Factors Affecting Liquidity of commercial banks in Ethiopia

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Statement of Declaration

I, Wubayehu Teshome declare that this thesis entitled: Factors Affecting Liquidity of Commercial Banks in Ethiopia and submitted in partial fulfillment of the requirements for the Degree of Master of Science in Accounting and Finance, is outcome of my own effort & study and that all sources of materials used for the study have been duly acknowledged. I have produced it independently with only guidance and suggestion of the thesis Advisor. The study complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Abstract

Banks are both the center for liquidity creation and financial crisis due to its role in the 'maturity transformation' of short term deposits into long term loans make banks inherently vulnerable to liquidity risk, both of an institution specific nature and that which affects markets as a whole. The study had assessed the factors affecting liquidity of commercial banks in Ethiopia by using the data over the period of 2011 to 2015 on sample size of twelve commercial banks in Ethiopia out of 17 in total with the aim of investigating macroeconomic as well as government policy and bank specific variables which affecting the liquidity of commercial banks in Ethiopia. The study employed sequential mixed research method approach by combining secondary data through balanced random effect regression model and interviews. The results of the study revealed that all macroeconomic and government policy variables were statistically significant in determining the liquidity of commercial banks in Ethiopia. Among those variables foreign direct investment and NBE-bill purchase had negative effect whereas unemployment rate and real GDP growth rate had positive relationship with banks' liquidity. On the other hand, among the bank-specific factors funding cost was statistically insignificant variable in affecting commercial banking liquidity in Ethiopia whereas level of deposit and bank size had statistically significant and negative relationship with banks' liquidity. Thus, the study suggests that macroeconomic factors are more important than firm-specific in determining the Ethiopian commercial banking liquidity. Therefore, banks shall be more concerned about macroeconomic environment in addition to internal environment as a cornerstone while reviewing its policy and developing strategies to enhance their liquidity position.

Key words: Ethiopian commercial banks, liquidity ratio, liquid assets, NBE –bills, deposit

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List of Abbreviations

AB – Abay Bank S.C.

AdIB – Addis international Bank SC.

AIB – Awash International Bank S.C

ALCO – Asset Liability Management Committee

BBI – Berhan International Bank S.C

BIB – Bunna International Bank S.C

BIS – Banks for International Settlement

BoA – Bank of Abyssinia S.C

CBB – Construction and Business Bank

CBO – Cooperative Bank of Oromia S.C

CLRM – Classical Linear Regression Model

CSA – Central Statistics Agency

DB – Dashen Bank S.C

DGB – Debub Global Bank S.C.

DP – Deposit

EB – Enat Bank S.C.

EIC – Ethiopian Investment Commission

FC – Funding Cost

FDI – Foreign Direct Investment

FEM – Fixed Effects Model

GDP – Gross Domestic Product

LIB – Lion International Bank S.C

LIQ – Liquidity Ratio

LOLR – Lender of Last Resort

NBE – National Bank of Ethiopia

NIB – Nib International Bank S.C

OECD – Organization for Economic Cooperation and Development

OIB – Oromia International Bank S.C

OLS – Ordinary Least Square

REM – Random Effects Model

UB – United Bank S.C

UEP – Unemployment Rate

WB – Wegagen Bank S.C

ZB – Zemen Bank S.C

Chapter One: Introduction

1.1. Background of the Study

Banks for international settlement (BIS, 2008) defines liquidity as the ability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. Liquidity can also be defined (Yeager and Seitz, 1989) as the ability of a financial institution to meet all legitimate demands for fund. However, 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.

According to the theory of financial intermediation, banks play an intermediary role through transformation service (Diamond and Dybvig, 1986) in order to solve the investor and depositor liquidity problem (Diamond and Rajan, 1999). Thus, liquidity creation is one of the pre-eminent functions of banks (Angora and Roulet, 2011). Banks play an important role in providing funds for firms and helping them and the economy to grow (Allen and Carletti, 2008). Banks also act as delegated monitors (Diamond and Dybvig, 1986) and insure that firms use the resources allocated to them effectively. Diamond and Dybvig (983) emphasized that banks are exist because of they provide better liquidity insurer than financial markets. Moreover, Allen and carletti (2008); Angora and Roulet (2011) argued that banks can help overcome asymmetric information problems by forming long-lived relationships with firms. However, banks are also a major source of shocks (Angora and Roulet, 2011) and cause fragility in the financial system (Allen and Carletti, 2008) and thus, through fixed nature of the claim; banks are often at the center of financial crisis as in the crisis that started in August 2007.

Nowadays, bank activities are more diverse than ever. In the past decades, competition has increased and new activities have emerged. The traditional form of banking, receiving deposits and extending credits, has become less important. Therefore, monitoring bank behavior is required to safeguard the continuity and stability of the banking sector due to moral hazard issues.

There are mechanisms (Aspachs et al., 2005) that banks can use to ensure against liquidity crisis; these include: banks hold buffer hold liquid assets on the assets side of the balance sheet

(Calomirisy et al, 2012; Tirole, 2010), borrow (Moore, 2009) from interbank market and liquidity assistance from central banks bank as typically act as Lender of Last Resolt (LOLR). Bankers are not indifferent (Merton, 1977) between combinations of liquidity and capital that have the same static consequences for default risk. The best way to deal with a liquidity crisis is to design a combination of capital and liquidity requirements that prevent liquidity crises by ensuring that banks do not become weak enough so that their default becomes imaginable.

As per NBE Directives number SBB/57/2014 liquid assets constitutes of 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. This definition of liquid assets is in line with the theory of liquid assets in banks (Alger and Alger, 1999), which said cash and securities are not close substitutes.

In order to identify the level of liquidity risk, banks can measure liquidity by using either liquidity gap and/or liquidity ratios (Vodova, 2013; Moore, 2009). However, for academic purpose employing the liquidity ratios is more appropriate than liquidity gap approach due to availability of the data and easy to compute ratios. Whereas liquidity gap approach is more data intensive and absence of comprehensive guideline to classify assets and liabilities into different time ladders.

NBE issued the directive which enforce commercial banks except commercial banks Ethiopia, which already finance large government projects, to purchase NBE-bill (government bond) in order to support the financing of government priority area (NBE directive MFA/NBEBILLS/001& 002/2013). This government bond has a maturity period of five years. As a result, a sizable amount of banks‟ assets next to loans and advances tied up in long term government security. Thus, the level of commercial banks liquidity reduced from time to time in recent periods. The study by Belete (2015) examined the NBE-Bill purchase had primarily serious adverse impact on banks‟ liquidity as it boldly changes liquid assets to illiquid long-term

investment. Furthermore, Tesfaye (2014) analyzed the effect of sector specific policy measures (NBE-Bills purchase) on Ethiopian middle sized banks performance and the result of finding revealed that exposure to government bills had negative and significant relationship with performance. Correspondingly, research in other country by Berger and Bouwman (2010) found that the monetary policy affect on-balance sheet liquidity creation.

The average liquidity ratio of commercial banks in Ethiopia which are forced to NBE-bill purchase and subject to this study is in considerably declining trend (as reports of NBE data base). It was 61.61% at the beginning of commencement of NBE-bill purchase in 2011 and declined to 27.15% in 2015; thus the latter is above the current regulatory minimum requirement of 15% (NBE-directive No. SBB/57/2014) by only 12.15%, i.e. the banks average liquidity ratio was 61.61%, 47.23%, 38.64%, 37.64% and 27.15% in the year 2011, 2012, 2013, 2014 and 2015, respectively. Contrary, the commercial banks‟ average ratio of NBE-bill purchase to total assets has been in increasing trend from 9.39% in 2011 to 22.86% in 2015 with an average annual growth rate of 3.37% (6.39%, 2.54%, 2.45% and 2.09% over the period cover 2012 to 2015, respectively).

The current financial situations especially commercial banks in Ethiopia deemed the responsible organs should maintain their financial safety and soundness by keeping their liquidity level at optimal position. Banks liquidity position is act as one of measurement for financial stability as it plays a major role in the Ethiopian financial system. Similarly, liquidity risk is among the factors affecting the reputation of banks as customers confidence is deteriorated due to banks unable to withdraw their deposits when they need. Depending on impacts that come from liquidity in the financial system in general and in banks in particular, the interest of scholars on studies of determinants of banks‟ liquidity in Ethiopia were increased in the past few years. For instance, the first study in the area was conducted by Tseganesh (2012), and then the other three studies by Belete (2015), Berhanu (2015), and Nigist (2015) were conducted three years later. However, on the one hand, providing additional works in the area could be important to increase the number of literature and on the other hand, employing additional macroeconomic variables as well as policy related and bank-specific variables, that might not used in the previous studies conducted in Ethiopia, in the model could help the banks and regulatory organs in developing their framework in order to properly manage liquidity risk.

Moreover, the researchers in Ethiopia overlooked the various macroeconomic variables and government policy as well as bank-specific variables may affect the liquidity positions of commercial banks. Those variables include: unemployment rate, foreign direct investment, NBE-Bills purchase, level of deposit and funding cost. Studies conducted in other Countries (Hackethal et al. 2010; Ferrouhi, 2014) unemployment rate and foreign direct investment had significant effects on liquidity of commercial banks. Conversely, studies by (Belete, 2015; Tesfaye, 2014) assessed NBE-Bills purchase has significant effect on liquidity of commercial banks in Ethiopia though Belete (2015) didn‟t show how significant is and also Tesfaye (2014) shown its impact on commercial banks performance rather than liquidity. Therefore, filling this gap by employing additional variables in the model through taking into consideration the small banks in sample selection and use of primary data through interview in addition to secondary data help the researcher to arrive at a better conclusion.

1.2. Statement of the Problem

Banks plays a significant role in the financial system by solving liquidity problem of both borrowers and investors (Diamond and Rajan, 1999), in monitoring and ensuring firms‟ effective utilization of resources allocated to them, and by creating liquidity. Though banks are contributes the primary source of economic welfare through creating liquidity, they are also primary source of shocks (Bryant, 1980; Calomiris and Kahn, 1991). Thus, every financial activities and economic welfare mainly depends on the position of banks‟ liquidity.

Currently, the liquidity issue in Ethiopia is not only the concern of banks and regulatory organ, but also the concern of borrowers in order to enhance their businesses. Such funds that the banks to lend are deposits mobilized from the customers. But banks in Ethiopia hardly find those funds to meet the investors need. Recently, few researches have been done on determinants of banks‟ liquidity in Ethiopia aimed to identify factors affecting liquidity of commercial banks in Ethiopia. The trend in the liquidity ratio of Ethiopian commercial banks also decreased from time to time so far. Therefore, to identify what make banks illiquidity is important to bankers and regulators to protect banks from liquidity shocks.

All commercial banks in Ethiopia except Commercial Bank of Ethiopia (CBE) are obliged to purchase NBE-bills, which is held for a maturity period of five years, from the fresh loans and advances disbursement. According to this directive (NBE directive

MFA/NBEBILLS/001&002/2013), banks must be investing 27% of fresh loans and advances disbursement in NBE-bills. Consequently, in the subsequent directive that the NBE issued the minimum limit of short-term loans and advance is 40% of total loans portfolio. This situation could lead banks re-purchase NBE-Bills more frequently (at least 5 times) by already disbursed short-term loans when collected and make disbursement. The research by Belete (2015) identified NBE-Bills purchase had primarily serious adverse impact on banks‟ liquidity as it boldly changes liquid assets to illiquid long-term investment.

As banks are liquidity insurers, they face transformation risk and are exposed to the risk of run on deposits. More generally, the higher is liquidity creation to the external public, the higher is the risk for banks to face losses from having to dispose of illiquid assets to meet the liquidity demands of customers. Banks should be always in position to maintain the optimum level of liquid assets in order to protect such losses. As per Asphachs et al. (2005), banks have three possible layers of insurance; a buffer of liquid assets in bank‟ individual portfolios, unsecured lending/borrowing in the interbank market and a lender of last resort/LOLR safety net. The first one is internal and the remaining two are external sources of liquidity. 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. Unemployment rate, Foreign Direct Investment (FDI) and real Gross Domestic Growth (GDP) growth rate are among the macroeconomic variables affecting liquidity of commercial banks. Bank-specific factors include level of deposit, funding cost and bank-size; and government policy variable known as NBE-bill purchase.

The current financial situations especially commercial banks in Ethiopia deemed the responsible organs should maintain their financial safety and soundness by keeping their liquidity level at optimal position. Banks liquidity position is act as one of measurement for financial stability as it plays a major role in the Ethiopian financial system. Similarly, liquidity risk is among the factors affecting the reputation of banks as customers confidence is deteriorated due to banks unable to withdraw their deposits when they need. Depending on impacts that come from liquidity in the financial system in general and in banks in particular, the interest of scholars on studies of determinants of banks‟ liquidity in Ethiopia is increased in the past few years. For the knowledge of researcher, the first study in the area was conducted by Tseganesh (2012), and then the other three studies by Belete (2015), Berhanu (2015), and Nigist (2015) were conducted three years later. However, on the one hand, providing additional works in the area could be important to

increase the number of literature available in the country and on the other hand, employing additional variables in the model could help the banks and regulatory organs in developing their framework in order to properly manage liquidity risk. Furthermore, using mixed (qualitative and quantitative) research approach could provide better solution (Choy, 2014) in assessment of issues related to liquidity of Ethiopian commercial banks. Employing only one approach (qualitative or quantitative) has its own limitations; thus, (Choy, 2014) identified that a comparison and complementary results as references from both separate processes on qualitative and quantitative approaches in a same research topic may reduce or perhaps eliminate those limitations or bias.

1.3. Research Objective and hypothesis

The main objective of this study is to examine the factors affecting the liquidity of commercial banks in Ethiopia. In line with this research objective, the research question was what are the factors affecting commercial banks‟ liquidity in Ethiopia and level of those factors in determining banks‟ liquidity?

Studies conducted in the world as well as in Ethiopia on determinants of commercial banks liquidity identified various variables which affects liquidity of commercial banks. However, a variable which has positive relationship with liquidity of commercial banks for one author has negative relation with liquidity for another author in the world as well as in Ethiopia. Therefore, the following hypotheses were designed in order to test the relationship between variables and liquidity of commercial banks in Ethiopia.

H1: There is a negatively significant relationship between the unemployment rate and banks‟ liquidity.

H2: There is a positively significant relationship between the Real GDP growth rate and banks‟ liquidity.

H3: There is a positively significant relationship between the Foreign Direct Investment and banks‟ liquidity.

H4: There is a negatively significant relationship between the NBE-Bill purchase and banks‟ liquidity.

H5: There is a negatively significant relationship between the Bank size and banks‟ liquidity.

H6: There is a negatively significant relationship between the Deposit and banks‟ liquidity.

H7: There is a positively significant relationship between the Funding cost and banks‟ liquidity

1.4. Methodology of the Study

In order to achieve the broad objective of the study the quantitative dominant mixed methods (Johnson et al., 2007) of research approach was employed since it leads to better conclusion (Choy, 2014) through eliminate or reduce the limitations or biases raised by using a single method of either quantitative or qualitative. The quantitative dominant mixed methods research is the types of mixed research in which one relies on a quantitative post-positivist view of the research process, while concurrently recognizing that the addition of qualitative data and approaches are likely to benefit most research projects.

For documentary review purpose, the five consecutive years audited financial statement over the period of 2011 to 2015 collected and analyzed over the sample of purposively selected twelve commercial banks operating in Ethiopia from the seventeen in total. The quantitative data related to macroeconomic and bank specific were collected from NBE, CSA, EIC, banks themselves, and analyzed by using econometric software package of Eview 8. Beside, the qualitative data through unstructured interview with five banks‟ risk managers conducted and utilized and sequential mixed methods approach employed.

1.5. Scope of the Study

This paper is confined in identifying the factors affecting liquidity of commercial banks in Ethiopian. The number of banks which provide commercial banking business is reduced to 17 from 18 in 2016 due to merger of two state-owned banks (CBE and CBB) and then named CBE. The study chooses a sample of twelve commercial banks operating in Ethiopia having a data at least for five years; such banks are AIB, DB, WB, BoA, NIB, UB, CBO, LIB, OIB, ZB, BuIB, and BrIB. The time series of the five years are chosen in order to increase the sample size and include those small (CBO, LIB, OIB, ZB, BuIB, and BrIB) banks classified by NBE. The study also disregarded the CBE from the sample due to CBE is not subject to NBE-bill purchase and giant banks in the country with more than 50% of market share in the industry. And also the reason for exclude other small banks from the sample is due unavailability of five years data.

1.6. Limitation of the Study

As banking industry in Ethiopia is young industry, there is no long period data for all banks operating in Ethiopia in order to randomly determine the sample size. On the other hand, the government policy is different for private and state-owned banks though operating in the same environment; as a result, exclude CBE from the sample selection because CBE do not enforced to government bond purchase and giant bank in the country, in most parameter which constitute more that 50% of market share. Therefore, select twelve commercial banks operating in Ethiopia having five years data and subject to NBE-Bills purchase for the study.

1.7. Significance of the Study

The study draws conclusion that might indicate the significant variables which affects the liquidity of commercial banks. It provides an opportunity to gain further awareness about variables which determines the liquidity of commercial banks in Ethiopia to all interesting stake holders in the area. Thus, it gives indicator to the management of the banks and policy makers to take remedial action where appropriate. It also helps other researchers as a source of reference and as a stepping stone for those who want to make further study in the area afterwards. Moreover, it contributes its part to the well-being of the financial sectors (whether the country‟s financial system is safe and sound), the economy and the society as a whole.

1.8. Structure of the Paper

The paper was organized in five chapters as the First Chapter deals with the Introduction part. The Second Chapter discussed the critical review of the related theoretical and empirical literatures. The Third Chapter covered the research methodology. Chapter four contains results and analysis of the study. The Fifth Chapter summarizes the main results of the study, draw conclusion from the result and finally end with recommendations.

Chapter two: Literature Review

Banks for international settlement (BIS, 2008) defines liquidity as the ability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. 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. Virtually every financial transaction or commitment has implications for a bank‟s liquidity. Liquidity is the significant factor that commercial banks have not been ignored in their day to day operations as it adversely affects the banks‟ reputation and profitability. Liquidity can also be defined as the ability of a financial institution to meet all legitimate demands for funds (Yeager and Seitz 1989). Moore (2009) explained that "a bank needs to hold liquid assets to meet the cash requirements of its customer; if the institution does not have the resources to satisfy its customers' demand, then it either has to borrow on the inter-bank market or the central bank". It follows therefore that a bank unable to meet its customers' demands leaves itself exposed to a run and more importantly, a systemic lack of confidence in the banking system. This chapter stated about general roles of commercial banks as well as discusses determinants of commercial banks‟ liquidity by taking into account the theoretical and empirical studies conducted in the area. Finally, driven conclusion based on reviewed related literatures and indicates the gap that the prior studies/literatures did not addressed.

2.1. Theoretical Review

2.1.1. Roles of financial intermediaries (bank)

Unlike capital/long-term market, banks play an intermediary role in order to solve the investor and borrowers liquidity problem (Diamond & Rajan, 1999). Banks offer a unique service; lending long-term while guaranteeing the liquidity of their liabilities to depositors (Shooner & Talyor 2010 cited in Van Ommeren 2011) this is due to savers do not withdraw their deposits at the same time and thus banks hold only a minor part of the saving in liquid cash. In order to cope up with the liquidity demand from the customers, banks diversify liquidity risks over a large pool of savers. Banks play an important role in providing funds for firms and helping them and the economy to grow (Allen & Carletti, 2008).

Transformation service of creating liquidity seems to be provided almost exclusively by banks, and consequently, it is particularly important to preserve the ability of banks to create liquidity (Diamond & Dybvig, 1986; Angora & Roulet, 2011). Banks receive short-term savings from depositors and transform those savings into long-term loans to borrowers. By holding a part of the short-term saving in liquid assets and cash, banks could withstand daily withdrawals from depositors (Schooner & Talyor 2010 cited in Van Ommeren 2011).

Diamond & Dybvig (1986) also discussed that banks are act as delegated monitors and ensure that firms use the resources allocated to them effectively.

Moreover, banks can help overcome asymmetric information problems by forming long-lived relationships with firms (Allen & Carletti, 2008). Banks and other financial intermediaries exist because they are an efficient response to the fact that information is costly. Banks specialize in assessing the credit worthiness of borrowers and providing and ongoing monitoring function to ensure borrowers meet their obligations (Bollard, 2011).

Though banks play positively significant effect on the financial system, it also has negative impact in the financial system (Allen & Carletti, 2008). Positively they play an important role in sharing risk in the economy by diversifying and smoothing fluctuations over time. The negative aspect is related to the fixed nature of the claims they issue can cause fragility in the financial system and banks are often at the center of financial crises as in the crisis that started in August 2007.

2.1.2. Theories of bank liquidity

Liquidity Risk, Liquidity Creation and Financial Fragility: a Theory of Banking

According to the theory of financial intermediation, one of an important role that banks play in the economy is to provide liquidity by funding long term, illiquid assets with short term, liquid liabilities. Banks perform valuable activities in making loans to difficult, illiquid borrowers in order to enhance the flow of credit in the economy and provide liquidity on demand to depositors at low cost. Through this function of liquidity providers, banks create liquidity as they hold illiquid assets and provide cash and demand deposits to the rest of the economy. Diamond and Dybvig (1983) emphasize the "preference for liquidity" under uncertainty of economic agents to justify the existence of banks: banks exist because they provide better liquidity insurance than

financial markets. However, as banks are liquidity insurers, they face transformation risk and are exposed to the risk of run on deposits. More generally, the higher is liquidity creation to the external public, the higher is the risk for banks to face losses from having to dispose of illiquid assets to meet the liquidity demands of customers. A natural justification for the existence of deposit-taking institutions, thereby giving also an explanation for the economically important role of banks in providing liquidity, was initially modeled by (Bryant 1980 and Diamond and Dybvig 1983).

The researchers like Hackethal et al. (2010) identified that there is a strong and persistent positive influence of general economic strength with liquidity creation; the stronger the economy, the larger is the amount of liquidity creation. Liquidity creation strongly depends on the given interest rate environment; the larger the yield curve spread and, consequently, the lower the ECB main refinancing rate, the higher the created liquidity.

A Theory of Bank Liquidity Requirements

This theory mainly considers the role of cash reserves in stabilizing banks. As cash is riskless and observable (verifiable) unlike book capital of the bank, which requires measurements to be observable as it depends of value of risky assets, plays a unique role in reducing risk in the mechanical sense (Calomirisy et al. 2012). Because cash is both observable and riskless, the commitment to hold cash has important implications for bankers‟ incentives toward risk in the future. Banks that hold sufficient cash are able to gain market confidence in their risk management, and thereby attract and retain deposits. However, there is a conflict of interest between the banker/owner and the depositors with respect to risk management; the banker suffers a private cost from managing risk, and does not always gain enough as the owner to offset that cost (Tirole, 2010).

The primary benefits derived from liquidity requirements (like capital requirements) relate to improvements in bank risk profiles and incentives towards risk during normal times, and the consequences of those behaviors for reducing the probability of a liquidity crisis by making banking systems more resilient from a default risk perspective. The best way to deal with a liquidity crisis is to design a combination of capital and liquidity requirements that prevent liquidity crises by ensuring that banks do not become weak enough so that their default becomes imaginable. Bankers are not indifferent (as they would be, say, under the Merton, 1977 model of

risk management) between combinations of liquidity and capital that have the same static consequences for default risk.

Liquid Assets in Banks: Theory

According to Alger and Alger (1999) cash and securities are not close substitutes. There is strong evidence that banks having more demand deposits (relative to total assets), have less liquid assets (relative to total assets). The banks having relatively more demand deposits are large banks. Intuition suggests that large banks differ from small ones on two crucial matters. First, they typically have a more diversified depositor population. Second, intuitively large banks have better access to liabilities to meet liquidity needs: they are better known, and creditors have better incentives to monitor large banks; they may also be considered as too big to fail, further diminishing the risk perceived by investors. As a result, large banks should not need to rely on liquid assets to meet liquidity needs as much as smaller banks. On the other hand, only small banks reduce their holdings of liquid assets substantially, whereas medium and large banks actually increase their holdings. Differences in their behavior could indeed have important implications for the regulation of banks.

Likewise the National Bank of Ethiopia (NBE) properly indicates the commercial banks‟ assets that are considered as liquid assets (NBE Directives No. SBB/57/2014). It defined liquid assets as it constitutes of 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. Banks are able to transform illiquid assets by offering liabilities with a different, smoother pattern of returns over time than the illiquid assets offer. Illiquidity of assets provides the rationale both for the existence of banks and for their vulnerability to runs.

Quantitative framework for measuring liquidity risk-theory

Before going to see the methods for measuring liquidity risk, sources of liquidity risk and possible ways to mitigate them should be clearly stated. 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). According to Aspachs 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 last strategy concerns the liability side of the balance sheet, as well. 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.

Rochet (2008) supports the above argument by stating three main sources of liquidity risk: on the liability side, there is a large uncertainty on the volume of withdrawals of deposits or the renewal of rolled-over inter-bank loans, especially when the bank is under suspicion of insolvency or when there is an aggregate liquidity shortage, on the asset side, there is an uncertainty on the volume of new requests for loans that a bank will receive in the future, and off-balance sheet operations, like credit lines and other commitments, positions taken by banks on derivative markets.

Two methods of liquidity risk measurement such as liquidity gap and liquidity ratio (Vodova, 2013; Moore 2009). The former measures the difference between assets and liabilities at both current and future dates; and the later identify main liquidity trend through various balance sheet ratios. Those ratios are liquid assets to total assets, liquid assets to deposits and short-term borrowings, liquid assets to deposits, loans to total assets, loans to deposits, and interbank ratio (due from banks over due to banks).

Among the aforementioned liquidity ratios, liquid assets to total assets ratio is most commonly used measures of liquidity risk as it informs on the split between liquid and illiquid asset (such as loans) on the bank‟s balance sheet (Aspachs et al., 2005; Malik and Rafique, 2013). And also other ratios like liquid assets to deposits and short-term borrowing, and liquid assets to deposits are widely used measurement for liquidity. The later is supposed to be relatively strict measure of liquidity while the former is more focus on the banks sensitivity to selected types of funding, it should therefore capture the bank‟s vulnerability related to those funding sources. Alternatively, other types of ratios can be used in measurement of the liquidity as loans to total assets, loans to deposits and interbank ratio. The first two indicates share of banks assets tied up on illiquid loans whereas the last is least used ratio for liquidity measurement as it depends on interbank market only.

Except Nigist (2015) all researchers conducted study in the area in Ethiopia measured liquidity through stock approach of liquidity ratio, she used gap/flow approach which is more data intensive and there is no standard technique to forecast inflows and outflows. Belete (2015) used relatively strict measures (Aspachs et al., 2005) of liquidity risk as he measured liquidity by employing the ratio of liquid assets to total deposits. Moreover, Berhanu (2015) and Tseganesh (2012) used the same methods for measurement of liquidity of commercial banks; both measured liquidity by using liquid assets to total assets and alternatively loans to deposits and short-term financing. Again Belete (2015) measured liquidity by using the ratio of total loans to total deposits as robustness testing.

Some authors like Tseganesh (2012), Berhanu (2015), and Nigist (2015) overlooked the existing practice of liquidity measurement in Ethiopia. In Ethiopia commercial banks should maintain the minimum liquidity requirement of 15% (NBE Directive No SBB/57/2014) which is computed as the ratio of liquid assets to total deposits. Having current practice of the country into consideration this study employed stock/liquidity ratio approach to measure liquidity; i.e. liquid assets to total deposits.

2.1.3. Determinants of commercial banks liquidity –theory

2.1.3.1. Macroeconomic factors

- **Foreign Direct Investment and bank liquidity**

IMF and OECD (2004) defines foreign direct investment enterprise is an enterprise (institutional unit) in the financial or non-financial corporate sectors of the economy in which a non-resident investor owns 10 per cent or more of the voting power of an incorporated enterprise or has the equivalent ownership in an enterprise operating under another legal structure.

Organization for Economic Co-Operation and Development/OECD (2002) discussed the major benefit and drawback of the FDI. The benefit due to FDI include triggers technology spillovers, assists human capital formation, contributes to international trade integration, helps create a more competitive business environment and enhances enterprise development. All of these contribute to higher economic growth, which is the most potent tool for alleviating poverty in developing countries. However, its Potential drawbacks include a deterioration of the balance of payments as profits are repatriated (albeit often offset by incoming FDI), a lack of positive linkages with local communities, the potentially harmful environmental impact of FDI, especially in the extractive and heavy industries, social disruptions of accelerated commercialization in less developed countries, and the effects on competition in national markets. Contessi and Weinberger (2009) also suggest there is strong relationship between FDI, productivity and growth. Moreover, Petrović and Stanković (2009) explained the main benefit of FDI compared to foreign credits is that they do not consider significant financial outflows in the future; thereby they do not affect the balance of payment and economic growth. The main benefit of FDI compared to portfolio investments is that FDIs are more stable source of capital, which was proven to be true during the global economic crises (1997 – 1998, 2001 – 2002, as well as 2008). Stability of FDI inflows is a consequence of investing into the fixed assets, which represents long term intentions of the investor, since it is harder to withdraw capital invested into the fixed asset than capital invested into securities.

Ferrouhi and Lehadiri (2013) identified foreign direct investment had a positive relationship with the liquidity of commercial banks in Morocco, as a decline in foreign direct investment, leads to a decline in exports, an increase of unemployment rate and closure of bank. Contrary, study conducted in Nigeria by Johnmark et al. (2013) concluded that Foreign Direct Investment had

negatively insignificant impact on the liquidity of the Nigerian banking sector. Countries that are less financially developed, higher uncertainty about investment productivity and higher liquidity risk attracts more capital formation in the form of FDI (Kirabaeva, 2008). Thus, the higher liquidity risk leads to a higher level of Foreign Direct Investment (FDI).

- **GDP growth and bank liquidity**

Macroeconomic context is likely to affect bank activities and investment decisions as the profile of bank liquidity (Pana et al. 2009; Shen et al. 2010). For example, the demand for differentiated financial products is higher during economic boom and may improve bank ability to expand its loan and securities portfolios at a higher rate. Similarly, economic downturns are exacerbated by the reduction in bank credit supply. Based on these arguments, we can expect banks to increase their transformation activities and their illiquidity during economic booms. According to the theory of bank liquidity and financial fragility, the relationship between banks‟ liquidity preference and the business cycle is fundamental to explain the inherent instability of the capitalist system as an endogenous market process (Minsky, 1982, p. 74). In periods of economic expansion, which are characterized by high degree of confidence of the economic units about their profitability, there is a rise in the level of investment. During this expansion, economic units decrease their liquidity preference, preferring more risky capital assets with higher return. In this environment, economic units are more likely to hold less liquid capital assets and to incur short-term debt with higher interest rates (Painceira, 2010).

- **Unemployment rate and bank liquidity**

Fiscal and monetary policies of government are considered as “demand management policies”, because the policies study management and control of demand. The main purposes of fiscal and monetary policies are to promote production, employment, and fix prices level in economy. Meanwhile, to provide more demand causes an increase the inflation rate while the lack of demand causes temporary unemployment. An increase in the unemployment rate can be translated into an increase in non-performing loans and thus lowering bank liquidity (Trenca et al. 2015). Bank‟s performance increases when unemployment rate decreases (Ferrouhi, 2014). The level of unemployment is connected with demand for loans and can also act as a proxy for the general health of the economy and the negative influence means (Hackethal et al. 2010). The negative influence of the level of unemployment indicate that the healthier economy is, i.e. the

lower the unemployment rate, the more liquidity is created by banks. The study by Vodova (2012) also supports the aforementioned issues by fount out bank liquidity decreases with the higher unemployment rate. However, Munteanu (2012) and Singh and Sharma (2016) found that unemployment rate had positive impact on bank liquidity and thus the impact thereon is significant for Munteanu (2012) and insignificant for Singh and Sharma (2016).

- **Government policy (NBE-bills purchase) and bank liquidity**

Since 2011 commercial banks in Ethiopia excluding Commercial Banks of Ethiopia (CBE), have been compulsory to purchase NBE-Bills amounted 27% of new loans disbursement. In line with this directive, NBE issued additional requirement that the commercial banks should maintain portfolio of short term loan composition is not less than 40%. This NBE-Bill has a maturity period of five years. The study by Belete (2015) examined the NBE-Bill purchase had primarily serious adverse impact on banks‟ liquidity as it boldly changes liquid assets to illiquid long-term investment. Similarly, NBE-bills purchase measured by log of NBE-bill (Shimels, 2016), by using as dummy variable (Alemayehu, 2016), and simple statistical description and qualitative data (Shibiru, 2014; Yoseph, 2013) had negative and significant impact on the liquidity of commercial banks subject to purchase NBE-bills in Ethiopia. Furthermore, Tesfaye (2014) analyzed the effect of sector specific policy measures (NBE-Bills purchase) on Ethiopian middle sized banks performance and the result of finding revealed that exposure to government bills had negative and significant relationship with performance. Correspondingly, research in other country by Berger and Bouwman (2010) found that the monetary policy affect on-balance sheet liquidity creation.

2.1.3.2. Bank specific factors

- **Size and bank liquidity**

According to the “too big to fail” argument, large banks would benefit from an implicit guarantee, thus decrease their cost of funding and allows them to invest in riskier assets (Iannotta et al. 2007). Therefore, “too big to fail” status of large banks could lead to moral hazard behavior and excessive risk exposure. If big banks are seeing themselves as “too big to fail”, their motivation to hold liquid assets is limited. In case of a liquidity shortage, they rely on a liquidity assistance of Lender of Last Resort. Thus, large banks are likely to perform higher levels of liquidity creation that exposes them to losses associated with having to sale illiquid assets to

satisfy the liquidity demands of customers. Hence, there can be positive relationship between bank size and illiquidity. However, since small banks are likely to be focused on traditional intermediation activities and transformation activities (Rauch et al. 2008; Berger and Bouwman 2009) they do have small amount of liquidity. Hence, there can be negative relationship between bank size and illiquidity.

- **Deposit and banks liquidity**

The level of the deposit is highly determines the position of the banks liquidity. The demand for liquidity may arrive at an inconvenient time and force the fire-sale liquidation of illiquid assets. Furthermore, because depositors are served in sequence, the prospect of fire-sales may participate self fulfilling runs that further jeopardize bank activity (Diamond and Rajan, 2001). On the other hand, Moussa (2015) studied Tunisian bank liquidity on a sample of 18 banks over the period of 2000-2010 and found that total deposits measured by dividing total deposits to total assets had negative relationship with liquidity even if it is statistically insignificant. A deposit taking bank holds a buffer of stock of cash and securities as a hedge against a state of the world where there are large deposit outflows (Kashyap et al. 2002). Depositors and borrowers may come from different segments of the population and so may have different liquidity demands or those two groups may have different incentives. Furthermore, Kashyap et al. (2002) argued that both the holdings of liquid assets and the quantity of commitments that a bank issues are increasing in the amount of demand deposits. In addition, the stock of liquid assets is not fixed, but rather is optimally adjusted with changes in deposits. Finally, they proposed that an increase in demand deposits should leads to an increase in liquid-assets holdings. In addition, authors like Singh and Sharma (2016) in their study of "an empirical analysis of macro-economic and bank-specific factors affecting liquidity" conducted in India found that deposits had a significant effect on bank liquidity. The level of deposits may also affect the expected liquidity shocks. Alger and Alger (1999) strongly argued that banks having more demand deposits (relative to total assets), have less liquid assets (relative to total assets).

- **Funding cost and bank liquidity**

The study conducted in Tehran by Abadi and Ahangarani (2014) "on Evaluating Factors Affecting Liquidity Risk of Banks" through 8 sampled banks over the period of 2002-2013, identified the positively significant relationship between financing cost and commercial banks

liquidity. Similarly, funding cost which is related to financial expenses for depositors and borrowings and computed as by dividing interest expenses to total loans had positive relationship with the liquidity of bank (Moussa, 2015). Contrary to the Moussa (2015) and Abadi and Ahangarani (2014), Singh and Sharma (2016) argued that Indian banks may maintain adequate liquid buffer or capital from other sources as their result of study revealed that funding cost had insignificant effect on liquidity. If liability cost increases, then banks, instead of relying on inter-bank market, tends to rely more on liquid assets that act as a source of liquidity (Berger and Bouwman, 2010). In order to avoid the funding cost related to borrowing from the inter-bank market and the central bank, banks would hold more liquidity themselves. Moreover, Alger and Alger (1999) found that when funding cost increases there is a significant shift in the composition of liquid assets (cash decreases and securities increases) whereas the overall effect on liquid assets is not significant.

2.2. The Empirical Studies

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

2.2.1. Studies in the World

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

However, the positive impact of interest rate on loans and bank profitability is very surprising and can be explained only by the fact that a simple increase in interest rate on loans may not have a direct impact on bank lending (and thus on bank liquidity) –interest margin is more important. In addition, Vodová (2013) identified positive relationship between liquidity and profitability.

The variables like unemployment, share of nonperforming loans and financial crisis have no statistically significant effect on the liquidity of Hungarian commercial banks. Finally, the relation between the growth rate of GDP and bank liquidity is ambiguous.

Hackethal et al. (2010) conducted studies on determinants of bank liquidity creation on German savings banks of data over the period of 1997-2006 by using liquidity measures of BB-Measures and liquidity transformation (LT) Gap. The results of regression analysis revealed that there is a strong and persistent positive influence of general economic strength with liquidity creation: the stronger the economy, the larger is the amount of liquidity creation. Liquidity creation strongly depends on the given interest rate environment; the larger the yield curve spread and consequently, the lower the ECB main refinancing rate, the higher the created liquidity. In contrast, bank specific factors such as size; do not seem to play any significant role in the creation of liquidity. The monetary policy indicators had a strong influence on liquidity creation. However, there is a strong positive relationship between economic health (as e.g. exemplified by industrial strength) and liquidity creation.

Roman and Sargu (2015) examined "the impact of bank-specific factors on the commercial banks liquidity: empirical evidence from CEE countries" aimed to analyzed a significant issue that needs to be tackled when promoting financial stability, more exactly the determinants of the liquidity risk of a sample of banks operating in a series of CEE countries (Bulgaria, the Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania), reviewing at the same time the progresses made in certain key areas and the remaining challenges. The authors considered bank specific factors (the total capital ratio, the ratio of impaired loans to total loans, and the return on average equity) over the period of 2004-2011 for the sampled banks of 76 from 7 countries and examined them employing an OLS regression analysis. The results of their research highlighted the negative impact that the depreciation of the loans portfolio had on the overall liquidity of the

analyzed banks and the total capital ratio had a positive impact on the overall liquidity of the analyzed banks as being desired.

Through examining the data over the period of 2001-2010 by using panel data regression in Czech and Slovak commercial banks Vodova (2013b) identified capital adequacy affects both countries commercial banks‟ liquidity. In one country (Czech) capital adequacy had positive relationship with liquidity, but in another country (Slovak) it had negative relationship. Thus, banks with lower capital adequacy pay more attention to liquidity risk management and hold a sufficient and realization of financial realization crisis have indirect relationship with liquidity ratio of Slovak commercial banks, i.e. the increase in those independent variables, decreases the dependent variable (liquidity). However, the increase in growth rate of gross domestic product (GDP), increases liquidity of commercial banks in Slovak. Correspondingly, liquidity of Slovak banks is also positively related to economic cycle. Contrary, the liquidity of Czech commercial banks increases with depreciation of exchange rate of Koruna (Czech) against Euro and worsening quality of credit portfolio. This is because of Czech commercial banks offset higher credit risk by more prudent liquidity risk management and banks to focus international transaction in interbank market.

The research by Wójcik-Mazur and Szajt (2015) on determinants of liquidity risk in commercial banks in the European Union through classifying those countries as old European Union (Austria, Belgium, Germany, Denmark, Spain, Finland, France, the UK, Greece, Ireland, Italy, Portugal) and new European Union (Bulgaria, the Czech Republic, Hungary, Poland, Romania, Slovenia, Slovakia) and employed unbalanced panel regression on collected data from sample of 443 banks from old and 84 banks from new European Union. The results of findings revealed that the determinants of liquidity risk characteristic for banks operating in countries of the so-called old EU are slightly different from those for banks operating in the countries of the so-called new EU. Furthermore, the relationships between micro- and macro-economic determinants are also dependent on the liquidity predictor. The performed estimation indicates that the interbank market interest rate in the old EU countries clearly have an impact on the level of liquidity. The positive relation between the actual increase in the interest rate for O/N deposit transactions in the unsecured interbank deposit market and the increase in the level of liquidity in the banks operating in the old EU means that the increase in interest rates encouraged banks to

increase money market engagement. On the other hand, in countries belonging to the group of the new EU the increase in this rate is not identical to the total increase in liquid assets.

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

Deléchat et al. 2014, studied the determinants of banks‟ liquidity buffers in Central America (Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua), Panama and the Dominican Republic (CAPDR) using a panel of 96 commercial banks over period of 2006-2010 with the aims to examines whether CAPDR banks‟ liquidity buffers, defined as the liquid assets-to-deposits ratio, can be explained by bank and country-level characteristics as predicted by theory and presented in some empirical studies. The results of finding revealed that the demand for precautionary liquidity buffers is associated with measures of bank‟s size, profitability, capitalization, and financial development. Higher liquidity is also associated with deposit dollarization, reinforcing the monetary policy and market development challenges in highly dollarized economies.

A survey of the effect of internal and external factors on bank liquidity in Iran on 18 banks of Islamic Republic of Iran data over a period of 2003 to 2012 by employing four independent variables two from external (inflation and unemployment rate) and the other two from internal (capital adequacy and asset quality) on 18 sampled banks of Iran and analyze panel data through multiple regression model. The results revealed that capital adequacy ratio and inflation rate had positive effect and assets quality and unemployment had negative effect on banks liquidity. (Raeisi et al. 2014).

Trenca et al. (2015) aimed to studied the impact of macroeconomic variables upon the banking system liquidity through applying General Method of Moment (GMM) on a panel of 40 commercial banks over the period of 2005Q1-2011Q4 on countries recently affected by adverse economic and financial conditions, such as Greece, Portugal, Italy, Croatia, and Cyprus. The authors identified an increase in GDP leads to increase in economic activity and credit default activity which will cause a drop in banking liquidity. An increase in inflation lowers the purchasing power so people need more money to buy the same products, this may increase bank lending and thus lower liquidity. An increase in the unemployment rate can be translated into an increase in non-performing loans and thus lowering bank liquidity. An increase in public deficit will involve increasing bank loans and thus will decrease liquidity. Therefore, macroeconomic variables with greater impact on liquidity ratio are inflation rate, unemployment rate and GDP growth rate.

2.2.2. Studies in Africa

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

Ferrouhi (2014) analyzed the relationship between liquidity risk and financial performance of Moroccan banks and to define the determinants of bank‟s performance in Morocco during the period 2001–2012 with the aim of first evaluate Moroccan banks‟ liquidity positions through different liquidity and performance ratios then analyze 5 bank specific determinants and 5 macroeconomic determinants of bank performance through applying a panel date regression to identify determinants of Moroccan banks performance by using 4 bank‟s performance ratios, 6 liquidity ratios.

Results shown that Moroccan bank‟s performance is mainly determined by 7 determinants: liquidity ratio, size of banks, logarithm of the total assets squared, external funding to total

liabilities, share of own bank‟s capital of the bank‟s total assets, foreign direct investments, unemployment rate and the realization of the financial crisis variable. Banks‟ performance depends positively on size of banks, on foreign direct investments and on the realization of the financial crisis and negatively on external funding to total liabilities, on share of own bank‟s capital of the bank‟s total assets and on unemployment rate while the dependence between bank performance and liquidity ratios and bank performance and logarithm of the total assets squared depend on the model used.

Employing a linear least square model and time series data from 1980 to 2009, Fadare (2011) studied the determinants of Banking Sector liquidity in Nigeria and assesses the extent to which the recent financial crises affected liquidity in deposit money banks in the country. The paper makes some interesting findings. First, we find that only liquidity ratio, monetary policy rate and lagged loan-to-deposit ratio are significant for predicting Banking Sector liquidity. Secondly, we find that a decrease in monetary policy rates, liquidity ratios, volatility of output in relation to trend output, and the demand for cash, leads to an increase in current loan-to-deposit ratios; while a decrease in currency in circulation in proportion to Banking Sector deposits; and lagged loan-to-deposit ratios leads to a decline in current loan-to-deposit ratios.

Ferrouhi and Lehadiri (2013) studied liquidity determinants of Moroccan Banking Industry using data over the period 2001 – 2012 with the aims to analyze the evolution of bank‟s liquidity in Moroccan banks and to explain the impact of the financial crisis on bank‟s liquidity in Morocco. Results show that in Morocco, liquidity is mainly determined by eleven 11 determinants: size of banks, share of own bank‟s capital of the bank's total assets, external funding to total liabilities, return on assets, foreign direct investment, monetary aggregate M3, foreign assets, growth rate of gross domestic product, public deficit, inflation ratio and the effects of financial crisis. Thus, liquidity of Moroccan banking industry is positively correlated with bank‟s size, share of own bank‟s capital of the bank's total assets, external funding to total liabilities, monetary aggregate M3, foreign assets, foreign direct investment and negatively correlated with return on assets, inflation rate, growth rate of gross domestic product, public deficit and financial crisis. However, bank‟s returns on equity, equity to total assets and unemployment rate have no impact on Moroccan bank‟s liquidity.

2.2.3. Studies in Ethiopia

There were scarce literatures on determinants of banks liquidity in Ethiopia though some researchers conducted in recent periods. The liquidity challenge in Ethiopian commercial banks is increasing from time to time as liquidity ratio is declined consecutively. Thus, researchers were interested in examining the factors that affecting liquidity in Ethiopian commercial banks. For the knowledge of the researcher, the first study in the area was conducted by Tseganesh (2012), and then Belete (2015), Berhanu (2015) and Nigist (2015) added the number of literatures available in the country. Therefore, the studies conducted in Ethiopia on determinants of commercial banks liquidity summarized as follow:

Tseganesh (2012) studied Determinants of Banks Liquidity and their Impact on Financial Performance: empirical study on commercial banks in Ethiopia aimed to identify determinants of commercial banks liquidity in Ethiopia and then to see the impact of banks liquidity up on financial performance through the significant variables explaining liquidity. Eight factors affecting banks liquidity were selected and analyzed over the data 2000-2011 of eight sampled commercial banks in Ethiopia by using balanced fixed effect panel regression.

The results of panel data regression analysis showed that capital adequacy, bank size, share of non-performing loans in the total volume of loans, interest rate margin, inflation rate and short term interest rate had positive and statistically significant impact on banks liquidity. Real GDP growth rate and loan growth had statistically insignificant impact on banks liquidity. Among the statistically significant factors affecting banks liquidity capital adequacy and bank size had positive impact on financial performance whereas, non-performing loans and short term interest rate had negative impact on financial performance. Interest rate margin and inflation had negative but statistically insignificant impact on financial performance. Therefore, the impact of bank liquidity on financial performance was non-linear/positive and negative.

Belete (2015) examines the bank-specific and macro-economic factors affecting bank liquidity for the sample of eight commercial banks in Ethiopia for the data cover over the period of 2002-2013 by using balanced fixed effect panel regression. Unlike other researchers in the area studied determinants of commercial banks liquidity in Ethiopia, he adopted a mixed methods research approach (secondary and primary data) by combining documentary analysis and in-depth interviews with selected banks‟ finance managers. The result showed a negative relationship

between loan growth and liquidity with strong statistical significance in case of L1 (liquid assets to total deposits) which is as expected, indicating that the increase in loans provided by banks lead to the reduction of the level of liquid assets held by banks. In accordance with expectation of study, capital adequacy and inflation showed positive and significant relationship with banks liquidity measured by L1. The positive influence of the share of capital on total assets is consistent with the assumption that bank with sufficient capital adequacy should be liquid, too. The positive and statistically significant impact of inflation was based on the argument stating that in the inflationary economy, economic units including banks refraining from long term investments due to the decline in the real value of their investments that aggravate the credit market rationing and prefer to hold risk free/liquid assets.

Surprisingly, interest rate margin had positive and statistically significant impact on Ethiopian banks liquidity measured by L1 which was opposite to expected sign and it may indicate the presence of credit rationing and credit crunch in the economy or it could be due to credit cap during two years period (2008/09 & 2009/10) and the forced investment on bonds (NBE Bills) which amounts 27% of each total loans disbursed.

In contrary to the above results profitability, non-performing loans, bank size and GDP are factors that have little or no impact on the liquidity of Ethiopian banks as per L1 as far as all those variables were not significant even at 10% significance level.

Besides, variables such as total deposits, branch network, efficient management of the liquid assets, availability of the adequate foreign currency on hand and bank‟s appetite to investments by themselves are also considered as possible internal factors that can affect Ethiopian banks liquidity. Furthermore, external variables such as change of interest rate by NBE, competition in the market, government regulation, absence of active secondary stock market, limited number of bank issue holding branches and lack of public awareness in relation to savings also contributes their own impacts for the presence of high or low level of liquidity in the Ethiopian commercial banks.

Among external factors, the result of the interview showed that the government regulation regarding investment on bonds (NBE Bills) which amounts 27% of the loans & advances disbursement, specifically the 40% minimum limit on portfolio share of short-term loans had

primarily serious adverse impact on banks‟ liquidity as it boldly changes liquid assets to illiquid long-term investment

Berhanu (2015) conducted study on "Determinants of Banks Liquidity and their Impact on Profitability: Evidenced from eight commercial banks in Ethiopia" with objective to identify the internal (non-performing loans in the total volume of loans, capital adequacy, bank size, loan growth, interest rate on bank lending and actual reserve ratio) and external (GDP growth, inflation rate, interest rate margin and monetary policy) factors that affect Commercial banks Liquidity and to assess their impact on Profitability. He used secondary source of data over the period of 2002/03-2013/14 and analyzed them with panel data regression model.

The results of regression analysis showed that Bank size and Loan growth had negative and statistically significant impact on banks liquidity measured by Liquid asset to total Asset. Real growth rate of gross domestic product on the basis price level, Interest rate on lending ,Non-performing loans in the total volume of loans, Bank size, Actual reserve ration and short term interest rate had positive and statistically.

Nigist (2015) studied "Determinants of Banks Liquidity: Empirical Evidence on Ethiopian Commercial Banks" with aims to investigate the determinants of commercial banks liquidity in Ethiopia. Secondary data of ten sampled commercial banks in Ethiopia over the period of 2007-2013 used. Both bank specific and macroeconomic variables were analyzed by employing the balanced panel fixed effect regression model.

The result of the study revealed that capital adequacy, profitability, and real GDP growth rate have negative and statistically significant impacts on liquidity of Ethiopian commercial banks while bank size has positive and statistically significant impact on liquidity. Whereas nonperforming loan, loan growth, inflation rate, and interest rate margin were found to be statistically insignificant/ has no any impact on liquidity of Ethiopian commercial banks for the tested period.

Study conducted by **Alemayehu** (2016) on „Determinants of Bank Liquidity of Commercial Banks of Ethiopia‟ over the period of 2002 to 2013 with main objective of determining the factors that affect the liquidity of commercial banks in Ethiopia through employing 8 explanatory variables such as capital adequacy, bank size, profitability, Non-Performing Loans (NPLs), loan growth, Gross Domestic Product (GDP) growth, inflation rate and national bank

bills (used as dummy variable) and he found that capital adequacy and profitability had positively significant impact, and loan growth rate and NBE-bill had negatively significant effect on liquidity of commercial banks in Ethiopia. Whereas inflation rate, NPLs, bank size and GDP growth were factors that have little or no impact on the liquidity of Ethiopian commercial banks.

Summary of researches in Ethiopia

Among the four researches in Ethiopia on determinants of commercial banks liquidity, all are argued capital adequacy affects banks‟ liquidity but the relationship is whether negative or positive. Tseganesh (2012); Belete (2015) and Alemayehu (2016) found the banks liquidity had positive relationship with capital adequacy, whereas Berhenu (2015) and Nigist (2015) found the relationship is negative. Most researchers argued that banks size had positive relationship with banks liquidity except Belete (2015) and Alemayehu (2016), they found no relationship. Similarly, all the four (Tseganesh, 2012; Belete, 2015; Berhenu, 2015; Alemayehu, 2016) found there are negative relationship between liquidity and loan growth rate but Nigist (2015) found no relationship. Two of them (Tseganesh, 2012; Berhenu, 2015) identified non-performing loans had negative effect on banks‟ liquidity and the other three found no effect. (Tseganesh, 2012; Belete, 2015) identified interest rate margin had a positive impact on commercial banks‟ liquidity whereas Berhenu (2015) found negative impact and Nigist (2015) found no had impact. In addition, the result for DGP and liquidity by those researchers were different as Tseganesh (2012) and Nigist (2015) found negative; Berhenu (2015) found positive and Belete (2015) and Alemayehu (2016) found no relationship. Finally, (Belete, 2015; Nigist, 2015; Alemayehu, 2016) were aimed to assess the relationship between profitability and commercial banks‟ liquidity and thus Belete (2015) found no relationship but Nigist (2015) found negative relationship and Alemayehu (2016) found the relationship was positive between those variables.

2.3. Conclusion and knowledge gap

From the aforementioned theoretical and empirical literature review, liquidity plays a major role in financial stability specifically in commercial banks as well as contributes for economic enhancement through providing funds for firms. Banks can also help overcome asymmetric information problems by forming long-lived relationships with firms. There is a strong and persistent positive influence of general economic strength with liquidity creation; the stronger the economy, the larger is the amount of liquidity creation (Hackethal et al, 2002). When the central

banks sell bonds for reserves, the banking sector‟s ability to issue demand deposit is diminished by the traditional multiplier effect (Diamond and Rajan, 2002). As a result, banks will hold fewer bonds so the public has to hold more bonds and les money (both in nominal units). In equilibrium, the cost of holding money will have to be higher, implying higher real interest rates, a higher cost of capital and lower aggregate economic activity. An increase in the unemployment rate can be translated into an increase in non-performing loans and thus lowering bank liquidity (Trenca et al (2015).

The current financial situations especially commercial banks in Ethiopia deemed the responsible organs should maintain their financial safety and soundness by keeping their liquidity level at optimal level. Banks liquidity position is act as one of measurement for financial stability as it plays a major role in the Ethiopian financial system. Similarly, liquidity risk is among the factors affecting the reputation of banks as customers confidence is deteriorated due to banks unable to withdraw their deposits when they need. Depending on impacts that come from liquidity in the financial system in general and in banks in particular, the interest of scholars on studies of determinants of banks‟ liquidity in Ethiopia is increased in the past few years. For instance, the first study in the area was conducted by Tseganesh (2012), and then Belete (2015), Berhanu (2015) Nigist (2015) and Alemayehu (2016) added the number of literatures available in the country. However, on one hand, providing additional works in the area could be important to increase the number of literature and on the other hand, employing additional variables in the model could help the banks and regulatory organs in developing their framework in order to properly manage liquidity risk. Furthermore, using mixed (qualitative and quantitative) research approach could provide better solution (Choy, 2014) in assessment of issues related to liquidity of Ethiopian commercial banks. Employing only one approach (qualitative or quantitative) has its own limitations; thus, (Choy, 2014) identified that a comparison and complementary results as references from both separate processes on qualitative and quantitative approaches in a same research topic may reduce or perhaps eliminate those limitations or bias.

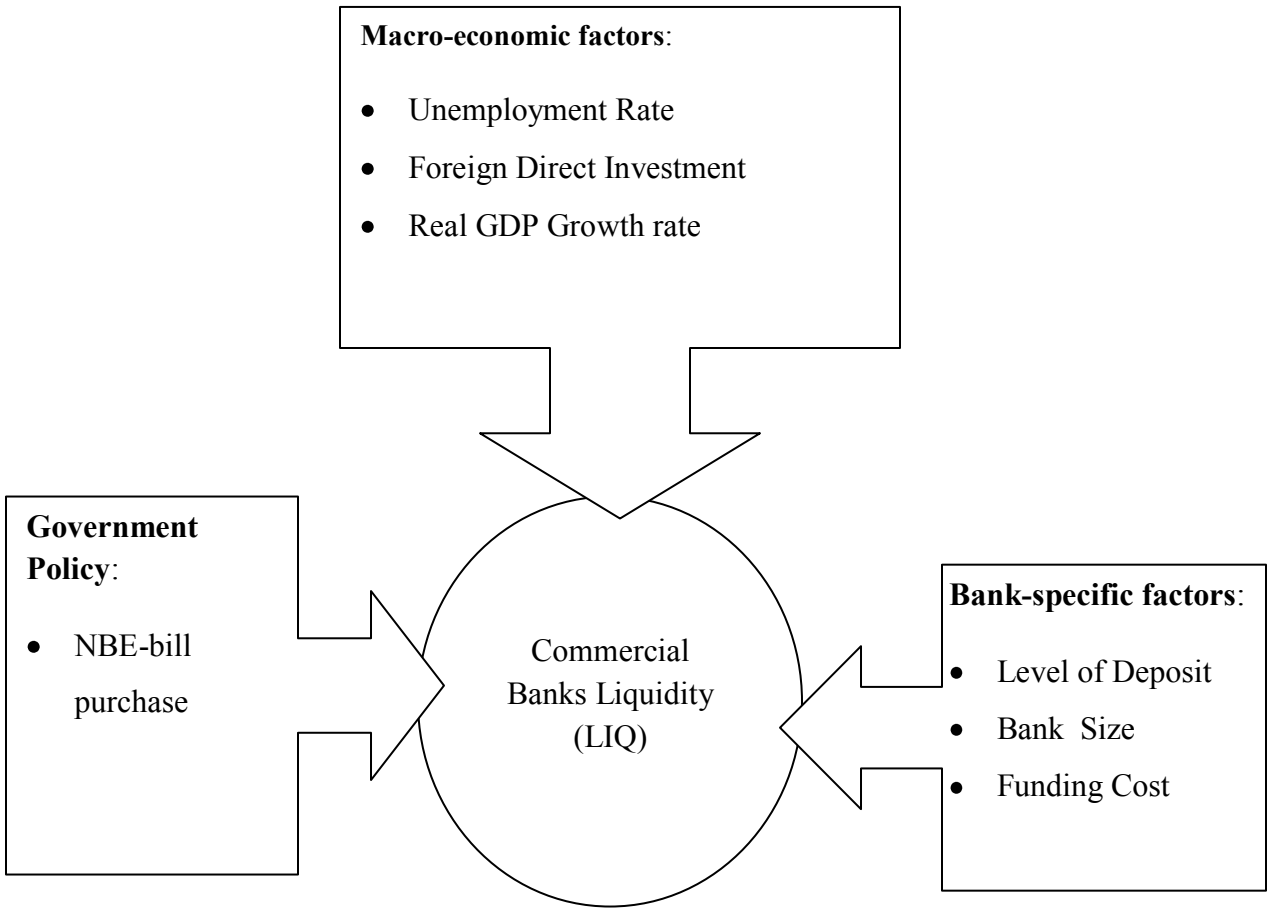
Moreover, the researchers in Ethiopia overlooked the various macroeconomic variables and government policy that may affect the liquidity positions of commercial banks. Those variables are unemployment rate, foreign direct investment, deposit level, funding cost, and NBE-Bills purchase, by using statistical econometric model with appropriate measure. Studies conducted in other Countries show that (Hackethal et al, 2010; Ferrouhi, 2014) unemployment rate and

foreign direct investment had significant effects on liquidity of commercial banks. On the other hand, studies by Belete (2015); Alemayehu (2016); Tesfaye (2014) assessed NBE-Bills purchase has significant effect on liquidity of commercial banks in Ethiopia though Belete (2015) conducted study through primary data and also Tesfaye (2014) shows its impact on commercial banks performance rather liquidity. Therefore, filling this gap by employing additional variables in the model through taking into consideration the small banks in sample selection and use of primary data through interview in addition to secondary data help the researcher to arrive at a better conclusion.

2.4. Conceptual Framework

Based on aforementioned theoretical and empirical assessments the following conceptual framework was developed to describe the relationship between explained variable of commercial banks‟ liquidity and explained variables of macroeconomic and bank-specific as well as government policy factors.

Figure 2.1: The relation between bank liquidity and its determinant



Source: developed by own self

Chapter Three: Research Design

Designing appropriate research methodology is a prerequisite in order to conduct a good research work. Accordingly, this chapter covered the research design and methodology that was used in the study. It also discussed the population from which the firms to be studied were obtained in addition to how the data used in the study was collected and analyzed.

3.1. Variable Selection, Measurement and Research Hypothesis

3.1.1. Dependent Variable

Liquidity is defined as the ability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. Gap/flow approach and liquidity ratio/stock approach (Moore, 2009) are the main methods to measure banks‟ liquidity. The stock approach focuses on the asset and liability sides of the balance sheet employing ratios to identify liquidity trends. Whereas the flow approach focuses on comparing the variability in bank's inflows and outflows to determine the amount of reserves that are needed during a period. The liquidity gap is the difference between assets and liabilities at both present and future dates.

Authors like Moore (2009), Vodova (2011, 2012, and 2013) measured liquidity ration by employing liquid assets to total assets, liquid assets to deposits, loans to total assets, loans to deposits, loans to deposits & short term borrowings and total loan to total liabilities. To this end, the stock approach employs various balance sheet ratios to identify liquidity trends. Thus, the stock approaches are more popular in practice and in the academic literature than the flow approach due to more data intensive and there is no standard technique to forecast inflows and outflows. NBE Directive No. SBB/57/2014 requires banks compute its liquidity ratio by dividing liquid assets to total deposits. Therefore, the ratio of liquid assets to total deposits had adopted in order to compute liquidity ratio (dependent variable).

The two most popular stock ratios are the loan-to-deposit ratio and the liquid asset ratio (Moore, 2009), where the higher the loan-to-deposit ratio (or the lower the liquid asset 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.

Liquid Assets to Total Deposits (LIQ)

It measures the ability of banks to pay the investors and depositors on demand without affecting day to day business activity. On the other hand, if the ratio is high, the bank do not search for external source of fund either borrow from interbank transaction or last resort borrowing from NBE. This ascertains whether the bank's short-term assets are readily available to pay off its short-term liabilities. The bank is able to meet its obligations in terms of funding (the volume of liquid assets is high enough to cover volatile funding) if the value of this ratio is 100% or more (Vodova, 2013). Lower value indicates a bank‟s increased sensitivity related to deposit withdrawals. This enables the researcher to capture the bank‟s vulnerability related to these funding sources. The higher is the value of the ratio, the higher is the capacity to absorb liquidity shock (the bank is in a better position to meet its stochastic withdrawals).

As per NBE‟s lastly replacement liquidity requirement directives No. SBB/57/2014, "liquid assets" includes 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. For the purpose of this research, the liquid assets include cash on hand (local and foreign), deposits with the National Bank Ethiopia and other local and foreign banks having acceptance by the National Bank and treasury bills.

$$Liquidity\ ratio\ (LIQ) = \frac{\text{Liquid assets}}{\text{Total deposits}}$$

3.1.2. Independent Variables

Independent variables are classified into bank specific and macroeconomic variables as well as government policy variable which could have effect on banks liquidity. Internal (bank-specific) variables could be controllable by put in place strong management system and practice by banks

whereas macroeconomic variables are not eliminated or controlled by employing strong management system as it is beyond the control of individual involvement rather it needs involvement of government or regulatory organ. Therefore, the following hypotheses through expected sign of the coefficient based on theories and literatures presented below.

3.1.1.1. Macroeconomic Variables

- **Unemployment Rate and Bank Liquidity**

An increase in the unemployment rate can be translated into an increase in non-performing loans and thus lowering bank liquidity (Trenca et al. 2015). The level of unemployment is connected with demand for loans and can also act as a proxy for the general health of the economy and the negative influence means (Hackethal et al. 2010). The negative influence of the level of unemployment indicate that the healthier economy is, i.e. the lower the unemployment rate, the more liquidity is created by banks. The study by Vodova (2012) also supports the aforementioned issues by point out bank liquidity decreases with the higher unemployment rate. However, Munteanu (2012) and Singh and Sharma (2016) found that unemployment rate had positive impact on bank liquidity and thus the impact thereon is significant for Munteanu (2012) and insignificant for Singh and Sharma (2016). Unemployment rate is computed as percentage of the unemployed population over the total number of economically active population (CSA, 2014). The rate indicates that the number of persons who are ready (aged ten years and above) to participate or engaged in the production of goods and services.

H1: There is a negatively significant relationship between the unemployment rate and banks‟ liquidity.

- **Gross Domestic Products (GDP) and Bank Liquidity:**

One of the macroeconomic variables which could affect commercial banks‟ liquidity is growth rate of Gross Domestic product (GDP). The demand for differentiated financial products is higher during economic boom and may improve bank ability to expand its loan and securities portfolios at a higher rate. Similarly, economic downturns are exacerbated by the reduction in bank credit supply. Based on these arguments, they expected banks to increase their transformation activities and their illiquidity during economic booms. Some literatures found that increase in GDP would increase liquidity of commercial banks; however, the authors like Trenca

et al (2015) argue that the increase in GDP leads to increase in economic activity and credit default activity which will cause a drop in banking liquidity. Therefore, the study expected positive relationship between banks liquidity and economic cycle. To proxy the economic cycle the real gross domestic products/GDP growth rate was used.

H2: There is a positively significant relationship between the Real GDP growth rate and banks‟ liquidity.

- **Foreign Direct Investment and Bank Liquidity**

IMF and OECD (2004) defines foreign direct investment enterprise is an enterprise (institutional unit) in the financial or non-financial corporate sectors of the economy in which a non-resident investor owns 10 per cent or more of the voting power of an incorporated enterprise or has the equivalent ownership in an enterprise operating under another legal structure. Though FDI benefited a country by contributes to high economic growth through triggers technology spillovers, assists human capital formation, contributes to international trade integration, helps create a more competitive business environment and enhances enterprise development, it also deteriorate balance of payments as profits are repatriated, weak linkages with local communities, harmful environmental, social disruptions of accelerated commercialization in less developed countries, and the effects on competition in national markets (OECD, 2002; Contessi and Weinberger, 2009; Petrović and Stanković, 2009). Ferrouhi and Lehadiri (2013) investigated foreign direct investment had a positive relationship with the liquidity of commercial banks in Morocco, as a decline in foreign direct investment, leads to a decline in exports, an increase of unemployment rate and closure of bank. Thus, Foreign Direct Investment (FDI) to GDP used as the proxy for FDI.

H3: There is a positively significant relationship between the Foreign Direct Investment and banks‟ liquidity.

3.1.1.2.Government policy factor

- **NBE-bills Purchase and Bank Liquidity**

Since 2011 commercial banks in Ethiopia excluding Commercial Banks of Ethiopia (CBE), have been compulsory to purchase NBE-Bills amounted 27% of new loans disbursement. In line with this directive, NBE issued additional requirement that the commercial banks should maintain

portfolio of short term loan composition is not less than 40%. This NBE-Bills has a maturity period of five years. NBE-bills purchase measured by log of NBE-bills (Shimels, 2016), by using as dummy variable (Alemayehu, 2016), and simple statistical description and qualitative data (Belete, 2015; Shibiru, 2014; Yoseph, 2013) had negative and significant impact on the liquidity of commercial banks subject to purchase NBE-bills in Ethiopia. Furthermore, Tesfaye (2014) analyzed the effect of sector specific policy measures (NBE-Bills purchase) on Ethiopian middle sized banks performance and the result of finding revealed that exposure to government bills had negative and significant relationship with performance. Correspondingly, research in other country by Berger and Bouwman (2010) found that the monetary policy affect on-balance sheet liquidity creation. Thus, NBE-bills purchase to total assets ratio was used as a proxy for measurement of NBE-bill purchase.

H4: There is a negatively significant relationship between the NBE-Bill purchase and banks‟ liquidity.

3.1.1.3.Bank Specific Factors

- **Bank Size (Bsize) and Bank Liquidity: `**

Banks in Ethiopia classified as large, medium, and small-sized banks (NBE Risk Management Guideline, 2010). NBE also classified those banks based on their level of total assets. Thus, for this research purpose use the amount of total assets to measure size of the bank. Various literatures in the world as well as in Ethiopia identified size of the banks had either negative or positive impact on liquidity of commercial banks. On the other hand, there are two opposing arguments both theoretically as well as empirically regarding to the relationship between bank liquidity and size. The first view is too big to fail which considers negative relationship between size and liquidity while; the traditional transformation view suggests positive relationship. This study expected positive impact of bank size on liquidity as per the second argument. The proxy for bank size was the natural logarithm of total assets.

H5: There is a negatively significant relationship between the Bank size and banks‟ liquidity.

- **Deposit and Banks Liquidity**

The level of the deposit is highly determines the position of the banks liquidity. The demand for liquidity may arrive at an inconvenient time and force the fire-sale liquidation of illiquid assets.

Furthermore, because depositors are served in sequence, the prospect of fire-sales may participate self fulfilling runs that further jeopardize bank activity (Diamond and Rajan, 2001). On the other hand, Moussa (2015) studied Tunisian bank liquidity on a sample of 18 banks over the period of 2000-2010 and found that total deposits measured by dividing total deposits to total assets had negative relationship with liquidity even if it is statistically insignificant. A deposit taking bank holds a buffer of stock of cash and securities as a hedge against a state of the world where there are large deposit outflows (Kashyap et al. 2002). Depositors and borrowers may come from different segments of the population and so may have different liquidity demands or those two groups may have different incentives. Furthermore, Kashyap et al. (2002) argued that both the holdings of liquid assets and the quantity of commitments that a bank issues are increasing in the amount of demand deposits. In addition, the stock of liquid assets is not fixed, but rather is optimally adjusted with changes in deposits. Finally, they proposed that an increase in demand deposits should leads to an increase in liquid-assets holdings. In addition, authors like Singh and Sharma (2016) in their study of "an empirical analysis of macro-economic and bank-specific factors affecting liquidity" conducted in India found that deposits had a significant effect on bank liquidity. The level of deposits may also affect the expected liquidity shocks. Alger and Alger (1999) strongly argued that banks having more demand deposits (relative to total assets), have less liquid assets (relative to total assets).

H6: There is a negatively significant relationship between the Deposit and banks" liquidity.

- **Funding Cost and Bank Liquidity**

The study conducted in Tehran by Abadi and Ahangarani (2014) "on Evaluating Factors Affecting Liquidity Risk of Banks" through 8 sampled banks over the period of 2002-2013, identified the positively significant relationship between financing cost and commercial banks liquidity. Similarly, funding cost which is related to financial expenses for depositors and borrowings and computed as by dividing interest expenses to total loans had positive relationship with the liquidity of bank (Moussa, 2015). Contrary to the Moussa (2015) and Abadi and Ahangarani (2014), Singh and Sharma (2016) argued that Indian banks may maintain adequate liquid buffer or capital from other sources as their result of study revealed that funding cost had insignificant effect on liquidity. If liability cost increases, then banks, instead of relying on inter-bank market, tends to rely more on liquid assets that act as a source of liquidity (Berger and

Bouwman, 2010). In order to avoid the funding cost related to borrowing from the inter-bank market and the central bank, banks would hold more liquidity themselves. Moreover, Alger and Alger (1999) found that when funding cost increases there is a significant shift in the composition of liquid assets (cash decreases and securities increases) whereas the overall effect on liquid assets is not significant.

H7: There is a positively significant relationship between the Funding cost and banks‟ liquidity.

In general, the following table summarized the variables, which are explained and explanatory variables, involved in the study with its measurement and expected sign.

Table 3.1: Description of the variables with their expected sign

Variables	Measurement	Expected sign
Dependent Variable:		
Liquidity (LIQ)	The ratio of liquid asset to deposit	NA
Independent Variables:		
Unemployment Rate (UEP)	The ratio of unemployed to employed and unemployed	-
Foreign Direct Investment (FDI)	The ratio of foreign direct investment to GDP	+
Gross Domestic Product (GDP)	Annual real Growth rate of gross domestic product	+
NBE-Bill Purchase (N-bills)	The ratio of NBE-bill to total assets	-
Deposit (DP)	Share of deposit on total asset	-
Size of the Bank (BSIZE)	Natural logarithms of total asset	-
Funding Cost (FC)	The ratio interest expense to deposits and borrowings	+

3.2. Research Approach/Research Design

There are three common approaches for social and business research paradigms, these include: quantitative, qualitative and mixed research methods (Creswell, 2009). The research approach/design for this study began with three framework elements (Creswell, 2003), these include: philosophical assumptions about what constitutes knowledge claims; strategies of inquiry; and data collection, analysis and writing methods. Thus, based on the aforementioned framework elements the types of research approach, which are quantitative, qualitative or mixed, were determined for this study.

Quantitative approach: is one in which the investigator primarily uses post-positivism claims for developing knowledge (i.e., cause and effect thinking, reduction to specific variables, and hypothesis and questions, use of measurement and observation, and the test of theories), employs strategies of inquiry such as experiments and surveys, and collects data on predetermined instruments that yield statistical data (Creswell, 2003). The method is a good fit for deductive approaches, in which a theory or hypothesis justifies the variables, the purpose statement, and the direction of the narrowly defined research questions (Borrego et al., 2009; Creswell, 2003).

Qualitative approach: is one in which the inquirer often makes knowledge claims based primarily on constructivism perspectives (i.e., the multiple meanings of individual experiences, meanings of socially and historically constructed, with an intent of developing a theory or pattern) or advocacy/participatory perspectives (political, issue-oriented, collaborative, or change oriented) or both (Creswell, 2003). It also uses strategies of inquiry such as narratives, phenomenology, grounded theory studies, or case studies. The researcher collects open-ended, emerging data with the primarily intent of developing themes from the data. According to (Borrego et al., 2009; Creswell, 2003) argument, through employing these methods the researcher seeks to identifying a culture-sharing group and studying how it developed shared patterns of behavior over time.

Mixed methods approach: is that involve collecting and analyzing both (quantitative and qualitative) forms of data in a single study; one in which the researcher tends to base knowledge claims on pragmatic grounds (e.g., consequence-oriented, problem-centered, and pluralistic). It employs strategies of inquiry that involve collecting data, both numeric information (e.g., on instruments) as well as text information (e.g., on interviews), either simultaneously or

sequentially to best understanding research problems (Borrego et al., 2009; Creswell, 2003, 2009, 2014) so that the final database represents both qualitative and quantitative information. The study begins with a broad survey in order to generalize results to a population and then focuses, in a second phase, on detailed qualitative, open-ended interviews to collect detailed views from participants.

There are quantitative dominant and qualitative dominant (Johnson et al., 2007) mixed methods research approaches. In quantitative dominant mixed methods research, a researcher relies on a quantitative research process, while concurrently recognizing that the addition of qualitative data and approach in order to benefit most research project; and the reverse is true for qualitative dominant mixed methods approach.

There are also sequential concurrent and transformative procedures in mixed methods approach (Creswell, 2003). In **sequential procedure** the researcher seeks to elaborate on or expand the findings of one (qualitative or quantitative) method with another method. This may involve beginning with a qualitative method for exploratory purposes and following up with a quantitative method or may begin with a quantitative method in which theories or concepts are tested, to be followed by a qualitative method involving detailed exploration a few cases or individuals. In **concurrent procedures** the researcher converges quantitative and qualitative data, by which both forms of data collected at the same time during the study, in order to provide a comprehensive analysis of the research problem and then integrates the information in the interpretation of the overall results. Finally, **transformative procedures** are procedures in which the researcher uses a theoretical lens as an overarching prospective within a design that contains both quantitative and qualitative data. This case a data collection method involves a sequential or a concurrent approach.

Creswell (2003) also discussed that quantitative approach is best if the problem is identifying factors that influence an outcome, the utility of an intervention, or understand the best predictors of outcome; as well as use it to test a theory or explanation. On the other hand, qualitative approach is employed when the researcher does not know the important variables to examine because of little or no research has been done on it. Furthermore, a mixed methods design is useful to capture the best of both quantitative and qualitative approaches through collecting both

closed-ended quantitative data and open-ended qualitative data prove advantageous to best understanding a research problem.

Therefore, this study had employed the quantitative dominant mixed sequential methods research approach (Creswell, 2014; Subedi, 2016; Johnson et al., 2007) in order to capture the benefit from use of it. Moreover, this study utilized both descriptive statistics in order to discuss the trend in more meaningful way and explanatory sequential mixed method approach to elaborate the result found by using quantitative data with qualitative data (Creswell, 2014).

3.3. Types and Source of Data

This study employed both types of quantitative and qualitative data through utilizing sequential mixed method research approach. The research primarily depends on quantitative data that were collected from NBE, EIC, CIA and banks‟ annual reports displayed in their official web sites and the one by which NBE provided the compiled audited financial statements. The source of qualitative data was the interview results conducted with selected five banks‟ risk managers. Those officials were believed to be highly knowledgeable in management of liquidity and in examining factors affecting bank liquidity as they are both involved in producing analytical assessment on liquidity of their bank and a member of assets and liability management committee (ALCO) in their banks. The reason choosing both types of quantitative and qualitative data were that it could enhance better solution (Choy, 2014) for the study.

3.4. Sample and Sampling Framework

3.4.1. Population

Until the end of Fiscal Year 2014/15 the number of banks in Ethiopia stood at 19 of which 16 were private and the remaining three were state-owned (NBE annual report 2014/15). Among the state-owned banks Development Bank of Ethiopia (DBE) by its nature mainly engaged on project financing in order to support economic development of the country rather than providing comprehensive commercial banking activities. Whereas Commercial Bank of Ethiopia (CBE) and Construction and Business Bank S.C. (CBB) among state-owned banks provide commercial banks business with majority of short- and medium-term loans portfolio. Besides, the government of Ethiopia decided the merger of those two state-owned banks which engaged in similar activity on December 22, 2015 (the report of Fana Broadcasting Corporate) and then

named Commercial Bank of Ethiopia. The government believed that merger could create a strong bank that helps boost of Ethiopian economic growth; however, the actual merger commenced on 02/04/2016. Therefore, the total number of banks operating in Ethiopia declined to eighteen, i.e. the number of state-owned banks reduced to two and private banks are remained sixteen. Thus, currently banks operating in Ethiopia are Commercial Bank of Ethiopia (CBE), Development Bank of Ethiopia (DBE), Dashen Bank S.C (DB), Awash International Bank S.C (AIB), Wogagen Bank S.C (WB), United Bank S.C (UB), Nib International Bank S.C (NIB), Bank of Abyssinia S.C (BoA), Lion International Bank S.C (LIB), Cooperative Bank of Oromia S.C (CBO), Oromia International Bank S.C (OIB), Zemen Bank S.C (ZB), Bunna International Bank S.C (BIB), Berehan International Bank S.C (BBI), Abay Bank S.C. (AB), Addis International Bank(AdIB), Debub Global Bank S.C. (DGB) and Enat Bank S.C. (EB).

Table 3.1: Summary of commercial banks in Ethiopia

No.	Bank Name	Year of Establishment	Ownership
1	Commercial Bank of Ethiopia	1963	Public
2	Construction & Business Bank	1983	Public(Merged with CBE)
3	Awash International Bank	1994	Private
4	Dashen Bank	1995	Private
5	Bank of Abyssinia	1996	Private
6	Wegagen Bank	1997	Private
7	United Bank	1998	Private
8	NIB International Bank	1999	Private
9	Cooperative bank of Oromia	2004	Private
10	Lion International Bank	2006	Private
11	Oromia International Bank	2008	Private
12	Zemen Bank	2008	Private
13	Bunna International Bank	2009	Private
14	Birhan International Bank	2009	Private
15	Abay Bank	2011	Private
16	Addis International Bank	2011	Private
17	Debub Global Bank	2012	Private
18	Enat Bank	2013	Private

Source: NBE report and each bank‟s annual financial report

3.4.2. Sampling Frame

NBE classified commercial banks operating in Ethiopia as small, medium and large banks (NBE Risk Management Guideline, 2010). The only large commercial bank in the country is Commercial bank of Ethiopia (state owned), which does not compulsion for NBE-Bills purchase as it is financing large government projects. The medium banks are AIB, DB, WB, BoA, UB and NIB and the rest CBO, LIB, ZB, OIB, BIB, BBI, AB, AdIB, DGB, and EB are classified as small banks. So far researchers whom studied determinants of Ethiopian commercial banks‟ liquidity disregarded those small banks in their sample selection. The reason they have indicated was lack of long period data as those small sized banks commence operation before few years ago (due to youngness). Therefore, including those small sized banks in the sample selection may vary the results of findings. On the other hand, disregarding Commercial bank of Ethiopia (CBE) from the sample could enhance appropriateness of conclusion. This is due to two reasons; the one is CBE does not subject to NBE-Bills purchase and the other is the size of the bank as the market share of CBE in most respects greater than 50%. That means the rest sixteen commercial banks in Ethiopia have the market share of less than 50% altogether. Therefore, twelve commercial banks having five years data (from 2011 to 2015) and subject to NBE-Bills purchase are purposively selected as a sample.

3.4.3. Sample size

Survey includes cross-sectional and longitudinal studies using unstructured interviews for data collection, with the intent of generalizing from a sample to a population (Babbie, 1990 as cited by Creswell, 2009). For this study purposively selected twelve (12) commercial banks as a sample from seventeen commercial banks operating in Ethiopia based on availability of data for the period of five years from 2011 to 2015 and subject to NBE-Bill purchase. The time series is reduced because of increasing the sample size and include banks which are classified as small sized by the NBE (NBE risk management guideline, 2010); so that enhance better generalization for the population (commercial banks in Ethiopia) specifically private commercial banks. Besides, the CBE is excluded because it is giant bank in the country with the market share of more than 50% in most parameters (deposits, loans, total assets… etc) and not compulsory to

purchase NBE-bills. Therefore, banks such as AIB, DB, WB, BoA, NIB, UB, CBO, LIB, OIB, ZB, BuIB and BrIB are selected as a sample.

3.5. Methods of Data Collection

The primary and secondary data were collected for sampled banks on bank specific factors, government policy factor, and macroeconomic factors affecting liquidity of commercial banks in Ethiopia. Audited financial statement of 12 sample banks over the period of five consecutive years (2011 to 2015) were collected in order to analyze bank specific and government policy factors affecting liquidity of commercial banks. On the other hand, macroeconomic data were collected from records held by NBE, Central Statistics Agency (CSA), and Ethiopian Investment Commission (EIC) for the aforementioned period. The primary data were collected through in-depth unstructured interview with selected risk managers of sampled banks in order to strengthen the conclusion drawn and assessed other variables that couldn't hypothesized for testing through econometric model. Furthermore, various sources like published books, articles in journals, articles on the internet, NBE report, related other researches, brochures, NBE directives and other related sources would used as source of information.

3.6. Method of data analysis

The analysis of this paper was beginning from collecting panel data through structured document review. As explained by Gujarati & Porter (2009) the Panel data Regression analysis has the advantage of providing more informative data, more variability, less collinearity among variables, more degrees of freedom and efficiency. Data collected through employing the above data collection techniques had been analyzed and interpreted in order to arrive at the objective of the study. Both descriptive statistics and inferential statistics/multiple regression analysis were conducted in testing of hypotheses and examined the relationship between independent variables and dependent variable. Calculate mean, maximum, minimum and standard deviation of variables over the sampled period of 2011-2015 for 12 banks in the sample to enables the researcher to assess the general trends of data through converting the raw data into more meaningful form.

Run multiple linear regression models to identify variables which affect the liquidity of commercial banks and examined the relationship between dependent and independent variables. Brook (2008) describes two panel estimators approaches as fixed effects models and random

effects models. And thus to choose the appropriate panel estimators such as fixed effect model and random effects model had been tested through Housman test by using EVIEW 8 econometric software package. The EVIEW 8 was also used for other tests like diagnostic tests on assumptions of Classical Linear Regression model (CLRM). The CLRM assumption is related to heteroscedasticity, autocorrelation, normality and multicollinearity. After the ensuring the test for assumption of CLRM in line with requirement, run multiple regression model developed for this study to arrive at the broad objective of the study.

The study adopted the following general multivariate regression model, which is in light of the Gujarati (2003), Vodova (2013) and Raeisi et al. (2014), to examine the internal and external factors affecting banks liquidity.

$$\boldsymbol{Y_{it} = \alpha + \beta . x_{it} + u_{it}}$$

Where:

$\mathbf{Y_{it}}$ represents dependent variables; subscript ***i*** denote the cross-section and ***t*** representing the time-series dimension; $\mathbf{x_{it}}$ is a vector of explanatory variables for bank *i* in time *t*; **α** is constant; **β** are coefficient which represents the slope of the explanatory variables and $\mathbf{u_{it}}$ is the error term.

From the above general multivariate regression equation, the following specific model (Cucinelli, 2013) was developed to test whether the commercial banks‟ liquidity was affected by the selected variables involved in the study.

$$LIQ_{i,t} = \alpha + \beta 1(FDI_t) + \beta 2(UEP_t) + \beta 3(GDP_t) + \beta 4(N\text{-}bill_{it}) + \beta 5(DP_{it}) + \beta 6(FC_{it}) + \beta 7(BSIZE_{it}) + U_{i,t}$$

Where,

LIQ_{it} = is liquidity ratio for i^{th} bank on year t.

FDI_t = is foreign direct investment on the year t.

UEP_t = is the overall unemployment rate in Ethiopia on the year t.

GDP_t = is the real domestic product/GDP growth of Ethiopia on the year t.

$N\text{-}bill_{it}$ = is the NBE-bill purchase for bank i at time t.

FC_{it} = is the funding cost for bank i at time t.

DP_{it} = is the level of deposit for bank i at time t.

$BSIZE_{it}$ = is the size for bank i at time t.

Uit = is a random error term

Chapter Four: Result and Discussion

To address the broad research objectives and to answer the research questions the results of the study as well as analysis are discusses in this chapter. The documentary review and primary data that gathered through in-depth interview with selected banks‟ risk managers are presented in the respective order as sequential mixed research approach. The documentary review results are presented in the form of descriptive statistics and regression analysis. The chapter is organized as 4.1. Descriptive statistics, 4.2. Correlation Analysis among Dependent and Independent Variables, 4.3. Testing for Classical Linear Regression Model and other assumptions, 4.4. Results and Discussion.

4.1. Descriptive Statistics

The descriptive statistics of dependent and independent variables which are used in regression analysis are presented in the table below. The descriptive statistics include: mean, median, maximum, minimum, and standard deviation. The variables described for include: liquidity ratio, bank size, deposit level, funding cost, NBE-bills, unemployment rate, Gross Domestic Product (GDP), and Foreign Direct Investment (FDI).

Table 4.1: Descriptive statistics of the dependent and independent variable

	LIQ	UEP	FDI	GDP	N-Bills	DP	FC	BSIZE
Mean	0.4245	0.1724	0.1460	0.1010	0.1742	0.7557	0.0274	22.5323
Median	0.4079	0.1740	0.1510	0.1020	0.1779	0.7597	0.0267	22.7429
Maximum	0.7697	0.1800	0.1730	0.1140	0.3036	0.8443	0.0401	23.9505
Minimum	0.1839	0.1650	0.1180	0.0870	0.0145	0.6291	0.0157	20.4765
Std. Dev.	0.1427	0.0054	0.0188	0.0087	0.062	0.0467	0.0053	0.8681
Observations	60	60	60	60	60	60	60	60

Source: NBE, EIC, CSA, Banks annual report and computed through Eview 8

The mean of liquidity ratio (liquid assets to current liabilities) for the sampled period is 42.45% with minimum and maximum ratio of 18.39% and 76.97%, respectively. The mean ratio is by far, more than twice, above the current minimum regulatory requirement of 15% (NBE

Directives No.SBB/57/2014). On the other hand, all the sampled banks are properly maintained the regulatory minimum requirement for the sampled period as their minimum liquidity ratio is 18.39% registered by NIB. However, the standard deviation is very high and stood at 14.27%, it mean that almost equal to the minimum liquidity ratio of regulatory requirement. On the other hand, the liquidity ratio is very vary from bank to bank and from time to time within individual bank.

The mean for unemployment rate is 17.24% with minimum and maximum of 16.50% and 18%, respectively. The standard deviations is very small with 0.54%, this indicates that there is small variations in unemployment rate in Ethiopia i.e. the unemployment rate in Ethiopia is almost constant for sampled period. Its median which stood at 17.40% is within the range of 100 base points of the maximum and minimum value.

The mean for Foreign Direct Investment (FDI) level measured by FDI to Gross Domestic Product (GDP) is 14.60% with minimum and maximum of 11.80% and 17.30%, respectively; and its standard deviation is 1.88%. Consequently, the variation in FDI is small for the sampled period in Ethiopia with fluctuating rate from time to time. The median of 15.10% is also very close to mean value having difference of 50 base points.

The mean of NBE-bills measured by total amount of NBE-bills purchased by the bank divided to total assets is 17.42% with the minimum and the maximum of 1.45% and 30.36%, respectively. The minimum value is registered by BuIB in the beginning year (2011) of NBE-bills purchase and the maximum is held by WB in the year 2015, i.e. the WB‟s sizable portion of total assets is held by long-term assets having maturity period of 5 years (NBE-bills), with much less interest rate (3%) even below minimum saving rate of 5% paid to depositors. This could significantly affect the profitability and capital of the bank in addition to liquidity problem. However, its standard deviations is very small (6.20%) with the median of 17.79%.

The banks deposit level plays a great role in position of commercial banks liquidity. The deposit level is measured by dividing total deposits to total assets. The mean of deposit level is 75.57% with the minimum and the maximum of 62.91% and 84.43%, respectively. This shows that majority of banks assets funded from depositors money mobilized from customers. On the other hand, the banks are more rely on external (deposits and borrowing) sources of funds rather than internal (equity) source of funds. This could be because of the banks are preferred to lower cost

of finance, and thus costs related to external source is lower than costs related to equity source. The median, which is almost equal to the mean value, is also very high and stood at 75.97% with standard deviation of 4.67%.

The mean of funding cost, which is measured by dividing interest expenses to total deposits and borrowings, is 2.74% with the minimum and the maximum of 1.57% and 4.01%, respectively. It means that banks are in average paid 0.0274 cents for one Birr mobilized from external (deposits and borrowings) sources. The median is also close to the mean value and stood at 2.67% with standard deviation of 0.53%; i.e. the funding cost incurred by the commercial banks in Ethiopia is relatively close to each other. Furthermore, the average funding cost incurred by commercial banks in Ethiopia is very small (almost half of minimum saving deposit rate of 5% that the regulatory is set).

The mean for real GDP growth rate for the sampled period in Ethiopia is 10.10% with median of 10.20% having the minimum and the maximum of 8.70% and 11.40%, respectively. The standard deviation is 0.87%, which indicates that the minimum fluctuation in the growth rate of GDP in the sampled period. This could shows that there is a rapid GDP growth rate in the country based on international best practice.

The mean of the size of the banks, which measured by taking natural logarithm of total assets, is 22.53 with median of 22.74 having the minimum and the maximum of 20.48 and 23.95, respectively. There is relatively some variation in the size of the commercial banks in Ethiopia as the standard deviation is stood at 0.8681.

4.2. Correlation Analysis among Dependent and Independent Variables

Table 4.2: Correlation Analysis

	LIQ	UMP	FDI	N-Bills	DP	FC	GDP	BSIZE
LIQ	1.0000							
UMP	0.6538	1.0000						
FDI	(0.3355)	(0.1047)	1.0000					
N-Bills	(0.7932)	(0.5545)	0.2936	1.0000				
DP	(0.3938)	(0.0842)	0.0999	0.2279	1.0000			
FC	(0.2655)	(0.1209)	0.0516	0.4775	0.3279	1.0000		
GDP	0.2695	0.3307	0.6484	(0.2675)	0.0766	(0.1584)	1.0000	
BSIZE	(0.6584)	(0.2944)	0.2488	0.4171	0.4635	0.1795	(0.0595)	1.0000

Source: NBE, EIC, CSA, Banks annual report and computed through Eview 8

The correlation between the dependent and independent variables are discussed below. Thus, liquidity ratio measured by dividing liquid assets to current liabilities strong negative correlation with NBE-bills purchase, i.e. an increase in level of NBE-bills can significantly decreases the level of liquidity ratio of sampled banks in Ethiopia. The increase in NBE-bills by 79.32% leads to 100% decrement of liquidity ratio. In addition, size of the bank and unemployment rate has relatively strong correlation with liquidity ratio. Consequently, the former has negative correlation while the latter has positive correlation. Whereas the rest of the independent variables such as FDI, deposit, funding cost and GDP have no strong correlation with liquidity ratio though most of those variables except GDP has negative correlation. Finally, there is no perfect correlation between dependent and independent variables as there is no 1 or -1 correlation between variables.

4.3. Testing for Classical Linear Regression Model (CLRM) and Other Assumptions

To be the regression model is fit, the diagnostic tests should be conducted before the regression analysis is carried out. The assumptions underlying in CLRM must be appropriate and the test results are presented below.

i. Average Value of the Error Term is Zero (E (u_t) = 0)

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

ii. Heteroscedasticity

The next OLS assumption for fitness of a model testing is that the variance of the errors term is constant, i.e. known as the assumption of homoscedasticity otherwise heteroscedasticity, where the errors do not have a constant variance (Brook, 2008). Among the statistical tests for heteroscedasticity, the popular one is known as white‟s (1980) general test for heteroscedasticity (white (1980) as cited by Brook, 2008). Thus, the heteroscedasticity result by using white‟s test revealed that there is no evidence for existence of heteroscedasticity in the equation at the 5% significance level as the probability value of F-statistics, observed R-square and scaled explained SS is 9.71%, 15.96% and 68.92%, respectively as shown in the table below. Therefore, the null hypothesis of the variance of errors term is constant (homoscedasticity) does not rejected.

Table 4.3: Test for Heteroskedasticity

Heteroskedasticity Test: White

F-statistic	1.625689	Prob. F(30,29)	0.0971
Obs*R-squared	37.62653	Prob. Chi-Square(30)	0.1596
Scaled explained SS	25.72208	Prob. Chi-Square(30)	0.6892

Source: own computation through Eview 8

iii. Autocorrelation

This assumption is made of the CLRM‟s disturbance terms is that the covariance between the error terms over time (or cross-sectionally, for that type of data) is zero i.e. the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are „autocorrelated‟ or that they are „serially correlated‟. Looking patterns of graphs of residuals and statistical tests of Durbin Watson (DW) and Breusch-Godfrey are the

mechanisms utilized in detection of whether the model involved autocorrelation. Durbin Watson tests only first order autocorrelation whereas Breusch-Godfrey tests up to the r^{th} order.

Roughly speaking, there is little evidence of autocorrelation, perfect positive autocorrelation and perfect negative autocorrelation in the residuals if DW is near to 2, 0 and 4, respectively. Thus, both the test for autocorrelation was used in determining the first order and r^{th} order autocorrelation of residuals in the regression. Therefore, the Eview result in the table 4.7 below automatically calculated the DW statistics of 1.671 indicated that there is no evidence for existence of first order autocorrelation in the model as it falls in the inconclusive region, where the null hypothesis of no autocorrelation can neither be rejected nor not rejected, since the value from the table by using 60 observations and 7 regressors for dL=1.179; dU=1.682 and thus 4-dL=4-1.179=2.821; 4-dU=4-1.682=2.318. Furthermore, the null hypothesis of no autocorrelation in the model does not rejected as F-statistics of 10.07% and observed R-square of 7.19% (Table 4.4) are more than 5%.

Table 4.4: Test for autocorrelation

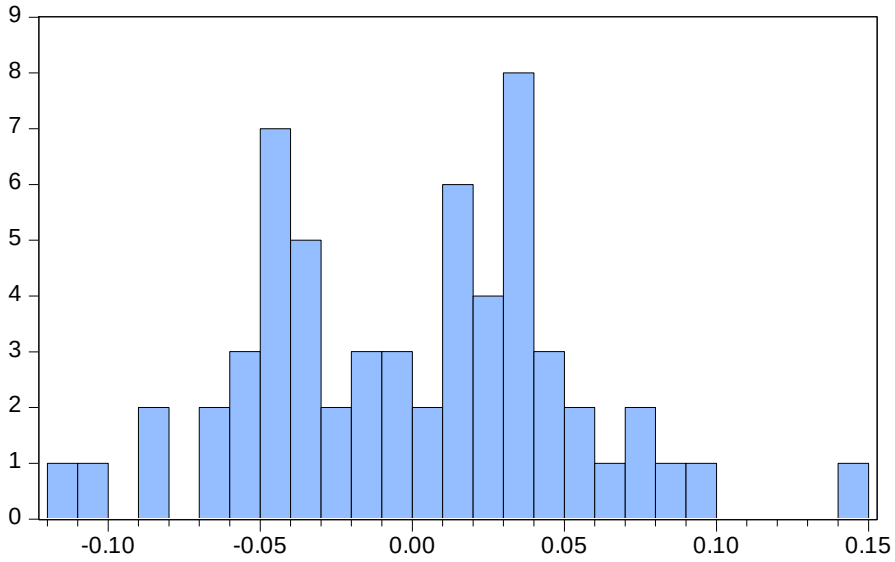
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.404706	Prob. F(2,50)	0.1007
Obs*R-squared	5.264875	Prob. Chi-Square(2)	0.0719

Source: own computation through Eview 8

iv. Normality

The errors term are normally distributed in order to conduct single or joint hypothesis tests about the model parameters. The diagnosis tests on normality indicates that the null hypothesis of disturbances are normally distributed does not rejected at 5% significant level since the coefficient of kurtosis is close to 3, which is 2.8203 and the Bera-Jarque statistics P-value is 91.57%.



Series: Residuals	
Sample 1 60	
Observations 60	
Mean	9.28e-16
Median	0.004117
Maximum	0.142571
Minimum	-0.110613
Std. Dev.	0.051605
Skewness	0.097678
Kurtosis	2.820278
Jarque-Bera	0.176160
Probability	0.915688

v. Multicollinearity

This assumption is concerned with the relationship exist between explanatory variables. If an independent variable is an exact linear combination of the other independent variables, then we say the model suffers from perfect collinearity, and it cannot be estimated by OLS (Brooks 2008). There is no clearly defined and consistent argument reached by the scholars for the existence of multicollinearity problem among the explanatory variables. Consequently, Hair et al. (2006), Malhota (2007) and Kennedy (2008) argued that there is no series multicollinearity problem if correlation coefficient is below 0.9, 0.75 and 0.7, respectively. Thus, the study taken the minimum of those scholars parameter of correlation coefficient among independent variables should be below 0.7. Therefore, there is no multicollinearity problem among the explanatory variables as the maximum correlation coefficient is 0.6484 involved between GDP and FDI.

Table 4.5: Test for multicollinearity

	UMP	FDI	N-Bills	DP	FC	GDP	BSIZE
UMP	1.0000						
FDI	(0.1047)	1.0000					
N-Bills	(0.5545)	0.2936	1.0000				
DP	(0.0842)	0.0999	0.2279	1.0000			
FC	(0.1209)	0.0516	0.4775	0.3279	1.0000		
GDP	0.3307	0.6484	(0.2675)	0.0765	(0.1584)	1.0000	
BSIZE	(0.2945)	0.2488	0.4171	0.4635	0.1795	(0.0594)	1.0000

Source: own computation through Eview 8

vi. Random Effects Model (REM) versus Fixed Effects Model (FEM)

If T (the number of time series data) is large and N (the number of cross-sectional units) is small, there is likely to be little difference in the values of the parameters estimated by fixed effect model/FEM and random effect model/REM. Hence, the choice here is based on computational convenience. Whereas according to Brooks (2008); Verbeek (2004) and Wooldridge (2004), it is often said that the REM is more appropriate when the entities in the sample can be thought of as having been randomly selected from the population, but a FEM is more plausible when the entities in the sample effectively constitute the entire population/sample frame. Therefore, run Hausman test to determine which model is appropriate and the result in the table below revealed that REM is appropriate for this study as the P-value is 1 meaning that it is more than 0.05 so that there is no evidence to rejected Null hypothesis of REM is appropriate model rather accept it.

Table 4.6: Test for appropriate model

Correlated Random Effects - Hausman Test
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	7	1.0000

Source: own computation through Eview 8

4.4. Results and Discussions

4.4.1. Regression Results

The empirical findings from the econometric results on the factors affecting liquidity of commercial banks in Ethiopia presented in this section. The section covers the empirical regression model used in this study and the results of the regression analysis. The following empirical model was used in order to identify the factors that can affect the liquidity of commercial banks in Ethiopia.

$$LIQ_{i,t} = \alpha + \beta_1(UEP_t) + \beta_2(FDI_t) + \beta_3(GDP_t) + \beta_4(N\text{-}BILLS_{it}) + \beta_5(DP_{it}) + \beta_6(FC_{it}) + \beta_7(BSIZE_{it}) + U_{i,t}$$

Table 4.7: Regression results

Dependent Variable: LIQ

Total panel (balanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.801876	0.435466	1.841421	0.0713
UEP	5.414793	1.660822	3.260309	0.0020
FDI	-2.408037	0.699555	-3.442241	0.0011
GDP	5.194271	1.501973	3.458298	0.0011
N-Bills	-0.986250	0.212038	-4.651286	0.0000
DP	-0.629250	0.207846	-3.027481	0.0038
FC	3.862588	2.027214	1.905368	0.0623
BSIZE	-0.041795	0.013966	-2.992530	0.0042

Weighted Statistics

R-squared	0.879036	Mean dependent var	0.268152
Adjusted R-squared	0.862753	S.D. dependent var	0.134012
S.E. of regression	0.049647	Sum squared resid	0.128173
F-statistic	53.98294	Durbin-Watson stat	1.671224
Prob(F-statistic)	0.000000		

Source: own computation through Eview 8

Except funding cost which is only significant at 10% significance level as its P-value is 6.23%, all the explanatory variables are statistically significantly affects the explained variable of liquidity ratio, measured by liquid assets divided to current liabilities, of commercial banks in Ethiopia event at the significant level of 1%. Those macroeconomic and bank-specific as well as regulatory policy independent variables include: unemployment rate, foreign direct investment, gross domestic product, NBE-bills purchase, deposit level, funding cost and size of bank explanatory power (i.e. R^2) is 87.90% and well above the minimum level of 60% that required for regression model is fit and it indicates that the explanatory power of independent variable over dependent variable is very high. Therefore, the model is good enough to carry out the regression analysis. However, the remaining 12% of changes on dependent variable could be explained by other factors which might not include in the model.

As stated above most of the independent variables are individually significant even at the 1% significant level as the null hypothesis of all independent variables do not have significant effect on dependent variable is rejected. Consequently, those independent variables collectively (F-statistics P-value is 0.0000) have statistically significant effect on the dependent variable, i.e. the liquidity of commercial banks in Ethiopia significantly affected by UEP, FDI, GDP, N-bills, DP, FC and BSIZE.

The coefficient of FDI, N-bills, DP and BSIZE is -2.4080, -0.9862, -0.6292 and -0.0418, respectively. This indicates that there is negative relationship between dependent variable of liquidity ratio and independent variables of FDI, N-bills, DP and BSIZE; meaning that as foreign direct investment, NBE-bills purchase, level of deposit and bank size increases the liquidity ratio of commercial banks in Ethiopia decrease and vice versa. However, the relationship between liquidity ratio and UEP, GDP and FC is positive; meaning that the increase in unemployment rate, gross domestic product and funding cost could also increases the position of liquidity ratio of commercial banks in Ethiopia and vice versa. Accordingly, the coefficient of UEP, GDP and FC is 5.4148, 5.1943 and 3.8626, respectively.

On the other hand, those independent variables‟ coefficient sign is positive had significant changes on dependent variable. It means that one unit changes in UEP, GDP and FC leads to change in the LIQ by 5.41, 5.19 and 3.86 in the same direction, respectively. Contrary, one unit

change in FDI, N-bills, DP and BSIZE leads to change in the LIQ by 2.41, 0.98, 0.63 and 0.04 in the opposite direction, respectively.

4.4.2. Interview Results

Unstructured interviews were carried out in order to comprehensively arrive at broad objective of the study. The interviews were conducted with five risk managers of commercial banks operating in Ethiopia, i.e. risk managers from DB, UB, ZB, CBO and BuIB on factors affecting liquidity of commercial banks. Those officials were chosen due to their exposure in the area and they believed to be the most knowledgeable persons in the subject matter. Furthermore, in most cases they (officials) are the member of ALCO either had voting member or non-voting member, by which their main responsibility is managing assets and liabilities of banks. The interview questions were aimed to identify factors affecting liquidity of commercial banks in Ethiopia which includes variables used in the regression as well as others which could have effects on banks‟ liquidity.

As per the interview results, bank-specific variables which affects the liquidity of commercial banks in Ethiopia include: total deposits held by a bank, deposits in foreign country, interest rate on loans and advances, funding costs, weakness in credit follow-up, size of the bank and funding mixes (types of liability side deposits held by banks). As total deposits of the banks increases, liquidity of the banks also increases due to liquid assets maintained in a bank is increases. Deposits in foreign country banks could be difficult to consider as liquid assets since difficulty in converting into local currency and utilize for liquidity purpose. Funding cost is less important factor in determining commercial banks‟ liquidity in Ethiopia due to banks are mainly engaged in retailed deposits with low cost funds. The interview result also indicates that there is positive relationship between banks liquidity and bank size since large banks had diversified pool of depositors.

On the other hand, macroeconomic factors affecting banks‟ liquidity include: competitions, real Gross Domestic Product (GDP) growth rate, inflation rate, unemployment rate, Foreign Direct Investment (FDI), underdeveloped financial system such as absence of secondary market and less involvement in financial inclusion and the like. According to the interview, real GDP growth rate had direct and significant relationship with banks liquidity since as individual income increases, savings also increases; whereas unemployment rate had negative impact on banks‟

liquidity, this is due to unemployed people could not have money in order to put in banks rather they even withdraw what they had in the banks for consumption. The interviewees also indicates from their experience that most of funds considered as FDI is not really come from home country of investor rather coming here for project work and form their own capital in the country and thus it is part of GDP and financed their business through loans advanced from local banks.

Furthermore, according to interview, government policy variable of NBE-bill purchase had significantly negative impact on private commercial banks‟ liquidity since sizeable amounts of banks‟ assets next to or nearly equal to loans and advances, held in long-term investment of government bond.

The competition in the banking industry has been increasing from time to time in the recent years in Ethiopia due to new entrants and a demand for loans has been extensively increased. So that the liquidity of commercial banks in Ethiopia was declined due to the fact that described and aggressive involvement in granting loans and advances in order to maximize their earnings.

Inflexible interest rate change in the assets (loans and advances) of banks had significant effect on liquidity of commercial banks. Banks were not involved in quick response for interest rate change based on demands and supplies of customers for loans and advances unless government changes the minimum deposit rate. For instance, banks were maintained their lending interest rate at least for two years.

Another variable, as per interview result, affecting commercial banks‟ liquidity in Ethiopia was deposits held in foreign banks in relation to total liquid assets. This is due to the fact that holding large amount of liquid assets in the form of foreign bank deposit could be difficult to convert into local currency in short period of time during liquidity crisis.

Underdeveloped financial system including less level financial inclusion and absence of secondary marker like money market were among the determinants of liquidity of commercial banks in Ethiopia. This could lead the banks to hold less deposit in relation to money supply in the market due to the fact that significant amount of money circulation does not taken place through financial institutions. According to the interviews, they experienced that some merchants were own their private volt in their home or in office. In addition, most of Ethiopian populations are lived in the rural area where there is no bank or other financial institutions; their money can be circulated through cash rather than financial institutions and thus reduces the banks' liquidity.

Another internal (bank-specific) factor which affecting commercial banks liquidity in Ethiopia were absence of communication between the organ involved in resource mobilization and whom it utilize. That means, lending organ is not take into account the level of liquid assets available in the bank while granting loans and advances. Those loans and advances had also been disbursed immediately after the end of budget year and nil then after rather that periodical disbursement based on plan. This could lead banks having loans and advances with relatively similar maturity dates and then banks would be more liquid in some period and faced liquidity problem in another period.

Furthermore, weak credit follow-up and ineffective deposit mobilization were among the internal factors affecting commercial banks‟ liquidity in Ethiopia. The interview also indicates that funding cost was not concerning issue as determinant of liquidity in Ethiopian commercial banks. Some interviewees whom their banks are aggressively involved in construction of own buildings investment, reduces the liquidity in significant manner.

Finally, the interview result indicates that inflation from macroeconomic and funding mix (types of deposit) from bank-specific factors had effects on liquidity of commercial banks in Ethiopia. As inflation rate increases and stood at above minimum deposit rate, depositors are tends to invest on assets which yield more rather than put their money in banks. On the other hand, volatile deposit such as fixed deposit could be maintained only in willingness of depositors and thus the banks are vulnerable to liquidity problem. Banks in Ethiopia had mainly mobilized retail deposit in the form of saving deposit had not been exposed banks to such a huge liquidity problem.

4.5. Analysis and Discussions

Based on the theoretical framework and the data collected through aforementioned data collection techniques in the chapter three above, the analysis and discussion of the study has carried out. The main focuses of the analysis of this study is on regression results obtained by using Eview 8 software package via Random Effects Model. Five per cent (5%) significant level was used to determine the level of effects (significant) of explanatory variables on explained variable. The variables that are selected for analysis from regression results as factors affecting the liquidity of commercial banks in Ethiopia include: Unemployment Rate (UEP), Foreign

Direct Investment (FDI), real GDP growth rate, NBE-Bills purchase, level of deposit, funding cost and bank size.

Unemployment Rate

The results of regression analysis revealed that unemployment rate is statistically significant even at 1% significant level to determine the liquidity of commercial banks in Ethiopia as its P-value is only 0.2%, i.e. below 1%. Thus, the null hypothesis of unemployment rate does not have significant effect on liquidity is rejected and the alternative hypothesis of unemployment rate does have significant effect on banks‟ liquidity is accepted. The coefficient of unemployment rate is 5.4148 indicates that the relationship between unemployment rate and commercial banks‟ liquidity is positive against prior studies conducted by Trenca et al. (2015), Vodova (2012) and Hackethal et al. (2010) and interview result stated that since increase in unemployment rate leads to reduces the tendency of saving and withdraw what they had in banks, it had negatively significant relationship with Ethiopian commercial banks liquidity but aligned with studies by Munteanu (2012) and Singh and Sharma (2016); and correspondingly one unit change in unemployment rate leads to change in the liquidity of commercial banks by 5.41 in the same direction. Those prior studies found that as unemployment rate increased the liquidity of banks could decreased and vice versa. However, this study found that the liquidity of commercial banks in Ethiopia increases or decreases with unemployment rate.

The positive relationship between the liquidity of commercial banks and unemployment rate is due to the fact that the lower in investment leads to increase unemployment rate and reduces demand for loans; and thus reduces the liquid assets tied up on long-term loans. Consequently, unemployment rate is the major factor affecting liquidity of commercial banks in Ethiopia as its change has huge changes in liquidity and its significance is also very high based on regression result. Therefore, the conclusion is ambiguous and further study could be needed to arrive at same conclusion with mixed (qualitative and quantitative) research method.

Foreign Direct Investment (FDI)

The coefficient of Foreign Direct Investment (FDI) to explain the liquidity ratio is -2.4080 with the P-value of 0.11%. Thus, the null hypothesis of FDI does not have significant effect on liquidity is rejected even at the significant level of 1%, meaning that FDI has statistically significant effect on liquidity of commercial banks in Ethiopia. One unit change in Foreign

Direct Investment leads to 2.41 units change in liquidity of commercial banks in Ethiopia in opposite direction. In other word, FDI had the inverse relationship with the liquidity of commercial banks in Ethiopia against Ferrouhi and Lehadigi (2013) found that FDI had positive relationship with the liquidity of commercial banks. However, the this study finding is in consistent with the conclusion of Kirabaeva (2008) and Johnmark et al. (2013) as well as interview result on their argument that negative relationship between FDI and liquidity of commercial banks, as FDI increase the demand for loans also increase and thus the commercial banks‟ liquidity is decrease. Countries that are less financially developed, higher uncertainty about investment productivity and higher liquidity risk attracts more capital formation in the form of FDI (Kirabaeva, 2008). Thus, the higher liquidity risk leads to a higher level of Foreign Direct Investment (FDI). Therefore, FDI had negatively significant relationship with the liquidity of commercial banks in Ethiopia.

Gross Domestic Product (GDP)

GDP has statistically positively significant impact on liquidity of commercial banks in Ethiopia since its P-value is 0.11% and coefficient is 5.1943. The positive sign of coefficient indicates that the increase in real GDP growth rate leads to increase in the liquidity of commercial banks against the studies conducted by Tseganesh (2012), Belete (2015), and Nigist (2015). However, the finding of this study is in line with studies conducted by Angora and Roulet (2011) and Cucinelli (2013) as well as interview result, they found that the real annual GDP growth rate has significantly positive relationship with banks‟ liquidity and thus the increase in individual income leads to save the excess amount in banks. Thus, the null hypothesis of real GDP growth rate does not have significant impact on liquidity of commercial banks is rejected and the alternative hypothesis is accepted even at the significant level 1%.

Besides, a unit change in real GDP growth rate changes the liquidity of commercial banks by 5.19 units in the same direction, i.e. one unit increase in real GDP growth rate increase the commercial banks‟ liquidity by 5.19 and vice versa. Therefore, the real GDP growth rate has significantly positive relationship with liquidity of commercial banks in Ethiopia for the study period cover 2011 to 2015. This could be due to the fact that the increase in real GDP growth rate increases the consumer income and thus savings can be boost to increase the liquid assets available in banks.

NBE-Bills Purchase

NBE-Bills purchase has the coefficient of -0.9862 with the P-value of 0.0000; meaning that N-bills have negatively significant effect on liquidity of commercial banks in Ethiopia during the sampled period, specifically, those banks enforced to purchase NBE-bills. The sign of the coefficient is in line with the expectation and interview result in which liquidity of the commercial banks in Ethiopia is decline with the increased level of NBE-bills purchase and vice versa. The sizable amount (27% of fresh loans disbursement, having short-term loans disbursement should not be less that 40% of total loans portfolio) of liquid assets of commercial banks, which are subject to NBE-Bills purchase, tied up in long-term investment with maturity period of 5 years. This could extensively affect banks liquidity in adverse manner. Furthermore, the liquidity ratio of those commercial banks forced to purchase NBE-Bills in Ethiopia is in declining trend since the beginning of purchase in 2011. This regression result is also in line with (Shimels, 2016; Alemayehu, 2016; Shibru, 2014; Yoseph 2013) findings and interview result (Belete, 2015) conducted with finance managers of selected commercial banks without employing statistical tools such as regression, correlation and etc; on which he found that NBE-Bill purchase had primarily serious adverse impact on commercial banks‟ liquidity as it boldly changes liquid assets into illiquid long-term investment.

On the other hand, the coefficient indicates that a unit change on NBE-bills purchase leads to 0.97 unit change on liquidity of commercial banks in Ethiopia during the study period in opposite direction. In other word, one unit increase in NBE-Bills purchase leads to 0.97 unit decrease in liquidity ratio and vice versa. Therefore, NBE-Bills purchase is among the statistically and qualitatively, interview result, most significant variable affecting liquidity of commercial banks in Ethiopia in adverse manner. Thus, the null hypothesis of NBE-Bills purchase does not have significant impact on liquidity is rejected and alternative hypothesis is accepted.

Deposits

Another independent variable that can affect the liquidity of commercial banks in Ethiopia is level of deposit that the banks mobilized in relation to their total assets. Deposit had negatively significant impact on liquidity of commercial banks as its P-value is 0.38% with coefficient of

-0.6292. Hence, the null hypothesis of deposit does not have significant effect on liquidity is rejected and alternative hypothesis is accepted even at the significant level of 1%.

The negative sign of the coefficient indicates that the banks deposit and liquidity has inverse relationship; that means one unit increase in deposit leads to 0.63 unit decreases in liquidity ratio of commercial banks in Ethiopia during the study period (2011 to 2015). Consequently, the regression result of this study is strongly consistent with studies conducted by Alger and Alger (1999), Kashyap et al. (2002), Moussa (2015), and Singh and Sharma (2016) but it is against interview result in which increase in deposit, increases liquid assets maintained in banks. Banks relying more heavily on deposit could face larger liquidity shocks (Alger and Alger, 1999). Thus, given an increase in demand deposits, banks might tend to invest more in loans than in liquid assets. Therefore, ambiguous to conclude that the relationship between banks‟ liquidity and level of deposit had positive or negative.

Funding Cost

Funding cost does not have significant impact on liquidity of commercial banks in Ethiopia for the study period covering 2011 to 2015 at significant level 5% rather at 10% since the P-value is 6.23%. The result was in consistent with the interview result conducted with selected commercial banks risk managers; this is due to banks operating in the country largely engaged in low cost retail deposits. It is the only explanatory variable among independent variables involved in the model, that cannot have statistically significant affect on liquidity of commercial banks at significant level of 5% chosen for this study. Thus, the null hypothesis of funding cost does not have significant impact on liquidity cannot be rejected rather accept it. However, a unit change on funding costs tends to changes liquidity of commercial banks by 3.86 unit in the same direction; meaning that one unit increase in funding cost tends to increase liquidity by 3.86 unit and vice versa even if the effect is insignificant at 5%. Ethiopian commercial banks may maintain adequate liquid assets buffer or capital from other sources; and when liability cost increases, then banks, instead of relying on inter-bank market, tends to rely more on liquid assets that act as a source of liquidity (Singh and Sharma, 2016; and Berger and Bouwman, 2010). Furthermore, as funding cost increases the depositors tends to save their excess money in the banks in order to gain more interest income in turn the position of liquid assets is increases.

Bank Size

The regression result of random effects model revealed that the coefficient of bank size is -0.0418 with the P-value of 0.42% as determinant of commercial banks‟ liquidity. Hence, the size of commercial banks in Ethiopia had statistically negatively significant impact on banks liquidity. Therefore, the null hypothesis of bank size does not have significant effect on liquidity is rejected even at significant level of 1% and the alternative hypothesis is accepted. The sign of the coefficient indicates that inverse relationship between bank size and liquidity, is as expected and also properly aligned with theoretical framework of "too big to fail" and prior studies (Alger and Alger, 1999; Vodova, 2013; and Cucinelli, 2013) and interview result argued that larger banks should not need to rely on liquid assets to meet liquidity needs as much as smaller banks due to the fact that they typically have a more diversified depositor population, better known and creditors have better incentives to monitor large banks.

Though liquidity had negative relationship with bank size, changes on bank size could not bring such a considerable change on liquidity of commercial banks in Ethiopia for the study period since one unit increase in bank size leads to decrease banks‟ liquidity only by 0.04 units (i.e. the effect of change is below 5%). Therefore, increasing or decreasing the assets size of the bank for liquidity management purpose could not bring a major change. On the other hand, among the studies conducted in Ethiopia prior to this study in the area, only Berhanu (2015) found that the relationship between bank size and liquidity had negatively significant and the rest Tseganesh (2012), Belete (2015) and Nigist (2015) found that the relationship was positively significant.

Chapter Five: Conclusion and Recommendation

The data were collected through document review and interview and analyzed by using statistical tools such as descriptive statistics, regression and correlation to determine the effect of explanatory variables on explained variable. The results obtained by those techniques were presented and analyzed in the chapter four above. Thus, based on results of statistical tools and interview with banks risk managers, this chapter mainly concerned with conclusion and recommendation of the study.

5.1. Conclusion

The study employed seven independent variables: three of them are macroeconomic, one is government policy variable and the rest three are bank-specific to carry out regression analysis on dependent variable via random effects model over the period cover 2011 to 2015 of twelve banks to come up with objective of the study. The study also included interview results to arrive at better conclusion. The main objective of the study was to identify factors and its level of effect on commercial banks‟ liquidity in Ethiopia.

Majority of those independent variables (factors) that affects the banks liquidity are not employed in the previous studies conducted in the area in Ethiopia. These variables include: Foreign Direct Investment (FDI), unemployment rate, NBE-bills purchase, deposit and funding cost. Among those aforementioned variables only funding cost had insignificant impact on banks liquidity and the rest newly included (when compared with prior researches conducted in the area in Ethiopia) had statistically significant effect on the liquidity of commercial banks in Ethiopia. The other two variables included in the model were real GDP growth rate and bank size.

The results of the study suggest that unemployment rate had statistically strong significant and positive impact on liquidity of commercial banks in Ethiopia. This could be the fact that the lower in an investment in the country, the higher in an unemployment rate and lower in demand for loans; and thus liquid assets which to be tied up in an illiquid assets (long term loans) could be unaffected.

Unlike to initial expectation but in consistent with Kirabaeva (2008) and Johnmark et al. (2013), Foreign Direct Investment (FDI) negatively strong significant impact on commercial banks‟ liquidity in Ethiopia. As FDI has direct relationship with demand for loans, the commercial banks liquidity could be declined. On the other hand, countries are higher liquidity risk, financially less developed and higher uncertainty about investment productivity attracts more capital formation in the form of FDI.

The statistically significant and positive effect of real GDP growth rate on commercial banks‟ liquidity was properly aligned to Angora and Roulet (2011) and Cucinelli (2013). The reason is that the increase in real GDP growth rate, increases the consumer income and thus the level of savings can be boomed to increase the liquid assets that the banks hold.

As expected the government policy can be significantly affects the liquidity of commercial banks in Ethiopia, specifically those banks subject to NBE-bill purchase. The NBE-bill purchase had strongly significant even at significant level of 1% and negative impact on banks liquidity. The trends in average liquidity ratio of those commercial banks since commencement of NBE-bill purchase are considerably declined from 61.61% in 2011 to 27.15% in 2015. Thus, most frequently purchased with the limitation of short term loans, mature within one year, not less that 40% and the bank must invest 27% of fresh loans disbursement extensively shifts the liquidity of banks into illiquidity.

Another independent variable that can affect the liquidity of commercial banks in Ethiopia was level of deposit that the banks mobilized in relation to their total assets. Deposit had negatively and statistically significant impact on liquidity of commercial banks. Banks relying more heavily on deposit could face larger liquidity shocks (Alger and Alger, 1999). Thus, given an increase in demand deposits, banks might tend to invest more in loans than in liquid assets.

Though funding cost had statistically insignificant effect on banks liquidity at 5% significant level but 10%, the relationship they had was positive. It is the only explanatory variable among independent variables involved in the model that cannot have statistically significant affect on liquidity of commercial banks. Ethiopian commercial banks may maintain adequate liquid assets buffer or capital from other sources; and when liability cost increases, then banks, instead of relying on inter-bank market, tends to rely more on liquid assets that act as a source of liquidity (Singh and Sharma, 2016; and Berger and Bouwman, 2010). Furthermore, as funding cost

increases the depositors tends to save their excess money in the banks in order to gain more interest income in turn the position of liquid assets is increases.

The inverse relationship between bank size and liquidity is as expected and also properly aligned with theoretical framework of "too big to fail" and prior studies conducted in the area. Larger banks should not need to rely on liquid assets to meet liquidity needs as much as smaller banks due to the fact that they typically have a more diversified depositor population, better known and creditors have better incentives to monitor large banks. However, a unit change on bank size did not leads to substantial change on banks‟ liquidity composition rather the effect would be increase or decrease only by 0.04 units (i.e. one unit change in bank size had less than 5% effect on liquidity). Therefore, increasing or decreasing the assets size of the bank for liquidity management purpose could not bring a major change on liquidity position of the commercial banks in Ethiopia.

Generally speaking, there is high liquidity risk in Ethiopian commercial banks as the minimum liquidity ratio (LIQ) of 18.39% approached to minimum regulatory requirement of 15% (NBE Directive No. SBB/57/2014). NBE-Bills purchase is among the extremely significant variables in negatively affecting the liquidity of commercial banks in Ethiopia as it extensively shifts the liquidity of banks into illiquidity. Banks in Ethiopia more rely on low cost source of fund as deposit to total assets reached 84.43%. Less developed financial system could contributes for liquidity risk as it limits alternative source of funding for liquidity purpose. Relatively smaller banks are holding more buffer of liquid asset than larger banks in Ethiopia.

Finally, macroeconomic as well as government policy variables extensively affects the liquidity of commercial banks in Ethiopia than bank-specific variables. All the statistically significant explanatory variables were significant at 1%, whereas one variable, funding cost, was only significant at 10%. Therefore, macroeconomic and government policy independent variables were the most important factors affecting the liquidity of commercial banks in Ethiopia.

5.2. Recommendation

Based on the results discussed in previous chapter and above conclusion drawn, the following recommendations are forwarded.

As most of the explanatory variables which had significant effects on commercial banks liquidity were external to the banks, the solution also expected from external organs that have relation with those variables. Some of them, like NBE-bill purchase, require immediate action while others may need necessary time and resource to overcome the problem. And also most of those variables are more related to general economic welfare that it might balance by own self or otherwise needs government involvement.

Since beginning of NBE-bill purchase, the liquidity of private commercial banks has been significantly in declining trend and its minimum was approached to the current regulatory minimum requirement of 15%; and thus the NBE should reconsider its policy and respective directives on reducing the percentage of NBE-bill purchase or allow banks NBE-bill purchase cap or total escape this activity. And also NBE in collaboration with other government organs should assess and implement secondary market, which may plays major role as a source of liquidity for commercial banks. The interview result also indicates that absence of secondary market in the country limits the formal alternative source of liquidity when needed. Furthermore, the country is in need for deposit insurance in order to protect deposit run which may hinder the banking operation and leads to financial distress.

On the other hand, less development in financial system might contributes for liquidity problem of the commercial banks in Ethiopia. Thus, all stakeholders including banks as well as government should strive for building strong financial system in the country.

Furthermore, commercial banks in Ethiopia should establish and practice robust asset liability management system such as comprehensive liquidity management policy and strong Asset Liability Management Committee (ALCO) in order to control or mitigate liquidity risk arising from bank-specific factors. This could help commercial banks strengthening its internal control of liquidity risk management at the acceptable level.

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Appendixes

Appendix 1:

Dependent Variable: LIQ
Method: Panel EGLS (Cross-section random effects)
Date: 11/27/16 Time: 14:52
Sample: 2011 2015
Periods included: 5
Cross-sections included: 12
Total panel (balanced) observations: 60
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.801876	0.435466	1.841421	0.0713
UEP	5.414793	1.660822	3.260309	0.0020
FDI	-2.408037	0.699555	-3.442241	0.0011
GDP	5.194271	1.501973	3.458298	0.0011
N-Bill	-0.986250	0.212038	-4.651286	0.0000
DP	-0.629250	0.207846	-3.027481	0.0038
FC	3.862588	2.027214	1.905368	0.0623
BSIZE	-0.041795	0.013966	-2.992530	0.0042

Effects Specification	S.D.	Rho
Cross-section random	0.028223	0.2315
Idiosyncratic random	0.051417	0.7685

Weighted Statistics

R-squared	0.879036	Mean dependent var	0.268152
Adjusted R-squared	0.862753	S.D. dependent var	0.134012
S.E. of regression	0.049647	Sum squared resid	0.128173
F-statistic	53.98294	Durbin-Watson stat	1.671224
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.868975	Mean dependent var	0.424536
Sum squared resid	0.157492	Durbin-Watson stat	1.442267

Appendix 2:

Correlated Random Effects - Hausman Test
Equation: EQ01
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	7	1.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
UMP	5.082097	5.414793	0.907330	0.7269
FDI	-2.242197	-2.408037	0.660244	0.8383
N_Bills	-1.066485	-0.986250	0.024169	0.6058
DP	-0.634761	-0.629250	0.020950	0.9696
FC	4.328993	3.862588	9.262001	0.8782
GDP	4.914308	5.194271	1.796815	0.8346
BSIZE	-0.043514	-0.041795	0.001534	0.9650

Cross-section random effects test equation:
Dependent Variable: LIQ1
Method: Panel Least Squares
Date: 11/27/16 Time: 11:20
Sample: 2011 2015
Periods included: 5
Cross-sections included: 12
Total panel (balanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.907486	1.189493	0.762918	0.4499
UMP	5.082097	1.914591	2.654403	0.0113
FDI	-2.242197	1.072204	-2.091204	0.0427
N-Bills	-1.066485	0.262925	-4.056236	0.0002
DP	-0.634761	0.253279	-2.506171	0.0163
FC	4.328993	3.656720	1.183846	0.2433
GDP	4.914308	2.013141	2.441114	0.0190
BSIZE	-0.043514	0.041577	-1.046597	0.3014

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.909823	Mean dependent var	0.424536
Adjusted R-squared	0.870233	S.D. dependent var	0.142734

S.E. of regression	0.051417	Akaike info criterion	-2.845130
Sum squared resid	0.108393	Schwarz criterion	-2.181921
Log likelihood	104.3539	Hannan-Quinn criter.	-2.585712
F-statistic	22.98122	Durbin-Watson stat	1.894957
Prob(F-statistic)	0.000000		

Appendix 3:

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.404706	Prob. F(2,50)	0.1007
Obs*R-squared	5.264875	Prob. Chi-Square(2)	0.0719

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 12/04/16 Time: 12:36
Sample: 1 60
Included observations: 60
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.036262	0.357139	0.101535	0.9195
UEP	-0.233150	1.671794	-0.139461	0.8896
FDI	0.066001	0.666579	0.099014	0.9215
GDP	0.026193	1.456134	0.017988	0.9857
N-Bills	-0.027255	0.185330	-0.147059	0.8837
DP	-0.103128	0.199730	-0.516336	0.6079
FC	0.548322	1.611001	0.340361	0.7350
BSIZE	0.002642	0.010508	0.251402	0.8025
RESID(-1)	0.311097	0.145499	2.138143	0.0374
RESID(-2)	-0.167828	0.157730	-1.064022	0.2924

R-squared	0.087748	Mean dependent var	7.05E-16
Adjusted R-squared	-0.076457	S.D. dependent var	0.051605
S.E. of regression	0.053542	Akaike info criterion	-2.865704
Sum squared resid	0.143335	Schwarz criterion	-2.516647
Log likelihood	95.97112	Hannan-Quinn criter.	-2.729169
F-statistic	0.534379	Durbin-Watson stat	2.020832
Prob(F-statistic)	0.842475		

Appendix 4: Ratio Data

Year	BANK	LIQ	UMP	FDI	GDP	N-Bills	DP	FC	BSIZE
2011	AIB	0.5228	0.1800	0.1510	0.1140	0.1432	0.7655	0.0271	23.1293
2012	AIB	0.3434	0.1750	0.1180	0.0870	0.1892	0.7711	0.0310	23.2978
2013	AIB	0.2847	0.1650	0.1340	0.0990	0.1769	0.8443	0.0289	23.6016
2014	AIB	0.3365	0.1740	0.1540	0.1030	0.1840	0.7509	0.0316	23.8191
2015	AIB	0.2096	0.1680	0.1730	0.1020	0.2128	0.7759	0.0345	23.9505
2011	DB	0.5258	0.1800	0.1510	0.1140	0.0664	0.8077	0.0275	23.4053
2012	DB	0.4105	0.1750	0.1180	0.0870	0.1156	0.8028	0.0292	23.5866
2013	DB	0.3824	0.1650	0.1340	0.0990	0.1480	0.8027	0.0309	23.7063
2014	DB	0.3700	0.1740	0.1540	0.1030	0.1863	0.8051	0.0324	23.8126
2015	DB	0.2791	0.1680	0.1730	0.1020	0.2347	0.8001	0.0337	23.9327
2011	BoA	0.4767	0.1800	0.1510	0.1140	0.1122	0.8347	0.0269	22.7081
2012	BoA	0.3726	0.1750	0.1180	0.0870	0.1773	0.8218	0.0308	22.8322
2013	BoA	0.2320	0.1650	0.1340	0.0990	0.2057	0.8388	0.0245	23.0417
2014	BoA	0.3019	0.1740	0.1540	0.1030	0.2404	0.8067	0.0348	23.1460
2015	BoA	0.2608	0.1680	0.1730	0.1020	0.2479	0.8135	0.0334	23.3383
2011	WB	0.5602	0.1800	0.1510	0.1140	0.1116	0.7390	0.0168	22.8103
2012	WB	0.4847	0.1750	0.1180	0.0870	0.1914	0.6898	0.0243	22.8452
2013	WB	0.3675	0.1650	0.1340	0.0990	0.2270	0.7265	0.0228	23.0645
2014	WB	0.3585	0.1740	0.1540	0.1030	0.2637	0.7458	0.0275	23.1681
2015	WB	0.2479	0.1680	0.1730	0.1020	0.3036	0.7199	0.0295	23.3415
2011	UB	0.5868	0.1800	0.1510	0.1140	0.1044	0.7852	0.0239	22.7678
2012	UB	0.4236	0.1750	0.1180	0.0870	0.1759	0.7690	0.0294	22.8965
2013	UB	0.2557	0.1650	0.1340	0.0990	0.2188	0.8082	0.0307	23.0244
2014	UB	0.3800	0.1740	0.1540	0.1030	0.2414	0.7498	0.0313	23.1978
2015	UB	0.2307	0.1680	0.1730	0.1020	0.2821	0.8220	0.0327	23.3878
2011	NIB	0.7066	0.1800	0.1510	0.1140	0.0792	0.7252	0.0232	22.6850
2012	NIB	0.5106	0.1750	0.1180	0.0870	0.1464	0.7055	0.0260	22.8366
2013	NIB	0.3388	0.1650	0.1340	0.0990	0.2090	0.7278	0.0278	22.9364
2014	NIB	0.2418	0.1740	0.1540	0.1030	0.2499	0.7372	0.0233	23.0511
2015	NIB	0.1839	0.1680	0.1730	0.1020	0.2847	0.7373	0.0307	23.3077
2011	CBO	0.6146	0.1800	0.1510	0.1140	0.0923	0.7920	0.0217	21.6434
2012	CBO	0.4418	0.1750	0.1180	0.0870	0.1163	0.7621	0.0212	22.0237
2013	CBO	0.6264	0.1650	0.1340	0.0990	0.0868	0.6829	0.0157	22.6008
2014	CBO	0.3390	0.1740	0.1540	0.1030	0.1143	0.7414	0.0185	22.7180
2015	CBO	0.3308	0.1680	0.1730	0.1020	0.1313	0.6428	0.0187	23.1623
2011	LIB	0.7035	0.1800	0.1510	0.1140	0.0912	0.7175	0.0209	21.3155
2012	LIB	0.5983	0.1750	0.1180	0.0870	0.1407	0.7051	0.0231	21.6247
2013	LIB	0.4670	0.1650	0.1340	0.0990	0.1778	0.7157	0.0265	21.8025
2014	LIB	0.4205	0.1740	0.1540	0.1030	0.1983	0.7436	0.0275	22.0079

2015	LIB	0.3445	0.1680	0.1730	0.1020	0.1445	0.7607	0.0239	22.4913
2011	OIB	0.5568	0.1800	0.1510	0.1140	0.1478	0.7780	0.0213	21.3971
2012	OIB	0.5230	0.1750	0.1180	0.0870	0.1638	0.7596	0.0262	21.7484
2013	OIB	0.3938	0.1650	0.1340	0.0990	0.1810	0.7799	0.0209	22.0871
2014	OIB	0.3726	0.1740	0.1540	0.1030	0.1779	0.8133	0.0203	22.5400
2015	OIB	0.2297	0.1680	0.1730	0.1020	0.2015	0.7646	0.0215	22.9782
2011	ZB	0.6082	0.1800	0.1510	0.1140	0.1341	0.7206	0.0353	21.2019
2012	ZB	0.5020	0.1750	0.1180	0.0870	0.1632	0.7488	0.0369	21.5963
2013	ZB	0.4483	0.1650	0.1340	0.0990	0.2244	0.7713	0.0401	21.9014
2014	ZB	0.4928	0.1740	0.1540	0.1030	0.2413	0.7722	0.0378	22.0906
2015	ZB	0.3019	0.1680	0.1730	0.1020	0.2785	0.7844	0.0358	22.3073
2011	BuIB	0.7697	0.1800	0.1510	0.1140	0.0145	0.6291	0.0266	20.4766
2012	BuIB	0.4467	0.1750	0.1180	0.0870	0.1725	0.6617	0.0259	21.0344
2013	BuIB	0.3754	0.1650	0.1340	0.0990	0.1848	0.7144	0.0256	21.4787
2014	BuIB	0.4153	0.1740	0.1540	0.1030	0.2008	0.7144	0.0257	21.8259
2015	BuIB	0.2341	0.1680	0.1730	0.1020	0.2264	0.7781	0.0257	22.2273
2011	BrIB	0.7619	0.1800	0.1510	0.1140	0.0295	0.7597	0.0255	20.6331
2012	BrIB	0.6098	0.1750	0.1180	0.0870	0.1413	0.7251	0.0303	20.9741
2013	BrIB	0.4644	0.1650	0.1340	0.0990	0.1588	0.7250	0.0246	21.5105
2014	BrIB	0.4879	0.1740	0.1540	0.1030	0.1945	0.7151	0.0301	21.7580
2015	BrIB	0.4052	0.1680	0.1730	0.1020	0.1951	0.7354	0.0238	22.1516

Appendix-5: Interview Instrument

Addis Ababa University

School of Business and Public Administration

Department of Accounting and Finance

Interview questions for the higher officials of Ethiopian Commercial Banks

1. Have you faced liquidity problem in the last five years?
2. Do you have a list of potential liquidity determinants of your bank?
3. Does the government policy relating to your operation have significant negative impact on your bank‟s liquidity?
4. What and how are your own factors affecting your bank‟s liquidity?
5. What and how are macroeconomic factors do you think affecting your bank‟s liquidity?
6. What measures have been employed in order to address liquidity risk raised from those liquidity determinants?
7. Any other comment

Thank you!