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Determinants of Commercial Banks' Liquidity Risk: Evidence from Ethiopia

Fentaw Leykun
Department of Accounting and Finance, Bahir Dar University, Bahir Dar, Ethiopia

Abstract
This paper empirically examine the determinants of liquidity risk in Ethiopian banking industry spanning the period 2005 to 2014—a period characterized by increasing the bank's growth in different aspects. The fixed effect unbalanced panel data estimation technique was used to estimate the results without compromising the classical linear regression assumptions. The results of the analysis revealed that capital adequacy ratio, total loan to total asset ratio and total deposit to total asset ratio affects the liquidity risk of commercial banks negatively and highly statistically significantly at 0.01% significant level. These variables are found to be the most important bank specific factors that determine the liquidity position of banks. The results of the study confirms the existence of the crowding-out of deposit hypothesis in Ethiopian banking industry that could be assured by the negative and significant effect of capital adequacy. In addition, both the share of loans and deposits in total assets and total liabilities respectively indicates mismatch of obtained funds and assets operations. All in all, the management of each bank should emphasize the importance to consider the liquidity mismatch of assets and liabilities to evaluate the liquidity profile of banks. Moreover, focusing on deposit funding leads to ignore some widely used alternative sources of funding through the issue of commercial paper enter alia, as per the recommendations of international practices.
Keywords: Determinants, liquidity risk, fixed effect, Ethiopia.

I. Introduction

Liquidity and liquidity risk management are the key factors for the safety of business operations in any commercial banks (Bertham 2011). Together with the development of finance market, opportunities and risks in liquidity management of commercial banks will also meet a correlative increase. This shows the importance of planning the liquidity needs by the methods with high stability and low cost in order to sponsor for business operations of commercial banks in the global growing competition (Kochubey, Kowalczyk 2014).

Commercial banks are chief financial institutions in the financial system and the economy as a whole, they accept demand deposits and make loans and provide other services for the public.

These banks make a profit by intermediating between depositors (savers) and borrowers (investors).

As financial intermediaries, banks play a crucial role in the operation of most economies. Banks require a good management team to enable them to segregate between different level of liquidity, maturity, and risk preferences(Acaravci & Çalim, 2013**)**.

Bank for International Settlements (BIS, 2008), define liquidity as the ability of bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. As banking system plays a vital role in economies based on modern market, it is surprising that researches on determinants of risk are still very few (Rahman et al, 2015.) For a number of financial participants, it is very important to understand the risk of bank. The evaluation of risk of bank is important for the stakeholders such as regulators, government, borrowers, market supervisors, bondholders and shareholders. As regulators and supervisors are responsible for financial stability, they have an interest on bank overall risk. Bondholders are concerned about the probability of bank default and concerned about the overall risk and shareholders are concerned about the systematic risk and overall risk. Haq & Heaney (2012) suggested that, usually, borrowers are concerned about the financial health of banks for credit, so they are interested in credit risk.

As the concern of this study, Liquidity risk arises from the fundamental role of banks in the maturity transformation of short-term deposits into long-term loans. Liquidity risk could be decomposed in to funding liquidity risk and market liquidity risk. Funding liquidity risk is the risk that the bank will not be able to meet efficiently both expected and unexpected current and future cash flow and collateral needs without affecting either daily operations or the financial condition of the firm. According to Drehman-Nikolau, (2009), market liquidity risk is the risk that a bank cannot easily offset or eliminate a position at the market price because of inadequate market depth or market disruption. In the literature of risk of banks, liquidity is considered as an important one. As a major portion of total asset corresponds to loans and advances, high level of liquidity is represented by high level of loans and advances which means there is a high level investment in risk-weighted assets. For that reason, it will lead the banks to a high level of risk (Berger, 1995; Roy, 2008). A high level of the liquidity ratio represents a low level of liquidity which implies that there is a risk for not having enough cash reserves in the banks to meet the demands of deposit withdrawals. Having the meaning and main sources of liquidity risk, this research is aimed at examining the bank specific and industry determinants of commercial

banks liquidity risk in Ethiopian banking industry.

1.1 Problem Statement

Samad (2004) states that ‘‘liquidity is the life and blood of a commercial bank**’’.** Recent studies indicate that liquidity risk arises from the inability of a bank to accommodate decreases in liabilities or to fund increases in assets. An illiquid bank means that it cannot obtain sufficient funds, either by increasing liabilities or by converting assets promptly, at a reasonable cost. In periods the banks don’t enjoy enough liquidity, they cannot satisfy the required resources critical conditions, lack of enough liquidity even results in bank’s bankruptcy (Group of Studies 2008).

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

Commercial banks that are able to select good from bad borrowers, diversify risks, minimize transaction costs, etc., and would then channel these savings to the best investors who earn the highest rate of return. Performing such roles of intermediation, banks not only increase the rate of capital accumulation but also increase productivity, thereby boosting the economy's steady-state growth (Bencivenga and Smith, 1991). However, in many less developed countries banks hold large quantities of excess liquidity-a large part of which is non-remunerated-in their asset portfolio (Fielding and Shortland, 2005; Khemraj, 2006; Saxegard, 2006). The required liquidity (or reserve) ratio is set by the central bank in the individual country.

Diamond and Rajan (2005) have argued that liquidity is one of the essential requirements for the effective functioning of the banking system. Without adequate liquidity, banks are not able to perform some of their core functions including settlement of their inter-bank obligations (transactions occurring between banks). In addition, too much liquidity in the banking system on a regular basis fosters an expectation of falling interest rates; too little liquidity increases the expectation of higher interest rates. Maintaining smooth cash flows and reducing short-term interest rate volatility produces a stable environment where businesses and individuals can make more informed decisions about savings, investment and other expenditures.

Recently, academic literature on issues of liquidity and liquidity risk is increasing. Though, practitioners perhaps question the late arrival of these topics into academic focus, academics have traditionally preferred to look at the world through the lens of complete and frictionless markets. Acharya, (2006), argue that this approach is traditional and have become clearly transparent over the last decade or two in the wake of events where the ability to trade securities and the ability to access capital market financing dried up considerably. Thus, according to him, the issue of liquidity is timely and fitting to examine what causes liquidity to vary over time and to dry up suddenly in some scenarios, and what implications this has for risk managers at banks and financial institutions.

In prior literature, it has been argued that in the liquidity risk management activities, banks continually deal with either a liquidity deficit or a liquidity surplus situation both of which are not desirable for banks, and Liquidity deficit can lead to unexpected cash shortages that must be covered at undue costs. On the other hand, excess liquidity results in low asset yields hence poor earnings. Excess liquidity build up may also entail a foregone income to a bank and a welfare loss to an economy.

Besides, banking literature suggests that Commercial banks are increasing the quantity of long-term loan that are not secured by long-term resources. The short-term resource transformation into the long-term assets threatens bank liquidity, and as a result, can lead to the bank insolvency. But the content of an unnecessarily high sum of liquidity assets can have a negative impact on the banks profitability, because the money in the customers’ current accounts does not earn anything. Therefore the management of liquidity is very important. The management of the commercial bank should choose liquidity assessment methods that would be able to identify, evaluate and manage every factor that influences liquidity. Because of the low-quality loan portfolio considerably decreased the liquidity of commercial banks in Ethiopia, this example proves the necessity of examining the determinants of liquidity risk in commercial banks operating in the country, Ethiopia.

Currently, accelerated and sustained economic growth is on the top of Ethiopian Government’s policy agenda. A developed financial sector facilitates economic competition, integrates commodity markets and facilitates growth. Moreover, once financial services are extended to rural and poor producers, a developed financial system is a strong tool to reduce poverty. The National Bank of Ethiopia (NBE) is vested with powers, duties and responsibilities of monetary management, regulation and supervision of banks. As one of its responsibilities the NBE is playing a vital role in managing the liquidity position of the banking system. In case of banks operating in Ethiopia, any licensed bank shall maintain liquid assets of not less than 25% of its total

current liabilities. For the purpose of meeting the liquidity requirement, each bank shall maintain at least 20% of the current liabilities in the form of primary reserve assets and 5% of the current liabilities in the form of secondary reserve assets (directive No SBB/44/2008). Furthermore, to the best knowledge of the researcher no empirical evidence which examine the determinants of commercial banks liquidity risk in Ethiopia. Thus, the purpose of this study is to fill this gap by examining the determinants of commercial banks liquidity risk in Ethiopia.

1.2 Objective Of The Study

Customarily, studies under quantitative approach do have one main objective and as many specific objectives as required. The general objective of the study was to analyse the bank specific and industry specific factors affecting the liquidity risk of commercial banks operating in Ethiopia.

Specifically, the study attempts to:

i. Examine the effect of capital adequacy ratio on liquidity risk of commercial banks in Ethiopia
ii. Examine the effect of operational efficiency on liquidity risk of commercial banks in Ethiopia
iii. Examine the effect of the share of loans in total assets on liquidity risk of commercial banks in Ethiopia
iv. Examine the effect of the share of deposits in total liabilities on liquidity risk of commercial banks in Ethiopia
v. Examine the effect of market power and competition on liquidity risk through each Bank Lerner index and market share in the sector.

1.3 Significance Of The Study

Creswell, (2003) suggested that this section elaborates on the importance and implications of a study for researchers, practitioners, and policy makers. According to him, in designing this section, one might include three or four ways in which the study adds to the scholarly research and literature in the field, helps improve practice and why the study will improve policy. Thus, the researcher suggests the potential benefits for potential audiences as bellow. On the whole, it will help the respective Bank managers in particular, and police makers, bank supervisors, and regulators in general, to frame policies aimed at maintaining the growth momentum of the banking sector in the country. Most classically this study will help managers in different ways; by focusing on the key factors affecting liquidity in the banking industry, it may be helpful in order to develop new deposit and loan business, used for supervision and staff motivation, achieves individual and branch sales goals through new business sales and Participates in community affairs to increase the Bank's visibility and to enhance new and existing business opportunities etc. and thereby increase performance of bank in terms of liquidity management, enter alia. At last, the study will be help full for researchers in the area, using the limitations of this study as stepping stone, to further investigate the factors affecting the liquidity position of commercial banks and forward their suggestions to the potential beneficiaries.

1.4 Delimitation And Limitation Of The Study

Though, it is believed in the literature that more observation means more information for generalization, the focus of this study is just to see the bank specific and industry specific factors affecting the liquidity position of commercial banks operating in Ethiopia covering the period 2005-to-2014, and in this time span the banks have shown a significant increasing trend in liquidity position, and growth. This study is designed to examine the determinants of commercial banks liquidity risk by applying fixed effect model (estimation technique) on unbalanced panel data without compromising the classical linear regression assumptions. The study would be better generalized if one could see these factors with mixed approach-philosophy-pragmatism paradigms through incorporating the macroeconomic factors as well.

II. Related Literatures

2. Theories of Bank Liquidity

In selecting a theoretical framework, many contending theories were considered as possible explanatory frameworks within which to fit the determinants of Bank liquidity and its impact on Profitability. In the banking theory and practice, there are no generally accepted indicators measuring the liquidity of banks. Though, there are not enough acceptable indicators for measuring the liquidity, different authors such as Sinkey, 2000; Koch et.al. (2000), offered their own approaches for measuring and expressing the liquidity of individual banks and the banking system, as a whole.

Different theories have been suggested in the literature; the inventory management model, demand for money model, Keynes liquidity preference theory, theory of corporate liquidity, theory of bank liquidity requirement, financial intermediation and liquidity management theory are among others. For the purpose of this study theory of banks liquidity requirement and financial intermediation have gained a special focus. Theory of Bank Liquidity Requirements states that, not only does cash mitigate the liquidity risks attendant to exogenous

shocks; it also mitigates endogenous (banker chosen) default risk (Charles, Florian and Marie, 2012). 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).

A central difficulty with discussing issues relating to liquidity is the lack of consensus on what it means Acharya (2006). Liquidity is clearly multifaceted and perhaps also a somewhat loosely employed economic concept. For capital market participants, it is commonly refers to transaction costs arising from such sources as bid-ask spreads, price impacts, and (limited) market depth for trading in securities, liquidity risk for this segment of market participants generally refers to unpredictable variations in transaction costs- this notion of liquidity and liquidity risk as pertaining to "market liquidity". In contrast, risk managers at banks and financial institutions are concerned about liquidity on the funding side- pertains to the ease with which cash shortfalls of the enterprise can be funded through various sources of financing - internal or external - that the enterprise has access to- refer to “funding liquidity" and its unpredictable fluctuations over time as funding liquidity risk.

It has been argued in the literature that, in the portfolios of commercial banks, liquid assets play a very vital role since the banks operate mainly with the funds borrowed from depositors in either forms of demand and time deposits. In view of the fact that these deposits represent the obligations of the banks to be paid whenever they are requested, the banks should always allocate their funds in such a way that their portfolios should always contain an adequate level of liquid assets. All in all, it can be inferred that liquid assets are viewed as the essential balance sheet items which have the capacity to maintain the confidence of depositors which is the most valuable intangible asset of the commercial banking business. Banks, deliberately or not, fail to maintain adequate levels of liquid assets in their portfolios are likely to create a fear or a loss of confidence among depositors over the safety of their deposits, and this fear is contagious(Friedman and Schwartz (1963, p. 308), it spreads among the banks through deposits withdrawals or through correspondent relations.

Furthermore, literature suggests that commercial banks are highly leveraged financial institutions and vulnerable to runs of deposits, they should be discouraged from taking excessive risks in their lending and investing activities. Excessive risk takings, in turn, produce substantial increases in holdings of illiquid assets in the banks' portfolios. Inevitably, aggressive behaviour of the unhampered banks adversely affects the level of liquid assets. These behavioural changes in the commercial banking sector during the instable periods eventually cause a fear to emerge among depositors over the safety of their money (Mehmet, 1987).

McKinney& McCracken, (1974), argued that the problem of bank liquidity is essentially that of being able to raise sufficient amounts of cash quickly and easily at going market rates of interest. They suggested reserves of short-term assets as traditional sources of liquidity which can be run off when credit is needed (asset liquidity) and the ability to purchase funds directly in the money market (liability liquidity). In addition, inflationary demand has caused asset liquidity to fall sharply in recent years as banks have run down their cash assets to make way for less liquid but more profitable business loans Liability liquidity - a bank's unused borrowing capacity or its ability to tap the market for additional funds - is more difficult to evaluate. If it is presumed that banks, like other borrowers, tend to wear out their welcome the more they borrow, then higher levels of actual borrowing would tend, ceteris paribus, to reduce liability liquidity.

Measurement and Computation of liquidity in accordance with Basel III

Liquidity risk can be measured by two main methods: liquidity gap and liquidity ratios. The liquidity gap is the difference between assets and liabilities at both present and future dates. At any date, a positive gap between assets and liabilities is equivalent to a deficit (Bessis 2009). Liquidity risk is usually measured as liquidity ratio which is practically calculated in two different forms: In first type, liquidity is adjusted by size which includes the ratio of cash asset to total asset (Barth 2003; Demirguc-Kunt 1998), the ratio of cash asset to deposits (savings) (Chen 2010). Second type includes the adjusted loan by the size which includes the ratio of total asset and/or the ratio of net loan to total asset (Kosmidou 2008). In first type, the higher is the liquidity ratio, the higher is the liquidity level, and therefore, it is less vulnerability against bankruptcy. In contrast, in second type, the higher are the values of ratios, it will represent that banks will undergo higher liquidity risk.

Acknowledging the necessity for an increasing level of bank’s liquidity risk management and control, the Basel Committee on Banking Supervision (BCBS) developed a new version of Basel III, it provides for the introduction of uniform requirements for the maintenance of a sufficient amount of liquid resources reserve in order to prevent the future periods of crisis the high level of insufficiency financial resources. In this case, for commercial banks are offered two new ratios, which regulate the condition of liquid assets: LCR – Liquidity Coverage Ratio and NSFR – Net Stable Funding Ratio. (LRC) is an essential element of Basel’s III reforms, which is regarded as the liquidity world standard for banks. LRC needs to strengthen global regulations of liquidity management with the objective to stimulate the world-banking sector being stronger. LCR stimulates stability of the banks in the short-term period. According to the requirements of Basel’s III, in case of a crisis, the bank’s liquid assets reserves should cover the predicted cash outflows in 30 calendar days. These measures will allow banks to have the necessary liquidity level in case unexpected withdrawals of cash or if a bank has

troubles receiving a loan in the interbank market. In other words, the LCR will help improve the banking sectors ability to absorb upheavals and lighten the impact from financial and economic strain.

According to Basel III of The liquidity coverage ratio (2013), LCR can be calculated using the formula; LCR= stock of high quality asset (SHQLA)/ Total net cash outflows over the next 30 calendar days >100%. The LCR was established on the 1st of January 2015 and the minimum requirement at first year shall be 60% and the LCR requirement will increase by 10% each year, meaning that by 2019 it shall be 100%. On the one hand, 100% of the liquid assets amount greatly increases a bank's ability to fulfil their liabilities; on the other hand, it also greatly decreases the profitability of a bank. The requirements of the LCR are strict and by following them the commercial banks are encouraged to invest their free resources in securities with high liquidity, in order to gain some profit while complying with liquidity requirements. According to this accord, in order to maintain liquidity, the commercial banks should to purchase quickly marketable securities, and at the same time, because of the great demand, the stock markets could reduce the coupon payments and discount rates for quickly marketable securities. But, i argue that this suggestion may work for countries having well structured financial markets, in Ethiopia there is no well established financial market-Banks, microfinance and insurance companies are the only financial institutions in the country.

The other new liquidity indicator is –the net stable funding ratio (NSFR). The objective of NSFR is liquid assets coverage by 100% at the expenses of 1-year stable liabilities. The NSFR planned to be implemented on the 1stof January 2018 (Basel III: The Net Stable Funding Ratio 2014). The NSFR was created that investment assets, off-balance sheets and other securitised assets could to receive financial support by stable liabilities. The purpose of this indicator is to limit the reliance on large financial sources in periods of liquidity surplus and promote the more precise liquidity risk assessments for all sheets of balance and off-balance sheets. This kind of approach will help the commercial banks lower the possibility of a sudden deterioration of the liquidity indicator and prevent the increase of liquid assets reserves on the account through the short-term sources of funding. According to Basel III: The Net Stable Funding Ratio 2014, The NSFR is calculated by the formula; NSFR = available amount of stable funds (ASF)/required amount of stable funds (RSF) > 100%. The gist of the NSFR is: the greater is the amount of the non-liquid assets in the bank, the greater is the necessity for a secure and stable financial support because the stable resources outflows would be less probable and it would allow using these resources as financial support of non-liquid assets in stress situations (Konovalova, 2015).

Furthermore, it is evident that bank liquidity and liquidity risk is very up-to-date and important topic which is of crucial importance of academicians and policymakers. There exist also a relatively large number of studies which use liquidity ratios. However, most of them use liquidity ratios only as an input for further analysis. Other studies focus more on the liquidity of the whole banking sector and so does not use the values of ratios of individual banks. Liquidity ratios are various balance sheet ratios which should identify main liquidity trends. These ratios reflect the fact that bank should be sure that appropriate, low-cost funding is available in a short time. This might involve holding a portfolio of assets than can be easily sold (cash reserves, minimum required reserves or government securities), holding significant volumes of stable liabilities (especially deposits from retail depositors) or maintaining credit lines with other financial institutions.

Various authors (such as Maechler et al., 2007; Ghosh, 2010; Aspachs et al., 2005; Moore, 2010, among others) provide various liquidity ratios such as liquid asset/total asset *100%, liquid asset/deposits + short term borrowings * 100%, liquid asset/ deposits *100%, loans/total assets *100% and loans/deposits *100%. For the purpose of evaluation of the liquidity positions of Ethiopian commercial banks the ratio of liquid asset to total deposits was used since it includes deposits to households and enterprises as compared to other liquidity ratios. It also measures the liquidity of a bank assuming that the bank cannot borrow from other banks in case of liquidity need. This is relatively strict measure of liquidity but it enables the researcher to capture at least the part of the market liquidity risk. 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. Lower value indicates a bank's increased sensitivity related to deposit withdrawals (Acharya, 2006*)*.

2.2 Empirical Evidences

Empirical findings suggested many of Bank-specific and macroeconomic determinants of liquidity of commercial banks in the world (Valla & Saes, 2006; Bunda & Desquilbet, 2008; Lucchetta, 2007; Fielding & Short land, 2005; Rauch et al, 2009 enter alia).

Valla & Saes, 2006, examine both bank specific and macroeconomic determinants of English banks and found that the liquidity ratio as a measure of the liquidity is influenced by Probability of obtaining the support from lender of last resort, interest margin, and bank profitability, size of the bank, GDP growth, and short term interest rate. A study by Bunda & Desquilbet, (2008) examined the determinants of liquidity risk of banks from emerging economies with panel data regression analysis and find that the liquidity ratio as a measure of bank's liquidity assumed to be dependent on individual behaviour of banks, their market and macroeconomic environment and the exchange rate regime. Bank size, the realization of a financial crisis and the lending interest

rate as a measure of lending profitability affects liquidity ratio. On the other hand the ratio of equity to assets as a measure of capital adequacy, the presence of prudential regulation, the share of public expenditures on gross domestic product as a measure of supply of relatively liquid assets, and the rate of inflation, have a positive and significant effect on liquidity ratio.

Lucchetta, 2007, test empirically the hypothesis that interest rates affect banks' risk taking and the decision to hold liquidity across European countries. This author suggest that the liquidity measured by different liquidity ratios is positively and significantly influenced by behaviour of the bank on the interbank market – the more liquid the bank is the more it lends in the interbank market, interbank rate as a measure of incentives of banks to hold liquidity and bank size measured by logarithm of total bank assets, and negatively related to monetary policy interest rate as a measure of banks ability to provide loans to customers, share of loans on total assets and share of loan loss provisions on net interest revenues, both as a measure of risk-taking behaviour of the bank, where liquid banks should reduce the risk-taking . Besides, Rauch et al (2009), examined the effects of the financial crisis on the liquidity of commercial banks in Latin America and Caribbean countries and suggested that Liquidity is negatively affected by cash requirements of customers, captured by fluctuations in the cash-to-deposit ratio and money market interest rate as a measure of opportunity costs of holding liquidity, and is positively affected by current macroeconomic situation, where a cyclical downturn should lower banks' expected transactions demand for money and therefore lead to decreased liquidity. Fielding & Short land, 2005), investigated the Liquidity position created by Germany's state-owned savings banks and its determinants. The result of this study suggested that monetary policy interest rate, where tightening monetary policy reduces bank liquidity, level of unemployment, which is connected with demand for loans, size of the bank measured by total number of bank customers and bank profitability affect liquidity ratio significantly and negatively, Whereas, savings quota and level of liquidity are found to have a positive and significant effect on liquidity position of the bank under consideration.

The loan portfolio is typically the largest asset and the predominate source of revenue. Diamond &Rajan (2002) stated that lending is the principal business activity for most commercial banks. As such, loan is one of the greatest sources of risk to a banks safety and soundness (Kiyotaki and Moore, 2008). Since loans are illiquid assets, increase in the amount of loans means increase in illiquid assets in the asset portfolio of a bank. According to Eakins (2008), in practice the amount of liquidity held by banks is heavily influenced by loan demand that is the base for loan growth. If demand for loans is weak, then the bank tends to hold more liquid assets (short term assets), whereas if demand for loans is high they tend to hold less liquid assets since long term loans are generally more profitable. Therefore, a growth in loans and advances, measured by the Current year total loans less previous year total loans over the previous year total loans, has negative impact on banks liquidity (Weisel, Harm, &Brandley, 2003).

In their assessment of liquidity in accordance with Basel III, Angora & Roulet, (2011), notice that the average share of total loans to total assets is significantly higher for US than for European banks (respectively, 69% and 65%), and the average share of total deposits to total assets is significantly higher for US banks than for European banks (respectively, 77% and 49%). They suggest that this may be explained by the differences in regulation in the US from Europe, indeed, in the US, banking groups are submitted to requirements in terms of segmentation of their activities into several subsidiaries. In addition, US banking groups are allowed to carry out activities closely related to banking, such as investment banking and insurance, only if they are considered as well capitalised by the Federal Reserve (i.e., if they meet the Fed's highest risk-based capital rating). It is the reason why most banking groups are focused on banking business, primarily issuing deposits and making loans. However, in Europe, banking groups are not submitted to such requirements and can more easily develop their market activities. This indicates that as the share of loans increases in the total assets of a bank, the banks liquidity position will be affected to be reduced below the requirement. In addition, as the share of total deposit in total assets increase and immediately transferred to long term loan again the liquidity position of the bank will be disrupted. Moreover, Mousaa, 2015, has empirically examine the determinants of commercial banks liquidity in Tunisia and 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.

The other important ratio is that proxy management is operational efficiency (OE) is the operating cost to gross income ratio i.e. the operating costs necessary to generate one unit of gross income. The relationships are expected to be negative, since high costs are likely to erode liquidity of the bank (Sharma & Gounder 2011). The Lerner index is used as a measure of the level of competition in the banking system, i.e. market power of banks. Inefficiencies in a banking sector are likely to reflect the absence of competitive environment (Gelos, 2006). Excessive competition may lead to excessive risk taking of banks, gambling, fragilities and instabilities, and ultimately lead to financial crisis (Stilgitzt 2000). Hawtrey and Liang (2008) defined Learning Index as the ratio of the difference between price and average cost divided by price, which is equivalent to the difference

between total revenue and total cost divided by total revenue. In other words, it is the difference between the price and the total marginal costs (operating + financial) as a proportion of the price (total revenues). The values of the index range from 0 (perfect competition) to 1 (monopoly), the sign of the relationship is expected to be positive as it was explained in literatures, this is because as the total revenue net of operating profit to total revenue increases that will compensate the liquidity balance of the bank through retained earnings as a reserve.
The market share measured as t the ratio of the total assets of a bank to the total assets of all the banks in a given country. Higher value means larger market share of a bank with respect to its domestic market. The Structure-Conduct-Performance (SCP) hypothesis, which also sometimes referred to as the market power (MP) hypothesis, asserts that increased market power yields monopoly profits. Applied in banking the MP hypothesis posits that the performance of bank is influenced by the market structure of the industry. Two distinct approaches have been suggested within the MP theory; the Structure-Conduct Performance (SCP) and the Relative Market Power hypothesis (RMP). According to the SCP approach, the level of concentration in the banking market gives rise to potential market power by banks, which may raise their profitability by lowering deposit rates and to charge higher loan rates as a results of collusive (explicit or tacit) or monopolistic reasons, than firms operating in less concentrated markets, irrespective of their efficiency (Tregenna, 2009). Unlike the SCP, the RMP hypothesis posits that bank profitability is influenced by market share. It assumes that only large banks with differentiated products can influence prices and increase profits. They are able to exercise market power and earn non-competitive profits. In this paper this variable is investigated theoretically and with intuitive thinking of the researcher because of lack of empirical evidence which support or neglect the casual relationship between the variable with liquidity position of banks.

2.3 Study Hypotheses

After stating the research problem and reviewing the theoretical and empirical literature, and considering the real situations of the Ethiopian banking industry, the ground is prepared for structuring hypothesis. A hypothesis is an expectation of what the researcher beliefs that he/she might find in the data. It provides a directly testable relational statement and facilities extension of knowledge. Hypothesis should always be in declarative sentence form, and should relate either generally or specifically variables to variables. Hypotheses are formulated usually either from a research problem statement, an existing theory or the findings of previous studies. Thus, basing all these, the researcher has formulated the bellow hypotheses to show the relationship between the dependent and independent variables concerned for this study.

i. HO: Capital Adequacy does not significantly affect commercial banks' liquidity risk in Ethiopia
ii. HO: Operational efficiency does not significantly affect commercial banks' liquidity risk in Ethiopia
iii. HO: The share of loans in total assets does not significantly affect commercial banks' liquidity risk in Ethiopia
iv. HO: The share of deposits in total liabilities does not significantly affect commercial banks' liquidity risk in Ethiopia
v. HO: Lerner index does not significantly affect commercial banks' liquidity risk in Ethiopia
vi. HO: Market share does not significantly affect commercial banks' liquidity risk in Ethiopia

III Research Methodology

This study was designed to follow the post positivism research paradigm-quantitative approach-philosophy, specifically explanatory research design-a research design through which the collected data are analyzed through statistical tools such as econometric models to see the significance of the parameters/ coefficients of each of the variables under investigation.

3.1 The Data

Majority of the data for this study has been collected from annual publications of the national bank of Ethiopia (NBE) and each commercial banks audited annual financial reports. The audited financial statements of the banks over the study period has been obtained from National Bank of Ethiopia, (which is responsible for maintaining the audited financial statements of all banks operating in the country and regulate their operating activities), the country's central bank. Basically, the balance sheet and income statements were the main sources of the relevant data to address the stated objectives of the study. The variables have been selected based on prior studies and professional judgment of the researcher. The variables considered are: equity –to- asset ratio as a proxy for capital adequacy, (operating cost + financing/total revenue)-Lerner index to proxy competition in the market/industry, operating expenses –to- total asset ratio to proxy for operational efficiency, total loans –to-total assets to proxy the level of , total deposit –to- total assets to proxy the level of deposits.

3.2 Sampling Design

It is believed that, in designing a sample, basing the sample selection on a comprehensive list of potential

respondents who have an equal chance of selection is vital to increasing the representativeness of the samples. Meanwhile, the researcher does not use any statistical formula to determine the sample size because the nature of the study and the population items, (unit of analysis in this study), does not allow the researcher to extensively justify the relevance of both probability and non-probability sampling techniques in the context of this study. Rather the researcher selected the sample banks based on non-probability sampling called judgemental (purposive) sampling on the basis of ownership structure, market share, level of profit and year of establishment so as to deduce the results for the entire population to address the essence of explanatory research design. The rationale behind selecting purposive sampling techniques than others is, it considered more appropriate when the universe happens to be small and a known characteristic of it is to be studied intensively. Hence, out of the nineteen 19 total bank population (both state and private owned), eleven (11) banks were considered for this study (two (2) of them are state the rest are private). The state banks are commercial bank of Ethiopian and construction and business bank prior to its merger their merger-before April 23/2008 E.C., private banks are; *Dashen bank, bank of Abyssinia, Wogagen bank, United bank, Buna international bank, Nib international bank, Oromia international bank, Awash international bank and lion international bank*, and since the newly emerging private banks are incorporated this makes the data structure unbalanced panel. The study employed unbalanced panel data model to account the effects of data variation arising from years of service between different banks. Such kinds of data structure has its own advantage of; (i) ability to acknowledge both time and cross-sectional variations, (ii) allows avoiding bias among the different bank regressions, (iii) possibility to use instrumental variables producing more precise and accurate estimators, and (iv) useful for panels characterised by relatively low number of years and large number of cross-sections per year. Thus, this data structure is assumed to be better to see banks with different year of existent, and thereby has a potential to increase the degree of freedom too.

3.3 Data Analysis Instruments And Frameworks

3.3.1 Descriptive Statistics

It is usually advisable to supplement the explanatory research design with descriptive statistics so as to see the characteristics/nature of the data and make it ready for the model adopted to examine the cause and effect relationship of the response and explanatory variables under consideration. It is used as complimentary data analysis tool in order to report the descriptive statistics for the variables in the regression analyses, most typically to observe the mean, standard deviations, minimum and maximum of the entire dependent and independent variables for the entire study period.

3.3.2 Econometric Model Specification

As for panel data, the commonly used models are fixed effect, random effect and dynamic panel data models based on the nature and characteristics of the data gathered for the purpose of the study. This study examined the determinants of commercial banks liquidity risk in Ethiopia using the fixed effect model as appropriate after rejecting the Hausman test of the null hypothesis that Random effect model is appropriate.

Fixed (dummy-variable least-squares*)* and random effect model estimators

Fixed effect estimators for T= 1, 2...T and i = 1, 2 ...N

This study used fixed effect to control or maintain Bank's difference and but the difference in the banks is probably related to the other x's explanatory variable. So that let banks control as different and time effect also (i.e. if this study leaves out the fixed effects, and these are related to the other x's, it will create omitted variable bias. Therefore it is advisable for this research to incorporate dummy variables for each bank (i.e. 10 dummies for 11 sampled banks under consideration). The sufficient condition for this estimator to be valid is;

COV (Xit . Uis) = 0, for all t & s.

However, thus condition will be violated when; futures regressors react to the past dependent variable (feedback), regressors contain a lagged dependent variable (i.e. related to xit) and an important regressor is omitted. Hence, this study seen comparatively among fixed effect, random effect and richer dynamic model (to regress yit on lags of yit, since the study incorporate lags of the dependent variable as dependent variable to capture the persistence nature of financial data as it has been recommended by different scholars so far). For simplicity consider a simple error component model bellow.

y_{it} =β1xit + αi + uit, t= 1….T and I=1 …N…… (1)

Here it is assumed that the idiosyncratic error uit is innocuous in the sense that it is harmless, producing no bad effect. That is;

E (uit|xi) = 0 or E (uit|xit) = 0, however the individual fixed effect αi could be arbitrarily correlated with xit. But here it is possible to cancel out the unobserved heterogeneity αi using the first difference technique among others in this case as follows.

First, fix the individual i and take an average over time.

ȳi = β1ẍi + αi + ūi..... (2)

Again here average of αi over time is just αi, time invariant, where;

$$\frac{1}{T}\sum_{t=1}^{T} yit, \ddot{x}i = \frac{1}{T}\sum_{t=1}^{T} xit, and\ \bar{u}i = \frac{1}{T}\sum_{t=1}^{T} uit$$

The point here is $\alpha i = \frac{1}{T}\sum_{t=1}^{T} \alpha i = \alpha i$, time invariant

Now, take a difference between the two questions formulated above,

y_{it} =β1xit + αi + uit, t= 1….T

$\bar{y}i$ = β1$\ddot{x}i$ + αi + $\bar{u}i$, then what will have is;

- y_{it}- $\bar{y}i$ = β1(xit – xi) + (uit- $\bar{u}i$), t= 1, 2, 3,.....T

Or $\ddot{y}it = \ddot{B}1\ \ddot{x}it + \ddot{u}it$, T= 1, 2, 3...T, here it is possible to apply the pooled OLS since the unobserved heterogeneity has been avoided by the first difference.

In sum, the fixed effect estimator uses information from within group (i) variation (Baltagi 2005). Hence;

$\ddot{y}i1$= yi1 - $\bar{y}i$

$\ddot{y}i2$ = yi2 - $\bar{y}i$

$\ddot{y}i3$ = yi2 - $\bar{y}i$

⋮ ⋮ ⋮

$\ddot{y}it = yiT - \bar{y}i$

Hence, for this reason the fixed effect is also called within estimator. As different researchers suggested the first difference (FD) and fixed effect estimator are numerically the same when time, T $\leq$ 2, therefore this study used fixed effect estimator for T > 2 time series panel, in comparison with random effect estimator using comparison test statistics (i.e. Hausman test). Finally, as it has been assured by different test statistics such as Hausman test (pv=0.18%, see table 8 in the appendix), the data recommends the use of fixed effect model for the purpose of this study relative to pooled OLS, first difference and dynamic panel data models. The final appropriate model has been estimated as below.

$$y_{it} = \alpha + \sum_{j=1}^{J}\beta_j X_{it}^{j} + \sum_{I=1}^{I}\beta_I X_{it}^{I},\ u_{it} = \mu_i + v_{it} \quad (3)$$

Where, y_{it} is the liquidity risk proxy, α is the constant, and β_j & β_I are the slope of each bank specific and industry specific parameter respectively. The explanatory variables are divided into $1 \times k$ vectors of bank-specific$\left(X_{it}^{j}\right)$ and industry specificX_{it}^{I}, where k refers to the number of slope parameters for the different variables classes. Finally, the model includes a one-way error disturbance term u_{it} capturing a bank-specific or fixed effect (μ_i) and a remainder or idiosyncratic effect that vary over time and between banks(v_{it}). Besides, with panel/cross sectional time series data, the most commonly estimated models are probably fixed effects and random effects models. Fixed effects regression methods are used to analyze longitudinal data with repeated measures on both independent and dependent variables. They have the attractive feature of controlling for all stable characteristics of the individuals, whether measured or not. This is accomplished by using only within-individual variation to estimate the regression coefficients. The fixed effects model is employed to identify the determinants of liquidity risk of commercial banks in Ethiopia, due to the fact that the this model takes into account the firm-specific effect (Kalluru & Bhat, 2008). Mainly thirteen version of the stata13 software has been used for data analysis purpose as per the recommendations of different scholars for panel data (see Baltagi, 2005).

4 Results And Discussion

4.1 Summaries of the Descriptive Statistics

The descriptive statistics mainly shows the mean, standard deviation, minimum and maximum values of each variable measured. As one measure of liquidity, the liquid asset to total deposit ratio indicates a significant variation across banks which ranges from 0.213 to 1.377, revealed that banks maintain their own of this ratio irrespective of the standards there of. In addition, there also a tangible deviation in the ratio of the Lerner index among each bank (i.e. -.46) as per table 1 in the appendix. The minimum deviation is observed between operating efficiency of each bank as indicated by operating expense to total asset ratio (table 1).

From the general descriptive statistics, the data show that banks are on average focused on traditional intermediation activities as loans and deposits account for a large share of bank total assets. Indeed, the average share of total loans in total assets is 47% and the average share of total deposits in total assets is 74%. In addition, there is a high heterogeneity across banks as shown by the high standard deviation and the extreme values of

each ratio. In terms of capitalisation, the average capital ratio is higher than the minimum regulatory requirement at 13%.

4.2 Model Specification Tests

In case of panel data estimation techniques, it is customary to justify the appropriateness of each of the different models explained in theoretical frame work of studies of such kind. Among others, pooled leas square (PLS), fixed effect (FE), random effect (RE) and dynamic panel data (DPD) models are the recommended ones in the structure of panel data set. The first three are used to estimate panel linear relationships and the latter is used in case where the structure of the data includes a lag of the dependent variable as independent variable to capture the persistence nature of financial data such as in this kind of study. Using stata13 soft ware, this study tried to check the fitness of the data to each of the aforementioned models. The test result indicates that the data does not justify the appropriateness of DPD model since the coefficient of the lag term is found to be insignificant. Similarly, using the Hausman test of specification (a test of the equality of the coefficients estimated by the FE and the RE estimators), the fitness of either FE or RE model has been checked, and the result of the test rejected the null hypotheses that random effect model is appropriate with p-value of 0.0018 as shown in the appendix, table 8. Once the fixed effect model is appropriate, as per theories no rationale for testing statistically the fitness of PLS. Hence, the fixed effect model has been selected for unbalanced panel data estimation for this study. The fixed effect model (FEM), assumes that individual bank differences are captured by differences in the intercept parameters, whereas, the random effect model (REM) treats individual firm differences as random rather than fixed. This model can capture biases arising from omitting a time constant variable, sometimes also referred to as unobserved heterogeneity bias or unobserved individual heterogeneity.

In the literature, it has been suggested that more observation means more information, and one of the ways of gaining more information is through panel data structure. For this study, among the panel data linear models, the fixed effect model is found to be efficient and consistent estimator of the parameters under unbalanced panel data without compromising the classical linear regression assumptions. (1) E(ut) = 0 (The errors have zero mean), (2) var(ut) = σ 2 < ∞ (The variance of the errors is constant and finite over all values of xt), 3) cov(ui, u j) = 0 (The errors are linearly independent of one another) and 4) cov(ut, xt) = 0 (There is no relationship between the error and corresponding x variate). All these assumptions have been depicted in the appendix including normality, linearity, multicollinearity, panel unit root test and omitted variable tests, and treated using the appropriate tests recommended for such types of data and research designs.

Test of normality and serial correlation

The structure of the data has been visualized through different graphical methods such as scatter plots, histogram, box plots and line graphs as well. Through these means the potential outliers in the data have been identified and removed by winsorizing technique-replace the maximum and minimum values which are outliers with the nearby/ next minimum or maximum values which are not outliers in the data set. Besides, the normality of the data has been statistically tested and checked for the null hypothesis that the data is normal. Autocorrelation/serial correlation may not be a problem in micro panels of such kind and as long as the dependent variable is not serially correlated; it has been confirmed by autocorrelation/partial autocorrelation post estimation tests.

Linearity

The use and interpretation of multiple regression models often depend on the estimates of individual regression coefficient. The predictor variables in a regression model are considered orthogonal when they are not linearly related. This issue has also been checked by the two-way scatter plot in stata13 software and all variables under concern are found to be linear throughout the model.

Multicollinearity test

When the regressors are nearly perfectly related, the regression coefficients tend to be unstable and the inferences based on the regression model can be misleading and erroneous, and create a condition known as multicollinearity.

One of the ways of identifying multicollinearity is to scan a correlation matrix of all of the predictor variables and see if any correlate very highly (by very highly to mean correlations of above .80 or .90). According to Field (2009), this is a good 'ball park' method but misses more subtle forms of multicollinearity. Luckily, Stata produces various co linearity diagnostics, one of which is the variance inflation factor (VIF), which indicates whether a predictor has a strong linear relationship with the other predictor(s). Although there are no hard and fast rules about what value of the VIF should cause concern, Myers (1990) suggests that a value of 10 is a good value at which to worry. What's more, if the average VIF is greater than 1, then multicollinearity may be biasing the regression model. Related to the VIF is the tolerance statistic, which is its reciprocal (1/VIF). As such, values below 0.1 indicate serious problems although Menard (1995) suggests that values below 0.2 are worthy of concern. For the purpose of this study, no problem of multicollinearity has found since the mean VIF value is found to be 1.23 as shown in the appendix, table 6.

Testing for homogeneity of variance (Heteroskedasticity test)

The linear regression model (LRM) assumes that the variance of the equation disturbance term is constant over the whole sample period. At each level of the predictor variable(s), the variance of the residual terms should be constant. This just means that the residuals at each level of the predictor(s) should have the same variance (Homoskedasticity, scatterdly plotted, random, no systematic pattern); when the variances are very unequal there is said to be Heteroskedasticity (systematic pattern). If the researcher collected continuous data (such as in co relational designs), this assumption means that the variance of one variable should be stable at all levels of the other variable (Field 2009). There are different Test statistics for the presence of Heteroskedasticity. The Breusch-Pagan / Cook-Weisberg test for Heteroskedasticity reveals that probability chi-square with p-value =12.41%, and accept the null hypothesis, constant variance. The test for omitted variable bias shown by Ramsey RESET test using powers of the fitted values of the dependent variable (DLIQA_TDE), this test accepted the null hypothesis that the model has no omitted variable with f-statistics of 0.30 and P-value of 82.76% as shown in the appendix table 7.

Panel unit root test

To assure that whether the data is stationary at level, or fist difference, second difference so on, the study used the fisher type test for panel unit root since it is an accurate test recommended for unbalanced panel data (stata13 manual). The test result shows that the three independent variables; total deposit to total asset, Lerner index and capital adequacy ratio are found to be stationary at level (see table 9 in the appendix), the rest of the explanatory variables were not stationary at level including the dependent variable (liquid asset to total deposit) rather these variables are checked for unit root at one lag difference. As a result, total loan to total asset ratio, operating expense to total asset, market share ratio, and the liquidity ratio becomes stationary at one lag difference (see table 9 in the appendix). All in all, the test result rejected the null hypothesis that all panel contains unit root, since the p-values corresponding the entire fisher type test indicates a highly significant value at less than 5% (see table 9 for details). In sum, this has done using Fisher type unit root test, for all variables under study; Based on augmented Dickey Fuller tests (ADF) as shown in the appendix table9.

4.3 Empirical Findings

The overall estimation results of the model have been depicted in the appendix, table8-indicats the results of both FE and RE estimation techniques in comparison one another. In its entirety, the result of the fixed effect model revealed that capital adequacy ratio, total loan to total asset ratio and total deposit to total asset ratio as proxies of bank capitalization, level of loans and level of deposits respectively of each bank under consideration in the banking industry, have found to be negatively and statistically highly significantly (at 0.01%) affect the liquidity risk of commercial banks. The rest of the variables; Lerner index, operating expense to total asset ratio and market share as proxies for market power, operating efficiency and competition respectively, revealed insignificant relationship with the liquidity risk. Except the Lerner index, the sign of the other variables is negative, reveres relationship.

Capital adequacy ratio-the empirical investigation suggested the negative and significant influence of capitalization on liquidity risk of commercial banks. Concerning this issue, the theoretical literature provides two opposite views on the relationship between bank capital and liquidity creation. Under the first view, bank capital tends to hamper liquidity creation through two distinct effects: the financial fragility structure and the crowding-out of deposits hypothesis. Indeed, financial fragility structure, characterized by lower capital, tends to favour liquidity creation (Diamond and Rajan, 2000, 2001), while higher capital ratios may crowd out deposits and thereby reduce liquidity creation (Gorton and Winton 2000). The results of the study confirms the existence of the crowding-out of deposit hypothesis in Ethiopian banking industry that could be assured by the negative and significant effect of capital adequacy ratio on liquidity ratio and by the mean of this ratio, 13%, found to be above the minimum requirement.

The loan to total asset ratio-the shares of total loans in total assets of commercial banks affect negatively the liquidity ratio of banks. It is a measure of the illiquidity of the asset portfolio that can reflect excessive illiquidity and higher exposure to default risk (Arena, 2005). The higher is the ratio, the more illiquid an institution is considered. It measures the share of loans in total assets. It indicates what percentage of the assets of the bank is tied up in illiquid loans. Therefore the higher this ratio the less liquid the bank is. It is inferred that, since loans are illiquid assets, increase in the amount of loans means increase in illiquid assets in the asset portfolio of a bank. According to Eakins (2008), in practice the amount of liquidity held by banks is heavily influenced by loan demand that is the base for loan growth. If demand for loans is weak, then the bank tends to hold more liquid assets (short term assets), whereas if demand for loans is high they tend to hold less liquid assets since long term loans are generally more profitable. This result indicates that, though, the banks maintain the liquidity ratio above the minimum standard set by the NBE shown by the mean of this ratio, still needs to give special concern on their level of long term loans to maintain the optimal liquidity position in the sector.

The share of total deposits in total liabilities do also have a negative and significant effect on liquidity ratio measured using one of the liquidity ratios, liquid asset to total deposit. Both the share of loans and deposits in total assets and total liabilities respectively indicates mismatch of obtained funds and assets operations. Commercial banks are increasing the quantity of long-term loan that are not secured by long-term resources. The short-term resource transformation into the long-term assets threatens bank liquidity, and as a result, can lead to the bank insolvency (Konovalova & Zarembo, 2015). Therefore the management of liquidity is paramount important. The management of the Ethiopian commercial bank should choose liquidity assessment methods that would be able to identify, evaluate and manage every factor that influences liquidity. Poorman and Blake (2005) indicate that using such liquidity ratios is not sensitive enough to measure bank liquidity, this is because, for example, a large regional bank such as the Southeast Bank in the US, which presented a ratio of total liquid assets to total assets more than 30%, bankrupts due to its inability to repay some liabilities claimed on demand with only its liquid assets. Thus, it emphasizes the importance to consider the liquidity mismatch of assets and liabilities to evaluate the liquidity profile of banks. Moreover, focusing on deposit funding leads to ignore some widely used alternative sources of funding through the issue of commercial paper or covered bonds.

The F-statistic, highly significant at 0.01%, of the model indicates that the model is fit (rejects the null hypothesis that all explanatory variables are equal to zero). In addition, as it has been indicated by R^2-within 65.69%, R^2-between 46.28% and R^2-overall 50.27%, of the fixed effect model, more than 65% of the variability in the dependent variable is explained by the variability of dependent variables which are in the model, which supports the general guideline of R^2 (i.e. is it is recommended to be 60% and above). The rest of the variables in the model; Lerner index, operating efficiency and market share are found to be spastically insignificant to influence the liquidity risk of these banks with their expected signs. In sum, the result of the study suggests that a bank can be solvent, holding assets exceeding its liabilities on an economic and accounting basis, and still die a sudden death if its depositors and other funders lose confidence in the institution (Elliott, 2014). In other words, the problem is that sometimes depositors lose confidence in a bank, or in the banking system, and withdraw their funds en masse. This is the classic “bank run” that has killed many a bank over the centuries. The only sure way to counter a bank run is to restore confidence, as no bank that engages in a normal level of maturity transformation can survive a bank run independently. Thus, the null hypotheses that Capital Adequacy, the share of loan in total assets and the share of deposits in total liabilities does not significantly affect commercial banks’ liquidity risk in Ethiopia, have been rejected with highly significantly at 0.01% level of significance.

5 Conclusions

Having the main objectives of examining the determinants of commercial banks liquidity, the result of this study, in sum, indicates that the capital adequacy ratio and ratios that proxy the share of total loans in total assets and the share of total deposits in total liabilities of commercial banks are found to be the key factors affecting the liquidity position of commercial banks. This result confirms the crowding-out of deposit hypothesis in Ethiopian banking industry that could be assured by the negative and highly significant effect of capital adequacy ratio on liquidity risk proxy. In addition, it reflects mismatch of obtained funds and assets operations as indicated by the share of loans and deposits in total assets and total liabilities respectively. Thus, it emphasizes the importance to consider the liquidity mismatch of assets and liabilities to evaluate the liquidity profile of banks. In the context of the crowding out of deposits hypothesis, deposits are more effective liquidity hedges for agents than investments in bank equity. Indeed, deposits are totally or partially insured and withdraw able at par value. By contrast, bank capital is not eligible and with a stochastic value that depends on the state of bank fundamentals. Consequently, higher capital ratios shift investors’ funds from relatively liquid deposits to relatively illiquid bank capital. Thus the higher is the bank's capital ratio; the lower is its liquidity creation. All in all, in this regard, the researcher has suggested different ways of optimizing the liquidity position of commercial banks under consideration; Banks can increase their liquidity by Shorten asset maturities and Lengthen liability maturities, and improve the average liquidity of assets and obtain liquidity protections enter alia.

References

Mehmet A. Civelek, 1987, Bank Liquidity Re-Examined: Evidence From. *The Turkish Commercial Banking System. Savings and Development, Vol. 11*, No. 4 (1987), pp. 355-364.

Hawtrey, K. And H. Linag, 2008. Bank interest margins in OECD countries, North American. *Journal of Economics and Finance, 19,* 249–260.

Gelos, r. Gaston. 2006. “Banking spreads in Latin America”, IMF Working paper, 06/44.

Lucchetta,. M. What Do Data Say About Monetary Policy, Bank Liquidity and Bank Risk Taking?, *Economic Notes by Banca Monte dei Paschi di Siena SpA*, Vol. 36, No. 2, pp. 189-203.

J. Bessis, *Risk Management in Banking,* John Wiley & Sons, 2009.

Sinkey, J. (2000), Commercial Bank Financial Management, Prentice.

Konovalova N., Zarembo J. (2015). Imbalanced Liquidity Risk Management: Evidence from Latvian and

Lithuanian Commercial Banks. *Copernican Journal of Finance & Accounting, 4(1),* 109-130.

McKinney, JR. G., and McCracken, J. 1974, The Painful Squeeze on Bank Liquidity Challenge, Vol. 17, No.

Viral V. Acharya, 2006. Liquidity Risk: Causes, Consequences and Implications for Risk Management. Economic and Political Weekly, Vol. 41, No. 6 (Feb. 11-17, 2006), pp. 460-463.

N. Valla, B. Saes-Escorbiac, Bank liquidity and financial stability, *Banque de France Financial Stability Review*, 2006, pp. 89-104.

Diamond and Rajan, (2002). Banks and Liquidity. *American Economic Review Papers and Proceedings, Vol 1:*8-23.

Eakins, G.S. (2008),Financial Markets and Institutions, Sage Publications Beverly Hills.

Kiyotaki, N. and Moore, J. (2008). Liquidity, business cycles and monetary policy. Princeton University, unpublished.

Weisel, J., Harm, N., & Bradley, C. (2003), the Cash Factor. Strategic Finance, 85(3), 29-33.

Angora, A., & Roulet, C., (2011). Liquidity Assessment and the Use of Liquidity Ratio as Defined in the Basel III Accords to Identify Bank Distress. *Université de Limoges, LAPE, 5 rue Félix Eboué, 87031 Limoges Cedex, France.*

Moussa, M.A.B., (2015). The Determinants of Bank Liquidity: Case of Tunisia. *International Journal of Economics and Financial Issues Vol. 5,* No. 1, 2015, pp.249-259.

Acaravci & Çalim, (2013). Turkish Banking Sector's Profitability Factors. *International Journal of Economics and Financial Issues Vol. 3*, No. 1, pp.27-41.

Elliott, D.J. (2014). Bank Liquidity Requirements: An Introduction and Overview, the Brookings Institution.

Charles C., Florian H., & Marie H. (2012). Theory of Bank Liquidity Requirements, Columbia University, Graduate School of Business Press.

Tirole, J. (2010). Overcoming Adverse Selection: How Public Intervention Can Restore Market Functioning, American Economic Review, forthcoming.

Kalluru, SR., and Bhat, K. (2008). An Empirical Analysis of Profitability Determinants in Indian Commercial Banks During Post Reform Period, *The ICFAI University Journal of Industrial 42 Economics*, *Vol. V, No. 4.*

I. Bunda, J. B. Desquilbet, The Bank Liquidity Smile Across Exchange Rate Regimes, *International Economic Journal*, Vol. 22, No. 3, 2008, pp. 361-386.

Drehman, M. – Nikolau, K. (2009): *Funding Liquidity Risk. Definition and Measurement*. [on-line],

Saxegaard, M. (2006) Excess liquidity and the effectiveness of monetary policy: evidence from Sub-Saharan Africa, Working Paper 06/115, *International Monetary Fund,* Washington, DC.

Khemraj, T. (2006) Excess Liquidity, Oligopoly Banking, and Monetary Policy in a Small Open Economy, PhD Dissertation, *New School for Social Research*, New York.

Fielding, D. and Shortland, A. (2005) Political violence and excess liquidity in Egypt. *Journal of Development Studies, 41, 542-57.*

Rahman, M.M., Uddin,K.M, & Moudud-Ul-Huq, S., 2015.Factors Affecting the Risk-taking Behaviour of Commercial Banks in Bangladesh. *Applied Finance and Accounting Vol. 1, No. 2.*

Diamond Duouglas W. and Rajan Raghuram G. (1998), *Liquidity Risk, Liquidity Creation and Financial Fragility*: A Theory of Banking.

Poorman, F & Blake, J 2005, Measuring and modeling liquidity risk: New ideas and metrics, Financial Managers Society Inc., Working Paper.

Gorton, G., and Winton, A. (2000). Liquidity provision, bank capital, and the macro economy, University of Minnesota, Working Paper.

Diamond, D W and Rajan, R G. (2000). Theory of bank capital, *Journal of Finance*, Vol. 100, No. 55, pp. 2431-2465.

Diamond, D W and Rajan, R G. (2001). Liquidity risk, liquidity creation, and financial fragility: a theory of banking, *Journal of Political Economy*, Vol. 109, No. 2, pp.287- 327.

Arena M. (2005), Bank failures and bank fundamentals: A comparative analysis of Latin America and East Asia during the nineties using bank-level data, Bank of Canada, Working paper.

APPENDICES

Table 1: Descriptive statistics summary

Variable	Mean	Std. Dev.	Min	Max
LIQA_TDE	.5210959	.1916852	.213	1.377049
CAR	.1320707	.0605685	.0420095	.5075188
L_index	.3035115	.2490408	-1.192308	.7327717
TL_TA	.4690095	.1192525	.224572	.7051793
TD_TA	.7441818	.0729579	.4586466	.8715184
ope_ta	.0287425	.0097533	.0087182	.0582319
mkt_shr	.1020166	.1575762	.0028871	.6889764

Table 2: correlation matrix among explanatory variables

	CAR	L_index	TL_TA	TD_TA	ope_ta	mkt_shr
CAR	1.0000					
L_index	-0.6980	1.0000				
TL_TA	-0.1709	0.2291	1.0000			
TD_TA	-0.4866	0.3684	0.2256	1.0000		
ope_ta	0.2780	-0.0110	0.1193	-.1765	1.0000	
mkt_shr	-0.4710	0.1002	-0.2601	0.1418	-0.5106	1.0000

Table 3: correlation matrix between response and explanatory variables

	LIQA_TDE	CAR	L_index	TL_TA	TD_TA	ope_ta	mkt_shr
LIQA_TDE	1.0000						
CAR	0.5384	1.0000					
L_index	-0.5030	-0.6980	1.0000				
TL_TA	-0.4235	-0.1709	0.2291	1.0000			
TD_TA	-0.5927	-0.4866	0.3684	0.2256	1.0000		
ope_ta	0.0414	0.2780	-0.0110	0.1193	-0.1765	1.0000	
mkt_shr	-0.2752	-0.4710	0.1002	-0.2601	0.1418	-0.5106	1.0000

Table 4: Partial and semi-partial correlations of response variable with explanatory variables

	Partial	Semi-partial	Partial	Semipartial	Significance
Variable	Corr.	Corr.	Corr.^2	Corr.^2	Value
CAR	-0.0355	-0.0223	0.0013	0.0005	0.7327
L_index	-0.2643	-0.1719	0.0698	0.0295	0.0097
TL_TA	-0.4578	-0.3230	0.2096	0.1043	0.0000
TD_TA	-0.4894	-0.3520	0.2395	0.1239	0.0000
ope_ta	-0.2392	-0.1545	0.0572	0.0239	0.0196
mkt_shr	-0.4093	-0.2813	0.1675	0.0791	0.0000

Table 6: summary of variance inflation factor

Variable	VIF	1/VIF
CAR	1.34	0.748532
L_index	1.32	0.754752
TD_TA	1.28	0.779346
DTL_TA	1.23	0.812663
dmkt_shr	1.20	0.831403
dope_ta	1.03	0.972950
Mean VIF	1.23	

Table 7: Heteroskedasticity and omitted variable test

Breusch-Pagan / Cook-Weisberg test for Heteroskedasticity	Ramsey RESET test using powers of the fitted values of DLIQA_TDE
Ho: Constant variance	Ho: model has no omitted variables
chi2 (1) = 2.37	F= 0.30
Prob > chi2 = 0.1241	Prob > F = 0.8276

Table 8: FE and RE estimation and specification tests – Dep. variable: LIQA_TDE

	FE		RE	
	Coefficient	t-statistics	coefficient	t-statistics
Intercept	.945	4.23	.302	1.90
CAR	-2.039	-4.59*	-.844	-3.36*
L_index	.048	0.44	.080	0.78*
TL_TA	-1.188	-8.81*	-1.230	-8.65
TD_TA	-.992	-4.00*	-.353	-2.11**
ope_ta	-.035	-0.04	.195	0.21
mkt_shr	-.299	-0.73	-.377	-0.88
Hausman test[1] $\chi 2$ (6) =	21.09, pv= 0.0018			
Wald test $\chi 2$ (6) =			125.60	
Corr(*vi*, xit)	-0.5847		0(assumed)	
F-statistic[2] F (6, 72) =	22.97, pv=0.0000			
F-test[3] F (10, 72) =	2.36, pv=0.0180			
R^2-within	0.6569		0.6089	
R^2-between	0.4628		0.6636	
R^2-overall	0.5027		0.6030	

* ** =the coefficients are significant at 1 and 5% significant level respectively.
1. This is a test of the equality of the coefficients estimated by the FE and the RE estimators. For details see Baltagi (2001).
2. The F-statistic of the equation (Ho: all explanatory variables are equal to zero).
3. The F-test that all *vi*= 0.

Table 9: Panel unit root test results; Ho: All panels contain unit roots, Ha: At least one panel is stationary

Fisher type unit root test- for	Based on augmented Dickey Fuller tests (ADF)	Statistics	p-values
LIQA_TDE (1 lag difference)	Inverse chi-squared(22) p	153.7761	0.0000
	Inverse normal Z	-7.5187	0.0000
	Inverse logit t(59) L*	-12.1260	0.0000
	Modified inv. chi-squared Pm	19.8660	
Capital adequacy ratio (0 lag difference)	Inverse chi-squared(22) p	159.5267	0.0000
	Inverse normal Z	-5.0392	0.0000
	Inverse logit t(59) L*	-11.9182	0.0000
	Modified inv. chi-squared Pm	20.7329	0.0000
Lerner index (0 lag difference)	Inverse chi-squared(22) p	266.4575	0.0000
	Inverse normal Z	-0.9087	0.0000
	Inverse logit t(59) L*	-22.0308	0.0000
	Modified inv. chi-squared Pm	36.8534	0.0000
Total loan_total asset(1lag difference)	Inverse chi-squared(22) p	117.7968	0.0000
	Inverse normal Z	-4.9402	0.0000
	Inverse logit t(59) L*	-8.9441	0.0000
	Modified inv. chi-squared Pm	14.4419	0.0000
Total deposit_total asset(0 la difference)	Inverse chi-squared(22) p	119.8592	0.0000
	Inverse normal Z	5.3768	0.0000
	Inverse logit t(59) L*	9.3819	0.0000
	Modified inv. chi-squared Pm	14.7528	0.0000
Opeexp_ta(1 lag difference)	Inverse chi-squared(22) p	135.7484	0.0000
	Inverse normal Z	-3.4197	0.0003
	Inverse logit t(59) L*	-8.8568	0.0000
	Modified inv. chi-squared Pm	17.1482	0.0000
Mkt_shr (1 lag difference)	Inverse chi-squared(22) p	148.6054	0.0000
	Inverse normal Z	-2.3870	0.0085
	Inverse logit t(59) L*	-9.6848	0.0000
	Modified inv. chi-squared Pm	19.0865	0.0000