"THE EFFECTS OF ASSET LIABILITY MANAGEMENT ON THE LIQUIDITY RISK": A STUDY ON SELECTED PRIVATE COMMERCIAL BANKS IN ETHIOPIA.

A Thesis Submitted to the School of Graduate Studies of Jimma University in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Science in Accounting and Finance (Msc)

BY

Aschalech Bekele Dejene

JIMMA UNIVERSITY

COLLEGE OF BUSINESS & ECONOMICS

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BY
ASCHALECH BEKELE DEJENE

UNDER THE GUIDANCE OF

DR. AREGA SEYOUM (PHD)

AND

MR. TADELETESFAY (MSC,)

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Jimma

Declaration

I hereby declare that this thesis entitled "The effects of asset quality (liability) management on the liquidity risk": A study on selected private commercial banks in Ethiopia*,* has been carried out by meunder the guidance and supervision of Dr. AregaSeyoum (PHD)and Mr. TadeleTesfay (MSC,)

The thesis is original and has not been submitted for the award of any degree ordiploma to any university or institutions.

Researcher's Name   Date   Signature

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CERTIFICATE

This is to certify that the thesis prepared by ASCHALECH BEKELE DEJENE, entitled: "The effects of asset liability management on the liquidity risk": A study on selected private commercial banks in Ethiopia, and submitted in partial fulfillment of the requirements for the degree of Master of Science in Accounting and Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Approved by:

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

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ABSTRACT

The objective of the study was to investigate the effect of Asset liability management on the liquidity risk on the selected seven private commercial banks in Ethiopia. The study adopted explanatory research design in its methodology and the researcher chose to study on private commercial banks due to availability of needed data and convenience. The targeted population for this study is Ethiopian private commercial banks operating for a decade (2005-2014) and the sample banks included in this study consisted of seven private commercial banks operating in Ethiopia. The study was used secondary data source and collected from audited financial statements reported by National Bank of Ethiopia and commercial banks from 2005-2014 fiscal periods to describe the magnitude of asset liability management indicators on liquidity risk trend indicators. Then, the collected panel data were analyzed and described by basic statistical techniques such as descriptive analysis, trend analysis, GLS fixed effect regression analysis were employed by using STATA version 12.0. The results of the regression analysis shows that there is a positive significant relationship between explanatory variables return on equity (ROE), the capital adequacy ratio (CAR), and negative significant relationship between independent variables the Loan to deposit ratio (LTD), the size of the bank and insignificant negative relationship between independent variable the Return on assets (ROA) on the dependent variable i.e. liquidity risk of private commercial banks. The findings of the analysis conclude that explanatory variables have an effect on the liquidity risk of private commercial banks in Ethiopia. The study gives the following recommendations: Commercial banks need to place greater emphasis on developing an integrated view of risks facing the banks; Asset liability committees and risk managers should implement strong and comprehensive balance sheet management approaches; management should also ensure there are effective liquidity management strategies. Lastly, this research study forms the basis for further research to be extended to other financial institutions that were relevant to the study such as public commercial banks, Microfinance institutions (MFIs) but were not covered. A further research could also be carried out on the role of Asset liability committee with a view to coming up with recommendation to strengthen its role in the management bank risks.

Key Words: Asset Liability Management, Liquidity Risk, Private Commercial Banks in Ethiopia

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LIST OF ACRONYMS AND ABBREVATIONS

AIB   AWASH INTERATIONAL BANK S.C

ALCO   ASSET LIABILITY COMMITTEE

ALM   ASSET LIABILITY MANAGEMENT

BAS   BANK SIZE

BOA   BANK OF ABSYINA S.C

CAR   CAPITAL ADEQUACY RATIO

CBE   COMMERCIAL BANK OF ETHIOPIA

CBO   COOPERATIVE BANK OF OROMIA

DAB   DASHEN BANK S.C

ETB   ETHIOPIAN BIRR

FE   FIXED EFFECT

FY   FINANCIAL YEAR

IQR   LIQUIDTY RISK

IRR   INTEREST RATE RISK

LDR   LOAN TO DEPOSIT RATIO

MFI   MICRO FINANCE INSTITUTION

NBE   NATIONAL BANK OF ETHIOPIA

NIB   NIB INTERNATIONAL BANK OF ETHIOPIA

NLR   NET LIQUIFIABLE RATIO

OLS   ORDINARY LEAST SQUARE

RE   RANDOM EFFECT

ROA   RETURN ON ASSETS

ROE   RETURN ON EQUITY

UB   UNITED BANK S.C

WB   WEGAGEN BANK S.C (WB)

VIF   VARIANCE INFLATION FACTOR

CAMEL CAPITAL ASSET MANAGEMENT EFFICIENCY

CHAPTER ONE

1. **INTRODUCTION**

1.1 **Background of the study**

Commercial banking businesses are remained and will continue to be an important financial institute for any economy as they play the most fundamental role in the payments system. One of the main functions of commercial banks is the availing of funds to its customers. For a bank to be in a position to do so, it must be in a healthy liquidity position (Litter et al, 2004). Hence, in a traditional financial intermediation framework, banks provide liquidity to the whole economy. This is done through balance sheet intermediation by creating a duration mismatch between their assets and liabilities.

Banking organization sometimes subjective and difficult task, because banks rarely have liquidity problems as long as they are viewed as sound and deposit inflows are positive. Failure to properly manage liquidity can quickly result in significant unanticipated losses. The purpose of liquidity management is to ensure that every bank is able to meet fully its contractual commitments. The ability to fund increases in assets and meet obligations as they come due is critical to the ongoing viability of any bank. Therefore, managing liquidity is among the most important activities conducted by banks (Paul, 2009).

Sound liquidity management can reduce the probability of serious problems. Indeed, the importance of liquidity transcends the individual bank, since a liquidity shortfall at a single bank can have system-wide repercussions. For this reason, the analysis of liquidity requires the management of the bank not only to measure the liquidity position of the bank on an ongoing basis, but also to examine how funding requirements are likely to evolve under various scenarios, including adverse conditions. Banks should review frequently the assumptions utilized in managing liquidity to determine that they continue to be valid. Since a bank's future liquidity position will be affected by factors that cannot always be forecasted with precision; assumptions need to be reviewed frequently to determine their continuing validity. These assumptions should

be made under the different categories of assets, liabilities and off-balance sheet activities (Baum, 1996).

One major area in the asset liability management involves the management of the total balance sheet dynamics and it involves quantification of risks and conscious decision making with regard to asset liability structure in order to maximize the interest earnings within the framework of perceived risks (Baum, 1996).

Asset Liability management as the practice of managing a business so that decisions and actions taken with respects to assets and liabilities are coordinated in order to ensure effective utilization of company's resources to increase its profitability. Asset liability management is conducted primarily at an overview, balance sheet level (Choundhry, 2011).

The essential of the whole subject of assets liabilities management is an area of banking that has under gone drastic change. Strong capital does not guarantee liquidity in all situations, there can be anxiety and sudden increase in the demand for liquidity (Paul, 2009). However, it is the job of the central banks to help in those circumstances. A strong capital base in the banking system and in all its components is likely to limit future liquidity shocks management, this is a stimulate idea for the management of the financial institutions to think about and act. However, how and when to act are the questions which led to asset liability management; a management tool to monitor and manage various aspects of risks associated with the balance sheet management, including the management of exposure of the financial institutions (Choundhry, 2011).

Several studies draw the link between the Asset liability management in the recent years has become a tool of integrated analysis of assets and liabilities so to value not only the interest rate risk but the liquidity risk, solvency risk, firm strategies and asset allocation as well (Muchangi, 2013).

The responsibility for managing the overall liquidity of the bank should be placed with a specific identified group within the bank, normally in the form of an asset liability committee that comprises senior management and the treasury function. The asset liability committee is charged with ensuring that the bank has enough financial resources to function in a profitable, sound and

sustainable manner. This includes the responsibility to ensure that the banks can fund desired levels of asset growth while meeting all liabilities as they become due and without incurring unreasonable cost in doing so. Similarly, National bank of Ethiopia in its directives states that, the board of directors of each bank to constitute an asset liability committee, which establish broad guidelines on the bank's tolerance for risk, among others. All proceedings of the committee should be properly recorded (Muchangi, 2013).

Through countries like Ethiopia, to strengthen or correct Asset liability management -liquidity, profitability and solvency of banks can be ensured and at the same time banks can manage and reduce risks such as credit risk, liquidity risk, interest rate risk, currency risk.

Based up on above facts, this study is attempted in answering the research gap in examining effects of asset liability management on the liquidity risk in selected seven private commercial banks in Ethiopia from period 2005-2014 fiscal year.

1.1.2 History of Banking in Ethiopia

The history of banking in Ethiopia goes as far back as 1905, when the first bank- the bank of Abyssinia was established under the arrangement between the emperor Menelik II and European banking group which was behind the national bank of Egypt. The establishment of financial institution in Ethiopia designed to collect and channel savings to productive investment dates back to 1942, when the state bank of Ethiopia was created by the imperial charter. The bank combined the function of central bank and commercial bank unit December 1963 when it was split into the national bank and commercial bank of Ethiopia. The central banking function was thus taken over by the national bank of Ethiopia. This period also characterized by emergent of specialized banks like agricultural bank of Ethiopia and investment bank of Ethiopia and private banks like Banco De Roma (Ethiopia) and Banco Napoli (operate in Asmara for many years), (Mersha, 2002).

In the post revolution period, financial sector institutions were nationalized and consolidated into specialized banks. At that period the country was following the socialist economic system. Hence all banks including NIB were thought to function as government to favor and promote the development and sustenance of the socialized sectors (cooperatives).

In the reform period, after 1991, the Ethiopian financial sector structure adjusted in the form of re-establishing the already existing banks in new form and allows privatization of financial institutions. Along with this reform all private banks began operating on the objective of making profit as other business. And NBE as sole regulator and supervisory organ set rules and regulation in order to maintain the operation of all banks should be to the aim of integrating the economic growth of the country.

Currently, according to NBE 2013/14 report the number of banks has reached 19 as at the end of March 2014, out of which 16 banks are privately owned. During this period, 93 new bank branches were opened raising the total number of bank branches to 2,108. Consequently, the ratio of total bank branch to total population improved to 41,088 from 42,985 in January 2014 reflecting improvement in financial outreach service.

1.2 Statement of the problem

Banks liquidity is directly affected by asset liability management decisions, managers should always analyze the impact that any asset liability management decision will have on the liquidity position of the bank. Liquidity risk depends on asset liability management variables such as asset liability management policy, contingency funding plans, maturity gap analysis, and stress testing and asset liability committee activities. Liquidity is affected by asset liability management decisions in some ways: Any alterations in the maturity structure of the assets and liabilities can change the cash requirements and flows; Savings or borrowing promotions or change the asset liability management mix could have a detrimental effect on liquidity if not monitored closely while changes in interest rates could impact liquidity. If savings rates go down, customers might withdraw their capital and cause a liquidity shortfall. Higher interest rates on loans make it difficult for some clients to meet interest payments, causing a liquidity shortage (Oldfield and Santamero, 1997).

One of the major problems with banks liquidity is that when banks get it wrong, there can be drastic consequences for the economy. A key issue to ensure advancement has to be how to make sure banks successfully balance their liquidity risk in order to be stable and still supply the economy with adequate liquidity. Public policy makers will aim to continue strong national economic growth while keeping low unemployment and inflation. Banks themselves have a

motive to ensure stability and also boast earnings. The unmitigated size and complexity of the modern economy increases the importance of this topic and this is all the more reason it needs to be carefully considered (Vossen, 2010).

Preceding studies have demonstrated the need for further research in liquidity risk. Gareth (2008) suggested further research on liquidity risk management by concluding that asset liability committee is also responsible for a banks liquidity risk management. Vossen (2010) concluded that Banks must change how to balance their liquidity risk and their role as liquidity providers, restructuring liquidity management. He further suggested future research noting that as banks and regulators change policies, there will be a need to evaluate such policies before crisis strikes in an attempt to prevent or limit the intensity of crises. Empirical analyses of the regulators actions and their effects are future research possibilities Vossen (2010).

However, in Ethiopia to the best of the researcher's knowledge, none of the studies addresses in examining the effect of Asset Liability Management on the liquidity risk on commercial banks in Ethiopia in the past decades. In addition, majority of published and unpublished studies done in the banking sector of Ethiopia has been focused on credit risk determinants, credit risk managements and bank performance determinants, to mention just a few among the studies by different postgraduate students and researchers (Terfera, 2011; Girma Mekasha, 2011; Shibru, 2014 and Tilahun et al., 2014).

To this end, the underlying motivation of the researcher is to fill this gap on literature and to make an effort to bring empirical evidence on the association between asset liability management practices on liquidity risk among private commercial banks in Ethiopia. Thus, this study will contribute to the limited literature on asset liability management practice of banks in emerging economies like Ethiopia, the researcher tried to raise research question in order to examine asset liability management practice on liquidity risk in selected seven private commercial banks in Ethiopia from 2005- 2014 fiscal year.

1.3 Research questions

1. Is there a uniform (standardized) liquidity risk management practice for private commercial banks in Ethiopia?

2. Is there any significant positive effect between -return on equity (ROE), the capital adequacy ratio (CAR), the Loan to deposit ratio (LTD), the Return on assets (ROA), the size of the bank on liquidity risk of private commercial banks in Ethiopia?

1.4 Objectives of the Study

The general objective of the study is to examine the effect of Asset Liability Management on the liquidity risk of selected seven private commercial banks in Ethiopia from 2005-2014.

1.4.1 Specific objectives

➢ To identify significant risk factors that affects the liquidity risk of private Commercial banks in Ethiopia.

➢ To investigate asset liability management of private commercial banks on liquidity risks practice.

➢ To examine empirical relationship between the effect of ROE on the liquidity risk, to examine empirical relationship between the effect of Return on assets (ROA), to examine empirical relationship between the effect of capital adequacy ratio (CAR), to examine empirical relationship between the effect of Loan to deposit ratio (LTD), to examine empirical relationship between the effect of bank size on Liquidity Risk in private commercial banks in Ethiopia.

1.5 Significance of the study

This study helps to add:

➢ Useful information to policy makers and regulators to design targeted policies and programs that will actively stimulate the growth and sustainability of the commercial banks in the country. Regulatory bodies such as the Central Bank of Ethiopia can use the study findings to improve on the framework for Asset liability management.

➢ Benefit management and staff of banks who will gain insight into the importance of Asset liability management practice adherence and its effect on liquidity risk mitigation in the operation of banks.

> ➢ Benefit to the academicians, who may find useful research gaps that will stimulate interest in further research in future.
> ➢ Value to any investors interested in setting up commercial banks or upgrading financial institutes in the country

1.6 Scope of the study

> ➢ The scope of the study was limited to examine effect of asset liability management on liquidity risk of private commercial banks in Ethiopia for the period 2005-2014.The study comprised all private commercial banks those started their operation before 2005.As a result, out of sixteen private commercial banks, seven (7) private commercial banks; (Awash International Bank, Dashen Bank, Bank of Abyssinia (BOA), Wegagen Bank (WB), United Bank(UB), Nib International Bank (NIB) and Cooperative Bank of Oromia (CBO) were selected under this study and state owned banks are being omitted because Government's policy stance of enacting forced saving through housing scheme excluding private banks, NBE directive to allocate 27 percent of their loan disbursements to purchase fixed and low-interest bearing NBE bills, public banks sufficiently liquid and that is why it is omitted.

1.7 Limitations of the study

The study may have certain limitations on targeting population study and in addressing study variables. The first limitation is it may not reflect the overall picture of the effect of Asset Liability Management on the liquidity risk of all commercial banks in Ethiopia; due to the omission of some banks from the study.

The limitation of the study, to the first, the horizon of the study is limited within the private commercial banks in Ethiopia and hence state owned banks are being omitted. Therefore, the study does not reflect the overall picture of asset liability management on commercial banking sector in Ethiopia.

Secondly, this study is based on various data collected from National bank of Ethiopia, selected private commercial banks and other documents. So, the value of the research paper entirely

depends on the reliability and accuracy of the secondary data. The study is confined only to one dependent variable liquidity risk (LIQR) and three independent variables (return on equity (ROE), the Loan to deposit ratio (LTD), the Return on assets (ROA), and two control variables that held constant in order to answer or clarify relationship between other variables the capital adequacy ratio (CAR), the size of the bank (SB).

1.8 Reliability and validity of the study

Secondary data have been collected from the audited financial statement by the private commercial banks and NBE. In addition, return on equity (ROE), the capital adequacy ratio (CAR), the Loan to deposit ratio (LTD), the Return on assets (ROA), the size of the bank were taken from audited financial statements (balance sheet and income statement) of seven private commercial banks and National bank of Ethiopia (NBE) from 2005-2014 directly in order to avoid the calculation mistakes. To ensure the accuracy of the results, researcher checked the data collection and calculation processes. Next, study used the statistical analysis tool STATA version 12 and MS excel office application to obtain results and conduct analysis of the regression model. The reliability of the STATA results has been proved by many researchers in their studies.

1.9 Organization of the study

This research is organized in to five parts. The first chapter includes background of the study, statement of the problem, objective of the study, research question, and significance of the study, scope and limitation of the study, reliability. Chapter two presents review of theoretical and empirical literatures. The third chapter presents methodological embodied in the study about research design, sample selection methods, method of data collection, data analysis, model specification and variables description and measurement. The fourth chapter discusses data analysis and findings. The conclusion and recommendations of the findings presented in the last chapter.

CHAPTER TWO

2. REVIEW OF RELATED LITRETURE

2.1 INTRODUCTION

The pervious chapter comprises background of the study, statement of the problem, research question, and objective of the study, significance of the study, reliability, scope and limitation of the study: whereas this chapter deals with key ideas and concepts pertinent to the theme of the thesis are discussed. Additionally, relevant empirical research and their findings are reviewed in order to inform the current analysis.

2.2 Theoretical Literature Review

2.2.1 Definition of Asset Liability Management

Asset liability management is defined by different scholars like Gup and Brooks (1993), Zawalinska (1999), and Charumati (2008). Charumati (2008) defined asset liability management as a dynamic process of planning, organizing, coordinating, and controlling the assets and liabilities; their mixes, volume, maturities, yield, and costs in order to achieve a specified net interest income. In other words, it deals with the optimal investment of assets in view of meeting current goals and future liabilities. It is related to the management of the risks associated with liquidity mismatch, interest rates and foreign exchange movements. Therefore, asset liability management is concerned with an attempt to match assets and liabilities in terms of maturity and interest rate sensitivity to minimize interest rate and liquidity risks (Zawalinska, 1999).

According to K. Kennan, Oct-Dec 1996 Asset Liability Management is the management of the total balance sheet dynamics and it involves quantification of risks and conscious decision-making with regard to asset-liability structure in order to maximize the interest earnings within the framework of perceived risks. The primary objective of Asset Liability Management is not to eliminate risk, but to manage it in such a way that the volatility of net interest income is minimized in the short run and economic value of the organization is protected in the long run.

The asset liability management function involves controlling the volatility of net income, net interest margin, capital adequacy, liquidity risk and ensuring an acceptable balance between profitability, growth and risk. Banks are a vital part of the economy and the essence of banking is asset liability management (Choudhry, 2011).

2.2.2 Asset Liability Committee Composition and Roles

The National Bank of Ethiopia **Directives No.SBB/57/2014**prudential guideline on liquidity risk management stipulates that, in order to effectively monitor its liquidity risk, a commercial bank shall establish an Asset & Liability Management Committee to manage its assets, liabilities and off-balance sheet items so as to fully meet the bank's contractual commitments with the following key roles.

Asset & Liability Management Committee's terms of reference shall at least include:
The first is recommending desired maturity profile and mix of incremental assets and liabilities. Second recommending source and mix of liabilities between fixed versus floating rate funds, wholesale versus retail deposits, etc., or sale of assets, on basis of composition, characteristics and diversification of the bank's assets and funding sources. Third regularly reviewing the funding strategy in the light of any changes in the internal or external environments; fourth recommending the structure, responsibilities, and controls for managing liquidity risk and for overseeing the liquidity positions of all legal entities, branches, etc in which a bank is active, and outlining these elements clearly in the bank's liquidity policy; fifth ensuring operational independence of liquidity risk management function, with adequate support of skilled and experienced officers; six ensuring adequacy of cash flow projections and the assumptions used; seven reviewing the stress test scenarios including the assumptions as well as the results of the stress tests and ensuring that a well documented contingency funding plan is in place which is reviewed periodically; eight recommending the transfer pricing policy of the bank and making liquidity costs and benefits as an integral part of bank's strategic planning; and nine regularly reporting to the board of directors and risk management committee on the liquidity risk profile of the bank (NBE,2013).

2.2.3 Objective of Asset Liability Management

According to (K. Kannan, 1996) Asset liability management has several important objectives the first is analysis of current source of funds and prudent management of these funds, second matching the assets financed by different types of duration of funds and it's monitoring, third formulating Gap management strategies for interest mismatch for different categories of assets and liabilities, last is assessment of risk factors associated with assets including its cost and returns**.**

According to Jayantllal Jain and Balachandran, (Aug. 1997) through proper Asset Liability Management, liquidity, profitability and solvency of banks can be ensured and at the same time banks can manage and reduce risks such as credit risk, liquidity risk, interest rate risk, currency risk etc. The liabilities of a bank have different Categories of varying cost, depending upon the tenor and maturity pattern. Similarly the assets comprise different categories with varying yield rates depending upon the maturity and risk factors. Thus the main focus of Asset Liability Management is the matching of the liabilities and assets in terms of maturity, cost and yield rates. The maturity mismatches and disproportionate changes in the levels of assets and liabilities cause both Liquidity Risk and Interest Rate Risk. The broad areas of Asset Liability Management include: Liquidity Risk Management, Interest Rate Risk Management, Management of Credit and investment portfolio, Management of borrowing and lending in the money and foreign market and Management of capital under the Capital Adequacy Norms.

According to Oracle White Paper (2011), the core functions of Asset liability management consists of managing maturity gaps and mismatches while managing interest rate risk within the overall mandate prescribed by asset liability management committee.

2.2.4 Factors affecting commercial banks liquidity: theory

Capital adequacy and bank liquidity

Bank capital can be seen in two ways. Narrowly, it can be seen as the amount contributed by the owners of a bank (paid-up share capital) that gives them the right to enjoy all the future earnings of the bank. More comprehensively, it can be seen as the amount of owners' funds available to support a bank's business (Athanasoglou et al., 2005). The latter definition includes reserves, and is also termed shareholders' funds (Anyanwaokoro, 1996). Adewumi (1997) gives two connotations of capital in banking. He opines that at the outset, capital in the form of issues and paid-up share is money with which the business of banking is started. Overtime, the capital funds of the bank reflect the accumulated (addition or depletion) capital. The question of adequate capital of a bank is more crucial especially in the light of the global financial meltdown where bail out measures is now being employed by the regulatory authorities to keep the financial system afloat.

It is a banking system which must be efficient, depositors can trust and investors can rely upon. Capital adequacy is important for banks to absorb risks till banks are able to generate profit. However, banks that are able to exceed the capital requirement stand a better chance of luring customers and instilling confidence in the system. Like other sectors, this sub-sector is also faced with poor infrastructural facilities and poor performance of regulatory authorities. According to Ajekigbe (2009), from the classical and historical perspective, several factors led to the failure of banks between 1977 and earlier 2000. Some of the reasons advanced are poor asset quality, under capitalization, inexperienced personnel, illiquidity, inconsistent regulatory policies and supervision.

The issue of bank capitalization in most economies today has been how to resolve the problem of unsound bank, enhance efficient management of the banking system, provide better funding for banks lending activities, reduce non-performing loans and advances, increase profitability, reduce risk, to ensure quality asset management and to put banks in a strong liquid position to meet customers obligation at all times (Soludo, 2004).

According to Nikhat Fatima, (2014) Capital adequacy ratio is the ratio which protects banks against excess leverage, insolvency and keeps them out of difficulty. It is defined as the ratio of banks capital in relation to its current liabilities and risk weighted assets. Risk weighted assets is a measure of amount of banks assets, adjusted for risks. An appropriate level of capital adequacy ensures that the bank has sufficient capital to expand its business, while at the same time its net

worth is enough to absorb any financial downturns without becoming insolvent. It is the ratio which determines banks capacity to meet the time liabilities and other risks such as credit risk, market risk, operational risk etc.

Since the eighties, the rules on bank capital have become one of the most prominent aspects of banking regulation. The rationale for regulatory bank capital ratio is to preserve bank solvency and so to protect the interests of creditors (especially small depositors) which are deprived of the expertise, incentives and ability to efficiently discipline bank managers (Dewatripont and Tirole J. 1994).

The National Bank of Ethiopia has set specific measure of the capital adequacy position of Banks, which is the ratio the Capital, a high market share and, as a consequence, the market becomes more concentrated, (Smirlock, 1985).

Financial Structure/Deepening – Maturity of the Banking Sector Demirguc Kunt and Huizinga (1999) present evidences that financial development and structure variables are very important. Their results show that banks in countries with more competitive banking sectors, where bank assets constitute a large portion of GDP, generally have smaller margins and are less profitable. Also, they notice that countries with underdeveloped financial systems tend to be less efficient and adopt less-than-competitive pricing behaviors.

Diamond and Rajan (2000, 2001) and Gorton and Winton (2000) showed that banks can create more or less liquidity by simply changing their funding mix on the liability side. Thakor (1996) shows that capital may also affect banks asset portfolio composition thereby affecting liquidity creation through a change in the asset mix

On the other side, higher capital tends to mitigate the financial fragility and enhances the bargaining power of the bank that leads to affect the credibility of its commitment to depositors. Thus, higher capital tends to decrease liquidity creation. Besides, Gorton and Winton (2000) show that a higher capital ratio may reduce liquidity creation through another effect: the crowding out of deposits. They consider that deposits are more effective liquidity hedges for agents than investments in bank equity. Indeed, deposits are totally or partially insured and

withdraw able at par value. By contrast, bank capital is not eligible and with a stochastic value that depends on the state of bank fundamentals and on the liquidity of the stock exchange. Consequently, higher capital ratios shift investors' funds from relatively liquid deposits to relatively illiquid bank capital. Thus the higher is the bank's capital ratio; the lower is its liquidity creation.

Bank size and liquidity risk

According to Roman Horváth, JakubSeidler and Laurent Weill (2012) did a survey on Czech banks and the results suggest that a strong expansion in liquidity creation until the financial crisis was mainly driven by large banks. They find that capital negatively Granger-causes liquidity creation for small banks, while there is likely to be no such causality for large banks. They also observe that liquidity creation Granger-causes a reduction in capital. These findings support the view that Basel III can reduce liquidity creation in small banks, but also that greater liquidity creation can reduce banks' solvency. Thus, these show that this reverse causality generates a trade-off between the benefits of financial stability induced by stronger capital requirements and the benefits of increased liquidity creation.

Liquidity creation increases the bank's exposure to risk because banks that create more liquidity face greater losses when they are forced to sell illiquid assets to satisfy the liquidity demands of customers (example, Allen and Santomero 1998; Allen and Gale 2004). By contrast, more capital allows the bank to absorb greater risk (example, Bhattacharya and Thakor 1993; Repullo 2004).

But, the financial fragility hypothesis predicts that increased capital hampers liquidity creation (Diamond and Rajan 2001). Berger and Bouwman (2010) analyze the impact of monetary policy on the aggregate liquidity creation by banks in the US. Analyzing the period from 1984 to 2008, they examine whether the impact differs between normal periods and financial crises, and whether the impact also differs according to bank size. They show that tightening monetary policy only reduces liquidity creation for small banks. This effect is weaker during financial crises. They also note that liquidity creation is somewhat higher prior to financial crises that suggests measures of aggregate liquidity creation have explanatory power in predicting crises.

Berger et al. (2012) investigate how regulatory interventions and capital injections influence risk and liquidity creation using a sample of German universal banks. They find that these

interventions reduce both risk and liquidity creation. Rauch et al. (2011) analyze potential determinants of liquidity creation for a sample of German savings banks. They compare the influence of macroeconomic factors, including monetary policy and unemployment, with the bank-specific factors such as size or financial performance. They find some support for the impact of monetary policy; the tightening of monetary policy reduces liquidity creation. However, bank-specific factors do not seem to have any influence on liquidity creation. Additionally, Pana et al. (2010) examine the impact of bank mergers on liquidity creation for US banks. They report that mergers have a positive influence on banks' liquidity creation.

According to Ongena and Smith (2001), Bae, Kang, and Lim (2002), and Bharath, et al. (2007), small banks engage in more relationship lending, which involves bank monitoring, than large banks. Small banks with higher capital ratios may withhold efforts for monitoring borrowers. As a result, they invest more in liquid assets, rather than lending more illiquid loans, and thus take less exposure to liquidity risk.

Some empirical results indicate that large banks tend to hold more illiquid loans or maintain less liquid funds, and thus have higher liquidity risk (example, Loutskina, 2011; Roulet, 2011; Shen, Chen, Kao, and Yeh, 2009). Large banks benefit from economies of scale in screening and monitoring loans. In addition, because of their too-big-to-fail position and easier access to the lender of last resort, large banks might build up more liquidity risk, hence less funding liquid.

Loan to deposit ratio and liquidity

The loan-to-deposit ratio regulation is basically an instrument for managing banks' liquidity, by limiting the sizes of their loans to within a certain ratio to their deposits. During a period of economic expansion, however, this regulation is used to curb any expansion in lending (CGFS 2012).

Deposit-taking and lending by banks are closely related. Both activities reflect the liquidity transformation function of banks and share a similar overhead (Kashyap et al, 2002). Hence it is useful to analyze loans and deposits in tandem, as is done through the Loan-to-Deposit ratio. It is a core indicator for liquidity mismatch risk. The Loan-to-Deposit ratio measures the coverage of loans with stable funding, usually deposits from households and non-financial companies. When loans exceed the deposit base, banks face a funding gap for which they have to access financial

markets. So a high funding gap implies a high dependence on market funding, which can be more volatile and/or expensive than retail funding, in particular if it concerns unsecured market funding (Kashyap et al, 2002).

The Loan-to-Deposit ratio can be used by the macro prudential authority to address both structural (long-term) and cyclical (short-term) liquidity risks. The structural dimension refers to the mismatch between loans and customer deposits following from the business models of banks. Their funding mix reflects structural developments of retail and wholesale funding markets. These show up in the trend of the Loan-to-Deposit ratio. The macro prudential authority could target a long-term trend level of the ratio at which the banking sector functions well and does not face excessive funding risks or impaired intermediation (both presenting a bad equilibrium). The crisis showed that this can pay off: economies where banks had relatively low Loan-to-Deposit ratios weathered the crisis relatively well Cecchetti (et al., 2011).

The Loan-to-Deposit ratio will fluctuate around its trend as a reflection of short term financial cycles. The ratio tends to rise in good times, when market funding is abundantly available to finance credit growth. The ratio usually levels off in stressed market conditions, when wholesale funding is substituted for retail savings and credit growth diminishes. In a sense the Loan-to-Deposit ratio resembles the leverage ratio (assets to equity), which also has strong pro-cyclical features (Adrian and Shin, 2008). A specific feature of liquidity cycles is that they are usually driven by the mutually interacting forces of market and funding liquidity (Brunnermeier and Pedersen, 2009).

2.3 Liquidity Risk

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

2.3.1 Theories of Liquidity Management
There are a number of liquidity management theories, as follows:

1). Anticipated Income Theory

According to this theory bankers again began to look at their loan portfolio as a source of liquidity. The anticipated income theory encouraged bankers to treat long-term loans as potential sources of liquidity. How can a banker consider a mortgage loan as a source of liquidity when, typically, it has such a long maturity? Using the anticipated income theory, these loans are typically paid off by the borrower in a series of installments. Viewed in this way, the bank's loan portfolio provides the bank with continuous flow of funds that adds to the bank's liquidity. Moreover, even though the loans are long term, in a liquidity crisis the bank can sell the loans to obtain needed cash in secondary markets. (The future of money)

2). Shiftability Theory

This theory further contends that highly marketable security held by a bank is an excellent source of liquidity. Dodds (1982) contends that to ensure convertibility without delay and appreciable loss, such assets must meet three requisites. Liability Management Theory Liquidity management theory according to Dodds (1982) consists of the activities involved in obtaining funds from depositors and other creditors (from the market especially) and determining the appropriate mix of funds for a particularly bank. This point of view contends that liability management must seek to answer the following questions on how do we obtain funds from depositors? How do we obtain funds from other creditors? What is the appropriate mix of the funds for any bank? Management examines the activities involved in supplementing the liquidity needs of the bank through the use of borrowed funds Dodds (1982).

The liquidity management theory focuses on the liability side of bank balance sheet. This theory contends that supplementary liquidity could be derived from the liabilities of a bank. According to Nwankwo (1991) the theory argues that since banks can buy all the funds they need, there is no need to store liquidity on the asset side (liquidity asset) of the balance sheet. Liquidity theory has been subjected to critical review by various authors. The general consensus is that during the period of distress, a bank may find it difficult to obtain the desired liquidity since the confidence of the market may have seriously affected and credit worthiness would invariably be lacking.

However, for a healthy bank, the liabilities (deposits, market funds and other creditors) constitute an important source of liquidity.

3). Liability Management Theory

This theory states that there is no need to follow old liquidity norms like maintaining liquid assets, liquid investments etc., banks have focused on liabilities side of the balance sheet (scribd.com). According to this theory, banks can satisfy liquidity needs by borrowing in the money and capital markets. The fundamental contribution of this theory was to consider both sides of a bank's balance sheet as sources of liquidity (Emmanuel, 1997).

Today, banks use both assets and liabilities to meet liquidity needs. Available sources of liquidity are identified and compared to expected needs by a bank's Asset and liability management committee. Key considerations include maintaining high asset quality and a strong capital base that both reduces liquidity needs and improves a bank's access to funds at low cost. There is a short-run trade-off between liquidity and profitability. In the long-run, if management is successful in managing liquidity, then, long-term earnings will exceed other banks earnings, as will the capital and overall liquidity (Koch and McDonald, 2003).

4). Commercial Loan Theory

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

The hypothesis of the loanable funds theory is that Individuals care only about real variables (output gains or losses, purchasing-power gains or losses). The marginal productivity of capital assets is given and determined by the technical characteristics of the productive assets. The time preference of individuals is given by the taste of individuals. Entrepreneurs want to maximize their real profit Individuals want to maximize their utility by arbitraging between present consumption and future consumption (and so saving).

In the loanable funds market, the supply of loanable funds comes from the individuals who want to save. They are the lenders. The demand for loanable funds comes from the entrepreneurs who want to buy capital assets (i.e. to invest). They are the borrowers. Negotiations in the loanable market are made in terms of real rate of interest: savers can lend at r, and entrepreneurs have to borrow at r. Thus for the entrepreneurs where marginal gain is greater than r they invest more and vice versa. For individuals where marginal gain is greater cost they save and vice versa. An increase in investment will increase interest rates automatically (Emmanuel, 1997).

Bank for International Settlements/BIS (2008) defines liquidity as the ability of bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. Hence, liquidity risk arises from the fundamental role of banks in the maturity transformation of short-term deposits into long-term loans. Therefore, banks have to hold optimal level of liquidity that can maximize their profit and enable them to meet their obligation.

The fundamental role of banks in the maturity transformation of short-term deposits into long-term loans makes banks inherently vulnerable to liquidity risk both of an institution – specific nature and that which affects markets as a whole. Liquidity risk arises from maturity mismatches where liabilities have a shorter tenor than assets. A sudden rise in the borrower's demands above the expected level can lead to shortages of cash or liquid marketable assets (Oldfield and Santamero, 1997).

According to Wellink (2008), The extreme liquidity conditions and resulting difficulties that persist today are vigorous illustrations of the critical importance of market liquidity to the banking sector, these events emphasized the links between market and funding liquidity, the

interrelationship between funding liquidity risk and credit risk, and the fact that liquidity is a key determinant of banking sector soundness.

The main role of banks in the financial market is to create liquidity and transform risk (Berger, & Bowman, 2009). Banks use short-term debt to invest in long-term assets (Diamond and Dybvig, 1983). This function creates liquidity risk and therefore a bank unable to roll over maturing debt can fail despite of being solvent. Majority of recent bank liquidity crises in developed economies were caused by increased uncertainty over a bank's solvency and played out primarily in wholesale funding markets (Huang &Ratnovski. 2011).

The new Basel III accord aims to address liquidity risk in banks through the Liquidity coverage ratio (a liquidity requirement) and the Net stable funding ratio (a restriction on maturity mismatch that limits the volume of refinancing coming due each period Basel Committee 2010). Basel III has introduced new banks requirement both on the capital and on the liquidity risk. These changes will have big impact on banks, because they are required to hold a level of capital and liquidity higher than in the past, this will inevitably have also an impact on the liquidity creation function performed by banks (Horvàt, et al, 2012).

In 2008 under Directive No.SBB/44/2008 (3rd Replacement), the liquidity requirement to maintain liquid assets was 25% and in 2012 under Directive No SBB/55/2012 (4thReplacement), the requirement was 20% of net current liabilities. According to National Bank of Ethiopia "Liquidity Requirement (5th Replacement) Directives No.SBB/57/2014" any licensed commercial bank shall maintain liquid assets of not less than fifteen percent (**15%)** of its net current liabilities.

According to National Bank of Ethiopia's (NBE) liquidity risk management guideline (p.16-17, May 2010), measurement of liquidity is expressed as follows. At a very basic level, liquidity measurement involves assessing all of a bank's cash inflows against its outflows to identify the potential for any net shortfalls going forward. This includes funding requirements for off-balance sheet commitments. A number of techniques can be used for measuring liquidity risk, ranging from simple calculations and static simulations based on current holdings to highly sophisticated

modeling techniques. As all banks are affected by changes in the economic climate and market conditions, the monitoring of economic and market trends is key to liquidity risk management.

An important aspect of managing liquidity is making assumptions about future funding needs. While certain cash inflows and outflows can be easily calculated or predicted, banks must also make assumptions about future liquidity needs, both in the very short-term and for longer time periods. Cash inflows arise from maturing assets, saleable non-maturing assets, access to deposit liabilities, established credit lines that can be tapped etc. These cash inflows must be matched against cash outflows stemming from decrease in liabilities due and settlement of contingent liabilities. Banks should also have some level of preparedness to meet cash outflows that arise from unexpected events (NBE, 2010).

2.3.2 Bank Liquidity Creation Theory

Determining what is adequate liquidity for banking organizations has always been a rather subjective and difficult task, because banks rarely have liquidity problems as long as they are viewed as sound and deposit inflows are positive. Failure to properly manage liquidity can quickly result in significant unanticipated losses. The purpose of liquidity management is to ensure that every bank is able to meet fully its contractual commitments. The ability to fund increases in assets and meet obligations as they come due is critical to the ongoing viability of any bank. Therefore, managing liquidity is among the most important activities conducted by banks (NBE RM, 2010).

Sound liquidity management can reduce the probability of serious problems. Indeed, the importance of liquidity transcends the individual bank, since a liquidity shortfall at a single bank can have system-wide repercussions. For this reason, the analysis of liquidity requires the management of the bank not only to measure the liquidity position of the bank on an ongoing basis, but also to examine how funding requirements are likely to evolve under various scenarios, including adverse conditions. Banks should review frequently the assumptions utilized in managing liquidity to determine that they continue to be valid. Since a bank's future liquidity position will be affected by factors that cannot always be forecasted with precision, assumptions need to be reviewed frequently to determine their continuing validity. These assumptions should

be made under the different categories of assets, liabilities and off-balance sheet activities (NBE RM, 2010).

Banks are financial institutions that accept deposits from depositors and provide loans to deficit parties .as Goose *et.al* in 1999) put it banks provide channel for banking those who have excess funds with those who are in need of funds. In so doing banks earn income when they lend money out at higher interest rate than they pay depositors for use of their money. Bank's main source of income is interest income. A bank pays out at a lower interest rate on deposit and receives a higher interest rate on loans. Commercial banks are regulated by government entities such as by central bank of the country (Goose, 1999).

Banks play a key role in improving economic efficiency by channeling funds from resource surplus unit to those with better productive investment opportunities. Banks also play key role in trade and payment system by significantly reducing transaction costs and increasing convenience (NCA, 2006). In less monetized countries, like Ethiopia, whilst financial sector is dominated by banking industry, effective and efficient functioning of the latter has significant role in accelerating economic growth (NCA, 2006).

Commercial banks are among the financial intermediaries that raise funds, as traditionally perceived, primarily by issuing checkable/demand deposits 1, saving deposits 2, and time/fixed deposits 3 (Mishikin, 2004). Because the financial system in our country is at its infancy stage, commercial banks are also authorized to provide all the banking service in the financial market. Since there is no organized financial market, almost all of the transactions and activities of money and capital market are carried out by the commercial banks. As Mishikin (2004) shows, a commercial bank's liability which is mainly financed by current, saving, and fixed deposits and equity (which is contributed by shareholders) represent its sources of funds; while asset which is composed of mainly investments, loans and advances represent its use of funds. Given the legal requirements of commercial banks, each commercial bank determines its own composition of liabilities and assets, which determines its specific operating objective; maximizing shareholders equity (Mishikin, 2004).

To enhance the role of banks in an economy, asset liability management practice is an important driving force; without asset liability management, it is improbable to bring about efficiency and foster financial sector development. In other words, insufficient asset liability management practice may result in substantial social losses on account of higher price, higher transaction cost, lower credit supply, lack of innovation and poor service quality (Northcott, 2004).

Although asset liability management practice has a positive effect on efficiency and economic growth, there are certain characteristics that may indicate restrictions on banking. In the absence of proper information processing (where the problem is eminent in less developed economies), banking industry is more vulnerable to instability relative to other industries, owing to the existence of short term liability versus long term assets and the presence of highly leveraged firms and banks that have an incentive to engage in risky behavior (Northcott, 2004).

Bank supervisors regularly review the liquidity positions and liquidity risk management practices of banks and provide banks with liquidity guidelines. The recent turmoil revealed certain weaknesses in these practices that are now being addressed by supervisors globally. Central banks as the ultimate source of liquidity are taking an enhanced interest in liquidity risk. The recent events have highlighted the central bank as key stakeholder in this area. Both the financial stability forum(FSF2008) report and the September 2008 Basel committee report on liquidity risk recommend that central banks take more active role in the area of liquidity risk including reviewing the liquidity contingency plans of banks (Basel,2008).

It has been said that liquidity is easier to recognize than define (Crockett 2008) and that it can be an elusive concept. In its barest essentials, however, liquidity is about having access to cash when you need it. A specific definition of liquidity pertaining to banks is that it represents the capacity of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses (Basel Committee, 2008a).

The fundamental role of banks typically involves the transformation of liquid deposit liabilities into illiquid assets such as loans; this makes banks inherently vulnerable to liquidity risk. Liquidity risk management seeks to ensure a bank's ability to continue to perform this fundamental role. While some outflows are known with certainty, risk arises from the need to meet uncertain cash flow obligation, which depend on external events and on the behavior of

other agents. The liquidity situation of an individual bank is ultimately a function of confidence: the confidence of counterparties and depositors in the institution and its perceived solvency or capital adequacy. A liquidity shortfall at a single institution can spread to others that are perceived to be exposed to it or to similar problems (Basel Committee, 2008a).

The distinction is frequently made between funding liquidity risk and market liquidity risk (IIF 2007). Funding liquidity risk is the risk that the firm will not able to efficiently meet both expected and unexpected current and future cash flows and collateral needs without impairing the daily operations or the financial condition of the firm. Market liquidity risk is the risk that a firm cannot easily offset or eliminate a position without significantly affecting the market depth or market disruption (IIF 2007).

According to Charles Goodhart liquidity and solvency are the heavenly twins of banking, frequently indistinguishable. An illiquid bank can rapidly become insolvent, and an insolvent bank illiquid (Goodhart 2008). Even though strong capital positions reduce the likelihood of liquidity pressure, apparently solvent banks can experience liquidity problems. Although problems with funding liquidity at bank can arise at any time, they will be most severe in an environment of heightened market liquidity risk, as witnessed during the latest turmoil. The close link between these two risks has been noted, including the fact that the same events may trigger both (Matz and Neu 2007).

Liquidity risk is sometimes thought of as a consequential risk or second order risk because it normally would not come about without a sharp rise in one or more of the other major financial risks (matz and neu 2007). Unlike the other major financial risks, liquidity risk can arise on both sides of the balance sheet. The trigger event might be, for example, a firm specific operational risk problem or damage to the bank's reputation (endogenous), or a market wide liquidity problem (exogenous). Trigger events tend to undermine confidence in an institution very quickly. This, In turn, leads to rapid erosion in its liquidity position, for example, from a rapid loss of wholesale deposits. Liquidity risk can, in turn, interact with market risk and credit risk in complex and unanticipated ways (matz and neu 2007).

2.4 Empirical Literature Review

2.4.1 Related empirical review

The pervious section was presented the theories of asset liability management and liquidity risk and other related topics. This topic reviews the empirical studies on asset liability management practice and liquidity risk of commercial banks and related issues.

(Tamiru Belete, 2013) did a survey on the effect of asset liability management on commercial banks profitability in Ethiopia, the asset items loans and advances variable have significant contribution to the creation of commercial banks profit at 0.01 level of significance. This is consistent with theory and empirical evidence. Other things being constant, Naceur*et al.* (2003) explained that more deposits are transformed into loans for earning interest incomes from borrowers. The higher the interest rate margins, the higher the profits and banks are able to shield themselves against hazards of credit risk resulting from adverse selection and moral hazard. Kosmidous*et al.* (2004) found loans and advances were the asset items which create profitability difference between domestic and foreign banks. All other items of assets have no significant effect on commercial banks profitability. Except for fixed assets variable, they have positive effect on profitability. This result is found because the spread commercial banks realize from the difference between rate of return from loans and advances and rate of cost of deposits is significant. As a result, loans and advance can be the major source of profitability for commercial banks in Ethiopia. The only asset item variable which has negative coefficient, though insignificant, is the fixed asset which implies that fixed assets have negative relation with commercial banks profitability. Although this finding is in line with Asiri (2007), it contradicts the finding of Kosmidou *et al.* (2004) where they found a positive relation between fixed assets and profitability. (Tamiru Belete, 2013) concludes that some empirical evidence indicates that the profitability of commercial banks in Ethiopia is positively affected by assets management, except for fixed assets; which is negatively affected by liability management.

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

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

According to Rauch et al. (2010) study the determinants of liquidity risk and attempt to identify the determinants of liquidity creation. Their results highlight that the most important determinants are macroeconomic variables and monetary policy, while not showing a significant relationship between liquidity creation and bank specific variables such as size and performance.

According to Vossen, (2010), in a study on Bank liquidity management noted that banks face two central issues concerning liquidity. Banks are responsible for managing liquidity creation and liquidity risk. He concluded that banks must change how to balance their liquidity risk and their role as liquidity providers by restructuring their liquidity management strategies. Liquidity risk exposes banks to financial challenges. Banks attempt to control liquidity risk factors by balancing cash inflows and outflows and some even hold liquidity cushions for strategic purposes. Being exposed to too much liquidity risk expose banks to challenges such as; run away investors, runs by depositors, ratings downgrades, and tougher financing. These consequences are what banks wish to avoid and why they implement policies to protect themselves from liquidity risk.

In addition, Vodova (2011) showed that bank specific and macroeconomic variables determine significantly the bank liquidity. After the global financial crisis, banks have begun to examine the problems of liquidity and its importance to the overall performance of the banking sector and financial markets. Moreover, Rauch et al. (2010) studied the determinants of bank liquidity. They found that the Size of bank, profitability, and the interest rate of monetary policy are

negatively associated with bank liquidity, while the value of delayed liquidity is positively associated with bank liquidity.

On the other hand, Saxegard (2006) studied the pattern of excess liquidity in the African countries of sub sahrienne using SVAR (structure of VaR), this result shows that excess liquidity alter transmission monetary policy so that the monetary authority could not control the demand for the currency. Gauley (2004) showed that the absorption of liquidity by monetary and authority encouraged to use the tools of monetary instruments such as the title of the central bank that have a major interest.

On the other hand, they showed that the decrease in the flow of money in proportion to deposits of the banking sector lead to decrease of the ratio (loans / deposits). Kamau et al. (2013) showed that 42.2% of the variation in the liquidity of 27 commercial banks in Kenya is explained by the change of several factors (profitability, obligation, policy management, credit rating, monetary policy), 57.8% is explained by others factors. Choon et al. (2013) studied the determinants of liquidity of 15 commercial banks in Malaysia in period (2003-2012). They used specific factors (size of bank, capital adequacy, profitability, credit), macroeconomic factors (GDP, interbank rate, financial crisis). They used panel data (fixed effect model with annual data). The empirical results show that all factors included are significant except interbank rate.

Factors that positively influence bank liquidity are (non-performing loans, profitability, GDP). Others factors negatively affecting the liquidity (bank size, capital adequacy, financial crisis). Hovarth et al. (2012) studied a sample of Czech banks between 2000 and 2010. They observed a negative relationship between the creation of liquidity and bank capital. This shows that Basel III reduces liquidity creation, but the creation of high liquidity can reduce bank solvency. Indeed, Berger and Bouwman (2009) showed 2 assumptions related to the motivation of the bank's capital to create liquidity. The idea of creating liquidity of the bank predicts that the capital increase improves the ability of the bank to create liquidity. But the hypothesis of financial fragility predicted that the increase in capital reduces liquidity creation (Diamond and Rajan, 2001). On the other hand, Lartey et al. (2013) have shown positive relationship between liquidity and profitability of listed banks in Ghana. Shachera (2012) studied the relationship between

liquidity and profitability of banks in Iran over the period (2002-2009), he found a non linear relationship between profitability and possession of liquid assets.

Konadu (2009) did a study on liquidity and profitability: empirical evidence from listed banks in Ghana. The objective of the study is to determine the liquidity trend of selected banks, to ascertain the profitability trend of the selected banks and to establish and analyze the relationship between the banks liquidity and profitability levels from 2002 to 2006. The researcher considered only banks listed on the Ghanaian stock exchange. The banks randomly selected were Standard Chartered Bank Ghana Ltd, Cal Bank Ltd and SG-SSB Ltd. The study the researcher considered current ratio, quick ratio, cash ratio, net operating cash flow ratio under liquidity ratios. Profitability ratios comprise of net profit margin, return on equity, return on assets and net asset turnover ratios. The researcher employed trend analysis to achieve the set objectives. The researcher found no positive relationship between liquidity trend and profitability. The research paper concluded that there is a negative relationship between liquidity and profitability in the Ghana banking sector.

Graham and Bordeleau (2010) did a study on the impact of liquidity on profitability of Banks in Canada. The study was aimed helping to distinguish empirically, whether the authors also identify the determinants of liquidity risk.

Olagunju et al. (2011) did a study to examine liquidity management and commercial banks profitability in Nigeria. The major aims of the study were to find empirical evidence of the degree to which effective liquidity management affects profitability in commercial banks and how commercial banks can enhance their liquidity and profitability positions. In attempt to achieve the objectives of the study, several findings were made through the analysis of both the structured and unstructured questionnaire on the management of banks and the financial reports of the sampled banks. The data obtained from the Primary and Secondary sources were analyzed through collection, sorting and grouping of the data in tables of percentages and frequency distribution.

A hypothesis was formulated and statistically tested through Pearson correlation data analysis. Findings from the testing of this hypothesis indicate that there is significant relationship between liquidity and profitability. That means profitability in commercial banks is significantly influenced by liquidity and vice versa. The study concluded that for the success of operations and survival, commercial banks should not compromise efficient and effective liquidity management and that both illiquidity and excess liquidity are financial diseases that can easily erode the profit base of a bank as they affect bank's attempt to attain high profitability-level.

Bonfim& Kim (2011) in a study on European and North American banks in the 2002-2009 period illustrate how banks manage liquidity risk. The authors also identify the determinants of liquidity risk. The results highlight that the type of relationship between liquidity risk and size, performance and the ratio between loans and deposits depends on the type of liquidity risk measure used. Bank size generally has a positive impact on bank liquidity, while the performance measure has an ambiguous relationship with liquidity risk.

2.5 Summary of Literature Reviews and Research Gaps

Research gaps exist since none of the studies in Ethiopia addressed what is the effect of Asset (quality) liability management on the liquidity risk of banking sector in Ethiopia. Accordingly, majority of the studies were either done on credit risk management or on liquidity risk in Ethiopia. Research gaps also exist as this research will provide more literature for examining the theories reviewed. In addition, the majority of the studies were done in developed economies hence leaving scarce literature in developing economies. In addition, an empirical review is conducted where past studies both global and local are reviewed in line with the following criteria, title, scope, methodology resulting into a critique. It is from these critiques that the research gap is identified.

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

The preceding chapter presented the review of the existing evidence on asset liability management on liquidity risk on banks and identified the knowledge gap. The chapter is organized in six subsections. The first part presents the research design, sample selection methods; method of data collection and sources of data; discusses method of data analysis, model specification; lastly variables and their measurements are presented.

3.1 Research Design

Research design refers to the way the study is designed, that is, the method used to carry out research. Depending on the nature of the research problem and the research perspective, a research approach could be based on the attitude of quantitative or qualitative or mixed approaches.

According to Creswell (2003), qualitative research uses a review of the existing literature to deductively develop theories and hypotheses to be tested. The research problem is translated to specific variables and hypotheses. Quantitative research approach assumes that there is a cause and effect relationship between variables. In line with this, quantitative research tests the theoretically established relationship between variables using sample data with the intention of statistically generalizing for the population under investigation and it uses statistical methods in describing patterns of behavior. Well designed and implemented quantitative research has the value of being able to make generalizations, for a broader population, based on findings from the sample.

Thus, in order to achieve the research objective stated in pervious chapter, bearing in mind the nature of research problem and research questions, the study was used quantitative approach to examine the effect of Asset Liability Management on the liquidity risk on selected seven private commercial banks in Ethiopia operated during the period of 2005 to 2014.Quantitative research approach assumes that there is a cause and effect relationship between variables. The study

adopted explanatory research design based quantitative research approach. In line with this, quantitative research tests the theoretically established relationship between variables using sample data with the intention of statistically generalizing for the population under investigation and it uses statistical methods in describing patterns of behavior. Well designed and implemented quantitative research has the value of being able to make generalizations, for a broader population, based on findings from the sample.

Thus, this research study were described the degree of the effect of Asset Liability Management on the liquidity risk by using regression from the selected seven selected private commercial banks.

3.2 Population and sampling techniques

As the National Bank of Ethiopia 2013/2014annual report shows Ethiopia has a total of 19 banks out of which 16 were privately owned commercial banks and were 2 public commercial banks (merged in 2016) and one development bank of Ethiopia. The targeted populations for this study were Ethiopian privately owned commercial banks and sample sizes of seven banks were selected by using purposive sampling technique. Purposive sampling was used and sample banks have been selected based on age and availability of data. For this study, ten years data (2005-2014) were used. Therefore, those banks which were established after 2005 and started to provide financial statement in the succeeding fiscal year were not included in this study. Because this study incorporated only banks that have financial statement for the year, 2005, and on wards. For that reason, only Awash International Bank S.C (AIB), Dashen Bank S.C (DAB), Bank Of Abyssinia S.C (BOA), Wegagen Bank S.C (WB), Nib International Bank Of Ethiopia (NIB), United Bank S.C (UB) and Cooperative bank of oromia (CBO) banks information were used in this study to examine the effect of Asset Liability Management on the liquidity risk of selected private commercial banks. The researcher believed that the numbers of the private commercial banks which included under sample size are enough to represent the banks in general (see table 3.1).

Table 3.1 sample composition and number of banks observation

No	Bank	Year of establishment	No of branches	Capital (2014/2015)
1	AIB S.C	1994	207	1,979.3
2	DB S.C	1995	164	1,994.1
3	BOA S.C	1996	136	1,326
4	WB S.C	1997	119	1,825.8
5	UB S.C	1998	128	1,334.4
6	NIB S.C	1999	115	1,731.3
7	CBO S.C	2004	141	739.9

Source: national bank of Ethiopia annual report 2014/15

3.3 Source of Data, Data Type and Methods of Data Collection

The study was used secondary data type in order to answer the research questions stated at the beginning. The secondary data were collected from internal and external sources. The internal sources were collected from audited annual financial statements of the selected private commercial banks and the external sources from National bank of Ethiopia (NBE) which regulates the banking sector of the country. So, the data used in this study were non confidential, that is, all the data used in this study were public. A balanced panel financial data of banks covering the period from 2005-2014 were used in this study to examine the effect of asset liability management on liquidity risk of selected private commercial banks in Ethiopia.

3.4 Methods of Data Analysis

Data analysis of the research was mainly based on computation of financial ratio data's (indicators) of the selected private commercial banks.

Moreover, the researcher compute ratios with the help of Microsoft spread sheet from balance sheet and income statements of commercial banks from 2005-2014 of the selected indicators; then the raw data processed through STATA version 12 of statistical packages.

Furthermore, the processed data interpreted through descriptive statistical analysis, trend analysis, and correlation and regression analysis. It means that this section provides the descriptive analysis of the panel data and variables for the study were in collaboration with some important test such as such as normality, multi co-linearity, and parameter stability of data of asset liability management indicators on liquidity risk trend indicators.

3.4.1. Descriptive Analysis

The descriptive statistics explores and presents an overview of all variables were used in the analysis. In this section the mean, minimum, maximum, standard deviation of the variables were produced for the variables for the period 2005 to 2014.

3.4.2. The Correlation Analysis

This section shows how variables are related with each other. The results of this analysis represent the nature, direction and significant of the correlation of the variables considered under the proposed study variable.

3.4.3. Regression Analysis

As mentioned above, the study is conducted on seven (7) private commercial banks data covering the time period from 2005 to 2014. It has a total of 70 observations (i.e. 7*10).

The regression analysis is used to examine the relationship between net liquefiable asset ratio NLR(Assets mainly comprise net amount of 1-month inter-bank deposits, Dollar or foreign currency notes and coins, gold, marketable securities and advances maturing within one month) of private commercial banks (one dependent variable) and asset liability management practice explanatory variables indicators (ratio) the return on equity (ROE), the Return on assets (ROA), the Loan to deposit ratio (LTD) and a control variables that held constant in order to answer or clarify relationship between other variables the capital adequacy ratio (CAR),the size of the

bank. The result of a regression analysis is an equation that represents the best prediction of a dependent variable from several other independent variables.

In terms of regression analysis, a panel data is adopted in this study, corresponded regression model. In fact, regression data analysis is done by using STATA version 12.0, this inferential statistics applied through corresponded regression panel model is selected from fixed effect and random effect regression (General Least square Methods). However, OLS (ordinary least square methods) method is not suitable in this case and it does not consider the bank specific effect. While, the Fixed Effect method or random effect GLS solves this problem and allows taking into consideration the bank-specific pooling effects of observation on the cross-section over the time periods on the regressions estimates as indicated in (Gujarati2004).Moreover, fixed effects regression is the model is used when researcher want to control for omitted variables that differ between cases but are constant over time. It allows using the changes in the variables over time to estimate the effects of the independent variables on dependent variable. Otherwise random effect estimation model is used and it is the models to use when researchers want to control for omitted variables that change over time but are constant between cases. It allows using the variation between cases to estimate the effect of the omitted independent variables on dependent variable.

In order to determine effect of Asset Liability Management on the liquidity risk of commercial banks in Ethiopia, the researcher was carried out the following procedures: - First, Housman model specification was tested and fixed effect model is selected (p<0.05) and appropriate to examine effect of Asset Liability Management on the liquidity risk of private commercial banks in Ethiopia. Housman model specification test is employed to know which panel model was appropriate for the study. Second, after Housman test, the investigator had done various diagnostic tests such as co- linearity test, normality test, fitness of the model test ,parameter stability test and Wald restricted coefficient test is applied to check whether the classical linear regression model assumptions are violated or not.

3.5 Model Specification

The study specifies study model through applying alternative panel regression approaches by

using the two most important panel data techniques including the Fixed Effects (FEM) and Random Effects Model (REM) was used in the specification of model of this research study. As Gujarati (2004) stated that the advantage of using panel data is to address a broader range of issues and tackle more complex problems than time series or using cross-sectional data alone.

Similarly, the econometric model employed in the study was the formula used by Simatwa Robi Martha (2014).Thus, the study is confined only to one dependent variable liquidity risk (LIQR) and three independent variables (return on equity (ROE), the Loan to deposit ratio (LTD), the Return on assets (ROA), and two control variables that held constant in order to answer or clarify relationship between other variables the capital adequacy ratio (CAR), the size of the bank (SB).

To this end, the panel model, in a functional form, is stated as follows:

$$Y = α + β1X1 + β2X2 + β3X3 + β4X4 + β5X5 + e$$

Where; **Y** denotes the dependent variable (Liquidity risk) –This is measured as a ratio by dividing net liquid assets to total short term liabilities.

α   is the value of the intercept.

βi is the coefficient of the explanatory x variables.

e is the error term assumed to have zero mean and independent across time period.

X1 is the Return on assets (ROA) - This is the bank asset utilization ratio and is measured by dividing the operating income by the total assets.

X2 is the return on equity (ROE) – It is measured by dividing earnings available for common stockholders to common stock equity.

X3 is the capital adequacy ratio (CAR) – This is a measure of the financial strength of a bank, expressed as a ratio of its capital to its assets. This is given by dividing total capital by the total risk weighted assets.

X4 is the size of the bank. This is measured as the natural log of total assets.

X5 is the Loan to deposit ratio (LTD) – This ratio measures the gross loans to gross deposits ratio. It is the amount of a bank's loans divided by the amount of its deposits at any given time.

3.5.1 Test of Significance

F-test was used to test the joint significance of all coefficients and t-test for (each explanatory variable) the test significance of individual coefficients. The significance of the regression model is determined at 95% confidence interval and 5% level of significance (t-test)

3.6 Variables Description and their Measurement

The study variables included in this study are variables which determine asset liability management practice and had significant impact on commercial banks liquidity studied in various countries. Similarly, the researcher developed study variables to the effect of Asset Liability Management on the liquidity risk of selected private commercial banks in Ethiopia; the study were used only to one dependent variable liquidity risk (LIQR) and three independent variables (return on equity (ROE), the Loan to deposit ratio (LTD), the Return on assets (ROA), and two control variables that held constant in order to answer or clarify relationship between other variables the capital adequacy ratio (CAR), the size of the bank (SB) generated from 2005-2014 fiscal year's from audited financial statements. Additionally, the researcher included disturbance term beside explanatory variables mentioned above; for minimizing the effect of missed variables from the model as indicated in *(*Brooks, 2008).

3.6.1 Dependent Variable

This study is used the most comprehensive measure of banks liquidity risk to examine the link and the effect of Asset Liability Management on the liquidity risk of selected private commercial banks in Ethiopia. In this study, a ratio by dividing net liquid assets to total short term liabilities is used to measure the liquidity risk of banks in Ethiopia from 2005-2014. In addition to this, the data for the study is drawn from the audited financial statement of the banks which disclose information about the accounting based variable to measure the liquidity risk of the banks.

Liquidity Ratio (LIQR):‑ High liquidity may allow a bank to avoid costly borrowing of funds should the need for cash arise (Ommeren, 2011) and (Davydenko, 2010).Kargi (2012) studied that lack of liquidity in extreme situations can lead to the bank's insolvency. And also suggest that if the bank does not invest sufficient fund in current assets, it may become illiquid which is risky. It may lose profitability some idle current assets do not earn anything. Liquidity ratio is ratio of liquid asset to customer deposits used by banks to analysis their ability to meet its obligation as and when due (Liyuqi, 2007). However, there is also an opportunity cost that banks incur by not investing the cash available to generate returns.

Total deposit is calculated from the bank's balance sheets of seven private commercial banks (demand, saving and fixed) and computed as follows:

LR = Liquid asset amount
     Total deposit amount

3.6.2 Independent Variables

Independent variables are explanatory variables that explain the dependent variables. Independent variables included in this study are include return on equity (ROE),the capital adequacy ratio (CAR),the Loan to deposit ratio (LTD),the Return on assets (ROA),the size of the bank generated from 2005-2014 fiscal year's audited financial statements. Majority of these variables are modified and adopted from previously done studies based on the extent of their effect of Asset Liability Management on the liquidity risk.

Return on equity (ROE)

ROE is an internal performance measure of shareholder value, and it is by far the most popular measure of performance, since: (i) it proposes a direct assessment of the financial return of a shareholder's investment; (ii) it is easily available for analysts, only relying upon public information; and (iii) it allows for comparison between different companies or different sectors (ECB, 2010)

Return on Equity = Earnings available for common stockholders

                  Common stock equity

Return on assets (ROA)

Return on asset is a ratio that measures company's income after tax against its total assets. The ratio is considered as an indicator of how efficient a company is using its assets to generate earnings before contractual obligation must be paid. In addition to this, the data for the study is drawn from the financial statement of the banks which disclose information about the accounting based variable which is important to measure the performance of the banks. ROA is computed as:

Return on Assets = Net income after tax

                 Total Assets

Loan to deposit ratio (LTD)

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

                LTD = Bank's loans

                    The amount of its deposits

3.6.3 Control variables
Capital Adequacy Ratio (CAR)

Capital adequacy is a measure of bank's financial strength expressed as a percentage of its risk-weighted asset. The ability of bank to undertake additional business is capital adequacy (Hosna, et al., 2009) According to Kenneth & Charles (2013), Capital adequacy ratio a measure of a

bank's ability to meet its obligations relative to its exposure to risk. Capital Management Risk; Capital requirement is of great importance under the Basel Accords II and these set the guide lines for the financial institutions. It is internationally accepted that a financial institutions should have capital that could cover the difference between expected losses over some time horizon and worst-case losses over the same time horizon. Based on the accords, capital adequacy has been divided in to two categories Tier I and Tier II. The tier I have been determined as core capital and Tier II as supplementary capital. Tier I capital consists of shareholders equity and disclosed reserves. Tier II capital consists undisclosed reserves, revaluation reserves, general provisions, hybrid instruments and subordinated term debt. According to Basel accord II requires that the total capital adequacy ratio should not be lower than 8% of capital on the risk weighted average assets of the bank. National bank of Ethiopia under its directive No SBB/24/99 set the minimum capital requirement for the bank to be at least 8% the same to the Basel accord, Capital adequacy ratio is a ratio that measures the total capital (Tier I capital and tier 2 capital) of bank articulated as percentage of it srisk weighted asset (Kenny Adedapo et al., 2013).

CAR = <u>Tier 1 capital + Tier 2 Capital</u>

  Risk weighted asset

Bank size (BAS)

Total assets of the bank measures bank size. In most of the literature, the total assets of the banks are as a proxy for bank size. Among the factors identified, bank size was identified as significantly affecting the performance of bank. Increase in size can lead to decreasing or increase liquidity for banks due to the situation (Aniet.al. 2012).As quoted from Kaaya & Pastory (2013), smaller banks generate less profit than larger banks. But a larger bank with economies of scale as well as number of branch network might be able to attract better deposits. Like previous studies this research also uses log of total asset to measure the size to the private commercial banks.

Bank size = natural logarithm of total asset (BAS)

CHAPTER FOUR

4. DATA ANALYSIS AND FINDINGS

This chapter presents the data analysis and findings on the study to investigate the effect of asset liability management on the liquidity risk of selected private commercial banks In Ethiopia. The sample contains seven private commercial banks which are purposively selected, for which ten consecutive year's financial data for the period between the years 2005-2014 were used.

4.1 Introduction

In examining the effect of asset liability management on the liquidity risk of selected private commercial banks, the researcher used a panel regression technique to test the effect of three independent variables and two control variables on one dependent variable. In this chapter the data collected were analyzed and presented with the help of various techniques such as descriptive statistics and regression models. The current chapter has six sections. Under section (4.2), Model specification test was applied, (4.3) diagnostic tests are made followed by descriptive statistics of the results under section (4.4). Section 4.5.Trend analyses of asset liability management practice indicator's Results of fixed effects regression analysis were presented (4.6). Then, discussions of the results were presented (4.7). Finally, the summary of the results were made (4.8).

4.2 Model Specification Test

To test the effect and relationship between asset liability management on (return on asset, return on equity, capital adequacy ratio, bank size, loan to deposit ratio) on liquidity risk (LIQR) of private commercial banks in Ethiopia, the model was adopted from Simatwa Robi Marthain 2014 empirical works and also based on the finance theory and new institutional economic theory from the literature part of this study.

The important issue from panel model specified in the methodology part of the study, it is not specified whether it is fixed effects or random effects model. So the focal point the researcher concern here is, to examine whether individual effects are fixed or random. Because, there are broadly two classes of panel data estimator approaches that can be employed in empirical research: fixed effects models and random effects models. This demands high concern when the researcher employed the panel data approaches based on theoretical concept considerations in fixed vs. random effect model. According to Gujarati (2003), fixed effect model is used when you want to control omitted variables that differ between cases (units) but constant overtime.

Additionally, Shibru, (2014, in his thesis work cited in Green (2008) also said that, fixed effect model allows for heterogeneity or individuality among entities by allowing to have its own intercept value. Intercept may differ across entities; but does not vary over time, that is time invariant. Whereas, random effect is used when some omitted variables may not be consistent over the time but vary between cases. Individual effects are not associated with explanatory variables in random effects approach. It allows estimating the effect of time invariant factors which cancel out in affixed effect estimation.

Thus, based up on above facts, the researcher tried to examine whether individual effects are fixed or random model. Therefore, the first issue is the choice between fixed effects (FE) and random effects (RE) model based on a houseman test. This test performed through STATA 12.0version running houseman specification test at five (5%) percent levels enables to choose the researcher between fixed effects and random effects.

According to this test null hypothesis says that random effects model is appropriate than the fixed effects model (Brooks, 2008). As indicated by the Houseman test on model stated on methodology part (1) (see Table 4.1. below), the difference in coefficients between FE and RE is systematic, providing evidence in favor of a FE model. The p-value for LIQR-model (0.000) the test is less than 5%, indicating that the random effects model is not appropriate and that the fixed effects specification is to be preferred, this result indicate that random effects model should be rejected and thus, the analysis of this study is based on fixed effects estimations.

Table 4.1hausman (fe re) test:-Fixed effects model versus Random effects Model

---- Coefficients ----

```
        |    (b)        (B)         (b-B)    sqrt(diag(V_b-V_B))
        |   fere      Difference      S.E.
-------------+----------------------------------------------------------------
roa |  -9.639856   -3.654949    -5.984907       5.2779
roe |   2.906438    2.781614     .1248243      .4744934
car |   6.708222    6.793077    -.0848549          .
bas |  -.4073962   -.2446325    -.1627638          .
ldr |  -3.016739   -2.221942    -.794797           .
-------------------------------------------------------------------------------
```

 b = consistent under Ho and Ha; obtained from xtreg

        B = inconsistent under Ha, efficient under Ho; obtained from xtreg

   Test: Ho: difference in coefficients not systematic

chi2 (5) = (b-B)'[(V_b-V_B)^(-1)](b-B)

        = 74.95

Prob>chi2 =   0.0000

         (V_b-V_B is not positive definite)

Note: Source; computed from SATA 12.0 version

4.3 Diagnostic Test

Before regression analysis and hypothesis testing, heteroskedasticity, autocorrelation, multicolinearity, parameter stability and hypothesis tests were tested to know whether the

assumption of classical linear regression model (CLRM) was violated or not. Accordingly, the output of the tests which are displayed by STATA 12 software presented and interpreted.

4.3.1 Heteroscedastic Test

One of Ordinary least square assumption conducted in this study is heteroscedastic diagnostic test. According to Birhanu Tsehay (2012) cited in (Brooks 2008, p.133) described that. Var (ut) = σ2 < ∞; it has been assumed that the variance of the errors is constant(σ2 -this is known as the assumption of homo-scedasticity) and finite over all values of variables. If the errors do not have a constant variance, they are said to be heteroskedasticity. In this study also hetroskedasticity test is performed, by using Breush-pagan/cook-weisberg test. As per, STATA 12.0 version output obtained (Breusch-Pagan / Cook-Weisberg test for heteroskedasticity) from diagnostic test result described as follows:-

Ho: Constant variance

    Variables: fitted values of liqr

chi2 (1)   = 0.0000

Prob> chi2 =   0.9145

The result shown above BP/CW test value of 0.9145 (liqr) which is greater than the p-value of 0.05 (5%) Since, the probability value fail to reject the null hypothesis of homoskedasticity presence at 5% significant level and the regression model has no heteroskedasticity problem. Therefore, it is possible to conclude that the variance of error term is constant or there is no evidence of heteroskedasticity in the regression model of liquidity of the study.

4.3.2 Multi-co linearity Test

Multi-co linearity originally it meant the existence of a "perfect," or exact, linear relationship among some or all explanatory variables of a regression model. According to (Gujarati, 2004) variable is said to be highly collinear tolerance (TOL) and variance inflation factor (VIF): the larger the value of VIF, the more "troublesome" or collinear the variable Xj. As a rule of thumb,

if the VIF of a variable exceeds 10 or the tolerance less than 0.1, it indicates that there is multi-co linearity problem among the explanatory variables.

Table (4.2) reveals that the maximum VIF result for explanatory variables in this study was 3.06 it is far less than 10 and the minimum tolerance was 0.327095,it far greater than 0.1. Therefore, all the variables in the model of this study have VIF less than 10 and a TOL more than 0.1, which indicates that there is no multi-co linearity problem and the independent variables are not highly correlated and all independent variables can be retained in the model.

Variable	VIF	1/VIF
Roa	3.06	0.327095
Roe	2.82	0.354899
Bas	2.58	0.388286
Car	2.19	0.456145
Ldr	1.37	0.729733
Mean VIF	2.40	

Source: Generated from STATA 12.0 version

Furthermore, the researcher tried to diagnosis multi-co linearity problem by conducting Pearson coefficient matrix of explanatory variables, in order to examine and to know the possible degree of multi co-linearity among explanatory variables in specified model of the study. This findings supported by pervious research works of Shibru (2014), cited in Kennedy (2008), said that "multi-colinearity problem is occurred when the correlation coefficient between two explanatory variables is above o.75."

Table 4.3 Correlation matrix of coefficients among explanatory variables (to detect collinear problem)

Variables	ROA	ROE	CAR	BAS	LDR	Cons
ROA	**1.0000**					
ROE	**-0.5144**	**1.0000**				
CAR	**0.2232**	**0.2267**	**1.0000**			
BAS	**-0.2796**	**-0.1497**	**0.3207**	**1.0000**		
LDR	**-0.0447**	**0.0853**	**0.3282**	**0.4474**	**1.0000**	
Cons	**0.2126**	**0.0595**	**-0.4489**	**-0.9791**	**-0.5740**	**1.0000**

Source:-generated by STATA 12.0 Version from NBE financial reports from 2005-2014

As it appears in the correlation matrix (table 4.2.2), there were no such high correlation between the explanatory variables. The results in the correlation matrix show that the largest correlation of -0.5144 which is between return on asset and return on equity, since, there is no correlation above 0.75 according to kennedy (2008), we can conclude in this study that there is no significance multi-colinearity problem.

The result above (table 4.2.2) obtained show that, the largest correlation observed between ROA and ROE indicators which slightly or weakly negatively correlated (-0.5144) above stated by (Kennedy (2008). since, in general there is no significance multi-co linearity problem analyzed above in correlation matrix obtained from STATA 12.0 version (see table 4.2.2).

4.3.3 Test for Normality of Residuals

One assumption of classical linear regression model (CLRM) is the normal distribution of the residuals part of the model. According to Guajarati (2004), before regression analysis carried out, it should be noted that the normality of data should be tested. This assumption has to be tested and pass the test to use the data for further inference. All of the results from the examined command suggest that the residual or the error terms are normally distributed. The mean and standard deviation values are near to 0 and 1 respectively. For this study, Shapiro-Wilk Wtest

and distributional graphical plot testing were used in examining the normality of distribution of the residual (liqr). Figure 4-1 normal distribution of residual plot (liqr)
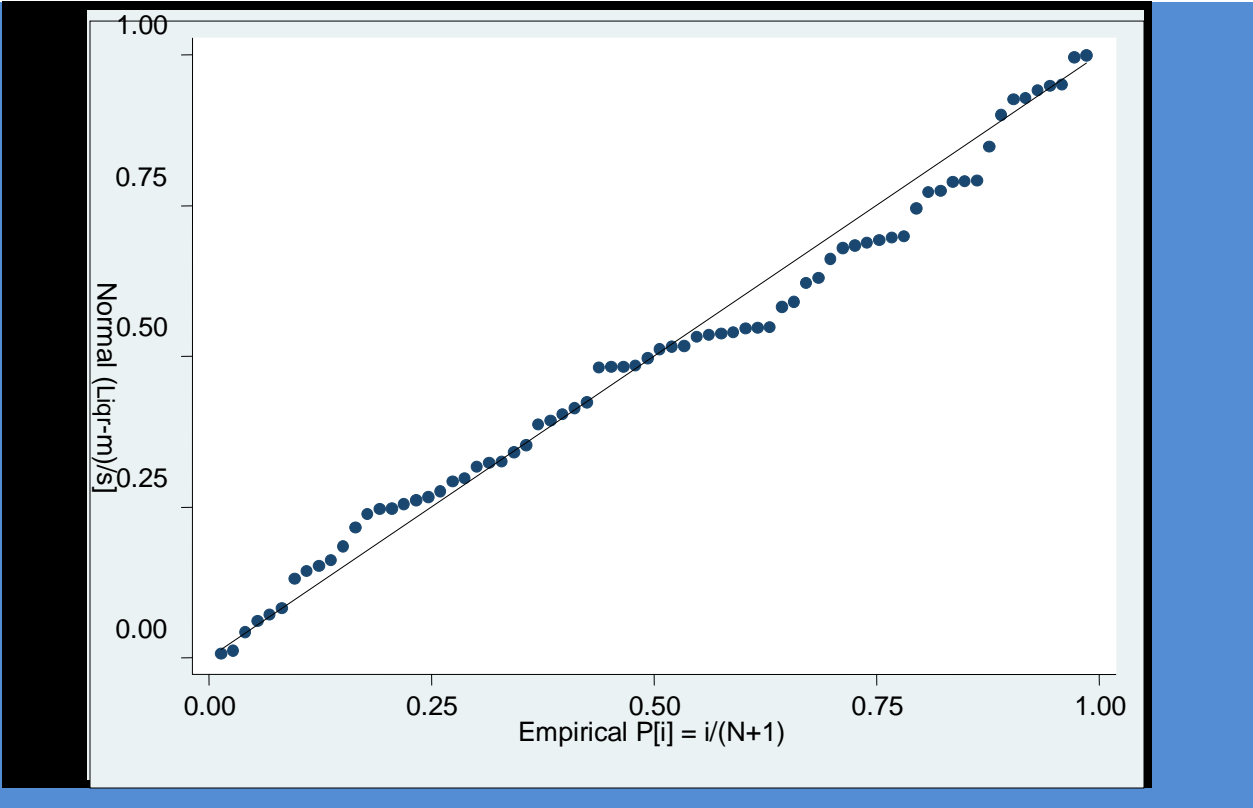
Source: generated by STATA 12.0 from financial statements released by NBE
Figure4-2: Histogram (Liqr-bell shaped curve)
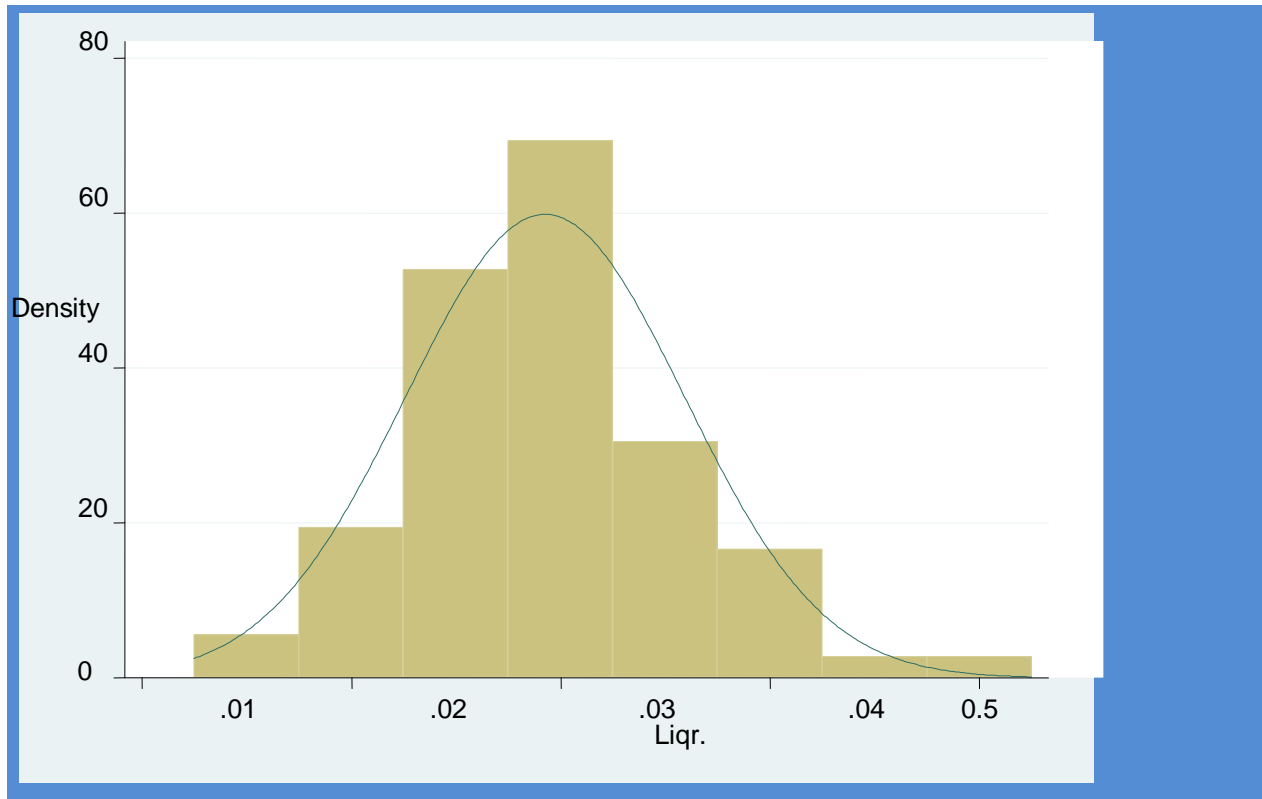
Figure 4.1-shows that the residual distributional plot is normally distributed in between mean zero and standard deviation 1. Additionally figure4-2 of the shape of histogram is bell-shaped it indicates that the shape normal distribution of mean and standard deviation across the sample of the study. In addition to the above graphical test, Shapiro wilk test was performed in the study to test normality distribution of error term. The result obtained from Shapiro wilk test (table 4.4) shows that, normal distribution Prob.>z=0.104004 which is statistically insignificant indicating that the residuals are normally distributed.

Table 4.4 Shapiro-Wilk W test for normal data

Variable	Obs	W	V	Z	prob>z
Liqr	70	0.20550	48.903	8.459	0.104004

Source: generated by STATA 12.from NBE financial statements.

4.3.4 Parameter Stability Test

One of the assumptions of CLRM assumed that the model should be linear in the parameters regardless of whether the explanatory and explained variables are linear or not. If the parameters are non-linear it is difficult to estimate the variables and their values are not known (Guajarati2004).To test the linearity of parameter, the study was conducted by using Ramsey Stability Reset test. Test Result obtained by STATA 12.0 version described as follows:-

Ramsey RESET test using powers of the fitted values of LIQR.

Ho: model has no omitted variables

$F (3, 61) = 0.75$

Prob> F = 0.5278

Ramsey RESET test result shows that, both F-statistics and p-value of the test statistic give the same conclusion that there is evidence of linearity in regression model used in the study, since the p-values are in excess of 5% of LIQR model. It is possible to conclude that, liquidity risk selected in this study has stable relation with asset liability management practices indicators already determined in the methodology part (ROA, ROE, CAR, BAS, LTD) in case of private commercial banks in Ethiopia.

4.3.5 Hypothesis test/Wald-coefficients Restriction Test

Wald –coefficient restriction test was used after ANOVA to test the multiple hypotheses as follows.

Ho: The coefficients of explanatory variables are zero.

Ha: The coefficients of explanatory variables are zero.

The null hypothesis (Ho) is rejected with p-value of zero to four decimal places. That means the explanatory variables have no impact on explained variable (LIQR). In other side, the alternative hypothesis (Ha) coefficients of explanatory variables are different from zero. That means the explanatory variables (ROA, ROE, CAR, BAS, LTD) have effect on the dependent variable (LIQR).The Wald test of STATA 12.0 performed result (see annex) shows that the p-value is<0.05(p=0.0000), indicating that the null hypothesis was rejected and the coefficients of explanatory variables are different from zero that is independent variables have an impact on the dependent variables.

4.4 Descriptive Statistics Results and Discussions

In this part, a descriptive result of the study shown below in Table 4.4 and describes the mean, standard deviation, minimum and maximum values of each variable in the sample of the study. It describes the asset liability management practice proxies independent variable through indicators (return on asset (ROA), return on equity (ROE), loan to deposit ratio (LTD) and control variables capital adequacy ratio (CAR), bank size (BAS) and dependent variable proxy on liquidity risk (LIQR) of sample private commercial banks from 2005-2014 fiscal years.

Table 4.5 Summary of Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Ma
Liqr	70	**.6142025**	**.9146006**	**.2557306**	8.066667
Roa	70	**.0260254**	**.0111758**	**-.0237394**	.0402093
Roe	70	**.220799**	**.0845724**	**-.035812**	**.3673508**
Car	70	**.1387965**	**.1084404**	**.064251**	.8682171
Bas	70	**22.06779**	**.9930102**	**18.67532**	**23.70628**
Ldr	70	**.6776445**	**.1699777**	**.2**	1.285714

Source: generated from financial Statements from 2005-2014 commercial Banks by STATA12.0

As stated in the above table, (table 4.4), the liquidity risks, through banks' liquidity ratio show a mean value of 61.42%, with standard deviation of 91.46% the minimum liquidity position observed value was .2557 of united bank (UB) and the maximum value 8.066% of cooperative bank of oromia (CBO), far above the NBE **Directives No.SBB/57/2014** (not less than 15%) of total current liabilities, implying that all the selected banks are sufficiently liquid. But holding excessive liquidity is also risky and should be invested indifferent portfolio of investment and should maintain the optimum balance because the data set of all the quoted banks have great variation 7.8109% (8.066-0.2557%).

Therefore, it can be concluded that total liquid assets to total deposits ratio was highly dispersed among banks. A higher liquidity risk indicates that a bank is relatively more liquid than a bank which has lower liquidity risk. Banks with more liquid provides more loans to customers and

increase the interest income of banks. In other side, depositors trust to banks maintained due to holding higher cash deposit ratio and ability to pay back the depositors claim and availability credit fund or loan to potential customers and satisfies the need of credit customers.

The return on asset (ROA) indicates that, all the sample Ethiopian private commercial banks have an average positive profit over the last decade. The average ROA for the selected banks was 2.6% (with a standard deviation of 0.0111); it ranges between -0.023% of CBO and 0.040% of WU. But variance in profitability shown in above indicates that, Ethiopia private commercial banks in asset liability management practice there was huge variation (risk indicator) in between the (minimum and the maximum profit returns) it is possible to judge there was risk factor that hider performance in the past decades due to variance of return on asset. To minimize this variance profitability among private commercial banks should practice strong or prudent risk practice on those variance factors that adversely affects the performance of private commercial banks, unless it shrink the performance of commercial banks profitability, shareholder' interests affected and even if existence or retaining in the industry questionable and might distort overall economic stability.

Return on equity (ROE) is relatively high with mean of 22.07% and low standard deviation of 8.4%. This implies that private commercial banks in Ethiopia earned more net income from shareholders and they are not effectively used their equity. For this reason return on equity of private commercial banks had high average value of return on equity. The maximum value of ROE is 36.73% minimum value of -3.5%. This means that there is variation of 36.73% in the data of ROE among the private commercial banks. This is contrary to Tsehay (2012) there is less variation in profitability reflected by the difference between the maximum and minimum values. The implication is that the profitability of banks is highly skewed to one size affecting shareholders' equity of some banks.

Capital adequacy is very essential for the solvency and profitability of banks. This is because the business of banking is risky due to the possibility that loans may not be paid back. Banks are therefore, required to have adequate capital to avoid the failure of financial system. As shown table 4.4 CAR has an average of 13.87%. The average capital to risk weighted assets ratio is

greater than the minimum capital to risk weighted asset ratio set by NBE on directive no. SBB/50/2011.This indicates sound financial condition of Ethiopian private commercial banks. Also, the study suggests that effective management in utilization of funds contributed by shareholders management reduce the levels of risks. In private commercial banks, there is high variation of capital adequacy ratio with the maximum value of 86.82% of CBO and minimum value of 0.0642 of DB. This implies that the capital adequacy private commercial banks have great difference in their capital.

This indicates that there was overall sound asset liability management practiced in capital risk management of private commercial banks in Ethiopia. However, there was high observed variation in capital adequacy ratios with maximum value 86.82 % and the minimum value of 0.0642.These imply that there was great difference in capital adequacy variation among commercial banks in Ethiopia. This result infers that, private commercial banks practice the asset liability management directive in better way but, it possible to conclude that the standard deviation of CAR is 10.84% little dispersion towards the mean value among seven private commercial banks and also it is good indicator of asset liability management practice to relate with liquidity risk. It was also supported by CAMEL frame work risk weighted assets parameter indicator explained by NBE (June 2003) and fulfill the strong practice parameter criteria because above min.8% risk weighted assets.

The Bank sizes also plays an important role in maintaining the position of a bank competitive in the market and measuring risk in terms of the size of natural logarithm of total assets and also has impacts on performance of private commercial banks. The bank size proxies of asset liability management practice on sample banks under this study (table 4.4) reveals that, the average, minimum, maximum and standard deviation values lies were 22.06, 18.67, 23.70 and 0.9930 respectively. This indicates that, large size banks earned more profits than smaller banks. This is achieved only asset liability management practice applied qualified assets, through balance sheet liquidity risk measurement mechanism adopted by banks with continuous application liquidity risk identification, measuring and mitigating, monitoring and controlling activities practiced in

all operation of the bank in standardized manner. Additional from standard variation almost the second smallest variance and it is possible to infer that, the assets size among private commercial banks almost determinant asset liability management practice in efficiently utilizing and managing overall size of the bank's assets.

The maximum and minimum values of total loans to total asset ratio is 128.5% and 20% respectively. This means that there is a very large variation in the total loans to total asset ratio indicated by variation 108.5% in the private commercial banks loan growth. The mean of the banks are equal 67.76% with standard deviation of 16.99%. This indicated an average; almost above half of the total assets of the bank (67.76%) are kept in terms of loan. As loans provided by bank increases, the probability levels of non-performing loans were occurred from the customers.

4.5. Trend analysis of asset liability management practice indicator's (ROA, ROE, CAR, LTD, BAS) on liquidity risk from 2005-2014 fiscal years.

Accordingly, depicting the trend of liquidity risk magnitude observed in figure bellow's with asset liability management variables indicators, it strength findings obtained from regression and descriptive statics and also helps in order to answer the research question. From this fact, figure 4.3 below shows that, average cumulative private commercial banks liquidity at initial period shows decreasing at increasing rate(2005-2007) ,from (2008-2010) increasing at increasing rate 2011-2014 decreasing at increasing rate. This, trend analysis magnitude shows that, liquidity of private commercial bank shows fluctuation during the period under study but on average it indicates that private commercial banks strongly liquid above the requirement set by NBE i.e. according to NBE parameters rating level > 20% it shows strong liquidity of private commercial banks, this was judged based on the CAMEL parameter of NBE.

Figure 4.3 trend of liquidity on private commercial banks of Ethiopia from 2005-2014

Additionally, to show the comparison the asset liability management indicators with magnitude of liquidity risk; it creates to know how commercial banks asset liability management practice coincides with liquidity risk of private commercial banks in Ethiopia (see figure 4.4).The figure also shows that, at the beginning of study period return on asset almost on marginal (0-0.9%) but the magnitude increasing at increasing rate but liquidity risk (increasing at increasing rate between 2005-2006, decreasing at increasing rate from 2007-2014) in figure(4.4).this infers that, there was some trend opposite magnitude association of management. Similarly, liquidity risk proxy by liquidity ratio also, shows that the average liquid assets hold by private commercial banks double more than NBE directives (15%). In the initial period of the study inverse magnitude relationship between liquidity and loan to deposit ratio from 2005-2009 but after 2010 there was direct magnitude between loan to deposit ratio and liquidity management practice but after 2012,there was inverse magnitude relationship between liquidity position of private commercial banks with their loan to deposit ratio. The same magnitude results also shown in the figure capital adequacy and return on equity (capital adequacy also above the minimum 8% requirements of NBE) proxy to describe capital & return on equity not directly coincide.

53

Figure 4.4 Time trend analysis of asset liability management Practice indicators from2005-
2014
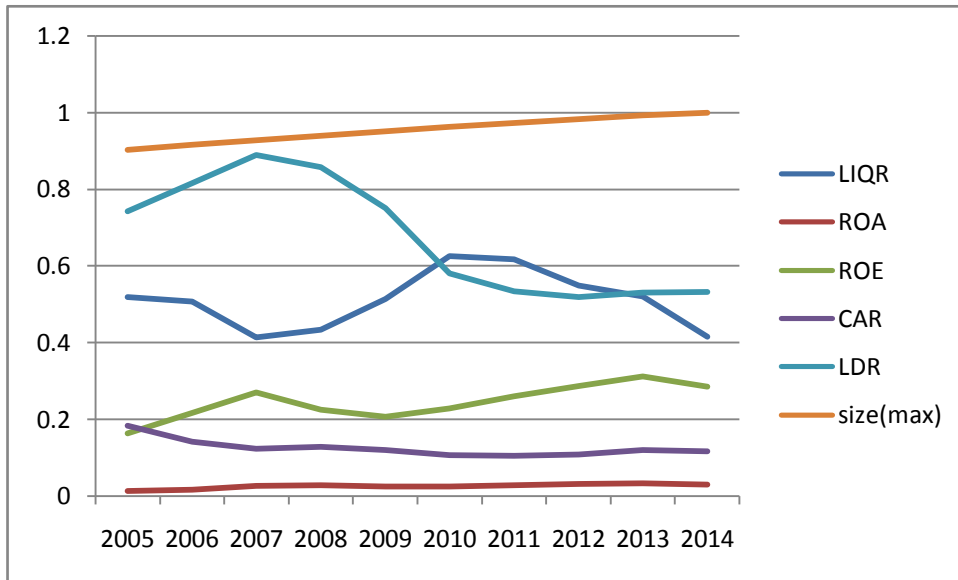
Source: from NBE financial statements reports during 2005-2014 computed by Ms-excel window 2007

The result indicates that, the asset liability management practice was almost stable across the period. And also, proved in diagram above liquidity and loan to deposit magnitude in opposite and also return on asset improved time to time, this implies that there was good asset liability management practice on liquidity risk in private commercial banks of Ethiopia.

4.6 Fitness of the fixed effect Regression Model and discussion of results

Based up on the results obtained from model specification test (see subsection 4.2), fixed effect regression model (LIQR) were used in this study to examine asset liability management practice (return on asset, return on equity, loan to deposit ratio) and control variables capital adequacy ratio, bank size impacts on liquidity risk of commercial banks in Ethiopia from 2005-2014 fiscal years. Thus, the results obtained by fixed effect model of LIQR, was presented in table 4.6 below

Fixed-effects (within) regression   Number of obs =   70

Group variable: code   Number of groups   =   7

R-sq: within = 0.9081   Obs per group: min =   10

Between = 0.9728   avg =   10.0

Overall = 0.8541   max =   10

  F(5,58)   =   114.68

corr(u_i, Xb) = -0.5768   Prob> F   =   0.0000

Asset liability mgt practice on	LIQR MODEL				
	liqr	Coef.	Std. err.	t	P>|t|
Return on asset	roa	-9.639856	8.393976	-1.15	0.256
Return on equity	roe	2.906438	.954358	3.05	0.003*
Capital adequacy	car	6.708222	.5018986	13.37	0.000**
Bank size	bas	-.4073962	.0667208	-6.11	0.000**
Loan to deposit	ldr	-3.016739	.277138	-10.89	0.000**
	cons	10.32688	1.560589	6.62	0.000**

Adjusted R2 =85.41% **F-statistic= 6.25**
Prob. (F-statistic) =0.0000
Notes:* and ** denotes significance level at 5% and 1% respectively; source F/st of sample of
commercial banks & own computation **through SATA 12.0**

The regression results in table 4.6 depicts liquidity risk (LIQR) as dependent variable and asset liability management practice measurement indicators (return on asset, return on equity, loan to deposit ratio) as explanatory variables and control variables capital adequacy ratio, bank size for the sample of seven private commercial banks in Ethiopia during 2005-2014 fiscal years.

On the relationship between asset liability management practices and liquidity risk of private commercial banks, the results showed that there is a positive relationship between liquidity risks of private commercial banks on asset liability management practices as evidenced by positive

correlation coefficient (r) of 0.9081 and the coefficient of determination (r2) of .8541 indicating that 85% of the liquidity risk of private commercial banks can be predicted by asset liability management practices. The study is in line with the views of Choudhry (2011) who observed that Asset liability management essentially comprises of managing the liquidity risk and market risks in an effective and efficient manner.

From the regression results in table4.6 indicates that, the value of adjusted R squared was 0.8541 an indication that there was variation of 85.41 percent on liquidity risk of private commercial banks in Ethiopia due to changes in asset liability management practice return on asset, return on equity, loan to deposit and control variables capital adequacy ratio, bank size ratio at 95 percent confidence interval. This shows that 85.41 percent changes in asset liability management practices of private commercial banks in Ethiopia could be accounted to change liquidity risk, while about 14.59% may be explained by other explanatory variables that were not included by this model. This judgment also supported by arguments (kaaya & pastony, 2013) said that "to made reasonable judgment on adjusted R squared of above 50% have ability to influence the dependent variable."

Additionally, the adequacy of the model as predicting was also validated by the F-test. As indicated in the same table, which is the population parameters, had a significance level of 0% ,which shows that the data is ideal for making a conclusion on the population's parameter as the value of significance (p-value=0.000)) is less than 5%.The F critical at 5% level of significance was 6.25% since F calculated is greater than the F critical (value = 2.37), this shows that the overall model was significant and asset liability management practices were significantly influencing liquidity risk of private commercial banks in Ethiopia. We can conclude that, the study model in table 4.6 asset liability management practice variables were significant (p<0.05): return on equity, loan to deposit ratio and control variables capital adequacy, bank size in between 1% & 5% level of significance whereas return on asset had insignificant in between 1% & 5% level of significance. Accordingly, the researcher after accepting overall fitness of the model (LIQR), the output of the STATA version 12(table 4.6) summarized findings result as follows

- Return on asset had negative coefficient estimates and insignificant at 1% and 5% level on LIQR. Therefore, ROA has inverse relationship with liquidity risk in private commercial banks of Ethiopia.
- Return on equity indicator had positive and significant impact on liquidity risk of private commercial banks and significant at 1% & 5% level.
- Capital adequacy ratio had positively and significantly influences liquidity risk of private commercial banks of Ethiopia.
- Bank size ratio had negative and significant at 5% on liquidity risk of private commercial banks in their overall assets deployed in the operation. This also indicates, there was negative practice in keeping of quality assets in their operation of business.
- Total loan to total deposit ratio (LDR) had negative significant effect on the liquidity risk private commercial banks.

Furthermore, this findings confirmed that the models applied was useful for measuring the relationship between asset liability management practices items and impacts on liquidity risk(LIQR) in order to answer the research questioned and objectives.

Accordingly from the data in the above table (4.6) the established regression equation was

LIQR Model= 10.326 - 9.639 X1 + 2.906 X2 +6.708 X3 - 0.407 X4-3.016 X5

$\qquad$ (1.560) (8.393) (0.954) (0.501) (0.066) (0.277)

From the above regression equation it was revealed that holding practice on return on asset, return on equity, capital adequacy ratio, bank size, loan to deposit ratio asset liability management to a constant zero, liquidity risk of private commercial banks in Ethiopia would be at 10.326. This indicates that other factors other than bank specific results have contribution to liquidity risk of private commercial banks.

4.7. Effect of asset liability management practice on LIQR with empirical evidence

The preceding section presents overall results of the study and the researcher tried expressing the findings through descriptive analysis, trend analysis, correlation analysis and regression analysis. Now, this section discusses in detail the analysis of the results for each components management practice on bank asset liability management indicators to see their impacts on commercial banks liquidity risk. In addition to the discussion analysis, the researcher tried to justify to previous empirical evidences. Therefore, the following discussion presents, asset liability management practice impacts on liquidity risk of private commercial banks in Ethiopia.

4.7.1 Return on asset (ROA)

The return on assets is calculated as net profit of the banks to total assets. The return on assets ratio indicates how much the banks are generating profit through efficient employment of its resources. Return on asset ratio a measure to capture banks' income after tax against its total assets of private commercial banks in Ethiopia. The regressed result of LIQR, which shows that Return on asset ratio is insignificantly negative impact on liquidity risk (See table 4.6) that means one unit increase in ROA, decreases LIQR by -9.639. The result is consistent with the prior study of YuqiLi (2007) who found that liquid asset to deposit ratio has significant and negative impact on the banks performance. The researcher proposed that holding strong liquid asset by banks results in lowering profits of the bank. The descriptive analysis (4.6) results also revealed that, the average value of ROA is2.6% of total asset. The return on assets of the private commercial banks is showing a decreasing sign on liquidity risk. ROA of the private commercial bank fell more which shows the lack of management. Furthermore, private commercial banks are focused on growth and expansion strategies which deviates them from liquidity risk oriented strategies. Private commercial banks lead the way in earning on their invested assets rather than focusing on liquidity. The findings are in line with the views of Bonfim and Kim (2011) who noted that the type of relationship between liquidity risk and size, performance and the ratio between loans and deposits depends on the type of liquidity risk measure used, however this study did not focus on the specific measures that banks use in the management of liquidity risk.

Due to above facts, this research finding reached similar results with prior findings of Habtamu Nigussie (2012), study on determinants of bank profitability, there is a negative correlation between private commercial banks profitability measure; return on asset, and liquidity. That

means the more the ratio of loan to deposit ratio of banks, the less the return on asset of private commercial banks in Ethiopia. Hence, as to his finding liquidity level of private commercial banks included in the study (loan to deposit ratio) has no significant relationship with return on asset. Similarly, he found that there is negative correlation between return on equity and liquidity. Liquidity has similar implication like return on asset, which means although more liquid assets increase the ability to raise cash on short-notice; excess cash in the bank increases the level of non-earning asset. Thus, liquidity (as measure of loan to deposit ratio) has a negative relationship with return on equity. Although, there is negative relationship between return on equity and liquidity, it is significant, which means the more liquidity the bank, the lower the profitability. However, liquidity in terms of loan to deposit ratio) is highly correlated with net interest margin in his study but has negative and insignificant relationship with profitability.

4.7.2 Capital adequacy ratio

The positive and statistically significant impact of capital adequacy on liquidity is in line with findings of Czech commercial banks analysis (Vodova 2011). This is based on the argument of risk absorption. According to this argument the higher capital to total assets ratio of banks the higher the capacity of the bank to absorb risks and create higher level of liquidity to the external public through deposits and loans. In other words, higher capital ratio of banks create positive signal to the external public and attract more deposits. In turn this enable banks to hold more liquid assets that create better potential to liquidity creation to the external public. However, the coefficient value of the variable (i.e. 6.708) indicate a percentage rise/decline in capital to total asset ratio of banks result in less proportionate (i.e. 6.708%) rise/decline in liquidity position of private commercial banks in Ethiopia. Generally, CAR had positive and significant relationship between capital adequacy and bank liquidity. The finding is in line with Horvath et al. (2012) in a study on Czech banks, show how capital impact on bank liquidity creation. Authors highlight that, for smaller banks, Basel III might lead to banks reduced liquidity creation by introducing tighter capital requirements and symmetrically greater liquidity creation might hamper banks solvency. This means that, enhanced liquidity creation can have some detrimental consequences. The results underline that there is a trade-off between the benefits of financial stability

introduced by the capital requirements and those of greater liquidity creation. Accordingly, they sustained that banks that create less liquidity on the market have also a lower exposure to liquidity risk.

The capital adequacy ratio, the regression result reveled that (table 4.6), a unit increase in capital adequacy ratio would lead to increase in liquidity risk of private commercial banks in Ethiopia by a factor of 6.708%. In Ethiopia , private commercial banks those satisfies minimum paid up capital should retain 10% of their net income should retained to their reserve capital account(NBE directive no SBB/45/2008).This findings supported by descriptive statistics obtained shows that, all the banks used in this study was adequately capitalized, has shown in above (table 4.6) a mean value of13.87%, which is far above the minimum benchmark (8% national and international banks respectively), seated in capital adequacy directives/24/99 amendedno.SBB/50/2011 also. Other supportive findings shown that, extremely high capital adequacy ratio could signify that a bank is operating over-carefully and ignoring potentially profitable investment opportunities Andrew M cited from (Ani et al., 2012). This suggests that a bank holding a relatively high proportion of capital adequacy is unlike to earn high profits and less exposed to risk in banks.

But this findings contradicts with (Hakim and Neamie ,2001),and also most empirical findings by different author supports that, banks with good capital management practice (capital adequacy ratio indicator) have positive impact on liquidity risk of commercial banks and able to absorb possible loan losses and thus avoids bank run insolvency and failure(Anthony Santomero, 1997).A solvent business has a positive net worth supported by financial economic theories in corporate finance (Williamson, 1998). The regression findings also revealed that, return on asset ratio was insignificant and inverse (negative) relation with liquidity risk (LIQR) in Ethiopian private commercial banks. This implies that, investment opportunities in commercial banks in Ethiopia tightened or not effectively practiced to reduce such risks and portfolio investment diversification among commercial banks could be weak. According to NBE directive no(SBB/12/1996) 10% of equity capital and up to20% it is possible to invest in insurance companies but not effectively practiced in the private commercial banks of Ethiopia based on

analysis of their balance sheet and income statement observation of their reports obtained for this study.

4.7.3 Return on equity

The return on equity is measured as the ratio of net income to total equity. The high ratios indicate the better return to the investments of the share holders. The results of the regression analysis shows that there is a significant relationship between independent variables return on equity, and the dependent variable (liquidity risk of private commercial banks), hence return on equity, and affect liquidity risk of commercial banks. The value of the coefficient (i.e.2.906%) indicate that when ROE ratio increased by one unit keeping the other thing constant, liquidity risk is expected to be increased by 2.906% units in the same direction. This result implies that effectiveness of asset liability management in terms of ROE ratio had positive influence on liquidity risk of private commercial banks in Ethiopia.

4.7.4 Bank size

The negative and statistically significant impact of bank Size affects liquidity risk private commercial banks in Ethiopia. This disclosed that large bank size impacts negatively on banks liquidity risk due to the existence of bureaucratic system and managerial inefficiency to manage their asset during the study. The value of the coefficient had -0.407 indicating lower impact of size on the liquidity position of commercial banks in Ethiopia. In other words, 1 birr rise/decline in total assets result in -0.407 birr rise/decline in liquid assets. Generally, the results suggest that since private commercial banks' size coefficient is low and their average mean value is relatively large (i.e. 22.06) , the their liquidity is directly related liquidity risk. Moreover, Rauch et al. (2010) studied the determinants of bank liquidity. They found that the Size of bank, profitability, and the interest rate of monetary policy are negatively associated with bank liquidity, while the value of delayed liquidity is positively associated with bank liquidity.

4.7.5 Loan to deposit ratio

Lastly, regression results shows that LDR had negative, but statically significant impact on liquidity risk. This finding indicates that asset liability management of LDR had significant impact on private commercial banks, but negative effect on liquidity risk. A unit increase in Loan to deposit ratio would lead decrease to liquidity risk of private commercial banks in Ethiopia by factors of -3.016; this also indicates that commercial banks and regulatory bodies should strengthen the asset liability management practice to solve loan to deposit ratio problems because the asset liability management was negatively affect the liquidity of commercial banks. This infers problems in managing assets liability management may challenges commercial banks liquidity risk. This finding is consistent with Alemayehu Geda Belleting (2016), private banks are required by NBE directive to allocate 27 percent of their loan disbursements to purchase fixed and low-interest bearing NBE bills. This could also be taken as additional contribution of the private banking sector to resource mobilization in the country. This has negative effect on their liquidity position and lending capacity (despite the reduction in liquidity and reserve requirement by the government). In addition to above, as observed from regression analysis those banks with excessive liquidity holding due to inflationary problem in counter in the country highly from 2008 up to 2011 but during 2011 and 2012 year loan and advances disbursement ceased by instruction of NBE, but latter released from end of year 2012, According to results of regression banks paid fixed interest to depositor during the period without providing any loan and advances. Particularly private commercial banks was some restriction in secretarial base which was intervened by government polices investment participating projects like building of condominium housing projects and similar activities ;even if no syndicate mechanism sated by government. From this fact the asset liability management practices on liquidity risk beyond of private commercial banks control.

4.8 Summary of results

The study examined the effect of asset liability management practice (return on asset, return on equity, loan to deposit ratio, and control variables capital adequacy ratio, and bank size) on liquidity risk (LIQR) of private commercial banks in Ethiopia. This chapter discussed the results of secondary data analysis then presented these results using the appropriate method. Accordingly, the descriptive and fixed effects regression analysis is discussed. It demonstrates how asset liability management practice indicators influences and links with the liquidity risk of

private commercial banks in Ethiopia during from 2005-2014 fiscal years. Thus, a significant relationship between independent variables and the dependent variable i.e. liquidity risk (LIQR) of private commercial banks in Ethiopia. The study suggest that these explanatory variables are the main variables which are significantly influence on the liquidity risk of the private commercial banks in Ethiopia during the study. Additionally, the findings in general are supported by different empirical studies conducted elsewhere by other researchers' and reviewed in the literature part of this study.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter introduces the summary from the data analysis; conclusion and recommendations for the policy. It also highlights limitations of the study and finally gives suggestions for future research studies.

5.2 Summary

From the finding on the Adjusted R squared, the study revealed that there was variation of 85.41 percent on liquidity risk of private commercial banks in Ethiopia due to changes in asset liability management practice on (return on equity (ROE), return on asset (ROA), the capital adequacy ratio (CAR), the Loan to deposit ratio (LTD), the size of the bank) practices.

According to Guajarati (2004), model fitness of F-test probability values significance level of less than 5%: which shows that the data or explanatory variables included in the study was ideal for making a conclusion on the population's parameter as the value of significance value is less than 5%. From this, the researcher concludes that, the F-test probability value of the study model result revealed that, prob. value (0.0000). Hence; this indicates that all explanatory variables of asset liability management practice ratio indicators are fitted.

This means asset liability management practice on(return on equity (ROE), the capital adequacy ratio (CAR), the Loan to deposit ratio (LTD), the size of the bank) practices are statistically significantly influencing or explained liquidity risk of private commercial banks in Ethiopia. Furthermore, fixed effect regression result revealed that, return on asset (ROA), proxy ratio was statistically insignificant at (1%) and negative relationship with liquidity risk.

The study established the existence of a significant relationship between liquidity risks of private commercial banks and asset liability management practices since all banks have asset liability management committee who undertake regular and systematic appraisal of asset liability management practice across the banks operational areas. Asset liability management committee

involves managing assets and liabilities, maturity gaps and mismatches, structural, static and dynamic gaps liquidity risk and market risks. In addition asset liability management consists of facilitating; coordinating, communicating and controlling risk planning undertakes maturity analysis of assets and liabilities to identify liquidity gaps and ensures that the banks risk lies within parameters set by the board.

The study established that liquidity risk can result into experiencing adverse operational and financial problems such as decline in investor confidence, panic withdrawals and daily operation problems hence banks attempt to control liquidity risk factors such as return on equity, capital adequacy ratio, loans to deposits ratio, return on assets and total assets of private commercial banks by balancing cash inflows and outflows hence the existence of positive relationship between liquidity and liquidity risk factors. It also found out that there is a significant relationship between independent variables return on equity (ROE), the Loan to deposit ratio (LTD), the control variables and capital adequacy ratio (CAR), the size of the bank and the dependent variable i.e. liquidity risk of private commercial banks in Ethiopia. Hence -return on equity, capital adequacy, loan to deposit ratio, return on assets, and total assets affect liquidity risk.

5.3 Conclusion

The researcher drawn the following conclusions based on the result of the descriptive analysis and regression result of the study. Thus, the researcher reached on the following conclusions.

The explanatory power of asset liability management determinants on private commercial banks liquidity risk in terms of R² for liquidity risk is 85%. Therefore, the liquidity risk of Ethiopian, private commercial banks explained by asset liability management.

The evidence provided in this study based on the empirical findings, showed that sound asset liability management strategies can promote banks liquidity. The results of the regression analysis shows that there is a positive significant relationship between explanatory variables return on equity (ROE), and the control variable capital adequacy ratio (CAR) and negative significant relationship between independent variables the Loan to deposit ratio (LTD), and the

control variable size of the bank insignificant negative relationship between independent variable the Return on assets (ROA) on the dependent variable i.e. liquidity risk of private commercial banks. Return on asset has negative insignificant relationship with liquidity risk of private commercial banks. Although more liquid assets increase the ability to raise cash on short notice excess cash in the bank increases the level of non earning asset.

Banks liquidity needs depend significantly on the balance sheet structure, product mix, and cash flow profiles of both on and off balance-sheet obligations which without efficient management can result into banks experiencing adverse operational and financial problems such as decline in investor confidence, panic withdrawals and daily operation problems. Hence, banks attempt to control liquidity risk factors such as return on equity, capital adequacy ratio, loans to deposits ratio, return on assets and total assets of commercial banks by balancing cash inflows and outflows hence the existence of positive relationship between liquidity risk and liquidity risk factors.

5.4 Recommendations

The results of the regression analysis shows that there is a positive significant relationship between explanatory variables return on equity (ROE), the control variable capital adequacy ratio (CAR), and negative significant relationship between independent variables the Loan to deposit ratio (LTD), the control variable size of the bank and insignificant negative relationship between independent variable the Return on assets (ROA) on the dependent variable i.e. liquidity risk of private commercial banks.

There is need for private commercial banks to place greater emphasis on developing an integrated view of risk across all the risk types and the banks operational areas while ensuring that the Asset management committee introduces and implements tighter regulations and reporting requirements with tighter capital requirements and symmetrically greater liquidity creation.

There is need for bank treasuries, risk managers and asset liability committees (ALCO's) to implement a robust and comprehensive balance sheet management solution to meet the evolving

financial needs of the bank while taking into consideration the emerging liquidity risks arising from the banks business expansion and technology.

There is need for the bank management and staff to take awareness of the fact that management of liquidity risks must not be left to the Asset liquidity management committee but is for all the participants in the organization. However, the management and board of directors must take the lead and continuously develop proactive policies and communicate the same consistently so as to ensure that every employee and manager buys into the process of asset liquidity management.

There is need for the bank to regularly train its employees on the various balance sheet risks and how they can be managed especially in the changing business environment in which the organization strives to be competitive in the marketplace and at the same ensure that it's profitable from its business operations. Employee training must be placed with efficient planning and monitoring process so as to ensure that both the risk management objectives and those of the overall organization are met.

Management needs to continuously develop, implement proactive, efficient and effective liquidity management strategy that allows the institution to monitor and measure expected daily gross liquidity inflows and outflows, manage and mobilize collateral when necessary to obtain intraday credit, identify and prioritize time-specific and other critical obligations in order to meet them when expected; settle other less critical obligations as soon as possible and control credit to customers when necessary.

5.5 Suggestions for Future Research

This research study was limited to selected private commercial banks and data collected from banks, however there are other public bank and financial institutions providers who were relevant to the study such as Microfinance institutions (MFIs) but were not covered. Since the study tested only the selected private commercial banking institutions except public banks and other financial institutions should be studied in order to compare the results.

The role of Asset liability committees has grown in importance in the management of balance sheet, liquidity risks and in the implementation of liquidity risk management strategies. Hence, there is need for further research on the role of this important committee with a view to coming up with recommendation to strengthen the committees role in the bank industry.

Further research study can be conducted on the factors that influence the liquidity levels of private commercial banks in Ethiopia. Future research should be conducted based on categories of demographic characteristics such as bank ownership (public and private) and/ or size of the bank among others.

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APPENDICES
Appendix I: Random vs fixed (ROA MODEL)
Fixed-effects (within) regression   **Number of obs = 70**
Group variable: code   **Number of groups = 7**

R-sq: within = 0.9081   **Obs per group: min = 10**
       Between = 0.9728   **avg = 10.0**
       Overall = 0.8541   **max = 10**

       F (5, 58)   **= 114.68**
corr(u_i, Xb) = -0.5768   **Prob> F**   **= 0.0000**

---c

liqr	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
roa	-9.639856	8.393976	-1.15	0.256	-26.44222	7.162512
roe	2.906438	.954358	3.05	0.003	.9960833	4.816793
car	6.708222	.5018986	13.37	0.000	5.703563	7.712881
bas	-.4073962	.0667208	-6.11	0.000	-.5409524	-.2738401
ldr	-3.016739	.277138	-10.89	0.000	-3.571491	-2.461987
_cons	10.32688	1.560589	6.62	0.000	7.203022	13.45074

-------------+--
sigma_u | .3060549
sigma_e| .28369905
rho | .53785268 (fraction of variance due to u_i)

F test that all u_i=0:   **F(6, 58) = 6.25**   **Prob> F = 0.0000**
Random-effects GLS regression   **Number of obs = 70**
Group variable: code   **Number of groups = 7**

R-sq: within = 0.8943   **Obs per group: min = 10**
between = 0.9857   **avg = 10.0**
overall = 0.8668   **max = 10**

       Wald chi2(5)   **= 416.61**
corr(u_i, X) = 0 (assumed)   **Prob> chi2**   **= 0.0000**

----

liqr	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
roa	-3.654949	6.527066	-0.56	0.576	-16.44776	9.137866
roe	2.781614	.8280429	3.36	0.001	1.15868	4.404548
car	6.793077	.5696279	11.93	0.000	5.676627	7.909527
bas	-.2446325	.0674224	-3.63	0.000	-.376778	-.112487
ldr	-2.221942	.2873158	-7.73	0.000	-2.78507	-1.658813
_cons	6.056477	1.558082	3.89	0.000	3.002693	9.110261

-------------+--

sigma_u | **0**
sigma_e| .28369905
rho | **0 (fraction of variance due to u_i)**

```
-------------------------------------------------------------------------------

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        ---- Coefficients ----
        |    (b)        (B)         (b-B)     sqrt(diag(V_b-V_B))
        |    fe          re       Difference        S.E.
------------+-----------------------------------------------------------
roa |  -9.639856   -3.654949    -5.984907        5.2779
roe |   2.906438    2.781614     .1248243       .4744934
car |   6.708222    6.793077    -.0848549           .
bas |  -.4073962   -.2446325    -.1627638           .
ldr |  -3.016739   -2.221942    -.794797            .
-------------------------------------------------------------------------------
```

            b = consistent under Ho and Ha; obtained from xtreg
        B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test: Ho: difference in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                =   74.95
Prob>chi2 =   0.0000
            (V_b-V_B is not positive definite)

Appendix II: CAMEL Ratios (Parameters Used by NBE)

Parameters	Capital adequacy			Asset quality			Earnings			Liquidity		
	Level %	Rating	Rank	Level %	Rating	Rank	Level %	Rating	Rank	Level %	Rating	Rank
Strong		>15%			0 - 5%			> 3%			> 20%	
Satisfactory		8.1 - 14.9%			5.1 - 10%			2 - 2.9%			16 - 20%	
Fair		7.1 - 8%			10.1 -15%			1 - 1.9%			15%	
Marginal		5 - 6.9%			15.1 - 20%			0- 0.9%			9 - 14%	
Unsatisfactory		< 5%			> 20%			Net loss			< 9%	

Source: (NBE, 2003)

Appendix III Summary of raw data(*Source, computed from NBE audited financial statements report 2005-2014***)**

LIQR	ROA	ROE	CAR	BAS	LDR	YEAR	code	dummy	BANK'S
0.508372	0.014689	0.167742	0.087571	21.294245	0.633624	2005	1	1	AIB
0.446392	0.017071	0.166667	0.102426	21.523472	0.664948	2006	1	1	AIB
0.361901	0.026405	0.256579	0.102911	21.806426	0.729256	2007	1	1	AIB
0.362468	0.037342	0.329873	0.113200	22.066000	0.807198	2008	1	1	AIB
0.476616	0.029625	0.239136	0.123884	22.296085	0.707548	2009	1	1	AIB
0.642183	0.020045	0.187798	0.106736	22.687937	0.546710	2010	1	1	AIB
0.662068	0.027436	0.258050	0.106322	22.923041	0.515184	2011	1	1	AIB
0.522755	0.032520	0.269833	0.120520	23.129259	0.514796	2012	1	1	AIB
0.343357	0.030051	0.238953	0.125760	23.297801	0.583485	2013	1	1	AIB
0.284700	0.024663	0.212276	0.116185	23.601561	0.614570	2014	1	1	AIB
0.400367	0.020919	0.325581	0.064251	21.707963	0.775941	2005	2	1	DB
0.360395	0.020760	0.292181	0.071053	21.952906	0.787857	2006	2	1	DB
0.311213	0.029256	0.344560	0.084910	22.237514	0.856988	2007	2	1	DB
0.343756	0.030955	0.343434	0.090134	22.521835	0.820407	2008	2	1	DB
0.473949	0.030535	0.327200	0.093321	22.781099	0.712344	2009	2	1	DB
0.593399	0.025675	0.274989	0.093366	22.998745	0.561690	2010	2	1	DB
0.518047	0.026231	0.288459	0.090934	23.237196	0.497690	2011	2	1	DB
0.525768	0.030741	0.322726	0.095254	23.408374	0.525075	2012	2	1	DB
0.467295	0.037215	0.356701	0.104332	23.586611	0.577091	2013	2	1	DB
0.432716	0.030726	0.296601	0.103594	23.706276	0.558205	2014	2	1	DB
0.466895	0.028070	0.248062	0.113158	20.854294	0.842466	2005	3	1	WB
0.481366	0.029703	0.266667	0.080501	21.203220	0.777950	2006	3	1	WB
0.371766	0.031430	0.278431	0.087329	21.538188	0.895951	2007	3	1	WB
0.484670	0.032189	0.277916	0.083958	21.970154	0.791261	2008	3	1	WB
0.607955	0.033659	0.229316	0.102128	22.140303	0.791140	2009	3	1	WB
0.781987	0.035291	0.215958	0.104111	22.356089	0.566568	2010	3	1	WB
0.773866	0.038897	0.212357	0.119818	22.471061	0.630640	2011	3	1	WB
0.695107	0.040105	0.241735	0.109599	22.810295	0.488470	2012	3	1	WB
0.484679	0.040209	0.209230	0.192177	22.845187	0.619236	2013	3	1	WB
0.322863	0.032717	0.185781	0.176107	23.064476	0.621141	2014	3	1	WB
0.545113	0.010386	0.072917	0.142433	20.328741	0.721805	2005	4	1	UB
0.559538	0.028891	0.248000	0.116496	20.793724	0.685549	2006	4	1	UB
0.486066	0.027517	0.230366	0.119450	21.192644	0.822951	2007	4	1	UB
0.491888	0.029317	0.177778	0.164911	21.503966	0.914990	2008	4	1	UB
0.567136	0.028010	0.194610	0.143927	21.901980	0.761113	2009	4	1	UB
0.687442	0.020116	0.179982	0.111766	22.260636	0.595238	2010	4	1	UB

0.693089	0.029587	0.273625	0.108129	22.497578	0.553162	2011	4	1	UB
0.586771	0.030009	0.257201	0.116675	22.767784	0.540233	2012	4	1	UB
0.423626	0.033898	0.270359	0.125382	22.896523	0.604568	2013	4	1	UB
0.255731	0.028235	0.234741	0.120283	23.024450	0.584210	2014	4	1	UB
0.397837	0.025072	0.202312	0.123926	21.056877	0.944712	2005	5	1	NIB
0.379395	0.026559	0.205357	0.129330	21.272543	0.926410	2006	5	1	NIB
0.299587	0.028614	0.203509	0.140602	21.429823	1.015840	2007	5	1	NIB
0.370410	0.029152	0.178824	0.163023	21.681466	0.967004	2008	5	1	NIB
0.539563	0.030969	0.188992	0.163864	22.018021	0.855820	2009	5	1	NIB
0.708217	0.031969	0.210832	0.151633	22.293235	0.673552	2010	5	1	NIB
0.743382	0.033647	0.219188	0.153506	22.510097	0.616918	2011	5	1	NIB
0.706591	0.034652	0.210511	0.164609	22.685006	0.536418	2012	5	1	NIB
0.510555	0.034587	0.187333	0.184631	22.836589	0.635289	2013	5	1	NIB
0.338809	0.031305	0.171837	0.182177	22.936423	0.682622	2014	5	1	NIB
0.492549	0.023002	0.196891	0.116828	21.225253	0.754510	2005	6	1	BOA
0.466503	0.029655	0.240157	0.123481	21.444514	0.720959	2006	6	1	BOA
0.358751	0.029993	0.211443	0.141849	21.764955	0.875517	2007	6	1	BOA
0.375597	0.019731	0.166253	0.118680	21.945864	0.824697	2008	6	1	BOA
0.414819	0.003414	0.034729	0.098296	22.174866	0.779049	2009	6	1	BOA
0.599950	0.018344	0.193488	0.094808	22.423753	0.548641	2010	6	1	BOA
0.576394	0.022387	0.240110	0.093238	22.560562	0.568161	2011	6	1	BOA
0.476672	0.024861	0.273820	0.090794	22.708116	0.530711	2012	6	1	BOA
0.372622	0.026187	0.237999	0.110030	22.832207	0.564288	2013	6	1	BOA
0.284855	0.026059	0.239033	0.109018	23.041735	0.542426	2014	6	1	BOA
8.066667	-0.017054	-0.019643	0.868217	18.67532296	0.200	2005	9	1	CBO
0.908163	-0.023739	-0.035812	0.544643	19.22715661	1.285714	2006	9	1	CBO
0.631769	0.007407	0.0190476	0.306604	19.86524401	0.851986	2007	9	1	CBO
0.671026	0.021334	0.0844831	0.21871	20.33494542	0.649791	2008	9	1	CBO
0.45868	0.00277	0.01547	0.152877	20.74569736	0.745411	2009	9	1	CBO
0.62072	0.01798	0.14535	0.106864	21.29345976	0.512833	2010	9	1	CBO
0.61457	0.02215	0.21743	0.09832	21.63969776	0.396804	2011	9	1	CBO
0.44184	0.03306	0.30773	0.11367	22.02356335	0.487408	2012	9	1	CBO
0.76100	0.04005	0.36735	0.106462	22.60081547	0.465778	2013	9	1	CBO
0.601418	0.036558	0.3375391	0.110066	22.31218941	0.476593	2014	9	1	CBO