on the profitability; while some studies such as Bourke (1989) and Kosmidou et al. (2005) believed in its negative effect. Liquidity risk is usually measured as liquidity ratio which is practically calculated in two different forms. In first type, liquidity is adjusted by size which includes the ratio of cash asset to total asset (Barth et al., 2003; Demirguc-Kunt et al., 1998), the ratio of cash asset to deposits (savings) (Chen et al., 2010). Second type includes the adjusted loan by the size which includes the ratio of total asset and/or the ratio of net loan to total asset (Kosmidou et al., 2005).

In first type, the higher is the liquidity ratio, the higher is the liquidity level, and therefore, it is less vulnerability against bankruptcy. In contrast, in second type, the higher are the values of ratios, it will represent that banks will undergo higher liquidity risk. In this research project, bank specific factors relying on liquidity ratios would be considered and the effect on financial performance of private commercial banks in Ethiopia would be analyzed.

## **1.2 Statement of the Problem**

The fundamental role of banks in the maturity transformation of short -term deposits into long-term loans makes banks inherently vulnerable to liquidity risk, both of an institution-specific nature and that which affects markets as a whole. Liquidity creation itself is seen as the primary source of economic welfare contribution by banks but also as their primary source of risk (Bryant (1980); Diamond and Dybvig (1983) or Calomiris and Kahn, 1991). Therefore, virtually every financial transaction or commitment has implications for a bank's liquidity.

Liquidity risk is said to be assassin of banks. This risk can adversely affect both bank's earnings and the capital. Therefore, it becomes the top priority of a bank's management to ensure the availability of sufficient funds to meet future demands of providers and borrowers, at reasonable costs. Episodes of failure of many conventional banks from the past and the present provide the testimony to this claim. For instance, as United States subprime mortgage crisis reached its peak in the years 2008/09 unprecedented levels of liquidity support were required from central banks in order to sustain the financial system. Even with such extensive support, a

number of banks failed, were forced into mergers or required resolution. A reduction in funding liquidity then caused significant distress. In response to the freezing up of the interbank market, the European Central Bank and U.S. Federal Reserve injected billions in overnight credit into the interbank market. Some banks needed extra liquidity supports (Longworth 2010; Bernanke 2008). It is evident that liquidity and liquidity risk is very up-to-date and important topic. Therefore banks and more so their regulators are keen to keep a control on liquidity position of banks.

However, this fragility is also a source of efficiency. Diamond and Rajan (2001) argue that the financial intermediation structure is efficient in that it disciplines banks when carrying out their lending function. The threat of a run is an incentive for the bank to choose projects with high return. More generally, this also suggests that an “even more liquid” bank might not always be desirable for the efficiency of the financial system. Therefore, effective liquidity risk management helps ensure a bank's ability to meet cash flow obligations, which are uncertain as they are affected by external events and other agents' behavior and to keep their optimal profitability.

Generally, in order to undertake their operations properly and profitably, commercial banks have to maintain their optimal liquidity. When we say banks are liquid, they are able to serve the demand of new borrowers and the withdrawal of cash by their depositors without affecting their day to day activities. To do so they have to keep sufficient liquid assets on their balance sheet. What is more necessary behind maintaining their liquidity is that properly identifying and managing important factors affecting the liquidity position of banks. As to Asphachs (2005), like the sources of their liquidity, the liquidity position of banks can be affected by bank specific factors, macroeconomic factors and government/central bank regulations. Firm specific factors include profitability, loan growth, bank size, capital adequacy, the percentage of non-performing loan on the total volume of loans which measures loan quality and others. Macroeconomic factors include GDP, the rate of inflation, different types of interest rates and other macroeconomic factors.

In Ethiopia beginning from the last two decades the banking sector has been playing important role in the economic development of the country (Simeneh Terefe, 2012). Ethiopia's financial sector is largely bank-based as the secondary market is still not found in the country. Banks dominate the financial sector in Ethiopia and as such the process of financial intermediation in the country depends heavily on banks. In fact the banking sector in Ethiopia currently acts as the link that holds the country's economy together. Hence, keeping optimal liquidity for banks is very important to meet the demand by their present and potential customers.

Therefore, empirical studies are important to identify significant bank specific measures of liquidity and their impact on financial performance in the context of Ethiopia. Thus, this study aimed to contribute to the current literature by assessing the effect of liquidity on financial performance of private commercial banks in Ethiopia through analyzing data of those significant bank specific measures of liquidity against performance (profitability).

### **1.3 Objective of the Study**

The overall objective of this research is to investigate the impact of bank liquidity on financial performance of private commercial banks in Ethiopia. Specifically, this study addresses the following objectives;

- To determine the impact of loan to deposit ratio on the performance of private commercial banks.
- To examine the significance of maintaining require liquid assets against deposits on private commercial banks performance.
- To investigate how loan to total assets ratio influence the performance of private commercial banks.
- To identify the significant measure of liquidity to Ethiopian private banks performance.

## **1.4 Research Hypotheses**

The Research Hypotheses are hereby stated to give more emphasis to the purpose of the Study.

### **Hypothesis 1:**

**H0:** There is no significant relationship between loan to deposit ratio and performance of private commercial Banks in Ethiopia.

**H1:** There is significant relationship between loan to asset ratio and performance of private commercial Banks in Ethiopia.

### **Hypothesis 2:**

**H0:** There is no significant relationship between loan to asset ratio and performance of private commercial Banks in Ethiopia.

**H1:** There is significant relationship between loan to asset ratio and performance of private commercial Banks in Ethiopia.

### **Hypothesis 3:**

**H0:** There is no significant relationship between liquid asset to deposit ratio and performance of private commercial Banks in Ethiopia.

**H1:** There is significant relationship between liquid asset to deposit ratio and performance of private commercial Banks in Ethiopia.

## **1.5 Significant of the Study**

The study has great contribution to the existing knowledge in the area of bank specific factors in determining commercial banks liquidity and their impact on financial performance in the context of private commercial banks in Ethiopia. This in turn contributes as input to consider for the wellbeing of the financial sector of the economy and the society as a whole. Therefore, the major beneficiaries from this study are each private commercial bank, regulatory bodies, the academic staff of the country and the society as a whole in the country.

## **1.6 Delimitation and Limitation of the Study**

### **1.6.1 Delimitation of the Study**

Currently, there are sixteen private commercial banks in Ethiopia which are fully engaged in commercial banking activity. But to make the study more manageable, comparable and time

constraints to compile required data, the scope of the study is delimited on randomly selected eight private commercial banks, which are engaged in the industry. And the research is concentrated on the effect of liquidity relying on bank-specific measures (Loan to Deposit, Loan to Total Assets, and Liquid Assets to Deposit ratios) on financial performance of those private banks. Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM) are considered as Performance (profitability) measures.

### **1.6.2 Limitation of the Study**

In the study due to time constraint to compile the data, more of financial related variables are considered by taking the last five years financial statements of those private commercial banks in the sample than that of non-financial measure variables and it may have a little influence and might need further investigation. Financial reports within those years may be affected by different non modeled variables in the state of the economy. This might fail to measure the actual effects of the internal and external determinants of liquidity on performance of the banks.

### **1.7 Organization of the Study**

This research report is organized in five chapters. The first chapter is already introduced as above. Chapter two describes the review of related literatures. Chapter three provide detail description of the methodology employed by the research. Chapter four contains data presentation, analysis and interpretation. Finally, the last chapter summarizes and concludes the total work of the research and gives relevant recommendations based on the findings.

## CHAPTER TWO

### 2. LITERATURE REVIEW

Under this chapter the theoretical and empirical evidences, focusing on relationship between liquidity and performance of private commercial banks, are presented. Accordingly, the first section, 2.1 presents overview of the banking system in Ethiopia. The second section 2.2 presents general information on liquidity, liquidity risk and its measures. Section 2.3 reveals about bank performance and its measures. Finally, in section 2.4, the relationship between liquidity and performance including theoretical and empirical evidences are discussed and presented.

#### 2.1 Overview Banking in Ethiopia

Traditional financial system in Ethiopia has long history and paramount contribution to economic betterment and social wellbeing of the society. Traditional institutions organized with a sense of cooperation and risk sharing has enabled Ethiopians to experience saving and financial management within its cultural context. Eqqub and Edir are some of the informal financial institutions in Ethiopia that shaped the social bond and interaction.

Modern banking in Ethiopia was introduced after the agreement that reached in 1905 between Emperor Minilik II and Mr.Ma Gillivray, representative of the British owned National Bank of Egypt. Following the agreement, the first bank called Bank of Abyssinia was inaugurated in Feb.16, 1906 by the Emperor. Within the first fifteen years of its operation, Bank of Abyssinia opened branches in different areas of the country in Harar (Eastern Ethiopia), Dire Dawa, Dessie and Djibouti. By 1931 Bank of Abyssinia legally replaced by Bank of Ethiopia shortly after Emperor Haile Selassie came to power.

The new Bank, Bank of Ethiopia - a purely Ethiopian institution, was the first indigenous bank in Africa, and established by an official decree on August 29, 1931 with capital of £750,000. In 1941, another foreign bank, Barclays Bank, came to Ethiopia with the British troops and organized banking services in Addis Ababa, until its withdrawal in 1943. Then on 15 April 1943, the State Bank of Ethiopia commenced full operation after 8 months of preparatory activities.

In 1945 and 1949, the Bank was granted the sole right of issuing currency and deal in foreign currency. The Bank also functioned as the principal commercial bank in the country and engaged in all commercial banking activities.

The National Bank of Ethiopia with more power and duties started its operation in January 1964. Following the incorporation as a share company on December 16, 1963 as per proclamation No.207/1955 of October 1963, Commercial Bank of Ethiopia took over the commercial banking activities of the former State Bank of Ethiopia. It started operation on January 1, 1964 with a capital of Eth. Birr 20 million. In the new Commercial Bank of Ethiopia, in contrast with the former State Bank of Ethiopia, all employees were Ethiopians. There were two other banks in operation namely Banco di Roma S.C and Banco di Napoli S.C. that later reapplied for license according to the new proclamation each having a paid up capital of Eth. Birr 2 million.

The first privately owned bank, Addis Ababa Bank Share Company, was established by Ethiopians initiative and started operation in 1964 with a capital of 2 million in association with National and Grindlay Bank, London which had 40 percent of the total share. In 1968, the original capital of the Bank rose to 5.0 million and until it ceased operation, it had 300 staff at 26 branches. There were also other financial institutions operating in the country like:

- Imperial Savings and Home Ownership public Association, which specialized in providing loans for the construction of residential houses and to individuals under the guarantee of their savings.
- Saving and Mortgage Corporation of Ethiopia whose aims and duties were to accept savings and trust deposits account and provide loans for the construction, repair and improvement of residential houses, commercial and industrial buildings and carry out all activities related to mortgage operations.
- Agricultural Bank that provides loan for the agricultural and other relevant projects established in 1945. But in 1951 the Investment Bank of Ethiopia replaced it. In 1965, the name of the bank once again hanged to Ethiopian Investment Corporation Share Company and the capital rose to Eth. Birr 20 million, which was fully paid up.

Following the declaration of socialism in 1974, the government extended its control over the whole economy and nationalized all large corporations. Organizational setups were taken in order to create stronger institutions by merging those that perform similar functions. Accordingly, the three private owned banks, Addis Ababa Bank, Banco di Roma and Banco di Napoli Merged in 1976 to form the second largest Bank in Ethiopia called Addis Bank with a capital of Eth. birr 20 million and had a staff of 480 and 34 branches. Then Addis Bank and Commercial Bank of Ethiopia S.C were merged by proclamation No.184 of August 2, 1980 to form the sole commercial bank in the country until the establishment of private commercial banks in 1994. The Savings and Mortgage Corporation S.C. and Imperial Saving and Home Ownership Public Association were also merged to form the Housing and Saving Bank with working capital of Birr 6.0 million and all rights, privileges, assets and liabilities were transferred by proclamation No.60, 1975 to the new bank. The financial sector that the socialist oriented government left behind constituted only three banks and each enjoying monopoly in its respective market, the following was the structure of the sector at the end of the era: the National Bank of Ethiopia (NBE), the Commercial Bank of Ethiopia, and Agricultural and Industrial Development Bank.

Following the demise of the Dergue regime in 1991 that ruled the country for 17 years under the rule of command economy, the Ethiopian Peoples' Revolutionary Democratic Front declared a liberal economy system. In line with this, Monetary and Banking proclamation of 1994 established the National Bank of Ethiopia as a judicial entity, separated from the government and outlined its main function. Monetary and Banking proclamation No.83/1994 and the Licensing and Supervision of Banking Business No.84/1994 laid down the legal basis for investment in the private banking sector. Licensed on November 10, 1994, Awash International Bank S.C. (AIB) is the pioneer private commercial bank in Ethiopia after the downfall of the military regime and introduction of market economic policy in 1991. Currently private commercial banks in Ethiopia reached to sixteen as shown in the table 2.1 below in their order of establishment.

**Table 1. List of Private Commercial Banks in Ethiopia**

<b>No.</b>	<b>Name of Private Commercial Bank</b>	<b>Establishment Year</b>
1	Awash International Bank(AIB)	1994
2	Dashen Bank(DB)	1995
3	Abyssinia Bank(BOA)	1996
4	Wegagen Bank(WB)	1997
5	United Bank (UB)	1998
6	Nib International Bank(NIB)	1999
7	Cooperative Bank of Oromia (CBO)	2004
8	Lion International Bank(LIB)	2006
9	Oromia International Bank(OIB)	2008
10	Zemen Bank(ZB)	2008
11	Buna International Bank(BUIB)	2009
12	Berhan International Bank(BIB)	2009
13	Abay Bank(AB)	2010
14	Addis International Bank(ADIB)	2011
15	Debub Global Bank(DGB)	2012
16	Enat Bank(EB)	2013

Source: [www.nbe.gov.et](http://www.nbe.gov.et)

## **2.2 Liquidity and Liquidity Risk**

Liquidity can be defined as the ability of a financial institution to meet all legitimate demands for funds (Yeager and Seitz 1989). It is also defined as the ability of bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses (Bank for International Settlement 2008). Liquidity is the quality of an asset that makes it easily convertible into cash with little or no risk of loss. A bank considered liquid when it has sufficient cash and other liquid assets, together with the ability to raise funds quickly from other sources, to enable it to meet its payment obligation and financial commitments in a timely manner.

According to Bank Risk Management Guidelines of NBE (2010), liquidity risk as one of the major risk from bank, it arises if the cushion provided by the liquid asset is not sufficient to cover its obligation. In such a situation, bank has to fund their liquidity requirements from market. However, conditions of funding through market highly relied on liquidity in the market and borrowing institution. Accordingly, shortage of liquidity from an institution may have to undertake transaction with heavy cost resulting in a loss of earning or it could result in bankruptcy if it is unable to undertake transaction even at current market prices for the worst case. In finance, liquidity risk may not be seen as isolated since all financial risks are not mutually exclusive and liquidity risk often caused by other financial risks such as credit risk, market risk, etc. For instance, a bank increases its credit risk through assets may increase its liquidity risk as well. Similarly, a large loan default can adversely impact a bank's liquidity position.

When banks hold a lower amount of liquid assets they are more vulnerable to large deposit withdrawals. In other words liquidity risk, arising from the possible inability of a bank to decrease accommodate liabilities or to fund increases on the assets' side of the balance sheet. Following Saunders and Cornett (2008), liquidity risk refers to the risk that an asset cannot convert into cash or that the conversion is costly. Furthermore, they state that price risk refers to the risk that the sale price will be lower than the purchase price of an asset. It is considered an important determinant of bank profitability Athanasoglou (2006). Therefore, liquidity risk estimated by the ratio of liquid assets to customer deposits and other short term funding. Insufficient liquidity is one of the major reasons of bank failures (Ommeren, 2011).

In addition to the maintenance of cash reserve with the Central Bank, the commercial banks are also required to maintain a minimum level of liquid assets. While the primary reason behind the imposition of minimum liquidity ratio is to ensure that the commercial banks have at all times, a reservoir of liquidity, which can be tapped to meet unusual deposit withdrawals, the ratio can also be used as a means of influencing the monetary situation in these countries. When total demand for liquidity exceeds its total supply, the commercial banks will face with liquidity deficit. In such a situation, these institutions will force to raise additional liquid funds by borrowings or disposing some of their liquid assets (Accenture, 2013).

According to the theories of financial intermediation, the two most crucial reasons for the existence of financial institutions, especially banks, are their provision of liquidity and financial services. Regarding the provision of liquidity, banks accept funds from depositors and extend such funds to the real sector while providing liquidity for any withdrawal of deposits. However, the banks' role in transforming short-term deposits into long-term loans makes them inherently vulnerable to liquidity risk (Bank for International Settlements (BIS), 2008b:1).

The concept of liquidity in finance principally lies in two areas: (a) the liquidity of financial instruments in the financial market, and (b) the liquidity related to solvency. The former relates to liquid financial markets and financial instruments. Examples of these include: marketable financial instruments, smooth transactions, and no financial barriers. The latter discusses the obligation of banks to make payments to third parties (Fiedler, 2000:442). Some examples of this include: setting up liquidity management policies, reserving liquidity, balancing assets and liabilities and, preparing liquid financial instruments.

The important discussion in liquidity risk management is to balance the demand for liquidity on the liability side with the supply of liquidity on the asset side. Liquidity risk problems occur if banks fail to balance those two sides, do not have sufficient internal liquidity reserves, and fail to obtain funds from external sources.

Liquidity management refers to the planning and control necessary to ensure that the organization maintains enough liquid assets either as an obligation to the customers of the organization so as to meet some obligations incidental to survival of the business or as a measure to adhere to the monetary policies of the central bank. For a commercial bank to plan for or manage its liquidity position, it first manages its money position by complying with the legal requirement.

Actually, management of money position is essential if a bank must avoid excesses or deficiencies of required primary reserves. Where there is a decline in market price of securities or where additional funds needed to correct the bank reserve position are for a very short time, it will be definitely expensive to sell securities than to borrow from another bank. Moreover, it may be more desirable to borrow for bank's liquidity needs than to call back outstanding loans

or to cancel or place embargo on new loans, a situation that will reduce the existing and potential customers of a bank.

Commercial banks are expected to maintain certain levels of reserves. These reserves are statutory requirements stipulated by the central bank specifying the cash reserves equal to certain fraction of the banks' deposits or loans and advances which bank must maintain. Originally, the purpose of the reserve requirement is to compel banks to maintain a reasonable degree of liquidity in order to be able to meet cash demands. But currently, these reserves are used as control device through which the federal government can influence the monetary system (Accenture, 2013).

Most commercial banks in their bid not to contravene the regulation specifying legal minimum reserve requirement and in order to provide against unforeseen large withdrawals, resolve to maintain reserves in excess of their legal requirements. For the fact that keeping excess reserve for the purpose of short run safety means to forgo income or earnings, commercial banks need to manage their reserves adequately. Effective liquidity management therefore involves obtaining full utilization of all reserves (Accenture, 2013).

Liquidity risk management is part of the larger risk management framework of the financial services industry, which concerns all financial institutions. Studying liquidity risk management issues is a critical but complex subject. Failure to address the matter may lead to dire consequences, including banking collapse, and by extension, the stability of the financial system. In fact, most bank failures are due to issues around managing liquidity risk. This is also the reason why regulators are very concerned with the liquidity position of financial institutions and many financial industry professionals believe that the current thinking of regulators appears to center around the strengthening of liquidity framework (Accenture, 2013).

Generally, liquidity risk arises from the fundamental role of banks in the maturity transformation of short-term deposits into long term loans. According to Joint Forum of the Basel Committee (2006), banks liquidity risk includes two types of risk: funding liquidity risk and market liquidity risk.

**Funding liquidity** risk is the risk that the bank will not be able to meet efficiently both expected and unexpected current and future cash flow and collateral needs without affecting either daily operations or the financial condition of the firm.

**Market liquidity risk** is the risk that a bank cannot easily offset or eliminate a position at the market price because of inadequate market depth or market disruption. There are strong interactions between funding liquidity risk and market liquidity risk, especially in periods of crisis. Drehmann and Nikolau (2009) pointed to the fact that shock to funding liquidity can lead to asset sales and may lead to decrease of asset prices. Lower market liquidity leads to higher margin which increase funding liquidity risk.

### **2.2.1 Measures of Liquidity Risk**

A financial institution can utilize a number of sources to meet its liquidity needs; these include new deposits, maturing assets, borrowed funds and/or using the discount window (borrowing from the central bank). Given that access to these measurement and management is an important activity in most commercial banks.

Before going to see the methods for measuring liquidity risk, for a better understanding of liquidity risk problems, we need to take a close look of the sources of liquidity risk in banks. According to Rochet (2008), the three main sources of liquidity risk are:

***On the liability side***, there is obviously a large uncertainty on the amount of withdrawals of deposits or the renewal of rolled-over inter-bank loans. This is especially so when the bank is under suspicion of insolvency, when there is an aggregate liquidity shortage or when the economy suffers from a macroeconomic shock.

***On the assets side***, there is also some uncertainty on the volume of new requests for loans that a bank will receive in the future. For sure, the bank could refuse to grant these new loans, but it would lead to the loss of profit opportunities. It could also be detrimental to the borrowing firm if it is credit rationed, and more general to the economy as a whole: it needs to be clear that banks are unique providers of liquidity to small and medium size enterprises, which constitute

and important fraction of the private sector. This credit rationing would be especially costly if the firm is forced to close down, possibly resulting in additional losses for the bank itself.

**Off-balance sheet operations** are a third source of liquidity risk for banks. For example, credit lines and other commitments. Furthermore, the formidable positions taken by banks on derivative markets can generate huge liquidity needs during crisis period.

According to Aspach et al. (2005), there are some mechanisms that banks can use to insure against liquidity crises: firstly, banks hold buffer of liquid assets on the asset side of the balance sheet. A large enough buffer of assets such as cash, balances with central banks and other banks, debt securities issued by governments and similar securities or reverse repo trades reduce the probability that liquidity demands threaten the viability of the bank. Second strategy is connected with the liability side of the balance sheet. Banks can rely on the interbank market where they borrow from other banks in case of liquidity demand. However, this strategy is strongly linked with market liquidity risk. The central bank typically acts as a Lender of Last Resort /LOLR to provide emergency liquidity assistance to particular illiquid institutions and to provide aggregate liquidity in case of a system-wide shortage.

There are different views from scholars and researchers with regard to measures of liquidity risk and they are compiled and presented as follows for a better understanding and their consumption in the analysis part latter on.

Liquidity risk of banks can be measured by **liquidity gap/flow approach** or **liquidity ratio/stock approach**. The liquidity gap is the difference between assets and liabilities at both present and future dates. At any date, a positive gap between assets and liabilities is equivalent to a deficit that has to be filled (Bessis 2009). Liquidity ratios are various balance sheet ratios which should identify main liquidity trends. These ratios reflect the fact that bank should be sure that appropriate, low-cost funding is available in a short time. This might involve holding a portfolio of assets than can be easily sold (cash reserves, minimum required reserves or government securities), holding significant volumes of stable liabilities (especially deposits from retail depositors) or maintaining credit lines with other financial institutions.

Various authors like Moore (2010), Rychtárik (2009), or Praet and Herzberg (2008) provide various liquidity ratios such as liquid assets to total assets, liquid assets to deposits and short term financing, loans to total assets and loans to deposits and short term borrowings.

To sum up, the stock approach employs various balance sheet ratios to identify liquidity trends. The flow approach, in contrast, treats liquid reserves as a reservoir: the bank assesses its liquidity risk by comparing the variability in inflows and outflows to determine the amount of reserves that are needed during a period. Although both approaches are intuitively appealing, the flow approach is more data intensive and there is no standard technique to forecast inflows and outflows. As a result, the stock approaches are more popular in practice and in the academic literature (see Crosse and Hempel 1980; Yeager and Seitz 1989; Hempel et al. 1994; Vodova 2011).

As per Crosse and Hempel (1980), the two most popular stock ratios are the ***loan-to-deposit ratio*** and the ***liquid asset to total assets ratio***, where the higher the loan-to-deposit ratio (or the lower the liquid asset to total assets ratio) the less able a bank to meet any additional loan demands. Both indicators have their short-comings: the loan-to deposit ratio does not show the other assets available for conversion into cash to meet demands for withdrawals or loans, while the liquid assets ratio ignores the flow of funds from repayments, increases in liabilities and the demand for bank funds. Fortunately, the ratios tend to move together.

In another approach, it considers the proportion of liquid assets to total assets along with their deposit renewal rate (Brickwork rating 2010) to measure liquidity. Abdul Samad et al. (2001) and Pak and Huh (1995) used loan to deposit ratio to calculate the level of liquidity in their study. Current and quick ratios are inappropriate for measuring banks liquidity as per Brickwork rating (2008). A loan-to-deposit ratio is more relevant. However, a bank's liquidity and solvency are directly affected by portfolio quality. Consequently, financial analysts (investment officers) are carefully analyzing the bank's portfolio quality based on collectability and loan-loss provisioning.

Unlikely normal firms, according to Erik Banks (2005, p.143, 146) financial institutions apply different liquidity ratios that are calibrated to their operations; they are based on slightly different definitions even though they measure liquidity risk as explained below.

Some important measures of liquidity of financial institution are based on the liability account like total deposits to total funds as they rely on the state of unsecured funding for bringing liquidity and credits for clients. Such borrowing ratios measure a bank's need to support their business with volatile borrowings and the degree of cash and equivalents can be used to repay short noticed money. With higher borrowing ratios mean a larger amount turnover of deposit or volatile funding with its total plan, which create much liquidity pressure. The loan to deposit ratio within the figure shows that the degree of banks can support their lending through deposits. The cash ratios such as cash to total assets are also very important for banks, which indicate how well banks can match their short term obligations without curtailing credit business. The general idea of cash ratios is that the higher ratio the more liquid assets with bank's portfolio.

In Ethiopia, NBE assesses and determines the liquidity requirement of commercial banks from time to time with the objective of ensuring that each bank is capable of meeting the day-to-day cash deposit withdrawal needs of customers and other commitments. In this regard, taking prudential mix of liquid assets is important in the operation of banks. NBE supervises this and such analysis needs to be carried out more frequently since liquidity problems can easily lead to the collapse of banks. According to NBE's recent Directive No. SBB/57/2014(5<sup>th</sup> Replacement); "any licensed commercial bank shall maintain liquid assets of not less than fifteen percent (15%) of its net current liabilities," defining the terms as follows.

**"Liquid assets"** include cash, deposits with the National Bank and other local and foreign banks having acceptance by the National Bank, other assets readily convertible into cash expressed and payable in Birr or foreign currency having acceptance by the National Bank, deposits held in Organization for Economic Cooperation and Development (OECD) member countries' currencies and payable by banks of OECD member countries and in such other currencies as may be approved by the National Bank as well as securities issued by OECD member countries

denominated in currencies of such countries and such other assets as the National Bank may from time to time declare to be liquid assets;

“**Current liabilities**” refers to the sum of demand (current) deposits, savings deposits and time deposits and similar liabilities with less than one-month maturity.

In 2008 under Directive No. SBB/44/2008 (3<sup>rd</sup> Replacement), the liquidity requirement to maintain liquid assets was 25% and in 2012 under Directive No. SBB/55/2012(4<sup>th</sup> Replacement), the requirement was 20% of net current liabilities.

According to NBE’s liquidity risk management guideline (p.16-17, May 2010), measurement of liquidity is expressed as follows.

At a very basic level, liquidity measurement involves assessing all of a bank’s cash inflows against its outflows to identify the potential for any net shortfalls going forward. This includes funding requirements for off-balance sheet commitments. A number of techniques can be used for measuring liquidity risk, ranging from simple calculations and static simulations based on current holdings to highly sophisticated modeling techniques. As all banks are affected by changes in the economic climate and market conditions, the monitoring of economic and market trends is key to liquidity risk management.

An important aspect of managing liquidity is making assumptions about future funding needs. While certain cash inflows and outflows can be easily calculated or predicted, banks must also make assumptions about future liquidity needs, both in the very short-term and for longer time periods. Cash inflows arise from maturing assets, saleable non-maturing assets, access to deposit liabilities, established credit lines that can be tapped etc. These cash inflows must be matched against cash outflows stemming from decrease in liabilities due and settlement of contingent liabilities. Banks should also have some level of preparedness to meet cash outflows that arise from unexpected events.

A maturity ladder is a useful device to compare cash inflows and outflows both on a day-to-day basis and over a series of specified time periods. The analysis of net funding requirements involves the construction of a maturity ladder and the calculation of a cumulative net excess or

deficit of funds at selected maturity dates. A bank's net funding requirements are determined by analyzing its future cash flows based on assumptions of the future behavior of assets, liabilities and off-balance-sheet items, and then calculating the cumulative net excess or shortfall over the time frame for the liquidity assessment.

In constructing the maturity ladders, a bank has to allocate each cash inflow or outflow to a given calendar date from a starting point, usually the next day. (A bank must be clear about the clearing and settlement conventions and timeframes it is using to assign cash flows to particular calendar dates). As a preliminary step to constructing the maturity ladder, cash inflows can be ranked by the date on which assets mature. Similarly, cash outflows can be ranked by the date on which liabilities fall due, the earliest date a liability holder could exercise an early repayment option, or the earliest date contingencies can be called. Readily marketable assets may be "slotted in" to the earliest point in the maturity ladder at which they could be liquidated. Banks should consider what discount should be applied to assets which are "slotted in" in this way in order to reflect market risks. Significant interest and other cash flows should also be included. In addition, certain assumptions can be made based on past experiences. The difference between cash inflows and cash outflows in each period, the excess or deficit of funds, becomes a starting-point for a measure of a bank's future liquidity excess or shortfall at a series of points in time.

The relevant time frame for active liquidity management can be quite short, including intra-day cash flows. In particular, the first days in any liquidity problem are crucial to maintaining stability. The appropriate time frame shall depend on the nature of the bank's business. Banks, which are reliant on short-term funding, shall concentrate primarily on managing their liquidity in the very short term (say the period up to five days). Ideally, these banks should be able to calculate their liquidity position on a day-to-day basis for this period. Other banks (i.e., those that are less dependent on the short term funds might actively manage their net funding requirements over a slightly longer period, perhaps one to three months ahead.

Hence, considering all the above facts with regard to measures of liquidity risk, the three important ratios: Loan to Deposit, Liquid Assets to Total Assets, and Liquid Assets to Current Liabilities ratios are considered in this study as measures of liquidity risk ratio.

### **2.3 Bank Performance**

It is a general measure of how well a bank generates revenues from its capital. It also shows a bank's overall financial health over a period of time, and it helps to compare different banks across the banking industry at the same time. The bank's performance generally can be recognized as its *stability and profitability*. The stability refers to its risk factors and profitability refers to its financial return. Hence, when we mean bank performance in this study it is in terms of profitability of a bank. As an individual bank, it would be important to start with its income statement for better understanding of how well it is operating, which describe the sources from income and expenses representing its profitability.

**Operating income** is the income which is from bank's ongoing operation. Mostly, it comes from bank's interest with its assets, particularly loans. Meanwhile, noninterest income comes from partly service charges on deposit accounts, but mostly comes from the off-balance-sheet activities that create fees or profits for the bank.

**Operating expenses** are expenses incurred as a result of bank's ongoing operations. Mostly, it is the interest payment for its liabilities, particularly with its deposits. Meanwhile, noninterest expenses cover the cost of its business running such as salaries, rent, equipment and cost of computer services, etc. Besides, an item named provision for loan losses played an important role within the financial crisis. When a bank has a bad debt or expected bad debt in the future, it needs to be written as a loss.

Different empirical evidences suggested that profitability of financial institutions specifically banks are affected by internal and external factors. Andreas and Gabrielle (2009) stated that Bank profitability is usually measured by the return on average assets and is expressed as a function of internal and external determinants. The internal determinants include bank-specific

variables. The external variables reflect environmental variables that are expected to affect the profitability of banks.

Internal factors such as capital adequacy ratio, asset size, asset quality, net worth, liquidity, earnings quality, loan performance, business risk, management quality, people, technology and operating environment are major determinants that are used to analyze the determinants of bank profitability. An external macroeconomic and industry-specific factor includes Effective tax rate, Real GDP growth, inflation, regulation and Bank concentration.

### **2.3.1 Bank Performance Measures**

After risk and return theory created by Bowman (1980), more and more studies used different accounting ratios to measure risk and return within corporate finance, which is concentrated on risk and return relationship between accounting variables (Nickel & Rodriguez, 2002) from firm's financial report. For example, researchers by using return on asset (ROA), return on equity (ROE) and Net profit margins (Miller & Bromiley, 1990; Nickel & Rodriguez, 2002) to measure their financial returns. However, (Nickel & Rodriguez, 2002) points out some limitations by using mean-variance relationships for measuring of risk and return. They criticized that somehow variance is measured historically when it should be measured as expectation. Thus, another market-based measure of risk and return, which based on the stock price of the firm, is used to measure financial performance since it reflects the expectation of firm's future performance (Dubofsky & Varadarajan, 1987).

As a result, stock return can be seen as an effective substitute for accounting based measurement of performance. Some studies also showed that researchers tend to employ multiple measures of performance for better understanding of the relationship between risks and return (Dubofsky & Varadarajan, 1987; Kim & Gu, 2003).

Besides all these popular researchers' study with methods of performance analysis, ECB recently published a paper of "How to measure bank performance" in 2009. According to this paper, the reasonable approaches for measuring bank's performance should require with a deeper analysis of how banks run their business and applied with their stress testing result, even more with supervisors on consistency between business strategy and their performance,

which common ratios like ROE does not applied due to short term profitability orientation. It suggested that an unbiased performance analysis framework needs to go further and provide with a more sophisticated assessment by using bank's business based data and qualitative information, which required enhanced disclosure and improved market discipline both towards the supervisors and public.

This ECB paper investigates bank's performance and its "capacity to generate sustainable profitability". With a long term stable good performance, earning, efficiency, risk taking and leverage together should be concerned by bank's manager. And these factors can be presented with stakeholders' overall interest. However, different stakeholders could be interested with different measurements from traditional, economic and market based point of view applied by academics or practitioners.

Traditional performance measures are similar to those applied in other industries, with return on assets (ROA), return on equity (ROE) or cost-to-income ratio being the most widely used. In addition, given the importance of the intermediation function for banks, net interest margin is typically monitored. The economic measures of performance take into account the development of shareholder value creation and aim at assessing, for any given fiscal year, the economic results generated by a company from its economic assets (as part of its balance sheet). These measures mainly focus on efficiency as a central element of performance, but generally have high levels of information requirements. Market-based measures of performance characterize the way the capital markets value the activity of any given company, compared with its estimated accounting or economic value.

According ECB's research (ECB, 2010, p.10,12), different stakeholders of a bank see its performance from different angles, which depositors are more likely concerned with bank's long term ability to insure their savings, equity holders are more likely looking for bank's profit generation and debt holders will pay more attention to how this bank can repay its obligation.

The traditional accounting based measures are easy proxies of banks' profitability, obtainable from public disclosed information. As concluded by extensive Prior academic research there are different accounting based measures for banks' profitability. For instance, Return on

Equity (ROE) used by (Goddard et al., 2004), Return on Assets (ROA) used by (Flamini et al., 2009), the Return on Equity (ROE) and Return on Assets (ROA) utilized by (Athanasoglou et al., 2006), Ommeren (2011) and Bashir (2003), ROE, ROA and Profit Earning Ratio (PER) applied by Moni (2008) and among others, Demirguc-Kunt and Huizinga (1999) uses the net interest margin (NIM) as proxy for banks' profitability. According to their investigation those accounting based measurements of bank profitability are nearer to accurate and proxies to measures profitability, even if, they have their own drawbacks.

In line with earlier studies that examined the measures of banks' profitability, this research relies on three commonly used measures of profitability by using the traditional accounting method; ROA, ROE and NIM.

#### **2.4 Liquidity and Bank Performance**

While several studies are underway to uncover the relationship that exists between liquidity risk and bank performance, there have been a lot of controversial debates of previous studies upon this topic. Some researchers find that there is a significant positive relationship between the two variables while others find a negative correlation.

For a sort of brainstorming and as input for the analysis part, both the theoretical and research findings in this regard are presented and discussed as follows.

Profitability accounts for the impact of better financial soundness on bank risk bearing capacity and on their ability to perform liquidity transformation (Rauch et al. 2008 and Shen et al. 2010). Loans are among the highest yielding assets a bank can add to its balance sheet, and they provide the largest portion of operating revenue. In this respect, the banks are faced with liquidity risk since loans are advanced from funds deposited by customers. However, the higher the volume of loans extended the higher the interest income and hence the profit potentials for the commercial banks. At this point, it is also worth noting that banks with a high volume of loans will also be faced with higher liquidity risk. Thus, the commercial banks need to strike a balance between liquidity and profitability. It is argued that when banks hold high liquidity, they do so at the opportunity cost of some investment, which could generate high returns (Kamau 2009). The trade-offs that generally exist between return and liquidity risk are demonstrated by

observing that a shift from short term securities to long term securities or loans raises a bank's return but also increases its liquidity risks and the inverse is true. Thus a high liquidity ratio indicates a less risky and less profitable bank (Hempel et al. 1994). Thus, management is faced with the dilemma of liquidity and profitability. Myers and Rajan (1998) emphasized the adverse effect of increased liquidity for financial institutions stating that, "although more liquid assets increase the ability to raise cash on short -notice, they also reduce management's ability to commit credibly to an investment strategy that protects investors" which, finally, can result in reduction of the "firm's capacity to raise external finance" in some cases. Thus, this indicates the negative relationship between bank profitability and liquidity.

Usually, short-term borrowings are costly and the loss of income from the sale of liquid assets will tend to have an adverse effect on profitability. On the other hand, idle funds and the lower returns on liquid assets may also adversely affect the profitability of those institutions with surplus liquidity. Thus, liquidity management represents yet another important determinant of commercial bank profitability (Raise, 2010).

Based on the risk-return hypothesis, more liquidity risk is associated with higher expected returns. Otherwise stated more cash and other liquid non-earning assets result in a lower expected return because these assets do not generate any return. Following prior research of Ommeren (2011) and Rasiah (2010), a negative relationship between profitability and large liquid assets to customer deposits and short term funding ratio is hypothesized. On the other hand researchers expected a positive relationship between liquidity risk and profitability and concluded that the fewer the funds tied up in liquid assets, the higher expected profitability to be (Eichengreen and Gibson, 2001).

Berger (1995) analyses the statistical relationships between bank earnings and capital for U.S. banks over the period of 1983-1989 and finds that, contrary to what one might expect in situations of perfect capital markets with symmetric information (see Modigliani and Miller 1958, 1963) in which there is no relationship between earning and bank capital), there is a positive relationship between capital and return on equity. This result, according to the author, is consistent with the "expected bankruptcy cost hypothesis." More specifically,

Berger's results suggest that banks with higher levels of capital see their funding costs decrease to such an extent that it more than offsets the cost of issuing additional capital. While Berger (1995), applies the concept of the "expected bankruptcy cost hypothesis" in the realm of capital, it is also conceptually applicable to the impact of liquid assets on profitability, whereby banks holding more liquid assets benefit from a superior perception in funding markets, reducing their financing costs and increasing profitability.

At the same time, a recent paper by Morris and Shin (2010), develops a model where the total credit risk of a bank is decomposed into "insolvency risk" ("the conditional probability of default due to deterioration of asset quality if there is no run by short-term creditors") and "illiquidity risk" ("the probability of a default due to a run when the institution would otherwise have been solvent"). The model provides a formula for "illiquidity risk" and the authors show that an increase in the liquidity ratio of a bank decreases the probability of an "illiquid" default.

These two concepts can be drawn together in the context of the current paper. If an increase in the relative liquid assets holdings of a bank decreases its probability of default, and if the "expected bankruptcy cost hypothesis" is indeed correct, then holdings of liquid assets should exhibit a positive relationship with bank profits. At the same time, holding liquid assets imposes an opportunity cost on the bank given their low return relative to other assets, thereby having a negative effect on profitability. Thus, overall, liquid assets exhibit a non-linear relationship to bank profitability in which increasing liquid assets would improve a bank's profitability through the "expected bankruptcy cost hypothesis", as long as the marginal benefit of holding additional liquid assets outweighs the opportunity cost of their low relative return.

## **2.5 Review of Related Empirical Studies**

According to Habtamu Nigussie (2012), study on determinants of bank profitability, there is a negative correlation between private commercial banks profitability measure; return on asset, and liquidity. That means the more the ratio of loan to deposit ratio of banks, the less the ROA of private commercial banks in Ethiopia. Hence, as to his finding liquidity level of private commercial banks included in the study (loan to deposit ratio) has no significant relationship

with ROA. Similarly, he found that there is negative correlation between return on equity and liquidity. Liquidity has similar implication like return on asset, which means although more liquid assets increase the ability to raise cash on short-notice; excess cash in the bank increases the level of non-earning asset. Thus, liquidity (as measure of loan to deposit ratio) has a negative relationship with return on equity. Although, there is negative relationship between return on equity and liquidity, it is significant, which means the more liquidity the bank, the lower the profitability. However, liquidity in terms of loan to deposit ratio) is highly correlated with NIM in his study but has negative and insignificant relationship with profitability.

Another study of the determinants of bank margins in the European banking by Val Verde & Fernandez. (2007, p. 2055, 2058) reveals that higher loan to deposit ratios and loan to total assets seem to be positively and significantly related to performance. These conventional approaches to bank margin and indicators of liquidity risk enables banks to diversify its portfolio through investment in traditional and non-traditional business boost revenues and increase market power. However, non-traditional businesses which include non-interest income may fill the gap that results from stronger competition in the traditional segment of loan and deposits.

In the same line, Dietrich et.al (2004, p.2, 18) supports that internal factors such as bank liquidity indicators, total expenditures and funds invested in securities are highly correlated with its profitability.

More so, the previous study of Bourke (1989, p.66, 76) points to that liquidity ratios, notably loan to assets, loan to deposits and cash ratios which contains data that are inherent in banks' financial statement can affect profitability positively. As opposed to capital based return, their finding reveals that liquidity ratios and interest margin are positively related to bank profitability.

In contrast to the above of mentioned studies, Kosmidou et.al (2005, p.9, 15) argues that Net interest margin is one of the most important determinants of bank performance measurement showing profitability of bank's interest –earnings –business, but is negatively related to liquidity indicators. It can however be significant only in the presence of external factors such as inflations, macroeconomic policies and economic growth. In a similar study of determinants of

bank profitability in Greece during the periods of financial integration, (Kosmidou; 2008, p.155) it is found that when considering banks internal characteristics such as liquidity risk, there is a significantly negative association between liquidity and Return on Assets. This do however become positive and insignificant when macroeconomics and others financial structure are taken into consideration.

Finally, the recent financial crash and the panic of possible future shock in the financial system particularly in the banking sector in Europe and US, it has necessitated the study of the relationship between liquidity risk and bank performance in Ethiopia. Although, some scholars find a positive relationship other find a negative effect. Based on these contradicting results, the hypotheses would be addressed upon completion of the study and the study would add contribution to current literature in this regard.

## CHAPTER THREE

### 3. RESEARCH DESIGN AND METHODOLOGY

This chapter discusses the research design and methodology. The chapter is organized in six sections. The first section 3.1 discusses the research design. Sampling design is presented in section 3.2. Methods of data collection and analysis plan are presented in section 3.3 and 3.4 respectively. In section 3.5 model assumption and data properties of the study are presented.

#### 3.1 Research Design

The main objective of this study is to investigate the impact of liquidity risk on private commercial banks profitability in Ethiopia and the study adopted an explanatory design by using descriptive and inferential statistics to realize a stated objective. The study employed quantitative research approach by using secondary data gathered from financial statements of private commercial banks in Ethiopia.

#### 3.2 Sampling Design

The population of this study includes all sixteen registered and fully operating private commercial banks in Ethiopia. However, using simple random technique, the eight private commercial banks are randomly selected and considered in the sample. As a result, out of the total 16 private commercial banks operating currently in Ethiopia, eight commercial banks namely Awash International Bank, Dashen Bank, Bank of Abyssinia, Wegagen Bank, United Bank, Nib International Bank, Cooperative Bank of Oromia, and Lion International Bank are selected representing 50% of the total population of private banks in number.

All private commercial banks included in the sample have operated in the industry for more than eight years and this would make more comparable for the parameters considered in the study. Due to time constraint, the last five years financial data covering from 2009/10 to 2013/14 are taken from financial statements of those banks in the sample.

#### 3.3 Sources and Methods of Data Collection

In order to carry out any research activity; information should be gathered from proper sources. The sources of data for this research are secondary sources. The secondary data

obtained from internal and external sources. The internal sources are the balance sheet and income statements of eight private Ethiopian commercial banks by collecting the data from their annual report bulletins and websites. The external sources are annual reports and website of National Bank of Ethiopia, and other published and unpublished documents.

### **3.4 Methods of Data Analysis**

The collected data are analyzed by using descriptive statistics, correlations, and multilevel linear regression analysis. The data analyzed supported by Excel for graphs and Stata software version 12.0 output for descriptive and statistical analysis.

#### **3.4.1 Descriptive Statistics**

Graphs, Mean, minimum, maximum and standard deviation values are used to analyze the general trends of the data from 2009/10 to 2013/14 for the variables which are included in the study.

#### **3.4.2 Inferential Statistics**

Correlation matrix and random effect multilevel regression model are used to examine the relationship between the dependent variable and explanatory variables in the study. According to Creswell (2009), variables need to be specified in quantitative researches; so that it is clear to readers what groups are receiving the experimental treatment and what outcomes are being measured.

In order to investigate the impact of liquidity risk on performance of listed banks in Ethiopia, It is begun by identifying the respective variables involved in the study. Though there are internal and external determinants of liquidity, this study employed only bank specific internal factors by taking and computing the data from financial statements of the sample banks.

As it is mentioned in the literature above, there are many different approaches or ratios to measure liquidity risks and bank's performances. For liquidity, common variables such as loans, deposits, liquid assets, current liabilities (customer deposits) are applied to calculate loan to deposit ratio, loan to asset ratio, and liquid assets to current liabilities(customer deposits) ratio

in which banks use the most with their daily liquidity risk management. For bank's performance (profitability), Return to Assets, Return to Equity and Net Interest Margin will be used. Accordingly, the dependent and independent variables along with their measurements for the study are described as follows.

#### **3.4.2.1 Dependent Variables**

Bank profitability is the dependent variable and it is measured by the ratio of the Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM). All profitability measures included in the study are described as follows;

- ***Return on Asset (ROA)***

As Golin (2001) points out, the ROA has emerged as key ratio for the evaluation of bank profitability and has become the most common measure of bank profitability. Most authors and researchers also used ROA as a measure of bank profitability (performance).

The ROA reflects the ability of a bank's management to generate profits from the bank's assets. It shows the profits earned per birr of assets and indicates how effectively the bank's assets are managed to generate revenues, although it might be biased due to off-balance-sheet activities. Basically, the higher ROA means better performance and vice-versa. Technically ROA can be raised by bank from either profit margin or assets turnover but not at the same time due to their trade-off. ROA can be calculated as:

$$\text{➤ ROA} = \text{Net Income after Tax} / \text{Total Assets}$$

This is probably the most important single ratio in comparing the efficiency and operating performance of banks as it indicates the returns generated from the assets that bank owns. Although ROA shows good information of profitability of bank, but it is not what shareholders care the most. Shareholders of bank more concern with how much bank earned for their investment to equity measured by ROE, which shows the net income after tax per Birr from equity capital.

- **Return on Equity (ROE)**

Although ROA provides useful information about bank profitability, we have already seen that it is not what the bank's owners (equity holders) care about most. They are more concerned about how much the bank is earning on their equity investment, an amount that is measured by the return on equity (ROE), the net income per birr of equity capital. It is calculated as:

➤ **ROE = Net Income after Tax / Total Shareholders' Equity**

- **Net Interest Margin (NIM)**

Another commonly watched measure of bank profitability is called the Net Interest Margin (NIM), the difference between interest income and interest expenses as a percentage of total loans and advances, which includes also interest income from other interest bearing assets such as deposits with foreign banks, treasury bills and other investments. One of a bank's primary intermediation functions is to issue liabilities and use the proceeds to purchase income-earning assets. If a bank manager has done a good job of asset and liability management such that the bank earns substantial income on its assets and has low costs on its liabilities, profits will be high.

➤ **NIM = Net Interest Income / Total Loans & Advances**

It shows how well a bank manages its assets and liabilities, which is affected by the spread between the interests earned on the bank's assets and interest costs on its liabilities. This spread is exactly what the net interest margin measures.

### **3.4.2.2 Independent variables**

Liquidity is the independent variable and it is measured by liquidity ratios including Loan to Deposit ratio, Loan to Assets ratio, and Liquid Assets to Current Liabilities (Deposits) ratio. Liquidity ratio shows the ability of bank to match its financial obligations within period to avoid default risk or financial distress in the future (Ross, Westerfield & Jaffe, 2005). Ratios will be applied to measure banks' ability to meet its short term obligations, keep its cash position and

collect interest receivables. With general perspective, the higher the liquidity position is, the greater its ability to cover periodical obligations and guarantee safety for both its customers and depositors. Approaches to liquidity ratio in this study which are considered as independent variables include:

- ***Loan to Deposits Ratio(LDR)***

Loan to deposit ratio is the most commonly used liquidity ratio by both banks and analysts. Basically, it measures the liquidity condition of the bank. For a listed bank, there are pressures from shareholders to see profit from bank's operation. Generally, with higher LD ratio, the more likely the bank is relying on borrowed funds. If receivables from loans are delayed or withdrawals from deposit side exceeds new deposit significantly over a short term of period, bank will take more financial stress by having excessive loans and more risky to meet depositors' obligations by selling an amount of loans at loss.

- **Loan to Deposits = Total Loans / Total Deposits**

- ***Loan to Assets Ratio (LAR)***

Loan to Asset ratio is also an important ratio which measures the liquidity of a bank. It measures liquidity of the bank in terms of bank's total assets. It shows the proportion of total assets of the bank has invested for loans. The higher LA ratio is the less liquidity of the bank and at the same time, higher potential profitability the bank can enjoy with exposure to liquidity risk.

- **Loan to Assets = Total Loans / Total Assets**

- ***Liquid Assets Position Ratio(LADR)***

It is the composition of the balance sheet relating liquid (short term) assets to volatile rate-sensitive liabilities where the difference between the two is the net liquidity position of the bank (deficit or surplus) and is a measure of its exposure to liquidity risk. As it is mentioned earlier in the literature part, this measure is being used as controlling mechanism or measure of liquidity for commercial banks by the central bank(NBE) enforcing them to maintain a certain

level of liquid assets vis-à-vis their current liabilities revising from time to time. The current liabilities are here expressed in terms of customers' deposits.

➤ **Liquid Assets Position = Total Liquid Assets/Total Deposits**

### **3.4.3 Model Specification and Description**

In statistics, dependence shows any statistical relationship between two sets of data and correlation refers to any of common statistical relationships involving dependence. The statistical tool applied in this case is the Regression Analysis. It can be used to analyze different variables by finding out their correlations and dependency.

To analyze the relationship between measures of liquidity risk and bank performance, a more formal analysis using multilevel linear regression model is performed. In this study, as it is described above, liquidity indicators are selected as the independent variables which are those variables in which the banks' management can exert control over. They include;

- Loan to Deposit Ratio (LDR)
- Loan to Assets Ratio (LAR)
- Liquid Asset Position Ratio (LAPR)

On the other side, bank performance ratios are dependent variables and they include:

- Return on Asset (ROA)
- Return on Equity (ROE)
- Net Interest Margin (NIM)

Given the longitudinal nature of the data being used, using ordinary linear regression model is not reasonable. In particular, the fact that a number of observations are being made for each bank in the sample may make the assumption of independence unattainable to use ordinary linear regression. To this end, the use of the method which accounts for the dependence of observations within clusters (banks) can result in improved estimation of model parameters.

Hence, this study has employed one of the model techniques called the multi-level model. More precisely, the study has used a two - level linear regression model with random intercept

where individual measurements at different occasions (time) are nested within banks. Within the context of the multi-level method, the measurements at the different occasions represent the first-level while the banks represent the second-level. The model is represented mathematically as follows:

$$Y_{ij} = \beta_0 + \beta_1 x_{1ij} + \beta_2 x_{2ij} + \beta_3 x_{3ij} + \beta_4 x_{4ij} + u_j + e_{ij}$$

Where  $Y_{ij}$  represent the performance measures (NIM, ROE and ROA) at occasion  $i$  for bank  $j$ ; the  $u_j$  (bank-level) and  $e_{ij}$  (measurement-level) represent the random effects; and the rest of the terms in the model constitute the fixed part of the model where  $X$ s represent the predictors (independent variables LDR, LAR and LADR), and  $\beta$ s represent model parameters.

The model assumes that the random effects have normal distributions with mean zero and the two random effect components are independent. According to Tom A. B. Snijders (p.6, 2012), two kinds of argument to choose for a multilevel analysis instead of an OLS regression of disaggregated data include;

- **Dependence as a Nuisance:** Standard errors and tests base on OLS regression are suspect because the assumption of independent residuals is invalid.
- **Dependence as an Interesting Phenomenon:** It is interesting in itself to disentangle variability at the various levels; moreover, this can give insight in the directions where further explanation may fruitfully be sought.

## CHAPTER FOUR

### 4. RESULTS AND DISCUSSIONS

In this chapter the findings using the data collected and the analysis on them using various statistical tools are presented and discussed. The chapter has five sections. Under the first section (section 4.1), descriptive statistics of both the dependent and independent variables (using graphics and descriptive analysis) will be presented and analyzed followed by correlation analysis under section 4.2. Under Section 4.3, the results of the regression analysis are presented and discussions for the results of the regression analysis are made under this section.

#### 4.1 Descriptive Statistics

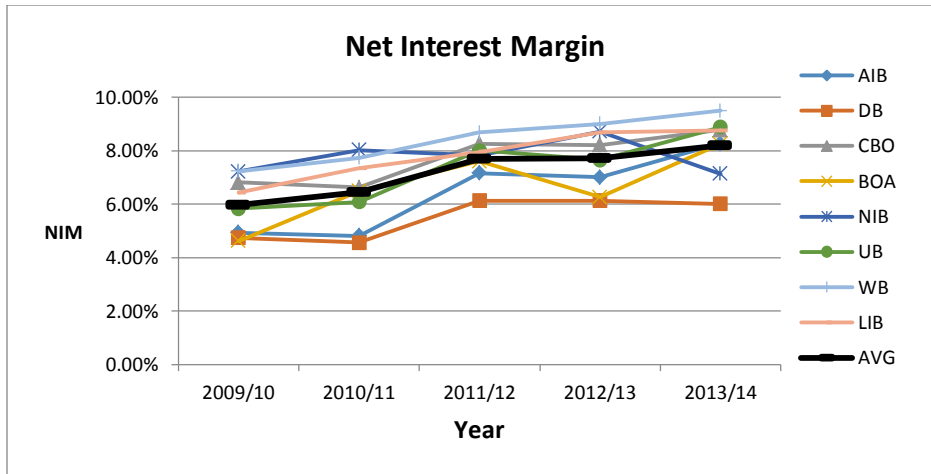
The descriptive statistics for the dependent and independent variable are presented below by using graphics to see the trend for each variables throughout the observation period and finally the descriptive analysis for the overall sample observation of all independent and dependent variables will be discussed relying on the output from the stata.

##### 4.1.1 Trend Analysis - Graphics

The aim of this section is to present and analyze the variables with descriptive tools (graphs) relying on the data collected on the sample banks for a better understanding and observation of the trend comparing with the average for each of the dependent and explanatory variables in each bank throughout the observation period. Here, the dependent variables in the study are performance (profitability) measurement ratios including Net Interest Margin (NIM), Return on Equity (ROE), and Return on Asset (ROA). Whereas the independent variables are liquidity measurement ratios of Loan to Deposit Ratio (LDR), Loan to Assets Ratio (LAR), and Liquid Assets to Deposit Ratio (LADR).

##### A) Net Interest Margin

As it is mentioned earlier, it is one of the commonly used bank profitability measures which is expressed in this study as the difference between interest income and interest expenses (net interest income) as a percentage of total loans and advances.

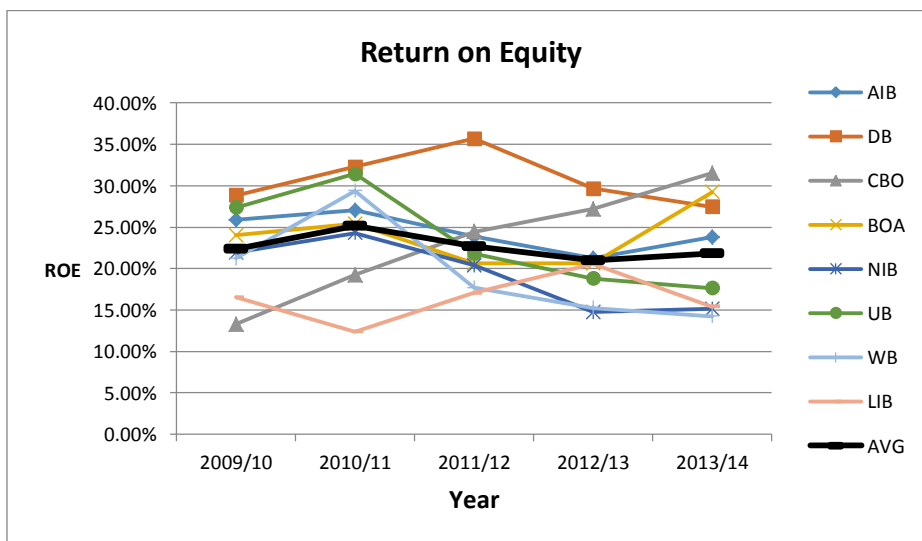


**Figure 1: Net Interest Margin**

As it can be seen from the above figure 1, the NIM of three banks LIB, WB and CBO is above the average NIM (shown on the black line) of the banks in the sample throughout the observation period. Whereas, DB and AIB earn NIM below the average and DB shows the least NIM with bottom line and even with marginal decreasing trend from year 2011/12 onwards. Overall, the average NIM shows an increasing trend throughout the sample period.

**B) Return on Equity**

ROE as one of the bank profitability measures concerned about how much the bank is earning on Shareholders' equity investment. While ROE is the net earning per Birr equity capital, the greater the ratio the higher the performance.



**Figure 2: Return on Equity**

From the above figure 2, the ROE is volatile in almost all sampled banks, except CBO which shows an increasing trend throughout the observation period and DB is with the highest ROE scoring above the average ROE throughout the period and the highest in 2011/12 with 35.67%. The lowest ROE is observed on LIB in 2010/11 with 12.40%. The average ROE is in a decreasing trend after 2010/11, where this might be due to directive of NBE (SBB/50/2011) that enforced commercial banks to increase their capital by setting the minimum paid up capital requirement of Birr 500 million and this can increase the denominator resulting in decrease on ROE of most banks.

### C) Return on Asset

ROA is fundamental measure of bank performance. Return on Asset represents the net earnings per unit of a given assets and shows the ease at which a bank can convert its assets into net earnings. Higher ratio implies that greater ability and better performance.

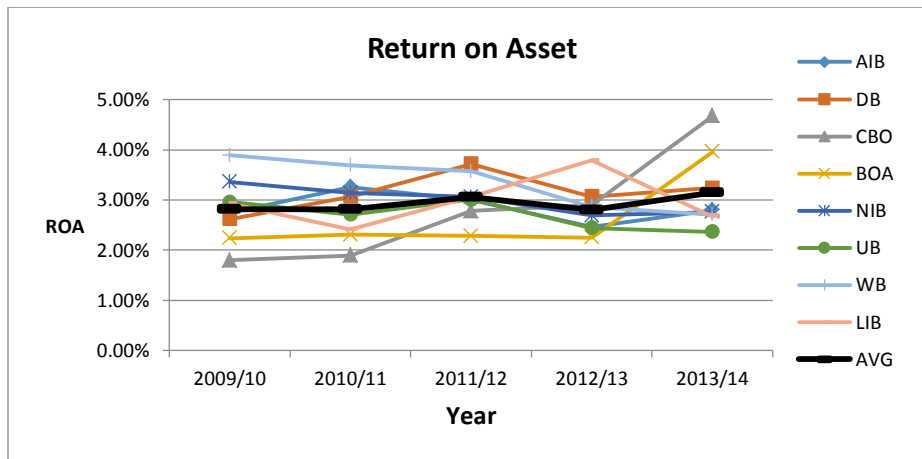


Figure 3: Return on Asset

As it is shown on the above figure 3, the average ROA shows slight increase for the sample banks throughout the period. Though the two banks CBO and BOA had ROA of below the average ROA before the year 2012/13, in 2013/14 CBO has the highest ROA of about 4.68% followed by BOA with 3.96% and DB with 3.24% scoring above the average ROA of 3.15%.

## D) Loan to Deposit

For bank's liquidity structure analysis, loan to deposit ratio shows the level of pressure bank has to meet its general obligations to its depositors. Normally, total loans of bank should be little less than total deposits; otherwise bank needs to borrow extra money with higher interest rate charges.

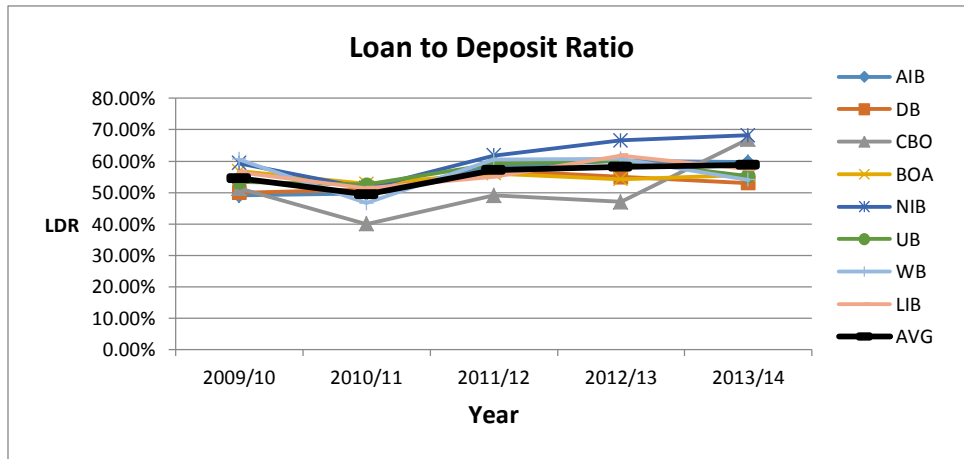
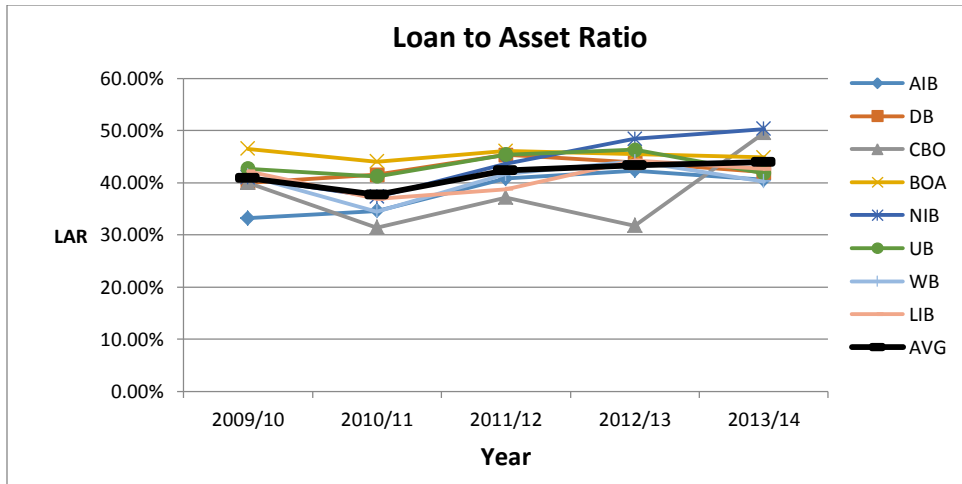


Figure 4: Loan to Deposit Ratio

As it is shown on above figure 4, loan to deposit ratio of most sampled banks concentrated around the average loan to deposit ratio (black line) of the banks with in the range of minimum 40% to maximum 68.25% within those five year periods. However, loan to deposit ratio of NIB is the highest and above the average throughout the period. Whereas LDR of CBO was the lowest till 2012/13 but it became above the average LDR in 2013/14 being the second highest LDR next to NIB's LDR. When we see the trend in the average LDR, it decreases in 2010/11 but shows an increasing trend afterwards.

## E) Loan to Asset

This ratio is a good supplement for Loan to Deposit ratio as a measure of liquidity risk, which indicates the proportion of total assets a bank has invested for loans. Theoretically, the higher ratio it is, the higher profits are generated from banks loan investments but also with higher exposure to liquidity risks.

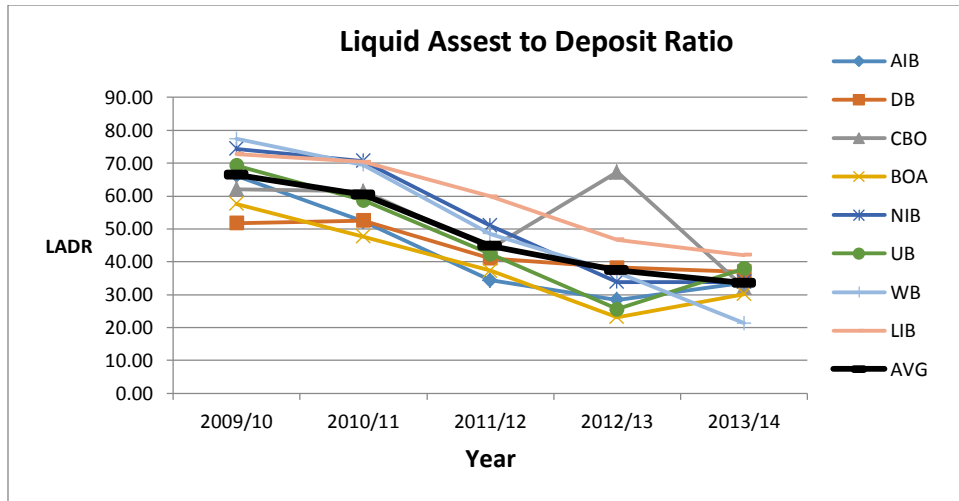


**Figure 5:** Loan to Asset Ratio

As it can be seen from the above figure 5, like LDR, the average LAR decreases in 2010/11 from the year 2009/10 and shows a slight increasing trend afterwards like that of loan to deposit ratio (LDR). BOA has the highest LAR above the average LAR line up to 2011/12 but decreasing trend afterwards and the highest LAR after that is accounted by NIB bank. Though LAR of CBO was the least up to 2012/13 being below the average LAR, in 2013/14 it takes the second highest LAR with 50% being led by NIB with the highest 50.32%.

#### **F) Liquid Asset to Deposit**

As it is mentioned before, it is the composition of the balance sheet relating liquid (short term) assets to volatile rate-sensitive liabilities (deposits) where the difference between the two is the net liquidity position of the bank (deficit or surplus) and is a measure of its exposure to liquidity risk.



**Figure 6:** Liquid Asset to Deposit Ratio

From figure 6 above, the two banks namely BOA and AIB maintained below the average LADR of all sample banks throughout those years. Whereas LIB is the one which had LADR above the average LADR throughout the period. LADR shows a decreasing trend in almost all banks up to 2012/13 except CBO which shows the highest with 67.23% and BOA the lowest with 23.20% in this year. Overall, the average LADR shows a decreasing trend throughout the period from the highest of 66.44% in 2009/10 to the lowest in 2013/14 with 33.54 % decreasing by almost 50% within five years.

#### 4.1.2 Descriptive Analysis

In this section descriptive statistics of all dependent and independent variables are presented from the output of stata mini-software by taking and computing the data from financial statements of the sample private commercial banks. Accordingly Mean, maximum, minimum and standard deviation values are included and presented in the table below and the analysis on these values is also discussed.

**Table 2. Descriptive Statistics of Variables**

<b>Dependent Variables</b>	<b>Observations</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>NIM</b>	40	7.25%	1.37%	5%	10%
<b>ROE</b>	40	22.57%	5.93%	12%	36%
<b>ROA</b>	40	2.95%	0.71%	2%	5%
<b>Independent Variables</b>	<b>Observations</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>LDR</b>	40	55.60%	5.83%	40%	68%
<b>LAR</b>	40	41.65%	4.52%	31%	50%
<b>LADR</b>	40	48.78%	16.24%	21%	77%

*Source: Stata 12 version output taking data from private banks financial statements*

As it can be drawn from the above table, the highest dispersion among dependent variables (performance measurement ratios) is observed on return on equity (ROE) with 5.93% standard deviation from its mean of 22.57% and with difference of 24% between the maximum and minimum ROE among the private commercial banks in Ethiopia. This variability on ROE might be due to the variation on paid up capital contribution among those commercial private banks. Usually shareholders prefer ROE as measure of performance of a bank vis-à-vis their equity contribution (investment). The minimum ROE in private banks in Ethiopia is therefore 12% and the maximum is 36%.

There is also slight variability in NIM among those private commercial banks in Ethiopia with 1.37% standard deviation from its mean of 7.25% and with difference of 5% between the minimum and maximum NIM of those banks. However, there is less variability in ROA among those banks with 0.71% deviation from the mean of 2.95%. With regard to independent variables, the highest variability is observed on liquid assets to deposits ratio (LADR) where there is 16.24% deviation from its mean of 48.78% and difference of 56% between the maximum and minimum LADR in the private banks. Similarly, there is slight variation in LDR among those private banks with 5.83% standard deviation and less dispersion is observed in LAR within the banks at 4.52%. The variations and/or the differences between the minimum

and the maximum values of the variables among those private commercial banks are also depicted on the graphs above for a better understanding on each variables in this regard.

## **4.2 Correlation Analysis**

In this section, correlation between the dependent variables (profitability measures) and independent variables (liquidity measures) are discussed relying on the correlation matrix table from stata version 12 output. The dependent variables are NIM, ROE and ROA; while the independent (explanatory) variables are LDR, LAR and LADR. Correlation is a way to index the degree to which two or more variables are associated with or related to each other.

Correlations are useful because they can indicate a predictive relationship that can be exploited in practice. There are several correlation coefficients, often denoted  $\rho$  or  $r$ , measuring the degree of correlation. The most common and widely used bi-variant correlation statistics is the Pearson product-movement coefficient, commonly called the Pearson correlation coefficient (Wikipedia).

The Pearson correlation is +1 in the case of a perfect direct (increasing) linear relationship (correlation), -1 in the case of a perfect decreasing (inverse) linear relationship (anti-correlation), and some value between -1 and 1 in all other cases, indicating the degree of linear dependence between the variables. As it approaches zero, there is less of a relationship (closer to uncorrelated). The closer the coefficient is to either -1 or 1, the stronger the correlation between the variables.

Accordingly, in the following sections the correlation between each dependent variable with all the independent (explanatory) variables would be discussed in line with the correlation matrix table below. The values in the parentheses are p-values and the coefficients attested at 5% significant level for the degree of correlation.

**Table 3. Correlation Matrix of Variables with P-Values**

	<b>NIM</b>	<b>ROE</b>	<b>ROA</b>
<b>LDR</b>	0.3780 (0.0162)	-0.2203 (0.1720)	0.3152 (0.0476)
<b>LAR</b>	0.1425 (0.3803)	-0.0459 (0.7786)	0.1056 (0.5166)
<b>LADR</b>	-0.3170 (0.0463)	0.0578 (0.7230)	0.0523 (0.7486)

*Source: Stata 12 version output taking data from private banks financial statements*

#### **4.2.1 Correlation Analysis between Net Interest Margin (NIM) and Explanatory Variables**

As it can be seen from the above table 3, net interest margin (NIM), the difference between interest income and interest expenses (net interest income) as a percentage of total loans and advances, is positively correlated with liquidity measures of total loans to deposits ratio (LDR) and total loans to assets ratio (LAR) with correlation coefficients of 0.3780 and 0.1425 but negatively and highly correlated with liquid assets to deposits ratio (LADR) with correlation coefficient of -0.3170. LDR is also highly correlated with NIM.

Here it could be easy to understand that the inverse relationship between liquid assets to deposits ratio and NIM, in that the higher the liquidity ratio in terms of liquid assets to deposits, the less the profit would be earned in terms of NIM as the idle fund (liquid asset) might not be lent out or invested to bear interest and hence less interest income. With regard to the positive correlation between LDR and LAR with NIM, the higher the ratio in these liquidity measures, the higher the profit could be earned measured by NIM but at higher margin due to LDR. But the higher the ratios in these measures imply the higher liquidity risk as the fund from customer deposits and other own bank cash convertible assets are tied with loans granted to customers. Hence, liquidity is positively correlated in terms of LDR and LAR with profitability (NIM) but it is negatively correlated with profitability (NIM) in terms of LADR in this study for private commercial banks.

#### **4.2.2 Correlation Analysis between Return on Equity (ROE) and Explanatory Variables**

When we see the correlation between ROE against explanatory variables LDR, LAR and LADR on the table 3 above, ROE is negatively and less correlated with loan to deposit and loan to asset ratios with coefficients of -0.2203 and -0.0459 respectively and it is positively but less correlated with liquid assets to deposits ratio with correlation coefficient of 0.0578. Hence, the higher the ratio on liquidity measures LDR and LAR of the banks, the lesser the profitability of the banks measured by ROE but with insignificant margin and the vice versa. However, the higher the liquidity ratio measured by liquid assets to deposit ratio, the higher the profitability of the banks measured by ROE and with insignificant margin. Here, when we say high liquid asset to deposit ratio, it means there is excess fund in excess of customers' deposits and other commitments for the bank and this might be due to contribution of capital by the shareholders and if this fund is invested in short-term income earning assets, it would generate income and then an increase in ROE.

#### **4.2.3 Correlation Analysis between Return on Asset (ROA) and Explanatory Variables**

As it can be seen from the above table 3, ROA, as a performance measure of banks, is positively correlated with all three explanatory variables (liquidity measures) of LDR, LAR, and LADR with correlation coefficients of 0.3152, 0.1056, and 0.0523 respectively. But it is highly correlated with LDR and less correlated with LAR and LADR. Here the higher the ratios in these liquidity measures would result increase in profit measured by ROA but significant increase due to increases in LDR.

### **4.3 Regression Analysis Results and Discussions**

In this section regression analysis for banks performance (profitability) measures; return on asset, return on equity, and net interest margin has been undertaken to understand the relationship with liquidity measures (explanatory variables) of loan to deposit ratio, loan to asset ratio, and liquid asset to deposit ratio.

This study has employed one of the model techniques called the multi-level model. More precisely, the study has used a two - level linear regression model with random intercept where

individual measurements at different occasions (time) are nested within banks. Within the context of the multi-level method, the measurements at the different occasions represent the first-level while the banks represent the second-level. The model is represented mathematically as follows:

$$Y_{ij} = \beta_0 + \beta_1 x_{1ij} + \beta_2 x_{2ij} + \beta_3 x_{3ij} + \beta_4 x_{4ij} + u_j + e_{ij}$$

Where  $Y_{ij}$  represent the performance measures (NIM, ROE and ROA) at occasion (time)  $i$  for bank  $j$ ; the  $u_j$  (bank-level) and  $e_{ij}$  (measurement-level) represent the random effects; and the rest of the terms in the model constitute the fixed part of the model where  $Xs$  represent the predictors (independent variables LDR, LAR and LADR), and  $\beta s$  represent model parameters. The model assumes that the random effects have normal distributions with mean zero and the two random effect components are independent. In the study, Stata 'xtreg' command is used to estimate the model parameters.

Hence, relying on the output of the model from the stata, regression analysis of each dependent (performance measure) variables with those explanatory (independent) variables is presented and discussed in the following sections.

#### **4.3.1 Regression Analysis between Net Interest Margin and Explanatory Variables**

As it is pointed out before, one of the bank profitability measures is net interest margin (NIM), the difference between interest income and interest expenses as a percentage of total loans and advances. The regression analysis is done to investigate the relationship between net interest margin and the explanatory variables included in this study. Under table 4 below, in line with the regression model, regression results of NIM with explanatory variables under fixed effect and random effect values are presented summarizing from the stata output for those variables.

**Table 4. Regression Analysis Result between NIM and Explanatory Variables**

<b>Net Interest Margin (NIM)</b>			
	<b>Coefficient</b>	<b>Std. Err.</b>	<b>P-values</b>
Cons	.120644	.0185991	0.000
<b>LDR</b>	<b>.2278532***</b>	0612426	0.000
<b>LAR</b>	<b>-.3534871***</b>	.0905207	0.000
<b>LADR</b>	<b>-.0005982***</b>	.0000921	0.000
Time	.0005251	.0007282	0.471
Sigma_u	.0099097***	.0027608	0.000
Sigma_e	.0063482	.0007991	0.000
ICC(rho)	.7090322***	.1291641	0.000

Significance \*: p<0.1; \*\* :<0.05; \*\*\* :< 0.01

*Source: Stata 12 version output taking data from private banks financial statements*

As it is shown on the above table, all liquidity measures loan to deposit, loan to asset and liquid asset to deposit ratios have statistically significant relationship on the bank performance measure, net interest margin. Hence, this result supports to reject the null hypothesis and implies that there is significant relationship between liquidity and profitability of private commercial Banks in Ethiopia. However, LDR has positive relationship with NIM whereas LAR and LADR have negative relationship with the performance (profitability) measure, NIM with coefficients of 0.23, -0.35 and -0.001 respectively.

Thus, an increase in loan to deposit ratio leads to a higher profitability and a decrease in loan to deposit ratio leads to lower profitability in the case of private commercial banks in Ethiopia.

Whereas liquidity measures loan to asset and liquid asset to deposit ratios have inverse relationship with the profitability measure, net interest margin and the higher these ratio measures, the lesser the profitability of the banks and the vice versa.

Banks face with liquidity risk since loans are advanced from funds deposited by customers. However, the higher the volume of loans extended the higher the interest income and hence the profit potentials for the commercial banks. This is why the loan to deposit ratio has impact

on the interest income to be generated by banks, the net interest income and hence with the NIM.

With regard to loan to deposit ratio, the result concurs with the study of Val Verde & Fernandez (2007, p. 2055, 2058) but against their study with loan to asset ratio on NIM. Loan to deposit ratio as determinant of profitability the study by Habtamu (2012), he finds that it has negative and insignificant relationship with NIM which is against this result.

Vincent Okoth Ignore (2013), in his study on Determinants of Financial Performance of Commercial Banks in Kenya, taking loan to deposit ratio as measure of liquidity against performance finds out that it is positively related but with insignificant effect on performance of the banks measured in terms of ROA, ROE and NIM.

#### **4.3.2 Regression Analysis between Return on Equity and Explanatory Variables**

The other regression analysis has been done to know how banks earn on their equity investment, an amount that is measured by the return on equity (ROE) in relation with explanatory variables included in this study. Accordingly, in line with the regression model for this dependent and explanatory variables, regression results of ROE with explanatory variables under fixed effect and random effect values are summarized and presented from the stata output under table 5 below.

**Table 5. Regression Analysis Result between ROE and Explanatory Variables**

<b>Return on Equity (ROE)</b>			
	<b>Coefficient</b>	<b>Std. Err.</b>	<b>P-values</b>
Cons	.104233	.1204503	0.387
<b>LDR</b>	<b>-.023964</b>	.4239263	0.955
<b>LAR</b>	<b>.1547309</b>	.5779	0.789
<b>LADR</b>	<b>.0011677 *</b>	.000606	0.054
Time	.0044787	.0049033	0.361
Sigma_u	.0411485***	.0027608	0.005
Sigma_e	.0426891	.0007991	0.005
ICC(rho)	.4816296***	.1291641	0.005

Significance \*: p<0.1; \*\* : <0.05; \*\*\* :< 0.01

*Source: Stata 12 version output taking data from private banks financial statements*

As it can be seen on the above table, loan to deposit ratio has negative and insignificant relationship with the performance measure, ROE. The higher the ratio on loan to deposit ratio, the less performance in ROE measure of the banks. Whereas loan to asset ratio has a positive and insignificant effect on performance of those private commercial banks in Ethiopia, in terms of the performance measure ROE, and liquid asset to deposit ratio has also positive and significant impact on ROE of the banks. Hence, the higher liquid asset to deposit ratio, the higher the profit to be earned measured by ROE.

The result of loan to deposit ratio on ROE concurs with Vincent Okoth Ignore (2013) finding in that it has insignificant relationship but positively in him. As to Habtamu (2012) this loan to deposit measure of liquidity has similar result for negative relationship but significantly in his part. Yet, various studies have various findings as it is pointed out earlier in this paper.

### 4.3.3 Regression Analysis between Return on Asset and Explanatory Variables

The last regression has been run relying on the multilevel linear regression model for ROA along with the explanatory variables and the regression result is summarized and presented from the stata output under table 6 below.

**Table 6. Regression Analysis Result between ROA and Explanatory Variables**

Return on Asset (ROA)			
	Coefficient	Std. Err.	P-values
Cons	.000436	.0155579	0.978
<b>LDR</b>	.0898159**	.0351455	0.011
<b>LAR</b>	-.0581913	.0485323	0.231
<b>LADR</b>	.0000704	.0000783	0.369
Time	-.0000238	.0006918	0.973
Sigma_u	.0020105	.0016067	0.227
Sigma_e	.0060618	.0007704	0.227
ICC(rho)	.099105	.1520918	0.227

Significance \*: p<0.1; \*\* :<0.05; \*\*\* :< 0.01

*Source: Stata 12 version output taking data from private banks financial statements*

As to table 6 above, loan to deposit ratio has positive and significant relationship at 5% significant level to bank performance ratio of ROA. But loan to asset ratio is negative and has insignificant relationship with the performance measure, ROA and the other liquidity measure ratio liquid asset to deposit has positive and insignificant relationship with ROA. As to Vincent Okoth Ignore (2013), loan to deposit ratio has positive relation but insignificant effect on ROA. Whereas Berhanu (2012) in his study on determinants of commercial banks profitability found that the relationship between loan to deposit ratio as a measure of liquidity and ROA is positive and significant, which agrees with this study result in this regard. But as to Habtamu (2012), loan to deposit ratio has negative and insignificant relationship with ROA.

## CHAPTER FIVE

### 5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

In this last chapter, the major findings of the study are summarized; conclusions are drawn based on the findings and recommendations are forwarded accordingly.

#### 5.1 Summary

As it is mentioned in the literature part, commercial banks liquidity is of utmost importance. Hence, the question is - What are the measures that allow a bank to maintain its liquidity level and enable it to perform consistently and effectively without this problem or liquidity risk?

The aim of this paper was to assess and see the impact of liquidity on financial performance of private commercial banks in Ethiopia. Accordingly, three bank specific measures of liquidity in terms of financial ratios were considered and taken as independent variables for the study. Similarly, three bank performance (profitability) measures in terms of financial ratios were taken to see the impact of liquidity measure variables on these performance measures (the dependent variables).

Data from the sample of eight private commercial banks in Ethiopia for five years covering from 2010 to 2014 was taken, presented and analyzed using both descriptive and inferential statistical tools. In order to see the trend in each variables and banks throughout the observation period, the data was presented and analyzed using graphics. The correlation analysis and regression analysis using multilevel linear regression model for each of the three performance measure ratios (dependent variables) of NIM, ROE and ROA against the explanatory variables (LDR, LAR and LADR) were conducted. Accordingly, the following summaries and conclusions are drawn based on the findings.

As it is shown on graphs under 4.1.1 above, the trend in the average performance of private commercial banks throughout the observation period varies among those performance measures. Accordingly, NIM shows an increasing trend, whereas ROE and ROA have irregular trend (both increasing and decreasing) throughout the observation period.

With regard to liquidity measures for the private commercial banks, decrease in 2011 but slight increasing trend thereafter is observed on both LDR and LAR. However, decreasing trend is observed on liquid asset to deposit ratio of the private commercial banks in the observation period where this is especially in sharp decreasing after 2011. This could be due to enforcement of NBE directive in 2011 that dictates to purchase bills at 27% of the total granted loans and advances for the private banks which might affect their liquidity position.

Descriptive analysis result implies that the average NIM of private commercial banks in Ethiopia is 7.25%, whereas the average ROE is 22.57% and that of ROA is 2.95%. From these performance (profitability) measures on the private banks, the highest variation among those private banks is observed on ROE. This variation might be due to differences on the amount of paid up capital among those private banks in Ethiopia.

Similarly, the average LDR of the private banks is 55.60%, whereas the average LAR is 41.65%, and the average LADR is 48.78%. From the liquidity measure ratios, the highest variation among those private banks is on LADR (liquid asset to deposit ratio).

With regard to relationship between liquidity and performance among private banks in Ethiopia from the study, the performance (profitability) measure, NIM, has significant relationship with liquidity measures of LDR, LAR and LADR all at 1% significant level. However, NIM has positive relation with LDR but inverse relationship with LAR and LADR.

The other performance measure, ROE has positive and insignificant relationship with LAR but it has positive and significant relationship LADR. Whereas, LDR has negative and insignificant relationship with ROE.

And at last, ROA has positive and significant relationship with LDR at 5% significant level. The rest liquidity measure ratios LAR and LADR have negative and positive insignificant relation with ROA respectively.

## 5.2 Conclusion

Hence, the impact of liquidity on financial performance of private commercial banks in Ethiopia is inconsistent (both positive and negative) and the significant relationship varies from measure to measure. Finally, considering that some results show a statistically significant relationship between liquidity and bank performance while others display insignificant relation, it could be concluded that we cannot draw a firm conclusion of the relationship between liquidity and bank performance of private commercial banks in Ethiopia.

## 5.3 Recommendation

Based on the findings of the research the following recommendations are forwarded:

- The ability to fund increases in assets and meet obligations as they come due is critical to the ongoing viability of any bank. Since a bank's future liquidity position will be affected by factors that cannot always be forecasted with precision, assumptions and measurements on assets, liabilities and off-balance sheet activities need to be reviewed frequently to determine their continuing validity. An important aspect of managing liquidity is making assumptions about future funding needs. Therefore, managing liquidity should be considered among the most important activities to be conducted by commercial banks like credit and market risks.
- There has to be further research apart from bank specific measures considered in this study on the relationship between liquidity and performance of private commercial banks in Ethiopia by incorporating regulatory factors and other bank specific and macroeconomic factors. Further research is recommended on how to achieve the optimal liquidity level in commercial banks. The result will help to solve the problem of excess liquidity and its effect on reducing profits, and arbitrary high profitability with its consequence to reducing liquidity position.

Also it is recommended that research should be launched on identifying better quantitative measures of profitability, liquidity, risk and managerial efficiency, which could lead to more satisfactory estimation of cause-effect relationship between them.

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