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# **Impact of Asset Liability Management on Profitability of Commercial Banks in Ethiopia**

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## **Declaration**

I, Seblewongel Lemma declare that this thesis entitled: Impact of asset liability management on profitability of commercial banks in Ethiopia, submitted in partial fulfillment of the requirements for the Degree of Master of Science in Accounting and Finance. is outcome of my own effort & study and that has not been submitted for any degree or diploma program in this or any other institution and all sources of materials used for the study have been duly acknowledged.

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## **ABSTRACT**

*The purpose of this study was to investigate the impact of asset liability management on profitability of banks in Ethiopia by using panel data of seven commercial banks from year 2005 to 2016. The study used quantitative research approach and analyzed by using regression models. Moreover, ROA, were used to measure profitability, Fixed effect regression model was applied to investigate the impact of capital adequacy, asset quality, operational efficiency, liquidity, income diversification and bank size. The finding of the study shows that income diversification, liquidity, bank size statistically significant and positive effect on banks profitability. On the other hand, variables like asset quality and operational efficiency has a negative and statistically significant effect on banks profitability. However, the relationship for capital adequacy is found to be statistically insignificant. The study revealed that asset quality ratio, operational efficiency, income diversification, liquidity, bank size are the key driver of return on asset of banks, Therefore, Bank managers are advised to give due attention to the significant variables to Improve profitability.*

**Key words: Profitability, Commercial banks, Asset liability Management**

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## **Acronyms and Abbreviations**

AIB	Awash International Bank S.C
ALM	Asset Liability anagement
ALCO	Asset Liability Management Committee
AQ	Asset Quality
BoA	Bank of Abyssinia S.C
BS	Bank Size
CA	Capital Adequacy
CBE	Commercial Bank of Ethiopia
CBO	Cooperative Bank of Oromia S.C
CLRM	Classical Linear Regression Model
DB	Dashen Bank S.C
DW	Durbin Watson
FEM	Fixed Effect Model
ID	Income diversification
LIQ	Liquidity
NBE	National Bank of Ethiopia
NIB	Nib International Bank S.C
NPL	Non-performing loans
OLS	Ordinary Least Square
OE-	Operational efficiency
REM	Random Effect Model
ROA	Return on Asset
ROE	Return on Equity
UB	United Bank S.C
WB	Wegagen Bank S.C

# CHAPTER ONE; INTRODUCTION

## 1.1. Background of the Study

A sound and dynamic banking system is essential requirement for economic development. As an important segment of the economy, Banking industry serves as the backbone of the financial sector that accumulates saving from surplus economic units in the form of deposits and provides it to deficit economic units in the form of advances. Banking industry provides support to the economy in general and industries in particular in the time of recessions and economic crisis. (Vossen, 2010).

Profitability is a measure of economic gains realized by a firm in relation to the capital invested. This level of economic success can be determined by the amount of reported profits in a financial year. (Zopounidis, 2001) stated that business environment is characterized by risks and uncertainties, To effectively compete in the market place banks manage their assets and liabilities taking into consideration the risk level, earnings, liquidity, profit, solvency, the level of loans and deposits to mitigate losses and thus improve profitability , Since Asset liability management plays a critical role in risk management, it is imperative that banks recognize the asset liability importance and apply effective risk management procedures, Effective implementation of advanced asset liability management techniques allows banks to hedge the risk and to maximize Profitability in today's highly competitive markets for banking services.

The stability of commercial banks as whole in the economy depends on proper asset liability management structures. Better asset liability management has the tendency to absorb risks and shocks that commercial banks can face. Moreover, asset liability management is the requisite condition for the efficiency and growth of commercial banks. Asset liability management in commercial banks is determined by the ability of the banks to retain capital, absorb loan losses, support future growth of assets and provide return to investors. For a bank to attain the same objectives then it has to ensure proper asset liability management, including liquidity risk management, interest rate risk management and credit risk management research surveyed by Francis, (2007) As cited in (Makau & Memba ,2014).

According to Angelopoulos et al, (2001) the management of assets and liabilities can be defined as the strategic management of the balance sheet for risk optimization of liabilities and assets taking into account all market risks. Asset liability management is comprehensive and dynamic framework used to measure, monitor and manage the market risk of a bank. It is the management of structure of balance sheet in such a manner that the net earnings from interest are maximized within the overall risk-preference of the firm, they put forward that asset liability management (ALM) ensures that all the relevant asset and liability classes are managed in an integrated fashion. The values of the assets and the liabilities are influenced by, amongst others, management strategy and economic circumstances. ALM models can be used to show the expected development of an organization, usually measured as solvency and profitability, dependent on both internal (strategy) and external (economy) factors.

Asset liability management enables the firm to balance between its liabilities and assets. This in turn minimizes financial risks and hence improves profitability. Asset liability management of the firm guides the management of the firm in making investment decision. This is because the firm is able to allocate sufficient funds for investment as a result of adoption of liquidity management best practices and argue that firms that maintain a proper structure of their balance sheet records high profitability compared to those firms who fail to maintain proper balances of assets and liabilities, This is achieved by effective risk management which play an integral role in addressing financial risk since all risk cannot be eliminated but it is the responsibility of risk managers to identify their risk levels and know which level can be controlled or accepted. (Uyemura and Van Deventer, 2003).

## **1.2. Statement of the Problem**

To cope with the changes in the environment, the Ethiopian banking industry has become competitive and have been forced to effectively manage their asset and liability to mitigate various risks that arise due to mismatch between their assets and liabilities. This competition in banking industry has generated a greater concern to manage the entire activities of bank in order to prevent any possible risks that may occur, Generally Proper management of assets and liabilities ensures a smooth and efficient functioning of the banking sector in a manner that it accommodates changes in the external environment (Angelopoulos et al., 2001).

Anjili, (2014) notes that sound asset liability management practices create a profitable and conducive environment that enables financial institutions to define strategic asset allocation and to identify financial opportunities and uncertainty in order to improve their financial resources. Asset liability management is relevant to and critical for the sound management of finances of any firm that invests to meet its future cash flow needs and capital requirements and as indicated on (Bhunia, 2010) asset and liability management ensures that the firm is liquid to meet short term obligations of the firm, holding cash gives a safety margin for eventual downturns. It is an important task for the financial manager to achieve appropriate balance between liquidity and profitability when making key investment decisions. Balance sheet risk is an integral part of ALM, It includes interest rates sensitivity credit risk, liquidity risk, capital adequacy, foreign exchange risk and cost of funds risk. ALM attempts to produce an acceptable risk/reward ratio for a bank because of increased competition and inflationary pressure on the pricing. Since ALM plays a critical role in risk management, it is imperative that banks recognize the ALM importance and apply effective risk management procedures. Effective implementation of advanced ALM techniques allows banks to hedge the risk and to maximize profitability in today's highly competitive industry for banking services. (Zawalinska, 1999).

The traditional ALM programs focus on interest rate risk and liquidity risk because they represent the most prominent risks affecting the organization balance-sheet (as they require coordination between assets and liabilities). But ALM also now seeks to broaden assignments such as foreign exchange risk and credit risk; however the main objective of ALM is not to eliminate risk. Rather, it is to manage risks within a framework that includes self imposed limits. Nonetheless, in the context of Ethiopian banking industry, the subject has received a limited research attention. In which case, in order to either prove the above premises or reach into some other assertion regarding the relationship between asset liability management and Profitability of Ethiopian banking sector, empirical investigation is lacking. As far as the knowledge of the researcher is concerned, there is a single study regarding asset liability management and Profitability in Ethiopian banking industry Tamiru (2013), this study focused on asset liability elements (deposit in other bank, loan and advance, fixed asset, demand deposit and saving and fixed deposit) affect the profitability of commercial banks and analyzed by using SCA (statistical cost accounting model). Nevertheless This

study goes further to include other variables influencing Profitability with relation to ALM (asset liability management) targeted factors are capital adequacy, asset quality, operational efficiency, liquidity, income diversification and bank size, their effect on Profitability of commercial banks in Ethiopia Therefore, this paper is intended to fill this gap .

### **1.3. Research Objective**

The general objective of this study is to assess the Impact of asset liability management on Profitability of commercial banks in Ethiopia. The specific objectives of this study are

- To examine the effect of capital adequacy on profitability of commercial banks.
- To test the effect of asset quality on profitability of commercial banks.
- To evaluate the effect of liquidity on profitability of commercial banks.
- To investigate the effect of income diversification on profitability of commercial banks.
- To test the effect of operational efficiency on profitability of commercial banks.
- To explore the effects of company size on profitability of commercial banks.

### **1.4. Significance of the Study**

This study is significant because it dealt with issues of Ethiopian banks are facing and will continue to tackle in the future. In the present scenario, asset liability management is important for the banking industry due to increased importance of managing the asset liability mix; so this study will provide more understanding of the best practices in managing different risks in the banking industry and economic environment. And will help to assess the risks and manage the risks by taking appropriate actions. And also it will provide insights to other firms in the finance sector on how to mitigate risks through ensuring a proper balance between assets and liabilities.

This study might contribute and form the basis for further research into the application of innovative asset liability management strategies in banking industry, This can go a long way in coming up with even better and more efficient strategies that are specific to different bank sizes, markets in which they operate and balancing of the different risk appetites that may be

present within the different banks. Generally this study will contribute to the other research on significant of maintaining a proper balance between assets and liability and risk reduction.

## **1.5. Scope and Limitations of the Study**

### **1.5.1. Scope of the study**

It is important to define the boundaries of the study that the readers will be aware of the direction to which this study is heading. The study is highly contemplated on the broadest of risk management techniques which is asset liability management despite that the topic of this study delimited to examining the asset liability management factors such as capital adequacy, asset quality, operational efficiency, liquidity, and income diversification and control variable bank size affecting the profitability of banks in Ethiopia by taking evidence for the period ranging from 2005 to 2016 and the study could not incorporate macroeconomic variables such as GDP and inflation.

### **1.5.2. Limitation of the study**

Due to the confidentiality of banking industry information the researcher found it fairly hard to access certain type of materials, like Nonperforming Loans data, which would limit the research work. And this study relies on Secondary data collected from the banks' financial reports as per the national bank of Ethiopia requirements. The study was therefore limited to the degree of precision of the data obtained from the secondary source only. Which means it is based on the financial statement of seven banks (CBO, AIB, DB, WB, BOA, UB and NIB) for 12 consecutive years .i.e. from 2005-2016 was collected.

## **1.6. Structure of the Study**

The paper is organized into five chapters. Chapter one presents introduction of the study. The literature review part of the study is presented in chapter two. The review of the literature includes the theoretical review in its first section which is followed by the review of the previous studies related to the area and conclusion and knowledge gap finally. Chapter three presents the research design and methodology. This is followed by an analysis of the results and discussion part of the paper concurrently in chapter four. Finally, chapter five presents the conclusions and recommendations.

## **CHAPTER TWO; LITERATURE REVIEW**

The first chapter introduced the problem to be investigated in this study along with purpose and Research objective. In order to put the study within the context of the existing literature, the Subsequent section of this chapter presents the review of both theoretical and empirical studies related to asset liability management and profitability of banks.

Several factors influence the Profitability of banks in related to ALM understanding the underlying concepts and definitions of asset liability management is essential in order to guarantee results and analyses. Hence, chapter two serves as background for this study by describing concepts of asset liability management and factors that could influence the Profitability of banks with in the contexts of asset liability management Subsequent chapters build on concepts and definitions described here. The review has eight sections. Section 2.1 present overview of banking industry 2.2 presents the Theoretical part related to asset liability management and Profitability of banks and overview of asset liability management Section 2.3 Present Theories related to Financial performance, section 2.4 present Factors Influencing Bank Profitability Section 2.5 presents review of empirical studies regarding the effect of asset liability management on Profitability of banks, conclusions on the literature review and identification of the knowledge gap is presented in section 2.6. section 2.7 present hypothesis of the study and finally conceptual framework is presented in section 2.8 .

### **2.1. Overview of Banking Industry**

The National Bank of Ethiopia indicates that modern Banking in Ethiopia dates back to the year 1905 when the Bank of Abyssinia was established (NBE, 2010). Bank of Abyssinia was formed under a fifty year franchise agreement made with the National Bank of Egypt, which was owned by the British by then. To widen its reach in the country the Bank had expanded its branches to Dire Dawa, Gore and Dessie. It also had an agency and a transit office in Gambella and at the port of Djibouti respectively. After its formal liquidation on August 29, 1931 the Bank of Abyssinia was replaced by the Bank of Ethiopia. According to NBE (2010) Bank of Ethiopia, which was also known as Banque National Ethiopienne, was a national Bank and one of the first indigenous banks in Africa. The Bank of Ethiopia operated until 1935 and ceased to function because of the Italian invasion. During the five years of the

Italian occupation (1936-41), many branches of the Italian Banks such as Banco d'Italia, Banco de-Roma, Banco Di-Napoli and Banco Nazianali del lavoro were operational in the main towns of Ethiopia. After evacuation of Italians, the State Bank of Ethiopia was established on November 30, 1943 with a capital of one million Maria Theresa dollars. Pursuant to the Monetary and Banking Law of 1963 the State Bank of Ethiopia that had served as both a central and a commercial bank was dissolved and split into the National Bank of Ethiopia and Commercial Bank of Ethiopia Share Company. Accordingly, the central banking functions and the commercial banking activities were transferred to the National Bank of Ethiopia and the Commercial Bank of Ethiopia Share Company respectively. Further, as per NBE (2010), due to change of government in 1974, and the command economic system which had prevailed in the country, the Commercial Bank of Ethiopia S.C. and other banks and financial institutions were nationalized on January 1st, 1975. The nationalized banks were re-organized and one commercial bank, the Commercial Bank of Ethiopia; two specialized banks- the Agricultural and Industrial Bank (AIB), renamed as the Development Bank of Ethiopia (DBE) and a Housing and Savings Bank (HSB) currently named as the Construction and Business Bank (CBB); and one insurance company, the Ethiopian Insurance Corporation (EIC) were formed. Proclamation No. 83/1994 which had allowed the establishment of private banks has marked the beginning of new era in the Ethiopian banking sector development. Commercial Banks both public and private are currently operational in line with Banking Proclamation No. 592/2008.

Following the enactment of the banking legislations in the country in the 1990s, a fairly good number of private banks have been established. For example, now, in the 2014/15 fiscal year the total number of banks already operational in the country is nineteen. Of these banks, sixteen are private and the other three are government owned. But in the 2015/2016 fiscal year one government owned bank (construction and business bank) is merged with commercial bank of Ethiopia so that total number of banks already operational in the country is reduced to eighteen of these banks, sixteen are private and the other two are government owned.

## **2.2. Theoretical Review**

The theoretical framework section is the starting point for this chapter. It presents the background theories, upon which the study relies. The researcher presents the basic concepts First, such as issues related to asset liability management and Profitability thereafter, the researcher focuses on the factors identified under ALM that affect profitability which includes capital adequacy, asset quality, operational efficiency, liquidity, income diversification and bank size.

This section reviews the asset liability management overview and the theories that support the relationship between asset liability management and profitability of firms. These theories are namely: Liquidity preference theory, Portfolio theory, Commercial Loan Theory and Liability Management Theory.

### **2.2.1. Asset Liability Management: An Overview**

ALM, is defined by different scholars like Gup and Brooks (1993), Zawalinska (1999), and Charumati (2008). Charumati (2008) defined ALM 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 (NII). 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, ALM 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).

ALM is defined as "managing both assets and liabilities simultaneously for the purpose of minimizing the adverse impact of interest rate movement, providing liquidity and enhancing the market value of equity. It is also defined as "planning procedure which accounts for all assets and liabilities of a bank by rate, amount and maturity." Generally asset liability management is managing the asset liability mix to minimize the risk. (Singh, 2013)

There are different kind of risks in the banks but the three main strand of risk exposure are credit risk, interest rate risk, foreign exchange risk and liquidity risk so ALM in the bank is

managing the mismatch between asset and liability is known as asset liability gap so there need to have a genuine risk management culture in the bank, the Asset liability management in the recent years has become a tool of integrated analysis of assets and liabilities and value not only the interest rate risk but the liquidity risk, solvency risk, firm strategies and asset allocation as well. The landscape of asset liability management for the financial sector is ever changing and the scope of asset liability management activities has widened. Banking institutions have adopted Asset liability management strategies to address key risks such as; interest rate risks, liquidity risk and foreign exchange risk. A sound ALM process integrates strategic, profitability, and net worth planning with risk management. This process often includes an Asset Liability Committee (ALCO), which has the central purpose of attaining goals established by the short and long-term strategic plans without taking on undue risk, a commercial bank shall establish an Asset & Liability Management Committee (ALCO) to manage its assets, liabilities and off-balance sheet items so as to fully meet the bank's contractual commitments. A bank may use attached to these directives as terms of reference to its ALCO. NBE Directive No. SBB/57/2014.

#### ALCO's TERMS OF REFERENCE

ALCO's terms of reference shall at least include:

- Recommending desired maturity profile and mix of incremental assets and liabilities;
- ✓ 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
- ✓ Regularly reviewing the funding strategy in the light of any changes in the internal or external environments;
- ✓ 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;
- ✓ Ensuring operational independence of liquidity risk management function, with adequate support of skilled and experienced officers;
- ✓ Ensuring adequacy of cash flow projections and the assumptions used

- ✓ 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;
- ✓ Recommending the transfer pricing policy of the bank and making liquidity costs and benefits as an integral part of bank's strategic planning; and
- ✓ Regularly reporting to the board of directors and risk management committee on the liquidity risk profile of the bank. NBE Directive No. SBB/57/2014

### **2.2.2. Need for ALM in Banks**

The Changes in the financial markets when foreign players have gained access to the domestic market, and risks associated with the operations of banks have become complex. Now the management requires strategic management to operate banks successfully. Competition after the entry of foreign banks increased the volatile interest rates and exchange rate has put the pressure on the banks to design their asset liability portfolio in such a way that the risk in the portfolio is minimized. Banks management needs to maintain a good balance between the gap, profitability and stability. The most important thing for bank management is to manage market liquidity risk and interest rate risk. Hence banks need a framework which enables them to combat these risks and helps them to optimize the performance of the banks. In this scenario ALM is very useful and helpful tool to analyze the performance of banks. (Kumar and Dhar, 2014).

The Basel committee on banking supervision (2001) Proposed and formulated the broad supervisory framework and suggested required standards for bringing best practices in the supervision mechanism of banking system. The motto behind this was to encourage global convergence towards common approaches and standards for banking system. This body also suggested setting up of rigorous risk and capital management requirements to ensure adequate capital reserve for various risks exposure in the process of lending and borrowing operations. It infers banks need to hold larger capital amount for greater exposure of risks. This will ensure solvency and stability, The Basel II norms (2004) focused on international standard for the amount of capital to be maintained by banks as a safeguard against various risks they come across in the banking business. Basel II proposed setting up rigorous risk and

capital management requirements designed to ensure that a bank holds capital reserves appropriate to the risk the bank exposes itself to through its lending and investment practices. It infers that the greater risk to which the bank is exposed, the greater the amount of capital the bank needs to hold to ensure solvency and stability. (Singh, 2013)

### **2.3. Theories of asset liability Management and Financial Performance**

There are theories that support the relationship between asset liability management and the financial performance of firms. These theories are namely: liquidity preference theory, portfolio theory. Commercial Loan Theory, Liability Management Theory.

#### **2.3.1. Liquidity Preference Theory**

This concept was first expressed by Keynes (1989), this theory is also known as liquidity preference hypothesis the idea of this theory is that investors need premium with longer maturities because they would prefer to hold cash, which entails less risk. When the investment is more liquid it is easy to sell it or easily converted in to cash with minimum risk and also the demand of money increase and decrease depends on the interest rate, when the interest rate decrease people demand more money to hold until the interest rate increase and vice versa.

Financial institution that lend out credit to borrowers must ensure the borrower's ability to pay the debt on time when borrowers are not able to pay the money on time this result credit risk this may prevent the firm from investing in profitable investment that promises higher returns in future so before giving out credit to the firm it is important to know the credit worthiness of the firm to decrease the credit risk. (Jappelli and Pagano, 2002)

The significance of this theory is that firms should maintain an optimum level of liquidity to able to grasp opportunity that promise higher return in the future and Firm's works towards the balance through proper management of their asset and liability to achieve capital requirement and future higher return investment which means in order to be profitable and stable in the sector its necessary to manage and coordinate asset and liability , for finance sector it is a key tools to achieve efficiency and growth.

### **2.3.2. Portfolio Theory**

This theory has a part in investing a portfolio model of asset diversification to alleviate the financial loss, since a clear portfolio prevents the firm from financial loss since the risks are minimized by portfolio assets. This might negatively affect the liquidity position of a financial institution. However, a well-defined portfolio prevents the firm from sustaining total loss since the risks are minimized by the portfolio of assets invested by the firm. (Markowitz, 1952). As cited on Obari (2015) (Black, et al 1972) argue that the portfolio diversification and the desired portfolio composition of commercial banks are results of decisions taken by the bank management. The ability to attain maximum profits depends on the feasible set of assets and liabilities determined by the management and the unit costs incurred by the bank for producing each component of assets. This means that the firm can limit the volatility of the firms' portfolio to improve its performance by spreading the risks among different types of securities that do not always behave the same way.

According to Canner et al. (1997), the relevance of this theory is that the firm should diversify its portfolio to minimize the financial loss that has a direct impact on the liquidity position because each asset has different characteristics of risk and reward. For example, stocks have higher returns but also higher risk, and bonds are lower risk investments but produce higher returns. According to the Portfolio balance model of asset diversification, the optimum holding of each asset in a wealth holder's portfolio is a function of policy decisions determined by a number of factors such as the vector of rates of return on all assets held in the portfolio, a vector of risks associated with the ownership of each financial asset, and the size of the portfolio. It implies portfolio diversification and the desired portfolio composition of commercial banks are results of decisions taken by the bank management.

### **2.3.3. Commercial Loan Theory**

This theory originated in England during the 18th century. It is also referred to as the "real bills doctrine" and is of English origin. Historically, liquidity management focused on assets and was closely tied to credit policies. Prior to 1930, the commercial loan theory encouraged banks to make only short-term, self-liquidating loan facilities. Such loans closely matched the maturity of bank deposits and enabled banks to meet deposit withdrawals with funds from

maturing loans. Logical basis of the theory Commercial bank deposits are near demand liabilities and should have short term self-liquidating obligations (Emmanuel, 1997), Bankers long ago recognized the advantage of making self-liquidating loans (otherwise known as real bills, or claims on real resources) in order to resolve the liquidity and earning problems. A loan was considered self-liquidating if it was secured by goods in the process of production or by finished goods in transit to their final destination for resale. The loan could be repaid after the goods were sold. Loans of this type could ensure the banks continuous liquidity and earn profits. This meant that, liquidity and earnings were simultaneously gained. However, no loan is truly automatically self-liquidating, because there may not be a ready market for the goods produced. Therefore, Banks that limit themselves to making self-liquidating loans are considered to subscribe to the commercial loan theory of bank management. This practice led to the development of commercial bills doctrine or commercial loan theory (Emmanuel, 1997).

The commercial loan theory, suffers from the fallacy of composition. Such a system can keep one bank liquid, but if all other banks follow this procedure, then the overall liquidity needs will not be met during times of financial crisis. Thus, a credit facility secured by goods cannot be repaid if the goods cannot be sold off, or if the customer takes a loan to buy the goods. The banking system is no more liquid or less liquid than it was before the transaction. In the absence of central bank as lender of last resort and that stands ready to supply needed liquidity to the system as a whole, the real bills doctrine is incomplete. Although commercial loans continue to be an important component of banks asset mix, development of other uses of their funds has caused the operating methods of modern banks to change significantly .(Guthua,2013)

#### **2.3.4. The Liability Management Theory**

Since the early 1960s, the loan portfolios of commercial banks have been affected by the emergence of a new theory, which became known as the liability-management theory. This is one of the important liquidity management theories and says that there is no need to follow old liquidity norms like maintaining liquid assets, liquid investments etc. Lately, banks have focused on liabilities side of the balance sheet. 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).

As cited on Guthua (2012), (Koch and McDonald, 2003) stated that 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 (ALCO). 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.

#### **2.4. Factors Influencing Bank profitability**

There is general agreement that bank Profitability is a function of internal and external factors, (Koch,1995) observed that the performance differences between banks indicate differences in management philosophy as well as differences in the market served, (Athanasoglou et al, 2006) concurred and argued that Profitability is a function of internal factors that are mainly influenced by a bank's management decisions and policy objectives such as the level of liquidity, provisioning policy, capital adequacy, expense management and bank size, internal determinants which are management controllable and the external factors related to industrial structural factors such as ownership, market concentration and stock market development and other macroeconomic factors. Generally Commercial banks profitability could be affected by a number of determining factors. In most literatures bank profitability usually expressed as a function of internal and external determinants. Bourke (1989) also indicated that the determinants of commercial bank profitability can be divided into two main categories namely the internal determinants which are management controllable and the external determinants which are beyond the control of management.

### **2.4.1. Capital Adequacy and its Impact on Profitability**

Capital refers to the amount of equity to absorb any loss that the bank may experience it is the major component of financial sector to meet their short and long term obligation, (Kosmidou, 2009). and also capital is one of the factors that affect the level of bank profitability, the capital structure of banks is highly regulated because most of bank failure is reduced by capital and it prevent from financial loss because capital is the financial strength of a bank (Kamau, 2009), Capital adequacy is the capital expected to maintain balance with the risks exposure of the financial institution such as credit risk, market risk and operational risk, in order to absorb the potential losses and protect the financial institution's debt holder. "Meeting statutory minimum capital requirement is the key factor in deciding the capital adequacy, and maintaining an adequate level of capital is a critical element.

There is a general agreement that capital requirement is required to reduce moral hazard the debate is on how much capital is enough ,bankers believes that its difficult to acquire additional equity and higher requirement restrict their competitiveness and that high capital leads to failure because a firm with high capital is risk averse which means they are afraid of risk and they didn't take risk and profitable investment opportunity also .because always highly profitable business is risky, however mostly highly capitalized banks has lower cost of bankruptcy and vice versa, lower need external funding or finance which is difficult. (Koch, 1995).

The NBE has set specific measure of the capital adequacy position of Banks, which is the ratio the Capital adequacy Ratio (CAR), the directive clearly set out the computation mechanism and the conversion factors for both on and off-balance sheet items and strictly set for all banks not to maintain their capital level below 8% of their risk weighted assets. (NBE Directives No.SBB/9/95).

### **2.4.2. Asset Quality and its Impact on profitability**

A bank asset is another variable that affect the profitability of banks, loan is the major asset of commercial bank and major source of income, the quality of loan portfolio has direct effect on bank profitability, The highest risk facing a bank is the losses derived from

delinquent loans (Dang & Uyen, 2011). Thus, nonperforming loan ratios are the best proxies for asset quality. Different types of financial ratios used to study the performances of banks by different scholars. It is the major concern of all commercial banks to keep the amount of nonperforming loans to low level. This is so because high nonperforming loan affects the profitability of the bank. Thus, low nonperforming loans to total loans shows that the good health of the portfolio a bank. The lower the ratio the better the bank performing (Sangmi & Tabassum, 2010).

Asset quality is a sign for the liquidation of a bank, the bank insufficient asset quality means it will have increase its bad debt losses, Non-performing loan and Profitability are inversely related the bank should maintain credit risk management and safeguard the bank's asset to minimize the risk and to be profitable and stable in the business, As cited in (Anjili,2014) credit risk is one of the factor that affect the Profitability of banks because credit risk is depend on the quality of asset in the bank .so the quality of asset is determined by the level of risk .poor asset quality and low level of liquidity are the major causes of bank failure.

The asset quality measures an ability to manage credit risk for a bank or financial institution. The asset quality reflects the composition and productivity of the assets. Thus, asset quality has a direct impact on the profitability of a bank. As per (Yuqi, 2006), in terms of risk poor asset quality is the major cause for banks poor profitability. It is evaluated by understanding the performance of assets category wise and estimating future performance factoring in the likely distribution of the assets in future. The bank's experience of loan loss, provisions/ write off, loan recovery rate, ability to reduce nonperforming assets and extent of weak assets are analyzed in these regard (Financial Management and Analysis of Projects 2006).

However Koch (1995) argues that a good measure of credit risk or asset quality is the ratio of loan loss reserve to gross loans because it captures the expectation of management with regard to the performance of loans. Hempel et al (1994) observed that banks with high loan growth often assume more risk as credit analysis and review procedures are less rigorous, however returns are high in such loans indicating a risk and return trade off.

### **2.4.3. Liquidity Management and Its impact on profitability**

Liquidity refers to the ability of an institution to meet demands for funds. Liquidity management means ensuring that the institution maintains sufficient cash and liquid assets to satisfy client demand for loans and savings withdrawals, and to pay the institution's expenses. Liquidity management involves a daily analysis and detailed estimation of the size and timing of cash inflows and outflows over the coming days and weeks to minimize the risk that savers will be unable to access their deposits in the moments they demand them.

In order to manage liquidity, an institution must have a management information system in place manual or computerized that is sufficient to generate the information needed to make realistic growth and liquidity projections. Liquidity management, ensuring that the institution maintains sufficient cash plus liquid assets to meet withdrawal and disbursement demands and pay expenses, is essential in savings mobilization. A savings institution must have effective liquidity and asset liability management in order to ensure that low cost funds will always be available for savers when they demand repayment of their funds deposited. (Monnie, 2003).

It is necessary to maintain public trust and confidence by ensuring that banks have sufficient level of liquidity at all times there is a need to maintain liquidity requirement consistent with reserve requirement of banks, it is essential to ensure that banks properly manage their liquidity. While the National Bank of Ethiopia, has set the minimum liquid asset of the Bank not to be less than 15% of the Bank's net current liability. Out of this the directive obliged banks to hold 5% of them in primary reserve assets (NBE Directive No.SBB/9/95).

As cited on Anjili (2014) the management of the bank should consider it seriously the liquidity management because liquidity always goes to profitability, high liquid asset indicate that a less risky and less profitability because more liquid asset indicate increase the facility to raise cash but it reduce the management decision to commit credibly to an investment approach which means the firms capacity to raise external finance will decrease. So the Profitability of banks will decrease.

#### **2.4.4 Operational efficiency and Its Impact on Profitability**

In some papers management efficiency is expressed by operational expense efficiency, poor expense management is expressed poor profitability. So expense efficiency usually used to assess managerial efficiency in banks, the overhead costs of running the bank including salaries and occupancy expense and other expense such as office supplies shows the cost to income ratio this operational cost efficiency shows the management ability to control costs and it is negative relation with profit so when the costs is managed it will increase efficiency therefore it have direct effect on profitability ,the cost to income ratio is used to measure banks operational efficiency the cost to income ratio is calculated by divided the overhead costs (cost of operating ) a bank to the income generated before provision. (Sufian and chong, 2009).

Further, the efficiency of banks is directly linked to the productivity of the economy. Without a sound and efficiently functioning banking system, the economy cannot function smoothly and efficiently. When banking system fails, the whole of a nation's payment system is in jeopardy. From the point of view of customers, only efficient banks can offer better services at reasonable prices, the standpoint of stakeholders is that only efficient banks ensure reasonable returns. The perspective of bank managers is that in a dynamic and competitive market environment, only efficient banks will survive and maintain their market share, and inefficient ones will eventually be eliminated . The efficient banks are better able to compete because of their lower operational costs and can steal business away from less efficient banks. In sum, the relative efficiency of banks is always a matter of serious interest to the regulators, customers, stakeholders, and managers because efficiency is a broader concept; it involves optimally choosing the levels, and mixes of inputs and outputs.

#### **2.4.5. Diversification of Income and its impact on Profitability**

Uzhegova, (2010) stated that the decline of interest in the bank forces the bank to find another source of finance or source of revenue this concept of revenue leads to portfolio theory which states that the firm can minimize the risk by diversifying their portfolio there is a debate about the benefit and cost of diversification in banking some believes that diversification provide stable income and also noted that as a result of activity diversification,

the economies of scale and scope caused through the joint production of financial activities leads to increase in the efficiency of banking organizations, The product mix reduces the risk because income from other sources is not related to the original source so diversification should provide to income and stable profit.

Senyo,et al (2015) stated that The conventional wisdom in the banking industry is that earnings from fee-based products are more stable than loan-based earnings, and that fee-based activities reduce bank risk via diversification, in fact interest income remains highest contributor to bank Profits non-interest sources of revenue play an augmenting role in times where there are short falls in interest revenue. (DeYoung and Rice 2004), banks are increasingly exploiting nontraditional source of generating income, to the extent that in recent times, almost half of banks' incomes in the US are obtained from nontraditional activities and this reflects not only a diversification of banks into nontraditional activities, but also a shift in the way banks earn money.

The opposite argument to activity diversification is that it leads to increased agency costs, (Mihail, 2009) stated that activity diversification leads to increased organizational complexity and the potential for riskier behavior by bank managers. Mentioned that activity diversification results in more complex organizations which make it more difficult for top management to monitor the behavior of the other divisions/branches, they further argued that the benefits of economies of scale/scope exist only to a point. The costs associated with a firm's increased complexity may overshadow the benefits of diversification. Using annual bank level data of all Philippines commercial banks (Sufian and Chong 2008) found a positive relationship between income diversification and bank profitability. And total non-interest income divided by total assets, a proxy for income diversification

#### **2.4.6. Bank size and its impact on profitability**

Bank size is one of the control variables that determine the Profitability of banks, In most literatures the effect of size on banks profitability are represented by total asset. (Ramlall 2009) indicated that size is used to capture the fact that larger banks are better placed than smaller banks in harnessing economies of scale in transactions and enjoy a higher level of profits. One of the most important questions underlying bank policy is which size optimizes

bank profitability, According to Athanasoglou et al., (2005) the effect of a growing size of a bank on profitability has been proved to be positive to a certain extent and used total assets measure of bank size. In the balance sheet, bank assets consist of short and long term in nature. In order to capture possible non linear relationship between size and profitability, the use of logarithm of total assets as a proxy for bank size is paramount. The rationale behind this thinking is because large banks are more likely to benefit from economies of scale. In this study it is assumed the bigger the bank size the higher the profitability. Bigger banks in terms of size enable to effectively diversify their assumed risks and respond more quickly to various changes in market conditions. Large firms have the capacity to diversify their investment portfolios and this could reduce their business risks. Large companies generally outperform smaller ones because they manage to utilize economies of scale and have the resources to attract and retain managerial talent. Therefore, it is expected that profitability is positively related with size of company.

## **2.5. Empirical Studies on Asset Liability Management**

Several studies have been conducted to examine the relationship between asset liability management and profitability in developed and developing countries for different banks. Given the amount of empirical literature available on the topic of this research it would have been quite difficult to present the results of all the studies.

Some of the studies are the study of Sheela and Bastray, (2015) examined the effect of Asset Liability Management (ALM) on the Commercial banks profitability in Indian financial market by taking into consideration one Public Sector Bank namely Union Bank of India and one private sector bank namely ICICI bank by using Gap Analysis Technique. The statistical tools, the multivariate statistical technique and Ratio analysis was used to interpret the financial statements and analyze the data this study primarily based on secondary data, and attempts to assess the interest rate risk that both the banks are exposed to, spread over a period from 2009 to 2014. The finding shows that it is evident that both banks are performing satisfactorily in terms of profitability and adequacy, but they are needs to address the immediate concern of liquidity. and also one of their finding was Indian bank is more profitable with good Asset-Liability Management strategy, Therefore Investors would be motivated to invest in a bank which has high profitability ratio.

Moore, (2006) investigated the impact of asset and liability management on financial performance of commercial banks in United Kingdom. The sample size consisted of 45 commercial banks. An explorative survey was used to test the relationship between the variables, the results of the study found a positive correlation between asset liability management and financial performance of commercial banks.

Gregory, (2013) investigated the relationship between asset liability management and financial performance of sampled service firms in America. The study used a longitudinal study research design. Secondary data for ten years was obtained from financial statements and records. Analysis of data was done using a regression model. The study concluded that there was a positive relationship between asset liability management and financial performance of service firms in United States.

Darush, (2013) did a study on the impact of asset liability management and financial performance of Swedish firms. The study used a cross-sectional survey design whereby secondary sources of data were obtained from the financial statements of Swedish micro firms. The study used descriptive statistics for analysis; the results established that there was a positive correlation between asset liability management and financial performance of Swedish micro firms.

Harvey, (2013) investigated the relationship between asset liability management and financial performance of commercial banks. The study used a cross-sectional research design. Panel data for 3 years was used. Data analysis was done using a regression model. The study concluded that there was a positive relationship between asset liability management and financial performance of service firms in United States.

DiMaggio, (2013) did a study on the impact of asset liability management and financial performance of Swedish firms. The study used a cross-sectional survey design whereby secondary sources of data were obtained from the financial statements of Swedish micro firms. The study used descriptive statistics for analysis; the results established that there was a positive correlation between asset liability management and financial performance of Swedish micro firms.

Rogers, (2005) investigated the impact of asset and liability management on financial performance of commercial banks in Scotland. The pop sample size consisted of 100 commercial banks. An explorative survey was used to test the relationship between the variables, the results of the study found a positive correlation between asset liability management and financial performance of commercial banks.

The study of Singh, (2013) attempt to analyze the impact of measures and strategies Indian banks undertook to manage the composition of asset-liability and its impact on their performance in general and profitability in particular the data used for this study was from 2005 to 2011 for both public and private sector banks. The asset liabilities were allocated and distributed in different maturity periods. To analyze the techniques of interest rates risk measurement Duration analysis has used, the finding shows that there are serious attempts by banks to minimize the asset liability mismatch since the implementation of RBI guidelines in 1997. Banks have made adequate follow up and monitoring arrangements at different levels.

The study of Saugatdas and Jain, (2015) tries to identify and analyze the asset-liability management of top five banks of India, CAMEL analysis has been used to test the liquidity and solvency of these banks, CAMEL include (capital adequacy ,resource deployed ,asset quality ,management quality ,earning ability ,liquidity) and the data collected for this study was secondary nature from the annual Reports of the respective banks for the accounting period 2009-14. Finally, a comparative analysis has been drawn between the selected banks to understand asset-liability situation over the previous five years. Their finding shows that Bank of India has not shown a good performance in any of the selected criteria and hence needs a complete check over its overall management and other credit policies. Bank of Baroda has also shown a weak performance in all factors except the management quality. Punjab National Bank and Canara Bank have performed well in most of the CAMEL factors while State Bank of India has shown a moderate status. So the CAMEL analysis is an important parameter in the analysis of Banks and it has an impact in the Profitability of banks.

The study of Sayeed and Hoque (2008 ), examines how asset and liability management together with external variables such as degree of market concentration and inflation rate impact the profitability of selected sixteen commercial banks in Bangladesh they are

classifying the bank as private and public bank their study was a comparative study . A modified Statistical Cost Accounting (SCA) model is applied to test whether the ALM of the private sector banks are better than public sector banks. The study considered 16 domestic commercial banks for the period from 1995 to 2006. The finding of the study shows that it is evident that Private Banks are better than public banks in terms of asset management, but they do not have any superiority over public banks in terms of liability management. This does not provide conclusive support that ALM in private banks is superior to ALM in public banks.

The study of Guthua,(2013) set out to investigate the effect of asset liability management on liquidity risk of commercial bank in Kenya, the study adopted descriptive design in its methodology All the 43 commercial banks of Kenya were targeted for the study and adopted fixed approach both primary and secondary data , Secondary data was obtained from annual Central bank of Kenya Banks supervision reports as well as banks annual and published financial reports while primary data was also collected by questionnaire method to supplement the secondary data. the finding of the study shows that there is a significant positive relationship between independent variables (return on equity, capital adequacy, loan to deposit ratio, return on assets, total assets, asset liability management policies, liquidity stress testing and contingency funding plan) and the dependent variable i.e. liquidity risk of commercial banks. The findings of the analysis conclude that independent variables have an effect on the liquidity risk of commercial banks in Kenya.

The study of Anjili, (2014) the study examine the effects of asset liability management on the financial performance of commercial banks in Kenya, The study employed secondary data and data was collected from the Central Bank of Kenya, published financial statement of banks and Banking Survey from 2004-2013 and also used the CAMEL approach which includes capital adequacy, asset quality, management efficiency, liquidity and operational efficiency the finding shows that all the CAMEL factors had a statistically significant impact on financial performance.

The study of Njogo, et al (2014) carried out a research on asset liability management on performance of some selected Nigerian commercial banks, The study examined the Asset and Liability management of 15 Nigerian banks from 2008 to 2012 in order to carried the study secondary source of data was used , the study adopted the Statistical Cost Accounting (SCA) Model with some adjustment to examine the effect of asset and liabilities on Profitability of banks of Nigeria during the sample period of 2008-2012.the finding shows that all the parameter of assets and liability management of Nigerian banks had positive and significant impact on profitability within the period of this study. This shows that the due process of asset and liability management instituted by the apex regulatory authorities in Nigeria within the period of this study have been effective.

The study of Kumar and Dhar, (2014) focused on the analysis and comparison of liquidity ratios and asset liability management practices in top three banks from public, private and foreign sector in India, The analysis is based upon the liquidity ratios calculation and the determination of maturity gap profiles for the banks under study. The paper also compares these banks maturity gap profiles with their corresponding group's maturity gap profiles. And identifies the interest rate sensitivity of the balance sheet items of these banks to determine the gap between rate sensitive assets and rate sensitive liabilities. The results of this study suggest that overall banks in India have very good short term liquidity position and all banks are financing their short term liabilities by their long term assets.

The Study of Trenca and Cociuba, (2014). Analyze the asset liability management in banks for 2004-2011 periods, using a panel of over 30 banks. The analysis is carried using the canonical correlations (Hotelling, 1936), analyses the relationship between assets and liabilities using the canonical correlation technique on a data panel set of 30 banks, The data set consists of annual financial statement of 33 banks cover the period between 2004-2011 the finding of the study shows that the risk level, earnings, liquidity, profit, solvency, the level of loans and deposits, and economic crisis affect the profitability of banks.

The study of Makau and Memba, (2014) examined the influence of asset liability on financial performance of commercial banks in Kenya with specific interest in Diamond Trust Bank. The objectives of the study was to determine the influence of customer deposits, loans

advanced to customers, management of the loans advanced to customers and management of loans from other banks influence the Net Interest Income (NII) of Diamond Trust Bank, The study adopted a case study design and made use of Secondary data which was obtained from the bank's annual audited financial statements from 2006-2013. the finding shows that the case of Diamond Trust Bank increase Net Interest Income by increasing the amounts of loans to customers, the customer deposits and loans are rising highly but the good thing is that the loans can be well cushioned by the deposits from customers hence no need for loans from other banks. So asset liability management has direct impact on profitability of banks.

The study of Obari, (2015) set out to determine the effect of asset liability management on profitability of commercial banks in Kenya, collected secondary data from published financial statements of 44 commercial banks in Kenya for the period 2010 to 2014 and used ROA as the Profitability proxies and independent variables namely; Size, Capital structure and asset liability management position of the bank. The findings show that there is a statistically significant positive relationship between bank size and Profitability and a statistically significant negative relationship between capital structure and financial performance.

The study of Thuku ,(2015) used secondary sources of data and descriptive research design to establish the relationship between asset liability management and profitability of microfinance banks in Kenya, The study carried out a census survey of nine (9) microfinance banks that had been in operation for five years (2010-2014), Data analysis was done using descriptive statistics, correlation analysis and regression analysis, the correlation results shows that there was no correlation between asset quality, liquidity and firm size with Profitability of microfinance banks in Kenya apart from operating efficiency which was strongly correlated to Profitability of microfinance banks in Kenya. The finding of the study shows Logarithm of assets and operating efficiency were found to be statistically significant in the model. On the contrary, asset quality and liquidity were found to be statistically insignificant in general the regression results concluded that asset and liability management was negatively significant with profitability of microfinance banks in Kenya.

## **Review of previous studies in Ethiopia**

Asset-Liability management is the art and science of measuring and managing risk in the banking operations. Risk management in banks is aimed at maximizing shareholders' wealth besides maintaining sound capital, An efficient asset-liability management requires maximizing firms profit as well as controlling and lowering various risks the primary aim of this process deals with maximization of liquidity, revenue, capital adequacy, and market subject to strategic financial management, in order to progress the profitability of banks.

However In the context of Ethiopia, to the knowledge of the researcher, there appears to be Single study exclusively focused on impact of asset liability management on Profitability of banks in Ethiopia, the study of tamiru (2013), But as asset liability management as one of risk management tools, there are a few studies in Ethiopia about risk management and Profitability like Eneyew (2013), Endaweke (2015) and Tsion (2015). So researcher includes those related studies .This particular section provides a detailed review of related studies conducted in Ethiopia.

The study of Tamiru, (2013) carried out a research on asset liability management and commercial Banks profitability in Ethiopia this study examined the effect of ALM on commercial banks profitability in the Ethiopian financial market. The SCA model was used to estimate the profitability which is measured by ROA as a function of balance sheet and macroeconomic explanatory variables. For this purpose eight commercial banks over the time period from 2005 to 2010 were selected. By adopting the pooled OLS method, the regression results were estimated, the empirical findings of this study provide evidence 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. The macroeconomic variables incorporated in this study model were the real growth rate (GDP) and the general Rate of inflation. They have negative effect on commercial banks profitability in general, assets management, mainly loans and advances, contributes positively for the profitability of commercial banks, except fixed assets. While liability management, particularly saving and fixed deposits and other liabilities and credit balances, cost affects negatively the profitability of commercial banks. Therefore, he concludes that in

the Ethiopian commercial banking market, assets management positively and liability management negatively affects profitability.

Eneyew (2013) conducted his study on the impact of financial risks on the profitability of commercial banks for a total of eight commercial banks in Ethiopia, covering the period of 2000-2011. The study adopted a mixed methods research approach by combining documentary analysis and in depth interviews. The findings of the study show that Credit risk and liquidity risk have a negative and statistically significant relationship with banks' profitability.

The study conducted by Endaweke (2015) examined Risk management and its impact on performance in Ethiopian Commercial Banks, balanced fixed effect panel regression was used for the data of 8 commercial banks in the sample covered the period from 2002 - 2013. The results of panel data regression analysis showed that credit risk management indicator, Liquidity risk management indicator and operational risk indicator had negative and statistically significant impact on banks performance. Capital adequacy ratio had positive statistically insignificant impact on banks performance. In addition to this, analysis of primary data by descriptive statistical tools and on hypothesis testing using regression model was used, finally he conclude that banks with good risk management policies have a lower risk and relatively higher return on asset, and also non performing loan ratio, liquidity ratio and cost to income ratio are significant key drivers of performance of commercial banks in Ethiopia.

Tsion, (2015) examined the effectiveness of risk management practice of commercial banks operating in Ethiopia. Information was obtained from 15 purposely sampled commercial banks & adopted concurrent mixed research design. Open and closed-ended questionnaires were administered to 86 respondents from selected commercial banks. The main conclusions of the paper were: risk managers perceive risk management as critical to their banks performance; the types of risks causing the greatest exposures are credit risk, operational risk, liquidity risk, interest rate risk and foreign exchange risk; there was a reasonable level of success with current risk management practices and, banks are utilizing some of the

approaches/techniques traditionally used to manage risks. She finally concluded that banks operating in Ethiopia are indeed risk-focused.

## **2.6. Conclusion and knowledge Gap**

From the review of the relevant literature relating to impact of asset liability management on bank performance, it's possible to see the existence of knowledge gap, The results of the empirical findings confirms to the hypothesis of the study which predicts the existence of a positive relationship between asset liability management and profitability of commercial banks in Ethiopia and also Literature has confirmed that poor management of assets and liabilities exposes the firm into financial risks that might impact negatively on the profitability of the firm. The firm should therefore work towards achieving a proper match between assets and liabilities. This is also consistent with the theories of the study which shows that firms that maintain a proper fit between their assets and liabilities achieve profitability as compared to those firms that do not effectively balance their assets and liabilities.

However in the case of Ethiopia to the knowledge of the researcher there exists single study undertaken by Tamiru, (2013) examine the effect of asset liability management on Profitability of bank in Ethiopia and he focused on asset liability management elements but this study come up with other aspect of asset liability management that affect the Profitability of banks in Ethiopia, Targeted factors include capital adequacy, asset quality, operational efficiency, liquidity and income diversification. Because these variables are very important variables which can significantly affects the performance of Ethiopian banking industry.

## **2.7. Hypothesis of the Study**

Hypotheses of the study stands on the theories related to Profitability that have been developed over the years by banking industry and empirical studies that are mentioned in this paper related to asset liability management and financial performance. The results from the literature review were used to establish expectations for the relationship of dependent and independent variables. Therefore, In order to achieve the objective of the study the researcher developed the following six testable hypotheses (*H01- H06*):

*HO1; capital adequacy has a positive and significant effect on Profitability of commercial banks' in Ethiopia.*

*HO2; Asset quality has a negative and significant effect on Profitability of commercial banks' in Ethiopia.*

*HO3; Operational efficiency has negative and significant effect on Profitability of commercial banks' in Ethiopia.*

*HO4; Liquidity has a positive and significant effect on Profitability of commercial banks' in Ethiopia*

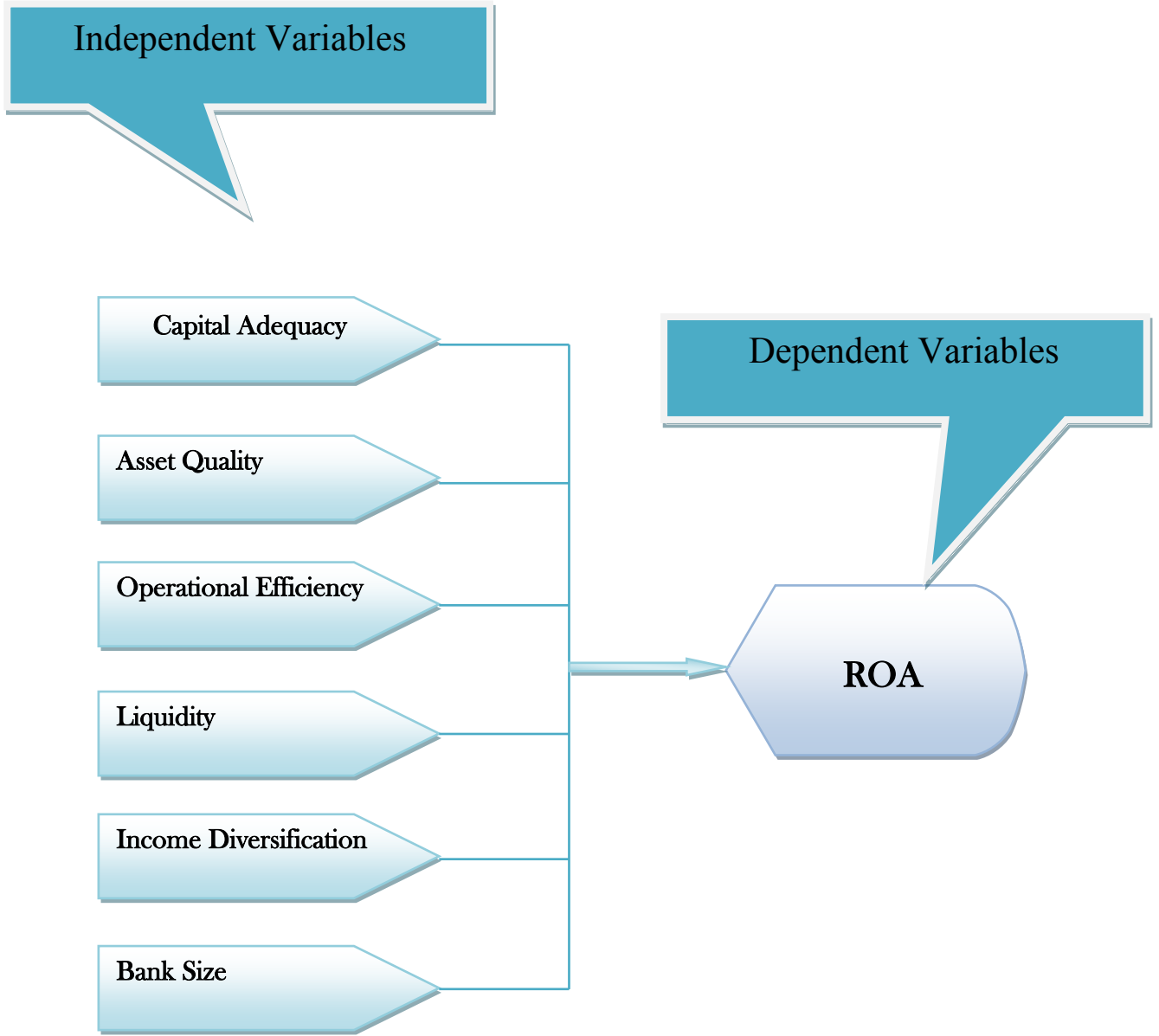
*HO5; Income diversification has a positive and significant effect on Profitability of commercial banks' in Ethiopia.*

*HO6; bank size has a positive and significant effect on Profitability of commercial banks' in Ethiopia.*

## **2.8. Conceptual Framework**

Conceptual framework as a framework that is structured from a set of broad ideas and theories that help a researcher to properly identify the problem they are looking at frame their questions and find suitable literature (Smyth ,2004) .conceptual framework of the study consist of independent variables; capital adequacy, asset quality, operational efficiency, liquidity, income diversification, bank size and dependent variable; Profitability(ROA), Based on the insights gained from review of the literature, the following conceptual Framework showing the relationship between asset liability management variable and Profitability was created.

**Figure 2.1 Conceptual Framework**



*Source: Researcher design based on theories and empirical literature review*

## **CHAPTER THREE: RESEARCH METHODOLOGY**

The chapter of the research outlines the overall research methodology that is used in the study. This includes the research design, population, data collection, data validity and reliability and data analysis. The preceding chapter presented reviews of literature on asset liability management with respect to the theoretical perspectives and prior empirical studies. The results from a review of the literature are used to establish expectations for the relationship of asset liability management and its impact on Profitability of banks. This chapter outlines and explains the methodology used to achieve the research objective and test the research hypotheses formulated in the study.

First section provides a brief overview of the research approach followed section two with the research design and section three discussed about population and sampling techniques adopted in the study, section four includes sources of data & collection instruments and section five discussed about data analysis technique used in the study, then section six present variable definition, measurements and research hypothesis Section seven discussed about the model specifications.

### **3.1. Research approach**

Research approach is the general framework for the study that links, knowledge claims, strategies of enquiry and specific methods. The research approach implicitly reflects the researcher attitude as to how knowledge is constructed and also commands what method to be employed in the study. As noted in (Creswell 2009), there are three research paradigms; these are quantitative research, qualitative research, and mixed research. (Jonker and Pennink ,2010) contended that the essence of quantitative research is to use a theory to frame and thus understand the problem at hand. Quantitative purists believe time and Context free generalizations are desirable and possible, and real causes of social scientific Outcomes can be determined reliably and validly and it is a means for testing objective theories by examining the relationship among variables therefore quantitative research design is appealing for this study to achieve the objectives of the study and to test the hypothesis.

### **3.2. Research Design**

The research problem tends to be explanatory which seeks to explain the relationship between asset liability management and financial performance. The explanatory type of research design helps to identify and evaluate the causal relationships between the different variables under consideration, If the objective is to determine which variable might be causing a certain behavior, i.e. whether there is a cause and effect relationship between variables, explanatory research must be undertaken (Shields, 2013). Therefore To achieve this objective explanatory research design is employed in the study.

### **3.3. Population and sample**

The population of a research applies to the collection of all possible individuals, objects or measurements of interest Mason et al, (1999). The identification of the population of the research question helps in narrowing down to the specific objective that is the subject matter of the research. For the study the target population would be all commercial banks registered by NBE and under operation in the country. Currently, the country has two state owned and sixteen private commercial banks which are operating throughout the country.

As noted in Jonker and Pennink, (2010) it is obvious that researchers are typically unable to study the entire population. Therefore, researchers typically study a subset of the population which is known as a sample. A sample is a portion of the population that inferences are to be made about the population. However, it is important that the sample be representative of the population from which it was selected. So that because of lack of twelve years data that is required for the analysis purpose in most of the newly established private banks the number of sample banks is reduced to seven, The researcher excluded the state owned banks such as commercial bank of Ethiopia, and development banks because mostly when we compare the results of the government owned and the private one the gap is extremely large but the main reason is they have other mission other than the normal operation of the sector. for instance Development Bank of Ethiopia which is a public bank is not included in the sample because it has additional mission other than its commercial nature and this will enhance the relationship between variables. Furthermore, some of recently established commercial banks which are operating in the Ethiopian financial market are not included in the sample because

either they have no full data in the sample period or they may not be able to significantly influence the criteria used in the sample; Moreover, these commercial banks were at their infancy stage; as a result, their financial statement may not portray the true relationship between variables. The time period selected to this study by considering the availability of data and the limitation of short panel was the year from 2005 to 2016.

Those samples banks were include (cooperative bank of oromia , Dashen Bank, Awash International Bank, Bank of Abyssinia, Wegagen Bank, United Bank, and Nib Bank) operating in Ethiopia. The researcher believes that the sample size is sufficient to make sound conclusion about the population.

**Table 3.1 List of the sample commercial Banks**

no	Name of Commercial Banks	Year of establishment
1	Awash International Bank	1994
2	Dashen Bank	1995
3	Bank of Abyssinia	1996
4	Wegagen Bank	1997
5	United Bank	1998
6	Nib International Bank	1999
7	Cooperative Bank of Oromia	2005

### **3.4. Source of Data and Data Collection Instruments**

The data required for this study were collected from NBE (which is responsible for maintaining the audited financial statements of all banks operating in Ethiopia and regulate their operating activities), and from each sampled commercial banks and their website of seven banks (CBO, AIB, DB, WB, BOA, UB and NIB) for 12 consecutive year's .i.e., from 2005-2016 was collected. Secondary data is utilized than the primary data sources which would allow given the confidentiality nature of the data, biased responses among the respondents and response rate considerations. The main reason that this study focused on commercial banks was to avoid comparison between different types of bank like , development banks, micro finances etc and to maintain homogeneity of data.

### **3.5. Data analysis techniques**

To comply with the objective, the paper primarily base on panel data, collected from secondary data. As noted in Baltagi (2005) the advantage of using panel data is that it controls for individual heterogeneity, less co linearity among variables and tracks trends in the data something which simple time series and cross sectional data cannot provide. Thus, the collected panel data analyses by using descriptive statistics, correlations, regression analysis and inferential statistics. Mean values and standard deviations are used to analyze. The general trends of the data from 2005 to 2016 based on the sector sample of 7 banks and a correlation matrix used to examine the relationship between the dependent variable and explanatory variables. A regression model and t-static used to determine the relative importance of each independent variable in influencing financial performance, and the study conducted regression analysis by using EVIEWS 8 econometric software package, to test the casual relationship between the asset liability management and Profitability and to determine the most significant and influential explanatory variables affecting the performance of Ethiopian banks. And also diagnostics tests of CLRM assumptions including Multicollinearity, Heteroskedasticity and autocorrelation and normality tests were conducted to ensure safe application of multiple linear regression models.

### **3.6. Variables definition, measurement and research hypothesis**

#### **3.6.1 Dependent variable**

In this study the dependent variable is profitability, the most commonly used Profitability ratios are namely ROA and ROE, NET PROFIT MARGIN. ROA reflects the ability of bank's management to generate profits from the bank's assets, although it may be biased due to off balance sheet activities. ROE shows the return to the shareholders on their equity.

Ahmed and Khababa, (1999) in their assessment of bank performance in Saudi Arabia employed three ratios as measures of performance that is return on equity (ROE), Return on Assets (ROA) and percentage change in earnings per share. (Sinkey, 1992) posits that return on asset is a comprehensive measure of overall bank performance from an accounting perspective being a primary indicator of managerial efficiency as it indicates how capable the

management of a bank has been in converting the bank's asset into net earnings. Rose and Hudgins (2006) however maintain that ROE is a good measure of accounting profitability from the shareholders perspective. It approximates the net benefit that the stockholders have received from investing their capital. Akintoye (2004) also identified three ratios that can be used as proxies for organizational performance namely: Net Profit Margin (NPMARG), Return on Capital Employed (ROCE), and Return on Assets (ROA).

As highlighted by Athanasoglou et al. (2008) and Sufian (2011). Many scholars suggest that ROA is the key ratio for the evaluation of bank profitability given that ROA is not distorted by high equity multipliers, while ROE disregards the risks associated with high leverage and financial leverage. In this respect, and rarely find the paper utilizes ROE as a single measure of profitability. Other papers utilize ROE for checking the consistency with ROA While a bulk of studies employ ROA as profitability measure in most of the previous studies on banking industry, return on assets (ROA) is being used as a proxy of profitability (Tamiru 2013) ;( Thuku 2015); .Therefore, this study attempts to measure profitability by using ROA similar to most of the aforementioned researchers, ROA is measured as net profit before tax divided by total assets.  $ROA = \text{NET PROFIT BEFORE TAX} / \text{TOTAL ASSET}$ .

### **3.6.2. Independent variable**

This subsection describes the independent variables that are used in the econometric model to estimate the dependent variable. To measure the predictor variables of banks performance in Ethiopia, six factors are used as independent variables which are extracted from different studies. The variables namely; capital adequacy, asset quality, operational efficiency, liquidity, income diversification, and bank size.

#### **3.6.2.1. Capital adequacy**

This analysis firstly examines the leverage structure of a bank by using the equity to total asset ratio (the inverse of the leverage ratio).The equity to asset ratio, measures how much of bank's assets are funded with owner's funds and is a proxy for the capital adequacy of a bank by estimating the ability to absorb losses. As the literature review pointed out, academic

research is mixed regarding the relationship between the equity to asset ratio and banks profitability.

Koch, (1995) , Beckmann (2007) argue that high capital leads to low profits since banks with a high capital ratio are risk-averse, they ignore potential (risky) investment opportunities and, as a result, investors demand a lower return on their capital in exchange for lower risk, Following the risk-return tradeoff, a higher equity-to-asset ratio leads to a lower expected return. Opposed to the risk-return hypothesis, Berger (1995) examines the signaling hypothesis and bankruptcy cost hypothesis; suggesting that a higher equity-to-asset ratio increase profitability due to signaling issues or lower costs of financial distress. Thus, the expected sign of the equity to asset ratio is unpredictable based on prior research. But positive and significant relationship between capital adequacy and profitability is expected in relation to the study. The following hypothesis is formulated based on the rationale stated above.

Hypothesis:

*H01; capital adequacy has a positive and significant effect on Profitability of commercial banks' in Ethiopia. .*

And a proxy to measure capital adequacy is total equity to total asset (total equity /total asset)

### **3.6.2.2. Asset Quality**

There appears to be an agreement that bank profitability is directly related to the quality of the assets on its balance sheet, poor credit quality has a negative effect on bank profitability and vice versa. This relationship exists because an increase in the doubtful assets, which do not accrue income, requires a bank to allocate a significant portion of its gross margin to provisions to cover expected credit losses; thus, profitability will be lower. This was in line with the theory that increased exposure to credit risk is normally associated with decreased firm profitability. Indicating that banks would improve profitability by improving screening and monitoring of credit risk, However Koch (1995) argues that a good measure of credit risk or asset quality is the ratio of loan loss reserve to total loan loans because it captures the expectation of management with regard to the performance of loans. Hempel et al (1994) observed that banks with high loan growth often assume more risk.

Kosmidou (2008) applied a linear regression model on Greece 23 commercial banks data for 1990 to 2002, using ROA and the ratio of loan loss reserve to gross loans as proxy profitability and asset quality respectively. The results showed a negative significant impact of asset quality to bank profitability. This was in line with the theory that increased exposure to credit risk is normally associated with decreased firm profitability.

Previous studies found a negative relationship between profitability and asset quality. Therefore, in this study a negative relationship between asset quality and profitability is expected in relation to the study. The following hypothesis is formulated based on the rationale stated above.

Hypothesis:

*H02; Asset quality has a negative and significant effect on Profitability of commercial banks' in Ethiopia.*

The proxy to measure asset quality applied in this study is loan loss provision to total loan (loan loss provision / total loan)

### **3.6.2.3. Operational efficiency**

Cost to income ratio shows the overheads or costs of running the bank, including staff salaries and benefits, occupancy expenses and other expenses such as office supplies, It is used as an indicator of management's ability to control costs and is expected to have a negative relation with profits, since improved management of these expenses will increase efficiency and therefore raise profits. It is also one of the key drivers of profitability that is examined.

Similar to Pasiouras & Kosmidou (2007), the cost to income ratio is used, to measure banks operational efficiency. The cost to income ratio is calculated by dividing the overhead costs (costs of operating a bank) to the income generated before provisions. Those researchers found that better efficiency is associated with higher profitability.

Based on the above discussion the researcher develops the following hypothesis.

Hypothesis

*H03; Operational efficiency has negative and significant effect on Profitability of commercial banks' in Ethiopia.*

A proxy to measure operational efficiency is operating cost to total income (operating cost /operating income)

#### **3.6.2.4. Liquidity**

Liquidity refers to the ability of an institution to meet demands for funds. Liquidity management means ensuring that the institution maintains sufficient cash and liquid assets, to satisfy client demand for loans and savings withdrawals, and to pay the institution's expenses. Liquidity management involves a daily analysis and detailed estimation of the size and timing of cash inflows and outflows over the coming days and weeks to minimize the risk that savers will be unable to access their deposits in the moments they demand them, It is argued that when banks hold high liquidity, they do so at the opportunity cost of some investment, which could generate high returns (Kamau, 2009).

Authors like Moore (2009), Vodova (2011,2012, and 2013) measured liquidity ratio by employing liquid assets to total assets, liquid assets to deposits, loans to total assets, loans to deposits, loans to deposits & short term borrowings and total loan to total liabilities. To this end, the stock approach employs various balance sheet ratios to identify liquidity trends. Thus, the stock approaches are more popular in practice and in the academic literature than the flow approach due to more data intensive and there is no standard technique to forecast inflows and outflows, And also the national bank of Ethiopia has set the minimum liquid asset of the bank not to be less than 15% of the bank net current liability out of this the directive obliged that banks to hold 5 % of them in primary reserve asset. But in this study the ratio of loan to deposit ratio had adopted in order to compute liquidity ratio.

Based on the above discussion the researcher develops the following hypothesis.

Hypothesis;

*HO4; Liquidity has a positive and significant effect on Profitability of commercial banks' in Ethiopia.*

A proxy to measure liquidity is total loan to total deposit (total loan / total deposit)

### **3.6.2.5 Diversification of Income**

As cited in Anjili, (2014) the decline of interest in the bank forces the bank to find another source of finance or source of revenue this concept of revenue leads to portfolio theory which states that the firm can minimize the risk by diversifying their portfolio, there is a debate about the benefit and cost of diversification in banking some believes that diversification provide stable income. The proponents of activity diversification or product mix argue that diversification provides a stable and less volatile income, economies of scope and scale, and the ability to leverage managerial efficiency across products .(Choi and Kotrozo, 2006). Chiorazzo et, al (2008) noted that as a result of activity diversification, the economies of Scale and scope caused through the joint production of financial activities leads to Increase in the efficiency of banking organizations they also further argue that product mix reduces total risk.

Using annual bank level data of all Philippines commercial banks Sufian and Chong (2008) found a positive relationship between total non interests incomes divided by total income, a proxy for income diversification. (Uzhegova ,2010) using a HH index of interest income, commissions, fee income, trading income, non-interest income and other operating income found empirical support of the idea that banks involved in diversification activities expect some benefits, Based on the above discussion the researcher develop the following hypothesis.

Hypothesis

*HO5; Income diversification has a positive and significant effect on Profitability of commercial banks' in Ethiopia.*

A proxy to measure income diversification is non interest income to total income (non interest income/total income)

### 3.6.2.6. Bank size

Ahmed and Khababa, (1999) argue that there exists a positive relationship between Profitability and firm size due to operating costs efficiencies through increasing output and economizing on unit of cost. Bigger banks in terms of size enable banks to effectively diversify their assumed risks and respond more quickly to various changes in market conditions. Large firms have the capacity to diversify their investment portfolios and this could reduce their business risks. Large companies generally outperform smaller ones because they manage to utilize economies of scale and have the resources to attract and retain managerial talent. Therefore, it is expected that performance is positively related with size of company.

Based on the above discussion the researcher develops the following hypothesis.

Hypothesis;

*H06; bank size has a positive and significant effect on Profitability of commercial banks' in Ethiopia.*

A proxy to measure size of the bank is computed as natural logarithm of total assets of banks.

$BZ = \text{Log} (\text{Total asset}).$

### 3.7. Model specification

In order to test the research hypothesis and used to test the relationship between variables the model was developed ,according to brook (2008 ) If there are more than one independent variables, the model appropriate to test the significance of these variables to explain about the change on dependent variable would be multiple regression model . In order to achieve the objectives of this study, multiple regression model were used.

Modeling is based on panel data techniques. Comprises of both cross sectional elements and time series elements; the cross sectional element is reflected by the 7 private banks and the time series element is reflected the period of study (2005-2016). Panel data is favored over time series or cross sectional data because it can control for individual heterogeneity and there is a less degree of multi-linearity between variables. (Altai, 2005).

The process of measurement is central to quantitative research because it provides the fundamental connection between empirical observation and mathematical expression of quantitative relationships Brooks, (2008).

According to Brooks, (2008), the general multivariate regression model with K independent variables can be written as follows:-

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + \epsilon_i \quad (i = 1, 2, 3, \dots, n)$$

Where  $Y_i$  is the  $i^{\text{th}}$  observation of the dependent variable,  $X_{1i}, \dots, X_{ki}$  are the  $i^{\text{th}}$  observation of the independent variables,  $\beta_0, \dots, \beta_k$  are the regression coefficients,  $\epsilon_i$  is the  $i^{\text{th}}$  observation of the stochastic error term, and  $n$  is the number of observations. Hence, the effect of asset liability management on Profitability can be modeled as described below:-

$$ROA = \beta_0 + \beta_1 CA_{i,t} + \beta_2 AQ_{i,t} + \beta_3 OE_{i,t} + \beta_4 LIQ_{i,t} + \beta_5 ID_{i,t} + \beta_6 SIZE_{i,t} + \epsilon_i$$

Subscript I refer to firm i, and subscript t refers to year t.

Where

ROA= denotes the dependent variable (profitability) measured by Return on asset (net profit before tax /total asset)

CA=Capital Adequacy Ratio (total equity / total asset)

AQ=Asset Quality (loan loss provision /total loan)

OE=operational efficiency (operating cost /operating income)

LIQ=Liquidity ratio (total loan /total deposit)

ID=income diversification (non interest income /total income)

Where

$\beta_0$  = Constant term

$\beta_1, 2, 3 \dots 7$  are parameters to be estimated;

$\epsilon$  = is the error component for company i at time t assumed to have mean zero  $E[\epsilon_{it}] = 0$

i = sampled banks  $i = 1 \dots 7$ ; and t = the index of time periods.

## CHAPTER FOUR; RESULT AND DISCUSSION

This chapter presents the results and analysis of data of selected bank in Ethiopia using the annual balanced panel data, where all the variables are observed for each cross-section and each time period. The study has a time series segment covering from the period 2005 up to 2016 and a cross section segment which considered seven selected private banks. The chapter organized into five sections. Section one presents descriptive statistics, section two correlation analysis, section three tests for the classical linear regression model assumptions, section four model diagnosis and section five analysis of results. 4.1. Descriptive statistics, 4.2. Correlation Analysis among Dependent and Independent Variables, 4.3. Testing for Classical Linear Regression Model and other assumptions, 4.4.model diagnosis 4.5. Results and Discussion

### 4.1.Descriptive Statistics

The descriptive statistics of the dependent and independent variables for the sample banks were summarize in table 4.1 from the year 2005 to 2016 the total observation of the study was 84. Also, the table shows the mean, median, standard deviation, minimum and maximum values for the dependent and independent variables, the variables described for include: profitability ratio, capital adequacy, asset quality, liquidity, income diversification, and operational efficiency and bank size.

Table 4.1 the descriptive statistics of dependent and independent variable

	ROA	CA	AQ	OE	LIQ	ID	SIZE
Mean	0.036014	0.159885	0.103577	0.030087	0.664714	0.434445	22.47561
Median	0.038852	0.130970	0.069458	0.028296	0.620197	0.447805	22.69655
Maximum	0.054899	0.668217	0.562503	0.056023	1.295918	0.649694	24.11136
Minimum	-0.00853	0.071053	0.000000	0.010620	0.200000	0.043659	18.67532
Std. Dev.	0.012294	0.101305	0.112380	0.008369	0.155622	0.131381	1.035287
Observations	84	84	84	84	84	84	84

*Source: Own computation from the financial statements using Eviews 8*

*Note: Return on Asset (ROA), capital adequacy (CA), Liquidity (LIQ), Bank size (SIZE), Asset Quality (AQ), operational efficiency (OE) and income diversification (ID).*

Table 4.1 shows the average indicators of variables computed from the financial statements and the standard deviation that shows how much dispersion exists from the average value. According to Brooks, (2008), a low standard deviation indicates that the data point tend to be very close to the mean, whereas high standard deviation indicates that the data point are spread out over a large range of values.

**Profitability;** as indicated in the above table 4.1 the Profitability measured by (ROA) shows that Ethiopian private banks achieved on average a positive of 3.6 % before tax over the last twelve years. The mean ROA (3.6%) indicated that During the period from 2005 to 2016 Ethiopian private banks maintained on average Profitability(ROA) was 3.6%, the range of ROA was a maximum of (5.4%) and a minimum of (-0.8%). That means the most successful banks among the sampled earned (5.4) %. The value of the standard deviation for ROA is 0.012294; this implies that the profitability of Ethiopian private banks varies from the mean by (1.2%). Which indicate that there was low variation from the mean, the lower standard deviation is a good indication that most of the observations are concentrated around the mean.

**Capital adequacy;** The mean value for capital adequacy measured by total equity to total asset (15.98%) with minimum and maximum of (7.1%) and (66.82%) respectively the standard deviation is high (10.13%) which means the capital adequacy of the banks vary from bank to bank and from time to time .

**Asset quality;** The mean value for asset quality measured by loan loss provision to total loan was (10.35%) with minimum and maximum of (0.000) and (56.25%) respectively however the standard deviation is high (11.23%) which indicated that there was a high dispersion from the mean value of asset, quality of Ethiopian private banks.

**Operational Efficiency;** The average value of operational efficiency measured by operating cost to total income was (3.00%) with minimum and maximum of (1.06%) and (5.60%) respectively The value of standard deviation (0.8) indicates a little bit dispersion from the

mean value of operational efficiency in the case of Ethiopia private banks .

**Liquidity;** the mean value of liquidity ratio which is measured by loan to deposit ratio was 66.47% which is above the current minimum regulatory requirement of 15% (NBE Directives No.SBB/57/2014). On the other hand, all the sampled banks are properly maintained the regulatory minimum requirement for the sampled period as their minimum liquidity ratio is (20%). However, the standard deviation is very high and stood at 15.56%, it mean that almost equal to the minimum liquidity regulatory requirement. On the other hand, the liquidity ratio is varying from bank to bank and from time to time within individual bank.

**Income Diversification;** the average value of income diversification measured by non interest income to total income was (43.44%) with minimum and maximum of (4.36%) and (64.96%) respectively however the standard deviation is high which is (13.13%) which indicated that there was a high dispersion from the mean value of income diversification on Ethiopian sampled private banks .

**Bank Size;** Bank size measured by logarithm of total asset is used as a proxy of size the mean of the logarithm of total assets during the period was (22.47). Having the minimum and maximum of (18.67) and (24.11) respectively and also there is relatively some variation in the size of the commercial banks in Ethiopia as the standard deviation is (1.03).

## **4.2. Correlation Analysis**

As noted in Brooks (2008), Correlation between two variables measures the degree of linear association between them. Values of the correlation coefficient are always ranged between positive one and negative one. A correlation coefficient of positive one indicates that a perfect positive association between the two variables; while a correlation coefficient of negative one indicates that a perfect negative association between the two variables. A correlation coefficient of zero, on the other hand, indicates that there is no linear relationship between the two variables.

The most widely used bi-variant correlation statistics is the Pearson product movement coefficient, commonly called the Pearson correlation, the result of the correlation analysis is shown in Table 4.2. It indicates a relationship between Profitability and bank size, income

diversification had positive relationship; capital adequacy, asset quality, operational efficiency and liquidity have negative relationship with banks profitability.

**Table 4.2**

Covariance Analysis: Ordinary

Sample: 2005 2016

Included observations: 84

Correlation	ROA	CA	AQ	OE	LIQ	ID	SIZE
ROA	1.000000						
CA	-0.459216	1.000000					
AQ	-0.346630	-0.086959	1.000000				
OE	-0.334409	-0.078572	0.548436	1.000000			
LIQ	-0.039270	0.033051	0.326527	0.197682	1.000000		
ID	0.515918	-0.383202	-0.111298	-0.045144	-0.297682	1.000000	
SIZE	0.491587	-0.571676	-0.122209	0.118484	-0.382906	0.365740	1.000000

*Source: Own computation from the financial statements using Eviews 8*

The correlation result in Table 4.2 shows that liquidity (LIQ), asset quality (AQ), operational efficiency (OE) and capital adequacy (CA) are negatively related to profitability of Ethiopian banks .which means when the increase in these factors leads in the decrease in profitability. Moreover, the coefficient estimates of correlation in the above table shows, (- 0.459216) for capital adequacy,(-0.346630) for asset quality,(-0.334409) for operational efficiency and (- 0.039270) for liquidity these implies that the correlation in these independent variables with the dependent variable is low. While income diversification (ID) and bank size (SIZE) is positively related with profitability. This means when the increase in these factors also leads to an increase in profitability of Ethiopian banks, in conclusion, there is no perfect correlation between dependent and independent variables as there is no 1 or -1 correlation between variables.

In general, even though the correlation analysis shows the direction and degree of associations between variables, it does not allow the researcher to make cause and affect inferences regarding the relationship between the identified variables. Thus, in examining the effects of selected independent variables on Profitability of banks the econometric regression analysis which is discussed in the forthcoming section of the paper gives assurance to overcome the shortcomings of correlation analysis.

### **4.3. Tests for the classical linear regression model (CLRM) assumptions**

When we say the regression model is fit the assumptions underlying in CLRM must be appropriate. The diagnostic tests should be conducted before the regression analysis is carried out which means the test of assumption of regression model is required. So different tests were run to make the data ready for analysis and to get reliable output from the Research. These tests were intended to check whether the CLRM assumptions are fulfilled when the explanatory variables are regressed against the dependent variables, accordingly, the following subsection presents tests of CLRM.

There are broadly two classes of panel estimator approaches that can be employed in financial research: fixed effects models (FEM) and random effects models (REM) (Brooks, 2008). In order to choose the appropriate model for this study the Hausman's misspecification test was used. The result is presented as follows.

According to brook (2008 ) It is often said that the random effects model is more appropriate when the entities in the sample can be thought of as having been randomly selected from the population, but a fixed effect model is more plausible when the entities in the sample effectively constitute the entire population, the random effects approach proposes different intercept terms for each entity and again these intercepts are constant over time, with the relationships between the explanatory and explained variables assumed to be the same both cross sectionally and temporally.

Random Effect Model: The rationale behind random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. Random effect model assume that the entity's error term is not correlated with the predictors which allows for time-invariant variables to play a role as explanatory variables (Oscar, 2007). The result of the test displayed below in table 4.3

Table 4.3

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

	Chi-Sq.		
Test Summary	Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	14.723142	6	0.0225

*Source: Own computation from the financial statements using Eviews 8.*

The null hypothesis of the test was that the random effect method is the preferred regression method. As shown above in table 4.3, random effect Hausman test provide statistical evidence of P-value of 0.0225, according to Brooks (2008) if the p-value for the test is less than 5%, indicating that the random effects model is not appropriate, The p-value for the test is less than 5%, indicating that the fixed effects specification is to be preferred. So in this case reject the null hypothesis that states that the random effect is appropriate and accept the alternative one.

Redundant Fixed Effects Tests: The fixed-effects model controls for all time-invariant differences between the individuals, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics. One side effect of the features of fixed effects model is that they cannot be used to investigate time-invariant causes of the dependent variables (Oscar, 2007). The pooled regression assumes that the intercepts are the same for each firm. This may be an inappropriate assumption, and Brooks (2008) recommended that we could instead estimate a model with firm fixed effects, which will allow for latent firm specific heterogeneity. The simplest types of fixed effects models allow the intercept in the regression model to differ cross-sectionally. To determine whether the fixed effects are necessary or not, this study run a redundant fixed effects test as recommended by Brooks (2008). The results of the test are summarized in the following table 4.4

Table 4.4

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.453857	(6,71)	0.0326
Cross-section Chi-square	15.829208	6	0.0147

*Source: Own computation from the financial statements using Eviews 8.*

Therefore, based on the above discussion and table the p value is less than 5 % the fixed effect model is preferable for this study. (Jean & Michel. 2006) suggested that the fixed effects model is preferred in cases where conclusions have to be made on the sample and if the observation (panel data) is less, fixed effects is more efficient than random effects, while the interests of random effects model are on the overall population.

#### 4.4 Model Diagnosis

##### Assumption one

The first assumption required is that the average value of the errors is zero. In fact, if a constant term is included in the regression equation, this assumption will never be violated if the regression did not include an intercept, and the average value of the errors was non zero but in this study the model constitute the constant term. A regression with no intercept parameter could lead to potentially severe biases in the slope coefficient estimates so by including the constant term in the model the researcher avoid this problem. (brook 2008 )

## Assumption two

### Heteroskedasticity

It is a test made to check whether error terms variance is constant (homoscedasticity) or not (heteroscedasticity). To test for the presence of heteroscedasticity (Brooks 2008), One of the important assumptions of the multiple regression reveals that the variance of the disturbance term is constant. This is called the assumption of homoscedasticity, If disturbance terms (errors) do not have constant variance, they are said to be heteroscedastic (Gujarat, 2003). Among the statistical tests for heteroscedasticity, the most popular method, a white test has to be made, null hypothesis stated that the error variances are all equal versus the alternative one stated that the error variance are a multiplicative function of one or more variables.

**Table 4.5**

Heteroskedasticity Test: White

F-statistic	0.486402	Prob. F(6,77)	0.8166
Obs*R-squared	3.067462	Prob. Chi-Square(6)	0.8003
Scaled explained SS	2.016487	Prob. Chi-Square(6)	0.9182

*Source: Own computation from the financial statements using Eviews 8*

According to the heteroscedastic : white test the assumption of homoscedasticity to be fulfilled F statistic, observed r square, scaled explained sum of square should be greater than 5 %. Which is presented on table 4.5 above shows that the probability of F-statistics, Observed R-square, and Scaled explained SS are (81.66 %) (80.03%), and (91.82%) respectively. In this case all the  $F$  statics and observed R-squared and explained sum of square versions of the test statistic give the same conclusion that there is no evidence for the presence of heteroscedasticity, since the  $p$ -values are considerably in excess of 0.05. (brook 2008 ) the null hypothesis stated that the variance of the errors is constant (homoscedasticity) should not be rejected.

### **Assumption three**

#### **Autocorrelation:**

As noted in Brooks (2008) this is an assumption that is assumed the errors are uncorrelated with One another, if the errors are not correlated with one another, it would be stated that they are ‘auto correlated’ or that they are serially correlated. The simplest and most popular test to detect the existence of autocorrelation is Durbin Watson (DW test). According to Brooks (2008) Durbin-Watson stat (DW-test) statistic near 2 suggest little evidence for autocorrelations and the null hypothesis stated that there is no auto- correlations would not be rejected.

According to brook (2008) The DW test does not follow a standard statistical distribution DW has 2 critical values: an upper critical value (DU) and a lower critical value (DL), and there is also an intermediate region where the null hypothesis of no autocorrelation can neither be rejected nor not Rejected. So, to reiterate, the null hypothesis is rejected and the existence of positive autocorrelation presumed if DW is less than the lower critical value; the null hypothesis is rejected and the existence of negative autocorrelation presumed if DW is greater than 4 minus the lower critical value; therefore the e view result shows that the  $DW = (1.967552)$  so the lower critical value  $(DL)=1.480$   $(DU)= 1.801$  and  $(4-DU)=2.199$  which means 1.967552 is between 1.480 and 2.199 this indicate that there is no evidence of autocorrelation and fail to reject the null hypothesis of no evidence of autocorrelation .

**Table 4.6: Autocorrelation test: Durbin Watson**

Variables DW test static result	1.967552
---------------------------------	----------

**Source:** Own computation from the financial statements using Eviews 8.

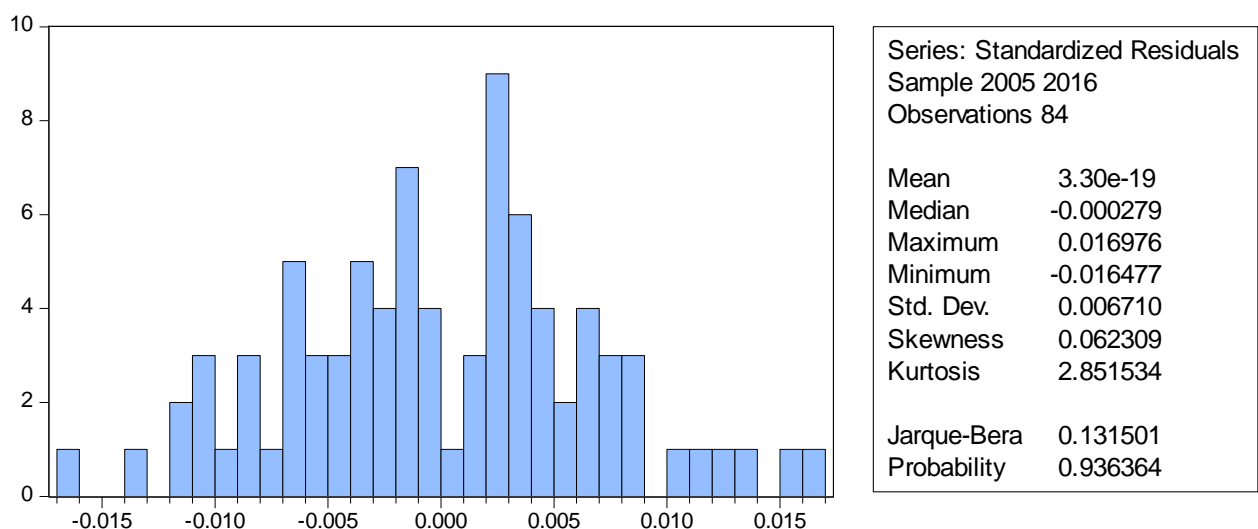
### **Assumption five**

Brook,(2008) stated that The disturbances are normally distributed Recall that the normality assumption ,One of the most commonly applied tests for normality is the Bera Jarque uses the property of a normally distributed random variable that the entire distribution is characterized by the first two moments the mean and the variance. The standardized third and fourth Moments of a distribution are known as its skewness and kurtosis.

A normal distribution will thus have a coefficient of excess kurtosis of zero. A normal distribution is symmetric and said to be mesokurtic, A normal distribution is symmetric about its mean, while a skewed Distribution will not be. (Brook, 2008), in order to conduct hypothesis test The Bera-Jarque probability statistics is also expected not to be significant (Brooks 2008).

**Normality test** The normality assumption is about the mean of the residuals is zero. In this study, the normality of the data was mainly checked with the popular Bera-Jarque test statistic (Brooks 2008). The Jarque-Bera statistic has a P-value of 93% implies that the p-value for the Jarque-Bera test for the model is very far greater than 5% which indicates that the errors are normally distributed. Furthermore, according to Brooks (2008) the standardized measurements of a distribution are known as its skewness and kurtosis. Skewness measures the extent to which a distribution is not symmetric about its mean value and kurtosis measures how fat the tails of the distribution area. A normal distribution is not skewed and is defined to have a coefficient of kurtosis of 3. Skewness that is normal involves a perfectly symmetric distribution. Kurtosis involves the peakedness of the distribution. Kurtosis that is normal involves a distribution that is bell-shaped and not too peaked or flat. The eviews results for the tests of both Skewness and Kurtosis are presented below figure 4.1 are fitted according to their expected conditions.

Figure 4.1 Normality



Source: Eviews 8 output

As shown in the above figure kurtosis close to three and skewness approaches to zero and the probability of jarque –bera is 93% which means greater than 5 % based on the statistical result, the study failed to reject the null hypothesis of residuals follows a normal distribution.

### **Multicollinearity**

Multicollinearity is an assumption of a linear relationship between explanatory variables that Creates biased regression model (Gujarati, 2004). This problem occurs when the explanatory variables are very highly correlated with each other. According to brook (2008) an implicit assumption that is made when using the OLS estimation method is that the explanatory variables are not correlated with one another. If there is no relationship between the explanatory variables, they would be said to be orthogonal to one another.

However, a problem occurs when the explanatory variables are very highly correlated with each other, and this problem is known as multicollinearity. It is possible to distinguish between two classes of multicollinearity: perfect multicollinearity and near multicollinearity. Perfect multicollinearity occurs when there is an exact relationship between two or more variables. In this case, it is not possible to estimate all of the coefficients in the model. Perfect multicollinearity will usually be observed only when the same explanatory variable is inadvertently used twice in a regression. Near multicollinearity is much more likely to occur in practice, and would arise when there was a non-negligible, but not perfect, relationship between two or more of the explanatory variables. But a high correlation between the dependent variable and one of the independent variables is not multicollinearity (brook 2008).

There is no clearly defined and consistent argument reached by the scholars for the presence of multicollinearity problem among the independent variables. Consequently, Hair et al (2006), argue that there is no series multicollinearity problem if correlation coefficient is below 0.9 And also Lewis-Beck, (1993) and Cooper and Schendlar, (2003) suggested that there is no multicollinerity problem if the correlation coefficient is below 0.8 therefore, there is no multicollinearity problem among the explanatory variables in the table 4.7 below as the maximum correlation coefficient is (0.548436) between asset quality and operational

efficiency and negatively (-0.571676) between capital adequacy and size, thus enhanced the reliability for regression analysis.

**Table 4.7**

Covariance Analysis: Ordinary

Sample: 2005 2016

Included observations: 84

Correlation	CA	AQ	OE	LIQ	ID	SIZE
CA	1.000000					
AQ	-0.086959	1.000000				
OE	-0.078572	0.548436	1.000000			
LIQ	0.033051	0.326527	0.197682	1.000000		
ID	-0.383202	-0.111298	-0.045144	-0.297682	1.000000	
SIZE	-0.571676	-0.122209	0.118484	-0.382906	0.365740	1.000000

**Source:** Own computation from the financial statements using Eviews 8.

#### 4.5. Regression Results and Analysis

The empirical findings from the econometric results on the effect of asset liability management on Profitability of banks in Ethiopia presented in this section. The section covers the empirical regression model used in this study and the results of the regression analysis. The following empirical model was used in order to identify the relationship between asset liability management and Profitability of banks in Ethiopia.

Table 4.8 below reports regression results between the dependent variable (ROA) and independent variables.

This section discusses in detail the analysis of the results for each explanatory variable and their importance in determining Profitability in private banks in Ethiopia. Furthermore, the discussion analyzes the statistical findings of the study in relation to the previous empirical evidences. Hence, the following discussions present the interpretation on the fixed effects model regression results and relationship between explanatory variables and profitability.

Table 4.8

Dependent Variable: ROA

Method: Panel Least Squares

Date: 05/03/17 Time: 16:48

Sample: 2005 2016

Periods included: 12

Cross-sections included: 7

Total panel (balanced) observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.072375	0.034394	-2.104311	0.0389
CA	-0.016886	0.009808	-1.721619	0.0895
AQ	-0.015363	0.007083	-2.168894	0.0334
OE	-0.508098	0.170144	-2.986282	0.0039
LIQ	0.024829	0.007089	3.502338	0.0008
ID	0.025803	0.006417	4.021118	0.0001
SIZE	0.004441	0.001496	2.968206	0.0041

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.702125	Mean dependent var	0.036014
Adjusted R-squared	0.651780	S.D. dependent var	0.012294
S.E. of regression	0.007255	Akaike info criterion	-6.872886
Sum squared resid	0.003737	Schwarz criterion	-6.496688
Log likelihood	301.6612	Hannan-Quinn criter	-.6.721658
F-statistic	13.94625	Durbin-Watson stat	1.967552
Prob(F-statistic)	0.000000		

*Source: Own computation from the financial statements using Eviews 8*

According to Brooks (2008) the standard error of the estimate is sometimes used as a broad measure of the fit of the regression. It is a measure of how confident one is in the coefficient estimate obtained in the first stage. If a standard error is small, the value of the test statistic will be large relative to the case where the standard error is large. Large standard error is undesirable; everything else being equal, the smaller this quantity is the closer is the fit of the line to the actual data. In this study, capital adequacy, asset quality, liquidity, income diversification and size had small standard error their corresponding standard error amount were (0.009808), (0.007083), (0.007089) & (0.006417). (0.001496) respectively.

Moreover, from the findings in the above table, the value of R-Square, also known as the Coefficient of determination is a commonly used statistic to evaluate model fit. R-squared defined that the square of a correlation coefficient; it must lie between 0 and 1. If this correlation is high, the model fits the data well, while if the correlation is low (close to zero), the model is not providing a good fit to the data. The adjusted R-squared compares the explanatory power of regression models that contain different numbers of predictors and it could control the extremes and the belatedness of the model. The value measures how well the regression model explains the actual variations in the dependent variable (Brooks, 2008). R-squared statistics and the adjusted R-squared statistics of the model was (70%) and (65%) respectively. The result of this estimation particularly the adjusted R-Squared indicates that the changes in the independent variables explain 65% of the changes in the dependent variable. This means the independent variable (capital adequacy, asset quality, operational efficiency, liquidity, income diversification, and bank size collectively explain 65 % of the changes in profitability. Thus the variables are good explanatory variables to identify the effects of asset liability management on banks Profitability in Ethiopia. However, the remaining 35% of changes was explained by other factors which are not included in the model.

Furthermore, F-statistic and Probability of (F-statistic) come as a pair and are used to test the hypothesis that none of the explanatory variables actually explain the dependent variable. Put more formally, the F-statistic computes the standard F-test of the joint hypothesis that all the coefficients, except the intercept, equal zero. Prob (F-statistic) displays the p-value corresponding to the reported F-statistic so in above table the F-statistic was 13.94 and Overall reliability and validity of the model was further enhanced by the Probability (F-

statistic) value (0.00000) which indicates strong statistical significance. indicates that the overall model is highly significant at 1% and that all the independent variables are jointly significant.

Table 4.8 above shows that five explanatory variables had significant impact on Profitability of Ethiopian private banks. The significant variables are asset quality, operational efficiency, liquidity, and income diversification and bank size were significant at 1% and 5% significant level since the p-value for those variables were (0.0334), (0.0039), (0.0008), (0.0001) & (0.0041), respectively. Only one variable had insignificant impact which is capital adequacy therefore above 50% of the variables is significant in this study.

The negative coefficient of explanatory variables against Profitability are; capital adequacy (-0.016886), asset quality (-0.015363), and operational efficiency (-0.508098). On the other hand, liquidity, income diversification and bank size had a positive relationship with the Profitability of banks in Ethiopia their coefficients were (0.024829), (0.025803) and (0.004441). Respectively.

#### **4.5.1 Capital adequacy and Profitability**

As the above fixed effect regressions model is presented the coefficient of capital adequacy measured by total equity over total asset is (-0.016886) and its p value is (0.0895). Holding other independent variables constant at their average value, when capital adequacy (total equity/total asset) decrease by one, profitability (ROA) of sampled Ethiopian private banks will increase by 1.68% and statistically insignificant at 5% of significant level. Therefore, the study reject the null hypothesis that capital adequacy has a positive and significant effect on Profitability of commercial banks' in Ethiopia, This means, there is no sufficient evidence to support the positive relationship between capital adequacy and profitability.

The possible reason for the negative relationship could be argue that high capital leads to low profits since banks with a high capital ratio are risk-averse, they ignore potential (risky) investment opportunities and, as a result, investors demand a lower return on their capital in exchange for lower risk. (Beckmann, 2007) because always highly profitable business is risky.

### **4.5.2 Asset quality and profitability**

As the above table shows that the coefficient of asset quality was (-0.015363) with the respective p value (0.0334) which is statistically significant at 5% of significant level, Holding other independent variables constant at their average value, when asset quality (loan loss provision /total loan) decrease by one, profitability (ROA) of sampled Ethiopian private banks will increase by (1.53%) and statistically significant at 5% of significant level. This means banks which fail to monitor their credit loans tend to be less profitable than those which pay particular attention to assets quality. This is in line with liquidity preference theory stated that increased exposure to credit risk is normally associated with decreased bank profitability which means Financial institution that lend out credit to borrowers must ensure the borrower's ability to pay the debt on time when borrowers are not able to pay the money on time this result credit risk this may prevent the firm from investing in profitable investment that promises higher returns in future, banks would improve profitability by improving screening and monitoring of credit risk. Therefore the study fail to reject the null hypothesis stated that Asset quality has a negative and significant effect on Profitability of commercial banks' in Ethiopia.

The finding of the study is matched with Kosmidou (2008) applied a linear regression model on Greece 23 commercial banks data for 1990 to 2002, using ROA and the ratio of loan loss reserve to gross loans to proxy profitability and asset quality respectively. The results showed a negative significant impact of asset quality to bank profitability.

### **4.5.3 Operational efficiency and profitability**

The coefficient of operational efficiency which is measured by operating cost to operating income was (-0.508098) and P value (0.0039) which is statistically significant at 1% of significant level. Holding other independent variables constant at their average value, when operational efficiency (operating cost /operating income) decrease by one, profitability (ROA) of sampled Ethiopian private banks will increase by (50.80%) and statistically significant at 1% of significant level. Therefore, the study fail to reject the null hypothesis that Operational efficiency has negative and significant effect on Profitability of commercial banks' in Ethiopia.

#### **4.5.4 Liquidity and Profitability**

The coefficient of liquidity which is measured by total loan and advance to total deposit was (0.024829) and p value (0.0008) which means statistically significant at 1% of significant level, Holding other independent variables constant at their average value when liquidity increase by one profitability of the sampled private banks will increase by (2.48%) These results provide reasonable evidence to the consistent view that, the higher the liquidity, the better the financial performance. This supports the claim that banks which are illiquid are forced to borrow from the market expensive funds or to prematurely liquidate their long term investments at unfavorable Bargains to cover immediate cash need thus reducing financial performance. Therefore the study fail to reject the null hypothesis stated Liquidity has a positive and significant effect on Profitability of commercial banks' in Ethiopia.

The finding of the study is in line with, the commercial loan theory and liability management theory the commercial loan theory encouraged banks to make only short-term, self-liquidating loan facilities. Such loans closely matched the maturity of bank deposits and enabled banks to meet deposit withdrawals with funds from maturing loans. Logical basis of the theory Commercial bank deposits are near demand liabilities and should have short term self-liquidating obligations (Emmanuel, 1997),and also the liability management theory is one of the important liquidity management theories and says that there is no need to follow old liquidity norms like maintaining liquid assets, liquid investments etc. Lately, banks have focused on liabilities side of the balance sheet.

#### **4.5.5 Income Diversification and Profitability**

The coefficient of income diversification which is measured by non interest income to total income was (0.025803) and p value (0.0001) which means statistically significant at 1% of significant level holding other independent variable constant at their average value when income diversification increases by one profitability of the sampled private banks will increase by (2.58%) Indicating that the more banks generate their revenue from different activities, the more their Profitability becomes better. The fixed effect regression output also the same with the expected hypothesis as income diversification has positive and significant impact on Ethiopian private banks financial performance. So the study failed to reject the

null hypothesis stated that Income diversification has a positive and significant effect on Profitability of commercial banks' in Ethiopia.

The finding of the study is consistent with portfolio theory argue that a well-defined portfolio prevents the firm from sustaining total loss since the risks are minimized by the portfolio of assets invested by the firm.( Markowitz,1952).the portfolio diversification and the desired portfolio composition of commercial banks are results of decisions taken by the bank management. Senyo,et al (2015) stated that The conventional wisdom in the banking industry is that earnings from fee-based products are more stable than loan-based earnings, and that fee-based activities reduce bank risk via diversification, in fact interest income remains highest contributor to bank Profits, non-interest sources of revenue as also play a major role.

#### **4.5.6 Size and profitability**

The size of the firm affects its Profitability in many ways. Large firms can exploit economies of scale and scope and thus being more efficient compared to small firms. Larger bank can achieve operating cost efficiencies through increasing output.

Company size is computed as logarithm of total assets of banks. The regression result of this study show that the variable size has positive coefficient (0.004441) and p value (0.0041) related to Profitability that means if the size of the company increase by one unit , ROA will also increase by (0.004441) unit considering that other independent variables remain constant. It also statistically significant (p-value=0.0041) at a 1% level of significance. This indicates that large volume of total asset has a significant effect on private banks financial performance. because large bank normally have greater capacity for dealing with adverse market fluctuations than small banks and have more economies of scale, complex information systems and better expenses management. The finding of this study is matching with (Obari, 2015), and Large firms are more likely to manage their working capitals more efficiently than small firms. According to Zenios and Ziemba (2007), most large firms enjoy economies of scale and thus are able to minimize their costs and improve on their financial performance.

Hence, this study supports the hypothesis that bank size has a positive and significant effect on Profitability of commercial banks' in Ethiopia.

**Table 4.9.**Comparison of test result with expectation

<b>Independent Variables</b>	<b>Expected Relationships with profitability</b>	<b>Actual result</b>	<b>Statistical Significance test</b>	<b>Hypothesis Status</b>
capital adequacy	+	-	insignificant	Reject
asset quality	-	-	Significant at 5%	Failed to Reject
operational efficiency	-	-	Significant at 1%	Failed to Reject
liquidity	+	+	Significant at 1%	Failed to Reject
Income diversification	+	+	Significant at 1%	Failed to Reject
bank size	+	+	Significant at 1%	Failed to Reject

From the above data analysis, Ethiopian banks performance is highly affected by all variables included in this study except capital adequacy, The findings of the study showed that asset quality, and management efficiency have statistically significant and negative relationship with Ethiopian banks financial performance. However, capital adequacy has negative and insignificant relationship with financial performance. On the other hand, variables bank size and liquidity and income diversification have a positive and statistically significant relationship with Profitability of banks in Ethiopia.

The effect of asset liability management on Profitability can be modeled as described below:-

$$ROA = \beta_0 + \beta_1 CA_{i,t} + \beta_2 AQ_{i,t} + \beta_3 OE_{i,t} + \beta_4 LIQ_{i,t} + \beta_5 ID_{i,t} + \beta_6 SIZE_{i,t} + \epsilon_i$$

As generated by regression analysis, shown in table 4.6 above, the established regression equation is:

$$ROA_{it} = -0.0723 - 0.0168CA_{i,t} - 0.0153AQ_{i,t} - 0.5080 OE_{i,t} + 0.0248LIQ_{i,t} + 0.0258 ID_{i,t} + 0.0044 SIZE_{i,t} + \varepsilon$$

## **CHAPTER FIVE; SUMMERY CONCLUSION AND RECOMMENDATION**

The basic intent of this chapter is to present the overall summery of the research by summing The main findings of the analysis part and give future research directions. Accordingly, the chapter starts its discussion by brief summary of the study and its main findings. Then based on the finding of the study the researcher highlights some recommendations for the target populations the study pivoting on.

### **5.1. Summary**

This study examined the effects of asset liability management on Profitability of Ethiopian banks. Balanced panel data of eighty four observations from 2005 to 2016 of seven private banks was analyzed using multiple regressions method. Only secondary data collected from financial statement of the banks was used to investigate the performance of commercial banks. It analyzed by examining available empirical literature reviews conducted in different countries and by selecting 6 variables, To achieve the main objective, descriptive statistics, diagnostic tests, selection of appropriate model, multiple regression result and test of hypothesis have been run using statistical package data of “EViews 8”. The appropriate model that has selected for this study was fixed effect model since the diagnostic test of all assumptions are valid and met, as a result it is possible to conclude that the model is adequate, statistically good fit, and data’s were represented reliably.

Descriptive analysis result shows the capital adequacy mean value was (15.98%) that was above the required standard of (8%), which means the total asset of private banks in Ethiopia were financed by shareholders contribution while the remaining (84.02%) were financed from deposit. the average value of asset quality was (10.35%). it indicates private banks Provide consistent provision to manage credit risk of the bank. The mean of operational efficiency was (3%) Ethiopian private banks spend (3%) percent of their revenue for operation expense; the average value of liquidity was (66.47%) which is above the minimum standard of (15%) This indicates (66.47%) of the deposit of Ethiopian private banks converted in to loan, the average value of income diversification was (43.44%) and also the mean of bank size was (22.47).

With regard to the relationship between the selected variable to profitability measures of Return on Asset (ROA) Capital adequacy ratio, asset quality ratio and operational efficiency ratio had negative relation with the return on asset of banks and positive relation with income diversification and liquidity ratio and bank size, These indicate that Capital adequacy, asset quality and operational efficiency ratio had inverse relation with the ROA. But liquidity, income diversification and bank size had direct relation with ROA, liquidity income diversification and, Operational efficiency, and bank size was significant at 1% whereas asset quality ratio is significant at 5%. Capital Adequacy ratio was insignificant .As to the explanatory power of the regression output 65 % of the change in the return on asset can be explained by the selected variable. Generally, the study finds that all factors related to ALM (the exception of capital adequacy) significantly affect Ethiopian private banks profitability for the last 12 years.

## **5.2. Conclusion**

The study revealed that asset quality, operational efficiency, liquidity, income diversification and bank size were the most influential factors of Ethiopian banks ROA based on the result the researcher concluded that the main factors affect the ROA of banks are asset quality, bank size, operational efficiency, income diversification and liquidity, since they have statistically significant impact at confidence level of 99% and 95%. This conclusion implies that Ethiopian banks with high liquid asset, low asset quality ratio, large total asset, and low operational cost maintain more profit than banks with low liquid asset, large asset quality ratio, and low total asset, And high operating cost.

In general managing asset liability of a bank should goes hand to hand with each other and balancing accordingly is a mandatory, the study concludes that there is a strong relationship between asset liability management and Profitability of banks in Ethiopia as explained by the model variables explanatory power adjusted R-Square was 65%, which means ROA of private banks of Ethiopia is explained by the selected variables .and 35 % is explained by other than the studied variables.

### 5.3. Recommendation

Based on the findings of the study the following possible recommendations were forwarded, The study revealed asset quality ratio, operational efficiency, income diversification, liquidity, bank size are the key driver of return on asset of banks, Therefore, Bank managers are advised to give due attention to the significant variables to Improve profitability.

- ❖ On the basis of the findings of the study the researcher recommends that superior Profitability in commercial banks can be achieved by; improving assets quality by reducing the rate of credit risk by reducing operational costs, improving diversifying income source and by increasing amount of liquid assets. And also by expanding the size of the bank Thus it can be concluded that Profitability in Ethiopian banking sector is largely driven by asset liability.
- ❖ For asset quality banks need to improve their processes of screening credit customers and monitoring of credit risk .This is an important indicator because banks have had serious problem with non-performing loans
- ❖ In terms of operational efficiency, it is obvious that a lot needs to be done to expenses in the banking sector to improve financial performance. The strong negative impact of operational efficiency indicates that banks are not able to manage operating cost. In order to survive and adapt to the changing environment, banking industry are putting more stress on understanding the drivers of operational efficiency like technology, infrastructure, process of delivering quality service to its customers and performance bench marking. Because efficiency is mainly concerned with cost relative to output imparts the ingredients to long term commercial success.
- ❖ It is better to have a diversified income source i.e. collecting more Service charges from foreign transactions like (foreign money transfer, letter of credit and other sources) because, this source of income is more crucial during loan default risk and interest rate fluctuation occur. And also Ethiopian private banks can improve their fee based income by introducing innovative products and services to make them best financial performer.

- ❖ It is better to maintain an optimal level of liquidity, The significance of liquidity preference theory is that firms should maintain an optimum level of liquidity to be able to grasp opportunity that promise higher return in the future.
- ❖ Concerning the bank size banks should increase their asset volume with putting in mind that as some times banks become larger they might suffer on inefficiencies and this leading to lower financial performance, In view of the research findings, a significant positive relationship is evident between bank size and levels of commercial banks Profitability so Policy makers should endeavor to put in place policies that smaller commercial banks have to be competitive and stable so as to promote further financial performance.
- ❖ This study uses only some representative financial ratios from factors of the Profitability model, the financial ratios included in the research may not exhaustive and enough to evaluate the bank's Capital adequacy, asset quality, and liquidity. Therefore future researcher is recommended to consider additional financial ratios.
- ❖ This study fully employed secondary data and the analysis was fully based on financial data. However, secondary data obtained from financial reports of banks or Through National Bank can have potential bias. Thus, future research is recommended to verify secondary data by primary data such as interviewing.
- ❖ Finally, this study is duly designed to test the impact of asset liability management on profitability of banks in Ethiopia Therefore, the researcher would like to recommend future researchers to include and measure the impact of macroeconomic factors such as GDP, inflation related ,government regulation and policy in order to obtain reliable results.

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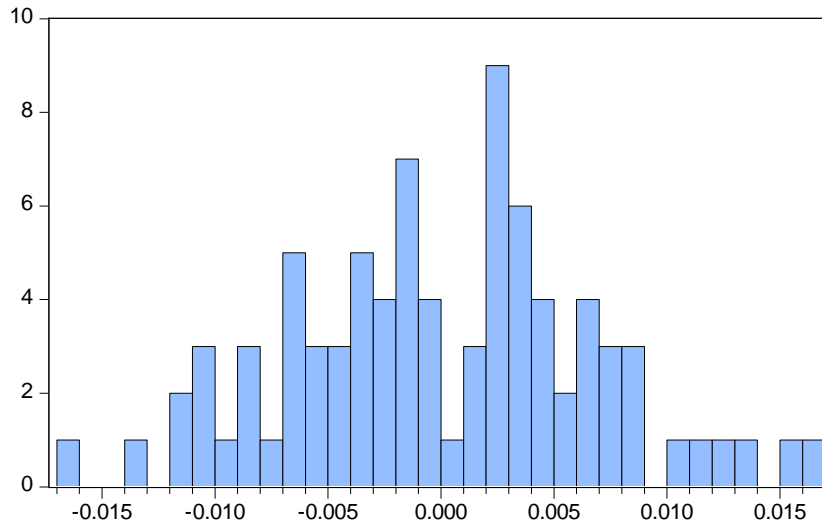
# Appendixes

## Appendix A: Redundant Fixed effect Tests

Redundant Fixed Effects Tests  
Equation: Untitled  
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.453857	(6,71)	0.0326
Cross-section Chi-square	15.829208	6	0.0147

## Appendix B: Normality test



Series: Standardized Residuals  
Sample 2005 2016  
Observations 84

Mean	3.30e-19
Median	-0.000279
Maximum	0.016976
Minimum	-0.016477
Std. Dev.	0.006710
Skewness	0.062309
Kurtosis	2.851534
Jarque-Bera	0.131501
Probability	0.936364

**Appendix C: Regression Results For impact of asset liability management on financial performance of commercial banks in Ethiopia.**

Dependent Variable: ROA  
 Method: Panel Least Squares  
 Date: 05/03/17 Time: 14:19  
 Sample: 2005 2016  
 Periods included: 12  
 Cross-sections included: 7  
 Total panel (balanced) observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.072375	0.034394	-2.104311	0.0389
CA	-0.016886	0.009808	-1.721619	0.0895
AQ	-0.015363	0.007083	-2.168894	0.0334
OE	-0.508098	0.170144	-2.986282	0.0039
LIQ	0.024829	0.007089	3.502338	0.0008
ID	0.025803	0.006417	4.021118	0.0001
SIZE	0.004441	0.001496	2.968206	0.0041

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.702125	Mean dependent var	0.036014
Adjusted R-squared	0.651780	S.D. dependent var	0.012294
S.E. of regression	0.007255	Akaike info criterion	-6.872886
Sum squared resid	0.003737	Schwarz criterion	-6.496688
Log likelihood	301.6612	Hannan-Quinn criter.	-6.721658
F-statistic	13.94625	Durbin-Watson stat	1.967552
Prob(F-statistic)	0.000000		

## Appendix D: Heteroskedasticity Test: White

Heteroskedasticity Test: White

F-statistic	0.486402	Prob. F(6,77)	0.8166
Obs*R-squared	3.067462	Prob. Chi-Square(6)	0.8003
Scaled explained SS	2.016487	Prob. Chi-Square(6)	0.9182

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 05/03/17 Time: 14:26

Sample: 1 84

Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000184	0.000135	1.356482	0.1789
CA^2	-0.000108	0.000102	-1.050362	0.2968
AQ^2	-5.09E-05	9.12E-05	-0.558833	0.5779
OE^2	0.018748	0.017320	1.082452	0.2824
LIQ^2	-2.59E-05	4.12E-05	-0.629192	0.5311
ID^2	-5.16E-05	5.86E-05	-0.879758	0.3817
SIZE^2	-2.33E-07	2.43E-07	-0.960315	0.3399

R-squared	0.036517	Mean dependent var	5.37E-05
Adjusted R-squared	-0.038559	S.D. dependent var	6.76E-05
S.E. of regression	6.89E-05	Akaike info criterion	-16.24867
Sum squared resid	3.65E-07	Schwarz criterion	-16.04610
Log likelihood	689.4441	Hannan-Quinn criter.	-16.16724
F-statistic	0.486402	Durbin-Watson stat	2.105881
Prob(F-statistic)	0.816586		

**Appendix E: - List of Commercial Banks in Ethiopia**

<b>S/N</b>	<b>Name</b>	<b>Established Date</b>
<b>1</b>	Construction and Business Bank (CBB)	1983
<b>2</b>	Commercial Bank of Ethiopia (CBE)	1963
<b>3</b>	Awash International Bank S.C (AIB)	1994
<b>4</b>	Dashen Bank S.C (DB)	1995
<b>5</b>	Bank Of Abyssinia S.C (BOA)	1996
<b>6</b>	Wegagen Bank S.C (WB)	1997
<b>7</b>	United Bank S.C (UB)	1998
<b>8</b>	Nib International Bank S.C (NIB)	1999
<b>9</b>	Cooperative Bank Of Oromia S.C(CBO)	2005
<b>10</b>	Lion International Bank S.C (LIB)	2006
<b>11</b>	Oromia International Bank S.C (OIB)	2008
<b>12</b>	ZemenBank S.C (ZB)	2009
<b>13</b>	Bunna International Bank S.C (BIB)	2009
<b>14</b>	Berhan International Bank S.C (BIB)	2010
<b>15</b>	AbayBank S.C (AB)	2010
<b>16</b>	Addis International Bank S.C (AdIB)	2011
<b>17</b>	Debub Global Bank S.C (DGB)	2012
<b>18</b>	Enat Bank S.C (EB)	2013

**Source NBE annual report 2013/14**