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The Effect of Liquidity on Banks Profitability for Commercial Banks in Ethiopia

BY

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Statement of declaration

I, the undersigned, declare that this thesis is my original work, has not been presented for degree in any other university and that all sources of materials used for the thesis have been appropriately acknowledged.

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Place and date of submission: St.Mary Unversisity, June05, 2017

Statement of certification

This is to certify that Tsige Tsegaye has carried out this research work on the topic entitled “The Effect of Liquidity on Banks Profitability of Ethiopian commercial banks” under my supervision. This work is original in nature and it is sufficient for submission for the partial fulfillment for the award of MBA in Accounting and Finance.

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St.Mary University

School of Graduate Studies

This is to certify that the thesis prepared by Tsige Tsegaye , entitled: “The Effect of Liquidity on Banks Profitability for commercial banks in Ethiopia” and submitted in partial fulfillment of the requirements for MBA in Accounting and Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Abstract

Banks role in the economy of any country is very significant. Liquidity can be defined as the ability of a financial institution to meet all legitimate demands for funds (Yeager and Seitz 1989). The different financial crisis over the world at different times had illustrated how quickly liquidity can evaporate and that illiquidity can last for an extended period of time. The banking system came under severe stress, which necessitated central bank action to support both the functioning of money markets and individual institutions. Liquidity of banks can be affected by bank specific as well as macroeconomic factors and government/central bank regulations. Thus it is important to study effect of liquidity on banks profitability. However, as to the knowledge of the researcher, there are few studies made generally on this study. Therefore, to examine the effect of liquidity on commercial banks profitability is important. An explanatory research design was employed to examine the relationship of the dependent and independent variables by using quantitative research approach used to see the banks' profitability that has been measured by Return on Assets (ROA) and liquidity explanatory for the independent variables and the unbalanced random effect panel regression was used for the data of all commercial banks in the sample covered the period from 2005 to 2015. Five liquidity explanatory's that are affecting banks profitability were selected and analyzed. The results of panel data regression analysis showed that cash deposit ratio and capital ratio had statistically significant effect on banks profitability. Liquidity ratio, deposit asset ratio and loan deposit ratio had statistically insignificant effect on banks profitability. Among the statistically significant factors affecting banks profitability cash deposit ratio had positive effect on profitability of commercial banks whereas, capital ratio had negative effect on profitability of commercial banks. Deposit asset ratio and loan deposit ratio had positive but statistically insignificant effect on financial performance but Liquidity ratio had negative but statistically insignificant effect on financial performance. Therefore, banks should maintain adequate liquidity to enhance profitability by financing to creditors and also should have enough capital to absorb shocks which emanate from liquidity and credit risks.

Key words: Commercial Banks, Liquidity, Profitability

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List of Acronyms

AB	Abay Bank.S.C
ADIB	Addis International Bank S.C
AIB	Awash International Bank S.C
BIB	Berehan International Bank S.C
BOA	Bank of Abyssinia S.C
BUIB	Buna International Bank S.C
CAR	Capital Asset Ratio
CBE	Commercial Bank of Ethiopia
CBO	Cooperative Bank of Oromia S.C
CDR	Cash Deposit Ratio
DAR	Deposit Asset Ratio
DB	Dashen Bank S.C
DGB	Debub Global Bank
EB	Enat Bank S.C
FEM	Fixed Effect Modeling
LDR	Loan Deposit Ratio
LIB	Lion International Bank S.C
LR	Liquidity Ratio
NBE	National Bank of Ethiopia
NIB	Nib International Bank S.C
OIB	Oromia International Bank S.C
REM	Random Effect Modeling
ROA	Return on Asset
ROE	Return on Equity
UB	United Bank S.C
WB	Wogagen Bank S.C
ZB	Zemen Bank S.C

Chapter One

Introduction

1.1 Back Ground of the study

Liquidity management is a concept that is receiving serious attention all over the world especially with the current financial situations and the state of the world economy. Some of the striking corporate goals include the need to maximize profit, maintain high level of liquidity in order to guarantee safety, attain the highest level of owner's net worth coupled with the attainment of other corporate objectives. The importance of liquidity management as it affects corporate profitability in today's business cannot be over emphasized. The crucial part in managing working capital is required maintenance of its liquidity in day-to-day operation to ensure its smooth running and meets its obligation (EliJelly, 2004). Liquidity plays a significant role in the successful functioning of a business firm. A firm should ensure that it does not suffer from lack-of or excess liquidity to meet its short-term compulsion. A study of liquidity is of major importance to both the internal and the external analysts because of its close relationship with day-to-day operations of a business (Obilor, 2013). Dilemma in liquidity management is to achieve desired trade-off between liquidity and profitability.

Effective working capital management implies a trade-off between liquidity and profitability of the company and thereby affects the financing and investment decisions. Each company should maintain a particular level of liquidity to support day-to-day operations. Over financing leads to additional expenses mainly reflected in the storage and maintenance costs. Also the surplus of cash, inventories and accounts receivable constitute the excess current assets and generate the cost of lost opportunities. On the contrary under financing may affect revenues. Lower requirements of working capital budgeting leads to lower cost of capital and hence cash availability for the shareholders. The lack of liquidity causes the reduction of sales and as a result profitability decrease. (Mishkin, 2004).

Asset and liability management is the practice of managing the various potential risks of commercial banks that arise due to mismatches and disproportions between the assets and

liabilities of the bank. Such risks were indicated as the risks arising from the movement of interest rates, foreign exchange rates or liquidity problems(Mishkin, 2004).

1.2 History of Banking in Ethiopia

The agreement that was reached in 1905 between Emperor Minilik II and Mr. Ma Gillivray, representative of the British owned National Bank of Egypt marked the introduction of modern banking in Ethiopia. Following the agreement, the first bank called Bank of Abyssinia was inaugurated in Feb.16, 1906 by the Emperor. The Bank was totally managed by the Egyptian National Bank. Thus by 1931 Bank of Abyssinia was legally replaced by Bank of Ethiopia shortly after Emperor Haile Selassie came to power. The new Bank, Bank of Ethiopia, was a purely Ethiopian institution and was the first indigenous bank in Africa (NBE, 2010) and established by an official announcement on August 29, 1931. The Bank with branches in Dire Dawa, Gore, Dessie, Debre Tabor, Harar, agency in Gambella and a transit office in Djibouti continued successfully until the Italian invasion in 1935. During the invasion, the Italians established branches of their main banks namely Banco di Italia, Banco di Roma, Banco di Napoli and Banco Nazionale dellavoro and started operation in the main towns of Ethiopia. However, they all ceased operation soon after liberation except Banco di Roma and Banco di Napoli which remained in Asmara. In 1941 another foreign bank, Barclays Bank, came to Ethiopia with the British troops and organized banking services in Addis Ababa, until its withdrawal in 1943. Then on 15th April 1943, the State Bank of Ethiopia commenced full operation after 8 months of preparatory activities. It acted as the central Bank of Ethiopia and had a power to issue bank notes and coins as the agent of the Ministry of Finance. In 1945 and 1949 the Bank was granted the sole right of issuing currency and deal in foreign currency. The Bank also functioned as the principal commercial bank in the country and engaged in all commercial banking activities.

The State Bank of Ethiopia had established 21 branches including a branch in Khartoum, Sudan and a transit office on Djibouti until it ceased to exist by bank proclamation issued on December, 1963. Then the Ethiopian Monetary and Banking law that came into force in 1963 separated the function of commercial and central banking creating National Bank of Ethiopia (NBE) and commercial Bank of Ethiopia (CBE). Following the fall of the Dergue regime in 1991 that ruled the country for 17 years under the rule of command economy, the EPRDF declared a liberal economy system. In line with this, Monetary and Banking proclamation of 1994 established the

National Bank of Ethiopia as a judicial entity, separated from the government and outlined its main function. Monetary and Banking proclamation No.83/1994 and the Licensing and Supervision of Banking Business No.84/1994 laid down the legal basis for investment in the banking sector. Consequently after the proclamation issued private equity holders began to join the Ethiopian banking industry and Seventeen commercial banks are operated and out of this sixteen are private owned.Currently commercial banks work for profit and the NBE controls and gives license for commercial banks. (National Bank of Ethiopia Quarterly Bulletin; September 2010).

In the context of Ethiopian banks, to the knowledge of the researcher, there is work on the assessment of determinants of the banks‟ liquidity which was conducted by (Tseganesh, 2012) the (Mekbib, 2016)The study were conducted by examining determinants of liquidity of commercial banks in Ethiopia both private and public banks. However, effect of liquidity on banks profitability is still unexplored part. Therefore, it is essential to examine the effect of liquidity management on profitability in the case of commercial banks in Ethiopia.

1.3 Statement of the problem

Effective working capital management implies a trade-off between liquidity and profitability of the company and thereby affects the financing and investment decisions. Each company should maintain a particular level of liquidity to support day-to-day operations. Over financing leads to additional expenses mainly reflected in the storage and maintenance costs. Also the surplus of cash, inventories and accounts receivable constitute the excess current assets and generate the cost of lost opportunities.

As Mishkin,(2004)shows, a commercial bank’s liability which is mainly financed by current, saving, and fixed deposits and equity (which is contributed by shareholders) represent its sources of funds; while asset which is composed of mainly investments, loans and advances represent its use of funds. Each commercial bank determines its own composition of liabilities and assets, which determines its specific operating objective; maximizing shareholders equity (profit).

Liquidity risk has become one of the main concerns of financial institutions following the financial crisis of 2007. For instance, as U.S. subprime mortgage crisis reached its peak in the years 2008/09 unprecedented levels of liquidity support were required from central banks in order to sustain the financial system. Even with such extensive support, a number of banks failed, were forced into mergers or required resolution. A reduction in funding liquidity then caused significant distress. In response to the freezing up of the interbank market, the European Central Bank and U.S. Federal Reserve injected billions in overnight credit into the interbank market. Some banks needed extra liquidity supports ((Longworth, 2010); (Bernanke, 2008)). As it clearly indicated in the financial crisis, liquidity and liquidity risk is very up to date and important topic. Therefore, investigating effect of liquidity on banks performance has become one of the major activities and responsibilities of all banks and their regulators so as to keep in a healthy business conditions. Depending on the sources of their liquidity; the liquidity position of banks could be affected by bank specific factors, macroeconomic factors, and government/central bank regulations thus firm specific factors consisted; capital adequacy, nonperforming loan, bank size, profitability, and loan growth while the macro economic factors were consisted; gross domestic products/ real GDP growth, inflation rate, and interest rate margin. (Vodova, 2012)

The role of commercial banks has remained central in financing economic activities in the various segments of the markets especially in Sub-Saharan Africa.(Munyamborera, 2010) indicated substantial gaps in service delivery to private agents in Sub-Saharan Africa banks constraints being high levels of credit risk to private agents, poor quality loans, limited and inadequate capitalization, operational inefficiencies, higher incidences of non-performing loans, higher levels of liquidity risk. Hence, studying the effect of liquidity on banks profitability for commercial banks in Ethiopia is open for empirical analysis. In Ethiopia beginning from the last two decades the banking sector has been playing important role in the economic development of the country. Ethiopia's financial sector is largely bank based as the secondary market is still not found in the country. Banks dominate the financial sector in Ethiopia and as such the process of financial intermediation in the country depends heavily on banks. In fact the banking sector in Ethiopia is

currently acts as the link that holds the country's economy together. Hence, keeping their optimal liquidity for banks in Ethiopia is very important to meet the demand by their present and potential customers and financing for countries mega project in connection with GTP of the country developmental plan.

As it deeply indicated in the literature part most studies on the area of this study were done in abroad i.e. (Vodova, 2012) with some of them in Africa (Chagwiza, 2011) but in Ethiopia few or possible to say finger counted studies were made related to banks liquidity but most of them studying on the determinants of banks liquidity directly and focused on to study points like the relationship between liquidity and performance of banks.

Among these efforts the studies conducted by (Worku, 2006)liquidity and its impact on performance of commercial banks in Ethiopia" and in her study entitled determinants of banks liquidity and their impact on financial performance" (Tseganesh, 2012) tried to investigate determinants of banks liquidity directly. However, the measurement used by the researcher for liquidity risk was only liquidity ratios and also selected some banks.

In today's developing and competitive world, banking sector has emerged as key player, and contributing its best to create employment opportunity, and improving the financial sector of the country. With the growing trend, it has become a challenge for the sector to earn maximum profitability. It has become necessary for firms to take dynamic decisions to effectively indicate their liquidity. Due to this challenge followed by the growing trend, it has become necessary, that research based study should be conducted .Therefore, this study designed to investigate the effect of liquidity on commercial banks profitability directly from a wide range of variables through significant measurements of liquidityand lastly to suggest a recommendations needed to achieve the required consensus between liquidity and profitability in these banks.

1.4 Objectives of the study

The general objective of the study is to determine the effect of liquidity on profitability of Commercial Banks in Ethiopia.

1.5 Specific Objectives of the Study

Specifically, this study intended to address the following objectives;

- To investigate the effect of liquidity on Loan to Deposit ratio on profitability of commercial banks in Ethiopia.
- To investigate the effect of liquidity Deposit Asset ratio on profitability of commercial banks in Ethiopia.
- To investigate the effect of liquidity Cash Deposit ratio on profitability of commercial banks in Ethiopia.
- To investigate the effect of liquidity Capital ratio on profitability of commercial banks in Ethiopia.
- To investigate the effect of liquidity Liquid ratio on profitability of commercial banks in Ethiopia.
- To know the measure variables that has a measure effect on the profitability of commercial banks in Ethiopia.

1.6 Significance of the study

This study will help strengthen the large banking sector by providing information on the liquidity management policies in regard to the profitability of Commercial Banks in Ethiopia. The Commercial Banks in Ethiopia can use the information to be able to improve on their mode of delivery to strengthen their stand against other financial institutions especially the MFIs.

Finance controllers and managers have a major role to manage their working capital and cost structure in order to drive the banks performances for the survival of the organization. This research will provide a guideline on whether banks can perform well if the working capital is efficient and cost structures are managed well. Therefore, this study was expected to provide empirical evidence on effect of liquidity variables on banks profitability and greatly contribute to the existing knowledge in the area of this title in the context of Ethiopia. This in turn contributes to the well being of the financial sector of the economy. Hence, the major beneficiaries from this study are commercial banks, the academic staff, central banks and the country as a whole.

1.7 Scope of the study

In Ethiopia there are seventeen commercial banks under operation out of which sixteen are private owned organization and the remaining one which is commercial bank of Ethiopia owned by government. From the number of the banks under operation the study usedall Commercial Bank in Ethiopia.In order to make the scope of the study manageable, this research focuses on effect of liquidityindicators on banks profitability by using variable such as return on asset (ROA) as dependent variable and liquidity indicators (i.e. Loan to deposit ratio, Deposit asset ratio, Cash deposit ratio, Capitalratio, Liquid ratio)as independent variable from 2005 to 2015i.e. elevenyears panel data.

1.8 Organization of the study

The main objective of the study is to fill the gap by providing full information about the effect of liquidity management system on banks profitability. The rest of this study is organized as follows. Chapter One: Provide some background about the study, statement of the problem, specifies the objectives and purpose of the study, as well as the significance and benefits gained from this research. Chapter two: The review of the related literature includes concept of liquidity, theories of liquidity and liquidity management, need for liquidity, measurement of liquidity in commercial banks, concept of profitability in banks industry and relationship between liquidity and profitability. Chapter three: This chapter describes the data, identifies the sources and explains the methodology which is employed in the study. The results of the different methods and an analysis of the results of the different methods used are presented in chapter four. Finally, chapter five presents the conclusions and recommendations.

Chapter Two

Review of Related Literature

Literature review is prepared in two parts, i.e. the theoretical review and the empirical review part. In the theoretical review part the theories that states about the concept of liquidity, liquidity management and assessment of banks profitability. The empirical literature part discusses past studies that were conducted on the area of the effect of liquidity management in banks profitability. In this part the variables that were included, the methodology that is used to undertake the study and the results of the study under review are discussed.

2.1 Theoretical review

This part presents some theoretical aspects related to banks liquidity concept, theories of liquidity management ,the need for liquidity, measurement of liquidity, banks profitability and its measures, as follows.

2.1.1 The Concept of Liquidity

Liquidity can be defined as the ability of a financial institution to meet all legitimate demands for funds (Moore, 2009). He explained that "a bank needs to hold liquid assets to meet the cash requirements of its customers, 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.

Bank liquidity means the ability to meet financial obligations as they come due. Liquidity in Commercial Bank means the bank's ability to finance all its contractual obligations when due, and these obligations can include lending, investment and withdrawal of deposits and maturity of liabilities, which happen in the normal course of the Bank actions (Amengor, 2010).

According to the theory of financial intermediation, an important role of banks in the economy is to provide liquidity by funding long term, illiquid assets with short term, liquid liabilities. Through this function of liquidity providers, banks create liquidity as they hold illiquid assets and provide cash and demand deposits to the rest of the economy.

(Diamond & 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.

2.1.2 Theories of Liquidity Management

There are a number of liquidity management theories, as follows:

- ***Liability Management Theory***

Management examines the activities involved in supplementing the liquidity needs of the bank through the use of borrowed funds. The liquidity management theory focuses on the liability side of bank balance sheet. This theory contends that supplementary liquidity could be derived from the liabilities of a bank. According to Nwankwo, (1992)the theory argues that since banks can buy all the funds they need, there is no need to store liquidity on the asset side (liquidity asset) of the balance sheet. Liquidity theory has been subjected to critical review by various authors. The general consensus is that during the period of distress, a bank may find it difficult to obtain the desired liquidity since the confidence of the market may have seriously affected and credit worthiness would invariably be lacking. However, for a healthy bank, the liabilities (deposits, market funds and other creditors) constitute an important source of liquidity.

request could affect the liquidity position adversely. Moreover, the theory fails to reflect in the normal stability of demand deposits in the liquidity consideration.

- ***Anticipated Income Theory***

This theory holds that a bank's liquidity can be managed through the proper phasing and structuring of the loan commitments made by a bank to the customers. Here the liquidity can be planned if the scheduled loan payments by a customer are based on the future of the borrower. According to Nzzotta, (2004) theory emphasizes the earning potential and the credit worthiness

of a borrower as the ultimate guarantee for ensuring adequate liquidity. (Nwankwo, 1992) posits that the theory points to the movement towards self-liquidating commitments by banks. This theory has encouraged many commercial banks to adopt a ladder effects in investment portfolio.

- ***Commercial Loan Theory***

This theory states that the liquidity of the commercial bank achieved automatically through self-liquidation of the loan, which being granted for short periods and to finance the working capital, Where borrowers refund the borrowed funds after completion of their trade cycles successfully. According to this theory, the banks do not lend money for the purposes of purchasing real estate or consumer goods or for investing in stocks and bonds, due to the length of the expected payback period of these investments, where this theory is proper for traders who need to finance their specific trading transactions and for short periods (Emmanuel, 1997).

- ***Liquidity Measurement***

Liquidity is a measure of the ability and ease with which assets can be converted to cash. Liquid assets are those that can be converted to cash quickly if needed to meet financial obligations; examples of liquid assets generally include cash, central bank reserves, and government debt. To remain viable, a financial institution must have enough liquid assets to meet its near-term obligations, such as withdrawals by depositors(Federal Reserve).The main measures of liquidity arecurrent ratio, capital ratio, cash ratio, quick ratio, investment ratio.

- ***The Need for Liquidity***

According to (Anyanwu, 1993)liquidity simply means the ability to convert an asset to cash with minimum delay and minimum loss/cost. In the portfolio of commercial banks, liquidity assets play a very crucial role because banks operate largely with the funds borrowed from depositors in form of demand and time deposits.These liquidity assets are the essential balance sheet items which have the capacity to maintain the confidence of depositors which is the most valuable intangible asset of the commercial banking business (Spindt, P. A., & Tarhan, V., 1980).
According to Nwankwo, (1992)adequate liquidity enables a bank to meet three risks. First is the Funding risk the ability to replace net outflows either through withdrawals of retail deposits or

non renewal of wholesale funds. Secondly, adequate liquidity is needed to enable the bank to compensate for the non receipt of inflow of funds if the borrower or borrowers fail to meet their commitments. The third risk arises from calls to honor maturity obligations or from request for funds from important customers. Adequate enables the bank to find new funds to honor the maturity obligations such as a sudden upsurge in borrowing under atomic or agreed lines of credit or to be able to undertake new lending when desirable. For instance a request from a highly valued customer. Adequate liquidity is also needed to avoid forced sale of asset at unfavorable market conditions and at heavy loss. Adequate liquidity serves as vehicle for profitable operations especially to sustain confidence of depositors in meeting short run obligations.

Finally, adequate liquidity guides against involuntary or non voluntary borrowing from the regulatory authorities where there is a serious liquidity crisis, the bank is placed at the mercy of the Central Bank, and hence the control of its destiny may be handed over. Having adequate or sufficient liquidity to meet all commitments at all times at normal market rates of interest is indispensable for both large and small banks (Nwankwo, 1992)Liquidity is the life blood of a banking setup.

2.1.3 Measurement of Liquidity in Commercial Banking

The ability of banks to meet their financial obligation is usually measured by examining their balance sheet and relating same to its current assets to some or all of their current liabilities. Fundamentally, a firm's liquidity rests not so much on its balance sheet as on whether or not it is doing well and earning money. A strong balance sheet with a large current ratio simply postpones liquidity problems for a short while if the firm is losing money. Therefore, the complexity of devising an appropriate measure arises from the uncertainties surrounding both size of the prospective needs for liquidity at any given time, and the availability of sources of liquidity sufficient to meet them. There is also the impact of active asset and liability management on liquidity management. An accurate measurement of liquidity therefore requires going beyond the technical liquidity indicated by the stock flow approach to an assessment of the stock of circumstances under which a bank could come under pressure likely to affect worthiness in the market place. Liquidity can be measured either as a stock at a point in time or as a flow over time. The most widely used is the stock approach. One of these is the loan/deposit ratio which is the most popular and commonly used measure in commercial banking.

According to (Nwankwo, 1992), under this measure, all bank loans are the most liquid of all bank assets. These are then compared with the total deposit as a proxy for the liquidities that banks could be called upon honor. An increase in the ratio indicates a less liquid position and vice versa. The regulatory reform for banks has been converted from post-crisis lip service into implementation actions, although the effect of the new rules on profitability is driving the financial sector to make changes to its business model.

The study analyzed the effect of capital and liquidity management on profitability in five leading South African banks during the period 2004 to 2014. A co-integration panel analysis was used to test for the effect of the liquidity indicators on profitability. The capital ratio and quick ratio were used as liquidity indicators, whilst return on assets (ROA) and return on equity (ROE) were used as proxies for measuring profitability. The empirical results showed that there is no long-run relationship between banks' profitability and liquidity and capital management. For the short-run, capital ratio was found to have significant positive effect on banks' profitability; whereas liquidity does not have an effect on banks' profitability. This study also revealed that the proxy used as measurements of profitability tends to affect the relationship between banks' profitability and liquidity and capital management. It was concluded that capital adequacy is considered to be the most effective tool to ensure the safety and soundness of South African financial institutions.

2.1.4 The Effect of bank liquidity on financial performance

Profitability accounts for the impact of better financial soundness on bank risk bearing capacity and on their ability to perform liquidity transformation ((Rochet, 2008)and (Shen, 2009)). Loans are among the highest yielding assets a bank can add to its balance sheet, and they provide the largest portion of operating revenue. In this respect, the banks are faced with liquidity risk since loans are advanced from funds deposited by customers. However, the higher the volume of loans extended the higher the interest income and hence the profit potentials for the commercial banks. At this point, it is also worth noting that banks with a high volume of loans will also be faced with higher liquidity risk. Thus, the commercial banks need to strike a balance between liquidity and profitability.

It is argued that when banks hold high liquidity, they do so at the opportunity cost of some investment, which could generate high returns (Kamau, 2014)The trade-offs that generally exist between return and liquidity risk are demonstrated by observing that a shift from short term securities to long term securities or loans raises a bank's return but also increases its liquidity risks and the inverse is true. Thus a high liquidity ratio indicates a less risky and less profitable bank (Hemple, 1999). Thus management is faced with the dilemma of liquidity and profitability. (Myers & Rajan, 1998) emphasized the adverse effect of increased liquidity for financial institutions stating that, "although more liquid assets increase the ability to raise cash on short-notice, they also reduce management's ability to commit credibly to an investment strategy that protects investors" which, finally, can result in reduction of the "firm's capacity to raise external finance" in some cases. Thus, this indicates the negative relationship between bank profitability and liquidity.

2.1.5 The Concept of Banks Profitability

Bank profitability is the ability of a bank to generate revenue in excess of cost, in relation to the bank's capital base. A sound and profitable banking sector is better able to withstand negative shocks and contribute to the stability of the financial system. (Athanasoglou, Brissimis, & Delis, 2005). Profitability in general is a relationship between the profits generated by the enterprise and investments that contributed to the achievement of these profits, and profitability ratios measure the efficiency with which a company turns business activity into profits. Profit margins assess the ability to turn revenue into profits. Return on assets measures the ability to use assets to produce net income. Return on equity compares the net income to shareholder equity.

According to (Aburime, 2008) profit means the difference between the revenue generated from the sale of output and the full opportunity cost of factor used in the production of that output. Included within costs are the premium charged for risk taking and the costs of using the owners capital. These are not included as cost in the accountant's measure of project which therefore does not correspond to this economic definition of profit. However, profit could either be normal or supernormal. Normal profit is that minimum amount of profit which a firm must acquire in order to induce the firm to remain in operation. Corporate profit planning remains one of the most difficult and time consuming aspects of financial management because of the many variables involved in the decision which are often outside the control of the company. It is even more

difficult if the company is operating in a highly competitive economic environment .A business unit can only grow focusing on its inner strengths to exploit the opportunities in the market. Consequently, the best definition as opined by (Tsomocos, 2003)should be adopted from a survival growth perspective as business unit should think of surviving before making profit. Again, optimizing profit involves two variables; revenue and cost. The issue of profitability is a continuous issue that a company has to consistently make. Essentially profitability is concerned with the level of turnover that must be achieved in order to cover the level of turnover that must be achieved in order to cover costs and make surplus Corporate profitability may be improved through ratio analysis, breakeven analysis marginal analysis, cost control or through financial control It is therefore necessary to mention at this juncture that whether a bank is planning for profit or taking steps to improve its profitability, it must ensure that it has adequate liquidity to transact business and finance operations. If the plan is to improve or increase profitability by increasing the income level, the bank must be able to determine the financing needs for the new income level.

2.2 Empirical Review on The effect of liquidity on Profitability of Commercial Banks

This section discusses studies which have being conducted by a number of researchers; which examines the effect of liquidity management on profitability of commercial banks in various countries.(Bourke, 1989)Carried out a study to establish the relationship between liquid assets and bank profitability for 90 banks in Europe, North America and Australia from 1972 to 1981, the study used econometric framework presented in an equation.

The dependent variable, profitability, was regressed against a nonlinear expression of relative liquid asset holdings, as well as a set of control variables. Liquid assets were generally included as a control variable in this study with very limited discussion around the estimated parameter. From the study a company with low liquidity and high profitability has to increase its borrowing leading to an increase of the financial costs. This would certainly lead to increasing interest rates, since the cheaper sources are quickly exhausted. Furthermore, having increased its debt, the company raises its credit risk, causing an increase in interest rates charged by their financier. Under these conditions, the company has to get more time from suppliers, resulting in the

acquisition of raw materials at higher prices. Also it will fail to achieve financial discounts offered by the anticipation of payments and incur interest and penalties for late payments the liquidity problems would become even worse. The study emphasized that profitability and solvency are necessary condition for the healthy existence of the company and both are conditioned by the strategy adopted in the medium and long term.

(Etienne Bordeleau, Etienne, Allan, & Graham, (2009)) reviewed the impact of liquidity on bank profitability for US banks and Canadian banks between the period of 1997 and 2009. The study employed quantitative measures to assess the impact of liquidity on bank profitability. Results from the study suggested that a nonlinear relationship exists, whereby profitability is improved for banks that hold some liquid assets, however, there is a point beyond which holding further liquid assets diminishes a banks' profitability, all else equal. Conceptually, this result is consistent with the idea that funding markets reward a bank, to some extent, for holding liquid assets, thereby reducing its liquid risk.However,this benefitcan eventually be outweighed by the opportunity cost of holding such comparatively low-yielding liquid assets on the balance sheet, at the same time, estimation results provide some evidence that the relationship between liquid assets and profitability depends on the bank's business model and the risk of funding market difficulties. Thereresearchers recommended that adopting a more traditional i.e., deposit and loan-based model allows a bank to optimize profits with a lower level of liquid assets.

(Bourke, 1989)describes a positive relationship between bank profitability and capital ratio, as higher the capital ratio the more will be the bank profitability. In the same way the banks which are sound capitalized are more cost-effective as compare to others in USA described by (Berger, 1995).significant link between the capital ratio and profitability is not restricted to USA local banking industry as a study of 18 countries from 1986-1989 explained that Capital ratio impacts bank profitability positively even though such association restricted to state own banks(Molyneuk & John, 1992). In the study of 80 developed and developing nations by (Kunt & Huizinqa, 1999) in which they concluded that the general result identifies a positive association between the capital ratio and bank profitability and overseas banks earn more return as compare to local banks in developing countries, while in developed countries the condition is vies versa, even though in general ending result demonstrates a positive link between the capital ratio and profitability.

Deposit is the most valuable and significant indicator of the balance sheet as it symbolizes a clue of conventionality banking activities. The deposit structure of banks indicates that banks which are strongly committed to short term and long term deposit are earning lower as compare to banks that depends on demands deposits described by (Heggestad, 1977). (Smirlock, 1985,) explored that short term deposit are more cheap source of financing and had significant impact of banks profitability.

The banks which have high deposits comparative to their assets and using those to strength the equity to enhance the performance of the bank , those are the better developing banks as illustrated by(Naceur & Mohammed, 2001).

Another problem in Pakistan is high currency risk because of it most of the bank's deposits are in local currency. While (Chiraw, 2003)described positive association between bank profit and deposit ratio a study conducted from 1970-1994 on time series data in Malawi. As possible as high deposits converted into credit then in return high profit will be expected as deposits are the basic source of financing that they can invest. "Deposit ratio has a direct and significant association with profitability back by various studies" (Alkassim, 2005)Banks that depend on high deposits have less profit because they need to have high network of branches in this way their expenses increase that effect profit inversely.

(Vodova, 2012)aimed to identify determinants of liquidity of commercial banks in Slovakia. In order to meet its objective the researcher considered both the bank specific and macroeconomic data over the period from 2001 to 2009. The data was analyzed with panel data regression analysis by using an econometric package Eviews7. The result of the study indicated that; bank liquidity decreases mainly as a result of financial crisis, higher bank profitability, higher capital adequacy and with the size of banks while liquidity measured by lending activity of banks increases with the growth of gross domestic product and decreases with the higher unemployment. Key interest rate, Interest rate margin, rate of inflation, and the level of non-performing loans have no statistically significant effect of the liquidity of Slovak commercial banks.

(Kosmidou, 2008) examined the determinants of performance of Greek banksduring the period of EU financial integration (1990-2002) using an unbalanced pooled time series data set of 23 banks and found that less liquid banks have lower ROA. This is consistent with their previous findings like (Bourke, 1989)who found out that there is a positive relationship between liquidity risk and bank profitability. Recently,(OLagunju, David, & Samuel, 2012) found out that there is a positive significant relationship between liquidity and profitability. They concluded that there is a bi-directional relationship between liquidity and profitability where the profitability in commercial banks is significantly influenced by liquidity and vice-versa.

(Owolabi, Obiakor, & Okwu, 2011)conducted a study that investigated the relationship between liquidity and profitability in 15 selected quoted companies in Nigeria. The central objective was to examine the nature and extent of the relationship between liquidity and profitability in profit-driven quoted companies and also to determine whether any cause and effect relationship existed between the two performance measures. Liquidity measure considered was current assets-liabilities ratio while profitability measure was operating profit-turnover ratio. Investigative and quantitative analysis methods were used for the study.

In an attempt to measure the impact of liquidity on profitability (Lamberg & Valming, 2009) conducted a study using a sample of companies listed on Shochholm Stock Exchange. Their focus was on impact of active liquidity strategies on company's profitability in and out of financial turbulence or economic downturn. Relevant data were financial ratios which generated from financial statements. Their findings suggested that the adaptation of liquidity strategies do not have a significant impact on return on assets (ROA). Only increased use of liquidity forecasting and short-term financing during financial crisis had a positive impact on ROA. (Saleem & Rehman, 2011) sought to reveal the relationship between liquidity and profitability. The main results of the study demonstrate that each ratio (variable) has a significant effect on the financial positions of enterprises with differing amounts and that along with the liquidity ratios in the first place. Profitability ratios also play an important role in the financial positions on income statement of enterprises.

(Lartey, 2013)sought to find out the relationship between the liquidity and the profitability of banks listed on the Ghana Stock Exchange. It was found that for the period 2005-2010, both the liquidity and the profitability of the listed banks were declining. Again, it was also found that

There was positive relationship between the liquidity and the profitability of the listed banks in Ghana. (Moein, 2013) Investigated the relationship between modern liquidity indices and stock return in companies listed on Tehran Stock Exchange. Results indicated that there was a positive and significant relationship between comprehensive liquidity index and stock returns while there was no significant relationship between the index of cash conversion cycle as well as net liquidity balance and sock returns.

(Almazar, 2014)Investigated the internal factors that have an effect on profitability in Saudi and Jordanian banks. He found that there is a positive correlation between profitability measured by ROA of Saudi and Jordanian banks with some liquidity indicators, as well as there is a negative correlation with other liquidity indicators between profitability measured by ROA of Saudi and Jordanian banks . Thisobvious view may eventually impact on the liquidity position of the bank. Also the theory assumes that repayment from the selfliquidating assets of a bank would be sufficient to provide for liquidity. This ignores the fact that seasonal deposit withdrawals and meeting credit request could affect the liquidity position adversely.

(Shen, 2009). empirically investigate the causes of liquidity risk and the relationship between bank liquidity risk and performance. The study aimed to employ alternative liquidity risk measures besides liquidity ratios (i.e. financial gap measures provided by (Saunders and Cornett 2006). The study further aimed to investigate the determinants of bank performance in terms of the perspective of the bank liquidity risk (bank liquidity risk and performance model). The study used an unbalanced panel dataset of 12 advanced economies commercial banks over the period 1994-2006. The panel data applied to instrumental variables regression, using two-stage least squares (2SLS) estimators to estimate bank liquidity risk and performance model. The researchers classified countries as bank-based or market-based system, and investigate the difference of causes of liquidity risk in different financial systems. The empirical results indicated that the bank-specific variable had the same effect on bank liquidity risk in two financial systems and liquidity risk was the endogenous determinant of bank performance.There are also other researchers investigated the relationship between bank liquidity risk and financial performance by taking liquidity as an endogenous variable. For instance, we can find that the effect of liquidity risk on bank profitability is mixed. Some studies found out the positive effect e.g.(Molyneuk & John, 1992); Barth et al.2003); others found out the negative effect like(Bourke, 1989)and (Demirguc & Huizinga, 1999).

2.3 Related Empirical Studies in Ethiopia

Few researcher studied the determinates of commercial banks liquidity and their impact on financial performance on commercial banks in Ethiopia.

Some related studies were conducted by different researchers in Ethiopia. Specifically, (Worku, 2006) argued that liquidity has an impact on the performance of commercial banks in Ethiopia and there was an inverse relation between deposit/net loan and ROE. And the coefficient of liquid asset to total asset was positive and directly related with ROE.

(Tseganesh, 2012) studied the determinants of banks liquidity and their impact on financial performance on commercial banks in Ethiopia including both public and private banks. Her study focused on two stapes; first, to identify determinants of commercial banks liquidity in Ethiopia and then to see the impact of banks liquidity up on financial performance through the significant variables explaining liquidity. The data was analyzed by using balanced fixed effect panel regression model for eight commercial banks in the sample covered the period from 2000 to 2011 and the result of her study indicate that capital adequacy, bank size, share of non-performing loans in the total volume of loans, interest rate margin, inflation rate and short term interest rate had positive and statistically significant impact on banks liquidity. Whereas, Real GDP growth rate and loan growth had statistically insignificant impact on banks liquidity.

(Birhanu, 2015) he examined some of bank specific and macroeconomic factors affecting banks liquidity and their impact on Profitability using Net interest margin which shows how well the bank is earning income on its assets. High net interest income and margin indicates a well-managed bank and also indicates future profitability.

2.4 Summery and Knowledge gap

In line with the above theoretical and empirical review; liquidity is important to all business specially for banking industry since their function is creations of liquidity on both the asset and liability side of their balance sheet. It suggested that commercial banks liquidity can be affected by different factors such as bank specific, macroeconomic and regulatory factors. As it is evident in different literature for instance (Vodova, 2012)the most important task is to choose the appropriate explanatory variables. Hence, the selection of variables for this study was on the basis

of previous studies that reviewed in the literature and the idea of the researcher and, so it focused on bank specific and macro economic variables that determine the liquidity of commercial banks in Ethiopia. Unlike the empirical studies, theory on bank liquidity was well documented. According to the review, most of the empirical studies were done on the area of bank liquidity following the U.S. subprime mortgage crisis. Although liquidity problems of some banks during global financial crisis re-emphasized, the fact that liquidity is very important for functioning of financial markets and the banking sector; an important gap still exists in the empirical literature about liquidity and its measurement. Studies cited above suggest that commercial banks‟ liquidity was determined both by bank specific factors (such as size of the bank, capital adequacy, Non performing loan, profitability, Loan growth and factors describing risk position of the bank), macroeconomic factors (such as different types of interest rates and indicators of economic environment) as well as the central bank decisions. Hence, as it was clearly indicated in the empirical review, most of the studies regarding the determinants of banks liquidity were done on the word wide base, some of them were done in Africa. However to the knowledge of the researcher, it is possible to say few studies in Ethiopia concerning to banks liquidity but most of them disregard studying effect of liquidity indicators directly, rather studying on points like the relationship between liquidity and performance of banks in Ethiopia (Worku, 2006).

The study made by (Tseganesh, 2012) on the determinants of banks liquidity and their impact on financial performance, and she tried to investigate determinants of banks liquidity directly. But the measurement used by the researcher for liquidity risk was only liquidity ratios.

Commercial banks are financial intermediaries that raise funds primarily by issuing checkable demand, saving, and time (fixed) deposits. The underdeveloped nature of the Ethiopian financial system makes the commercial banks to be authorized to provide universal banking service in the financial market. For instance, commercial banks undertake almost all of the transactions and activities of money and capital market. This conglomeration entails lack of diversification which exposes banks to credit, interest rate and liquidity risks. Liquidity management involves the management of the uses of funds (assets) including investments, loans and advances as well as the

Sources of funds (liabilities) including various savings collected by banks and equities retained in a way that banks undertake productive financial services in an economy and maximize their own earnings.

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. Financial market developments in the past decade have increased the complexity of liquidity risk and its management. The global market turmoil that began in mid-2007 re-emphasized the importance of liquidity to the functioning of financial markets and the banking sector. The financial crisis illustrated how quickly liquidity can evaporate and that illiquidity can last for an extended period of time. The banking system came under severe stress, which necessitated central bank action to support both the functioning of money markets and, in a few cases, individual institutions. As it was discussed in the literature review part, liquidity of banks can be affected by bank specific as well as macroeconomic factors. Thus it is important to study effect of liquidity on banks profitability.As to the knowledge of the researcher, there are varies study made on the effect of liquidity on banks profitability in other countries. While there is few study made the effect of liquidity on banks profitability by considering both private and public banks in the case of Ethiopian commercial banks. Therefore, The objective of this study to investigate the effect of liquidity on commercial banks profitability (the dependent variable) has been measured by the Return on Asset (ROA), Return on Equity (ROE) and Net interest margin (NIM). However on the study consider on the first one that is Return on Asset (ROA) and the independent variable are liquidity measures which are described below.

2.5 Variables Definition

According to Husni, (2011) the determinants of banks profitability are normally consisting of factors that are within the control of commercial banks. They are the factors which affect the revenue and the cost of the banks. Some studies like (Salam N, 2013) classified them into two categories namely the financial statement variables and non-financial variables. The financial statement variables include factors that are directly related to the bank's balance sheet and income

statement.Whiles, the non-financial statement variables include factors like the number of branches of a particular bank, location and size of the bank.

- ***Income***

(Rasiah, 2010)Presented that banks generate income mostly on their assets and the assets could be termed as income and non-income generating. With regards to commercial banks income (Rasiah, 2010)classified it into two, namely interest and non-interest income. The interest income consist of rates charge on loans, overdraft and trade finance which the banks offers to customers.
Whereas, the non-interest income is consisting of fees, commissions, brokerage charges and returns on investments in subsidiaries and securities

- ***Capital Ratio***

(Devinaga,2010) and (Vong et al,2009) included capital ratio as a variable in their study of determinants of banks profitability and performance because capital also serve as a source of funds along with deposits and borrowings. They argue that capital structure which includes shareholders' funds, reserves and retained profit affect the profitability of commercial banks because of its effect on leverage and risk. They documented that, commercial banks assets could be also financed by either capital or debt. But debt financing could be very risky as compared to capital financing with regards to credits and liquidity risks with which commercial banks are expose to. This is because for instance, if a commercial bank experience loss of profit as result of credit default or liquidity problem the bank still has the obligation to services its debt, on the other hand a commercial bank with enough capital is able take higher risk and also absorb shocks which emanate from liquidity and credits risks.

- ***Liquidity Ratio***

According to (Rasiah, 2010) commercial banks are required by regulators to hold a certain level of liquidity assets. And the reason behind this regulation is to make sure that the commercial banks always possess enough liquidity in order to be able to deal with bank runs. he further argue that a bank assume the status of highly liquid assets as well as having the ability to raise funds quickly from other sources to be able to meet its payment obligation and other financial commitments on time.

- ***Deposits***

Banks are said to be heavily dependent on the funds mainly provided by the public as deposits to finance the loans being offered to the customers. There is a general notion that deposits are the cheapest sources of funds for banks and so to this extent deposits have positive impact on banks profitability if the demand for bank loans is very high. That is, the more deposits commercial bank is able accumulate the greater is its capacity to offer more loans and make profits (Rasiah, 2010)

- ***Measurement of profitability***

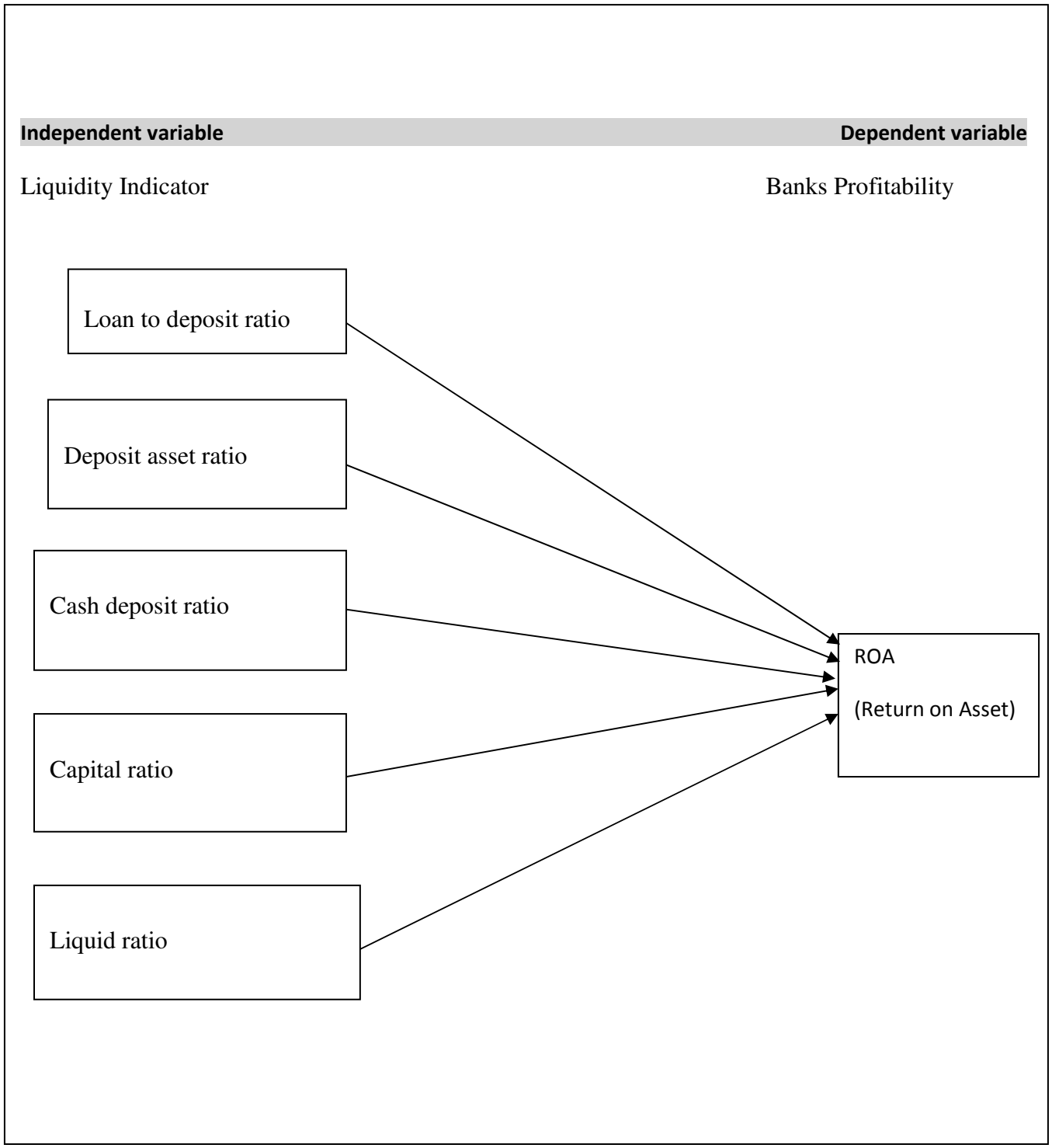
Financial performance of banks: Profitability accounts for the effect of better financial soundness on bank risk bearing capacity and on their ability to perform liquidity transformation (OLagunju, David, & Samuel, 2012). According to (Popa,et.al 2009), popular measures of bank performances are return on assets (ROA), return on equity (ROE), net banking income and the efficiency ratio.

The argument made by (Richard & Thomas, 1997)that bank profitability is best measured by ROA which is defined net income divided by total assets. Thus ROA cannot be distorted by high equity multiplier. Returns on total assets to measure performance of the banks in actual sense signifies managerial efficiency, in other words it depicts how effective and efficient the management of banks has been as they seek to transform assets into earnings.

Variable Symbol	Measurement unit	Variable Explanation
LDR	Loan to deposit ratio	Total loan/total deposit
DAR	Deposit asset ratio	Total deposit/ Total Asset
CRD	Cash deposit ratio	Cash/Total deposit
CR	Capital ratio	Capital / Total assets
LR	Liquid ratio	Liquid assets / Total assets

Source from different related review literature. Some of these are Bourke (1989), Bordeleau, Crawford and Graham (2009) ,(Molyneux & Thornton, 1992) and Vodava(2012).

Figure 2. 1 Conceptual Frame Work on Effect of Liquidity on Banks Profitability



Source: Researcher own construction based on different related review literature. Some of these are (Bourke, 1989),(Molyneuk & John, 1992)and (Vodova, 2012).

Chapter Three

Research Design and Methodology

The preceding chapter presented the review of the existing evidence on effect of liquidity on the profitability of banks and identified the knowledge gap. The results from a review of the literature are used to establish expectations for the relationship of the different variable.

This chapter outlined the methodology which was used in carrying out the study. Aspects covered include research design ;target population, sampling design and data collection followed by, data analysis and model methods and finally, it presented variable description and hypothesis.

3.1 Research design

The primary aim of this study was to examine the effect of liquidity in Ethiopian commercial banks. To achieve the objective explanatory and descriptive type of research design was employed. This type of research design helps to identify and evaluate the causal relationships between the different variables under consideration (Creswell, 2009) So that, the explanatory research design was employed to examine the relationship of the dependent and independent variables and also the present study enabled to describe the effect of liquidity explanatory on performance of commercial banks. (Creswell, 2009) Defines a research design as the scheme, outline or plan that is used to generate answers to research problems. The data for all variables are obtained from National Bank of Ethiopia via the respective commercial banks audited financial report. It is considered five independent variables and all are bank specific variables.

The research methodology begins by presenting the overall research design, as the research design provides an important framework & guidelines on how to collect and analyze data. The choice of appropriate research design will help the researcher to answer the research questions and to satisfy the research objectives. Therefore, it is a paramount to properly define and evaluate the research design before conducting the research.

3.2 Research Approaches.

According to (Creswell, 2009), there are three basic research approaches; these are quantitative, qualitative and mixed research approaches. Quantitative research is the systematic empirical investigation of observable phenomena via statistical, mathematical or computational techniques. The objective of quantitative research is to develop and employ mathematical models, theories and/or hypotheses pertaining to phenomena. The process of measurement is central to quantitative research because it provides the fundamental connection between empirical observation and mathematical expression of quantitative relationships among variables. Quantitative data is any data that is in numerical form such as statistics, percentages, etc. The researcher analyzes the data with the help of statistics. The researcher is hoping the numbers will yield an unbiased result that can be generalized to some larger population

Therefore, for this study quantitative research approach is used to see the banks' profitability that has been measured by Return on Assets (ROA) by using the independent variables that are the liquidity explanatory, that has been measured by the following ratios: Loan to Deposit ratio, Deposit to Asset ratio, Cash to Deposit ratio, Capital ratio and Liquid ratio.

This study also adopted an explanatory approach by using panel research design to meet the research objective. According to (Brooks, 2008), a panel of data will embody information across both time and space and it measures some quantity about them over time. The advantage of using panel data is to address a broader range of issues and tackle more complex problems than would be possible with pure time-series or pure cross-sectional data alone. Panel data has also the advantage of giving more informative data as it consists of both the cross sectional information, which captures individual variability, and the time series information, which captures dynamic adjustment (Brooks, 2008, p. 488).

3.3 Target population

In this research, the target population is the commercial banks in Ethiopia. According to (NBE, annual report, 2013/14) Ethiopia consists of 18 Commercial banks. Commercial Bank of Ethiopia (CBE), Construction and Business Bank (CBB), 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 AbyssiniaS.C (BOA), Lion International Bank S.C (LIB), Cooperative Bank of Oromia S.C (CBO), Berehan International Bank S.C (BIB), Buna International Bank S.C (BUIB), Oromia International Bank S.C (OIB), Zemen Bank S.C (ZB),Abay Bank(AB),Addis International Bank(ADIB),Debub Global Bank(DGB)and Enat Bank (EB). But now publicly owned bank that is the Construction and Business Bank (CBB) is merged with Commercial Bank of Ethiopia (CBE) and now there are 17 commercial banks in Ethiopia; and out of these sixteen are privately owned commercial banks. The study took all of them to the research. The rationality to choosing all commercial banks was due to the availability of structured data for the specific duration of 2005 to2015[1].

3.4 Data collection

Only secondary data were used for the study. Conducting appropriate data gathering instruments helped researchers to strengths and amend some of the inadequacies of any source of data to minimize risk of irrelevant conclusion. Consistent and reliable research indicates that research conducted by using appropriate data collection instruments increase the credibility and value of research findings (Koul, 2006). Accordingly, structured document review was used for this research to collect required information, which was relevant for addressing the objectives of the study. Data were collected from all commercial banks audited financial statements (balance sheet and income statement) from 2005 to 2015. The source of data is obtained from NBE. All data were collected on annual base and the figures for the variables were on June 30 of each year under study. Data was collected for the commercial banks in operation during the period and this ensured completeness and consistency of the study elements.

[1].in order to take all commercial banks data
Taking 11 years of data should be logical.
To get large number of data.

3.5 Method of data analysis

In order to achieve the objective of the paper, the study is conducted primarily based on panel data obtained through structured document review. According to (Baltagi, 2005)the advantage of using panel data is that it controls for individual heterogeneity, leads to less co linearity among variables and tracks trends in the data (something which simple time-series and cross-sectional Data cannot provide). The collected panel data were analyzed using descriptive statistics, correlations and multiple linear regression analysis which was tested by five multiple linear regression model assumptions. These are: heteroscedasticity, autocorrelation, multicollinearity, Normality & constant variable. Mean values and standard deviations were also used to analyze the general trends of the data from 2005 to 2015 of commercial banks in Ethiopia.

Correlation matrix was used to examine the relationship between the dependent variable and explanatory variables. The multiple linear regressions model was performed and thus ordinary least square (OLS) was conducted using EVIEWS 8 econometric software package, to test the effect of liquidity on profitability.

3.6 Random Effect Model

According to Gujarati (2004), 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). There are broadly two classes of panel estimator approaches that can be employed in a panel data financial research: fixed effects models (FEM) and random effects models (REM) (Brooks 2008). Even if this two approaches end up with nearly the same result, there are situations that they will deviate widely. Since the number of time series (i.e. 11 year) is less than the number of cross-sectional units (i.e. 17 commercial banks), random effect model is preferable in this case.

A random effect method of panel multiple linear regressions model and t-static was used to determine the significance level of each independent variable in influencing profitability. The multiple linear regressions model was run using OLS through EViews 8 econometric software package, to test the casual relationship between the firms' profitability and Liquidity and to determine the most significant and influential liquidity indicators affecting the financial

performance of Commercial Banks. According to (Gujarati, 2004.)OLS outperforms the other estimators when the following holds; the cross section is small and the time dimension is short. Therefore, as far as both the above facts hold true in this study it was found reasonable to use OLS in this study.In connection to this, the general model for this study is represented by; (Brooks, 2008), Economic model: $Yi,t = \beta 0 + \beta Xi,t + \varepsilon i,t$ mostly found in the existing literature. Subscript i representing the cross sectional dimension and t denote the time series dimension. the left hand variable Yi,t represents the dependent variables in the model which is the financial institution of ROA,Xit contains the set on independent variables in the estimation model is taken to be constant over time t and specific to individual cross-sectional unit i. if β0 is taken to be the same across units, then OLS provides a consistent and efficient estimates of β0 and β.

In light of the above model, the unbalanced panel data constructed by taking all commercial banks in Ethiopia was analyzedby using the following multiple linear regression model.

and the model was presented below .

$$ROA,t = \beta_0 + \beta_1(CDRi,t) + \beta_2(CRi,t) + \beta_3(DAi,t) + \beta_4(LDRi,t) + \beta_5(LRi,t) + \mu i,t$$

This model has its basis to the models of (Owolabi, Obiakor, & Okwu, 2011), (Saleem & Rehman, 2011), (Shen, 2009),(Worku, 2006)and (Tseganesh, 2012) in order to explain the relationships between liquidity and profitability of commercial banks in Ethiopia.

Where:

ROA = Annualized Net Income/Total Assets

CDR (Cash Deposit ratio)= Cash/Total Deposit

CR (Capital Ratio) = Capital/ Total Asset

DAR (Deposit Asset ratio)=Total Deposit/Total Asset

LDR (Loan Deposit ratio)=Total Loan/Total Deposit

LR(Liquid Ratio)= Liquid Asset/Total Asset

μi t: is a random error term

3.7 Model Assumption Test

In order to make the data ready for analysis and to get reliable results from the research, the model stated previously was tested for five multiple linear regression model assumptions. Those are: test for heteroscedasticity, autocorrelation, multicollinearity, normality and constant variable. Accordingly, the following sub-section presents the tests made.

Assumption one: the errors have zero mean (E (ε) = 0) or constant variable

The first assumption states that the average value of the errors should be zero. According to (Brooks 2008) if the regression equation contains a constant term, this presumption will never be breach. Therefore, since from the regression result table the constant term (i.e. β0) was included in the regression equation; this assumption holds good for the model.

Assumption two: homoscedasticity (variance of the errors is constant ($\mathbf{Var(\mu_t) = \sigma^2 < \infty}$)

Heteroskedasticity is a systematic pattern in the errors where the variances of the errors are not constant. When the variance of the residuals is constant it is referred as homoscedasticity, which is desirable. To test for the absence of heteroscedasticity white test was used in this study. In this test, if the p-value is very small, less than 0.05, it is an indicator for the presence of heteroscedasticity (Gujarati, 2004.)

Assumption three: covariance between the error terms over time is zero (cov (ui, uj) = 0)

This assumption states that covariance between the error terms over time or cross-sectional, for that type of data is zero. That is, the errors should be uncorrelated with one another. If the errors are not uncorrelated with one another it is an indicator for the presence of Auto correlation or serial correlation (Brooks, 2008)

Assumption four: Normality (errors are normally distributed $\mu_{t\sim}$ N(0, σ^2)

A normal distribution is not skewed and is defined to have a coefficient of kurtosis 3. Jarque-Bera formalizes this by testing the residuals for normality and testing whether the coefficient of skeweness and kurtosis are zero and three respectively. Normality assumption of the regression model can be tested with the Jarque- Bera measure. If the probability of Jarque Bera value is greater than 0.05, it's an indicator for the presence of normality (Brooks, 2008)

Assumption five: Multicollinearity Test

According to (Churchill and Iacobucci 2005), multicollinearity is concerned with the relationship which exists between explanatory variables. When there exists the problem of multicollinearity, the amount of information about the effect of explanatory variables on dependent variables decreases and as a result, many of the explanatory variables could be judged as not related to the dependent variables when in fact they are. How much correlation causes multicollinearity, however, is not still clearly defined. Many authors have suggested different level of correlation to judge the presence of multicollinearity. While (Hair, et al. 2006) argued that correlation coefficient below 0.9 may not cause serious multicollinearity problem(Malhotra, 2007.) stated that multicollinearity problem exists when the correlation coefficient among variables is greater than 0.75. This indicates that there is no consistent agreement on the level of correlation that causes multicollinearity.

3.8 Variable description and research hypotheses

This research work attempted to see the relationship between the dependent and independent variables through testing the hypotheses regarding to the effect of liquidity on financial performance of commercial banks in Ethiopia. Therefore, the following hypotheses were developed.

Dependent variable:

Financial performance of banks: Profitability accounts for the effect of better financial soundness on bank risk bearing capacity and on their ability to perform liquidity transformation (OLagunju, David, & Samuel, 2012). According to (Popa,et.al 2009), popular measures of bank performances are return on assets (ROA), return on equity (ROE), net banking income and the efficiency ratio.

The argument made by (Richard & Thomas, 1997)that bank profitability is best measured by ROA because ROA cannot be distorted by high equity multiplier. This study chose to use (ROA) thus returns on total assets to measure performance of the banks ROA in actual sense signifies managerial efficiency, in other words it depicts how effective and efficient the management of banks has been as they seek to transform assets into earnings. The ROA is defined as net income divided by total assets. The data was obtained from the financial statements of all commercial banks for period of 2005 to 2015.

Independent variable:

Cash Deposit ratio=Cash/Total Deposit

This variable is absolute term of addition of bank cash asset (CA), bank balances and Treasury bill and certificate. Cash and cash equivalents are most liquid assets within the asset portion of company balance sheet, which are readily convertible into cash. The data was obtained from the financial statements of all commercial banks for period of 2005 to 2015.

Deposits to total assets ratio=Total Deposit/Total Asset

The effect of fund source on profitability is captured by the deposits/total assets ratio. It is believed to be the major and the cheapest source of funding for banks, empirical evidence provided by (Husni, 2011)prove that customer deposits impact banking performance positively as long as there is a sufficient demand for loans in the market.

Capital and reserve to total assets ratio= Capital/ Total Asset

This is defined as total equity over total asset. This is expected to uncover the capital adequacy of the banks and capture the general average safety and soundness of the banks. According to (Molyneuk & John, 1992)banks with high level of equity can reduce their cost of capital and that could impact positively on profitability. Earlier work done by (Ameyaw & Krakah, 2010) on Profitability determinants of commercial banks in Ghana revealed that the equity ratio which is the measure of the capital strength of the banks posted a positive relationship with the banks ROA which was in line with the study of (Sufian & Chong, 2008)which as well revealed positive relation existing between Philippines banks level of capitalization and profitability.

Liquid assets to total assets ratio=Liquid Asset/Total Asset

Liquid assets to total assets ratio should give us information about the general liquidity shock absorption capacity of a bank. As a general rule, the higher the share of liquid assets in total assets, the higher the capacity to absorb liquidity shock, given that market liquidity is the same for all banks in the sample. Nevertheless, high value of this ratio may be also interpreted as inefficiency. Since liquid assets yield lower income liquidity bears high opportunity costs for the bank. Therefore it is necessary to optimize the relation between liquidity and profitability. According to the NBE establishment proclamation (No. 591, pp. 4168) liquid assets of banks include cash on hand, deposit in other banks, and short term government securities that are acceptable by the NBE as collateral (for instance, Treasury bills).

Loans to deposits ratio=Total Loan/Total Deposit

Loan to deposit ratio relates illiquid assets with volatile liabilities. It indicates what percentage of the volatile funding of the bank is tied up in illiquid loans. The volatile funding includes deposits, interbank borrowing, certificate of deposit and short term borrowing from the central bank. Therefore the higher this ratio the less liquid the bank is.

Hypothesis of the study

A more formal statement of research utilizes hypotheses. These hypotheses are predictions about the outcome of the results; the results from the literature review will used to establish expectations for the relationship of the different determinants. Hence, based on the objective, the present study seeks to test the following five hypotheses. These hypotheses may be written as alternative hypotheses specifying the exact results to be expected , and also may be stated in the null form, indicating no expected difference or no relationship between independent variables on a dependent variable as stated by (Creswell, 2009).

Hypothesis 1: CDR has positive and significant effect on the profitability of Commercial Banks in Ethiopia.

Because saving accounts and transaction deposits can be withdrawn at any time, there is high liquidity risk for both the banks and other depository institutions. Banks can get into liquidity problem especially when withdrawals exceed deposit significantly over a short period of time. (Kamau, 2014) under study that, CDR positive sign implies that to send a positive signal to the depositors the bank retain high ratio of liquid assets (idle cash).

(Chiraw, 2003)under study liquid assets significantly determined the profit of the commercial banks especially in the period after political instability after the elections. The cash held by the commercial banks influenced the profitability.

This study considered the second hypothesis since it has been used by various empirical studies reviewed under this study. The proxy for Cash Deposit Ratio used in this study was the ratio of cash to deposit.

Hypothesis 2: CR has positive and significant impact on the profitability of Commercial Banks in Ethiopia.

(Bourke, 1989)describes a positive relationship between bank profitability and capital ratio, as higher the capital ratio the more will be the bank profitability. In the same way the banks which are sound capitalized are more cost-effective. (Berger, 1995)as a study of 18 countries from 1986-1989 explained that Capital ratio impacts bank profitability positively even though such association restricted to state own banks. This study considered the same as the above hypothesis since it has been used by various empirical studies reviewed under this study. The proxy for Capital Ratio used in this study was the ratio of Capital to Asset.

Hypothesis 3: DAR has positive significant impact on the profitability of Commercial Banks in Ethiopia.

The banks which have high deposits comparative to their assets and using those to strength the equity to enhance the performance of the bank , those are the better developing banks as illustrated by (Naceur & Mohammed, 2001). (Chiraw, 2003)described positive association between bank profit and deposit ratio a study conducted from 1970-1994 on time series data in Malawi.

As possible as high deposits converted into credit then in return high profit will be expected as deposits are the basic source of financing that they can invest. “Deposit ratio has a direct and significant association with profitability.

This study considered the above hypothesis since it has been used by various empirical studies reviewed under this study. The proxy for Deposit Asset Ratio used in this study was the ratio of Deposit to Asset.

Hypothesis 4: LDR has positive significant impact on the profitability of Commercial Banks in Ethiopia.

According to (Shen, 2009) study findings exhibits a positive relationship between loan ratio and profitability. Further Abreu and Mends (2002), Ferdi (2005), Fitriani (2010) and Rasiah (2010) found that there is a positive and significant relationship between the ratio of the LDR and bank profits.

This study considered the above hypothesis since it has been used by various empirical studies reviewed under this study. The proxy for loan deposit Ratio used in this study was the ratio of Loan and advance to Asset.

Hypothesis 5:LR has postive and significant impact on the profitability of Commercial Banks in Ethiopia.

(Kunt & Huizinqa, 1999)reviewed the impact of liquidity on bank profitability for US banks and Canadian banks. The study employed quantitative measures to assess the impact of liquidity on bank profitability. Results from the study suggested that a nonlinear relationship exists, whereby profitability is improved for banks that hold some liquid assets, however, there is a point beyond which holding further liquid assets diminishes a banks' profitability, all else equal.

(Kosmidou, 2008)the result of the study indicatedthat there is a positive relationship between liquidity risk and bank profitability.(Bourke, 1989)who found out that there is a positive relationship between liquidity risk and bank profitability. (OLagunju, David, & Samuel, 2012) found out that there is a positive significant relationship between liquidity and profitability.

This study considered the above hypothesis since it has been used by various empirical studies reviewed under this study. The proxy for liquidity Ratio used in this study was the ratio of liquid Asset to Total Asset.

Chapter Four

Results and Discussion

This chapter presents the results and analysis based on data collection through secondary source to examine the effect of liquidity on banks profitability by using different models and tools. The chapter is organized into three sections. Section 4.1 shows the descriptive statistics results, correlation analysis and tests for MLRM of regression analysis and finally section 4.4 indicates the hypothesis testing.

4.1 Results and Tests for MLRM

This part of the paper discusses the basic findings and presents the tests for the multiple linear regression models. It is structured as follows. First, it gives the descriptive statistics of the variables used in the research. Second, it presents the results of correlation analysis and tests for the Multiple Linear Regression Model assumptions respectively. Then the result of the regression analysis is presented in the last section with hypothesis testing.

4.1.1 Descriptive statistics

The study examined the effect of liquidity on banks profitability for seventeen commercial banks in Ethiopia over years 2005-2015.The descriptive statistics of the dependent and independent variables for all commercial banks in Ethiopia is summarized in table 4.1.The table presents mean, median, maximum, minimum, standard deviation values of for the dependent and independent variables for the total observation of 137 (unbalanced panel data). The mean of ROA of the commercial banks is 3.24% with a minimum of -4.1% and a maximum of 7.5% for the period taken. Standard deviation statistics for ROA is 1.86%.

The descriptive statistics of independent variable have showed the following results. Among these variable LDR was highly dispersed from its mean value compared with other explanatory variables (i.e. 77.72%) that is slightly higher than the international standard for loan to deposit

ratio i.e. 75% (China Banking Regulatory Commission(CRBC), 2012)with the standard deviation of 19.55%.This indicates on average for the commercial banks in Ethiopia higher amount of deposits were tied up with illiquid loans. The possible reason for these could be presence of mega projects and infrastructure in connection with growth transformation plan in our country so commercial bank of Ethiopia are financed for these huge project and also NBE required for private commercial bank to purchase bond of 27% from the amount of loan dispersed. Thestandard deviation of LDR was 19.55%.with the maximum and minimum of LDR shows 129.59% 18.49% respectively.

The commercial banks always possess enough liquidity in order to be able to deal with bank runs and the status of highly liquid assets as well as having the ability to raise funds quickly from other sources to be able to meet its payment obligation and other financial commitments on time. The mean value of LR was 30.31% that was above the liquidity requirement of NBE i.e. 15 % (directive no.SBB/57/2014, October 1, 2014). The standard deviations of LR were 12.56% with the maximum and minimum values of LR were 93.79% and 6.55% respectively with the given period of time.

Deposit Asset ratio is indicator of Liquidity, Banks are said to be heavily dependent on the funds mainly provided by the public as deposits to finance the loans being offered to the customers the mean and standard deviation for the period taken shows 72.96% and 15.48% respectively. The maximum of DAR was 83.62% .while the minimum value of DAR was 11.63 with the given period of time.

Capital ratio is also indictor of Liquidity, Commercial banks assets could be financed by either capital or debt. Commercial bank with enough capital is able take higher risk and also absorbs shocks which emanate from liquidity and credits risks. The mean value of capital ratio was 16 with the maximum and minimum values of 86.82% (the figure extracted from cooperative bank of Oromia since this bank has been established in 2005 and in this period there is limited amount of liability as compared with their equity amount)and 9.76% respectively. The standard deviation for CR was 9.94% revealing little dispersion towards the mean among banks in Ethiopia.

Cash deposit ratio is other indicator of liquidity of commercial banks. The amount of money a bank should have available as a percentage of the totalamount of money its customers have paid into the bank. This amount is calculated so that customers can be sure that they will be able to

take their money out of the bank if they want to. The standard deviation of CDR is 10.11% with mean value of 12.5% and the maximum and minimum value of CDR is 64% and 1.58% respectively. The ratio indicates the percentage of short term obligations that could be met with the bank's liquid assets in the case of sudden withdrawals. The higher the ratio the better is the liquidity position of the bank, therefore, the more is the confidence and trust of the depositors in the bank as compared to the bank with lower. This ratio boosts the rust of the depositors in the bank as the depositors know that bank is not only having enough cash but also made some investments in securities portfolio and supposedly earning some positive returns on those portfolio investments.

Table 4. 1 Descriptive statics of Dependent and Independent Variables

Table 4. 2Descriptive statics of Dependent and Independent Variables

	ROA	CDR	CR	DAR	LDR	LR
Mean	0.032446	0.125019	0.160069	0.729602	0.777241	0.303051
Median	0.036777	0.100237	0.141436	0.725058	0.822741	0.282628
Maximum	0.075056	0.640000	0.868217	0.836226	1.295918	0.937984
Minimum	-0.041307	0.015890	0.009760	0.116279	0.184868	0.065516
Std. Dev.	0.018676	0.101144	0.099451	0.154795	0.195545	0.125597
Skewness	-1.586357	2.185737	3.554822	1.948419	-0.533096	1.122975
Kurtosis	6.497266	9.909955	22.55723	14.40607	3.344765	6.413422
Jarque-Bera	127.2787	381.6436	2471.892	829.3279	7.167556	95.30485
Probability	0.000000	0.000000	0.000000	0.000000	0.027771	0.000000
Sum	4.445140	17.12766	21.92949	99.95548	106.4820	41.51801
Sum Sq. Dev.	0.047433	1.391297	1.345099	3.258754	5.200355	2.145360
Observations	137	137	137	137	137	137

Source; data from Income statement and Balance sheet held by NBE.

4.1.2 Correlation Analysis

One of the measures used to identify the degree of linear association between variables is correlation. Values of the correlation coefficient are always ranged between +1 and -1. A correlation coefficient of +1 indicates that the existence of a perfect positive association between the two variables; while a correlation coefficient of -1 indicates perfect negative association. a correlation coefficient of zero, on the other hand, indicates the absence of relationship (association) between two variables (Brooks, 2008)In this study, the researcher employed the Pearson product moment of correlation coefficient in order to find the association of the independent variables with the profitability of commercial Banks of Ethiopia. Table 4.2 below shows the correlation coefficient between the dependent variables and independent variables.

Table 4. 3 Correlation analysis with ROA

	CDR	CR	DAR	LDR	LR
ROA	-0.174384	-0.556608	0.390850	0.077301	-0.316994

From the above correlation analysis result table 4.2

A positive relationship exists between the banks level of deposit and profitability level realized by the bank. It is expected that with a bank having high customer deposit base, it will be able to invest the funds prudently and be able to generate adequate return. Interestingly, the correlation of profits with the LDR is positive that means most of the banks lend to borrowers, it is expected that the lending level of such firms will be high which in turn generates high interest income to the bank as a result enhance the profitability of the banks.

Even if the result on CR had negative relationship, which means on the other hand that the bank enough capital is able take higher risk and also absorb shocks which emanate from liquidity and credits risks and the LR of the bank also had a negative correlation which means that banks hold adequate liquidity able to minimize liquidity risk, financial crises and can absorb any possible unforeseen financial position.

4.1.3 Regression Analysis

4.1.3.1 Tests for the Multiple Linear Regression Model Assumptions

In order to make the data ready for analysis and to get reliable results from the research, the model stated previously was tested for five multiple linear regression model assumptions. Those are: test for heteroscedasticity, autocorrelation, multicollinearity, normality and constant variable. Accordingly, the following sub-section presents the tests made.

Assumption one: the errors have zero mean (E (ε) = 0) or constant variable

The first assumption states that the average value of the errors should be zero. According to (Brooks 2008) if the regression equation contains a constant term, this presumption will never be breached. Therefore, since from the regression result table the constant term (i.e. β0) was included in the regression equation; this assumption holds good for the model.

Assumption two: homoscedasticity (variance of the errors is constant ($Var(\mu_t) = \sigma^2 < \infty$)

Heteroskedasticity is a systematic pattern in the errors where the variances of the errors are not constant. When the variance of the residuals is constant it is referred as homoscedasticity, which is desirable. To test for the absence of heteroscedasticity white test was used in this study. In this test, if the p-value is very small, less than 0.05, it is an indicator for the presence of heteroscedasticity (Gujarati 2004).

But from Table 4.3 presents three different types of tests for heteroscedasticity. Since the probability values of all the three tests are considerably in excess of 0.05 it's a clear indicator that there is no evidence for the presence of heteroscedasticity. Hence, the model passes the second test.

Table 4. 4 Heteroscedasticity Test: White test

F-statistic	1.032075	Prob. F(24,112)	0.4333
Obs*R-squared	24.81149	Prob. Chi-Square(24)	0.4161
Scaled explained SS	29.35178	Prob. Chi-Square(24)	0.2072

Assumption three: covariance between the error terms over time is zero (cov (ui, uj) = 0)

This assumption states that covariance between the error terms over time or cross-sectional, for that type of data is zero. That is, the errors should be uncorrelated with one another. If the errors are not uncorrelated with one another it is an indicator for the presence of Auto correlation or serial correlation (Brooks, 2008)

According to Brooks (2008), presence/absence of autocorrelation is by using the Breusch–Godfrey test (shown in table 4.4). The result of the statistic labeled "obs*R-squared", which is the LM (linear model) test statistic for the null hypothesis of no serial correlation shows a p-value of 0.0607 (which is greater than 0.05) which indicates the absence of autocorrelation.

Table 4. 5 Breusch-Godfrey Serial Correlation LM Test

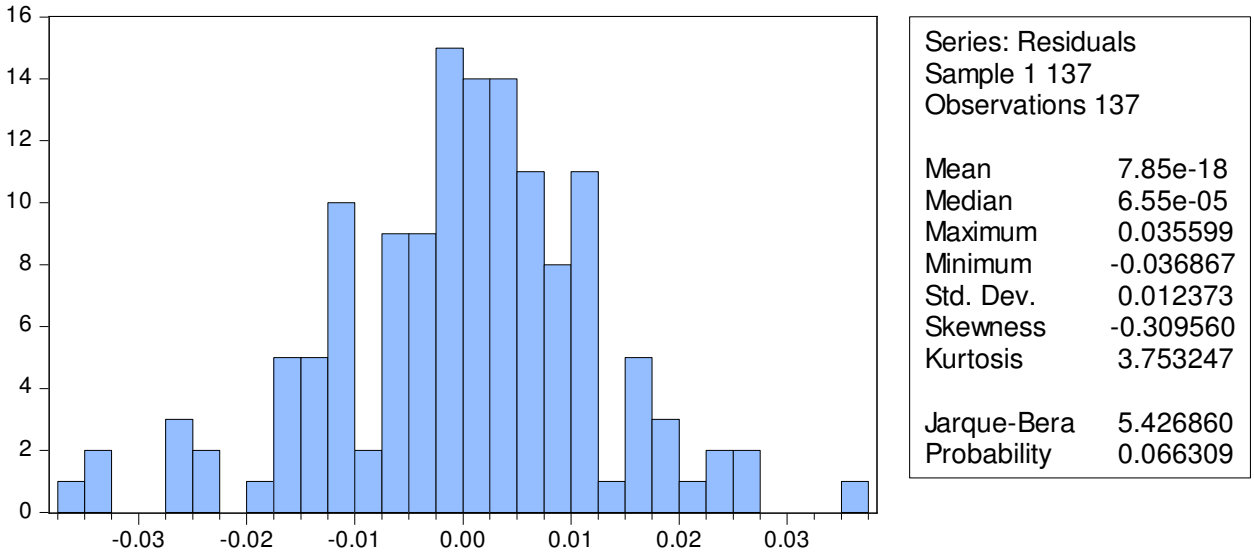
F-statistic	1.443010	Prob. F(46,81)	0.0745
Obs*R-squared	61.70405	Prob. Chi-Square(46)	0.0607

Assumption four: Normality (errors are normally distributed $\mu_{t\sim} N(0, \sigma^2)$

A normal distribution is not skewed and is defined to have a coefficient of kurtosis 3. Jarque-Bera formalizes this by testing the residuals for normality and testing whether the coefficient of skeweness and kurtosis are zero and three respectively. Normality assumption of the regression model can be tested with the Jarque- Bera measure. If the probability of Jarque Bera value is greater than 0.05, it's an indicator for the presence of normality (Brooks 2008).

The normality tests for this study as shown in Figure 4.1 the kurtosis is close to 3, skwness is around 0, and the Jarque-Bera statistic has a p-value of 0.0663 which is well over 0.05 implying that the data were consistent with a normal distribution assumption.

Figure 4. 1Normality Test result



Assumption five: Multicollinearity Test

According to (Churchill and Iacobucci 2005), multicollinearity is concerned with the relationship which exists between explanatory variables. When there exists the problem of multicollinearity, the amount of information about the effect of explanatory variables on dependent variablesdecreases and as a result, many of the explanatory variables could be judged as not related to the dependent variables when in fact they are. How much correlation causes multicollinearity, however, is not still clearly defined. Many authors have suggested different level of correlation to judge the presence of multicollinearity. While (Hair, et al. 2006) argued that correlation coefficient below 0.9 may not cause serious multicollinearity problem.(Malhotra 2007) stated that multicollinearity problem exists when the correlation coefficient among variables is greater than 0.75. This indicates that there is no consistent agreement on the level of correlation that causes multicollinearity.

Therefore, in this study correlation matrix for five of the independent variables is shown below in Table 4.5 The result of the estimated correlation matrix shows that the highest correlation of 0.536843 which is between LR and LDR. Since there is no correlation above 0.75 and 0.9 according to (Malhotra, 2007.)and (W. Black, 2006.)respectively, it can be concluded that there is no problem of multicollinearity.

Table 4. 6 Correlation matrix between explanatory variables

	CDR	CR	DA	LDR	LR
CDR	1.000000				
CR	0.341575	1.000000			
DA	-0.247618	-0.485421	1.000000		
LDR	-0.257503	-0.153585	-0.288533	1.000000	
LR	0.488592	0.495782	-0.128331	-0.536843	1.000000

Source: Output of EViews 8

4.1.3.2 Regression Analysis Results

Under the following regression outputs the beta coefficient may be negative or positive; beta indicates that each variable's level of influence on the dependent variable. P-value indicates at what percentage or precession level of each variable is significant. R^2 values indicate the explanatory power of the model and in this study adjusted R^2 value which takes into account the loss of degrees of freedom associated with adding extra variables were inferred to see the explanatory powers of the models.

The Regression Random Effect Model

According to (Gujarati, 2004.)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). There are broadly two classes of panel estimator approaches that can be employed in a panel data financial research: fixed effects models (FEM) and random effects models (REM) (Brooks 2008). Even if this two approaches end up with nearly the same result, there are situations that they will deviate widely.

To check which of the two (FEM or REM) models provide consistent estimates is preferred for this study;Hausman specification test which suggests the fixed effects model was better than random effects model as the p-value (0.00), is less than 0.05. on other side Hausman specification test random effects model was better than fixed effect model as p-value(0.0620) ,is greater than 0.05 .so random effect model is preferable in this case.

Operational model: the operational unbalanced panel regression model used to find the statistically significant determinants of commercial banks liquidity measured by ROA.

Table 4. 7 Random Effect Regression model

Dependent Variable: ROA

Method: Least Squares

Date: 04/12/17 Time: 00:08

Sample: 1 137

Included observations: 137

Method:Random Effects

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.034534	0.013148	2.626687	0.0097
CDR	0.027635	0.013166	2.098932	0.0378**
CR	-0.074806	0.014681	-5.095512	0.0000***
DAR	0.016469	0.009284	1.773950	0.0785
LDR	0.000899	0.007487	0.120125	0.9046
LR	-0.017690	0.012705	-1.392357	0.1662
VAR1	-0.062752	0.013157	-4.769658	0.0000
VAR2	-0.059900	0.013206	-4.535692	0.0000
VAR3	-0.045537	0.013047	-3.490250	0.0007
VAR4	0.041799	0.012924	3.234246	0.0016

Note: R-squared = 0.561042, Adjusted R-squared = 0.529934, F-statistic = 18.03571, Prob(F-statistic) = 0.000000, Durbin-Watson stat = 1.096543

The starred coefficient estimates are significant at the 1 % (***) and 5 % (**)level.

Source: Financial statement of all commercial banks and own computation through Eviews-8

The above table presents results of Return on Asset (ROA) as dependent variable and bank specific explanatory variables for seventeen commercial banks in Ethiopia. The explanatory power of this model is high (i.e. around 53%). The regression *F*-statistic takes a value 18.03571. F-statistics tests the null hypothesis that all of the slope parameters (βs') are jointly zero. In the above case *p*-value of zero attached to the test statistic shows that this null hypothesis should be rejected even at 1% level of significance. As it is shown in the above table CDR and CR were the statistically significant factors affecting results of Return on Asset (ROA) of commercial banks in Ethiopia. CDR had positive and statistically significant impact on results of Return on Asset (ROA) at 5% level. CR had negative and significant impact on ROA at 1% level. And DA had positive and statistically significant influence on results of Return on Asset (ROA) in Ethiopia at 10% level. Whereas, LDR and LR were statistically insignificant.

4.2 Testing of Hypothesis

The following section provides a detailed but brief analysis of the results for each explanatory and their importance in determining the profitability of Commercial Banks in Ethiopia through testing hypothesis. In addition, the discussions analyses the statistical findings of the study in relation to the previous empirical evidences.

Hypothesis 1: H0: CDR has positive and significant impact on the profitability of Commercial Banks in Ethiopia.

H1: CDR has a negative and significant impact on the profitability of Commercial Banks in Ethiopia.

Because saving accounts and transaction deposits can be withdrawn at any time, there is high liquidity risk for both the banks and other depository institutions. Banks can get into liquidity problem especially when withdrawals exceed deposit significantly over a short period of time. (Sufian & Chong, 2008)Under study that, CDR positive sign implies that to send a positive signal to the depositors the bank retain high ratio of liquid assets (idle cash).However, higher liquidity

may imply the inefficient utilization of resources and loan service by the banks is decline and also not disburse additional loans to the prominent clients to strength the borrower's capacity.

(Naceur & Mohammed, 2001)under study liquid assets significantly determined the profit of the commercial banks especially in the period after political instability after the elections. The cash held by the commercial banks influenced the profitability.

The result of the random effect estimate on Table 4.6 indicated that the CDR had positive relationship with the profitability of Commercial Banks in Ethiopia and this relationship is statistically significant (p-value = 0.0378) at 5% level of significance, which is also the most strong significant level of the above regression result. Thus a percentage change in the amount of CDR ratio will cause a 0.027635 percentage change on the profitability of commercial banks in Ethiopia under the study. The result for the CDR ratio in this study is consistent with the researcher's expectation. Based on this result the researcher rejected the null hypothesis.

Hypothesis 2: H0: CR has positive and significant impact on the profitability of Commercial Banks in Ethiopia.

H1: CR has a negative and significant impact on the profitability of Commercial Banks in Ethiopia.

(Bourke, 1989)describes a positive relationship between bank profitability and capital ratio, as higher the capital ratio the more will be the bank profitability. In the same way the banks which are sound capitalized are more cost-effective. (Berger, 1995)as a study of 18 countries from 1986-1989 explained that Capital ratio impacts bank profitability positively even though such association restricted to state own banks. (Molyneuk & John, 1992)In the study of 80 developed and developing nations they concluded that the general result identifies a positive association between the capital ratio and bank profitability and overseas banks earn more return as compare to local banks in developing countries, while in developed countries the condition is vies versa, even though in general ending result demonstrates a positive link between the capital ratio and profitability.

The result of this study of the random effect estimate on Table 4.6clearly indicated that the CR hada negative relationship with the profitability of Commercial Banks in Ethiopia. And this relationship is statistically significant (p-value = 0.0000) at 1% level of significance, which is also

the most strong significant level of the above regression result. Thus a percentage change in the amount of CR ratio will cause a 0.074806 percentage change on the profitability of Commercial Banks in Ethiopia under the study in opposite direction. The result was in accordance with the un expected sign which stated that there is a significant positive relationship between CR ratio andProfitability. This negative sign shows the inverse relationship between the CR ratioand profitability. Based on this result the researcher accepted the null hypothesis.

This result is consistence with other prior studies that capital ratio has a negative and significant effect on profitability (Mulualem, 2015). This implies that commercial banks in Ethiopia uses there equity as sources of capital in order to meet the regulatory requirement level of capital. As the result implies capital adequacy has a significant effect on the banks profitability since it is an expensive source of fund it affects the profitability of banks. This is because capital adequacy directly and automatically influences the amount of funds available for loans, which invariably affects the level and degree of risk absorption.

In addition, higher capital adequacy ratios may restrict the competitive ability of banks they also affect banks growth capabilities. NBE set fixed amount to banks capital to continue their service and if the banks are not able to meet up with the mandatory capital ratio it may affect their going concern and on their lending abilities which eventually affect their primary function of banks.

Hypothesis 3:H0: DAR has positive significant impact on the profitability of Commercial Banks in Ethiopia.

H1: DAR has a negative and significant impact on the profitability of Commercial Banks in Ethiopia.

The banks which have high deposits comparative to their assets and using those to strength the equity to enhance the performance of the bank , those are the better developing banks as illustrated by (Naceur & Mohammed, 2001)(Chiraw, 2003)described positive association between bank profit and deposit ratio a study conducted from 1970-1994 on time series data in Malawi.

As possible as high deposits converted into credit then in return high profit will be expected as deposits are the basic source of financing that they can invest. “Deposit ratio has a direct and significant association with profitability back by various studies” (Alkassim, 2005)

The effect of fund source on profitability is captured by the deposit to total assets ratio. It is believed to be the major and the cheapest source of funding for banks, empirical evidence provided by (Husni, 2011)prove that customer deposits impact banking performance positively as long as there is a sufficient demand for loans in the market

The result of the random effect estimate on Table 4.6 indicated that the DAR have positive relationship with the profitability of Commercial Banks in Ethiopia conforms to the hypothesis, however this relationship is statistically insignificant at (p-value = 0.0785) at 5% level of significance. Even if it results in insignificant level of the above regression result,the percentage change in the amount of DAR ratio will cause a 0.016469 percentage change on the profitability of Commercial Banks in Ethiopia under the study and it is aligning with the previous studies with the positive relationship exist under the study. It is expected that with a bank having high customer deposit base, affects banking performance positively as long as there is a sufficient demand for loans in the market.

Hypothesis 4: H0: LDR has positive significant impact on the profitability of Commercial Banks in Ethiopia.

H1:LDR has a negative and significant impact on the profitability of Commercial Banks in Ethiopia.

According to (Vodova, 2012)study findings exhibits a positive relationship between loan ratio and profitability. Further (Rasiah, 2010) found that there is a positive and significant relationship between the ratio of the LDR and bank profits.

The result of this study clearly indicate that LDR which is measured by loan to deposit ratio had a positive effect on the profitability of commercial banks in Ethiopia conforms to the hypothesis. But, as it was indicated by the p-value (0.9046) this relationship was not statistically significant and the low coefficient (0.000899) of the control variable suggests the positive impact of LDR on the profitability of commercial banks in Ethiopia is very little and insignificant. LDR is positive that means most of the banks lend to borrowers, but in significant effect on the profitability of the banks.

Hypothesis 5: H0: LR has no negative and significant impact on the profitability of Commercial Banks in Ethiopia.

H1: LR has a negative and significant impact on the profitability of Commercial Banks in Ethiopia.

Bordeleau, Crawford and Graham (2009) reviewed the impact of liquidity on bank profitability for US banks and Canadian banks between the period of 1997 and 2009. The study employed quantitative measures to assess the impact of liquidity on bank profitability. Results from the study suggested that a nonlinear relationship exists, whereby profitability is improved for banks that hold some liquid assets, however, there is a point beyond which holding further liquid assets diminishes a banks' profitability, all else equal.

(Saleem & Rehman, 2011)the result of the study indicated that; bank liquidity decreases mainly as a result of financial crisis, higher bank profitability, higher capital adequacy.

(Kosmidou, 2008)) the result of the study indicatedthat there is a positive relationship between liquidity risk and bank profitability. (Bourke, 1989) who found out that there is a positive relationship between liquidity risk and bank profitability. (OLagunju, David, & Samuel, 2012)found out that there is a positive significant relationship between liquidity and profitability.

The results of the random effect model in Table 4.7 clearly indicated that the level of LR had a negative relationship with profitability of commercial banks in Ethiopia but this relationship was found to be insignificant (p-value = 0.1662). Even if the relationship is negative as hypothesized, it was not significant.

(Rasiah, 2010)commercial banks are required by regulators to hold a certain level of liquidity assets to meet its payment obligation and other financial commitments and the same is true in our country the licensing and supervision of banking business liquidity requirement of NBE is 15 %(directive no.SBB/57/2014, October 1,2014) and the reason behind this regulation is to make sure that the commercial banks always possess enough liquidity in order to be able to deal with bank runs and the status of highly liquid assets as well as having the ability to raise funds quickly from other sources to be able to meet its payment obligation and other financial commitments on time.

Chapter Five

Summary, Conclusions and Recommendations

5.1 Summary and Conclusion

According to the modern theory of financial intermediation, banks exist because they perform two central roles in the economy—they create liquidity and they transform risk. Analyses of banks' role in creating liquidity and thereby Spurring economic growth has a long tradition, dating back to Adam Smith (1776).

An important role of banks in the economy is to provide liquidity by funding long term, illiquid assets with short term, liquid liabilities. Through this function of liquidity providers, banks create liquidity as they hold illiquid assets and provide cash and demand deposits to the rest of the economy. The "preference for liquidity" under uncertainty of economic agents to justify 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.

Data was presented by using descriptive statistics. The correlation and regression analysis for liquidity indicator and financial performance was conducted. Before performing OLS regression the models were tested for the multiple linear regression model assumptions.

The overall result obtained from the regression model indicates that liquidity indicator defines profitability of commercial banks in Ethiopia to an important extent. The overall result obtained from the regression model indicates that liquidity indicator such as Cash Deposit ratio (CDR) and Capital ratio (CR) have significant impact on the profitability of commercial banks in Ethiopia to an important extent. While Deposit Asset ratio (DAR), Loan Deposit ratio and Liquidity ratio results in lower significant level of profitability for commercial Banks in Ethiopia.

The independent variables used in order to achieve the objectives stated were; Cash Deposit Ratio(CDR), Capital ratio(CR) and Deposit Asset ratio(DAR),Loan Deposit Ratio(LDR) and

Liquidity Ratio(LR). Among these, Capital ratio and Cash Deposit ratio were found to have a significant effect on profitability of commercial banks in Ethiopia. Among these indicators used in the study, Capital ratio appears to be adding the most significant weight followed by Cash Deposit ratio. On the other hand not significant effect on profitability of commercial banks in Ethiopia was found on the remaining three independent variables these are Deposit Asset Ratio,Loan Deposit ratio (LDR) and Liquidity ratio (LR).

The coefficient and significance level of cash deposit ratio indicated that the amount of most liquidity asset of the commercial bank have a positive and a very significant effect on the financial performance of this financial institutions next to capital ratio even if it has negative coefficient . This indicates that as the level of cash deposit ratio increases, the commercial banks in Ethiopia will be able to operate smoothly and able to generate a positive profit. Therefore this indicates that commercial banks in Ethiopia should increase the level of bank cash asset (CA), bank balances and Treasury bill and certificate so as increase profitability of the firm.

The coefficient of capital ratio (CR) was found to be relatively high as compared to other variables, showing that an increase in capital ratio will result in a significantly lower profitability of commercial banks in Ethiopia. This implies that commercial bank with enough capital is able take higher risk and also absorb shocks which emanate from liquidity and credits risks even if it resulting in a lower level of profitability.

The coefficient of deposit asset ratio (DAR) showed that a positive and insignificant effect on the profitability of these institutions.Hence, this shows that the more deposits commercial bank is able accumulate, the greater is its capacity to offer more loans and make profits in lower cost as compared with other source of financing like debt financing.

The coefficient of loan to deposit ratio has a positive but it is less significant on the profitability of commercial banks in Ethiopia. Loan to deposit ratio relates illiquid assets with volatile liabilities. It indicates what percentage of the volatile funding of the bank is tied up in illiquid loans.

The result on liquidity ratio indicated that negative coefficient and insignificance level for the profitability of these institutions. Hence, this shows. that the commercial banks always possess enough liquidity in order to be able to deal with bank runs and to fill the liquidity requirement of

the regulatory body that is the National Bank of Ethiopia (NBE) and status of highly liquid assets as well as having the ability to raise funds quickly from other sources to be able to meet its payment obligation and other financial commitments on time.

5.2 Recommendation

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

- Liquidity has a significant effect on profitability, however when liquid assets are held exclusively they generate little or no interest at all. The study recommends that banks should maintain adequate liquidity levels in order to realize profits by financing credit to potential investor and the same time to meet financial obligation and legal requirement required by central government i.e. NBE and also important for the health and functioning of the real economy.
- Cash deposit ratio has a significant effect on profitability. The study recommends that banks should maintain adequate level of cash asset be able to operate smoothly and able to generate a positive profit.
- The study also recommends that Commercial bank should have enough capital in order to take higher risk and also absorb shocks which emanate from liquidity and credits risks even if it resulting in a lower level of profitability.

Room for further research

This study was attempted to see effect of liquidity indicators on profitability on commercial banks in Ethiopia. Since liquidity and profitability are very crucial to the existence of banks; other explanatory variable of liquidity that has not been included in this study should be identified in order to see their effects on profitability. The study relied only on data from published financial statements which are subject to managerial discretion thus the quality of information reported in the financial statements of commercial banks in Ethiopia will have a major effect on the findings of this study. In addition other factors especially qualitative factors relating to commercial bank management i.e. policy and strategy as well as macroeconomic factors with incorporating regulatory factors that may influence liquidity have not been. So further studies are supplemented with these factors, the findings would be more informative.

Bibliography

Aburime, U. T. (2008, Septemper 2). *Determinants of Bank Profitability: Macroeconomic Evidence from Nigeria.* Retrieved April 04, 2017, from Aburime, Toni, Determinants of Bank Profitability: Macroeconomic Evidence from Nigeria (September 2, 2008). Available at SSRN: https://ssrn.com/abstract=1231064 or http://dx.doi.org/10.2139/ssrn.1231064

Alkassim, F. A. (2005, septemper). The Profitability of Islamic and conventional banking in GCC Countries:A comparative Study.

Amengor, E. C. (2010). Importance of Liquidity and Capital Adequacy to Commercial Banks. *A Paper Presented at Induction Ceremony of ACCE, UCC Campus* .

Anyanwu, J. (1993). Monetary Economics Theory, Policy and Institutions. Onitsha: Hybrid Publishers Ltd.

Athanasoglou, P. P., Brissimis, S. N., & Delis, M. D. (2005). Bank-specfic,Industry-Specfic and Macroeconomic determinants of bank profitability. *Working Paper-bank of Greece,25 Retrieved from http:/www.bank of greece.gr.*

Bank Managment, ISBN: 978-0-471-16960-4 (1999).

Bernanke, B. (2008). Liquidity Provision by the Federal Reserve Risk Transfer Mechanisms and Financial Stability Workshop Basel. Switzerland.

Birhanu, E. (2015). Determinants of Banks Liquidity and their Impact on Profitability: Evidenced from eight commercial bank. *A Thesis Submitted to The Department of Accounting and Finance College of Business and Economics* .

Bourke, P. (1989). Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of Banking and Finance, 13* (1), 65-79.

Brooks, C. (2008). *Introductory Econometrics for Finance, 2nd ed.* New York: CAMBRIDGE UNIVERSITY PRESS.

Chagwiza, W. (2011). Zimbabwean Commercial Banks Liquidity And Its Determinants. *International Journal of emprical finance* , 52–64.

Chiraw, E. (2003). Determinants of commercial banks' profitability in Malawi: A cointegration approach. *Applied Financial Economics, 13* (8), 565-571.

Creswell, J. W. (2009). *Research design : qualitative, quantitative, and mixed methods approaches, 3rd ed.* Thousand Oaks, CA: SAGE Publications, Inc.

Diamond, D. W., & Dybvig, H. P. (1983). "Bank runs, deposit insurance, and liquidity". *Journal of Political Economy, Vol. 105, No. 91*, PP. 401-419.

EliJelly, A. (2004). Liquidity - profitability tradeoff: An empirical investigation in an emerging market. *International Journal of Commerce and Managemen* , 14(2):48-61.

Emmanuel, N. R. (1997). Commercial Banking in an Era of Deregulation. *3rd Ed.* Greenwood Publishing Group.

Etienne Bordeleau, A. C., Etienne, B., Allan, C., & Graham, C. ((2009), December). Regulatory Constraints on Bank Leverage: issues and lessons from the canadian experiance. *Bank of Canada Discussion papers 2009-15* .

Federal Reserve. (n.d.). Retrieved October Monday, 2017, from federalreserve.gov: http://www.federalreserve.gov

Gujarati, D. (2004.). *Basic Econometrics.* Boston: McGraw,.

Heggestad, A. A. (1977). The Competitive Condition of U.S. Banking Markets and the impact of structural reform. *Journal of Finance* (3).

hTTP://federalreserve.gov. (n.d.).

Kosmidou, K. (2008). MEASUREMENT OF BANK PERFORMANCE in Greece. *South-Eastern Europe Journal of Economics* , 75-79.

Koul, L. (2006). *Method of educational research, 5th ed.* New Delhi: Vikas publishing House.

Kunt, D., & Huizinqa, H. (1999). Determinants of commercial bank interest margins and profitability : some international evidence. *1*, 379-408.

Lamberg, S., & Valming, S. (2009). Impact of Liqudity Management on profitability,a study of the adaptation of liquidity strategies in a financial crisis.

Lartey, V. (2013). The Relationship between Liquidity and Profitability of Listed Banks in Ghana. *International Journal of Business and Social Science, Retrieved from http://ijbssnet.com/journals, 4* (3), 48-56.

Longworth, D. (2010). Bank of Canada Liquidity Facilities. *Howe Institute* .

Malhotra, N. .. (2007.). Marketing Research: An applied Orientation,. *5th Edition*. New Delhi: PHI.

Mekbib, S. (2016). determinants of liquidity of Ethiopian private commercial banks. Addis Ababa, Ethiopia.

Mishkin, P. F. (2004). The Economics of Money, Banking and Financial Markets(7th.ed), . USA: Addison-Wesley.

Molyneuk, P., & John, T. (1992). Determinants of European bank profitability. *Journal of Banking and Finance, 16*, 1173-1178.

Moore, W. (2009, March 27). How do financial crises affect commercial bank liquidity?:‟Evidence from Latin America and the Caribbean. (n. A. http://mpra.ub.uni-muenchen.de/21473/1/MPRA_paper_2, Ed.)

Germany in its series MPRA Paper with number 21473.: University Library of Munich Germany in its series MPRA Paper with number 21473.

Munyamborera, E. (2010). Determinants of commmercial banks profitability in Sub-Saharan Africa.

Myers, C. S., & Rajan, G. R. (1998). The Paradox of Liquidity. *The Quarterly Journal of Economics,, Vol. 113, No. 3*, pp. 733-771.

Naceur, S., & Mohammed, G. (2001). The determinants of the Tunisian deposit banks' performance. *11* (3), 317-319.

NBE. (2009/10). annual report. Addis Ababa,Ethiopia: NBE.

NBE. (2013/14). *annual report.* Addis Ababa.

Nwankwo, U. A. (1992). Economic Agenda for Nigeria. Lagos, Nigeria.: Centralist Production Ltd.

Nzzotta.S. (2004). Money, Bankung and Finance: Theory and Practice. Owerri.

Obilor, S. (2013). The Impact of Liquidity Management on the Profitability of Banks in Nigeria. *Journal* , 37-48.

OLagunju, A., David, A. O., & Samuel, O. O. (2012). 'Liquidity Management and Commercial Banks'. *2*, 24-38.

Owolabi, S. A., Obiakor, R. T., & Okwu, ,. A. (2011). Investigating Liquidity Profitability Relationship in Business Organisation, A Study of Selected Quoted Companies in Nigeria. *British Journal of Economics, Finance and Management Sciences, 1*.

Rochet, C. J. (2008). "Liquidity Regulation and the Lender of Last Resort". *Banque de France Financial Stability Review* , 45-52.

Salam N, a. o. (2013). NON-FINANCIAL INDICATORS AND CORPORATE ANNUAL REPORTS. *American Academic and scholarly research jouranal, 5* (4).

Saleem, Q., & Rehman, R. (2011). "Impacts of liquidity ratios on profitability (Case of oil and gas companies of Pakistan)." Interdisciplinary Journal of Research in Business, Vol. 1, Issue. 7, July 2011(pp.95-98). *Interdisciplinary Journal of Research in Business, 1* (7), 95-98.

Shen, C. Y. (2009). Bank Liqudity risk and performance. National University of Kaohsiung.

Smirlock, M. (1985,). Evidence on the (Non) Relationship between Concentration and Profitability in Banking. *Journal of Money, Credit and Banking, vol. 17,* (1), 69-83.

Spindt, P. A., & Tarhan, V. (1980). Liquidity structure adjustment behavior of large money center banks. *Journal of Money, Credit and Banking. x. http://dx.doi.org/10.2307/1991772* .

Tektas, A. N.-G. (2005). Asset and liability management in financial crisis. *The Journal of Risk Finance, 6(2)*, 135-149.

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

Tsomocos, P. D. (2003). Equilibrium analysis, banking, contagion and financial fragility Working paper no.115. *Bank of England* . Park End Street, UK: Said Business School, University of Oxford :ISSN 1368-5562.

Vodova, P. K. (2012). Liquidity of Czech commercial banks and its determinants'. *International journal of* , 1060-1067.

W. Black, l. B. (2006.). Multivariate Data Analysis. New Jersey: PearsonEducation,.

Worku, G. (2006). liquidity and its impact on performance of commercial banks in Ethiopia. *Msc project paper* . Addis Ababa Univercity.

Yeager, F. a. (1989). *Financial Institution Management* (Text and Cases, 3rd ed.,3rd ed ed.). New Jersey., Prentice Hall Inc., Englewood Cliffs, : Prentice Hall Inc.,.

Appendix

Appendix I – List of Commercial Banks in Ethiopia

	Bank Name	Year Establishment.
1.	Abay Bank S.C.	2010
2.	Addis International Bank	2011
3.	Awash International Bank	1994
4.	Bank of Abyssinia	1996
5.	Berhan International Bank	2010
6.	Bunna International Bank	2009
7.	Commercial Bank of Ethiopia	1963
8.	Cooperative Bank of Oromia(s.c.)	2005
9.	Dashen Bank	2003
10.	Debub Global Bank	2012
11.	Enat Bank	2013
12.	Lion International Bank	2006
13.	Nib International Bank	1999
14.	Oromia International Bank	2008
15.	United Bank	1998
16.	Wegagaen Bank	1997
17.	Zemen Bank	2009

Source. Website of the National Bank of Ethiopia

Apendix II:

Heteroskedasticity Test: White

F-statistic	1.032075	Prob. F(24,112)	0.4333
Obs*R-squared	24.81149	Prob. Chi-Square(24)	0.4161
Scaled explained SS	29.35178	Prob. Chi-Square(24)	0.2072

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/12/17 Time: 00:02
Sample: 1 137
Included observations: 137
Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003353	0.003913	-0.857032	0.3933
CDR^2	0.003208	0.002243	1.430422	0.1554
CDR*CR	0.005041	0.007243	0.695984	0.4879
CDR*DA	0.003122	0.007839	0.398245	0.6912
CDR*LDR	0.002149	0.003267	0.657739	0.5121
CDR*LR	-0.002768	0.004779	-0.579222	0.5636
CDR*VAR1	-0.001100	0.001007	-1.093030	0.2767
CDR*VAR2	-0.000417	0.001429	-0.291420	0.7713
CDR*VAR3	-0.011742	0.010115	-1.160850	0.2482
CDR*VAR4	-0.004520	0.005226	-0.864890	0.3889
CDR	-0.005347	0.008623	-0.620064	0.5365
CR^2	0.001842	0.006151	0.299403	0.7652
CR*DA	0.003137	0.006172	0.508229	0.6123
CR*LDR	-0.001229	0.002998	-0.409908	0.6827
CR*LR	-0.003390	0.005540	-0.611855	0.5419
CR	6.54E-05	0.007369	0.008875	0.9929
DA^2	-0.001551	0.001782	-0.870156	0.3861
DA*LDR	-0.002617	0.002824	-0.926728	0.3561
DA*LR	-0.005169	0.004512	-1.145579	0.2544
DA	0.005108	0.006038	0.846003	0.3994
LDR^2	-0.000480	0.000740	-0.648733	0.5178
LDR*LR	-0.001477	0.002098	-0.704109	0.4828
LDR	0.002681	0.002860	0.937141	0.3507
LR^2	-0.000746	0.002247	-0.331938	0.7406

LR	0.006297	0.004658	1.352033	0.1791

R-squared	0.181106	Mean dependent var	0.000152
Adjusted R-squared	0.005628	S.D. dependent var	0.000253
S.E. of regression	0.000252	Akaike info criterion	-13.56770
Sum squared resid	7.13E-06	Schwarz criterion	-13.03486
Log likelihood	954.3875	Hannan-Quinn criter.	-13.35117
F-statistic	1.032075	Durbin-Watson stat	1.689979
Prob(F-statistic)	0.433319		

Apendix III:

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

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	10.510412	5	0.0620

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LDR	-0.013789	-0.003850	0.000015	0.0094
DA	0.002804	0.012595	0.000013	0.0065
CDR	0.034111	0.023430	0.000040	0.0928
CR	-0.105348	-0.097520	0.000051	0.2708
LR	-0.025095	-0.016232	0.000040	0.1609

Cross-section random effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/31/17 Time: 12:54
Sample: 2005 2015
Periods included: 11
Cross-sections included: 17
Total panel (unbalanced) observations: 137

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.061321	0.016631	3.687173	0.0003
LDR	-0.013789	0.009577	-1.439757	0.1527
DA	0.002804	0.011261	0.248995	0.8038
CDR	0.034111	0.016301	2.092512	0.0386
CR	-0.105348	0.019019	-5.539163	0.0000
LR	-0.025095	0.016204	-1.548724	0.1242

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.558541	Mean dependent var	0.032446

Adjusted R-squared	0.477927	S.D. dependent var	0.018676
S.E. of regression	0.013494	Akaike info criterion	-5.627035
Sum squared resid	0.020940	Schwarz criterion	-5.158133
Log likelihood	407.4519	Hannan-Quinn criter.	-5.436485
F-statistic	6.928564	Durbin-Watson stat	1.759829
Prob(F-statistic)	0.000000		

Apendix IV:

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.443010	Prob. F(46,81)	0.0745
Obs*R-squared	61.70405	Prob. Chi-Square(46)	0.0607

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 04/11/17 Time: 23:58
Sample: 1 137
Included observations: 137
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.018518	0.016553	1.118691	0.2666
CDR	0.001114	0.015102	0.073770	0.9414
CR	-0.001066	0.019455	-0.054803	0.9564
DA	-0.002750	0.010830	-0.253877	0.8002
LDR	-0.015498	0.009869	-1.570324	0.1202
LR	-0.013488	0.014228	-0.947983	0.3460
VAR1	-0.007595	0.018526	-0.409984	0.6829
VAR2	-0.011240	0.018907	-0.594493	0.5538
VAR3	-0.000839	0.019540	-0.042923	0.9659
VAR4	-0.004515	0.019668	-0.229553	0.8190
RESID(-1)	0.529637	0.120895	4.380949	0.0000
RESID(-2)	-0.004800	0.135630	-0.035387	0.9719
RESID(-3)	0.054602	0.131809	0.414249	0.6798
RESID(-4)	-0.424194	0.133188	-3.184930	0.0021
RESID(-5)	0.200085	0.145062	1.379301	0.1716
RESID(-6)	-0.150495	0.143480	-1.048894	0.2973
RESID(-7)	0.206816	0.135950	1.521268	0.1321
RESID(-8)	-0.214260	0.140611	-1.523777	0.1315
RESID(-9)	0.063574	0.143020	0.444514	0.6579
RESID(-10)	-0.051718	0.144769	-0.357246	0.7218
RESID(-11)	0.004491	0.155763	0.028835	0.9771
RESID(-12)	-0.096519	0.161512	-0.597598	0.5518
RESID(-13)	0.117227	0.153954	0.761443	0.4486
RESID(-14)	-0.103031	0.157886	-0.652566	0.5159
RESID(-15)	-0.067200	0.160468	-0.418775	0.6765
RESID(-16)	0.025134	0.151852	0.165517	0.8689
RESID(-17)	0.090771	0.155796	0.582628	0.5618

RESID(-18)	-0.082329	0.151307	-0.544120	0.5879
RESID(-19)	0.027697	0.145212	0.190737	0.8492
RESID(-20)	-0.080918	0.148880	-0.543514	0.5883
RESID(-21)	0.008553	0.166223	0.051458	0.9591
RESID(-22)	-0.019818	0.158813	-0.124788	0.9010
RESID(-23)	-0.027507	0.162437	-0.169341	0.8660
RESID(-24)	0.076245	0.154478	0.493567	0.6229
RESID(-25)	0.082766	0.162703	0.508691	0.6124
RESID(-26)	-0.084416	0.184866	-0.456635	0.6492
RESID(-27)	0.134600	0.172160	0.781834	0.4366
RESID(-28)	-0.049461	0.165241	-0.299324	0.7655
RESID(-29)	0.070125	0.179337	0.391025	0.6968
RESID(-30)	0.029889	0.172204	0.173568	0.8626
RESID(-31)	-0.069557	0.182713	-0.380688	0.7044
RESID(-32)	-0.179590	0.186831	-0.961247	0.3393
RESID(-33)	-0.090069	0.176800	-0.509440	0.6118
RESID(-34)	0.317437	0.189026	1.679335	0.0969
RESID(-35)	-0.286564	0.186212	-1.538908	0.1277
RESID(-36)	0.044458	0.176140	0.252404	0.8014
RESID(-37)	-0.185414	0.179777	-1.031356	0.3054
RESID(-38)	0.238619	0.181779	1.312683	0.1930
RESID(-39)	0.081184	0.197323	0.411428	0.6818
RESID(-40)	-0.058643	0.203710	-0.287873	0.7742
RESID(-41)	-0.291865	0.212106	-1.376030	0.1726
RESID(-42)	0.301268	0.221166	1.362184	0.1769
RESID(-43)	-0.125485	0.220100	-0.570126	0.5702
RESID(-44)	0.010898	0.214663	0.050770	0.9596
RESID(-45)	-0.086531	0.218491	-0.396042	0.6931
RESID(-46)	0.235143	0.179355	1.311042	0.1935

R-squared	0.450395	Mean dependent var	7.85E-18
Adjusted R-squared	0.077206	S.D. dependent var	0.012373
S.E. of regression	0.011886	Akaike info criterion	-5.734920
Sum squared resid	0.011443	Schwarz criterion	-4.541352
Log likelihood	448.8420	Hannan-Quinn criter.	-5.249883
F-statistic	1.206881	Durbin-Watson stat	1.991311
Prob(F-statistic)	0.218295		

Apendix V: Correlation matrix

	ROA	CDR	CR	DA	LDR	LR
ROA	1.000000					
CDR	-0.174384	1.000000				
CR	-0.556608	0.341575	1.000000			
DA	0.390850	-0.247618	-0.485421	1.000000		
LDR	0.077301	-0.257503	-0.153585	-0.288533	1.000000	
LR	-0.316994	0.488592	0.495782	-0.128331	-0.536843	1.000000

Apendix VI:Ratio Data

obs.	Bank	Year	ROA	LDR	DAR	CDR	CR	LR	var1	var2	var3	var4
1	CBE	2005	0.023782	0.777252	0.752006	0.026689	0.043241	0.530883	0	0	0	0
2	CBE	2006	0.030579	0.954219	0.781037	0.020472	0.042324	0.539211	0	0	0	0
3	CBE	2007	0.027036	0.895107	0.755987	0.01997	0.00976	0.431497	0	0	0	0
4	CBE	2008	0.037121	0.989821	0.725111	0.027066	0.090926	0.169229	0	0	0	0
5	CBE	2009	0.045764	1.039334	0.711832	0.023901	0.085279	0.147308	0	0	0	0
6	CBE	2010	0.037829	1.01	0.736591	0.028258	0.075076	0.141043	0	0	0	0
7	CBE	2011	0.036967	0.863974	0.771342	0.026684	0.055488	0.168462	0	0	0	0
8	CBE	2012	0.049946	1.041756	0.734139	0.019768	0.048661	0.096629	0	0	0	0
9	CBE	2013	0.043805	0.972112	0.787888	0.01677	0.047069	0.200733	0	0	0	0
10	CBE	2014	0.039676	1.031416	0.790424	0.01589	0.045436	0.108971	0	0	0	0
11	CBE	2015	0.041641	1.086347	0.79216	0.020942	0.043665	0.065516	0	0	0	0
12	Dashen	2005	0.021108	0.837548	0.740142	0.062677	0.080663	0.306638	0	0	0	0
13	Dashen	2006	0.036403	0.902501	0.738868	0.038838	0.092792	0.178862	0	0	0	0
14	Dashen	2007	0.037493	0.863536	0.714855	0.051902	0.100883	0.274798	0	0	0	0
15	Dashen	2008	0.042491	0.516683	0.695739	0.096408	0.106736	0.348651	0	0	0	0
16	Dashen	2009	0.06	0.56	0.81	0.59	0.09	0.48	0	0	0	0
17	Dashen	2010	0.038882	0.621915	0.676709	0.069523	0.106323	0.353824	0	0	0	0
18	Dashen	2011	0.045545	0.547431	0.698302	0.066977	0.12052	0.263142	0	0	0	0
19	Dashen	2012	0.040426	0.713108	0.701273	0.045854	0.12576	0.170693	0	0	0	0
20	Dashen	2013	0.032783	0.655772	0.705424	0.048238	0.116185	0.165409	0	0	0	0
21	Dashen	2014	0.037492	0.866606	0.68038	0.045537	0.117475	0.194078	0	0	0	0
22	Dashen	2015	0.034161	0.951928	0.734631	0.053415	0.126337	0.179338	0	0	0	0
23	Awash	2005	0.021108	0.837548	0.740142	0.062677	0.080663	0.306638	0	0	0	0
24	Awash	2006	0.036403	0.902501	0.738868	0.038838	0.092792	0.178862	0	0	0	0
25	Awash	2007	0.037493	0.863536	0.714855	0.051902	0.100883	0.274798	0	0	0	0
26	Awash	2008	0.042491	0.516683	0.695739	0.096408	0.106736	0.348651	0	0	0	0
27	Awash	2009	0.06	0.55	0.77	0.64	0.12	0.5	0	0	0	0
28	Awash	2010	0.038882	0.621915	0.676709	0.069523	0.106323	0.353824	0	0	0	0
29	Awash	2011	0.045545	0.547431	0.698302	0.066977	0.12052	0.263142	0	0	0	0
30	Awash	2012	0.040426	0.713108	0.701273	0.045854	0.12576	0.170693	0	0	0	0
31	Awash	2013	0.032783	0.655772	0.705424	0.048238	0.116185	0.165409	0	0	0	0
32	Awash	2014	0.037492	0.866606	0.68038	0.045537	0.117475	0.194078	0	0	0	0
33	Awash	2015	0.034161	0.951928	0.734631	0.053415	0.126337	0.179338	0	0	0	0
34	Abysinia	2005	0.036777	0.720662	0.729641	0.067276	0.113518	0.304317	0	0	0	0
35	Abysinia	2006	0.040783	0.87348	0.722243	0.046445	0.13325	0.226336	0	0	0	0

36	Abysinia	2007	0.026546	0.880909	0.76058	0.047093	0.03013	0.249272	0	0	0	0
37	Abysinia	2008	0.004834	0.737996	0.767301	0.093584	0.092682	0.220107	0	0	0	0
38	Abysinia	2009	0.026549	0.543535	0.820612	0.136208	0.094808	0.381855	0	0	0	0
39	Abysinia	2010	0.031266	0.568161	0.818348	0.12874	0.093238	0.361011	0	0	0	0
40	Abysinia	2011	0.035504	0.661998	0.834793	0.13045	0.090794	0.395392	0	0	0	0
41	Abysinia	2012	0.035024	0.776598	0.821802	0.119909	0.11003	0.404675	0	0	0	0
42	Abysinia	2013	0.034593	0.884313	0.836226	0.097826	0.109018	0.402152	0	0	0	0
43	Abysinia	2014	0.03117	0.854434	0.806683	0.136404	0.13559	0.443664	0	0	0	0
44	Abysinia	2015	0.027361	0.835912	0.813471	0.112527	0.13247	0.41805	0	0	0	0
45	Wegagen	2005	0.039175	0.408805	0.79703	0.044411	0.111521	0.34489	0	0	0	0
46	Wegagen	2006	0.041704	0.990787	0.78707	0.095981	0.112708	0.25092	0	0	0	0
47	Wegagen	2007	0.043755	0.921337	0.78261	0.074622	0.115854	0.341472	0	0	0	0
48	Wegagen	2008	0.04606	0.455307	0.71913	0.04505	0.146779	0.341829	0	0	0	0
49	Wegagen	2009	0.050036	0.286979	0.72844	0.04607	0.163416	0.466396	0	0	0	0
50	Wegagen	2010	0.0553	0.342139	0.68318	0.057217	0.183166	0.424479	0	0	0	0
51	Wegagen	2011	0.056833	0.641427	0.73905	0.117846	0.165903	0.414058	0	0	0	0
52	Wegagen	2012	0.0549	0.970096	0.68984	0.105228	0.192177	0.265058	0	0	0	0
53	Wegagen	2013	0.043263	1.047947	0.72646	0.080609	0.176107	0.21449	0	0	0	0
54	Wegagen	2014	0.035892	0.942818	0.72728	0.081268	0.185988	0.224663	0	0	0	0
55	Wegagen	2015	0.033007	0.952477	0.74522	0.071069	0.176086	0.10297	0	0	0	0
56	United	2005	0.039974	0.763665	0.695695	0.059259	0.116388	0.325868	0	0	0	0
57	United	2006	0.037289	0.798758	0.763069	0.05576	0.119632	0.191992	0	0	0	0
58	United	2007	0.039794	0.887608	0.706033	0.075242	0.164808	0.282628	0	0	0	0
59	United	2008	0.038714	0.778658	0.715134	0.075767	0.143948	0.252379	0	0	0	0
60	United	2009	0.028704	0.616977	0.726895	0.076844	0.111764	0.248124	0	0	0	0
61	United	2010	0.042004	0.569164	0.750397	0.070473	0.108129	0.258981	0	0	0	0
62	United	2011	0.04175	0.843617	0.749046	0.113438	0.116675	0.34422	0	0	0	0
63	United	2012	0.046262	0.764961	0.728541	0.115925	0.125382	0.247263	0	0	0	0
64	United	2013	0.037469	0.968427	0.770966	0.112462	0.120283	0.166441	0	0	0	0
65	United	2014	0.030398	0.882816	0.750151	0.106172	0.132639	0.245389	0	0	0	0
66	United	2015	0.024945	0.978062	0.770899	0.114498	0.117419	0.149602	0	0	0	0
67	Nib	2005	0.031	0.93	0.7061	0.379	0.129	0.27	0	0	0	0
68	Nib	2006	0.03928	0.97677	0.71621	0.07635	0.14061	0.183488	0	0	0	0
69	Nib	2007	0.040419	0.934483	0.720838	0.078169	0.163104	0.235612	0	0	0	0
70	Nib	2008	0.043498	0.823419	0.676673	0.13818	0.163865	0.27801	0	0	0	0
71	Nib	2009	0.045723	0.642538	0.685818	0.311323	0.151633	0.3998	0	0	0	0
72	Nib	2010	0.047774	0.713863	0.691262	0.150793	0.153506	0.423776	0	0	0	0
73	Nib	2011	0.048381	0.662216	0.725188	0.088363	0.164628	0.405137	0	0	0	0
74	Nib	2012	0.047063	0.868362	0.705454	0.089094	0.184631	0.291428	0	0	0	0
75	Nib	2013	0.041399	0.975238	0.72778	0.10416	0.182177	0.209705	0	0	0	0
76	Nib	2014	0.038579	1.021526	0.737237	0.107687	0.182777	0.141226	0	0	0	0
77	Nib	2015	0.033253	1.091511	0.737328	0.087834	0.164249	0.150954	0	0	0	0
78	CBO	2005	-0.01705	0.2	0.116279	0.4	0.868217	0.937984	0	0	0	0
79	CBO	2006	-0.02374	1.295918	0.4375	0.204082	0.544643	0.397321	0	0	0	0
80	CBO	2007	0.007407	0.862816	0.653302	0.166065	0.306604	0.412736	0	0	0	0

81	CBO	2008	0.021334	0.657854	0.722353	0.222185	0.218707	0.484718	0	0	0	0
82	CBO	2009	0.003552	0.745414	0.771037	0.123151	0.152911	0.154734	0	0	0	0
83	CBO	2010	0.020434	0.512831	0.775646	0.177934	0.106865	0.361212	0	0	0	0
84	CBO	2011	0.027297	0.513325	0.792054	0.222792	0.098321	0.375395	0	0	0	0
85	CBO	2012	0.038078	1.21707	0.400783	0.200646	0.11366	0.231543	0	0	0	0
86	CBO	2013	0.040835	0.714892	0.682992	0.306341	0.106462	0.5204	0	0	0	0
87	CBO	2014	0.064738	0.822741	0.741472	0.179831	0.148343	0.218216	0	0	0	0
88	CBO	2015	0.041963	0.714892	0.642816	0.306341	0.123094	0.5204	0	0	0	0
89	Lion	2007	-0.0182	0.610072	0.458343	0.166536	0.506004	0.609301	0	0	0	0
90	Lion	2008	-0.00144	0.480636	0.65355	0.307141	0.297859	0.54121	0	0	0	0
91	Lion	2009	0.003926	0.661209	0.738712	0.201444	0.201333	0.464807	0	0	0	0
92	Lion	2010	0.036414	0.564587	0.746239	0.232079	0.177322	0.444052	0	0	0	0
93	Lion	2011	0.034183	0.640887	0.717551	0.215693	0.195194	0.409657	0	0	0	0
94	Lion	2012	0.04251	0.749795	0.705089	0.225391	0.179342	0.500462	0	0	0	0
95	Lion	2013	0.051181	0.953223	0.715688	0.204237	0.184183	0.265884	0	0	0	0
96	Lion	2014	0.035199	0.840182	0.743629	0.217955	0.173751	0.275896	0	0	0	0
97	Lion	2015	0.047035	0.912521	0.760731	0.178643	0.140309	0.225014	0	0	0	0
98	Buna	2010	1E-04	0.795454	0.498341	0.100237	0.352212	0.445804	0	0	0	0
99	Buna	2011	0.034308	0.760146	0.628791	0.13289	0.29747	0.38799	0	0	0	0
100	Buna	2012	0.030267	0.974382	0.661747	0.129996	0.21026	0.200703	0	0	0	0
101	Buna	2013	0.037747	0.897869	0.727105	0.120151	0.175011	0.174561	0	0	0	0
102	Buna	2014	0.035729	0.905424	0.714352	0.158751	0.171571	0.261779	0	0	0	0
103	Buna	2015	0.042676	0.92	0.701824	0.163121	0.159008	0.195997	0	0	0	0
104	Oromia	2009	-0.04131	0.591735	0.580642	0.334259	0.328725	0.442667	1	0	0	0
105	Oromia	2010	0.01923	0.444334	0.733913	0.198544	0.189536	0.45652	0	0	0	0
106	Oromia	2011	0.028896	0.424327	0.778004	0.143319	0.150888	0.315938	0	0	0	0
107	Oromia	2012	0.023378	0.690597	0.759597	0.124803	0.157021	0.285755	0	0	0	0
108	Oromia	2013	0.026117	0.864618	0.779918	0.127834	0.140008	0.268816	0	0	0	0
109	Oromia	2014	0.033999	0.748108	0.801329	0.124066	0.124202	0.24823	0	0	0	0
110	Oromia	2015	0.030832	0.645595	0.764594	0.147224	0.104136	0.130335	0	0	0	0
111	Zemen	2009	-0.01976	0.672165	0.600622	0.027476	0.195668	0.304013	0	0	1	0
112	Zemen	2010	0.065494	0.549282	0.651772	0.034404	0.150237	0.315392	0	0	0	0
113	Zemen	2011	0.075056	0.731335	0.720335	0.049555	0.149146	0.226769	0	0	0	1
114	Zemen	2012	0.051504	0.814369	0.748831	0.052581	0.117198	0.273634	0	0	0	0
115	Zemen	2013	0.038114	0.926143	0.771292	0.075998	0.151913	0.251523	0	0	0	0
116	Zemen	2014	0.04193	0.379304	0.57348	0.023406	0.167401	0.341107	0	0	0	0
117	Zemen	2015	0.041136	0.920088	0.783584	0.043152	0.156915	0.196812	0	0	0	0
118	Birhan	2010	-0.01594	0.637202	0.627137	0.116285	0.269706	0.426507	0	0	0	0
119	Birhan	2011	0.028435	0.511462	0.759761	0.273553	0.164089	0.463987	0	0	0	0
120	Birhan	2012	0.036202	0.756898	0.725058	0.295132	0.183765	0.367403	0	0	0	0
121	Birhan	2013	0.031854	0.869933	0.725034	0.241641	0.173643	0.299654	0	0	0	0
122	Birhan	2014	0.043229	0.851391	0.71486	0.176975	0.197012	0.288326	0	0	0	0
123	Birhan	2015	0.033213	0.876571	0.735364	0.150009	0.174212	0.257148	0	0	0	0
124	Addis	2012	0.021878	1.012763	0.497797	0.087223	0.382437	0.372597	0	0	0	0
125	Addis	2013	0.040456	0.814795	0.612623	0.080418	0.245587	0.360303	0	0	0	0

126	Addis	2014	0.047599	0.86489	0.627544	0.092028	0.249823	0.310671	0	0	0	0
127	Addis	2015	0.045688	0.975764	0.647007	0.125032	0.259518	0.252766	0	0	0	0
128	Abay	2011	-0.00831	0.758405	0.576474	0.103484	0.344928	0.28696	0	0	0	0
129	Abay	2012	0.025353	0.805171	0.629215	0.167551	0.213457	0.145638	0	0	0	0
130	Abay	2013	0.02607	0.824929	0.756463	0.203046	0.17324	0.193878	0	0	0	0
131	Abay	2014	0.023675	0.835996	0.787736	0.192307	0.141436	0.195492	0	0	0	0
132	Abay	2015	0.036665	0.924867	0.790846	0.139971	0.156252	0.155614	0	0	0	0
133	Debub	2013	-0.03754	0.847298	0.416137	0.328856	0.297371	0.374861	0	1	0	0
134	Debub	2014	0.021125	0.533047	0.571807	0.19205	0.207404	0.311033	0	0	0	0
135	Debub	2015	0.019764	0.184868	0.716465	0.156336	0.191408	0.311817	0	0	0	0
136	Enat	2014	0.012377	0.804279	0.65576	0.032132	0.204534	0.368528	0	0	0	0
137	Enat	2015	0.000539	0.94923	0.708423	0.045599	0.201262	0.349111	0	0	0	0