THE EFFECT OF LIQUIDITY MANAGEMENT ON THE PERFORMANCE OF COMMERCIAL BANKS IN ETHIOPIA: CASE OF SELECTED COMMERCIAL BANKS OF ETHIOPIA

BY

YARED KASSA

SUBMITTED TO ADDIS ABABA UNIVERSITY FACULITY OF BUSINESS AND ECONOMICS IN PARTIAL FULFILLMENT OF THE REQUIRMENT FOR THE DEGREE OF MASTERS OF SCIENCE ACCOUNTING AND FINANCE

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This is to certify that the thesis prepared by Yared Kassa, entitled: **Effect of liquidity management on the performance of Commercial Banks in Ethiopia: In the case of selected Commercial Banks in Ethiopia** and submitted in partial fulfillment of the requirement for the degree of Masters of Science in Accounting and Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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STATEMENT OF DECLARATION

I,Yared Kassa, the undersigned declare that this thesis is my original work, prepared under the guidance and support of Doctor Sewale Abate(Ass.Prof.). All sources of materials used for this thesis have been duly acknowledged. I further confirm that this thesis has not been submitted either in part or in full to any higher learning institution for the purpose of earning any degree.

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Signature

April 2021

Addis Ababa, Ethiopia

ENDORSEMENT

This thesis has been submitted to Addis Ababa University, Faculty of Business and Economics for examination with my approval as a University advisor.

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ABBREVIATION AND ACRONYMS

ALCO	Asset and liability management committee
BIS	Bank for International settlement
CAP	Capital adequacy
CATAR	Current asset to total assets ratio
CBE	Commercial bank of Ethiopia
CBRC	China banking regulatory commission
CLRM	Classical linear regression model
COVID-19	Corona virus disease 2019
FI	Financial institutions
GDP	Growth domestic product
GNP	Growth national product
INF	Inflation rate
LACL	Liquid assets to net current liability ratio
LATAR	Liquid assets to total assets ratio
LATD	Liquid assets to total deposit ratio
LDR	Loan to deposit ratio
LM TEST	Lagrange multiplier test
OLS	Ordinary least square
ME	Management efficiency
NBE	National bank of Ethiopia
NPL	Non-performing loan
OECD	Organization for economic corporate and development
ROA	Return of Assets
ROE	Return of equity
SBB	Supervision of banking business

ABSTRACT

The aim of the study to examine the effect of liquidity management on the performance of selected commercial banks of Ethiopia. In order to achieve the stated objectives a quantitative approach was used. To this end, the researcher took nine explanatory variables of liquidity management variables; those are bank specific (Capital adequacy(CAP),current assets to total asset ratio(CATAR),loan to deposit ratio(LDR),liquid assets to net current liability ratio(LACLR),liquid asset to total asset ratio(LATAR),liquid assets to deposit ratio(LATDR),non-interest expense to total income ratio(ME)and macro-economic variables(GDP and inflation rate(INF)).Balanced fixed effect panel regression was used for the data of seven commercial banks(namely Awash bank(AIB), Bank of Abyssinia(BOA),Commercial bank of Ethiopia(CBE),Dashen bank(DB), Nib international bank(NIB),Hibret bank(HB) and Wegagen bank(WB) in the sample covered the period from 2000 to 2018 G.C. The study used return of asset (ROA) used as dependent variable for measuring the profitability of the selected commercial banks the above liquidity variables used as explanatory variables. The study based on a balanced panel constructed ordinary least square (OLS) and fixed effect model. The regression result showed that capital adequacy (CAP), GDP and inflation rate had a positive and significant effect and non-interest expense to total revenue ratio had negative and significant effect. On the other hand current asset to total asset ratio (CATAR), loan to deposit ratio (LDR) had positive but insignificant effect and liquid asset ratio (LATAR), Liquid assets to net current liabilities ratio (Quick ratio) and liquid asset to deposit ratio (LATDR) had inverse relationship and insignificant effect on the ROA of the selected commercial banks within the study time frame. Therefore, liquidity management had non-linear effect on the performance of the banks.

Key words: liquidity, management, profitability, commercial banks

CHAPTER ONE

1. INTRODUCTION

This chapter presents the overall introduction of the study. This includes the background of the Study problem description of the study, purpose of the study, scope of the study, importance of the study and finally the organization of the study is presented.

1.1.Background to the study

Banks play a dynamic role in the livelihood of society by facilitating financial services for the economic development of a country in general. As per Bello (2005), banking system is catalytic for financial intermediation through the transferring and channeling of financial assets. Banks in performing their fundamental role in the economy, facilitate financial settlement through the payment system, influence money market rates and provide a means for international payment. The institution transfer financial assets from the excessive units into the economy and by on-lending such funds to the shortage units for investment, banks in the process enhance the quantum of national savings and investment. Though, the banking institutions sometimes discovery it challenging to funding its operation. This funding problem not only affect the operation of the banks but also affects the management of liquidity of the single banks which anticipate affect their amount of return (Goddard et al., 2004).

The Basel Banking Supervision Committee defines liquidity as an entity's capacity to finance increases in its volume of assets and to comply with its payment obligations on maturity, without incurring unacceptable losses. (Basel Committee on Banking Supervision, 2008)

Decker (2000) describes about liquidity is the capacity of the bank to maintain sufficient funds to meet mature obligation without incurring high costs. Greuning and Bratanovic (2007), the basic aim of liquidity management resolve two kinds of banking risks; the first one is that inadequate level of liquidity will lead to attracting other sources of deposits which are highly expensive and will have a direct impact on profitability and leading to insolvency in the long run. The second of having high level of liquidity level will reduce profit of the bank.

Profitability and liquidity as performance indicators are very important to the major stakeholders: shareholders, creditors and tax authorities. The shareholders are interested in the profitability of banks

because it determines their returns on investment. The tax authorities are interested in the profitability of the banks in order to determine the appropriate tax obligation (Olagunji, et al., 2011).

Finally, profitability and liquidity are effective indicators of the corporate health and performance of not only the commercial banks but all profit-oriented ventures. These performance indicators are very important to the shareholders and depositors who are major publics of a bank. As the shareholders are interested in the profitability level, the depositors are concerned with liquidity position which determines a bank's ability to respond to the withdrawal needs which are normally on demand or on a short notice as the case may be (Eljelly, 2004).

Thus, maintaining sound liquidity position is one of the significant indicators of better performance of a bank. Without ensuring the adequate liquidity, the banking sector will fail to hold its current leading position in mobilizing resources and allocating funds in profitable ends in the economy. So, the topic "Liquidity management and its impacts on Profitability of Commercial Banks Perspective" will cover the relevant field to have a look in the liquidity and profitability position of banking sector as an indicator of the performance of the overall banking industry (Wilner, 2000).

1.2. Statement of the Problem

Risk is an everyday phenomenon in our lives. We deal with various kinds of risks at home, in the office, on the streets we walk down and so on. Risk is part of our lives and we cannot avoid it rather we manage it. We analyze the various risks we come across and make informed decisions and judgments on how to deal with them. For example when we cross the street on our way to work there is a risk of getting hit by a passing car, God forbid, but we acknowledge the existence of that risk and make analysis of the situation by observing the number of cars on the street, the speed at which they are traveling, and the possibility of them being able to make an emergency stop and so on. Based on these information mentally processed, we make a decision of crossing the street or not, if so when to cross it. This is the process of risk management; by using it we reduce the probability of risk and increase the probability of success.

Banking firms are highly exposed to numerous and varying kinds of risks such as credit, liquidity, market, operational risks. As known commercial banks play their intermediation role by collecting financial excesses from their depositors and put them at the disposal of borrowers to be directed

towards various investment activities. This investment activity done by the bank is hardly devoid of risks and problems, for the reason that the commercial banks are looking for to maximize its expected profits on these investments, and this requires optimum utilization of the available resources, since the bank is exposed at any time to satisfy the obligations of its clients and depositors who want to withdraw their savings, and so these banks should be prepared to meet these requirements at any time. The problem arises when the banking firms cannot satisfy these demands, especially those unexpected ones, which may embarrass the bank with its clients and may lose their trust over the time. Therefore, every commercial bank should work to maximize its profits, and at the same time be able to meet the financial requirements of its depositors by holding a sufficient amount of liquidity, in order to achieve a balance between the profitability and liquidity.

The difficulty lies in how to choose or select the optimal level at which banking firms can maintain their assets in order to achieve these two objectives together, because each level of liquidity has a different effect on the levels of profitability, and the problem arises when the commercial banks try to maximize their profit at the expense of neglecting the liquidity, which may cause a technical and financial hardship with the consequent withdraw of deposits.

Maroza, (2015) describe about the effect of improper management of liquidity that it may be sever effect on the performance of the financial institutions.

In our country context the commercial banks have important role in the country growth by providing liquidity to the economic units. Financial sector of the country still is largely bank-based and the secondary market not found in the country. In fact the banking industry in Ethiopia is nowadays acts as the link that holds the country's economy together. Hence, maintaining their sufficient liquidity for banks in Ethiopia is very important to meet the demand by their present and potential customers. Different local studies like Worku (2006),Semu (2010)show on their studies that there was high amount of liquidity hold by the commercial banks the indicated the presence of excess liquidity held by commercial banks in Ethiopia. So, the finding indicates that sound liquidity management play important role to maintain sufficient liquidity and sustain profit maximization.

The study tried to examine the effect of liquidity management on the profitability of selected commercial banks of Ethiopia.

Finally a variety of liquidity variables (capital adequacy, current asset to total asset ratio, liquid asset to total asset ratio, loan to deposit ratio, liquid asset to total deposit ratio, liquid asset to current liability ratio, non-interest expense to total revenue ratio, Gross domestic product, inflation rate and return on asset), that are believed to be potentially responsible for liquidity and profitability of banks were used considering as dependent and independent variable.

1.3. Research Objective and hypothesis

The general objective of this study was investigating the effect of liquidity management on the performance of commercial banks in Ethiopia.

1.3.1. Research Questions

What was the effect of liquidity variables on the performance of Commercial banks in Ethiopia?

1.3.2. Research Hypothesis

In order to achieve the aforementioned objective of the study, the following hypotheses were tested regarding effect of liquidity management on the performance of selected commercial banks in Ethiopia based on different empirical research and theoretical reviewed made:

H_1: Capital adequacy has positive and significant effect on the performance of the banks.

H_2: Current asset to total asset ratio has negative and significant effect on the performance of the banks.

H_3: Loan to deposit ratio has negative and significant effect on the performance of the banks.

H_4: Liquid asset to total assets ratio has negative and significant effect on the performance of the banks.

H_5: Liquid asset to current liability ratio has negative and significant effect on the performance of the banks.

H_6: Liquid assets to deposit ratio has negative and significant effect on the performance of the banks.

H_7:Non-interest expense to total income ratio has positive and significant effect on the performance of the banks.

H_8: GDP has positive and significant effect on the performance of the banks.

H_9: Inflation rate has negative and significant effect on the performance of the banks.

1.4. Scope of the study

The main objective of this study was investigating the effect of liquidity management on the profitability of selected commercial banks in Ethiopia. Nowadays, in Ethiopia seventeen commercial banks operate in the banking industry, from these banks sixteen's' are owned by private investors and CBE is the only government owned commercial bank. The researcher of this study chose only seven commercial banks as sample data from 2000 to 2018.The reason behind choose these seven commercial banks due to their availability of data, years of establishment and working experience.

1.5. Significance of the Study

The study helps to district directors and policy makers to evaluate the effect of liquidity management on the financial returns on commercial banks and to develop strategies to mitigate the liquidity risks on performance of the banks.

The findings of this study also will serve for further study in the sector and help as additional input for future researchers who will have an interest on the title relatedness.

1.6. Organization of the study

This research was prepared in five chapters. The first chapter one describe about introduction and background of the study. The second chapter was explained about the assessment of different literatures. The third chapter also contains brief explanation of the methodology engaged by the study. The fourth chapter describe about data presentation, method of analysis and interpretation. The final chapter provides the conclusion and recommendation of the study constructed on the findings.

CHAPTER TWO

2. LITRATURE REVIEW

The researcher of this study discussed both theoretical as well as empirical reviews in this chapter. The researcher of this paper has reviewed literatures relating to relationship between liquidity management and performance of commercial banks in Ethiopia. This chapter discusses the liquidity management variables identified by the researcher and other variables of liquidity risk management pointed out by other researchers.

2.1. Concept of liquidity

There are several literatures mentioned on their researches about the concept of liquidity in a brief way. Archer and D'Ambrosio mentioned on their studies that "liquidity means the convenience of cash and cash equivalent assets and it is arise from present activities and prior accumulations to meet the obligation of both the short-term and long-term capital providers". Yeager and Seitz (1989) explained their study "liquidity is the capacity of the banks to meet statutory demands of cash. Moore (2009) also mentioned on his research that "the main reason of the banks preserve sufficient liquidity is to satisfy the cash need of their customers". Moore (2009) also argue that "the banking firms unable to satisfied their customer cash requirement, they oblige to borrow from the external sources like inter-bank market or the last resort(central bank) and the consequence of this problem the financial institutions exposed leave their customers(turnover) and decrease the public confidence on the financial system".

Moore (2009) explained that a bank's need for liquidity immediately spendable funds can be viewed within a demand-supply framework. What activities give rise to the demand for liquidity inside a bank? And what sources can the bank rely upon to supply liquidity when spendable funds are needed? These various sources of liquidity demand and supply come together to determine each bank's net liquidity position at any moment in time.

Anthony & Marcia (1999), net liquidity position of the banks as describe: Liquidity Position (L) of the bank is the difference of incoming deposits (inflows), revenue from the sale of non-deposit assets, Customer loan repayment, Sale of bank assets, Borrowing from money market) from Deposit

withdrawals (outflows), volume of acceptable loan request, repayment of bank borrowings, other operating expenses, dividend payments to bank stockholders.

In general liquidity means the ease with which an asset can be converted into cash. In banking sector liquidity means the ability of the banks to meet up the claim of the deposit holders or any other client in cash instantly with minimum cost. So having the adequate amount of cash and near cash assets with the banks indicates better liquidity position of banks.

2.2. Qualities of Liquidity

Liquidity rate vary unlike with different types of assets. For example, the types of banking deposits (like current and time fixed deposits) are the most liquid asset than common stock and common stock more liquid asset than real estate. Peters& Sylvia (2004) mentioned about the qualities of liquidity that there are three basic descriptive features of liquidity that are Marketability, Stability and Conservatism. The marketability feature describe about the liquid assets easily changed into cash before reached the maturity date. The classes of assets that cannot convert into cash before the maturity date can say that these kinds of assets are called illiquid assets.

The second feature of liquid asset is price worth stability. This feature describe that deposits and short-term investment on securities are more liquid than long term investments (such as common stocks).According to the above information, price of deposits more stable and have smaller price changeability and the price of long term investments the price are vary (Praet, P and Herzberg, 2008).

The last quality of liquidity is Conservatism describe that it is the capacity of the liquidity owners (banks) to decrease the costs of financial assets during the resale period. The common stocks are costly when the time of resale than short term investments. In concerning this feature management of the financial institutions should preserve sufficient cash because it is high liquidity value than others.

2.3. Liquidity management in Commercial Banks

Saunders & Cornett, (2005) liquidity management is the ability of banks to meet its short-term financial obligations. Poor liquidity management creates disparity between assets and liabilities of the commercial banks.

Sardakis, G., Mole, K., Hay, G. (2007)describe about the aim of liquidity management that is the ability of the banks used as the middle way among evading excess liquidity and concurrently increase the shortage of liquidity until it reach optimum liquidity level to meet matured financial obligations. Bwacha &Xi(2017) also argue that the capacity of holding sufficient liquidity important factor to create peaceful financial system. Shortage of maintain sufficient liquidity may lead financial collapse of the banks and also panic to the entire financial system in the country. The mismatch transaction of assets and liabilities is a basic indicator liquidity risks in financial institutions. Customer saving is short term promised liability to the banks compared than loan assets. So, liquidity management needs additional funds to decrease the problem when create the unanticipated removal entirely by depositors (Kumar &Yaddav, 2013).

Decker (2000), management of the financial institutions must stipulate strategic mechanisms about source of funding activities of the financial institutions by designing proper capital structure of assets and liabilities mixture used to confirm sufficient liquidity to meet their financial needs. The designed strategy should consider the inherent source of liquidity risks connected with the basic operation of the banks. And also financial institutions should design contingency plan to build the capacity of liquidity to absorb liquidity shock when the institution unable to satisfied their expected commitments. It is difficult work to design a globally synchronized framework for managing liquidity risks (Basel III Liquidity Standards).

The methods of liquidity management are continuously changing to meet the needs of enhancing various sources of financing. Managers of the banks unable to design appropriate strategies to avoid unanticipated losses the banking institutions they might be negatively affected by financing problem. The stages of liquidity management contains formation of strategic direction, incorporation of liquidity risk management as portion of asset/liability management, design a liquidity risk measurement procedure, track and control the present capacity and anticipated liquidity position and continuous appraising both the bank's financial ability and prevailing trends in the financial market for emerging patterns and development of contingency liquidity plans (Decker, 2000).

Sound liquidity management can reduce the probability of severe problems in the banking organizations. Certainly the importance of excess liquidity may important to the single bank, but a liquidity shortage may not the problem of the single bank rather may the entire system trouble. From this description, the investigation of liquidity demand that the management of the banking firms not

only to measure level of liquidity position of the banking firms, but also to inspect how sources of requirements are likely to develop under different circumstances, including negative situations. The banking institutions should evaluate continuously concepts applied in managing liquidity to control that they continue to be effective. Though the banking institutions cannot accurately forecasted affected variables to future liquidity position, concepts and assumptions important to be evaluating continuously to fix their continuing validity. These assumptions should be prepared under the various groups of assets, liabilities and off-balance sheet activities (NBE risk guidelines).

2.4. Liquidity Management and Financial Performance of Banks

Liquidity and profitability as performance indicators are very important to the major stakeholders: shareholders, creditors and tax authorities. The owners are mainly focused on the return of banks because it is important factor to their earning on investment. The tax collector organ is concerned about the profitability of the institutions in order to impose the appropriate tax requirement (Olagunji, et al., 2011).

According to Eljelly, (2004) describe about financial returns and liquidity consider as the best metrics of the corporate stability and performance of not only the commercial banks but all profit-oriented organizations. These performance metrics are crucial factor to the owners and depositors and interested parties who have return motives. Like the owners are concerned on the level return, the depositors are focused on level of liquidity which is the indicator of bank's capacity to answer to the unanticipated withdrawal demand.

Continuous and effective sufficient liquidity status is one of the significant indicators of better performance of a bank. Without safeguarding the sufficient level of liquidity, the financial sector will collapse to maintain its current leading position in transferring funds and allocating resources in profitable ends in the economy. So, the topic “Liquidity management and its effect on Profitability of Commercial Banks Perspective” will cover the relevant field to have a look in the liquidity and profitability position of banking sector as an indicator of the performance of the overall banking industry (Wilner, 2000).

Bwacha & Xi (2017) long-term assets have relatively high returns than short-term assets, preserve sufficient level of liquidity can protect banks from suffering high costs connected to illiquidity and long term loan investments , thus enhancing profitability .Markowitz (1985) assumed that the earning

of the financial asset is mainly suspend on the level of risks associated with the financial asset, this assumptions indicate that there is a direct relationship among risks and earning of the financial returns. Markowitz (1985) also argue that the higher risked assets provide higher returns to reward for the amount of risks connected with the asset. Like in the above suggestion, Kumar (2012) hypothesized that if any financial institution preserves excess amount short term assets and minimum amount of short-term liabilities, the return of such institutions would be negatively affected. From the above perspective, profitability and liquidity have inverse relationship.

2.5. Liquidity requirement directives in Ethiopia

National bank of Ethiopia (NBE) is regulatory institution in our country and responsible to emanate different directives to create stable financial environment in the nation.

Banks working in Ethiopian banking industry shall legitimately need complying with the reserve and liquidity obligation procedure of the National Bank of Ethiopia (NBE) as a tool of soundly managing the level of liquidity positions of banks. As point of fact, the pioneer strategy to liquidity management in our country is agree with these obliged reserve requirement and liquidity ratios as stated by the supervisory organ directives. From this respect, strategic actions has been engaged by the NBE to enhance financial sector liquidity &produce peaceful financial returns and a consistent flow of credit to the real part of the economy contains the continuous decreasing of the statutory level of reserve requirement and liquidity ratio. For example, national bank of Ethiopia (NBE) has decrease obliged reserve requirement from 15% to 10% and then to 5% and liquidity ratio requirement decrease from 25% to 20% and then to 15% in Directives No. SBB/45/2008, SBB/46/2012 & SBB/55/2013 and Directives No. SBB/44/2008, SBB/45/2012 & SBB/57/2014, respectively.

According to NBE's finally changed liquidity requirement procedures No. SBB/57/2014, that "liquid assets" are financial assets comprises vault cash, reserve in national bank and other domestic and foreign banks that recognize by the NBE, other financial assets willingly changed into cash describe and payable in Birr or foreign currency having recognize by the national bank of Ethiopia, customer saving preserve in Organization for Economic Cooperation and Development (OECD) member countries' currencies and payable by banks of OECD member countries and in such other currencies as may be recognize by the National Bank as well as securities delivered by OECD countries denominated in currencies of such countries and such other assets as the National Bank may from time to time announce to be liquid assets; and "current liabilities" denotes to the sum of demand or current

deposits, savings deposits and time deposits and similar liabilities with less than one month maturity.(NBE No. SBB/57/2014)

And also the NBE directives of SBB/57/2014 of liquidity requirement state that:

- Any licensed commercial bank should establish an Asset & Liability supervising Committee (ALCO) to control its assets, liabilities and off-balance sheet items so as to meet its expected obligation.
- And also the directive of the NBE tells about the statutory level of banks liquidity that they should preserve liquidity at least assets (15%) of their current liabilities.

For instance CBE establish its own asset and liability management committee (ALCO). The committee (ALCO) and/or the risk management committee is responsible to monitor the liquidity position by analyzing the maturity structure of assets and liabilities, the stability of deposits by type of customer and the compliance of minimum standards set forth by the regulations and corporate policies.(CBE risk management framework).

The committee used to measure and manage liquidity risk is the ratio of net liquid assets to customer deposits received. Net liquid assets are cash and cash equivalents and negotiable financial instruments that mature in less than 186 days from the date of issue. At the 2016 yearend, such ratio was 12.69% 12.05% and 16.69% at June 30, 2015 and July 1, 2014).

CBE's exposure to liquidity risk is measured using internally developed and approved ratio metrics. The key ratios that vindicate the level of the risk are mentioned as follows.

Table 1.1 Commercial bank of Ethiopia liquidity risk metrics

Risk Indicator/Level	**Loan to deposit ratio**	**Short-term liquidity mismatch**	**Liquid asset to Total assets ratio**	**Liquid asset to current liability ratio**
Low	<75%	<10%	<20%	<20%
Moderate	[75%-90%]	[10%-20%]	[10%-20%]	[15%-20%]
High	>90%	>20%	>10%	>15%
June 30,2014	106.9	11.8%	12.79%	16.69%
June 30,2015	110.02	0%	9.04%	12.05%
June 30,2016	114.2	70%	9.25%	12.69%

2.6. Theoretical Review

In this section try to describe theories related to liquidity management. This subsection would examine three theories that are deemed relevant to research topic. It also entails the determinants of financial returns of commercial banks and review of empirical studies related to the research topic.

2.6.1. Bank liquidity creation and financial fragility theory

As per the financial intermediate theory describe about the role of the banking firms in the nation's economy is to deliver liquidity by financing long term investments. The creation of liquidity role of liquidity providers, the banks maintain illiquid assets by itself and deliver the cash and demand deposit to the economy units.

Though the banking firms are liquidity provide guarantors, they highly confronted different risks like transformation risk and they are affected by deposits run-out problem. If the banks higher are liquidity creation to the external public, the higher is the risk for banks to face losses. According to Bryant, (1980) and Diamond and Dybvig, (1983) mentioned on their model that the presence of banking institutions in the economy, thereby economically significant role of banks delivering liquidity.

2.6.2. Shiftablity Theory

This theory posits that a bank's liquidity is maintained if it holds assets that could be shifted or sold to other lenders or investors for cash. This point of view contends that a bank's liquidity could be enhanced if it always has assets to sell and provided the Central Bank and the discount Market stands ready to purchase the asset offered for discount. Thus this theory recognizes and contends that shiftability marketability or transferability of a bank's assets is a basis for ensuring liquidity (Sunny O., 2013).

2.6.3. Anticipated Income Theory

This theory states that the bank can manage its liquidity through the appropriate directing of the granted loans, and the ability to collect these loans when due in a timely manner and to reduce the possibility of delays in repayment at the maturity time. This theory posts that bank's management can plan its liquidity based on the expected income of the borrower, and this enables the bank to grant a medium and long-term loans, in addition to short-term loans as long as the repayment of these loans

are linked by the borrowers expected income to be paid in a periodic and regular premiums, and that will enable the bank to provide high liquidity, when the cash inflows are regular and can be expected (Ali Sulieman, 2014).

2.6.4. Liquidity preference Theory

The reserved funds by banking institutions are affected by three motives namely: speculative, transaction and pre-caution motives and also interest rate also the affecting factor of reserve money of the firms. Keynes (1936) describe about how the interest rate constructed that by investigating the predictable requirement of money and the sum of money available to meet the predictable requirement money. Keynes (1936) also describes about the definition of liquidity preference that is the amount of cash of the firms or individual persons retained funds in a given point of time.

As per Appelt (2016) stated that about the concept of interest rate that it is anticipated by liquidity preference theory is lacking in uniformity.

2.7. Determinant of Commercial Banks liquidity

2.7.1. Bank specific variables

Current ratio

As per Fabozzi& Peterson, (2003) describe about the current ratio that it means a tool of measuring the banks short-term liquidity and the current ratio is expressed the ratio of current assets with current liabilities of the banks. The following items are considered as the current assets cash and assets transfer into cash in a short period of time (such as marketable securities, receivables, inventories, and prepaid expenses). And also Fabozzi & Peterson, (2003) describe about the component of current liabilities that it is the short-term obligation settled in one year time and also he mentions the following are the component of current liabilities: accounts payable, bills payable, note payable, accrued expenses and tax liability. This ratio is greater than one means the firms have reasonable capacity of current assets than current liabilities but this measurement is not consistent within all firms. Fabozzi & Peterson,(2003) also describe the limitation of current ratio regarding liquidity that it is the only measure quantity not measure the quality aspects and not confirm the real position of liquidity level of the firms.

Quick ratio

Quick ratio is another factor liquidity indicator in the firms. Adebayo O. (2011) describe about the means of Quick ratio on his research that it is measured the association among liquid assets and current liabilities without including inventory assets. Quick ratio is proportion of Quick assets with current liabilities. Eljelly(2004) mentioned about the quick assets that it is the assets are easily transferring into cash without losing the nature of values. Eljelly(2004) also describe about the reason of subtracting inventory assets that inventory take a time changed into cash and has price variation time to time. Quick ratio is a better indicator of the short-term liquidity position of the banks.

Current asset to total asset ratio

Current assets to total assets ratio is used to measure the firm's credibility and also used to find out the investment policy of working capital adopted by the firms under consideration. This investment policy can be of two types, first is the aggressive policy and second is the conservative policy. In aggressive investment policy of working capital, less investment is made in current assets as compared to fixed assets to get more returns. On the other hand, in conservative investment policy of working capital, more investment is placed in current assets as compared to fixed assets. Aggressive investment policy allows getting more profits through investing major portion of resources in fixed assets.

Conservative investment policy helps to avoid the risk of bankruptcy. A lesser value of Current assets to total assets ratio demonstrates more aggressive policy.

Liquid asset to total asset ratio

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).

Liquid asset to total deposit ratio

Vodova,(2013) describe about this ratio that it is the ability of the banking firms to ensure that the short term assets pay-off expected current liability obligations. This ratio also measures the liquidity of the banking firms supposing that the bank unable to borrow from inter-banking when the time of liquidity required. Vodova, (2013) also suggested that if the value of this ratio is (100%) or more, the banks have enough capacity to meet its expected commitments. The lesser value the ratio shows a bank's increased sensitivity related to deposit drawings.

According to NBE liquidity directive SBB/57/2014, "liquid assets" includes cash, assets readily convertible into cash (acceptable foreign currency), deposit in NBE and other domestic and foreign banks.

Loan to deposit ratio

Mekbib, S. 2016) cited NBE directive No SBB/43/2008 on his research tells that loans & advances is asset to banking firms that originated from different sources of fund from financial institution to the customers(borrowers) that is the person obliged to reimburse the fund on a stated date with interest. Loans & Advances are the main portion of the financial asset of the firms. This ratio say show much percentage of volatile resources hold by illiquid asset. This ratio also implies that how much portion of volatile funds (deposits) tied in to illiquid asset. This ratio used as important to forecasting and monitoring instrument in liquidity management. The means of higher this ratio, the less amount of liquidity of the bank is and they are opposite connection.

Capital adequacy ratio

Capital adequacy is a core measure of the bank's financial strength in the regulatory point of view and also a critical factor that can influence on profitability. In the banking perspective that capital on the should comprise the following items: paid up capital, retained earnings, statutory reserve or other funds and excess reserve preserved apart for contingencies. Supervisory organs in several nations fix the minimum limit and controlling capital adequacy to shelter depositors and also used as a tool to keep the public confidence on the banking sector. However capital adequacy ratio is represented by the proportion of total contribution of the owners to risk asset, in few researchers it could besides measured by the ratio of owners funds (capital) to total weighted assets.

According to "Financial fragility-crowding out" theories argue that higher amount of capital contribution is the impeding factor for liquidity formation. Diamond and Rajan (2000, 2001) are the famous financial fragility-crowding out .The model tells that banks raise funds to enhance the capacity of entrepreneur.

Diamond and Rajan(2000) also mentioned there is inverse effect of capital on liquidity creation. It is rely on deposit insurance coverage being incomplete. If deposit insurance were complete, depositors have no incentive to run on the bank, and a deposit contract does not mitigate the bank's holdup problem.

Furthermore, Gorton and Winton (2000) also describe the higher capital has negative effect on liquidity creation through: the crowding out of deposits. Gorton and Winton (2000) reflect that deposits are high level of liquidity hedges for agents than investments in bank equity.

2.7.2. Macro-economic Variables

Gross domestic product (GDP)

The stability of the country economy is basically express in terms of the amount increasing the nation earning. The nation's economic growth is expressed into the following two proxies: Gross Domestic Product (GDP) or Gross National Product (GNP). The concept of GNP is wider than GDP, but most of the literatures used to these two measurement tools of economic growth.

GDP is one of the macroeconomic factors that affect bank liquidity. According to (Pana et al. 2009 and Shen et al. 2010), when the nation economy in sealed in recession(crises) decrease the capacity banks borrowers' and the result of this enhance the banks' non-performing loans and finally banks bankruptcy. According to Painceira (2010), stated that when the country economy in the boom situation the financial firms become less. Aspachs, Nier andTiesset (2005) mentioned on their study that the financial institutions prioritize liquidity when the economy falls. during risk lending opportunities, while neglecting liquidity during economic boom when lending opportunities may be favorable. Thus, to best knowledge, banks forgo liquidity inducing lending during economic growth. Saes-Escorbiac and Tiesset (2006) stated on their study a negative effect between liquidity and GDP of the country.

Inflation rate (INF)

As per the (Karl et al, 2002) inflation means the state of economy describe that the supply of goods and services become less than the demand. Inflation is one of the disturbance factor the economy. It hurts people who are retired and living on a fixed income. On the time of generally price of goods increase these consumers not willing to buy the goods as previously. Inflation also has direct effect the payment of loans and saving decrease because time value of money. From this perspective inflation one factor that affects the level of liquidity of the Commercial Banks.

In any nations inflation is unwanted because of the inflation has high economic costs. In the time of inflation become high, currency and non-interest-bearing checking accounts are unwanted because their values continually decreasing in purchasing power.

A rising theoretical literature mentioned that mechanisms whereby even predictable increases in the rate of inflation interfere with the ability of the financial sector to allocate resources effectively. More specifically, recent theories emphasize the importance of informational asymmetries in credit markets and demonstrate how increases in the rate of inflation adversely affect credit market frictions with negative repercussions for financial sector (both banks and equity market) performance and therefore long-run real activity (Huybens and Smith 1998, 1999). The common feature of these theories is that there is an informational friction whose severity is endogenous. Given this feature, an increase in the rate of inflation drives down the real rate of return not just on money, but on assets in general. The implied reduction in real returns exacerbates credit market frictions. Since these market frictions lead to the rationing of credit, credit rationing becomes more severe as inflation rises. As a result, the financial sector makes fewer loans, resource allocation is less efficient, and intermediary activity diminishes with adverse implications for capital/long term investment. In turn, the amount of liquid or short term assets held by economic agents including banks will rise with the rise in inflation. Hence, there is positive relationship between increase in inflation rate and banks liquidity.

2.8. Review of Empirical Studies

2.8.1. International Evidences on the effect of liquidity on the profitability financial and non-financial institutions

In the study of Olagunju (2012), liquidity management and commercial banks profitability, analyzed impacts of liquidity management on commercial banks profitability in Nigeria. Results indicated that liquidity management is important to the achievement of the operations and the existence issue. And also he conclude that the excess and under level of liquidity basically panic for the financial institution because they are easily erode the profitability of the banks.

On the study of Akinwumi and Michael (2007) showed on their assessment of the relationship between liquidity management and banks' profitability on Nigeria banks that there is a significant relationship between liquidity and profitability of the banks and additionally recommended the importance of the financial institutions to appraise their liquidity management strategy to improve their profit maximization to the owners. Lartey et al, (2013) conclude that had no strong connection between level of liquidity and profitability on his study that focused on selected banks in Ghana.

Vodova (2011) expected to identify important factors affecting commercial banks liquidity of Czech Republic. In order to meet its objective the researcher considered bank specific and macroeconomic data over the period from 2001 to 2009 and analyzed them with panel data regression analysis by using E-views 7 software package. The study considered four firm specific and eight macroeconomic independent variables which affect banks liquidity. The expected impact of the independent variables on bank liquidity were: capital adequacy, inflation rate and interest rate on interbank transaction/money market interest rate were positive and for the share of non-performing loans on total volume of loans, bank profitability, GDP growth, interest rate on loans, interest rate margin, monetary policy interest rate/repo rate, unemployment rate and dummy variable of financial crisis for the year 2009 were negative whereas, the expected sign for bank size was ambiguous (+/-). The dependent variable (i.e. liquidity of commercial banks) was measured by using four liquidity ratios such as liquid asset to total assets, liquid assets to total deposits and borrowings, loan to total assets and loan to deposits and short term financing.

The study made on bank specific determinants of liquidity on English banks studied (Valla et al., 2006) and assumed that, the liquidity ratio as a measure of the liquidity should be dependent on the following factors: bank profitability and loan growth had negatively correlated with liquidity while size of the bank is ambiguous. Liquidity created by Germany's state-owned savings banks and its determinants has been analyzed by (Rauch et al. 2009). In the first step they attempted to measure the liquidity creation of all 457 state owned savings banks in Germany over the period 1997 to 2006 and they analyzed the influence of monetary policy on bank liquidity creation. To measure the monetary policy influence, the study developed a dynamic panel regression model. According to this study, the following factors determine bank liquidity: monetary policy interest rate, where tightening monetary policy expected to reduces bank liquidity, level of unemployment, which is connected with demand for loans having negative impact on liquidity, savings quota affect banks liquidity positively, size of the bank measured by total number of bank customers have negative impact, and bank profitability expected to reduce banks liquidity.

Annas Ali &Al qudh(2015) study about the relationship of current asset investment and profitability of companies in Amman stock exchange industry sector. The findings showed that investment in current asset had direct relation with profitability of the listed companies.

The study made by Lucchetta (2007) on the hypothesis that „interest rates affect banks‟ risk taking and the decision to hold liquidity across European countries‟. The liquidity measured by different liquidity ratios should be influenced by: behavior of the bank on the interbank market. The more liquid the bank is, the more it lends in the interbank market. The results of the study revealed that the risk-free interest rate negatively affects the liquidity retained by banks and the decision of a bank to be a lender in the inter-bank market. Conversely, the inter-bank interest rate has a positive effect on such decisions. Typically, it is the smaller, risk-averse banks that lend in the inter-bank markets. Meanwhile, the risk-free interest rate is positively correlated with loans investment and bank risk-taking behavior.

Moore (2010) investigated the effects of the financial crisis on the liquidity of commercial banks in Latin America and Caribbean countries and specifically addresses the behavior of commercial bank liquidity during crises in Latin America and the Caribbean. They identify the key determinants of liquidity, and to provide an assessment of whether commercial bank liquidity during crises is higher or lower than what is consistent with economic fundamentals. The regression model was estimated by

using ordinary least squares. The result of the study showed that the volatility of cash-to-deposit ratio and money market interest rate have negative and significant effect on liquidity. Whereas, liquidity tends to be inversely related to the business cycle in half of the countries studied, suggesting that commercial banks tend to error on the side of caution by holding relatively more excess reserves during downturns.

The study conducted by Bourke (1989) to establish the effect of liquid assets on the profitability of selected commercial bank in Northern Europe, South America and Australia the time scope of 1972 - 1981, the study used econometric framework presented in an equation. The dependent variable, profitability, was regressed against a non-linear 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 financiers. 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.

Karlee et al. (2013) studied the determinants of liquidity of 15 commercial banks in Malaysia in period (2003-2012). They used bank specific factors; size of bank, capital adequacy, profitability, credit and macroeconomic factors such as GDP, interbank rate, financial crisis. The empirical results show that all factors included are significant except interbank rate. The factors with positive influence on bank liquidity are Non-Performing Loan, Profitability and Gross Domestic Product. On the other hand, factors to bring negative effect to bank's liquidity are Bank Size, Capital Adequacy, and Financial Crisis. While Interbank Rate turned out insignificant

In another study from Pakistan, Malik & Rafique (2013) examines bank specific and macroeconomic determinants of commercial bank liquidity in Pakistan. Their study period covers from 2007 to 2011. They have used two models of liquidity. The first model L1 is based on cash and cash equivalents to

total assets. The second model L2 is based on advances net of provisions to total assets. Their results suggest that, Non-Performing Loan (NPL) and Return on Equity (ROE) have a negative and significant effect with L1. Capital adequacy (CAP) and inflation (INF) are negatively and significantly correlated with L2, Additionally there is a significant and positive impact of financial crisis on the liquidity of commercial banks. The central bank regulations greatly affect the liquidity of commercial banks which means tight monetary policy can regulate the undesirable effect of inflation on liquidity.

Bordeleau, Crawford and Graham (2009) reviewed the impact of liquidity on bank profitability for 55 US banks and 10 Canadian banks between the period of 1997 and 2009. The study was employing quantitative measures to assess the impact of liquidity on bank profitability. Results from the study suggested that a nonlinear relationship exists, whereby the reason of increasing the return of the banks they preserve some liquid assets.

On the study of Nyabateh (2013) investigate that the relationship between liquidity management and profitability of the selected financial firms at the NSE in the selected study time of 2009 – 2013. The target population on his study was including eighteen financial firms operated in the market. The conclusion of his study shown that there was no strong and positive relationship among the firms performance of return and liquidity management aspects.

Sushil et al. (2013) had made a study on the relationship between liquidity of selected Nepalese commercial banks and their impact on financial performance and found that capital adequacy, share of non-performing loans in the total volume of loans had negative and statistically significant impact on banks liquidity whereas loan growth, growth rate of gross domestic product on the basis price level, liquidity premium paid by borrowers and short term interest rate had negative and statistically insignificant impact on banks liquidity. Bank size had positive and significant impact and inflation rate had positive and insignificant impact on banks liquidity.

The article written by Idowu et al (2017), the objective of their study to investigate the relationship between management of liquidity and profitability of selected four Nigerian banks. The time frame of the study was for the period of 2006 – 2015and the researcher applied Pearson's correlation coefficient model to investigate the association variables of the study. The found there was a strong relationship between the banks liquidity management capacity and profitability of the selected banks.

2.8.2. Local studies

There were figures counted studies conducted in Ethiopia concerning on liquidity and liquidity management titles.

The research of Tseganesh Tsefaye (2012) studied to detect the determinants factors liquidity and also she tried to show the effect of these selected variables on the profitability of selected eight commercial banks in Ethiopia. The study time covered from 2000 to 2010 data collected from different sources. She identified the following explanatory variables that affects the bank liquidity namely: 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, Real GDP growth rate and loan growth. The selection the identified data taken from the identified previous researcher and different theoretical reviews used in the study. She applied balanced fixed effect panel regression method to analyze the collected data. The regression result of the study showed that capital adequacy, total assets(bank size), non-performing loans ratio, interest rate, inflation rate and short term interest rate were positively affected the banks liquidity but GDP and loan growth has insignificant effect on the liquidity of the banks. And she tied to show the second fold analysis that the effect of these significant variables on the profitability of selected commercial bank. From these selected variables capital adequacy and total assets(bank size) had positive and significant effect on the profitability selected banks where as non-performing loans and short term interest rate insignificant effect on the profitability of the banks. Interest rate and inflation had negative but statistically insignificant impact on financial return of the banks. Finally, she concluded that liquidity had impact on the profitability of the banks but the sign of the relationship it depends on the selection time frame. The researcher of this study understand from Tsegansh Tsefaye(2012) study that she used more or less similar variables like in the previous literatures and she was not include basic liquidity indicators ratio such as loan to deposit ratio(LDR),liquid assets to deposit ratio(LATDR),current asset to total assets ratio(CATAR) etc.

Maaza Amare (2020) to assess the impact of liquidity management on the profitability of selected private banks operating in Ethiopia. The study time frame was from 2015-2019.She identified the following liquidity management proxies namely: cash to deposit ratio(CDR),cash to assets ratio(CAR),loan to deposit ratio(LDR),deposit to asset ratio(DAR) and non-performing loan ratio(NPLR).The findings of her study show that cash to assets ratio(CAR) and cash to assets ratio(CAR) had positive and significant effect on the profitability but cash to deposit ratio(CDR) and

non-performing loan ratio(NPLR) had negative and significant effect on the profitability of the banks. She recommended that the banking firms should maintain adequate liquidity level and invest when excess liquidity happened to enhance their profitability.

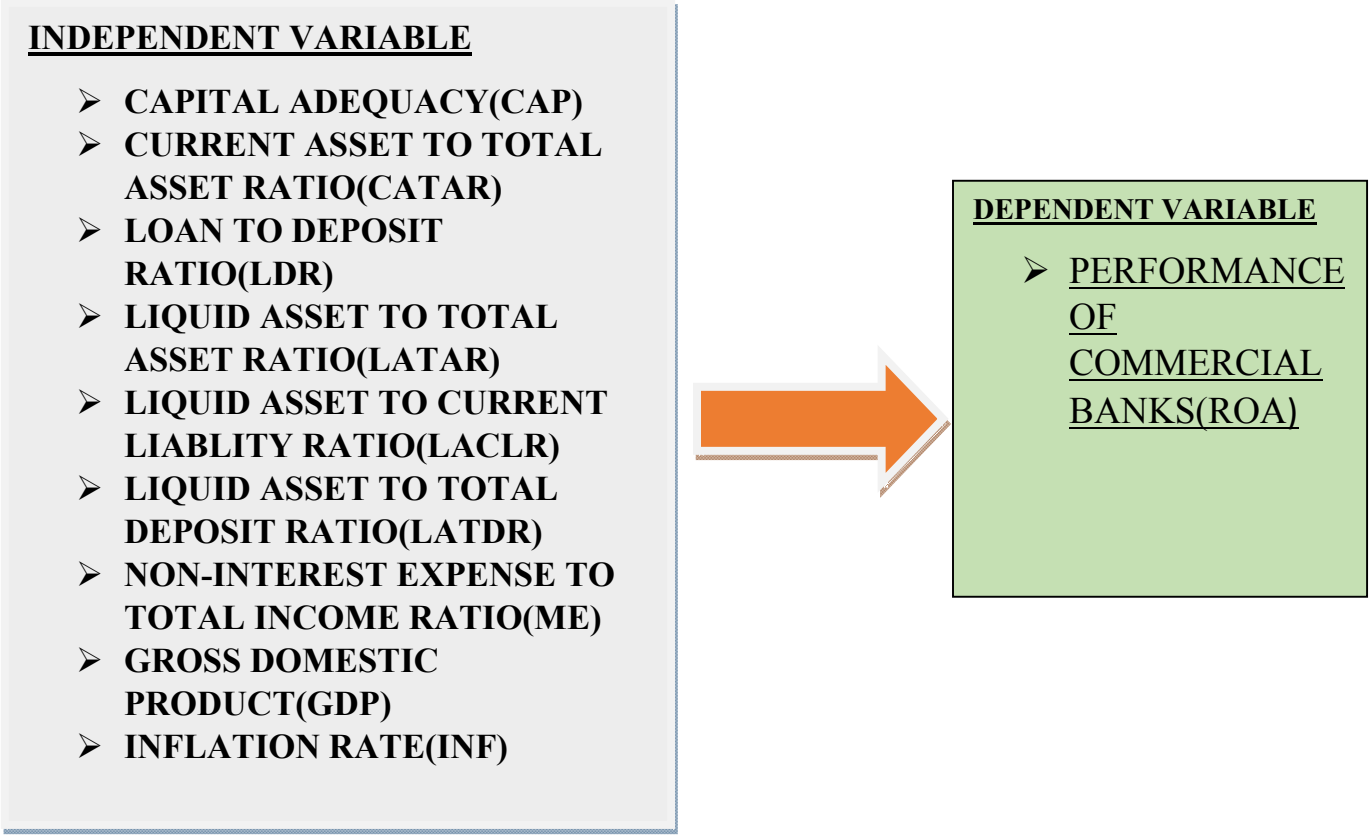
Tigist Seife (2015) concluded in her investigation of the influence of liquidity management on the performance of selected private commercial banks in Ethiopia the overall results revealed that liquidity management have a significant influence on ROA of selected private banks of Ethiopia.

Worku (2006) also studied capital adequacy and found that the capital adequacy of all banks in Ethiopia were above threshold, means there was sufficient capital that can cover the risk-weighted assets. Depositors who deposit their money in all banks were safe because all the studied banks fulfilled NBE requirement (Worku, 2006). Worku used different ratios when analyzing liquidity effect on banks performance and these ratios were liquid asset/net profit, liquid asset/total assets, net loans/net deposits, interest income/net deposit and interest income/interest expense (Worku, 2006).

2.9. Conceptual Framework

The conceptual schema of the relationship between the dependent variable (ROA of Commercial banks in Ethiopia) and independent (Capital adequacy, investment of Current asset ratio, Loan to deposit ratio, liquid asset to current liability ratio Liquid assets ratio, Liquid asset to total deposit ratio, Non-interest expense to total revenue ratio, GDP and Inflation rate) variables are depicted here below:

Figure 2.1. Conceptual framework of the study



Source: Researcher design based on theories and empirical literature review (Developed by the researcher)

2.10. Summary of Literature Review and Knowledge Gap

Based on the literature review section the researcher of this study understand that liquidity is crucial factor for banking firms since their function is creation of liquidity both on the asset and liability side of their balance sheet. It also revealed that banks liquidity can be affected by different factors such as bank specific, macroeconomic and regulatory factors. While this study focused on some of the bank specific and macroeconomic factors affecting liquidity and the impact of bank liquidity on financial performance

According to the literature review, the researcher understands that most of the empirical studies done on the area of bank liquidity and its impact on financial performance were done following the U.S. subprime mortgage crisis but the problem of liquidity there was exist before the crisis. The reason behind increasing the number of studies after the crisis may be panic and affected overall global economic sectors. And also the researcher understands from the literatures review section that there is still a gap consistent concept liquidity and its measurement. Most of the literatures cited in the literature review more or less used similar of liquidity variables such as bank specific factors(capital adequacy, total assets(size of the bank),quality of assets(NPL),loan growth, cash balance) and macro-economic variables(GDP, interest rate, inflation rate and central banks directives and polices).And also the researcher understand that most of the studies concerning on liquidity were done on the developed countries and some of them were done on African countries. In our country there was little number of studies. In our country context most of the studies focused on the liquidity determinate and impact of liquidity on the profitability. The impact of insufficient study found in our country creates foreign bias on the domestic researches.

From the understanding of the researcher from the above literature parts that most of domestic researchers used almost similar independent variables and not include recent data to show the effects of liquidity/liquidity management on the returns of financial institutions.

Based on the researcher's knowledge, there was a literature gap in terms of taking recent years data to show the effects on their researches. Therefore, this research meant to fill the gap by focusing on selected commercial banks in Ethiopia from the period of 2000 up to 2018.In addition to this, the researcher attempts to include some independent variables of liquidity risk indicators developed and approved by Asset and liability management (ALCO) of Commercial bank of Ethiopia which has not seen by previous researchers.

CHAPTER THREE

3. Research Methodology

Research methodology is a method to scientifically resolve the research question. Research methodology can be considered because used different scientific methods to solve different problems.

3.1. Research approach

This study was use the quantitative research approach to achieve its objectives. Quantitative approach is allow examining the relationship among the dependent and independent variables and these variables in turn can be measured on instruments and analyzed using statistical procedure (Creswell 2009).

Quantitative research involves a considerable amount of activities towards measuring concepts with scales that either directly or indirectly provides numeric values which can then be used in statistical computation and hypothesis testing (Zikmund et al 2011).

3.2. Target population and Sample size

All commercial banks (both public as well as private commercial banks) are target population of this study. According to the recent NBE report describe that nowadays, there are seventeen commercial banks in the market. These are; Abbay Bank S.C (AB),Addis International Bank S.C (AIB), Awash Bank S.C (AIB), Bank of Abyssinia S.C (BOA), Birehan Bank S.C (BB),Buna Bank S.C (BUIB), Commercial Bank of Ethiopia(CBE), Cooperative Bank of Oromia S.C (CBO), Dashen Bank S.C (DB), Debub Global Bank S.C (DGB), Enat Bank S.C (ENTB). Lion International Bank S.C (LIB),Nib International Bank S.C (NIB), Oromia International Bank S.C (OIB),Hibret Bank S.C (HB), Wogagen Bank S.C (WB) and Zemen Bank S.C (ZB),Commercial bank of Ethiopia(CBE) the only government owned and the rest of sixteen's are privately owned commercial banks.

This study was include seven (7) commercial banks that has been operated for at least for the past nineteen (19) years. These are Bank S.C (AIB), Bank of Abyssinia S.C (BOA), Commercial Bank of Ethiopia (CBE), Dashen Bank S.C (DB), Nib International Bank S.C (NIB),Hibret Bank S.C (UB) and Wogagen Bank S.C (WB).

Table 3.1: List of commercial banks with the year of establishment

No.	Name of Banks	Est.year
1	Commercial Bank of Ethiopia(CBE)	1942
2	Awash International Bank(AIB)	1994
3	Dashen Bank(DB)	1996
4	Bank of Abyssinia(BOA)	1996
5	Wegagen Bank(WB)	1997
6	Hibret Bank(UB)	1998
7	Nib International Bank(NIB)	1999
8	Cooperative Bank of Oromia(CBO)	2007
9	Lion International Bank(LIB)	2006
10	Oromia International Bank(OIB)	2008
11	Bunna International Bank(BIB)	2009
12	Zemen Bank(ZB)	2009
13	Abay Bank(AB)	2010
14	Berhan International Bank(BrIB)	2010
15	Addis International Bank(AdIB)	2011
16	Debub Global Bank(DGB)	2012
17	Enat Bank(EB)	2013

3.3. Data source and collection

The study was conducted based on secondary data source. The secondary data acquired from audited financial statements (i.e. balance sheet and income statement) of the annual reports of each selected commercial banks in Ethiopia from the period 2000 – 2018, all of them have been consolidated on June 23 (sene 30) of each year and are calculated in Ethiopia birr. Data over the period 2000 – 2018 for banks conducted with 133 total observations.

3.4. Variable Description

The researcher of this study was try to show the effect of explanatory variables on dependent variable by testing the hypotheses concerning to the effect of liquidity management of bank specific variables and macro-economic variables on the performance of selected commercial bank in Ethiopia.

The variables used in the study ROA, capital adequacy, current asset to total asset ratio, loan to deposit ratio, liquid assets to total asset ratio, liquid asset to current liability ratio, liquid asset to total deposit ratio, non-interest expense to total income ratio ,GDP and inflation rate. The variables, their units of measurement and representation are shown in Table 3.5.1, as below.

Table 3.5.Variable definitions, Measurement and data sources of the study

		VARIABLES	NOTATION	SOURCES
Dependent Variable		Return of assets	ROA	Audited annual report and NBE
Independent variables	Bank specific Variables	Capital adequacy	CAP	Audited annual report and NBE
		Current asset to total asset ratio	CATAR	Audited annual report and NBE
		Loan to total deposit ratio	LTD	Audited annual report and NBE
		Liquid assets to total assets ratio	LATA	Audited annual report and NBE
		Liquid assets to current liability ratio	LATCL	Audited annual report and NBE
		Non-interest expense to total income	EM	Audited annual report and NBE
	Macroeconomic variables	Gross domestic product	GDP	NBE
		Inflation rate	INF	NBE

3.4.1. Dependent variable

In this study, the researcher was used ROA as dependent variable. As per the Pop et al. (2008) argue about the measurement tool of the performance of the banking firms that return on assets (ROA),

return on equity (ROE), earning of the bank and the management quality ratio are the basic indicator of the return of firms. From these measurement tools the researcher was employed return of assets (ROA) used as measure the whole financial returns of the selected commercial banks.

$$\textbf{ROA}=\frac{\textbf{Net income before tax}*100}{\textbf{Total assets}}$$

ROA is the most common used benchmark for bank profitability and it measures the company's return on investment in a format that is easily comparable with other institutions.ROA is a ratio of net income produced by total assets during a period of time. In other words, it measures how efficiently a company can manage its assets to produce profits (Remi, 2014).

Reason to use ROA as profitability

Different Studies on bank profitability employ various measures to test the predictions of different liquidity management impact hypothesis. For the purpose of this study the researcher was use return on assets as the profitability proxy.

Return on assets (ROA) is the ratio of Net Income after taxes divided by total Assets. The ROA signifies managerial efficiency in other words ROA also describe about the capacity of the banks management in what way effectively and cost minimization efficiency generates income from their invested assets. And the higher ratio indicates the higher performance of the banks. It is a useful measurement tool for comparing profitability of one bank with other or the whole commercial banking system.

Many researchers have presented ROA as an appropriate measure of bank profitability. Among them are (Thomas, 1997) who argued that bank profitability is best measured by ROA in the sense that, ROA cannot be distorted by high equity multiplier. Thus, the researcher was utilizing return on assets as good measurement of the banks' profitability proxy.

3.4.2. Independent variable

The following independent variables hypothesis was propose to increase our understanding of the outcome of liquidity management variables on the profitability of selected commercial banks in Ethiopia. These variables determine by detail review of the literatures.

The present chapter sub-section defines that explanatory variables used as in the econometric model to assess the dependent variable. To measure the predictor variable of performance of commercial banks in Ethiopia, nine variables will used as independent variables which are extracted from different

studies to support the model of analysis. The variables namely; capital adequacy, current asset to total asset ratio, loan to deposit ratio, Liquid assets to total asset ratio, liquid asset to current liability ratio, liquid asset to total deposit ratio, non-interest expense to total income ratio, GDP and inflation rate.

3.4.2.1. Bank- specific Variables

Capital adequacy

Alhanasoglou et al., (2005), Capital refers to owner's financing which used as a safeguard in unfavorable circumstances. Capital adequacy is a core measure of the bank's financial strength from a regulatory point of view and also a critical factor that can influence on profitability. Capital on the banking industry perspective should comprise the following items: paid up capital, retained earnings, statutory reserve or other funds and excess preserved apart for contingencies. Supervisory organs in several nations fix the minimum limit and controlling capital adequacy to shelter depositors and also used as a tool to keep the public confidence on the banking sector. However capital adequacy ratio is represented by the ratio of total contribution of the owners to risk asset, in few researchers it could besides measured by the ratio of owners' funds (capital) to total weighted assets. The researcher of this study used total capital of the banks owners to total asset of the bank as the proxy for capital adequacy ratio.

According to CBE Risk management framework describe that capital adequacy is the basic indicator of credit and liquidity risk level and also the NBE directive number SBB/9/95, the adequacy of bank's capital shall be 8% or more. The capital adequacy is calculated by assigning credit risk weight for each on balance sheet asset item as set in the directive and off – balance sheet asset items are initially converted using the credit conversion factor as stated in the directive and then multiplied by the respective risk weight in order to get the total risky assets of the bank. Capital Adequacy Ratio is the fraction of total owners' capital to risk weighted assets.

Theoretical and empirical evidences suggest that, the higher capital demand increase the higher liquidity capacity of banks.

$$\textbf{CAP} = \frac{\textbf{Total Capital}}{\textbf{Total assets}} * 100$$

H_0: Capital adequacy has no positive and significant effect on the profitability of selected Commercial banks in Ethiopia.

H_1: Capital adequacy has a positive and significant effect on the profitability of selected of Commercial banks in Ethiopia.

Current assets to total asset ratio

It indicates the extent of total funds invested for the purpose of working capital and throws light on the importance of current assets of a firm. It should be worthwhile to observe that how much of that portion of total assets is occupied by the current assets, as current assets are essentially involved in forming working capital and also take an active part in increasing liquidity. And also used as a determinant of investment policies. There are two types of investment policies. The first is aggressive policy and second is the conservative policy. In aggressive investment policy of working capital, less investment is made in current assets as compared to fixed assets to get more returns. On the other hand, in conservative investment policy of working capital, more investment is placed in current assets as compared to fixed assets. Aggressive investment policy allows getting more profits through investing major portion of resources in fixed assets. Conservative investment policy helps to avoid the risk of bankruptcy. Current asset to total asset ratio used as an indicator of liquidity for the purpose this research. The hypothesis of the ratio formulated based on aggressive investment policy because investing on fixed assets help to increase profitability of the banks.

$$\textbf{CATAR}=\frac{\textbf{Current asset}}{\textbf{Total assets}}*100$$

Mohmmed Neab and Noriza BMS (2010) examine the relationship between the investment in current assets and profitability and liquidity of commercial banks of Pakistan. The researcher found that current assets to total assets ratio has positive impact on liquidity but negative effect on profitability of selected commercial banks.

H_0: Current assets to total asset ratio has no negative and significant effect on the return of assets of selected commercial banks in Ethiopia.

H_1: Current assets to total asset ratio has negative and significant effect on the return of assets of selected commercial banks in Ethiopia.

Non-interest expense to total revenue ratio (management efficiency)

Management quality in financial institutions may not be easily measured using financial ratios as the effects and processes are qualitative (Saunders and Cornett, 2005). The role of management in financial institutions ensures the smooth operations of activities, day-today handling of risks, and the role of stewardship. The agency problem manifests itself in the managing of financial institutions where managers put their personal goals first rather than maximizing shareholder value. Tools such as total expenses to total income and operating expenses to total expenses ratios could be used to assess management quality (Chen et al., 2012).

$$\textbf{Non-interest expense ratio (EM)} = \frac{\textbf{Total non-interest expenses}}{\textbf{Total revenue}} * 100$$

Abdus Samad (2015) studied that the determinants of bank profitability of Bangladesh commercial banks. He used total asset ratio, equity capital to total assets, and non-interest expenses to total income ratio as independent variable affected performance of the banks. The result implied that bank specific factors such as loan deposit ratio, loan-loss provision to total asset ratio and capital adequacy had direct relationship and significant effect on the profitability of the banks but non-interest expense to total revenue was negatively significant effect on the profitability of the bank.

H_0: Total non-interest expense to total revenue has no negative and significant effect on the return of assets of selected commercial banks in Ethiopia.

H_1: Total non-interest expense to total revenue has a negative and significant effect on the return of assets of selected commercial banks in Ethiopia.

Loan to Total deposit ratio

Loan- deposit ratio is one of the instrument to determine bank liquidity, and by extension, it influences the profitability of the banks. The proxy of Loan-to-deposit ratios as a general measure:

$$\textbf{Loan-to-Deposit Ratio} = \frac{\textbf{Total loans}}{\textbf{Total deposits}} * 100$$

Loans are one of the least liquid assets, while deposits are understood as the primary source of funds to banking sector. A high ratio indicates illiquidity, because in this case a bank is fully loaned up relative to its stable funding. Implicitly, it is assumed that new loans must be financed with large purchased liabilities. A low ratio suggests that a bank has additional liquidity, since it can grant new loans financed with stable deposits.

As per the Asset and Liability Management Committee (ALCO) guideline, loan to deposit ratio is one of the liquidity risk indicator of Commercial bank of Ethiopia (CBE 2016).

Abdus samad(2015) studied the determinant of profitability of commercial banks of Bangeladesh.The findings of the study showed that Credit to deposit ratio had positive impact on the banks return of assets.

H_0: Loan to deposit ratio has no negative and significant effect on the performance of selected commercial banks in Ethiopia.

H_1: Loan to deposit ratio has a negative and significant effect on the performance of selected commercial banks in Ethiopia.

Liquidity asset to total asset ratio

The liquid asset ratio tells about the ability of the banks regarding sever liquidity problems. As the principal of liquidity, the higher the portion of liquid assets occupied of the total asset, the higher the ability to remove liquidity shockwave. Though, higher amount of liquidity ratio is the ability of increasing the severe liquidity problem, it can be also the sign of management ineffectiveness. Liquid assets generate lower income and expose to high opportunity cost for the banks. Thus the management of the banks should take appropriate measurement to compromise level of liquidity and profitability. Based on the proclamation of NBE describe that the following take as liquid assets: cash, assets readily convertible into cash (acceptable foreign currency), deposit in NBE and other domestic and foreign banks. In this study, the researcher expected to get a negative correlation between liquidity to total assets ratio and profitability of selected commercial banks. This is because the increase this ratio will result liquidity and increase the capacity of liquidity shock absorption. However the effect of this

ratio may have good implication for liquidity and increase the absorption of liquidity shock, it may be a sign of inefficiency of asset utilization of the banks.

$$\textbf{Liquid asset-to-total asset ratio} = \frac{\textbf{liquid asset}}{\textbf{Total asset}} * 100$$

H_0: Liquid assets to total asset ratio has no negative and significant effect on the profitability of commercial banks in Ethiopia.

H_1: Liquid assets to total asset ratio has a negative and significant effect on the profitability of commercial banks in Ethiopia.

Liquid assets to net current liability ratio (Quick ratio)

The quick ratio is an indicator of a bank's short-term liquidity position and also the indicator of the banks capacity to meet short-term commitment without selling inventories. Since it indicates the company's ability to instantly use its near cash assets (assets that can be converted quickly to cash) to pay down its current liabilities, it is called the acid test ratio.

The quick ratio measures the birr amount of liquid assets available against the birr amount of current liabilities of a company. Liquid assets are the assets that can be quickly converted into cash with the minimal impact on the price received in the open market, while short-term liabilities are a bank's debts or commitments that should due to creditors' in single year.

The quick ratio indicates a company's capacity to pay its current liabilities without needing to sell its inventory or get additional financing.

The result of the ratio is one considered to be the normal quick ratio. It indicates that the company is fully equipped with exactly enough assets to be instantly liquidated pay off its current l liabilities. A company that has a quick ratio less than one may not able to fully pay off its current liabilities in the short term, while a company having a quick ratio higher than one can instantly gets rid of its current liabilities.

According to the directive no SBB/57/2014 article 4.3 stated that 'any registered commercial banks should have to maintain at least fifteen percent (15%) of its short-term liabilities.

$$\textbf{Quick ratio} = \frac{\textbf{liquid asset}}{\textbf{Current liability}} * 100$$

Tigist seife (2015) studied the influence of liquidity management on the profitability of selected private banks in our country. The researcher used different liquidity ratio used as explanatory variables. The findings showed that the liquidity asset to current liability ratio had a significant impact on the performance private commercial banks in Ethiopia.

The research prepared by Berhanu Berhiun (2015) about the affecting factors of liquidity and impact on the profitability of selected commercial banks in Ethiopia, The result showed that current ratio had a significant impact on the performance commercial banks in Ethiopia at a time spanning of 2002/03-2013/14.

H_0: Liquid assets to current liability ratio have no negative and significant effect on the profitability of commercial bank of Ethiopia.

H_1: Liquid assets to current liability ratio have negative and significant effect on the profitability of commercial bank of Ethiopia.

Liquidly assets to Total deposit ratio

As per the directives number SBB/57/2014 describe about liquid asset means cash at banks (domestic& foreign currency), deposits preserve in NBE and other domestic and oversea banks having recognize by NBE, other assets like readily changeable into cash stated and payable in Birr or overseas currency having recognition by the NBE. And also deposit classified into demand (current), savings and fixed time deposits of the banks.

Liquid asset to total deposit ratio implies that the ratio of volatile funds with banks liquidity to meet the mature obligations and when there is the existence the overall unexpected withdrawals. It is also ensuring whether the banking firms are readily available to reimburse its current liability obligations.. According to Vodova (2013) describe about the concentration part of this ratio that highly concerned

on bank's sensitivity and the types of fund financing. The higher value of this ratio shows that the banks have higher ability to overcome sever liquidity problem.

$$\textbf{Liquid asset to total deposit ratio} = \frac{\textbf{liquid asset}}{\textbf{Total deposit ratio}} * 100$$

The study conducted by Belay Mola(2017) and Alemayehu Fekadu(2016)conducted the determinant of liquidity in commercial banks in Ethiopia .The findings of their research revealed that liquid asset to total deposit ratio had the main determinant factor to the liquidity of selected commercial banks.

Tigist Seife(2015) studied the influence of liquidity management on the profitability of selected private banks in Ethiopia in the year 2000-2014.The result of her research showed that liquid asset to total deposit had negative influence on the return of assets(ROA)of sampled banks.

H_0: There is no negative and significant relationship between liquid assets to total asset ratio and profitability of commercial banks in Ethiopia.

H_1: There is a negative and significant relationship between liquid assets to total asset ratio and profitability of commercial banks in Ethiopia.

3.4.2.2. Macro-economic Factors

Gross Domestic Product (GDP)

Economic performance is generally being measured through GDP (Gross Domestic Product), a variable that has also become the de facto universal metric for standards of living (Yanne et al, 2007). It is universally applied according to common standards, and has some undeniable benefits mainly due to its simplicity (Goossens et al, 2010).

H_0: There is no positive and significant relationship between GDP and profitability of commercial bank of Ethiopia.

H_1: There is a positive and significant relationship between GDP and profitability of commercial bank of Ethiopia.

Inflation rate (INF)

As per the (Karl et al, 2002) inflation means the state of economy describe that the supply of goods and services become less than the demand. Inflation is one of the disturbance factor the economy. It hurts people who are retired and living on a fixed income. On the time of generally price of goods increase these consumers not willing to buy the goods as previously. Inflation also has direct effect the payment of loans and saving decrease because time value of money. From this perspective inflation one factor that affects the level of liquidity of the Commercial Banks.

H_0: There is no negative and significant relationship between inflation rate and profitability of commercial bank of Ethiopia.

H_1: There is negative and significant relationship between inflation rate and profitability of commercial bank of Ethiopia.

3.5. Data presentation and Analysis

To examine the suggest hypotheses, statistical analyses employed by the following methods: Primary, descriptive statistics were compute of the independent and dependent variables over the study time frame. Malhotra (2007) describe about the descriptive statistics methods that it is support to the examiner give the clear image of the current circumstance and permits related information to the researcher. Secondly, a correlation analysis made among dependent and explanatory variables. Lastly, the researcher engaged ordinary least square (OLS) regression approach with testing five CLRM assumptions and diagnostic. The aim of testing five assumptions to show the appropriateness of the regression model established primarily to examine the effect of liquidity management variables on the financial performance of the banks. Data collected from different sources will analyzed by using E-views 8 software package.

3.6. Model of Analysis

In light of above, in the theoretical literature review suggest that capital adequacy, investment of current asset ratio, loan to deposit ratio, liquid assets to total assets ratio, Quick ratio, non-interest expense to total income ratio, liquid asset to total deposit ratio, GDP and inflation rate are somehow

related. The empirical framework of this study was focus on modeling the influence of liquidity management on the profitability of selected commercial banks in Ethiopia.

The paper used the following liquidity management variables: Capital adequacy (CAP), current assets to total asset ratio (CATAR), Loan to deposit ratio (LDR), Liquid assets to total assets ratio (LATAR), liquid asset to current liability ratio (LACLR) non-interest expense to total income ratio (ME),Gross domestic product(GDP) and Inflation rate(INF).Based on the above explanation, the models are formulated as follows:

ROA=f (CAP, CATAR, LDR, LATAR, LACLR, LATD, ME, GDP and INF) ……. ……. .3.1

In connection to above description, the general model for this study, as is found in the existing literature is represented by;

$$Y_t = \alpha + \beta x_t + \varepsilon_t$$

The subscript 't'demonstrate the time-series measurement. The left-hand variable Y_t represent the dependent variable in the model, which is the bank's performance .X_t contains the set of independent variables in the estimation model, is taken to be constant over time **t.**If **α** will take to be the same across units, then OLS provides a consistent and efficient estimate of **α** and **β.**

In the light of the above model, the time-series data constructed by taking the commercial bank of liquidity risk management using the following multivariate regression model.

$$ROA_{it}=\beta_0+\beta_1(CAP_{it})+\beta_2(CATAR_{it})+\beta_3(LDR_{it})+\beta_4(LATAR_{it})+\beta_5(LACLR_{it})+\beta_6(LATD_{it})+\beta_7(EM_{it}) +\beta_8(GDP_{it}) +\beta_9(INF_{it})+\varepsilon_{it}$$

Where

ROA_{it}= represent the return on total assets of the selected banks on year t

CAP_{it}= represent capital adequacy ratio of ith bank on the year t.The variable will the ratio of the total bank capital to total assets

$$CAP = \frac{\text{Equity}}{\text{Total assets}} * 100$$

$CATAR_{it}$= represent of ith bank on the year t.The variable will the share of current asset from the total assets of the bank

CATAR = current assets *100
Total assets

LDR_{it}= represent loan to deposit ratio of ith bank on the year t .The variable was the ratio of total loans to total deposit of the bank

LDR = Total loans*100
Total deposit

$LATAR_{it}$= represent the proportion of liquid assets over total assets of ith bank on the year t.The variable was the ratio of liquid assets to total asset.

LATAR = Liquid assets*100
Total assets

$LACLR_{it}$= represent the ability of liquid asset cover the current liability of ith bank on the year t. The variable was the ratio of liquid assets to current liabilities

LACL = Liquid assets*100
Current liability

$LATDR_{it}$= represent the proportion of liquid asset over the total deposit of ith bank on the year t.The variable was the ratio of liquid asset to total deposit

LATDR = Liquid assets*100
Total deposit

EM_t= represent the non-interest expense to total income of ith bank on the year t.The variable was the ratio of non-interest expense to total income

EM = Total non-interest expense*100
Total revenue

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

INFt= the overall inflation rate in Ethiopia on the year t.

E_{it} =represent random error term

CHAPTER FOUR

4. DATA ANALYSIS AND INTERPRETAION

This chapter presents data analysis and interpretation on the collected data through secondary source to examine the effect of liquidity management on the commercial banks profitability. Section 4.1 shows the specification of model, Section 4.1 presents the descriptive statistics results, section 4.2 presents the correlation analysis, section4.3 present testing of assumptions of CLRM, section 4.4 random effect model, section 4.5 present results of regression result and finally section and section 4.3 indicates the hypothesis testing.

4.1. Descriptive Statistic

Descriptive statistics are brief descriptive coefficients that summarize a given data set, which can be either a representation of the entire or a sample of a population. In this part the researcher offers the output of the descriptive statistics of explanatory and dependent variables this was support to the researcher to look the general view of the study. In this part provides the whole output result of the descriptive statistics like: average, median, standard deviation, minimum and maximum values with the total number of observations of the study in the tabular form.

Table 4.1.Descriptive statistic of the variables

	ROA	CAP	CATAR	LDR	LATA	LACL	GDP	INF	LATD	ME
Mean	2.642286	12.15518	31.72034	59.49550	32.47238	38.27587	11.23603	12.23993	41.91297	36.32149
Median	2.802225	11.74611	31.76990	61.60239	32.57633	37.22707	11.89840	9.570000	40.90028	33.96005
Maximum	4.858300	29.43925	59.40661	115.7895	111.5385	100.0000	16.10942	44.37000	111.5385	111.1554
Minimum	-2.15882	2.065680	2.267501	8.757062	2.267501	5.918519	-0.2942	-8.24	5.918519	13.46144
Std. Dev.	1.051993	4.615071	12.78973	25.78534	14.48380	16.12083	3.855133	11.55345	17.82486	11.96177
Skewness	-1.04062	0.936333	0.209436	-0.47116	1.234887	0.558415	-1.64504	1.090465	0.608734	2.203907
Kurtosis	5.417034	5.350031	2.339830	2.712455	8.100061	3.498923	5.516747	4.454987	3.648757	13.43803
Jarque-Bera	56.80260	50.41486	3.412972	5.419500	179.2831	8.353965	95.80227	38.37670	10.62572	716.7951
Probability	0.000000	0.000000	0.181502	0.066553	0.000000	0.015345	0.000000	0.000000	0.004928	0.000000
Sum	354.0663	1628.795	4250.525	7972.397	4351.299	5128.967	1505.629	1640.150	5616.338	4867.080
Sum Sq. Dev.	147.1896	2832.751	21755.76	88429.56	27900.80	34564.18	1976.653	17753.12	42257.49	19030.16
Observations	133	133	133	133	133	133	133	133	133	133

As it can be seen from the table 4.1 the mean value of return on asset (ROA) is 2.64% and standard deviation is 1.05%.The result shows that the total assets of the sample banks generates 2.64% of income to their owners and also the standard deviation (1.05%) indicates less dispersion from the mean of ROA of the sample banks. -2.16% and 4.86% were the minimum and maximum values of ROA respectively. The minimum value of ROA was registered on the year 2002 in the Commercial bank of Ethiopia (CBE).This minimum value (-2.16%) was arise from the higher non-interest expenses than compared than the preceding two consecutive years. Maximum value of was indicating Nib international Bank (NIB) at the year 2001.

The result of descriptive statistics on the explanatory variables seeing as follows:

Capital adequacy was one of a liquidity indicator with an average of 12.16% .This implies that the mean value was above the minimum statutory requirement of NBE standard of capital adequacy ratio (8%). And also implies from the total financed of assets only 12.16% was covered by equity contribution and the remaining financed by debt funds. This means that selected banks highly depend on their depositors. The standard deviation sample banks were 4.6% and this show that there is little dispersion between the selected banks towards the average value of capital adequacy of the banks. The minimum and maximum value was 2.06% and 29.44% respectively with range of 27.38%. The range difference indicates that there was irregularity of equity financed between selected commercial banks. The minimum of capital adequacy was registered in the Commercial bank of Ethiopia (CBE) at the year 2015.The reason of this minimum capital adequacy was increase the amount of total assets by 300 %(fixed assets increase by 250%) on the reported year.

The second explanatory variable of the descriptive statistics: current asset to total assets ratio the mean and the standard deviation were 31.72% was 12.79%respectively .The mean value of the variable interpreted in to two ways .The first one was that the selected commercial banks less invested on the current assets than fixed assets and the second interpretation that selected banks were maintain sufficient current asset to perform the day-to-day activities. The standard deviation also shows that there was minimum dispersion on the investment of current assets between selected banks. The maximum and minimum value was 59.14% and 2.27% respectively with range 56.87%.This show that the large disparity on investment of current assets between the selected commercial banks.

In the descriptive statistics the third explanatory variable; loan to deposit ratio is an indicator of what percentage of the volatile funds (deposits) tied up with illiquid loans and liquidity positions of the banks. The average value of the studied commercial banks was 59.5% and standard deviation 27.79%.The mean value was lower than the international standards (75%(CBRC2012)).The result implies on average the studied commercial banks had better amount of volatile funds(deposit)were tied up with illiquid loans and also the banks had good liquidity positions. In addition to this the maximum and minimum score of LDR for the selected banks was found 115.79% and 8.76% respectively with range of 107.03%. The maximum ratio was registered in United bank in the year 2000.The reason of this maximization was arise from less deposit collection in the specific year. The result of the maximum and minimum range shows that, there was inconsistent on the liquidity position in the selected commercial banks.

The forth explanatory variable is the how much portion of liquid assets occupied from the total asset which indicates that the capacity of the banks to solve high liquidity problems when unexpected liquidity shock happened. The average value of portion of liquid asset ratio from total asset of the studied commercial banks for the period from 2000 to 2018 was 32.47% this was above the minimum requirement of NBE directive no SBB/57/2014.This show that the selected banks had high on average about capacity of liquidity shock absorption. The standard deviation (14.48%) was described that there was a moderate dispersion between the banks about the capacity liquidity shock absorption. The maximum and minimum value of the ratio were 111.54% and 2.27% respectively with range with 109.27%.The range was show there was a big differences between the banks liquidity shock absorption.

The fifth explanatory variable is quick ratio. This ratio describe about the ability of the banks to satisfied mature obligations with its highly liquid asset (assets that can be converted into cash) without selling inventories. The mean value and standard deviation of the ratio was 378.28% and 16.12%.The mean value implies that the banks had moderate ability liquidity of the banks to meet the current obligations without getting any additional financing from inventory. The standard deviation of the ratio was describe there was a moderate dispersion between studied banks about meet mature obligations without any financing from inventory. The maximum and minimum value of the ratio was 100% and 5.92% with the range 94.08%.The range implies that there was a big differences between

the banks about level of liquidity to meet current liabilities without considering the inventory financing.

The sixth explanatory variable indicated in the descriptive statistic liquid assets to deposit ratio is one of liquidity management proxy of this study. Liquid assets to deposit shows that it is the capacity of the banks to meet their mature short-term commitments using by bank's liquid assets when the customers withdrawal their deposit in unexpected way. This ratio also the ensuring tool for the banks short-term assets is readily available to settle its expected short-term liabilities. The average value of the variable of selected commercial banks was 41.9%and standards deviation 17.82%.The mean value indicate that good capacity to pay off the short term liabilities and standard deviation show that moderate dispersion from its mean. The maximum and minimum value of the variable was 111.53% and 5.92%respectively with range of 105.61%.The range show that inconsistent capacity of pay off short term liabilities and liquidity shock absorption between the selected banks. The maximum value of liquidity assets to deposit ratio registered in the year 2000 of Nib international Bank (NIB).The reason of maximum liquidity assets (Cash on hand, cash at bank, reserve account with NBE foreign banks and Treasury bills) greater than total deposit by 11.54%.The result implies that the NIB had maximum capacity of liquidity absorption in that year. The minimum value of liquidity absorption registered in the year 2015 of commercial bank of Ethiopia (CBE).The were two reason the above minimum liquidity absorption capacity .The first reason was the total deposit collected from the customer in the registered year greater than the preceding year of total deposit .The second reason was total liquidity assets of the bank on the registered year less than by 119% than the preceding year.

The seventh explanatory variable of the study was gross domestic product (GDP) .Growth domestic product is one of the macroeconomics factors affect the liquidity and performance of all banks.GDP indicates that the overall economic wellbeing of a country. The average value of the country growth rate was 11.24% and standard deviation was 3.86%.The standard deviation shows that little dispersion towards the average over the period of the study. The maximum and minimum value of the GDP growth rate of the country was 16.11% and (-0.29) respectively. The maximum growth rate of the country was registered in the year 2005 and least growth rate of the country registered in 2003.

Inflation rate the last explanatory variable of the study. Inflation rate tells a state of decreasing the purchasing power of the domestic currency and also the super pass of the demand of the society than the supply. Inflation one of the macroeconomic factor that affect the loan repayment and discourage

savings and also liquidity position of commercial banks. The mean value of the variable and standard deviation was 12.24% and 11.55% respectively. The standard deviation indicate that high dispersed over the periods under the study towards its mean. The maximum and minimum values were 44.37% and (-8.24).The maximum inflation rate registered in the year 2008.The reason of this maximum value was increase the world food prices and agricultural supply shocks due to drought.

4.2. Correlation analysis

Correlation coefficient is one of the measurement tool to identify the degree of linear association between variables is correlation. The magnitude of the correlation coefficient ranged within -1 and +1. Brooks (2008) describe about the magnitude of correlation coefficient that: -1 implies that there is perfectively negative relationship between two variables and +1 describe perfectively positive correlated relationship between the selected variables and correlation coefficient is zero tells that there is no relationship between two variables. The sample size the key factor to determine the correlation coefficient statistically significant /insignificant or not different from zero. According to Meyers et at. (2000) describe that the sample size of the study 100 and above the correlation coefficient greater than or equal to 0.2(>=0.2) is significant at 5%. The researcher of this study employed 7*19 matrixes of 133 observations (i.e:7 and 19 are representing the selected commercial banks and the scope time frame of the study) .From the above justification the study used the above magnitude of correlation coefficient. In this study, the researcher employed the Pearson product moment of correlation coefficient in order to examine the relationship between the explanatory variables and the performance of selected commercial banks in Ethiopia.

Table 4.2.1.Correlation matrix of the dependent and independent variables

	ROA	CAP	CATAR	LDR	LATA	LACL	GDP	INF	LATD	ME
ROA	1									
CAP	0.236175	1								
CATAR	-0.02348	0.023798	1							
LDR	-0.0395	0.368368	-0.07149	1						
LATA	-0.07518	0.122568	0.631107	-0.01403	1					
LACL	-0.00428	0.202872	0.668699	0.006118	0.665018	1				
GDP	0.458528	-0.04721	0.027965	-0.05178	-0.00102	0.025287	1			
INF	0.32887	-0.08631	0.131655	-0.10826	0.076808	0.100066	0.167367	1		
LATD	-0.01006	0.209358	0.659677	0.038135	0.664196	0.694116	0.007206	0.093828	1	
ME	-0.72728	0.12991	-0.04547	0.208247	0.020413	-0.01129	-0.40207	-0.23681	-0.00941	1

Source:E-views 8

From the above result of the correlation matrix in table 4.2.1 profitability (ROA) was positively correlated with capital adequacy (CAP), Gross domestic product (GDP) and inflation rate (INF) with coefficients of 0.236, 0.459 and 0.329 statistically significant respectively.

And Current assets to total assets (CATAR), ratio of liquid assets(LATAR), loan to deposit (LDR),Quick ratio(LACL),liquid assets to deposit ratio (LATDR) and non-interest expense to total revenue ratio (EM) were negatively correlated with profitability of selected banks with coefficient -0.023,-0.039,-0.075,-0.004,-0.01,and -0.727 respectively. From these negative correlated variables only operating expense to total revenue ratio was statistically significant the remaining negatively correlated variables current assets to total assets ratio (CATAR),ratio of liquid assets(LATAR), loan to deposit (LDR), Quick ratio(LACL) and liquid assets to total deposit (LATDR) were statistically insignificant.

4.3. Testing assumptions of classical linear regression model (CLRM) and diagnostic test

The study employed applicable diagnostic testing to detect for any violation of the underscoring assumption of the classical linear regression model (CLRM). There was employ four the linear regression model (CLRM) assumptions to confirm the validity of method of estimation, ordinary least squares (OLS), and test the hypothesis tests concerning the coefficient. Exactly, it was supposed that the error terms are homoscedastic (constant variance), no auto correlated between error terms (zero covariance), the residual terms are normally distributed (normality) and are absence of multi-collinearity between explanatory variables(no correlation between independent variables) .

Assumption one: 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 Breusch-Pagan-Godfreytest was used in this study. In this test, if the p-value was very small, less than 0.05(p-value<0.05), it is an indicator for the presence of heteroscedasticity (Gujarati 2004).

But from Table 4.3.1 presents three different types of tests for heteroscedasticity. Since the p-values of all the three tests are considerably greater than 0.05(5%) it's a clear indicator no proof for the presence of heteroscedasticity problem. Hence, the model passes the second test.

Table 4.3.1: Heteroscedasticity Test: Breusch-Pagan-Godfreytest

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.951994	Prob. F(9,124)	0.4831
Obs*R-squared	8.660499	Prob. Chi-Square(9)	0.4692
Scaled explained SS	7.969049	Prob. Chi-Square(9)	0.5373

Source: Output of EViews 8

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

The third CLRM assumption describe that there is an absence of correlation(zero covariance) between two consecutive error terms over time series and cross –sectional data. From this perspective, the residual terms should be uncorrelated with one another. Brooks (2008) describe the errors are not uncorrelated with one another it is an indicator for the presence of Auto correlation or serial correlation

And also Brooks (2008) revealed that the presence/absence of autocorrelationis tested by using the Breusch–Godfrey test (shown in table 4.3.2). The result of the statistic labeled "obs*R-squared", which is the LM test statistic for the null hypothesis of no serial correlation shows a p-value of 0.0538 (which is greater than 0.05) which indicates the absence of autocorrelation.

Table 4.3.2: Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.484920	Prob. F(51,73)	0.0601
Obs*R-squared	68.23023	Prob. Chi-Square(51)	0.0538

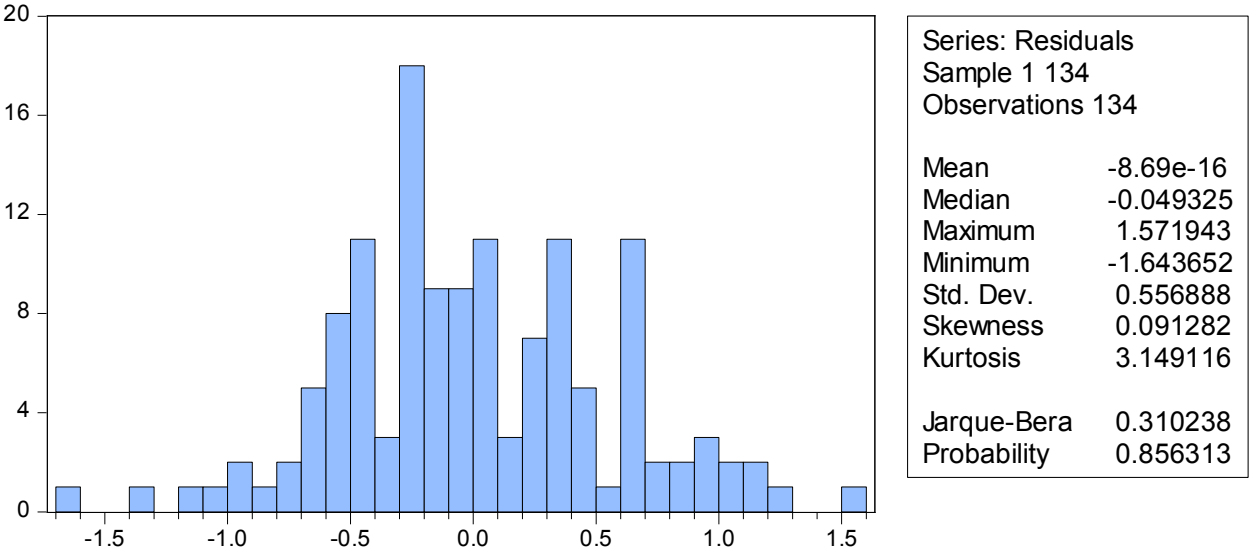
Assumption three: Normality (errors are normally distributed $\mu_{t\sim} N(0, \sigma^2)$

The fourth CLRM assumption is normal distribution that the distribution of the data should not skewed and the coefficient of kurtosis should be three (3). Jarque-Bera formalizes this by testing the error terms for normality and testing whether the coefficient of skeweness and kurtosis are zero and three

respectively. The fourth assumption tested by the Jarque- Bera measure. As per Brooks (2008) state that the probability of Jarque-Bera value is above 0.05, it's the sign of the existence of normality.

The following normality test figure show that the kurtosis near to 3 and the skewness also near to 0(0.091282) and the p-value of the Jarque-Bera statistic was0.8566313.The result show that the p-value of the Jarque-Bera was greater than 5 %(0.05).Therefore, the result indicated that the data was consistent with a normal distribution assumption.

Figure 4.2 Normality Test result



Assumption four: Multicollinearity Test

According to (Churchill and Iacobucci 2005), multi-collinearity is worried about the relationship which exists between explanatory variables. When there exists multi-collinearity problem between the explanatory variables, the impact of independent variables to become decrease on the result of dependent variables. How much correlation causes multi-collinearity, however, is not still clearly defined. Many authors have suggested different level of correlation to judge the presence of multi-collinearity. For example, Hair, et al. (2006) suggested that the value of the correlation coefficient less than 0.9 may not the reason for serious multi-collinearity problem.

The researcher of this study engaged the correlation matrix between nine independent variables describe in the following table 4.3.3. In the result of the table the highest (0.694116) correlation registered between liquid asset to deposit ratio and liquid asset to current liability ratio. The result of

the table indicated that there was no correlation greater than 0.9 as per (Hair, et al. 2006).Therefore, the researcher of the study conclude that there was no of multi-co linearity problem between the explanatory variables.

Table 4.3.3: Correlation matrix between explanatory variables

	CAP	CATAR	LDR	LATA	LACL	GDP	INF	LATD	ME
CAP	1	0.023798	0.368368	0.122568	0.202872	-0.04721	-0.08631	0.209358	0.12991
CATAR	0.023798	1	-0.07149	0.631107	0.668699	0.027965	0.131655	0.659677	-0.04547
LDR	0.368368	-0.07149	1	-0.01403	0.006118	-0.05178	-0.10826	0.038135	0.208247
LATA	0.122568	0.631107	-0.01403	1	0.665018	-0.00102	0.076808	0.664196	0.020413
LACL	0.202872	0.668699	0.006118	0.665018	1	0.025287	0.100066	0.694116	-0.01129
GDP	-0.04721	0.027965	-0.05178	-0.00102	0.025287	1	0.167367	0.007206	-0.40207
INF	-0.08631	0.131655	-0.10826	0.076808	0.100066	0.167367	1	0.093828	-0.23681
LATD	0.209358	0.659677	0.038135	0.664196	0.694116	0.007206	0.093828	1	-0.00941
ME	0.12991	-0.04547	0.208247	0.020413	-0.01129	-0.40207	-0.23681	-0.00941	1

Source: Output of EViews 8

4.4. Random effect (RE) versus fixed effect (FE) model

The following table shows the relationship between dependent variable ROA and independent variables and how the regression result is virtually depicted by the researcher. According to Brooks (2008) describe about the categories of the panel data estimator that fixed effects models (FEM) and random effects models (REM) are the basic approaches of the panel data estimator. Even if this two approaches end up with nearly the same result, there are situations that they will deviate widely. If t (the number of time series data) is greater than the n (the number of cross-sectional units), the fixed effect model/FEM is more appropriate. The study used 19 year of time series data and 7 commercial banks representing the number of cross-sectional units. So, the time series data (19 years) was greater than 7 commercial banks number of cross-sectional units. Based on the above description the researcher of this study applied fixed effect model (FEM) for this study.

4.5. Results of Regression analysis

In the following section shows the effect of explanatory variables on dependent variable ROA and how the regression result was virtually depicted by the researcher.

Table 4.5.1: Regression result

Dependent Variable: ROA
Method: Panel Least Squares
Date: 11/13/20 Time: 15:55
Sample: 2000 2018
Periods included: 19
Cross-sections included: 7
Total panel (unbalanced) observations: 133

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.988091	0.385384	7.753549	0.0000
CAP	0.098145	0.018278	5.369602	0.0000
CATAR	0.033179	0.024452	1.356870	0.1773
LDR	0.005637	0.002239	0.000251	0.9998
LATA	-0.009317	0.015387	-0.605541	0.5459
LACL	-0.016018	0.040288	-0.397582	0.6916
GDP	0.050080	0.014569	3.437369	0.0008
INF	0.016021	0.004530	3.536569	0.0006
LATD	-0.008473	0.028291	-0.299487	0.7651
ME	-0.057246	0.004824	-11.86648	0.0000

R-squared	0.719772	Mean dependent var	2.642286
Adjusted R-squared	0.699433	S.D. dependent var	1.051993
S.E. of regression	0.576744	Akaike info criterion	1.808859
Sum squared resid	41.24658	Schwarz criterion	2.025116
Log likelihood	-111.1936	Hannan-Quinn criter.	1.896739
F-statistic	35.38861	Durbin-Watson stat	1.136325
Prob(F-statistic)	0.000000		

Source: Output of EViews 8

The regression model arising from the above data was

ROA=2.9881+0.0981CAP+0.0332CATA+0.0056LDR-0.0093LATA-0.016LACL-0.0085LATD- 0.0572ME+0.05GDP+0.016INF

Table 4.5.1 shows that the result of the regression analysis of the dependent variable profitability of the banks which measured by return of assets(ROA) and the independent variables of liquidity management indicators which expressed in terms of both banking factor and macroeconomic factors for the selected commercial banks in Ethiopia. $R^2$and adjusted R^2 was 0.719772 and 0.699433 were the coefficient determination of the model. The result indicate that 70% of the profitability(ROA) of selected commercial banks explained by the variation of capital adequacy(CAP),non-interest to revenue ratio(ME) gross domestic product(GDP) and inflation rate (INF) variables.

Result of R^2 and Interpretation

According to Brooks (2008),R^2 is a statistical measure that represent the proportion of the variance a dependent variable that's explained by an independent variable or variables in the regression model.

According to the result of table 4.3 ,the R^2coeffiecnt of 0.719772 obtained from the estimated model revealing that around 72% variation profit of the selected commercial banks was explained by the variation of bank specific(capital adequacy(CAP),liquid assets to total assets ratio(LATAR),current assets to total assets ratio(CATAR),loan to deposit ratio(LDR),liquid assets to current liability ratio(LACLR),liquid assets to deposit ratio(LADR) and non-interest to revenue ratio(ME)) and macroeconomic(gross domestic product(GDP) and inflation rate (INF) variables. The remaining variation around 28% explained by others explanatory variables was not included in the model. The power of explanatory variables was high.

Result of adjusted R^2 and Interpretation

Adjusted R^2 measure the proportion of the variation explained by those independent variables that really help in explained the dependent variable(s).It penalize for adding independent variables that do not help in predicting the dependent variables. When we add an independent variable in the model, the value of R^2increase, even if the independent variable is insignificant. Whereas adjusted R^2increase only when independent variable is significant and affect dependent variable. The table of the result of this study show that adjusted R^2 was 0.699433 implies that around 70% variation the profitability of selected commercial banks explained by the bank specific(capital adequacy(CAP),liquid assets to total assets ratio(LATAR),current assets to total assets ratio(CATAR),loan to deposit ratio(LDR),liquid assets to current liability ratio(LACLR),liquid assets to deposit ratio(LADR) and non-interest to

revenue ratio(ME)) and macroeconomic(gross domestic product(GDP) and inflation rate (INF) variables. The adjusted $R^2$was decrease by 2% from R-squared because of adding insignificant variables in the model.

Result of F-statistics and Interpretation

The F-statistics tells about the overall significance indicates whether our data linear regression model provides a better fit to the data than a model that contains no independent variables.

H0:B1, B2, B3, B4, B5, B6, B7, B8, B9=0

H1:B1, B2, B3, B4, B5, B6, B7, B8, B9≠0

H1:B1, B2, B3, B4, B5, B6, B7, B8, B9≠0

The F-statistics was 35.38861 and the p-value of 0.00000itwasimportant to measure the overall variables significance of the model. Thus, the p-value of F-statistics was zero at six digits, the null hypothesis was rejected and the model was significant even at 1%.

Result of capital adequacy and Interpretation

According to Richard Cantor (2001) definition capital adequacy is the adequate fund used to keep their interested parties from financial losses and also preserve the interest of different institutions who have responsive to create stable financial system. Capital adequacy is measure by the ratio of regulatory capital to risk weighted assets and according a minimum of 8%(NBE directives number SBB/9/95).Based on the above literatures and theoretical reviews that capital adequacy is one of the indicator of liquidity of the banks. And also the evidence says that properly managed capital adequacy ratio play an important role to compromise the contradicting objectives that maximizing profitability and maintain sufficient funds. The result of the table shows that the ratio of the capital adequacy of the banks had positively and significantly affects the return of selected commercial banks at 1% level of significance. This means that when increase the capital adequacy increase, profitability of the banks also increase in the same direction. The coefficient sign of 0.098145 indicates that, when equity contribution of the owners was increase by a unit, the profit of the selected commercial banks was increase by 0.098145 units being other variables remains constant. The result was similar with the previous local studies like Belay M.(2015),Alemayehu F.(2016),Anisa M.(2016) and Tigist S.(2016).

Result of current assets to total asset ratio and interpretation

Current assets to total asset ratio is used to measure the firm's liquidity and credibility and also used to find out the investment policy of working capital. The coefficient of the ratio of current asset to total asset ratio was 0.033179 and it was insignificant at 10%.The reason behind the insignificant effect of the ratio could be most of Ethiopian commercial banks follow conservative working capital investment policy or the banks mostly focused on long term loans. The result was opposite to the hypothesis. Jeremaihe N. (2012) and Rubien M. (2015) consistent with the result and contradicted with Tigist S.(2015).

Result of loan to deposit ratio and Interpretation

According to the study of Joni Tamkin B. &Towpek (2006) loan- deposit ratio is a useful instrument to determine bank liquidity, and it influences the profitability of the banks. The coefficient of loan to deposit ratio (0.00563) insignificant at 10%.The reason of insignificant could be high dispersion of illiquid loans between selected banks. The result also contradicted with Tigist S. (2015) and similar with Alemayhu F. (2016) and Belete F. (2012).

Result of liquid asset to total assets ratio

Liquid assets to total assets ratio tell us information about the ability to absorb high level of liquidity shock. The regression table shows that the coefficient of the ratio was insignificant at 10%. This could be high dispersion of liquid asset to total asset ratio among the selected banks. The result was similar with the effect of direction but opposite with the level of significance with the hypothesis. The result was similar with previous literatures Tigist S.(2015),Tsegansh T.(2012),Joshua M.(2012) and contradicted with Alemayehu A.(2014).

Result of liquidity assets to current liabilities and Interpretation

According to NBE directives SBB/57/2014 any registered commercial banks should have to preserve at least fifteen percent (15%) of its short-term liabilities. The higher ratio increases the capacity of to meet current obligation but decrease the income of the banks. The more ideal liquidity has impact on the banks profitability. And the impact of liquid asset to current liability on the performance of banks statistically insignificant. This could be high dispersion of the ratio between selected banks and also inventory had important role to performance of the banks. The result was opposite with the hypothesis.

Result of non-interest expense ratio and Interpretation

According to Saunders and comet (2005) describe efficiency ratio is one of the tool to measure the management capability. And also used as a tool to determine the financial performance of the banks. It is the ratio of non-interest expense to total income ratio. A higher efficiency ratio indicates that the banks face higher operating costs, which directly affect the performance of the banks. According to the table 4.3 tells that the efficiency ratio was negative relationship and significant impact on the profitability of selected banks at 1% level of significance. The negative relationship tells that when the efficiency ratio goes up, the profitability of the banks goes in opposite direction. The magnitude (-0.057246) implies that when the efficiency ratio increase by 1%, the performance of the banks decrease by 5.724% other variables were remains constant. The result of the regression was similar with the hypothesis. The result also consistent with previous studies Joshua M.(2012), Jeremiahi N.(2012) and Ruben M.(2013).

The result of GDP and interpretation

As per Goossens et.al (2007), Gross domestic product is a variable used to measure the economic performance of the country. When the country economy at in crisis in business operations reduces borrower's capability to service obligation which increase banks NPL and eventually insolvency (Gavin & Hausman, 1998).GDP had positive and statistical significant effect on the performance the selected commercial banks at 1% level of significance. When the country economy increases, the financial institution encouraged to invest more and increase the performance of the banks. The positive relationship implies that when the growth rate of the country increases, the commercial banks prefer investment than holding higher liquidity. The hypothesis was similar with the regression result. The previous studies were similar with the result of this study Berhanu B. (2015),Tseday P.(2016),Tsegansh Seife(2014) and opposite with Alemayehu Fekadu(2014).

Result of inflation rate and interpretation

As per Finger and Hesse (2009), inflation is the persistent increase in the general prices of goods and services within an economy over a given period. Inflation is one of the macro-economic determinant of liquidity and performance of the banks. Inflation had positive and statistical impact on the performance of the banks at 1%.The coefficient (0.016021) indicates that a percentage of increase

inflation of the country, the profitability of commercial banks increase by 1.602%.The finding was consistent with the previous research of Belay Mola (2015),Berhanu B.(2015) Tsegansh Seife(2014).

4.6. Result of hypothesis

The following section provides the results for each independent variables and their importance in determining the profitability of selected commercial banks of Ethiopia through testing hypothesis.

Capital adequacy

The researcher expected to get a positive and significant impact on the profitability of selected commercial banks. The researcher used for the result in the literature part, the higher capital adequacy ratio, the lower need external funding and good implication for profitability of banks. And increase the internal funding increase the ability to absorb risks. The finding of the result (p-value=0.0000) was significance at 1% level of significance. The result was consistent with the hypothesis. Therefore the null hypothesis was rejected due to the consistent result.

Current assets to total asset ratio

In this research, current asset to total asset ratio was expected to have negative and significant effect on the profitability of selected commercial banks. The formulation of the hypothesis, current asset to total asset ratio is increase, much of the portion of the total asset occupied by current assets. However the major portion of the total assets tied by current assets advantageous for liquidity, the bank's profitability becomes less because current asset has less return than long term asset. The findings shows that similar relationship but insignificant (p-value=0.1773) at 10%.The reason behind of the result that commercial banks select conservative working capital investment policy or the banks mostly focused on long term loans. Therefore, the null hypothesis was not rejected due to the opposite relationship of significance.

Loan to deposit ratio

Loan to deposit ratio was expected to have inverse relationship and significant with the profitability of selected commercial banks. This is because, the higher the ratio implies that major portion of the deposit tied up by illiquid loans. The banks need additional funds from externally to meet mature obligation. This external source of finance exposes to banks for additional interest expenses. So, from

the above reason the ratio and profitability has inverse relationship. The finding shows that the ratio and the profitability had positive and insignificant (p-value=0.9999) at 10% level of significance. This could be high dispersion about this ratio. Therefore, the null hypothesis was not rejected due to the level of significance.

Liquid asset to total asset ratio

The researcher was expected that liquid asset to total asset ratio inverse and significant relationship with profitability of commercial banks. The expected result formulated based on the following insight. The high volume of liquid asset occupied from the total assets it is a good sign of liquidity position but it may be the sign of management inefficiency about assets utilization. The finding shows that the ratio and the profitability of selected commercial banks negative and insignificant (p-value=0.5459) at 10% .Even though the relationship was similar with hypothesis, the level of significance opposite with the expected result. The reason of insignificancy could be banks not select liquidity preferences than loan investment. So the null hypothesis was not rejected due to contradicted significance.

Liquid asset to current liability ratio (Quick ratio)

Quick ratio was expected to get negative and significance relationship between the performances of selected commercial banks in Ethiopia. The expectation of the result based on the following insight. The quick ratio is an indicator of the bank's short term liquidity position useful to meet short term obligation without any additional financing from the sale of inventories. However the high this ratio is a good implication to the banks liquidity, it is negative result on the profitability of the banks because of opportunity cost. The finding of the study show that (p-value=0.6916) was insignificant at 10% level of significance. This reason could be inventory was one basic asset to their profitability and high dispersion of this ratio between selected banks. So the null hypothesis was not rejected due to the finding of the study.

Liquid asset to total deposit ratio

A negative correlation and significant impact was expected on the hypothesis part. The expected result formulated based on the following two insights. The first revealed that the higher liquid asset to total deposit ratio means major portion of the deposit is ideal. This zero income generating liquidity expose to banks for opportunity costs. The second perspective also implies that higher liquid assets to total deposit ratio means maybe major portion of the deposits tied by short term loans. The effect of this has

direct impact on the return of the banks. The findings revealed that the ratio was negative and insignificance (p-value=0.7651) at 10% level. The reason of insignificancy might be selected banks had no ideal deposit on the study time or they highly invest on the long term investments. Therefore the null hypothesis was not rejected due to insignificant level.

Non-interest expense to total revenue ratio

In this result, it was expected that there was a negative significant relationship between non-interest expense to total revenue ratio and profitability of selected commercial banks. This is because an increase non-interest expenses to total revenue ratio will result decrease the profitability and liquidity of commercial banks. The findings was consistent with the hypothesized sign and significance (p-value=0.000) at 1%.Accordingly, the null hypothesis was rejected due to consistent result.

Gross Domestic Product (GDP)

In this research, GDP was expected to positive and significant effect on the return of assets (ROA) of selected commercial banks. The reason that GDP of the country increases makes banks rundown their liquidity and gets more returns. When the country economic growth become downturn, the banking firms decrease their confidence in reaping (gaining) profits and also they prefer holding their liquidity than long term investments. The finding shows that the result consistent with the expected value (p-value=0.0008) at 1% level of significance. Therefore the null hypothesis was rejected due to the consistence result.

Inflation rate

The researcher was expected that there was a positive relationship between inflation rate and profitability of selected commercial banks. This is because when increase inflation rate decrease the capacity of the borrowers concerning about the repayment of loans and negatively affects savings due to the time value of money. And also affects the profitability of commercial banks. The findings of this study shows that similar with the expected result (p-value=0.0000) at 1%level of significance. Therefore the null hypothesis was rejected due to the consistent result.

Table 4.6.1.Summary of expected and actual relationship of independent variables and dependent variable

Explanatory Variables	Expected effect on profitability(ROA)	Actual effect on the profitability(ROA)
Capital adequacy(CAP)	Positive & Significant	Positive & Significant
Current assets to total asset ratio(CATAR)	Negative & significant	Positive & insignificant
Loan to deposit ratio(LDR)	Negative & significant	Negative& insignificant
Liquid asset to total assets ratio(LATAR)	Negative & significant	Negative& insignificant
Liquid asset to current liability ratio(LACLR)	Negative & significant	Negative& insignificant
Liquid assets to total deposit ratio(LATDR)	Negative & significant	Negative& insignificant
Non-interest expense to total revenue ratio(ME)	Negative & significant	Negative & significant
Gross domestic product(GDP)	Positive & Significant	Positive & Significant
Inflation(INF)	Negative & significant	Positive & Significant

CHAPTER FIVE

Conclusions and Recommendations

The output of this study indicates that liquidity management is the means of the survival issue for financial institutions especially for banking firms. The researcher aimed to show the effect of liquidity management on the profitability of selected commercial banks in Ethiopia through analyzing nine variables of liquidity. The following nine explanatory variables used in order to achieve the stated objectives: bank specific variables(capital adequacy(CAP),investment of current assets ratio(CATAR), liquid asset to total assets ratio(LATAR),loan to deposit ratio(LDR),liquid asset to current liability ratio(LACLR),liquid assets to total assets ratio(LATAR) & efficiency ratio(ME) and macro-economic Variables(Gross domestic product(GDP) and inflation rate(INF).

The study was employed panel data used selected sampled of seven (7) commercial banks operating in Ethiopia year from 2000 to 2018.The data was presented using descriptive statistics, correlation analysis and balanced fixed effect of regression analysis for nine liquidity variables and performance measured by ROA of the banks. Test for OLS regression model was conducted for the classical linear regression model assumptions.

The majority of the descriptive analysis shows that the selected commercial banks had positive liquidity position within the period of the study. However majority of the output was positive, the maximum and minimum result of the descriptive statistics indicates that there was irregular liquidity management between selected commercial banks.

The mean value of the return of assets (ROA=2.64%) show that the selected commercial banks generates 0.0264 cents of income from 1 birr investment of assets.

According to the regression result capital adequacy (CAP) had positive and statistically significant effect on the performance of the banks. This shows that the capital and reserve of the banks decrease the additional cost of the banks. Therefore, the study reject the null hypothesis that capital adequacy had no positive and significant effect on the performance of the selected banks.

The study also found GDP had positive and statistically significant effect on the performance of the selected banks. The result show that the banks more optimistic on their long-term investment during the economic growth of the country.

Non-interest expense ratio was negative and significant on the performance of commercial banks at 1%.This show that staff salaries, rent, bonus and other operating expense had effect on the performance of the banks.

Inflation rate had positive and significant effect on the performance selected commercial banks at 1%.The finding show that when the level inflation rate increase, the profitability of selected commercial banks increase within the study time frame. But the result contradicted with the expected result.

Current assets to total asset ratio (CATAR), liquid asset to total assets (LATAR),loan to deposit ratio (LDR), liquid asset to current liability ratio (LACLR), liquid assets to total assets ratio (LATAR) was found not significant on the profitability of commercial banks in this study. The reason insignificant could be the high dispersion of variables within the study time frame. Therefore, it can be conclude that liquidity management had non-linear (positive/negative) effect on the performance of the banks.

The researcher put the following recommendations based on the findings and conclusion of the research:

- Concerning to the result of capital adequacy of selected commercial banks to become consistent regulatory organ of NBE should make a periodic and active supervision on capital strength of the banks. The capital adequacy of the study was 12.5% which was greater than from the NBE requirement 8%.This show that the banks was not exposed to liquidity problem and contributed to increase profitability of the banks. The management of the banks and NBE should give prioritizing proper attention the result to be consistent.
- Negative result of the regression result that managers of the banks should give prioritization on their productive investment area to increase profitability of the banks.
- Concerning the negative result of non-interest expense ratio that managements of the banks should cost minimization strategies to reduce non-interest expense to be competitive and increase the sustainability in the market.
- Concerning to the macroeconomic variables included in this study GDP and inflation rate were the key drivers of profitability of Ethiopian commercial banks. This is clearly indicate that the management of commercial banks should asses both internal and macroeconomic indicators when designing their strategies to improve their liquidity position and profitability.

- Concerning to further studies that this research was investigate the effect of nine internal and macroeconomic variables of liquidity management on the performance of seven commercial banks using 18 years data. Thus the researcher recommends using more challenging explanatory variables (such as NBE regulation, government policies, privatization, and IFB banks) and also increasing the sample size of the banks.

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APPENDICES

Appendix-I-List of commercial banks with the year of establishment

No.	Name of Banks	Est.year
1	Commercial Bank of Ethiopia(CBE)	1942
2	Awash Bank(AIB)	1994
3	Dashen Bank(DB)	1995
4	Bank of Abyssinia(BOA)	1996
5	Wegagen Bank(WB)	1997
6	Hibret Bank(UB)	1998
7	Nib International Bank(NIB)	1999
8	Cooperative Bank of Oromia(CBO)	2007
9	Lion International Bank(LIB)	2006
10	Oromia International Bank(OIB)	2008
11	Bunna International Bank(BIB)	2009
12	Zemen Bank(ZB)	2008
13	Abay Bank(AB)	2010
14	Berhan International Bank(BrIB)	2010
15	Addis International Bank(AdIB)	2011
16	Debub Global Bank(DGB)	2012
17	Enat Bank(EB)	2013

Appendix-II-Variable description and data sources

		VARIABLES	NOTATION	SOURCES
Dependent Variable		Return of assets	ROA	Audited annual report and NBE
Independent variables	Bank specific Variables	Capital adequacy	CAP	Audited annual report and NBE
		Current asset to total asset ratio	CATAR	Audited annual report and NBE

		Loan to total deposit ratio	LTD	Audited annual report and NBE
		Liquid assets to total assets ratio	LATA	Audited annual report and NBE
		Liquid assets to current liability ratio	LATCL	Audited annual report and NBE
		Non-interest expense to total income	EM	Audited annual report and NBE
	Macroeconomic variables	Gross domestic product	GDP	
		Inflation rate	INF	

Appendix-III- Descriptive statistic of the variables

	ROA	CAP	CATAR	LDR	LATA	LACL	GDP	INF	LATD	ME
Mean	2.642286	12.15518	31.72034	59.49550	32.47238	38.27587	11.23603	12.23993	41.91297	36.32149
Median	2.802225	11.74611	31.76990	61.60239	32.57633	37.22707	11.89840	9.570000	40.90028	33.96005
Maximum	4.858300	29.43925	59.40661	115.7895	111.5385	100.0000	16.10942	44.37000	111.5385	111.1554
Minimum	-2.15882	2.065680	2.267501	8.757062	2.267501	5.918519	-0.2942	-8.24	5.918519	13.46144
Std. Dev.	1.051993	4.615071	12.78973	25.78534	14.48380	16.12083	3.855133	11.55345	17.82486	11.96177
Skewness	-1.04062	0.936333	0.209436	-0.47116	1.234887	0.558415	-1.64504	1.090465	0.608734	2.203907
Kurtosis	5.417034	5.350031	2.339830	2.712455	8.100061	3.498923	5.516747	4.454987	3.648757	13.43803
Jarque-Bera	56.80260	50.41486	3.412972	5.419500	179.2831	8.353965	95.80227	38.37670	10.62572	716.7951
Probability	0.000000	0.000000	0.181502	0.066553	0.000000	0.015345	0.000000	0.000000	0.004928	0.000000
Sum	354.0663	1628.795	4250.525	7972.397	4351.299	5128.967	1505.629	1640.150	5616.338	4867.080
Sum Sq. Dev.	147.1896	2832.751	21755.76	88429.56	27900.80	34564.18	1976.653	17753.12	42257.49	19030.16
Observations	133	133	133	133	133	133	133	133	133	133

Appendix-IV-Correlation analysis of the dependent and independent variables

	ROA	CAP	CATAR	LDR	LATA	LACL	GDP	INF	LATD	ME
ROA	1									
CAP	0.236175	1								
CATAR	-0.02348	0.023798	1							
LDR	-0.0395	0.368368	-0.07149	1						
LATA	-0.07518	0.122568	0.631107	-0.01403	1					
LACL	-0.00428	0.202872	0.668699	0.006118	0.665018	1				
GDP	0.458528	-0.04721	0.027965	-0.05178	-0.00102	0.025287	1			
INF	0.32887	-0.08631	0.131655	-0.10826	0.076808	0.100066	0.167367	1		
LATD	-0.01006	0.209358	0.659677	0.038135	0.664196	0.694116	0.007206	0.093828	1	
ME	-0.72728	0.12991	-0.04547	0.208247	0.020413	-0.01129	-0.40207	-0.23681	-0.00941	1

Appendix-V-Heteroscedasticity Test: Breusch-Pagan-Godfreytest

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.951994	Prob. F(9,124)	0.4831
Obs*R-squared	8.660499	Prob. Chi-Square(9)	0.4692
Scaled explained SS	7.969049	Prob. Chi-Square(9)	0.5373

Appendix-VI-Breusch-Godfrey Serial Correlation LM Test (Autocorrelation Test)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.484920	Prob. F(51,73)	0.0601
Obs*R-squared	68.23023	Prob. Chi-Square(51)	0.0538

Appendix-VII-Multi-collinearity Test

	CAP	CATAR	LDR	LATA	LACL	GDP	INF	LATD	ME
CAP	1	0.023798	0.368368	0.122568	0.202872	-0.04721	-0.08631	0.209358	0.12991
CATAR	0.023798	1	-0.07149	0.631107	0.668699	0.027965	0.131655	0.659677	-0.04547
LDR	0.368368	-0.07149	1	-0.01403	0.006118	-0.05178	-0.10826	0.038135	0.208247
LATA	0.122568	0.631107	-0.01403	1	0.665018	-0.00102	0.076808	0.664196	0.020413
LACL	0.202872	0.668699	0.006118	0.665018	1	0.025287	0.100066	0.694116	-0.01129
GDP	-0.04721	0.027965	-0.05178	-0.00102	0.025287	1	0.167367	0.007206	-0.40207
INF	-0.08631	0.131655	-0.10826	0.076808	0.100066	0.167367	1	0.093828	-0.23681
LATD	0.209358	0.659677	0.038135	0.664196	0.694116	0.007206	0.093828	1	-0.00941
ME	0.12991	-0.04547	0.208247	0.020413	-0.01129	-0.40207	-0.23681	-0.00941	1

Appendix-VIII-Regression result

Dependent Variable: ROA
Method: Panel Least Squares
Date: 11/13/20 Time: 15:55
Sample: 2000 2019
Periods included: 20
Cross-sections included: 7
Total panel (unbalanced) observations: 134

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.988091	0.385384	7.753549	0.0000
CAP	0.098145	0.018278	5.369602	0.0000
CATAR	0.033179	0.024452	1.356870	0.1773
LDR	0.005637	0.002239	0.000251	0.9998
LATA	-0.009317	0.015387	-0.605541	0.5459
LACL	-0.016018	0.040288	-0.397582	0.6916
GDP	0.050080	0.014569	3.437369	0.0008
INF	0.016021	0.004530	3.536569	0.0006
LATD	-0.008473	0.028291	-0.299487	0.7651
ME	-0.057246	0.004824	-11.86648	0.0000

R-squared	0.719772	Mean dependent var	2.642286
Adjusted R-squared	0.699433	S.D. dependent var	1.051993
S.E. of regression	0.576744	Akaike info criterion	1.808859
Sum squared resid	41.24658	Schwarz criterion	2.025116
Log likelihood	-111.1936	Hannan-Quinn criter.	1.896739
F-statistic	35.38861	Durbin-Watson stat	1.136325
Prob(F-statistic)	0.000000		

Appendix-VIII-Ratio of data

BANK	Year	ROA	CAP	LDR	LATA	LACL	GDP	INF	LATD	ME
CBE	**2000**	2.211	6.501	65.842	34.572	43.621	12.317	0.660	43.621	24.091
CBE	**2001**	0.092	6.054	61.004	28.391	34.921	9.755	-8.240	34.921	52.200
CBE	**2002**	-2.159	3.743	52.623	35.808	42.795	3.202	1.650	42.795	111.155
CBE	**2003**	2.352	5.277	43.280	56.421	69.092	-0.294	17.760	69.092	25.501
CBE	**2004**	1.280	5.348	36.949	59.407	73.761	14.726	3.220	73.761	40.457
CBE	**2005**	1.871	4.308	37.671	52.670	68.869	16.109	11.660	68.869	22.078
CBE	**2006**	2.324	4.201	32.864	59.156	74.973	14.861	13.560	74.973	20.504
CBE	**2007**	2.179	9.711	29.687	59.048	78.058	14.814	17.250	78.058	32.490
CBE	**2008**	2.900	9.046	46.072	35.380	47.397	13.361	44.370	47.397	19.179
CBE	**2009**	3.498	8.484	48.072	26.289	35.914	10.830	8.480	35.914	13.461
CBE	**2010**	2.947	7.488	43.950	21.032	28.553	11.898	8.130	28.553	20.968
CBE	**2011**	3.038	5.480	42.431	26.483	35.686	13.729	33.230	35.686	23.440

CBE	**2012**	3.980	4.864	53.450	15.805	21.530	10.782	24.130	21.530	16.985
CBE	**2013**	3.432	4.589	46.950	18.010	23.295	11.828	8.070	23.295	19.953
CBE	**2014**	3.056	4.458	45.384	12.963	16.208	12.342	7.400	16.208	23.687
CBE	**2015**	1.879	2.066	59.721	2.268	5.919	11.549	9.570	5.919	24.087
CBE	**2016**	1.644	3.856	47.781	8.347	11.112	9.117	6.630	11.112	32.283
CBE	**2017**	2.002	9.091	41.153	10.934	14.676	12.284	10.690	14.676	33.511
CBE	**2018**	1.009	8.226	39.722	9.062	11.509	10.328	13.830	11.509	36.463
AIB	**2000**	2.317	12.385		36.232	46.531	12.317	0.660	46.531	32.813
AIB	**2001**	1.321	11.466		33.738	40.746	9.755	-8.240	40.746	36.842
AIB	**2002**	1.189	11.781		36.241	43.333	3.202	1.650	43.333	40.741
AIB	**2003**	1.114	9.779		39.615	47.680	-0.294	17.760	47.680	56.436
AIB	**2004**	1.640	8.757		42.881	50.837	14.726	3.220	50.837	47.581
AIB	**2005**	1.902	10.243		38.904	44.639	16.109	11.660	44.639	40.268
AIB	**2006**	3.012	10.291		31.449	36.190	14.861	13.560	36.190	30.263
AIB	**2007**	4.216	11.319	80.720	29.452	36.247	14.814	17.250	36.247	22.449
AIB	**2008**	3.302	12.388	70.755	38.261	47.662	13.361	44.370	47.662	26.714
AIB	**2009**	2.543	11.676	54.671	49.619	64.218	10.830	8.480	64.218	32.451
AIB	**2010**	3.446	11.836	51.518	50.883	66.207	11.898	8.130	66.207	26.350
AIB	**2011**	3.994	12.932	51.480	40.018	52.275	13.729	33.230	52.275	22.964
AIB	**2012**	3.577	13.491	59.804	26.476	34.336	10.782	24.130	34.336	26.577
AIB	**2013**	3.788	13.535	61.458	24.037	28.470	11.828	8.070	28.470	31.843
AIB	**2014**	3.543	12.609	61.014	25.265	33.647	12.342	7.400	33.647	32.119
AIB	**2015**	2.940	12.947	67.396	16.263	20.961	11.549	9.570	20.961	34.807
AIB	**2016**	2.782	12.886	67.672	19.562	25.369	9.117	6.630	25.369	37.402
AIB	**2017**	2.803	11.108	73.801	16.678	22.884	12.284	10.690	22.884	39.831
AIB	**2018**	3.069	8.812	72.044	21.047	26.771	10.328	13.830	26.771	36.347
DA	**2000**	1.429	8.902	88.099	37.688		12.317	0.660	53.884	43.284
DA	**2001**	2.137	8.455	80.587	32.091		9.755	-8.240	39.842	37.383
DA	**2002**	1.856	8.210	73.216	34.253	42.737	3.202	1.650	42.737	34.783
DA	**2003**	1.553	6.479	78.162	32.597	40.037	-0.294	17.760	40.037	50.000
DA	**2004**	2.399	6.425	77.594	32.574	40.037	14.726	3.220	40.037	38.021
DA	**2005**	2.329	7.105	78.786	29.854	36.040	16.109	11.660	36.040	36.325
DA	**2006**	3.339	8.491	85.699	25.275	31.121	14.861	13.560	31.121	31.335
DA	**2007**	3.533	9.013	82.041	27.661	34.376	14.814	17.250	34.376	27.629
DA	**2008**	3.447	9.333	71.234	37.242	47.395	13.361	44.370	47.395	26.142
DA	**2009**	2.846	9.337	56.169	48.320	59.340	10.830	8.480	59.340	26.951
DA	**2010**	2.934	9.093	49.769	42.542	51.805	11.898	8.130	51.805	26.743
DA	**2011**	3.337	9.525	52.507	42.468	52.577	13.729	33.230	52.577	25.506
DA	**2012**	4.052	10.433	57.757	32.960	41.055	10.782	24.130	41.055	24.451
DA	**2013**	3.256	10.359	55.909	30.693	38.236	11.828	8.070	38.236	28.290
DA	**2014**	3.416	11.828	53.331	29.791	37.004	12.342	7.400	37.004	28.636

DA	**2015**	3.121	11.807	58.176	22.331	27.909	11.549	9.570	27.909	35.152
DA	**2016**	2.726	11.750	55.782	24.043	30.189	9.117	6.630	30.189	38.117
DA	**2017**	2.393	11.532	65.087	15.176	18.914	12.284	10.690	18.914	44.335
DA	**2018**	2.321	12.915	64.706	15.500	19.566	10.328	13.830	19.566	41.854
BOA	**2000**	2.170	17.131	108.299	22.423	33.402	12.317	0.660	33.402	37.705
BOA	**2001**	2.354	16.406	105.530	19.866	27.343	9.755	-8.240	27.343	30.337
BOA	**2002**	-0.196	12.347	73.597	38.091	47.855	3.202	1.650	47.855	47.500
BOA	**2003**	0.485	11.178	75.186	38.035	47.119	-0.294	17.760	47.119	56.790
BOA	**2004**	2.605	12.177	75.451	39.621	49.255	14.726	3.220	49.255	32.520
BOA	**2005**	3.350	12.348	75.845	36.898	46.650	16.109	11.660	46.650	24.342
BOA	**2006**	3.476	14.185	90.170	27.558	35.875	14.861	13.560	35.875	25.909
BOA	**2007**	2.151	11.867	84.712	30.094	37.560	14.814	17.250	37.560	41.948
BOA	**2008**	0.380	9.829	81.005	33.786	41.482	13.361	44.370	41.482	66.812
BOA	**2009**	2.062	9.481	60.277	49.233	59.995	10.830	8.480	59.995	36.375
BOA	**2010**	2.392	9.324	61.361	47.169	57.639	11.898	8.130	57.639	30.984
BOA	**2011**	2.669	9.079	54.577	39.790	47.667	13.729	33.230	47.667	31.705
BOA	**2012**	2.788	11.003	57.556	30.622	37.261	10.782	24.130	37.261	31.262
BOA	**2013**	2.355	10.935	55.344	19.460	23.201	11.828	8.070	23.201	31.262
BOA	**2014**	4.180	13.559	55.637	24.354	30.190	12.342	7.400	30.190	29.139
BOA	**2015**	2.339	13.247	53.113	45.899	56.424	11.549	9.570	56.424	38.298
BOA	**2016**	2.365	12.624	58.758	18.444	22.763	9.117	6.630	22.763	43.657
BOA	**2017**	2.706	11.470	67.279	13.581	16.614	12.284	10.690	16.614	44.164
BOA	**2018**	1.964	13.273	69.747	14.043	17.413	10.328	13.830	17.413	44.354
UB	**2000**	2.740	27.972	115.789	24.476	46.053	12.317	0.660	46.053	50.000
UB	**2001**	2.801	29.439	103.876	32.243	53.488	9.755	-8.240	53.488	45.455
UB	**2002**	1.515	28.025	86.243	45.223	75.132	3.202	1.650	75.132	45.833
UB	**2003**	1.277	19.403	101.045	36.887	60.279	-0.294	17.760	60.279	58.065
UB	**2004**	1.225	14.243	72.180	43.027	54.511	14.726	3.220	54.511	54.348
UB	**2005**	3.549	11.650	68.555	45.107	55.954	16.109	11.660	55.954	34.066
UB	**2006**	3.293	11.945	82.295	37.086	48.607	14.861	13.560	48.607	29.365
UB	**2007**	3.385	16.495	91.499	34.731	49.189	14.814	17.250	49.189	33.854
UB	**2008**	3.352	14.394	76.111	42.638	56.714	13.361	44.370	56.714	32.537
UB	**2009**	2.369	11.178	59.524	53.435	68.744	10.830	8.480	68.744	35.871
UB	**2010**	3.308	10.813	55.316	55.540	69.309	11.898	8.130	69.309	31.076
UB	**2011**	3.404	11.667	54.023	46.071	58.677	13.729	33.230	58.677	25.878
UB	**2012**	3.608	12.538	60.457	32.579	42.363	10.782	24.130	42.363	27.229
UB	**2013**	2.278	12.038	58.421	20.667	25.573	11.828	8.070	25.573	38.943
UB	**2014**	1.814	13.264	56.930	28.496	38.005	12.342	7.400	38.005	41.736
UB	**2015**	2.144	11.742	58.115	18.964	23.071	11.549	9.570	23.071	44.218
UB	**2016**	2.144	12.001	65.459	16.901	22.387	9.117	6.630	22.387	42.972
UB	**2017**	1.949	11.485	72.682	14.548	19.306	12.284	10.690	19.306	71.126

UB	**2018**	2.298	10.538	65.279	16.149	19.614	10.328	13.830	19.614	39.689
WB	**2000**	0.682	9.728	70.241	46.109	63.539	12.317	0.660	63.539	53.333
WB	**2001**	1.094	9.949	76.615	38.765	50.334	9.755	-8.240	50.334	48.333
WB	**2002**	0.976	9.907	78.835	35.294	44.272	3.202	1.650	44.272	48.387
WB	**2003**	1.433	10.461	81.108	35.321	44.602	-0.294	17.760	44.602	52.239
WB	**2004**	3.154	11.316	84.247	35.877	46.689	14.726	3.220	46.689	42.727
WB	**2005**	3.483	11.139	77.795	38.366	48.137	16.109	11.660	48.137	43.333
WB	**2006**	3.665	11.288	89.595	29.261	37.177	14.861	13.560	37.177	41.364
WB	**2007**	3.903	11.580	79.126	37.931	48.467	14.814	17.250	48.467	35.000
WB	**2008**	3.651	14.678	79.114	43.720	60.796	13.361	44.370	60.796	34.997
WB	**2009**	3.908	16.342	56.657	56.963	78.199	10.830	8.480	78.199	28.090
WB	**2010**	4.113	18.317	63.064	52.869	77.387	11.898	8.130	77.387	30.437
WB	**2011**	4.684	16.590	48.847	51.372	69.511	13.729	33.230	69.511	31.488
WB	**2012**	4.099	19.218	61.924	33.435	48.468	10.782	24.130	48.468	29.645
WB	**2013**	3.664	17.611	62.116	26.700	36.754	11.828	8.070	36.754	34.258
WB	**2014**	2.818	19.072	54.916	15.915	21.341	12.342	7.400	21.341	40.987
WB	**2015**	2.825	17.609	61.513	17.844	24.787	11.549	9.570	24.787	43.920
WB	**2016**	2.512	17.331	67.755	19.132	27.957	9.117	6.630	27.957	46.442
WB	**2017**	2.866	16.019	73.013	18.637	27.852	12.284	10.690	27.852	45.183
WB	**2018**	3.283	13.970	73.381	14.782	19.745	10.328	13.830	19.745	41.632
NIB	**2000**	0.633	25.316	75.641	111.538	111.538	12.317	0.660	111.538	60.000
NIB	**2001**	4.858	18.452	100.962	27.381	44.231	9.755	-8.240	44.231	28.125
NIB	**2002**	2.989	18.539	93.913	48.406	48.406	3.202	1.650	48.406	28.889
NIB	**2003**	1.832	14.124	93.537	41.497	41.497	-0.294	17.760	41.497	54.545
NIB	**2004**	3.283	13.873	94.471	39.784	39.784	14.726	3.220	39.784	31.183
NIB	**2005**	3.088	12.933	92.641	26.790	37.939	16.109	11.660	37.939	33.333
NIB	**2006**	3.086	14.060	101.584	21.460	29.959	14.861	13.560	29.959	29.193
NIB	**2007**	3.280	16.302	96.700	26.697	37.041	14.814	17.250	37.041	28.846
NIB	**2008**	3.613	16.386	85.582	36.511	53.956	13.361	44.370	53.956	30.195
NIB	**2009**	3.634	15.163	67.355	48.571	70.822	10.830	8.480	70.822	30.875
NIB	**2010**	3.728	15.351	61.692	51.387	74.338	11.898	8.130	74.338	32.624
NIB	**2011**	3.768	16.461	53.642	51.243	70.659	13.729	33.230	70.659	29.416
NIB	**2012**	3.720	18.463	63.529	36.017	51.055	10.782	24.130	51.055	28.711
NIB	**2013**	3.437	18.218	68.262	24.658	33.881	11.828	8.070	33.881	32.257
NIB	**2014**	2.990	18.278	68.251	17.828	24.182	12.342	7.400	24.182	32.374
NIB	**2015**	2.809	16.425	70.534	13.561	18.392	11.549	9.570	18.392	38.673
NIB	**2016**	2.680	15.906	60.468	18.812	23.972	9.117	6.630	23.972	38.215
NIB	**2017**	2.407	14.054	65.247	15.614	19.992	12.284	10.690	19.992	37.755
NIB	**2018**	2.158	12.666	62.438	14.557	17.970	10.328	13.830	17.970	38.204