THE EFFECT OF ASSET AND LIABILITY MANAGEMENT ON THE PROFITABILITY OF LISTED DEPOSIT MONEY BANKS IN NIGERIA

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DECLARATION

I, Maryam Rabi'u Zakariyya, hereby declare that this work is entirely the product of my research efforts undertaken under the supervision of Prof. Ibrahim Magaji Barde and has not been presented anywhere for the award of degree or certificate. All sources have been duly acknowledged in the references, and any act of commission or omission is not intended and is highly regretted.

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CERTIFICATION

This is to certify that the research work for this thesis and the subsequent preparation of it (by Maryam Rabi'u Zakariyya SPS/13/MAC/00005) were carried out under our supervision.

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APPROVAL

This thesis titled "The Effect of Asset and Liability Management on the Profitability of Listed Deposit Money Banks in Nigeria" has been examined and approved as meeting the requirements for the award of degree of MASTER OF SCIENCE (MSc.) IN ACCOUNTING, of Bayero University Kano, and is approved for its literary presentation and contributions to knowledge.

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DEDICATION

I dedicate this write up to my parents Malam Rabi'u Zakariya'u and Hajiya Fatima Sani for being there for us always. May Allah reward them with the best of life both here and in the hereafter in His infinite mercy.

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ABSTRACT

This study examines the Effect of Asset and Liability Management (ALM) on the Profitability of the Listed Deposit Money Banks (DMBs) in Nigeria over the period of ten years (2007-2016). The study use Return on assets (ROA) as proxy of profitability; while deposits in other banks, other investments, loans and advances, government securities, demand deposits, fixed deposits, deposits from other banks and borrowings were adopted to measure the ALM. Using ten years audited financial statements of eleven banks filtered from a total of fifteen DMBs listed in 2016; the Pearson correlation, ordinary least square and random effect regression results of the model indicate mixed results. In the model, deposits in other banks are found to be significantly associated with profitability. The results of the regression reveal that other investments are negatively insignificant with profitability of listed DMBs in Nigeria. In the case of loans and advances, they are found to be positive and significant. Further, the result of government securities is seen to be positively insignificant. On the part of the liabilities, results show that demand deposits are positively insignificant with profitability of listed DMBs in Nigeria. Also, fixed deposits regression result is found to be insignificant. However, the result of deposits from other banks is found to be negatively insignificant. For borrowings, the result is found to be negatively insignificant for the RE regression. As a result of this findings, the current study recommendations therefore centers on bank management to review some of its policies which should be geared towards reducing their lending rate and explore strategies that will lead to lower operational cost of deposit and also diversify their sources of income with an aim of maximizing the returns of the listed Deposit Money Banks in Nigeria.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Asset management refers to the process of developing, operating, maintaining, upgrading and disposing of assets cost effectively. In other words, asset management coordinates the financial, operational, maintenance, risk and other asset related activities of an organisation to realize more value from its assets. It is a term used mostly in the financial sector to describe how people or companies manage investments on behalf of others (Wikipedia, 2015). In a nutshell asset management monitors and maintains valuable things of an entity which may be both tangible assets and intangible assets.

Liability management is the flip side of the coin which involves management of debts, loans and mortgages (Salvin Surjith & Sathiyanarayana, 2014). It is the process by which financial institutions balance their outstanding liabilities in order to reduce liquidity risks as well as adverse impacts of market condition. Liability management also involves the use of some of the banks' assets to fund profitable loan opportunities.

Asset and Liability management (ALM) is defined by the Society of Actuaries (SOA, 2003) as an the on-going process of formulating, implementing, monitoring and revising strategies related to assets and liabilities to achieve an organisation's financial objectives, given the organisation's risk tolerances and other constraints. Also, ALM refers to the process by which an institution manages its statement of financial position in order to allow for alternative interest rate and liquidity scenarios (Francis, 2007). Banks and other financial institutions provide services which expose them to various kinds of risks like credit risk, interest risk and liquidity risk. Proper ALM

controls the risks inherent in the business due to mismatches between assets and liabilities (Rosen & Zenios, 2006). ALM is an approach that provides institutions with protection that makes such risk acceptable. It is therefore appropriate for institutions-banks, finance companies, leasing companies, insurance companies, and others to focus on asset-liability management when they face financial risks of different types. ALM includes not only a formalization of this understanding but also a way to quantify and manage these risks leading to higher returns and profitability. Also, even in the absence of a formal asset-liability management program, the understanding of these concepts is of value to an institution as it provides a true picture of the risk/reward trade-off in which the institution is engaged.

Penman (2007) defined profitability as the ability of a firm to make profit from its business activities. Profitability measures the efficiency in the utilization of organizational resources in adding value to the business. Profitability is deemed as a relative term measurable in terms of profit and its relation to other elements that directly influence profitability. According to Srivastava and Srivastava (2006), profitability is the ability of a given investment to earn a return from its use.

Pandey (2005) argues that profit maximization is the fundamental objective of all firms. In a competitive marketplace, a business owner must learn to achieve a satisfactory level of profitability. Increasing profitability involves determining which areas of a financial strategy are working and which ones need to be improved. 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. Profitability measures include: ROA (Return on Assets) computed as Net Income divided

by Total Assets and ROE (Return on Equity) computed as to Net Income divided by Equity.

This study employs ROA as a measure of profitability as it is a financial ratio that shows the percentage of profit an organisation earns in relation to its overall resources. For the purpose of this study, ROA which is d as profit before interest and tax divided by total assets is expressed as the dependent variable. This is in conformity with the works of Al Shubiri (2010), Gikonyo (2011) and Betele (2013). The study uses net profit before tax as taxes are charged at fixed rates of assessable income and are not normally controlled by management

Banks' profitability is of utmost concern in modern economy. Banks are in a business to receive deposits or liabilities and to issue debt securities on the one hand and create or invest in assets on the other hand (Flamini, McDonald, & Schumacher, 2009). Banks incur costs for their liabilities and earn income from their assets. Thus profitability of banks is affected by the way they manage their assets and liabilities. In addition, different market and macroeconomic factors also influence the ability of the banks to make profits (Aburime, 2008).

According to Charumathi (2008), banks always aim at maximizing profitability at the same time they try to ensure sufficient liquidity to repose confidence in the minds of the depositors on their ability in servicing the deposits by making timely payment of interest/returning them in due dates and meeting all other commitments as agreed upon. To achieve these objectives, it is essential that banks have to monitor, maintain and manage their assets and liabilities portfolios in a systematic manner taking into account

the various risk involved in these areas like the interest rate risk, operation risk and gap analysis.

Anjichi (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 the finances of any firm that invests to meet its future cash flow needs and capital requirements.

This implies that the bank management is expected to target required profit levels by efficient management of assets and liabilities and ensure minimization of risk to acceptable levels to retain the interest of investors in their bank. Therefore, this study seeks to examine the effect of asset and liability management on the profitability of listed Deposit Money Banks in Nigeria.

1.2 Statement of the Problem

Asset and liability management (ALM) is important for all institutions, especially, financial institutions and among them, especially banks. This is so because banks play an important role in the development of a country. A sound, progressive and dynamic banking system is a fundamental requirement for economic development. As an important segment of the financial sector of an economy, commercial banks act as the backbone of economic growth and prosperity by acting as a catalyst in the process of development. They inculcate the habit of saving and mobilize funds from numerous small households and business firms spread over a wide geographical area. The funds so mobilized are used for productive purposes in agriculture, industry and trade (Vossen,

2010). Economies that have a profitable banking sector are better able to withstand negative shocks and contribute to the stability of the financial system (Athanasoglou, Brissimis & Delis, 2008).

However, bank management typically involves several conflicting goals, such as the maximization of returns, minimization of risk, expansion of deposit and loans. Because of the rapidly increasing complexity of problems facing the management of banks in today's competitive environment managers constantly seek to know what technique can maximize the return and control the risk thereby maximise the shareholders' wealth.

There have been several steps in the development of asset and liability management. During the 1950s, with an abundance of relatively stable, low cost funds, extremely conservative investment planning, a concept of "asset allocation" was emphasized and spreads were achieved without the competition and severe pressure. During the 1960s, a highly economic growth took place as a result of technological innovations which led to the increasing need for funds. In the 1970s, a period of volatile interest rates started and continued until the early 1980s. This volatility had dangerous implications for financial institutions such that it capped the interest rates that banks could pay depositors and the cost of funds and inherent risk increased significantly. Firms gradually accrued financial losses over the subsequent 5 or 10 years. Thus, the profitability can only be achieved by analyzing the information on both sides of balance sheet and implementing an approach for managing the asset and liability for the financial institutions. As such ALM practices have evolved since the early 1980s (Habart, Gehin, Janssen, & Manca, 2015).

Over the last few years the financial markets worldwide have witnessed wide ranging changes at fast pace. Intense competition for business involving both the assets and

liabilities, together with increasing volatility in the domestic interest rates as well as foreign exchange rates, has brought pressure on the management of banks to maintain a good balance among spreads, profitability and long term viability.

The financial crisis of late 2007 and beyond brought considerable change to the marketplace for lending and borrowing, as well as caused increased uncertainty in funding conditions and capital requirements for most financial institutions. Economic slowdown had an adverse effect on credit quality of many institutions, which resulted in their decreased profitability, lower returns on equity and higher level of risk-weighted assets. It has also forced policymakers to come up with the proposals for tighter regulations, requiring the higher level of capital to be maintained with the function of a protective buffer. Continuous significant losses and failures in the financial industry over the past few years created a greater awareness of the importance of effective risk management. Even `too-big-to-fail' companies were in a deep liquidity crisis and in need of considerable amounts of cash for survival.

In the case of Nigeria, the financial sector in which the DMBs are found has been characterized by bubble, boom, and burst (Ndibe, Igbokwe, Dauda & Abdulazeez 2013). The evolving competition in the banking industry as a result of globalization has made it difficult for Nigerian banks to play their major role of financing economic activities arising from inadequate capital. Inadequate bank capital has led to a crisis of confidence in the banks to the extent that the original functions which is to support the volume, type and character of a bank’s business, to provide for the possibilities of losses that may arise there from and to enable the bank to meet a reasonable credit need of the community have been eroded. Losses suffered by banks led to bank failure especially in the areas of

lending. The soundness, safety and profitability of a bank affect the quality of its loan portfolio (Ikpefan, 2012). Over the years this sector has witnessed changes in monetary policies control, reforms in legal, regulatory and supervisory guideline, number of banks, assets, capital and liabilities. Nevertheless, these positive changes have attracted new firms and led to exit of old ones.

The Nigerian economy observed in the present dispensation of President Muhammad Buhari's administration (2015-2019) has been characterized by worsening economic fortunes in terms of reduced growth, increased unemployment, inflation, high incidence of poverty, worsening balance of payment conditions, high debt burden and increasing unsustainable fiscal deficit. This development made the economy to slip into recession for the first time in 25 years (Onuba, 2019). There are management challenges confronting Nigeria banks since the advent of indigenous banks. Aside losses experienced by depositors, shareholders, employees and other stakeholders, the level of confidence in the financial system has been negatively affected (Bosede, Olusegun & Olubukunola, 2013). These abnormalities in the financial system highlight the importance of asset and liability management. Therefore, asset and liability management is an appropriate tool to strike a balance between risk and reward.

Kosmidou & Zopounidis (2004) pointed out that due to the competition in the financial markets commercial banks seek out greater efficiency in the management of their assets and liabilities. The core issue of Asset-Liability Management (ALM) is the bank's balance sheet and the main question is: Given a certain level of risk, government regulation, globalization, competitors, alternative choices of investment, liquidity and interest rate changes in the market, what should be the composition of a bank's assets and

liabilities in order to maximize the bank's profit? What should be the optimal combination of ALM? These are the two questions raised by Kosmidou & Zopounidis (2004) who argued that the optimal balance between these factors cannot be found without considering important interactions that exist between the structure of a bank's liability and capital and the compositions of its assets.

A number of studies have been conducted on Asset and liability management on the profitability of banks at different times in developed, as well as, developing countries, most of which are well documented in accounting and finance literature. However, most of the studies conducted in Nigeria used few of the ALM proxies such as loan and advance, demand deposit and fixed deposits. This study differ from most of the earlier ones because it employed wide range of proxies of ALM including deposits in other banks, government securities, other investments, deposits due to other banks and borrowings in addition to the proxies mentioned above. Also, there are only few studies on ALM that have been conducted in Nigeria.

The studies of Hester and Zoellner, (1966); Vasiliou, (1996); and Kosmidou, Pasiouras, & Floropoulos, (2004) employ the Statistical Cost Accounting (SCA) model to examine the effect of ALM on banks profitability. But their studies do not incorporate additional macroeconomic variables. Practically, there are also macroeconomic factors that have effect on commercial banks profitability. Although they have not found evidence that differential returns and costs on different categories of assets and liabilities exist, Kwast and Rose (1982) expanded the traditional SCA model to incorporate market structure and inflation rate as macroeconomic variables.

Most of the previous studies such as that of Asiri (2007), Sayeed & Ziaul Hoque, (2010); Al Shubiri, (2010); Gikonya, (2011); Sayeed, Edirisuriya & Hoque (2012); Belete,

(2013); Njogo, Ohiaeri & Omisakin (2014); Shrestha (2015); Uddin & Haque (2016) and Ajibola (2016), found that assets management positively and liabilities management negatively relates to the profitability of banks. Studies of scholars like Vasiliou (1996), Asiri (2007), Betele (2013), Njogo, Ohiaeri and Omisakin (2014) and Ajibola (2016) found that the chosen strategy of the bank asset and liability management allows a significant positive effect on banks' profitability.

With regards to liability management Hester and Zoellner (1966), using SCA model as a regression model assumes that rate of cost on liability is negative and varies across liabilities. In line with Hester and Zoellner (1966) model, Betele (2013), Asiri (2007), Njogo, Ohiaeri and Omisakin (2014) and Ajibola (2016) used the same model and found that liability management negatively relates with the profitability of commercial banks. However, Njogo, Ohiaeri and Omisakin (2014) and Ajibola (2016) did not include macroeconomic factors as indicators of financial performance of banks.

As to date and to the best of the researcher's knowledge, no econometric study applying SCA has been undertaken to examine the effect of ALM on commercial banks' profitability in the case of Nigerian banks; therefore, this study is an attempt to fill such a vacuum. The current study also employs the SCA model with some modifications. The traditional SCA model is expanded to incorporate inflation rate and GDP as macroeconomic variables in order to examine the effect of ALM on DMBs of Nigeria during the sample period of 2007-2016. This method was tested in US, UK, Indian, Greek, Italian, Kuwaiti, Bangladeshi, Jordan, Ethiopia, Kenya, Nigeria, Nepal and Ghana banks (Hester and Zoellner, 1966; Kwast and Rose, 1982; Vasiliou, 1996; Kosmidou, Psiouras & Floropoulos, 2004; Asiri, 2007; Sayeed and Hoque, 2008; Al Shubiri, 2010;

Gikonya, 2011; Belete, 2013; Njogo, Ohiaeri & Omisakin. 2014; Shrestha, 2015 and Tee, 2017).

This study intends to fill the gaps poised by the above empirical studies, especially that there are few available studies conducted in the developing economies and particularly in Nigeria. Also, most of the Nigerian studies have used few variables that serve as proxies to ALM such as loan and advance, demand deposit and fixed deposits. This study differ from most of the earlier ones because it employed wide range of proxies of ALM including deposits in other banks, government securities, other investments, deposits due to other banks and borrowings in addition to the proxies mentioned above. Also, there are only few studies on ALM that have been conducted in Nigeria. Hence in addition to more variables of ALM, this study has included macroeconomic factors as indicators of profitability of banks.

In light of the foregoing, this study intends to find answers to the following research questions:

a) What effect does asset management (deposits in other bank, other investments, loan and advances, government security) has on the profitability of listed DMBs in Nigeria?

b) What effect does liability management (demand deposits, fixed deposits, deposit from other banks, borrowings) has on the profitability of listed DMBs in Nigeria?

1.3 Objectives of the Study

The primary objective of the study is to determine the effect of asset and liability management on the profitability of listed DMBs in Nigeria. While the specific objectives of the study are to examine the effect of:

a) Deposits in other banks on the profitability of DMBs in Nigeria.

b) Other investments on the profitability of DMBs in Nigeria.

c) Loan and advances on the profitability of DMBs in Nigeria.

d) Government security on the profitability of DMBs in Nigeria.

e) Demand deposits on the profitability of DMBs in Nigeria.

f) Fixed deposits on the profitability of DMBs in Nigeria.

g) Deposit from other banks on the profitability of DMBs in Nigeria.

h) Borrowings on the profitability of DMBs in Nigeria.

1.4 Research Hypotheses

Based on the statement of problem and the objectives of the study, the following hypotheses are used to guide the study;

Ho_1. Deposits in other banks do not have significant effect on the profitability of DMBs in Nigeria.

Ho_2. Other investments do not have significant effect on the profitability of DMBs in Nigeria.

Ho_3. Loan and advances do not have significant effect on the profitability of DMBs in Nigeria.

Ho_4. Government securities do not have significant effect on the profitability of DMBs in Nigeria.

Ho_5. Demand deposits do not have significant effect on the profitability of DMBs in Nigeria.

Ho_6. Fixed deposits do not have significant effect on the profitability of DMBs in Nigeria.

Ho_7. Deposits from other banks do not have significant effect on the profitability of DMBs in Nigeria.

Ho8. Borrowings do not have significant effect on the profitability of DMBs in Nigeria.

1.5 Significance of the Study

This study is important, because to the best of the researcher's knowledge none of the studies conducted on ALM and profitability as being discussed in the statement of the problem, have employed all the variables used in this study as well as macroeconomic factors to analyse the effect of ALM on the profitability of DMBs in Nigeria. The study is also useful because of the following reasons:

Users of accounting information in the financial sector which include the management, shareholders, investors, regulators, financial analysts, and other stakeholders will find this research resourceful as it will help them in evaluating their policies, regulation, directives or taking of various decisions and judgment with regards to investment and financing.

On the part of the management the result of this study may give them insights into best management of risks practices that may be useful and appropriate for specific asset and liability portfolio in order to increase their profit margin and improve the performance of their organisation.

The findings of the study may assist shareholders in evaluating the status of the bank and to measure whether the bank is able to provide a reasonable return on their investment. Creditors and depositors are also interested in these performances to observe the ability of these banks to generate sufficient profits to enable them repay debts and meeting the withdrawal requirements.

The findings of this research are also of particular interest to policy makers in order to set policies and regulations that govern banks' activities without having a negative impact on their profitability.

The findings of this study are hoped to contribute to empirical literature relating to banks' ALM in emerging economies, as it examines the effect of ALM on the profitability of

DMBs in Nigeria. The fact that the research is conducted in a country where the financial sector is dominated by DMBs, the findings can be useful for developing countries under the same scenarios. The result of the study would make a good library material for researchers, as well as, serve as a reference material for researchers and students who may wish to conduct similar studies in this area. Besides that, there exist few studies on ALM and profitability in Nigeria. This study will therefore, extend the frontiers of knowledge.

1.6 Scope of the Study

The research covers only DMBs which are quoted on the Nigerian Stock Exchange market. The study also covers a period of ten years (2007-2016). The period of ten years is considered adequate to determine the effect of asset and liability management on the profitability of banks.

This study covers the effect of ALM structures consisting of Deposits in other bank (A1), Other investments (A2), Loans and Advances (A3) Government Securities, (A4), Demand Deposit (L1), Fixed Deposits (L2), Deposits from other banks (L3) and Borrowings (L4). On the other hand, Return on Asset (ROA) will be used as a proxy of profitability.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews relevant empirical literature on the concept of Asset and liability management (ALM) and profitability of banks. Similarly, literature on ALM and profitability are reviewed in order to use the evidence from the studies to establish the gaps in the literature and also to serve as a basis for validation of the findings of this work.

2.2 The Concept of Asset and Liability Management

Diverse definitions have been given by different scholars with regards to ALM (Zawalinska, 1999; Choudhry, 2007 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). Choudhry (2007), gives the definitions of assets, liabilities, and risks to be specific to each institution, but generally, assets may be viewed as expected cash inflows, and liabilities as expected cash outflows. Although short term risks arising from the possibility that an institution's assets will not cover its short-term obligations are important to assess and quantify, ALM is usually conducted from a long-

term perspective. As such, ALM is considered a strategic discipline as opposed to a tactical one.

ALM is a comprehensive and dynamic framework for measuring, monitoring and managing the market risk of a bank. It is the management of structure of balance sheet (liabilities and assets) in such a way that the net earnings from interest are maximized within the overall risk-preference (present and future) of the institutions. The ALM functions extend to liquidly risk management, management of market risk, trading risk management, funding and capital planning and profit planning and growth projection (Singh & Tandon, 2012).

ALM is considered as risk management technique designed to earn an adequate return while maintaining a comfortable surplus of assets over liabilities. It is the act of planning acquiring and directing the flow of funds through a financial organization to generate adequate and stable earnings, maintain adequate liquidity and steadily build capital while taking reasonable and measured business risks. In short ALM is the sum of the financial risk management of any financial institution. (Cole & FeatherStone, 1997).

The variables that serve as proxies of ALM include deposit in other banks, loan and advances, government security, cash in hand balances, investments, bills discounted, fixed assets, other assets, demand deposits, fixed/time deposits, deposit due to other banks, borrowed funds and other liabilities (Al Shubiri, 2010; Sayeed & Ziaul Hoque, 2010; Gikonyo, 2011; Piyadasa, 2012; Belete, 2013, Shrestha, 2015; Uddin & Haque, 2016).

2.2.1 Asset-Liability Risks

According to Memmel and Scherteler (2010), traditional perception on financial intermediaries show a simple logic that a bank accept deposits with short term maturities from a large number of individuals and grants loans with long term maturities to a small number of borrowers. These transformation activities expose banks to credit, interest rate, and liquidity risks.

The issue of jointly managing assets and liabilities has arisen in many industries such as banking, insurance and pension funds in recent times. This is because, the traditional approach of managing risks based on the risk type (credit risk, liquidity risk, interest rate risk), has been found to be no longer effective. According to Romanyuk (2010), many organisations, including financial institutions view risks from an event driven perspective. They therefore classify risks according to the events that cause potential losses. From this perspective, the Global Derivatives Study Group (1993) classifies financial risks into three broad categories namely; market risk, liquidity risk and credit risk. According to the Group, market risk is the risk that results from changes in market price of commodities or other assets such as stocks and bonds, interest rates or market indexes. Market risk also includes the risk of exposure to unexpected changes in basis and correlation risks. Basis risk is the mismatch between the derivative price of an asset or commodity and the spot price while unexpected changes in the correlation of the underlying risk factors are called correlation risk. Volatility risk can also be classified under market risk.

Liquidity risk is the risk that cash inflow may not be sufficient to cover liabilities or maturing debt obligations. According to Rosen and Zenios (2006), the inability to raise

adequate resources to finance profitable investment opportunities is called funding liquidity risk while trading liquidity risk exists when it becomes costly or impossible to sell off assets or enter into new positions to hedge current exposures as the need arises.

Credit risk on the other hand refers to the risk that a firm or a sovereign would be unwilling or unable to meet maturing debt obligations. This may arise from sheer dereliction of duty or out of genuine inability due to lack of adequate financial resources. Indirect credit risk relates to the impact of the credit quality of a third party not directly related to a financial transaction that causes changes in the present value of cash flows. For instance, a credit downgrade of a country would affect contracts entered into by other counterparties within the country depending on the term structure of interest rates.

2.2.2 Asset and Liability Management Components

This study covers the effect of ALM variables, the assets variables are Deposits in other banks, other investments, Loan and Advances and Government Security. On the other hand, the liabilities variables are Demand Deposits, Fixed Deposits, Deposits from other banks and Borrowings. This is in line with Al Shubiri (2010); Gikonyo (2011); Belete (2012); Sayeed, Edirisuriya & Hoque (2012) and Njogo, Ohiaeri and Omisakin (2014).

i. Deposits in other Banks

Deposits and loans with other credit institutions such as resources deposited in current accounts, time deposits and loan granted, operating funds in and funds granted to foreign branches. The funds are provided by banks to other financial institutions at inter-bank rates. They are loans that are very short in nature, usually lasting no longer than a week. More often than not, these funds are used for helping banks meet reserve requirements.

ii. Other Investments

The commercial banks rightly regard their investments (often consisting largely of medium term government securities but also sometimes including industrial shares and participants) as rather less liquid than money market asset.

Banks also invest in various financial securities to complement its loan portfolio. A right mix of investments helps control total risks and provide liquidity to meet coming-due liabilities. A bank spends relatively less money on physical assets, and investments, another major asset category on a bank's balance sheet. A bank may invest in some securities for speculative trading purposes, some as held-to-maturing investments to earn higher yields and others as available for sale holdings to provide needed liquidity (Way, 2019).

iii. Loan and Advances

Loans and Advances represent one of the highest yielding assets on banks' balances sheet. It is obvious that the more banks offer loans the more it generate revenue and more profit (Abreu & Mendes, 2000). However, banks have to be cautious in offering more loans because as they offer more loans to customers they expose themselves to liquidity and default risks which impacts negatively on banks' profits and survival (Rasiah, 2010).

For instance the financial crisis which started in the United States of America in 2007 and 2008 is well known to have been as a result of offering of lots of loans including non-prime loans by most of the banks during these periods. And when the housing prices fell most banks suffered large number of defaults on non-prime loans that in turn resulted in loss of profits and the collapsed of some banks (Gaurav & Kelly, 2011).

Loans are the major asset category on a commercial bank's balance sheet. Hence, by definition a bank is in the business of lending money and its primary money use is to issue loans to businesses and consumers (Way, 2019). Loan and advances are derivatives of demand deposits and savings and fixed deposits given out to borrowers at agreed interest rates and other charges. Loan and advances constitutes the single most important earning asset in the books of banks (Ajibola, 2016). This means that there would be a boost to interest income when a bank issues more loans to individuals and businesses, thereby increasing profitability of the bank.

iv. Government Securities

According to the Central Bank of Nigeria (CBN), government securities are issued by the CBN on behalf of the Federal Government of Nigeria. They comprise of Nigerian Treasury Bills, Nigerian Treasury Certificate, Federal Government Development Stocks and Federal Government Bonds. Banks are the heaviest participants in the Government securities market, buying and selling for their own account and as agents for their customers. They serve a variety of purposes in the portfolios of commercial banks. Most obviously, these investments are important sources of income. In addition to providing income, Government securities especially short and intermediate maturities provide liquidity because they are the most readily marketable of all fixed-income securities. Government securities are also used as temporary haven for funds in order to secure income at times when demand for bank loans is low, either for seasonal or cyclical reasons. Also, they serve as collateral to secure governmental (Federal, state, and local) bank deposits that typically require such protection (Scherer, 1968).

v. Demand Deposits

Briys and Varenne (2010) argue that as with any business, a bank has a balance sheet that is comprised of assets, liabilities, and equity. Banks fund their assets through a combination of their liabilities and equity. Bank liabilities represent the bank's debt, that traditionally consists of deposits of money from people who entrust the bank to hold onto their money and return it when asked to do so. On the other side of the balance sheet are a bank's assets, most of which consist of loans offered to its customers, from which the bank derives income in the form of interest charged to the borrowers.

Deposits are the most important source of fund for banks. A demand deposit is an account with a bank or other financial institution that allows the depositor to withdraw funds from the account without warning. In other words, the account allows the depositor to withdraw fund at anytime, and there is no limit to the number of transactions a depositor can conduct.

Demand deposits are usually considered part of the narrowly defined money supply, as they can be used via checks and drafts, as a means of payment for goods and services and to settle debt. During times of financial crises bank customers will withdraw their funds in cash leading to a drop in demand deposits and a shrinking of the money supply. This will lead to low profitability of bank as there will be no enough money to give out as loan.

vi. Fixed Deposits

Fixed deposits refer to money deposited at a banking institution that cannot be withdrawn for a preset fixed 'term' or period of time. When the term is over it can be withdrawn or it can be rolled over for another term Koranteng, (2012). Generally speaking, the longer the term the better the yield on the money deposit. This is also referred to as term deposit unlike

demand deposit the fixed deposits have a notice period or a fixed maturity date, so that the money cannot be withdrawn on demand. Term deposits that have tenure between one week and few years are an expensive liability for a bank as there are high interests paid on such deposits. These accounts are normally kept by highly net worth individuals and entrepreneurs. A growth in the term deposits means that the bank will have more funds in its vaults to disburse and earn interest income, thus having a positive impact on profitability.

vii. Deposits from other Banks

Banks engage in three types of loan agreements amongst them; overnight loans, term loans, and continuing contracts. Overnight loans are unwritten agreements, negotiated via wire or telephone, with the borrowed funds returned the next day. Normally these loans are not secured by specific collateral, though where borrower and lender do not know each other well or there is doubt about the borrower's credit standing, the borrower may be required to place selected government securities in a custody account in the name of the lender until the loan is repaid. Term loans are longer-term funds contracts lasting several days, weeks, or months, often accompanied by a written contract. Continuing contracts are automatically renewed each day unless either borrower or lender decides to end this agreement (Gieseche, 2012). Other deposits and loans received from other credit institutions include funds received from other credit institutions term deposits and received loans, operating funds received from branches, including subordinated loans and deposits received from credit institutions.

viii. Borrowings

Borrowings constitute another major liability on a bank's balance sheet. A commercial bank lends but also borrows. A bank may issue short term bank notes and long term bank bonds, as well as bank certificates of deposit, to raise money. Using borrowing, a bank can have more control over planning a fund raising effort for specific investments and operations, compared to relying on deposits. However, borrowings increase financial risks if earnings fail to grow and must be maintained within a certain limit against the level of a bank's own equity (Way, 2019). Banks also borrow from the Central bank of the country and these borrowings also constitute its liabilities and source of funds. In the statement of financial position these borrowings from the reserve of the central bank are included in other items of the liabilities. When supply of money is very tight the borrowings from central bank are of immense help to the banks.

2.3 The Concept of Profitability

According to Penman (2007), profitability can be defined as the ability of a firm to make profit from its business activities. Profitability measures the efficiency in the utilization of organizational resources in adding value to the business. Profitability is deemed as a relative term measurable in terms of profit and its relation to other elements that directly influence profitability. According to Srivastava and Srivastava (2006), profitability is the ability of a given investment to earn a return from its use.

Pandey (2005) argues that profit maximization is the fundamental objective of all firms. In a competitive marketplace, a business owner must learn to achieve a satisfactory level of profitability. Increasing profitability involves determining which areas of a financial strategy are working and which ones need improvement. 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. Banks' profitability is of utmost concern in modern economy. Banks are in a business to receive deposits or liabilities and to issue debt securities on the one hand and create or invest in assets on the other hand (Fama 1980). Commercial Banks incur costs for their liabilities and earn income from their assets. Thus, profitability of banks is directly affected by management of their assets and liabilities.

2.3.1 Measures of Profitability

The key recommended measures for financial analysis include - profitability, liquidity and solvency (Zenios, Jackson & Ostrom, 1999). Profitability measures the extent to which a business generates a profit from the factors of production - labour, management and capital. Profitability analysis focuses on the relationship between revenues and expenses and on the level of profits relative to the size of investment in the business.

Profitability is necessary for a bank to maintain ongoing activities and for its shareholders to obtain fair returns. Bank profitability is typically measured by the return on assets (ROA) and/or the return on equity (ROE) is usually expressed as a function of internal and external determinants (Athanasoglou, Delis & Staikouras, 2006). According to previous studies, the factors determining the profitability of banks fall into two main groups. First, there is a group of determinants of profitability that are specific (internal) to each bank and that, in many cases, are factors that are mainly influenced by a bank's managerial decisions and policy objectives such as asset structure, asset quality, capitalization, financial structure, efficiency, size, and revenue diversification. The second group of determinants includes factors relating profitability to the industry

structure and to the macroeconomic environment (external) within which the banking system operates. In this group, variables that reflect the economic and legal environment where the banking institutions operate such as bank concentration, gross domestic product (GDP), inflation, and interest rates are used to measure profitability. The factors in the second group are also considered to be beyond the control of the management of a bank. In other words, these are sector-wide or country-wide factors that affect the profitability of banks (Athanasoglou, Delis & Staikouras, 2006).

According to Trujillo-Ponce (2012), ROA is perhaps the single most important ratio for comparing the efficiency and operational performance of banks. It is the net profits expressed as a percentage of total assets. This ratio considers the returns generated from the assets that the bank finances; it is primarily an indicator of managerial efficiency. Therefore ROA is often used as an overall index of profitability, is a financial ratio used to measure the relationship of profits and earnings and total assets. ROA suggests that organisations with higher amounts of assets should be able to earn higher levels of income. ROA measures management's ability to earn a return on the firm's resources (assets). ROA is a widely used financial tool to determine the level and intensity of returns that a firm has generated by employing its total assets. Firms are usually considered well off when they generate returns that can attract further investors and lenders, and in trouble if they need to raise the finance required for growth or capital needs, or if their ROA does not convince financiers (Ali, 2011).

The empirical evidence provides the various methods employed in studying bank profitability using these determinants. Most of the empirical literatures agree that bank level as well and macroeconomic factors largely influence bank profitability. There is

however limited evidence that industry-specific factors have any influence on bank profitability. It is against this background that the study utilized only bank level and macroeconomic factors to estimate profitability.

2.4 Empirical Studies on Asset and Liability Management

The study of Hester and Zoellner (1966) employed statistical cost accounting (SCA) method on US banks and found statistically significant coefficients for most of the categories of assets and liabilities and rejected the null hypothesis that there is no relationship between them. However, Kwast and Rose (1982) expanded the traditional SCA model by including market structure and macro economic variables. Their model, nonetheless, found no evidence that differential returns and costs on different categories of assets and liabilities exist between high and low profit banks.

This study is also in line with the views of Kwast and Rose (1982) regarding the expansion of the traditional SCA model employed by Hester and Zoollner (1966) to include the macroeconomic variables – inflation and gross domestic product as factors that help in determining the profitability of banks. However, this study is contrary to the views of Kwast and Rose (1982) on their findings that there exist no differential returns and costs on different categories of assets and liabilities between high and low profit banks. On a practical note, banks widely vary in their business volumes, hence the need to divide the variables of the study by total assets so as to avoid inefficiency in estimation of coefficients associated with heteroscedasticity of residuals.

On the part of Vasiliou (1996), by employing SCA method, it suggests that asset management rather than liability management plays a more prominent role in explaining inter-bank differences in profitability. However, these findings contrast with the findings

of Kosmidou, Pasiouras and Floropoulos (2004), who found that liability management contributes more in creating the profitability differences among banks.

Also Vaidyanathan (1999) discussed issues on asset-liability management and elaborates on various categories of risks that required to be managed in the Indian context. In the past Indian banks were primarily concerned about adhering to statutory liquidity ratio norms; but in the changed situation, namely moving away from administered interest rate structure to market determined rates, it became important for banks to equip themselves with some of these techniques, in order to immunize them against interest rate risk. Vaidyanathan argues that the problem gets accentuated in the context of change in the main liability structure of the banks, namely the maturity period for term deposits. For instance, in 1986, nearly 50% of term deposits had a maturity period of more than five years and only 20%, less than two years for all commercial banks, while in 1992, only 17% of term deposits were more than five years whereas 38% were less than two years (Vaidyanathan, 1995). He found that several banks had inadequate and inefficient management systems. Also, he argued that Indian banks were more exposed to international markets, especially with respect to foreign exchange transactions, so that asset-liability management was essential, as it would enable the bank to maintain its exposure to foreign currency fluctuations given the level of risk it can handle. He also found that an increasing proportion of investment by banks was being recorded on a marked-to-market basis, thus being exposed to market risks. He also suggested that, as bank profitability focus has increased over the years, there is an increasing possibility that the risk arising out of exposure to interest rate volatility would be built into the capital

adequacy norms specified by the regulatory authorities, thus in turn requiring efficient asset-liability management practices.

In the study of Kosmidou, Pasiouras & Floropoulos (2004) 'Linking profits to asset-liability management of domestic and foreign banks in the UK', they employed the statistical cost accounting method on a sample of 36 domestic and 44 foreign banks operating in the UK over the period 1996-2002 to examine the relationship between profits and asset-liability composition. The sample was initially split into high and low profit banks .Their operating profits were then compared with the industry average. The results show that high profit banks experience considerably lower cost of liabilities for most sources of funding, which can cover any losses from the lower rate of return on assets that they experience compared to the lower profit banks. The sample was then split into domestic and foreign banks. The operating profit that domestic banks experience appeared to be generated by the loans that they hold on their earning assets portfolio and their fixed assets while the operating profit of foreign banks was generated by all the assets that comprise their portfolios. Liabilities, in both cases customer and short-term funding were found to be more costly than other sources of funding.

The Statistical Cost Accounting (SCA) method was employed by Asiri (2007) to test whether assets and liabilities of a bank could help forecast its profits. In the study, all Kuwaiti Listed Banks were examined over the period 1980-1997 for the asset-liability relationship. Considering the size difference, the sample was divided into sub-samples. The study concluded that asset, mainly loans, are the key variable in generating profits whereas liabilities reduce profits. It also proved that a bank's profits are positively related

to risk. In managing asset-liability, the results highlight a significant difference between small and large banks.

From the study of Kosmidou, Pasiouras & Floropoulos (2004) it was concluded that small banks exhibit higher overall performance compared to large ones in the UK. The finding was also similar to the study done by Vasiliou (1996) for Greek banks where it was found that annual rates of return on fixed assets are higher for the high-operating profit group. The results for Kuwaiti banks do not provide evidence that small banks generate greater profit, but interestingly it showed that the behavior of assets-liabilities management differ for small compared to large firms in generating profits. Low profit firms have more emphasis on capital risk, liquidity risk, and deposits and investments. On the other hand, large profit banks have more emphasis on taking credit and capital risk and reducing fixed assets in order to generate profit. This final finding contradicts the results reported by Kosmidou, Pasiouras & Floropoulos (2004) where they found a positive relation between fixed assets and profits.

On the part of Angele (2008), in her research on Analysis of Chosen Strategies of Asset and Liability Management in Commercial Banks discovered that the core problem in asset and liability management is the fact that the main asset of commercial bank credits cannot always be liquid, especially if the country's economy is in deep recession.

The study conducted by Dash, Venkatesh & Bhargav (2011), analysed ALM in banks operating in India by determining the liquidity position of banks in India through maturity profiling. The results of the study suggest that, overall; public sector banks had a better short-term liquidity position than the private sector banks and foreign banks.

The goal programming method was used by Samuel (2011) to study the Effects of ALM on Profitability of National Investment Bank in the New Juabeng Municipality in Ghana. His major findings of the study were; the value of assets and liabilities of the bank had a direct effect on the profitability of the bank, decrease in assets value leads to increase in banking profitability. Increased or decreased in liability had direct effect on company's profitability, inflation rate has the direct effect on profitability. Increase in inflation leads to increase in profitability and decreased in inflation, decreases the profit margin of the firm, Bank of Ghana base rate affects the strategic decisions of the banks, changes in the base rate have direct effect on the banking profitability and Bank of Ghana policies normally affect the decisions of the bankers.

Gikonya (2011), studied the Relationship between Asset Liability Management and Profitability of Commercial Banks in Kenya. A cross-sectional survey was used in a population of 43 licensed commercial banks in Kenya. Secondary data was obtained from financial statements and records of commercial banks. Analysis of data was done using a linear regression mode. The study found asset liability management was positively related to profitability.

Betele (2013), carried out a research on Asset Liability Management and Commercial Banks Profitability in Ethiopia, the study examined the effect of ALM on commercial banks profitability in 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. The model hypothesize that the rate of return on earning assets is positive and varies across assets, and the rate of cost on liabilities is negative and varies across liabilities. The findings reveal that assets management, mainly

loans and advances, contributes positively to the profitability of commercial banks, except fixed assets. While liability management, particularly saving and fixed deposits and other liabilities and credit balances, cost negatively the profitability of commercial banks. Therefore, in the Ethiopian commercial banking market, assets management positively and liability management negatively affect profitability.

Singh (2013) analyzed the impact of measures and strategies banks undertook to manage the composition of asset-liability and its impact on their performance in general and profitability in particular There are serious attempts by banks to minimize the asset liability mismatch since the implementation of RBI guidelines in 1997. The study suggested much scope for banks to improve profitability by monitoring and reducing short term liquidity.

In the study of Prathap (2013), ALM in Indian banking system is still in a nascent stage. Against this backdrop, the objective of the research was to study and analyze the status of ALM approach in the Indian banking system. The result of the study also indicates a strong relationship between fixed assets and net worth for all groups of banks.

In Nigeria, Njogo, Ohiaeri and Omisakin (2014) study on a panel data analysis of asset and liability management on performance of some selected Nigerian commercial banks, was aimed at examining the ALM of 15 Nigerian banks from 2008-2012 and found that all variables of interest show positive and a strong relationship with profitability within the period of the study. The study also showed that the due process of ALM instituted by the apex regulatory authorities in Nigeria within the period of the study have been effective. This study differs from Njogo, Ohiaeri and Omisakin (2014), as it expands the model to incorporate macroeconomic variables of gross domestic product and inflation to

measure profitability of DMBs in Nigeria. Also, the independent variables are clearly spelt out. In their study, they employed the use of Eviews to analyse the data of the study, while this study use Stata12 to analyse the data of the study. Furthermore, their study covered a scope of 5 years while this study covers a period of 10 years and is considered suitable enough to determine the effect of ALM on the profitability of DMBs in Nigeria.

The study conducted by Shretha (2015) examined the effect of ALM on commercial banks' profitability in Nepal. For this purpose top seven private commercial banks were taken as sample, which constitutes 49 percent share of total net profit of overall 30 commercial banks over 7 years time period from 2007-08 to 2013-14. The report emphasized that the rate of return on assets is positive and varies across assets, and the rate of cost on liabilities is negative and varies across liabilities. The pooled OLS regression analysis result showed that all assets, including fixed assets, mainly loans and advances as well as other assets affect profitability positively, while all liabilities, mainly deposits, and other liabilities have negative effect on commercial banks profitability. With regard to macroeconomic variables, GDP and Inflation rate have negative effect on commercial banks profitability. This study includes borrowings, deposits in other banks, deposits from other banks and other investments in addition to the variables used by Shretha (2015) to determine the effect of ALM on the profitability of DMBs in Nigeria.

Obari (2015), conducted a study on the effect of ALM on profitability of commercial banks in Kenya. The objective was to determine the effect of ALM and profitability of commercial banks in Kenya. Secondary data was obtained from financial statements and records of commercial banks. Analysis of data was done using ANOVA. The findings were that, there is statistically significant positive relationship between bank size and

financial performance and a statistically negative relationship between capital structure and financial performance.

In the study of Uddin and Haque (2016) on the impacts of ALM policy on the profitability of sample banks working in Bangladesh, the rationality of the study is to observe the degree of relationship of different assets and liability variables with profitability through applying Statistical Cost Accounting (SCA) model using time series data from 2003 to 2014. Financial ratios and different statistical tools like Pearson Correlation, Descriptive analysis and regression analysis have been applied to identify the relationship among the variables. After analysis, Loans & Advances is found to have a significant positive relationship with banks' profitability. Therefore they concluded that there is no underlying fact to ignore the importance of asset-liability management policy to ensure profitability and long-run sustainability of financial institutions in any economy.

Recently, Tee (2017) conducted a study on Asset Liability Management and the Profitability of Listed Banks in Ghana. All the seven listed banks of Ghana were examined over the period 2008 to 2012 for the asset-liability relationship using the SCA model. The findings were that assets management, mainly loans and advances, are believed to contribute positively to the profitability of commercial banks. While liability management, particularly saving and fixed deposits and other liabilities and credit balances, affects the banks' profitability negatively. The macroeconomic variables incorporated in this study were the real interest rate and the general rate of inflation. Interest rate had no significant effect on profitability. However, the rate of inflation had a negative effect on commercial banks profitability.

In the study of Ogbeifun and Akinola (2018) 'A Comparative Study of Asset-Liability Management Framework in the Banking Industry in Nigeria', they examined some practices in the management of asset-liability and their influence on the performance of banks taking into account the unique attributes of the Nigerian economy. Secondary data sourced from the Central Bank Nigeria Bulletin and financial reports of Banks, information concerning Shareholders' funds, Total Assets (independent variables) and profit after tax (dependent variable) of listed deposit money banks in Nigeria were extracted and explored in presenting the facts of the situation. Data were tested using the Ordinary Least Square Linear Regression model. The result of the study showed that Shareholders' Funds positively relate to profitability and is significant at 5 percent and that the Total Asset also positively relate to profitability at 5 percent level of significance. This study shows that there is a significant relationship between bank performance (in terms of profitability) and Asset-Liability Management. The study concluded that an efficient Asset-Liability Management has significant influence on profitability.

The study of Ogbeifun and Akinola (2018) also like most of the studies conducted in Nigeria has no macroeconomic variables to measure the profitability of DMBs in Nigeria. They also used profit after tax to express ROA, but this current study use profit before tax to express ROA, as taxes are charged at fixed rates of assessable income and are not normally controlled by the banks' management.

From the empirical review of studies provided above on asset liability management and its link to banks' profitability, it can be seen that a number of authors (Hester & Zoellner, 1966; Kwast & Rose, 1982; Vasiliou, 1996 and Kosmidou, Pasiouras & Floropoulos, 2004) have done studies about the influence of the composition of assets and liabilities on

the profitability of bank. For the first time, Hester & Zoellner (1966) found statistically significant coefficients for most of the categories of assets and liabilities in US banks and rejected the null hypothesis that there is no relationship between them while Vasiliou (1996), suggest that asset management rather than liability management play more prominent role in explaining inter-bank differences in profitability. These findings however contrast with the findings of Kosmidou, Pasiouras & Floropoulos (2004) who found that liability management contributes more in creating the profitability differences among the banks. However, these authors did not incorporate the macroeconomic variables in their model. In fact, a number of bank specific or macroeconomic factors such as inflation rate, gross domestic product (GDP), etc do impact bank's net earnings which were ignored by these authors.

Kwast & Rose (1982) expanded the traditional SCA model by including market structure and macro economic variables. Nonetheless, their model found no evidence that differential returns and costs on different categories of assets and liabilities exist between high and low profit banks. Asiri (2007); Sayeed, Edirisuriya & Hoque (2012) and Belete (2013) applied SCA method and found that assets are positively and liabilities are negatively related to the profitability of banks.

In the case of Nigeria Njogo, Ohiaeri and Omisakin (2014) and Ogbeifun and Akinola (2018) they also employed the SCA model although they did not incorporate the macroeconomic determinants of profitability to their study and found that the chosen strategy of the bank asset and liability management allows a significant positive effect on commercial banks profitability. Profitability is determined by two broad factors, of which the first group is specific (internal) to each bank as they influence a bank's managerial

decisions and policy objectives such as asset structure, asset quality, capitalization, financial structure, efficiency, size and revenue diversification. The second group of determinants includes factors relating profitability to the industry structure and to the macroeconomic environment (external) within which the banking system operates. In this group, variables that reflect the economic and legal environment where the banking institutions operate such as bank concentration, gross domestic product (GDP), inflation, and interest rates are used to measure profitability. The factors in the second group are also considered to be beyond the control of the management of a bank. As such, it is worthy to include the macroeconomic factors in other to determine the profitability of banks. As it can be noted, the debate on the relationship between ALM and profitability of banks is not yet settled. Furthermore, most of these studies were done in different environments which cannot be generalized to developing countries especially Nigeria. Hence, the present study seeks to bridge the gap.

2.5 Theoretical Review

In examining the effect of ALM on the profitability of listed DMBs in Nigeria, four theories are found relevant. These are the commercial loan, shift ability, anticipated income and liability management theories.

2.5.1 Commercial Loan Theory

This theory originated in England during the 18th century and is also referred to as the real bills doctrine. 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 to business organisations. Loans meant to finance the production, and evolution of goods through the successive phases of

production, storage, transportation, and distribution are considered as self-liquidating loans. 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).

This theory also states that whenever commercial banks make short term self-liquidating productive loans, the central bank should lend to the banks on the security of such short-term loans. This principle assures that the appropriate degree of liquidity for each bank and appropriate money supply for the whole economy.

The central bank is expected to increase or erase bank reserves by rediscounting approved loans. When business starts growing and the requirements of trade increased, banks will be able to capture additional reserves by rediscounting bills with the central banks. When business goes down and the requirements of trade declines, the volume of rediscounting of bills would fall, the supply of bank reserves and the amount of bank credit and money would also contract. 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.

These short-term self-liquidating productive loans acquire three advantages. First, they acquire liquidity so they automatically liquidate themselves. Second, as they mature in the short run and are for productive ambitions, there is no risk of their running to bad debts. Third, such loans are high on productivity and earn income for the banks.

Despite the advantages, the commercial loan theory has certain defects. First, if a bank declines to grant loan until the old loan is repaid, the disheartened borrower will have to

minimize production which will ultimately affect business activity. If all the banks pursue the same rule, this may result in reduction in the money supply and cost in the community. As a result, it makes it impossible for existing debtors to repay their loans in time.

This theory also believes that loans are self-liquidating under normal economic circumstances. If there is depression, production and trade deteriorate and the debtor fails to repay the debt at maturity. Third, this theory disregards the fact that the liquidity of a bank relies on the ability to sell its liquid assets and not on real trade bills. It assures safety, liquidity and profitability. The bank need not depend on maturities in time of trouble. Again, the general demerit of this theory is that no loan is self-liquidating. A loan given to a retailer is not self-liquidating if the items purchased are not sold to consumers and stay with the retailer. In simple words a loan to be successful engages a third party. In this case the consumers are the third party, besides the lender and the borrower. Therefore this theory tends to notify banks on how to grant loan in order to avoid mismatch of assets and liabilities, as such hindering the financial performance of the banks.

2.5.2 Shift ability Theory

This theory was proposed by H.G. Moulton and it states that, for an asset to be perfectly shift-able, it must be directly transferable without any loss of capital or loss when there is a need for liquidity. This is specifically used for short term market investments, like treasury bills and bills of exchange which can be directly sold whenever there is a need to raise funds by banks. But in general circumstances when all banks require liquidity, the shift ability theory need all banks to acquire such assets which can be shifted on to the

central bank which is the lender of the last resort. In other words, this theory views banking from a different perspective and redirects the attention of bankers and regulators from loan to investment as source of liquidity. The banks need not to worry about maturity period and loss in value of assets.

The shift ability theory has positive elements of truth. Now banks obtain sound assets which can be shifted on to other banks. Shares and debentures of large enterprises are welcomed as liquid assets accompanied by treasury bills and bills of exchange.

Shift ability theory has its own demerits. Firstly, only shift ability of assets does not provide liquidity to the banking system. It completely relies on the economic conditions. Secondly, this theory neglects acute depression, the shares and debentures cannot be shifted to others by the banks. In such a situation, there are no buyers and all who possess them want to sell them. Third, a single bank may have shift able assets in sufficient quantities but if it tries to sell them when there is a run on the bank, it may adversely affect the entire banking system. Fourth, if all the banks simultaneously start shifting their assets, it would have disastrous effects on both the lenders and the borrowers.

Based on this theory, the credit needs of the customers are better served as more loans become available to both businessman and consumer and the resulting profits were attractive to both the bank management and its stockholders.

2.5.3 Anticipated Income Theory

This theory was proposed by H.V. Prochanow in 1944 on the basis of the practice of extending term loans by the US commercial banks. This theory states that irrespective of the nature and feature of a borrower's business, the bank plans the liquidation of the term-loan from the expected income of the borrower. A term-loan is for a period

exceeding one year and extending to a period less than five years. It is admitted against the pledge as security of machinery, stock and even immovable property. The bank puts limitations on the financial activities of the borrower while lending this loan. While lending a loan, the bank considers security along with the anticipated earnings of the borrower. So a loan by the bank gets repaid with the future earnings of the borrower in installments, rather giving a lump sum at the maturity of the loan.

This theory dominates the commercial loan theory and the shift ability theory as it satisfies the three major objectives of liquidity, safety and profitability. Liquidity is settled to the bank when the borrower saves and repays the loan regularly after certain period of time in installments. It fulfills the safety principle as the bank permits a relying on good security as well as the ability of the borrower to repay the loan. The bank can use its excess reserves in lending term-loan and is convinced of a regular income. Lastly, the term-loan is highly profitable for the business community which collects funds for medium-terms.

The theory of anticipated income is not free from demerits. This theory is a method examining a borrower's creditworthiness. It gives the bank conditions for examining the potential of a borrower to favorably repay a loan on time. It also fails to meet emergency cash requirements. This theory was developed further in the 1960s and it states that, there is no need for banks to lend self-liquidating loans and maintain liquid assets as they can borrow reserve money in the money market whenever necessary. A bank can hold reserves by building additional liabilities against it via different sources. These sources comprise of issuing time certificates of deposit, borrowing from other commercial banks,

borrowing from the central banks, rising of capital funds through issuing shares, and by ploughing back of profits.

Hence, according to Fleming (1974), the adoption of this theory of lending allowed commercial bankers to begin making, in larger volume, many of the types of bank loans with which one is now familiar - consumer loans, real estate loans, term loans, margin loans, et cetera. Generally speaking, none of these loans generate their own repayment over any relatively short period of time. The extension of these loans by bankers has played a vital role in the expansion of our economy during the past several decades.

2.5.4 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 theory recognizes the fact that asset structures of a bank have prominent role to play in providing it with liquidity that it needs. This approach is considered more aggressive than the other methods as it enhances fund raising opportunities for execution of attractive investments which will translate to efficient performance. 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. This is what led banks in U.S.A, from 1960 to adopt strategies of sourcing potential depositors more aggressively by creating marketing departments to be able to remain profitable business. The fundamental contribution of this theory is that it considers both sides of a bank's balance sheet as sources of liquidity (Emmanuel, 1997).

According to Fleming (1974), the theory of liability management banking, especially has had rather significant effects on the structure of the banking industry and on the operations of individual banks. The practice of liability management techniques has allowed the officials of large commercial banks to expand the total of loans and investments on both a relative and an absolute basis. The concept has suggested a viable alternative or substitute for the holding of large amounts of liquid assets, while providing an acceptable method of adjusting for emergency needs for funds. This theory has allowed commercial banks to acquire increased flexibility in their operations, improving their services to their customers, to the general public, to bank owners, and to the total financial system of the country.

Considering the objective of the study which is to examine the effect of ALM on the financial performance of Nigerian DMBs, the anticipated income theory, as well as, the liability management theory best explained the study.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology used in the study. It specifically explains the research design, population of the study, sources and methods of data collection and analyses. It also explains the variables of the study and their measurement.

3.2 Research Design

A research design is a plan, structure and strategy of investigation so conceived as to obtain answers to research questions or problems. This study is carried out using the panel data. The data is analysed with a view to establish relationship between the variables of the study. This makes the ex post facto research design suitable for the study where the variables of the study are not interfered with as the event of the study has already happened. The Ex-post facto research design considers a research problem in which the variables are readily available and the researcher starts with the observation of an independent variable(s) in retrospective for their possible relations to, and effects on, the dependent variable. In this study, the ex-post facto design is used to establish causal relationship between ALM and profitability of Nigerian DMBs, that is, to measure the extent to which ALM is associated with the profitability of DMBs in Nigerian and its effects. The design is believe to be adequate and appropriate for the measurement of the Effect of ALM on the Profitability Nigerian DMBs.

3.3 Population of the Study

The study's population comprises of all the fifteen (15) DMBs that are listed on the Nigeria Stock Exchange (NSE) as at 31st December 2016. The population of the study is listed in table 3.1, showing the year of listing of the DMBs.

Table 3.1: Listed Deposit money Banks in Nigeria

S/No	Name	Year Listed on NSE
1	Access Bank Plc	1998
2	Diamond Bank Nigeria Plc	2005
3	Eco Bank Nigeria Plc	2006
4	Fidelity Bank Plc	2005
5	First Bank Nigeria Plc	1971
6	First City Monument Bank Plc	2004
7	Guaranty Trust Bank Plc	1996
8	Skye Bank Plc	2005
9	Stanbic-IBTC Bank	2005
10	Sterling Bank Plc	2006
11	Union bank of Nigeria Plc	1971
12	United Bank for Africa Plc	1970
13	Unity Bank Plc	2006
14	Wema Bank Plc	1991
15	Zenith Bank Plc	2004

Source: Generated from CBN publication and NSE Fact book, 2016.

To be selected as a sample, the bank must have been listed on the NSE and must not be delisted between 2007 and 2016. Hence, the number of banks in the population was reduced to eleven (11). Ecobank Nigeria got delisted in 2011 as it was absorbed by Ecobank Transnational Inc. (ETI), now known as Ecobank Nigeria Limited (Egene, 2012). Similarly, First Bank Nigeria, Stanbic-IBTC Bank Plc and First City Monument Bank Plc were delisted in 2012 in compliance with the revised regulation on the scope of Banking Activities and Ancillary Matters No. 3, 2010 by the CBN which requires commercial banks to divest from non-core banking business or adopt a holding structure.

Table 3.2: Working Population and Sample of the Study

S/No	Name	Year Listed on NSE
1.	Access Bank Plc	1998
2.	Diamond Bank Nigeria Plc	2005
3.	Fidelity Bank Plc	2005
4.	Guaranty Trust Bank Plc	1996
5.	Skye Bank Plc	2006
6.	Sterling Bank Plc	2006
7.	Union Bank of Nigeria Plc	1971
8.	United Bank for Africa Plc	1970
9.	Unity Bank Plc	2006
10.	Wema Bank Plc	1991
11.	Zenith Bank Plc	2004

Source: Generated by the researcher from table 3.1

3.4 Sample Size and Sampling Technique

At times it would be practically impossible to study a whole population hence researchers make a selection from the population to be studied (Zango, 2008). According to Asika (1991), the best sample is the complete population itself, because every element of the population is represented in it. Representation is the hallmark of a good sample, which makes it validly estimate the population characteristics, thereby minimizing sampling error and ensuring the absence of systematic variance. The whole working population presented in table 3.2 is taken as sample for the study.

3.5 Sources and Methods of Data Collection

In conducting this study, secondary source of data is used. The data is generated from the annual reports and accounts of the sampled banks, as well as, the Fact Book of the Nigerian Stock Exchange for a period of 10 years from 2007 to 2016.The data obtained from these sources are on Deposits in other banks (A1), Other investments (A2), Loans and Advances (A3) Government Securities, (A4), Demand Deposits (L1), Fixed Deposits

(L2), Deposits from other banks (L3) and Borrowings (L4). Other data that are obtained from annual reports and accounts is on the proxy of profitability i.e. Return on Asset (ROA).

3.6 The Variables of the Study and their Measurement

There are two sets of variables covered by this study. These are the dependent and the explanatory variables.

3.6.1 The Dependent Variable

The dependent variable is the profitability of listed DMBs in Nigeria. For the purpose of this study, Return on Asset (ROA), which is defined as profit before interest and tax divided by total assets is expressed as the dependent variable. This is in conformity with the works of Al Shubiri (2010), Gikonyo (2011), Betele (2013) and Tee (2017). This study uses net profit before tax as a dependent variable since taxes are charged at fixed rates of assessable income and are not normally controllable by management.

3.6.2 The Explanatory Variables

The explanatory variables include the independent variables and the control variables of the study.

a) Independent Variables

ALM is the independent variable of this study. As assets happen to be the economic resources owned by the bank, liabilities are amounts owed by the bank to others, other than the shareholders. They represent major sources of funds used by the bank. For the purpose of this study, the assets and liabilities variables are described as follows:

Table 3.3: Variables and their Measurement

Variables	Description	Measurement	Source
Asset Variables			
A1	Deposits in other banks	Total deposits in other banks to total assets ratio.	Asiri, 2007; Gikonyo, 2011; and Uddin & Haque, 2016
A2	Other Investments	Total other investment divided by total asset.	Gikonyo, 2011; and Uddin & Haque, 2016
A3	Loans and Advances	Total loans and advances divided by total asset.	Asiri, 2007; Gikonyo, 2011; and Uddin & Haque, 2016
A4	Government Security	Total government securities divided by total assets.	Gikonyo, 2011
Liability Variables			
L1	Demand Deposits	Total demand deposits to total assets ratio.	Asiri, 2007
L2	Fixed Deposits	Total fixed deposits divided by the total assets.	Uddin & Haque, 2016
L3	Deposit due to other banks	Total deposits due to other banks divided by the total assets.	Gikonyo, 2011
L4	Borrowings	Total borrowings by the total asset.	Uddin & Haque, 2016
Macroeconomic Variables			
GDP	Real Growth rate in GDP	The GDP rate for the year.	Betele, 2013
INF	General rate of Inflation	The rate of inflation for the year.	Al Shubiri, 2010 & Betele, 2013

3.7 Methods of Data Analysis

In analyzing the effect of ALM on profitability, the study employed the statistical tools of Descriptive statistics, Pearson correlation and Multiple regression.

3.7.1 Descriptive Statistics

Descriptive statistics is used in this study to compute the summary statistics that describe the central tendency, as well as how the data spread out around this value, or the variability. In other words it is a tool used to describe the dependent and the independent variables of the study by computing the mean, median, mode, range and the standard deviation of the variables.

3.7.2 Pearson Correlation

Pearson Correlation analysis is particularly useful in ascertaining the strength and direction of association between variables. In other words it is used to determine the nature of relationship between all variables under study so as to understand their individual relationship with one another before they are regressed.

3.7.3 Multiple Regression

In an attempt to determine the variations of dependent variable due to variation in any of the independent variables, the research uses multiple regression analysis. This is because multiple-regression is expected to explain the variation of dependent variable due to variation in any of the independent variables. However, the selection of the appropriate statistical techniques among the many multiple statistical tools that are available surely depends on the measurement of the research variables.

Multiple regression technique using panel data methodology is found to be suitable as such it is used to analyse the data. This is because the panel character of the data has a combination of time series, as well as, cross-sectional attributes which justifies the

application of a panel data methodology. The multiple regression is used to test hypotheses one to eight of the study.

To examine the effect of ALM on DMBs profitability in Nigeria, the modified Statistical Cost Accounting (SCA) model is adopted. That is, SCA model examines how operating profit is regressed by ALM in DMBs of Nigeria. As described by Hester and Zoellner (1966), the SCA model as a regression model assumes that the rate of return on earning assets is positive and varies across assets, and the rate of cost on liabilities is negative and varies across liabilities.

A bank earns revenue from many different sources and mainly from interest income, service fees and commissions from its assets and income from using liabilities. On the other hand, costs of banks are also sourced from bank's assets and liabilities. These expenses include interest expenses on deposits, other liabilities and administrative expenses. Now, if we subtract operating costs from operating revenues we will get net operating income for the banks. The variation in commercial banks' operating income is expressed by the traditional SCA model which was developed by Hester and Zoellner (1966) for bank b in time t which will be used in this study is as follows:

$\pi_{bt} = \alpha_0 + \Sigma\alpha_{1i} A_{ibt} + \Sigma \alpha_{2j} L_{jbt} + \varepsilon_{bt}$ …….…….. Eq. (1)

Where:

π_{bt} = Operating profit of a commercial bank

A_i = the ith asset of a bank; i = 1, 2, 3… n

L_j = the jth liability of a bank; j = 1, 2, 3… m

b = banks; b = 1, 2, 3… z

t = the time period; t = 1, 2, 3… t

α_{1i} = the marginal rate of return on assets

α_{2j} = the marginal cost of liabilities

α_0 = Constant term

ε_{bt} = Stochastic term

Because commercial banks are widely varied in their business volumes, it needed to divide all the variables in equation (1) by their total assets. This is done in order to avoid inefficiency in estimation of coefficients associated with heteroscedasticity of residuals (Kosmidou, Pasiouras & Floropoulos, 2004).

$$\frac{\pi_{bt}}{TA_{bt}} = \frac{\alpha_0}{TA_{bt}} + \Sigma\alpha_{1i}\frac{A_{ibt}}{TA_{bt}} + \Sigma\alpha_{2j}\frac{L_{jbt}}{TA_{bt}} + \mu_{bt} \quad \text{..... Eq. (2)}$$

Where:

TAbt5= Total assets for bank b at time t

$$\mu bt = \frac{\varepsilon_{bt}}{TAbt}$$

The models above imply that all banks experience identical interest rates on their assets and liabilities (Al Shubiri, 2010). But, practically, there are many factors that may have significant effect on profitability of commercial banks of which real growth rate in GDP and the general rate of inflation are the major ones (Sayeed and Haque, 2008). As different scholars like Ramlall (2009) describe, rapid economic growth increases profitability for a large number of countries. Consequently, the movements in general activity level are expected to generate direct effects on the profitability of commercial banks. And the effect of inflation can be substantial and undermines the stability of the financial system and the ability of the regulator to control the solvency of financial intermediaries. Therefore, an important indirect influence on commercial banks lies in the

effect of inflation on their customers and the consequence changes the demand for different kinds of financial services (Staikouras and Wood, 2004).

Such macroeconomic factors were incorporated in the models of Kwast and Rose (1982), Al Shubiri (2010), and Sayeed and Hoque (2008) to present the traditional SCA model in modified way. The following modified SCA model was employed for the study:

$$\frac{ROA_{bt}}{TA_{bt}} = \frac{\alpha_0}{TA_{bt}} + \Sigma\alpha_{1i}\frac{A_{ibt}}{TA_{bt}} + \Sigma\alpha_{2j}\frac{L_{jbt}}{TA_{bt}} + \alpha_3 GDP_t + \alpha_4 INF_t + \mu_{bt} \ldots \text{Eq.(3)}$$

Where:

ROAbt = Return on assets for bank b at time t

GDPt = the rate of gross domestic product at time t

INFt = the general rate of inflation at time t

α3 = Coefficient of real growth rate in GDP

α4 = Coefficient of general rate of Inflation

All assets and liabilities are not included as independent variables in this model. Since balance sheet identity is that total assets are equal to total liabilities and owners' equity, inclusion of all assets and liabilities would create perfect co-linearity within the independent variables. Hence, cash and fixed assets on the assets side and equity capital on the liabilities side are excluded from the model. The reason for such exclusion is that expected rate of return from cash and fixed assets are zero and that the cost of equity is not considered in the computation of net operating income as advocated by Kwast and Rose (1982) and Vasiliou (1996).

A classical test for the panel data is one of Random effect model versus fixed effect model. This analysis is employed in the conduct of this study. This technique of data analysis is used to examine the relationship between the dependent (ROA) and the

independent (ALM) variables. It predicts the dependent variable, using the information derived from the analysis of the independent variable. The coefficient of correlation (R) indicates the extent of the relationship between the independent variable and dependent variable in the model. The coefficient of determination (R^2) will also indicate the extent to which the independent variable explains the variability in the dependent variable. Lastly, the coefficient of the independent variable shows the amount of change in the independent variable has to a unit change in the dependent variable.

Estimating models from panel data requires first, to determine whether there is a correlation between the unobservable heterogeneity of each firm and the explanatory variables of the model. If there is a correlation (fixed effects), we would obtain the consistent estimation by means of the within-group estimator. Otherwise (random effects) a more efficient estimator can be achieved by estimating the equation by Generalized Least Squares (GLS). The normal strategy to determine whether the effects are fixed or random is to use the Hausman specification test under the null hypothesis. If the null hypothesis is rejected, the effects are considered to be fixed, and the model is then estimated by OLS. If the null hypothesis is accepted, we would have random effects, and the model is then estimated by GLS.

This technique of data analysis helps in ascertaining the significance of the relationships between profitability and each of the independent variables. The different elements of ALM are adopted as the independent variables. Each null hypothesis, designed to assess the significance of the relationship between each independent variable and profitability will be tested using the Fixed-Effect Regression (OLS) and Random-Effect (GLS) Regression statistics.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents, analyses and interprets the data generated for the study. The data relating to each of the statistical hypotheses of the study were presented and analyzed. The chapter starts with the preliminary analysis of the sample using descriptive statistics, correlation, the robustness test carried-out and then the regression result of the dependent variable (ROA) and the independent variables (deposit in other banks, other investments, loan and advances, government security, demand deposit, fixed deposits, deposit from other banks and borrowings). The hypotheses of the study were also tested and inferences there from. In addition, the implications of the findings were explained.

4.2 Analysis and Interpretation

This section presents the results of the analysis conducted on the data collected from the annual report. It includes results on descriptive statistics and correlation, regression results which are presented in the subsequent sub sections.

4.2.1 Descriptive Statistics

Table 4.1 presents summary of statistics for the variables of the study. It provides the variables mean, standard deviations, minimum and maximum values.

Table 4.1: Descriptive Statistics

Variables	Description	Obs	Mean	Std. Dev.	Min	Max
ROA	Return on asset	110	.018483	.0479371	-.1507826	.3856228
A1	Deposits in other banks	110	.1434502	.1226483	.0020152	.8355994
A2	Other Investments	110	.0201293	.0214547	.0004638	.1071788
A3	Loan and Advances	110	.4301127	.331386	.1425019	3.671199
A4	Government Securities	110	.1474621	.1282792	.0004841	1.053381
L1	Demand Deposits	110	.3510832	.5084476	.0002553	5.461855
L2	Fixed Deposits	110	.2216956	.1431429	.0001336	1.348847
L3	Deposit due to other banks	110	.0252546	.0347535	.0004059	.1991914
L4	Borrowings	110	.0814386	.0739608	.0003761	.6147641
GDP	Real Growth rate in GDP	110	.05133	.0390653	-.051	.0954
INF	General rate of Inflation	110	.11274	.0345385	.66	.1855

Source: Generated by the Researcher from the Annual Reports Data of the Listed DMBs

From table 4.1 above, it can be observed that the number of observations for each variable is 110. This is in line with the number of the listed DMBs which is 11, and the study period which covers 10 years. Also, it can be observed that the mean statistic for A1 (deposits in other banks) is seen as 0.143. The standard deviation of 12% indicates that the banks slightly vary in their amounts of deposits in other banks. This can be seen from the minimum of 0.002 and maximum of 0.835 as a result of deposits in other banks of Access Bank Plc and Zenith Bank Plc both in 2012.

Moreover, it can also be seen from table 4.1 that, the mean of A2 (other investments) is 0.020. This means that on average 2% of the assets of the listed DMBs are other investments. The standard deviation of 2% implies that, the banks to some extent vary in the amounts of other investments. This can be justified from the minimum of 0.0004 to the maximum of 0.107. Also, it can be observed from the same table that, 0.430 stands

for the average of A3 (loans and advances), this suggests that 43% of the total assets are in the form of loans and advances. The standard deviation of 33% indicates the extent upon which the banks vary. This can be evidenced from the minimum of 0.142 to the maximum 3.671 from Unity Bank Plc in 2008 and Zenith Bank Plc in 2012 respectively.

The minimum and maximum values under A4 (government securities) are 0.0004 and 1.053 which are as a result of Fidelity Bank Plc in 2007 and Zenith Bank Plc in 2012.The mean statistics is 0.147, this implies that on average loans and advances constitute 14% of the total assets of the listed DMBs in Nigeria.

Furthermore, Table 4.1 indicates that the liability variables which serve as sources of funds to the bank, on average L1, L2, L3 and L4 have mean values of 35%, 22%, 2.5% and 8% respectively. Their standard deviations of 0.508, 0.143, 0.034 and 0.073 indicate the extent upon which the banks vary. This can be seen looking at their minimums at 0.0002, 0.0001, 0.0004 and 0.0003 as well as their maximums at 5.461, 1.348, 0.199 and 0.614 respectively.

The macroeconomic variables incorporated in this study have the mean value of 5% and 11% with the standard deviation of 3.9% and 3.4% for real growth rate in GDP and the general rate of inflation, respectively. The minimum and maximum values of real growth rate in GDP are -0.51 and 0.095 respectively, while the minimum and maximum values of the general rate of inflation are 0.66 and 0.185 respectively.

Conclusively, the minimum value derived for ROA is –0.150, this may be attributed to the operating loss before tax earned by Wema Bank Plc in 2008, 2009, 2011 & 2012, Unity Bank ad Sterling Bank Plc in 2009, Union Bank of Nigeria Plc in 2009, 2010 & 2011, Diamond Bank Nigeria Plc and United Bank for Africa Plc in 2011. The ROA had

a mean of 0.018 with an average dispersion of 0.047 represented by the standard deviation.

4.2.2 Correlation Matrix

The correlation between the dependent and independent variables are presented in Table 4.2. The sign of the correlation coefficient which ranges from -1 to 1, indicates the direction of the relationship (positive or negative), the absolute values of the correlation coefficient indicates the strength, with larger values indicating stronger relationships. The correlation coefficients on the main diagonal are 1.0, because each variable has a perfect positive linear relationship with itself. Negative coefficients means indirect relationship, while positive implies the reverse. Variance Inflation Factor (VIF) result was presented alongside model coefficients to prove absence of collinearity among the explanatory variables.

Table 4.2 Correlation Matrix of the Dependant and Independent Variables

	ROA	A1	A2	A3	A4	L1	L2	L3	L4	GDP	INF
ROA	1.0000										
A1	0.4685	1.0000									
A2	0.2435	0.1641	1.0000								
A3	0.7305	0.3752	0.3471	1.0000							
A4	0.4051	0.1720	0.4226	0.6021	1.0000						
L1	0.7272	0.5145	0.3888	0.9064	0.6393	1.0000					
L2	0.6096	0.4690	0.2358	0.6863	0.4364	0.7613	1.0000				
L3	0.3362	0.2251	0.0600	0.4916	0.3078	0.4603	0.3511	1.0000			
L4	-0.1046	-0.0960	-0.0440	-0.0207	0.1239	-0.0437	-0.0398	-0.0256	1.0000		
GDP	-0.0441	0.3520	0.1059	-0.1478	-0.0113	0.0007	0.0613	0.0049	-0.1777	1.0000	
INF	-0.0167	0.0060	-0.0434	0.0890	-0.0907	-0.0290	-0.0369	0.0168	0.0520	-0.5286	1.000

Source: Generated by the Author from the Annual Report and Account of Listed DMBs

Table 4.2 shows the correlation coefficients on the relationship between the dependent variable (ROA) and independent variables (deposit in other banks A1, other investments A2, loan and advances A3, government security A4, demand deposit L1, fixed deposits L2, deposit from other banks L3, borrowings L4, gross domestic product GDP and inflation INF. From the table 4.2, it shows that the correlation coefficient for A1 and ROA is 0. 4685; this indicates that deposit in other banks and ROA are moderately positively correlated.

The correlation results presented in table 4.2 also indicate that all the explanatory variables with the exception of L4, GDP and INF are positively correlated with the explained variable. The negative correlation of L4, GDP and INF indicates that ROA is adversely affected by them. Similarly, all the other explanatory variables are positively related between themselves except L4 and GDP as well as INF, of which GDP and INF are control variables.

Collinearity is a situation where two of the independent variables are related, and multicollinearity is a state where there is a very high intercorrelations or inter associations among the independent variables or predictors. This implies interdependence among the predictors or independent variables and if high in magnitude, adversely affects the predictive ability of the independent variables. To determine the presence of collinearity problem, a Variance Inflation Factor (VIF) test was carried out, the results of which provide evidence of the absence of collinearity. This is because the results of the VIF test ranges from a minimum of 1.09 to a maximum of 9.80. Hence, the predictive ability of the independent variables is not adversely affected by the relationship.

4.2.3 Regression Analysis

Regression analysis is a set of statistical processes for estimating the relationships among variables. It helps one understand how the typical value of the dependent variable changes when any one of the independent variables is varied, while the other independent variables are held constant**.**

4.2.3.1 Robustness Test of Independent and Dependent Variables

The robustness test was conducted in order to improve the validity of all statistical inferences for the study. The tests include Normality, Multicollinearity and Heteroscedasticity. These are discussed below.

a) Normality Test of the Residuals

This test was conducted to check for the distribution pattern of the research data. The research used histogram of standardized residuals, normal probability plot (P plot) and Shapiro wilk test for this purpose (See Appendix B, Figures 1 & 2 and Table 4.6a). The outcome of the histogram of standardized residuals as well as the P plot did not indicate a good fit and this suggest the presence of outliers among the regression standardized residuals, which means that the data are not normally distributed. However, the non-normality is corrected through robust standard error regression in order to have unbiased results (See Appendix A, Table 4.7a).

b) Multicollinearity Test

Collinearity occurs where there is linear association between two explanatory variables in a multiple regression model while multicollinearity is a situation where the same statistical phenomenon exists among more than two explanatory variables (Wikipedia, 2017). Multicollinearity test is carried out to check whether there is a correlation between independent variables which will mislead the result of the study. The results show that

the variance inflation factor (VIF) is less than 10 which indicate absence of multicollinearity (See Appendix, Table 4.2a)

c) Heteroskedasticity Test

This test was carried out to check whether the variability of error terms is constant or not (i.e. homoscedasticity if constant and heteroskedasticity if otherwise). The test of ensures that the regression fits all the values of the independent variables and this is possible only if the residuals do not vary with independent variable and therefore are random in nature. The presence of heteroskedasticity invalidates statistical tests of significance and cause estimates of the variance and standard errors of the coefficients to be biased. For this study heteroskedasticity exist as the result of the test show a significant probability of 0.0000. This was later corrected through the OLS robust test (See Appendix; Table 4.5a).

4.2.3.2 Hausman Specification Test

This test is conducted in other to choose between two alternatives, i.e. it is performed to decide between fixed or random effect models. It basically tests whether the unique errors (term error) are correlated with the regressor. It is also used to assess whether a statistical model corresponds to the data. The role of Hausman test is to check for strict exogeneity. If no correlation is found, random effects should be employed but if correlation exists, fixed effects should be employed.

Hence, prob>chi2 is the criteria used to determine the efficiency of fixed and random effect regression results, and to also make choice between the two. Therefore, if prob>chi2 is less than 0.1, fixed effect result is more efficient than random effect, and will be selected. However, if prob>chi2 is greater than or equal to 0.1, the reverse will be

the case. The result of the test reveals that the prob>chi2 is insignificant (0.6238) as such the random effect model was used (See Appendix; Table 4.8a).

4.2.3.3 Regression Results

The regression results of the Ordinary Least Square (OLS), Random effects (RE) and Fixed effects (FE) estimation techniques are presented in Table 4.4 The summary of the regression results obtained from the model of the study:

$$\frac{ROA_{bt}}{TA_{bt}} = \frac{\alpha_0}{TA_{bt}} + \Sigma\alpha_{1i}\frac{A_{ibt}}{TA_{bt}} + \Sigma\alpha_{2j}\frac{L_{jbt}}{TA_{bt}} + \alpha_3 GDP_t + \alpha_4 INF_t + \mu_{bt}$$

is presented in Table 4.4. The Table presents the coefficient, standard error, t-statistics and probability of OLS, RE and FE.

Where:

ROAbt = Return on assets for bank b at time t

GDPt = the rate of gross domestic product at time t

INFt = the general rate of inflation at time t

α3 = Coefficient of real growth rate in GDP

α4 = Coefficient of general rate of Inflation

Table 4.3 Regression Result

OLS					FIXED				RANDOM			
VARIABLES	**Coefficient**	**Robust Std Error**	**t**	**p>/t/**	**Coefficient**	**Std Error**	**T**	**P> /t/**	**Coefficient**	**Std Error**	**z**	**p>/z/**
CONSTANT	- 0.01328	0.00886	-1.50	0.137	-0.00406	0.01722	-0.24	0.814	-0.00198	0.01743	-0.11	0.909
A1	0.04111	0.01736	2.37	0.020**	0.07667	0.03962	1.94	0.056	0.08977	0.03600	2.49	0.013**
A2	0.01020	0.08139	0.13	0.900	-0.19937	0.17722	-1.12	0.264	-0.10162	0.16636	-0.61	0.541
A3	0.06206	0.01207	5.14	0.000***	0.00525	0.03507	0.15	0.881	0.05126	0.02795	1.83	0.067*
A4	0.00122	0.01675	0.07	0.942	0.03353	0.03869	0.87	0.388	0.00635	0.03537	-0.18	0.857
L1	0.02603	0.00931	2.80	0.006***	0.02919	0.02423	1.20	0.232	0.01387	0.02055	0.67	0.500
L2	0.00320	0.01659	0.19	0.847	0.09021	0.03838	2.35	0.021	0.05566	0.03470	1.60	0.109
L3	-0.04944	0.05089	-0.97	0.334	0.08560	0.11180	0.77	0.446	-0.00381	0.10373	-0.04	0.971
L4	-0.06833	0.02129	-3.21	0.002***	-0.01031	0.05063	-0.20	0.839	-0.03698	0.04568	-0.81	0.418
GDP	-0.00395	0.05485	-0.07	0.943	-0.19788	0.10622	-1.86	0.066	-0.18282	0.10555	-1.73	0.083*
INF	-0.01080	0.05530	-0.20	0.845	-0.11581	0.10748	-.108	0.284	-0.16023	0.10597	-1.51	0.131
R Squared	0.6079											
F Value	56.12											
Prob > F	0.0000											
R Squared:												
Within					0.6235				0.6117			
Between					0.1992				0.5975			
Overall					0.5424				0.5989			
rho					0.3057				0.1340			
F(10, 89)					2.49							
Prob > F					0.011							

Source: Generated by the Author from Annual Reports and Accounts Data of Listed DMBs

***, ** and * indicate 1% and 5% and 10% significant levels respectively

Table 4.3 presents the regression results of the dependent variable (ROA) and the independent variables of the study (deposits in other banks, other investments, loans and advances, government securities, demand deposits, fixed deposits, deposits from other banks, borrowings, gross domestic product and inflation). The OLS regression does not provide efficient estimates and to check whether the variability of error terms is constant or not, a test for heteroskedasticity was conducted. The heteroskedasticity test performed revealed presence of heteroskedasticity which is corrected using the OLS robust test. In order to examine whether endogeneity exist, which could potentially lead to biased coefficient, a Hausman specification test to make the choice between Fixed Effect (FE) and Random Effect (RE) regression was performed. This test is necessary considering that there is a trade-off between the efficiency of the random effect and the consistency of the fixed approach. Although, Table 4.3 presents the regression results of OLS robust, FE and RE, discussion is done on RE estimation only. This is due to the fact that the Hausman test reveal that the RE is more efficient as evident by the p-value of 0.6238 which is insignificant i.e. greater than 0.1. Also, Lagrangian multiplier (LM) test was conducted to help decide between a random effects regression and a simple OLS regression. The null hypothesis was therefore rejected and it was concluded that panel regression with random effect was necessary in this study. (See Appendix A, Tables 4.6a and 4.8a)

The RE regression results reveal the cumulative R2 (0.60) which signifies that 60% of total variation in profitability of listed DMBs in Nigeria is caused by their deposits in other bank (A1), other investments (A2), loan and advances (A3) government security, (A4), demand deposit (L1), fixed deposits (L2), deposit from other banks (L3),

borrowings (L4), gross domestic product (GDP) and inflation (INF). This indicates that the model is fit and the explanatory variable are properly selected, combined and used as substantial value of the profitability is accounted for by the explanatory variables. This can be confirmed by the value of F- statistics of 56.12 at 10% level of significance. Hence, the finding of the study is relied upon.

The hypotheses have been tested using computed p values at 1, 5 and 10% level of significance. Thus, the outcome of the regression is given as follows:

a) Deposits in other Banks

The RE estimation from the regression result in table 4.3 reveals that deposits in other banks (A1) using the p value have positive and significant effect at 5% level, on the profitability of listed DMBs in Nigeria. This implies that an increase in deposits in other banks, other independent variables remaining constant increases the profitability. This means that deposits in other banks has an effect on the profitability of DMBs in Nigeria. Thus, the null hypothesis Ho_1 is hereby rejected and this implies that the Nigerian listed DMBs can improve on their ROA by keeping more deposits in other banks. This is however contrary to the findings of Uddin & Haque (2016) which rejected the alternate hypothesis that there exists a significant relationship between balances with other banks and profitability.

b) Other Investments

Other investments (A2) have no significant effect on the profitability of listed DMBs in Nigeria as shown in the RE regressions. This implies that an increase in A2 by one more unit, other independent variables remaining constant increases the profitability in financial reports of DMBs positively but insignificantly. This led to the acceptance of

Ho_2. The findings support the work of Uddin and Haque (2016) who rejected the hypothesis that there exists a significant relationship between balances with other banks and profitability (ROA) The findings contradict Gikonyo (2011) whose study found that government securities and loan to be the most significant in contributing to net operating profits for all sizes of banks

c) Loans and Advances

The results in Table 4.3 from the RE model also show that loans and advances (A3) have significant effect on the profitability of listed DMBs in Nigeria from the RE estimation at 10% level of significance. This means that an increase in A3 by one more unit, other independent variables remaining constant increases the ROA. Due to the outcome of events, hypothesis Ho_3 is rejected which implies that loans and advances contribute to the profitability of DMBs in Nigeria. This finding is in line with Vasiliou (1996), Kosmidou, Pasiouras & Floropoulos (2004) and Asiri (2007) who found loans and advances to be the asset items which create profitability in banks. The finding from this study is not surprising in view of the fact that it is consistent with theory and empirical evidence. Other things being constant, Naceur, Steiner & Goaied (2003) explained that more deposits are transformed into loans for earning interest incomes from borrowers. The higher the interest rate margins, the higher the profits and banks are able to shield themselves against hazards of credit risk resulting from adverse selection and moral hazard.

d) Government Securities

On the relationship between government securities (A4) and profitability, the relationship is insignificant from the RE estimation. This implies that investment in government

securities do not significantly contribute to the profitability of listed DMBs in Nigeria. As such, the hypothesis Ho_4 is accepted. This is however contrary to the findings of Gikonyo (2011) and Ibe (2013) that investment in government securities is significant in contributing to net operating profits of banks.

e) Demand Deposits

Looking at the relationship between demand deposits (L1) and the ROA, this study documented a positive insignificant relationship from the result of RE estimation. This implies that increase in demand deposits, other independent variables remaining constant increases the profitability positively but insignificantly. This led to the acceptance of Ho_5 that the demand deposits do not have significant effect on the profitability of listed DMBs in Nigeria. The findings of this study are in line with studies of Kosmidou (2004) and Betele (2013) studies, where customer deposits were found to be more costly than other sources of funding. Also the result of Shrestha (2015) work is in line with this study, evident to the consistent view that, the higher the deposit levels the more it will be costly on profitability.

f) Fixed Deposits

Considering the association between fixed deposits (L2) and ROA, the result reveals that L2 is insignificantly associated with ROA of listed DMBs in Nigeria from the RE regressions. This implies that fixed deposits do not significantly contribute to the profitability of listed DMBs in Nigeria. Hence, the hypothesis Ho_6 is not rejected which implies that fixed deposits do not have a significant effect on the profitability of DMBs. This is consistent with previous studies findings such as Uddin & Haque (2016) in which the hypothesis, there exists a significant relationship between term deposits and

profitability was rejected. In the case of Betele (2013) the outcome of the study revealed a negative in significant relationship between fixed deposits and profitability. The findings contradict Sayeed & Ziaulhoque (2010) work where the relationship between fixed deposits and profitability was found to be significant.

g) Deposits from other Banks

From table 4.3, it can be seen that deposits from other banks (L3) are negatively insignificant from the RE regressions. This implies that one unit change in L3 all other independent variables remaining constant will cause a negative unit change in ROA. Based on this hypothesis Ho_7 is accepted. This is contrary to the findings of Gikonyo (2011), whose study revealed a significant negative relationship between deposits due to other banks and profitability.

h) Borrowings

The association of borrowings (L4) and profitability in this study reveals that for RE model it is negatively insignificant. This led to the acceptance of hypothesis Ho_8 which states that borrowings do not have significant effect on the profitability of DMBs. This finding is contrary to the studies of Betele (2013) and Uddin & Haque (2016) suggested that this happens largely because banks are in a simple logic that they obtain debts that are most times costly to fund their operations. The findings also support the work of () which rejected the hypothesis that there exists a significant relationship between borrowing from other institutions and profitability (ROA).

Regarding the two macroeconomic variables, which were incorporated in the model to examine the effect of macroeconomic variables on the profitability of DMBs, table 4.3 presented that both real growth rate in GDP and general rate of inflation INF have

negative effect on the profitability of DMBs. But real GDP is significant at 10% level of significance in the RE regression.

This is consistent with Betele (2013) findings that Real growth rate in GDP is expected to influence numerous factors related to the supply and demand for loans and deposits. Favorable economic conditions affect positively the demand and supply of banks' services, but have either positive or negative effect on banks' profitability. As a result real growth rate in GDP has a negative effect on banks' profitability.

The negative and insignificant relation between profitability and general rate of inflation exist either because bank managements may not be able to well forecast the future rate of inflation or it may happen unexpectedly. This might be because banks' managements' ability to predict inflation accurately can positively affect the profitability of the bank as the bank can adjust interest rates in the desired direction in order to increase profit, where as failure to accurately predict inflation could raise costs due to imperfect adjustment of interest rates and thus adversely affect banks' profit.

The finding is in line with Betele (2013) and Tee (2017) that influence of the inflation rate depends on the predicting ability of the managements of banks. If predictions become correct, such adjustments in interest rates could be incorporated in inflation expectation, to achieve higher profits. In this case, the effect to bank profitability becomes positive. A positive relationship between inflation and bank profitability would suggest that banks are able to project the effect of inflation expectations in their operational costs to increase profits.

In summary, deposits in other banks are found to be positively significantly associated with profitability at 5% level of significance. The results of the regression further reveal

that other investments are negatively insignificant with profitability of listed DMBs in Nigeria. On the other hand, loan and advances are found to be positively related with profitability of Nigerian listed DMBs which is significant 5% level. Also, the result of government securities is seen to be positively insignificant.

On the part of the liabilities, results show that demand deposits are positively insignificant likewise fixed deposits regression results show an insignificant result. However, the result of deposits from other banks is found to be negatively insignificant. For borrowings, the results were found to be negatively insignificant.

4.3 Policy Implication of the Findings

Based on the result of the findings of the study, it implies that, even though, the current study arrived at mixed results; the knowledge-based view adopted to guide the work, and to theoretically explain the relationship between ALM and profitability still hold water. The findings of the study have implications for bank management, bank regulators and policy makers in Nigeria. The management should device an optimum asset and liability portfolio mix to overcome the problems of mismanagement in the banking sector of Nigeria. From the result of the findings, it implies that the management should explore strategies that will lead to a lower operational cost of deposits, diversify sources of funds so as to improve services to customers, public and shareholders as well as financial system of the country.

The Central Bank of Nigeria (CBN) and the Government of Nigeria should provide regulatory and other policy measures so that assets of the banks are adequately protected from impairment and loan loss are brought to tolerable limit with a view to ensuring reasonable returns on assets of the banks. The findings of the study also shed more light on

the importance of asset and liability management for all institutions, especially financial institutions and among them, especially banks. As banks play an important role in the development of any nation.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This study examined the effect of ALM on the profitability of the listed DMBs in Nigeria. The study comprised of five chapters. The first chapter started with a background in which a general overview of the area of the study was explained with a view to appreciating the study environment and the implications of ALM on the profitability of listed DMBs in Nigeria. Over the last few years the financial markets worldwide have witnessed wide ranging changes at fast pace. Intense competition for business involving both the assets and liabilities, together with increasing volatility in the domestic interest rates as well as foreign exchange rates, has brought pressure on the management of banks to maintain a good balance among spreads, profitability and long term viability.

Recent financial crisis brought considerable change to the marketplace for lending and borrowing, as well as caused increased uncertainty in funding conditions and capital requirements for most financial institutions. Economic slowdown had an adverse effect on credit quality of many institutions, which resulted in their decreased profitability, lower returns on equity and higher level of risk-weighted assets. It has also forced policymakers to come up with the proposals for tighter regulations, requiring the higher level of capital to be maintained with the function of a protective buffer. Continuous significant losses and failures in the financial industry over the past few years created a greater awareness of the importance of effective risk management. Even `too-big-to-fail'

companies were in a deep liquidity crisis and in need of considerable amounts of cash for survival.

A number of studies have been conducted on ALM on the profitability of banks at different times in developed, as well as, developing countries, most of which are well documented in accounting and finance literature. Most of the studies conducted in Nigeria used few of the ALM proxies such as loan and advance, demand deposit and fixed deposits. This study differ from most of the earlier ones because it employed wide range of proxies of ALM including deposits in other banks, government securities, other investments, deposits due to other banks and borrowings in addition to the proxies mentioned above, in order to have robust results. Also, there are only few studies on ALM that have been conducted in Nigeria. Consequently, this study examined the effect of ALM on the profitability of listed DMBs in Nigeria.

In line with the problem statement, eight research hypotheses were formulated in null form with a view to testing them at the end of the study. Finally, the first chapter also explained that the scope of the study which covered only listed DMBs in the Nigerian banking industry which are quoted on the first-tier market of the Nigerian Stock Exchange. The study also covered a period of ten years from 2007-2016.

To clearly identify the gap filled by this study, various researches on ALM and profitability were reviewed in chapter two. The chapter reviewed literature related to issues, concepts, findings and theories related to the subject matter of the study.

The chapter on research methodology explained the relevant research tools that were adopted for the study. It showed that a descriptive design was used in view of the nature and purpose of the study. Similarly, the chapter explained that the population of the study

comprised all the fifteen DMBS that are publicly listed on the floor of the Nigerian Stock Exchange as at 31st December 2016. The samples of the study were eleven out of fifteen DMBs that made up the study population. Data for the study were collected from the annual report and accounts of the sampled for a period of 10 years, from 2007-2016. The study used longitudinal balanced panel data from secondary sources. Multiple regression was adopted to examine the model of the study. In addition, the data generated were analysed using t-test, descriptive statistics and correlation using Stata (version 12.0).

The chapter on results and discussions, presented, analyzed and interpreted the data generated for the study. The result of which was used to test the hypotheses of the study. The result of the analyses (Multiple regression, Pearson correlation coefficient and descriptive statistics) led to the rejection of four and not rejecting of four null hypotheses. Also, the results of robustness tests (multicollinearity, heteroskedasticity, Hausman specification and histogram test of residuals) were conducted in order to assess the validity of all statistical techniques used for the study.

The following are the summary of the major findings of the study as obtained from the presentations, analyses and interpretation of data.

i. Deposits in other banks have significant positive effect on the profitability of DMBs in Nigeria as given by the analysis. Deposits in other banks here are seen as a contributory factor in the profitability of Nigerian DMBs in the period under review.

ii. There is an insignificant positive relationship between other investments and profitability of listed DMBs in Nigeria as given by the analysis. Thus, the investments that the banks engage into do not significantly contribute to their profitability.

iii. Loans and advances were found to have significant and positive effect on the profitability of listed DMBs in Nigeria. Loans and advances granted to borrowers by banks serve as the main source of income of the banks.

iv. Government securities also like the other investments the banks engage into are insignificant but positively related to the profitability of DMBs in Nigeria.

v. Demand deposits are positively and significantly related with the profitability of listed DMBs in Nigeria this may be linked to the ability of the banks to transform the deposits into loans.

vi. In the case of fixed deposits, they are found to be positively insignificant to the profitability of listed DMBs in Nigeria.

vii. Deposits from other banks have a negative insignificant effect on the profitability of listed DMBs in Nigeria.

viii. Borrowings are found to be negatively insignificant with profitability of listed DMBs in Nigeria.

ix. Both the control variables; gross domestic product and inflation are negative. It is negatively significant for GDP and profitability, while it is negatively insignificant looking at the RE regression results.

5.2 Conclusions

The following are the conclusions that are drawn based on the findings of the study:

1. Profitability of banks can be increased when more deposits in other banks are made, i.e. the more deposits in other banks are made the more the bank receives interest income on those deposits which will lead to increase in the profitability of banks.

2. The other investments of the banks do not have favorable effect on the profitability of listed DMBs in Nigeria. Other investments are expected to have a positive effect on the profitability but it is not unusual to have a negative effect as it is the case with the findings of this study. This occurs when there is a downturn on the economy or when the banks invest in low yield ventures.

3. On the part of loans and advances, which happen to be the major source of income to banks, the results of the analysis indicated that an increase in loans and advances would lead to a boost in interest income, thereby increasing the profitability of banks.

4. It is evident that investments in government securities do not much lead to the profitability of DMBs in Nigeria. This is because investments in government securities are ventured by the banks to maintain the statutory liquidity requirement of banks. Hence the need to investment certain percentage of their assets to government securities. This investment is always considered to be a safe investment, but it may or may not have positive influence on profitability as the return from government securities is not always competitive with the market.

5. Demand deposits do not have effect on the profitability of DMBs in Nigeria. This happens largely because banks are in a simple logic that they accept deposits with short term maturities from a large number of individuals and grants loans with long term maturities to a small number of borrowers. Again it may be because these banks pay only nominal interest on this deposit but charge high service fees.

6. The fixed deposits on the other hand have a positive insignificant relationship with ROA. This means that fixed deposits do not have effect on the profitability of the listed

DMBs in Nigeria, as a unit increase in Deposits in other banks will lead to the decrease in profitability. This may be as a result of poor utilization of these funds by the banks.

7. Deposits from other banks are seen to have a negative insignificant relation with the profitability of DMBs in Nigeria, meaning that a unit increase in deposits in other banks will lead to a decrease in profitability.

8. The borrowings have been found to be negatively insignificant this may be due to the fact that banks use the borrowed funds which are costly source of funds for their operations. As such where these funds are not utilized properly it will result to a negative effect on profitability.

9. The macroeconomic variables incorporated in the model of this study; GDP and Inflation have negative effect on banks' profitability. The real growth rate in GDP has significant negative effect because its effect is depending on the economic conditions prevalent in the economy. Favourable economic condition will affect positively on the demand and supply of banking services and profitability. When the general rate of inflation is considered, it has a negative effect on profitability although it is insignificant. This factor depends on the predicting ability of banks' management. If predictions become correct, such adjustments in interest rates could be incorporated in inflation expectation, to achieve higher profits. In this case, the effect to banks profitability becomes positive. A positive relationship between inflation and banks profitability would suggest that banks are able to project the effect of inflation expectations in their operational costs to increase profits. From this conclusion, if the forecast is incorrect, the effect of inflation on bank's profitability could be negative or less significant.

5.3 Recommendations

The following are the recommendations that are made based on the conclusions of the study;

1. In order to increase profitability the banks should make more deposits in other banks so as to get interest income from such deposits.

2. The management of the banks should not just invest in any possible type of investment opportunity but rather they should be quiet sure that any investment they engage in is capable of yielding returns. Investing in unprofitable projects which lead to large outflow of liquidity that are prone to have adverse effect on the profitability of DMBs in Nigeria should be checkmated. As such banks' managements should checkmate every investment opportunity so as not to make a wrong move.

3. Loans and advances should be managed properly as poor management may lead to cases of nonperforming loans which may have adverse effect on the profitability of banks.

4. Like in the case of other investments, here also the banks' management should checkmate every investment opportunity so as not to make a wrong move.

5. The banks management should look into the ways of enhancing operations as high cost of operations may result to adverse effects on profitability of DMBs in Nigeria.

6. The management of the banks should review their policies towards ways that would be geared to reduce their lending rate and explore strategies that will lead to lower operational cost of deposits and also diversify their sources of generating funds with an aim of maximizing the returns of the listed DMBs in Nigeria.

7. Since it has been found that there is a negative effect on deposit from other banks and profitability of DMBs in Nigeria, the banks should device a means that will ease operational costs of all deposits which will lead to improve profitability.

8. The management of the banks should review their policies on borrowings. They should not rely solely on taking loans as means of financing their operations. The banks should secure debts that are less costly. This is necessary so as to prevent untimely death of the banks.

9. It is recommended that the banks' management should be able to make right predictions on the outcome of the economy so as to project the effect of inflation expectations in their operational costs to increase profitability.

5.4 Frontier for Further Research

This research examines the effect of ALM on the profitability of listed DMBs in Nigeria and has paved the way for further research in the area. The relationship between ALM and profitability in other sectors of the economy such as b insurance, manufacturing and oil and gas requires research effort, especially as they are not covered in this work. In addition, same research can be conducted by bringing in other ALM variables the non bearing components of asset and liability. Further research in these areas would not only complement this study, but would also help in bringing about improvement in management of assets and liabilities for higher profitability in Nigeria.

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APPENDIX A

```
  ___  ____  ____  ____  ____ (R)
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/   12.0   Copyright 1985-2011 StataCorp LP
  Statistics/Data Analysis             StataCorp
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     Special Edition                   College Station, Texas 77845 USA
                                       800-STATA-PC        http://www.stata.com
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Notes:
      1.  (/v# option or -set maxvar-) 5000 maximum variables

. *(13 variables, 110 observations pasted into data editor)

. xtset code year, yearly
       panel variable:  code (strongly balanced)
        time variable:  year, 2007 to 2016
                delta:  1 year
```

Table 4.1a

```
. sum roa a1 a2 a3 a4  l1 l2 l3 l4 gdp inf
```

Variable	Obs	Mean	Std. Dev.	Min	Max
roa	110	.018483	.0479371	-.1507826	.3856228
a1	110	.1434502	.1226483	.0020152	.8355994
a2	110	.0201293	.0214547	.0004638	.1071788
a3	110	.4301127	.331386	.1425019	3.671199
a4	110	.1474621	.1282792	.0004841	1.053381
l1	110	.3510832	.5084476	.0002553	5.461855
l2	110	.2216956	.1431429	.0001336	1.348847
l3	110	.0252546	.0347535	.0004059	.1991914
l4	110	.0814386	.0739608	.0003761	.6147641
gdp	110	.05133	.0390653	-.051	.0954
inf	110	.11274	.0345385	.066	.1855

Table 4.2a

```
. vif
```

Variable	VIF	1/VIF
l1	9.80	0.102011
a3	7.00	0.142922
l2	2.47	0.405271
a4	2.02	0.495014
gdp	2.01	0.497984
a1	1.98	0.503876
inf	1.60	0.626749
l3	1.37	0.730898
a2	1.33	0.749808
l4	1.09	0.921650
Mean VIF	3.07	

Table 4.3a

```
. corr  roa a1 a2 a3 a4 l1 l2 l3 l4 gdp inf
(obs=110)
```

	roa	a1	a2	a3	a4	l1	l2	l3	l4	gdp	inf
roa	1.0000										
a1	0.4685	1.0000									
a2	0.2435	0.1641	1.0000								
a3	0.7305	0.3752	0.3471	1.0000							
a4	0.4051	0.1720	0.4226	0.6021	1.0000						
l1	0.7272	0.5145	0.3888	0.9064	0.6393	1.0000					
l2	0.6096	0.4690	0.2358	0.6863	0.4364	0.7613	1.0000				
l3	0.3362	0.2251	0.0600	0.4916	0.3078	0.4603	0.3511	1.0000			
l4	-0.1046	-0.0960	-0.0440	-0.0207	0.1239	-0.0437	-0.0398	-0.0256	1.0000		
gdp	-0.0441	0.3520	0.1059	-0.1478	-0.0113	0.0007	0.0613	0.0049	-0.1777	1.0000	
inf	-0.0167	0.0060	-0.0434	0.0890	-0.0907	-0.0290	-0.0369	0.0168	0.0520	-0.5286	1.0000

Table 4.4a

```
. reg  roa a1 a2 a3 a4 l1 l2 l3 l4 gdp inf
```

Source	SS	df	MS		
Model	.152272981	10	.015227298	Number of obs	= 110
Residual	.098205369	99	.000991973	F(10, 99)	= 15.35
				Prob > F	= 0.0000
				R-squared	= 0.6079
				Adj R-squared	= 0.5683
Total	.25047835	109	.002297967	Root MSE	= .0315

roa	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
a1	.0909885	.0346508	2.63	0.010	.0222338	.1597433
a2	-.0282705	.1623824	-0.17	0.862	-.3504725	.2939315
a3	.0754727	.0240798	3.13	0.002	.0276931	.1232523
a4	-.0168003	.033425	-0.50	0.616	-.0831228	.0495222
l1	.0096055	.0185767	0.52	0.606	-.0272546	.0464656
l2	.0341331	.033105	1.03	0.305	-.0315544	.0998207
l3	-.0549526	.1015337	-0.54	0.590	-.2564175	.1465124
l4	-.0495629	.0424866	-1.17	0.246	-.1338655	.0347397
gdp	-.1675402	.1094303	-1.53	0.129	-.3846737	.0495933
inf	-.1804741	.1103283	-1.64	0.105	-.3993893	.038441
_cons	-.0005535	.0176917	-0.03	0.975	-.0356577	.0345507

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of roa

         chi2(1)      =     8.34
         Prob > chi2  =   0.0039
```

Table 4.5a

Robust regression

				Number of obs =	110
				F(10, 99) =	56.12
				Prob > F =	0.0000

roa	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
a1	.0411163	.0173691	2.37	0.020	.0066522	.0755805
a2	.0102073	.0813961	0.13	0.900	-.1513003	.1717149
a3	.0620655	.0120703	5.14	0.000	.0381154	.0860156
a4	.0012224	.0167547	0.07	0.942	-.0320226	.0344673
l1	.0260355	.0093118	2.80	0.006	.007559	.0445121
l2	.0032007	.0165943	0.19	0.847	-.029726	.0361274
l3	-.0494483	.050895	-0.97	0.334	-.150435	.0515384
l4	-.0683372	.0212969	-3.21	0.002	-.1105949	-.0260795
gdp	-.0039596	.0548533	-0.07	0.943	-.1128004	.1048812
inf	-.010808	.0553034	-0.20	0.845	-.1205418	.0989259
_cons	-.0132843	.0088682	-1.50	0.137	-.0308807	.0043121

Table 4.6a

```
. swilk e
```

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
e	110	0.29604	62.951	9.237	0.00000

Table 4.7a

```
. regress roa a1 a2 a3 a4 l1 l2 l3 l4 gdp inf, vce(robust)
```

Linear regression				Number of obs =	110
				F(10, 99) =	681.00
				Prob > F =	0.0000
				R-squared =	0.6079
				Root MSE =	.0315

roa	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
a1	.0909885	.0400754	2.27	0.025	.0114703	.1705068
a2	-.0282705	.1063724	-0.27	0.791	-.2393365	.1827955
a3	.0754727	.0261907	2.88	0.005	.0235046	.1274408
a4	-.0168003	.0330036	-0.51	0.612	-.0822865	.0486859
l1	.0096055	.0216918	0.44	0.659	-.0334357	.0526468
l2	.0341331	.0377676	0.90	0.368	-.0408059	.1090722
l3	-.0549526	.0862697	-0.64	0.526	-.2261303	.1162252
l4	-.0495629	.0433043	-1.14	0.255	-.1354879	.0363622
gdp	-.1675402	.1308414	-1.28	0.203	-.427158	.0920776
inf	-.1804741	.1472863	-1.23	0.223	-.4727221	.1117738
_cons	-.0005535	.0186778	-0.03	0.976	-.0376143	.0365073

```
. xtreg  roa a1 a2 a3 a4 l1 l2 l3 l4 gdp inf, fe

Fixed-effects (within) regression               Number of obs      =       110
Group variable: code                            Number of groups   =        11

R-sq:  within  = 0.6235                         Obs per group: min =        10
       between = 0.1992                                        avg =      10.0
       overall = 0.5424                                        max =        10

                                                F(10,89)           =     14.74
corr(u_i, Xb)  = -0.0386                        Prob > F           =    0.0000

------------------------------------------------------------------------------
         roa |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          a1 |   .0766786   .0396208     1.94   0.056     -.002047    .1554043
          a2 |  -.1993779   .1772258    -1.12   0.264    -.5515217     .152766
          a3 |   .0052578   .0350754     0.15   0.881    -.0644363     .074952
          a4 |   .0335369   .0386904     0.87   0.388    -.0433401    .1104139
          l1 |    .029191   .0242335     1.20   0.232    -.0189604    .0773424
          l2 |   .0902142    .038388     2.35   0.021      .013938    .1664904
          l3 |   .0856034   .1118048     0.77   0.446    -.1365503    .3077572
          l4 |  -.0103106   .0506399    -0.20   0.839     -.110931    .0903099
         gdp |  -.1978803   .1062221    -1.86   0.066    -.4089414    .0131808
         inf |  -.1158112   .1074859    -1.08   0.284    -.3293833     .097761
       _cons |  -.0040672   .0172205    -0.24   0.814     -.038284    .0301497
-------------+----------------------------------------------------------------
     sigma_u |  .01948208
     sigma_e |  .02935864
         rho |   .3057247   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(10, 89) =     2.49              Prob > F = 0.0110

. estimate store fixed


. xtreg  roa a1 a2 a3 a4 l1 l2 l3 l4 gdp inf, re

Random-effects GLS regression                   Number of obs      =       110
Group variable: code                            Number of groups   =        11

R-sq:  within  = 0.6117                         Obs per group: min =        10
       between = 0.5975                                        avg =      10.0
       overall = 0.5989                                        max =        10

                                                Wald chi2(10)      =    152.10
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000

------------------------------------------------------------------------------
         roa |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          a1 |   .0897718   .0360018     2.49   0.013     .0192095    .1603341
          a2 |  -.1016289   .1663693    -0.61   0.541    -.4277068     .224449
          a3 |   .0512637   .0279546     1.83   0.067    -.0035264    .1060537
          a4 |   .0063532   .0353767     0.18   0.857    -.0629838    .0756901
          l1 |   .0138755   .0205574     0.67   0.500    -.0264163    .0541674
          l2 |   .0556615   .0347002     1.60   0.109    -.0123496    .1236726
          l3 |  -.0038167   .1037317    -0.04   0.971     -.207127    .1994936
          l4 |  -.0369877   .0456843    -0.81   0.418    -.1265273    .0525518
         gdp |  -.1828237   .1055577    -1.73   0.083     -.389713    .0240656
         inf |   -.160238   .1059744    -1.51   0.131     -.367944     .047468
       _cons |  -.0019883   .0174361    -0.11   0.909    -.0361624    .0321858
-------------+----------------------------------------------------------------
```

```
     sigma_u |  .01155061
     sigma_e |  .02935864
         rho |  .13404034   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. estimate store random
```

Table 4.8a

```
. hausman fixed random

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |     fixed        random       Difference          S.E.
-------------+----------------------------------------------------------------
          a1 |    .0766786     .0897718       -.0130932        .0165431
          a2 |   -.1993779    -.1016289       -.0977489        .0610755
          a3 |    .0052578     .0512637       -.0460058        .0211855
          a4 |    .0335369     .0063532        .0271838        .0156665
          l1 |     .029191     .0138755        .0153155        .0128317
          l2 |    .0902142     .0556615        .0345527        .0164177
          l3 |    .0856034    -.0038167        .0894201         .041714
          l4 |   -.0103106    -.0369877        .0266772        .0218483
         gdp |   -.1978803    -.1828237       -.0150567        .0118622
         inf |   -.1158112     -.160238        .0444268        .0179621
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg


 Test:  Ho:  difference in coefficients not systematic

                chi2(10) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                         =        8.05
              Prob>chi2 =      0.6238
              (V_b-V_B is not positive definite)
```

Table 4.9a

```
. xtreg  roa a1 a2 a3 a4 l1 l2 l3 l4 gdp inf
Random-effects GLS regression                   Number of obs      =       110
Group variable: code                            Number of groups   =        11

R-sq:  within  = 0.6117                         Obs per group: min =        10
       between = 0.5975                                        avg =      10.0
       overall = 0.5989                                        max =        10

                                                Wald chi2(10)      =    152.10
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000

------------------------------------------------------------------------------
         roa |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          a1 |   .0897718   .0360018     2.49   0.013     .0192095    .1603341
          a2 |  -.1016289   .1663693    -0.61   0.541    -.4277068     .224449
          a3 |   .0512637   .0279546     1.83   0.067    -.0035264    .1060537
          a4 |   .0063532   .0353767     0.18   0.857    -.0629838    .0756901
          l1 |   .0138755   .0205574     0.67   0.500    -.0264163    .0541674
          l2 |   .0556615   .0347002     1.60   0.109    -.0123496    .1236726
          l3 |  -.0038167   .1037317    -0.04   0.971     -.207127    .1994936
          l4 |  -.0369877   .0456843    -0.81   0.418    -.1265273    .0525518
```

```
         gdp |  -.1828237   .1055577    -1.73   0.083     -.389713    .0240656
         inf |   -.160238   .1059744    -1.51   0.131     -.367944     .047468
       _cons |  -.0019883   .0174361    -0.11   0.909    -.0361624    .0321858
-------------+----------------------------------------------------------------
     sigma_u |  .01155061
     sigma_e |  .02935864
         rho |  .13404034   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Table 4.10a

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        roa[code,t] = Xb + u[code] + e[code,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                     roa |    .002298       .0479371
                       e |   .0008619       .0293586
                       u |   .0001334       .0115506

        Test:   Var(u) = 0
                                 chibar2(01) =     1.69
                              Prob > chibar2 =   0.0970
```

APPENDIX B

Figure 1

```
. histogram e, normal
(bin=10, start=-.02725356, width=.04150005)
Normality Test
```

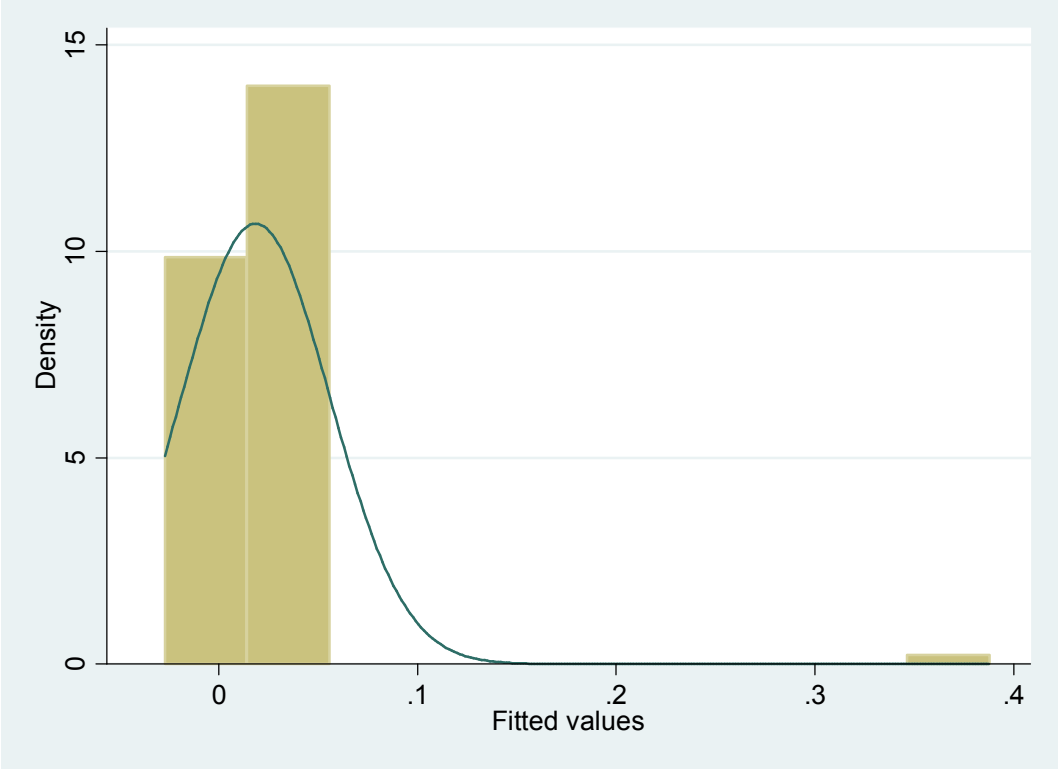
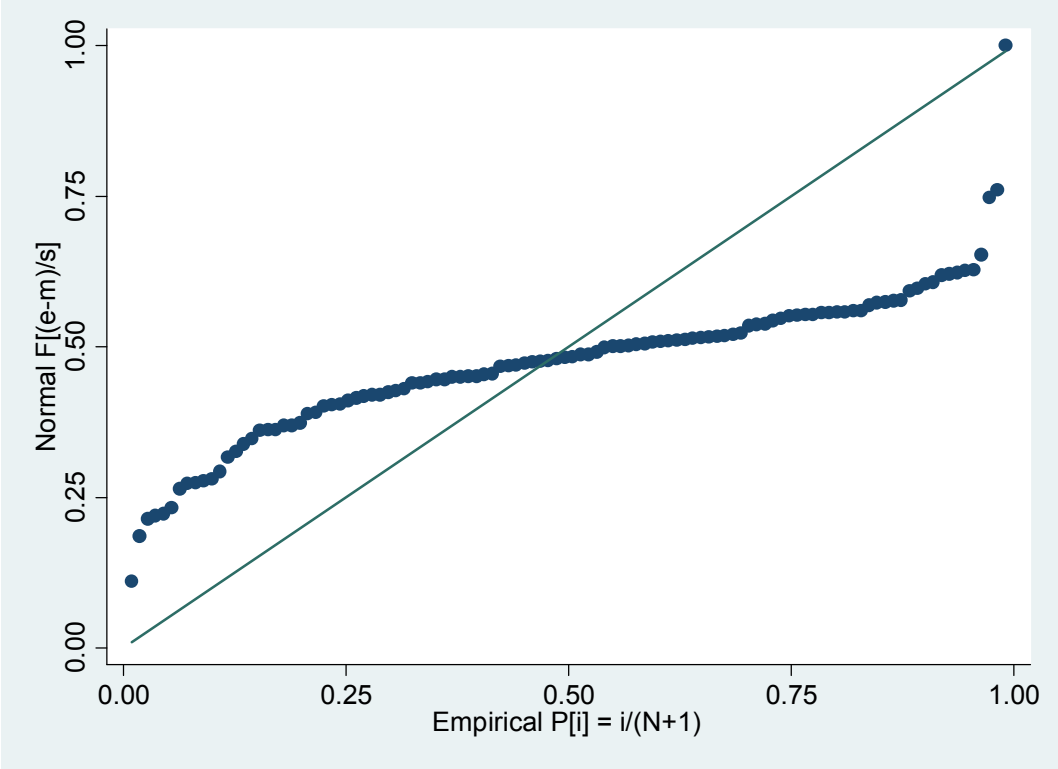


Figure 2

P plot

```
. pnorm e
```


Normal F[(e-m)/s]
0.00
0.25
0.50
0.75
1.00
Empirical P[i] = i/(N+1)
0.00
0.25
0.50
0.75
1.00

APPENDIX C

Year	Code	ROA	A1	A2	A3	A4	L1	L2	L3	L4	GDP	INF
2007	1	0.024475938	0.389319725	0.01334382	0.327892867	0.11871459	0.30120428	0.31143897	0.020135155	0.01001006	0.0732	0.066
2008	1	0.018248916	0.528112916	0.00400549	0.234407111	0.056994169	0.14465603	0.18620384	0.066363551	0.01404168	0.072	0.15
2009	1	0.043401656	0.136068303	0.00100459	0.604854815	0.112315516	0.17158229	0.40446642	0.060264371	0.00483645	0.0835	0.13
2010	1	0.024304735	0.099286649	0.033373368	0.554609105	0.176666553	0.29783736	0.2898378	0.047792052	0.03120634	0.0954	0.118
2011	1	0.016931636	0.135636338	0.002973472	0.489585972	0.134698238	0.15877006	0.22273583	0.127944324	0.04315517	0.0531	0.103
2012	1	0.024428856	0.002015181	0.029813863	0.365885249	0.277318197	0.349755	0.27858883	0.016222979	0.06852854	0.0421	0.12
2013	1	0.018405907	0.007657237	0.023209872	0.431490713	0.181370159	0.38480718	0.2671401	0.035969466	0.07061936	0.0549	0.0796
2014	1	0.023281258	0.03698818	0.02024292	0.514597189	0.114098403	0.31104446	0.29615859	0.067867137	0.07383907	0.0622	0.0798
2015	1	0.027022979	0.03468477	0.018839262	0.515441187	0.06467596	0.26236867	0.26236867	0.026262543	0.12559163	0.0279	0.0955
2016	1	0.026035736	0.04794646	0.019140552	0.5152125	0.052084878	0.27586143	0.25832174	0.03073454	0.12025348	-0.051	0.1855
2007	2	0.028159433	0.080243409	0.028771369	0.308679027	0.031992599	0.36675232	0.25198809	0.047218165	0.02504591	0.0732	0.066
2008	2	0.024960139	0.21149963	0.019364273	0.383615078	0.044204147	0.30277104	0.32287511	0.010581078	0.03080794	0.072	0.15
2009	2	0.012818932	0.20059905	0.025262231	0.444414784	0.061919093	0.32161816	0.30826094	0.00529562	0.02926907	0.0835	0.13
2010	2	0.017264719	0.112342929	0.029983412	0.537781788	0.076256493	0.34468378	0.17919483	0.007483732	0.0515698	0.0954	0.118
2011	2	-0.037757858	0.099701317	0.020411883	0.411994032	0.178452955	0.43548096	0.15423906	0.005449712	0.07585524	0.0531	0.103
2012	2	0.025947101	0.107478232	0.014144628	0.494151825	0.07110205	0.46504675	0.17557196	0.007716928	0.04717647	0.0421	0.12
2013	2	0.024540347	0.077414749	0.016911102	0.432459747	0.207175229	0.46988109	0.19479028	0.004240066	0.03926235	0.0549	0.0796
2014	2	0.013948138	0.122574401	0.009051105	0.406831243	0.184895032	0.38597124	0.24698161	0.005534182	0.05905739	0.0622	0.0798
2015	2	0.003325391	0.061827157	0.010186506	0.417295811	0.149921619	0.35026859	0.13840221	0.036764217	0.09092052	0.0279	0.0955
2016	2	0.00197923	0.014944244	0.009528901	0.483988794	0.096427071	0.35315173	0.08629049	0.008039244	0.11888354	-0.051	0.1855
2007	3	0.020278633	0.164259803	0.013286086	0.323459831	0.000484134	0.37198932	0.40234695	0.004871844	0.01219944	0.0732	0.066
2008	3	0.029631116	0.104033808	0.005739999	0.432758451	0.003665904	0.25279988	0.41711407	0.00376109	0.00037611	0.072	0.15
2009	3	0.009151784	0.090010393	0.001616537	0.426670687	0.017165049	0.28366167	0.37256528	0.007013591	0.00637689	0.0835	0.13

2010	3	0.017415662	0.310425549	0.0052634	0.331610944	0.085783381	0.41162885	0.18978992	0.002418319	0.00069244	0.0954	0.118
2011	3	0.011116851	0.133060089	0.000463822	0.345171384	0.121399633	0.46131888	0.22073865	0.018070122	0.00933999	0.0531	0.103
2012	3	0.023348572	0.107178792	0.107178792	0.377859924	0.098184523	0.39736974	0.20479024	0.014617125	0.01010279	0.0421	0.12
2013	3	0.00834985	0.074799971	0.074799971	0.394070755	0.296937618	0.41431831	0.24893245	0.005435542	0.06504522	0.0549	0.0796
2014	3	0.013070491	0.057905267	0.057905267	0.456339167	0.205347823	0.35426887	0.25074535	0.003261094	0.0990215	0.0622	0.0798
2015	3	0.011385686	0.064902632	0.064902632	0.469426543	0.238828242	0.26295382	0.2613796	0.003785757	0.11526546	0.0279	0.0955
2016	3	0.008520646	0.037900351	0.037900351	0.553407527	0.188591224	0.24249369	0.12987726	0.012242122	0.1225098	-0.051	0.1855
2007	4	0.032088671	0.187891789	0.071106966	0.237693372	0.263006982	0.32649626	0.25139462	0.00127843	0.12137774	0.0732	0.066
2008	4	0.037881214	0.089902773	0.055791105	0.406031838	0.174859779	0.30333171	0.15533005	0.038948762	0.08759965	0.072	0.15
2009	4	0.026433478	0.198850852	0.016925898	0.527631613	0.114582558	0.28062505	0.3117275	0.001061872	0.0120918	0.0835	0.13
2010	4	0.04262901	0.191765159	0.040256969	0.528217051	0.003198273	0.3667799	0.21105543	0.003112275	0.0694213	0.0954	0.118
2011	4	0.040707263	0.184509052	0.024579555	0.447050431	0.004639558	0.38055103	0.16295939	0.001990952	0.14915366	0.0531	0.103
2012	4	0.063585032	0.139068374	0.014148518	0.458204686	0.079636676	0.36188971	0.18938603	0.004425258	0.11259074	0.0421	0.12
2013	4	0.059142338	0.10598732	0.023624905	0.545710308	0.241804085	0.43283999	0.18447812	0.00522334	0.1449826	0.0549	0.0796
2014	4	0.051898533	0.05503516	0.018870557	0.556014327	0.151537647	0.37986925	0.18102913	0.00675732	0.11888926	0.0622	0.0798
2015	4	0.049624871	0.052942318	0.01839886	0.555773629	0.145237159	0.3200684	0.17458356	0.001753675	0.1486547	0.0279	0.0955
2016	4	0.058930519	0.068253634	0.016824628	0.542301389	0.158213686	0.36689582	0.12694304	0.00154347	0.12716213	-0.051	0.1855
2007	5	0.016854436	0.200179775	0.009591719	0.243099297	0.066207292	0.00025533	0.00021684	0.081909557	0.06087457	0.0732	0.066
2008	5	0.026023153	0.273132895	0.005451803	0.313921399	0.058732695	0.0002579	0.00025943	0.00112548	0.04778322	0.072	0.15
2009	5	0.003452466	0.195451682	0.013853261	0.510739934	0.058915334	0.00029744	0.00022866	0.00875231	0.00385429	0.0835	0.13
2010	5	0.017258018	0.095985946	0.016026057	0.614417118	0.145470995	0.00033216	0.00013363	0.048946726	0.04666224	0.0954	0.118
2011	5	0.003396359	0.099466417	0.010340811	0.558169914	0.194430976	0.00030078	0.00026098	0.017854556	0.09725656	0.0531	0.103
2012	5	0.014724949	0.08949222	0.002809642	0.504088915	0.19617086	0.00030545	0.00021315	0.002454003	0.10660583	0.0421	0.12
2013	5	0.01756627	0.133093958	0.002675021	0.494903995	0.17061696	0.33016041	0.22847281	0.001283651	0.12269639	0.0549	0.0796
2014	5	0.007659158	0.046388126	0.017143064	0.494515415	0.077535644	0.24326693	0.14450058	0.010331803	0.10330728	0.0622	0.0798

2015	5	0.0154356	0.136456446	0.01434689	0.542308699	0.186556776	0.03434433	0.18456798	0.003332235	0.12434598	0.0279	0.0955
2016	5	0.016435538	0.076543785	0.012874435	0.534522498	0.01943456	0.03244543	0.19544343	0.012345766	0.09865422	-0.051	0.1855
2007	6	0.004146452	0.30576393	0.010621055	0.314834305	0.038379219	0.41546573	0.18922597	0.073019516	0.05007231	0.0732	0.066
2008	6	0.032937115	0.341847183	0.007537349	0.278167894	0.132984576	0.4853379	0.21414599	0.041168836	0.04682056	0.072	0.15
2009	6	-0.044120169	0.275198981	0.013264657	0.379983387	0.125162471	0.23337177	0.41325713	0.005729427	0.06905997	0.0835	0.13
2010	6	0.014208559	0.084107532	0.01050836	0.382588229	0.372115716	0.31913567	0.26397741	0.150148716	0.09621588	0.0954	0.118
2011	6	0.006858751	0.111095971	0.013775342	0.316665013	0.025637508	0.49256868	0.24804549	0.004633389	0.05412347	0.0531	0.103
2012	6	0.012925398	0.058388756	0.002019831	0.395399203	0.006574354	0.48964366	0.27390005	0.005375104	0.05231762	0.0421	0.12
2013	6	0.013153765	0.120940044	0.013267827	0.454570542	0.04678099	0.50275664	0.26738726	0.014099823	0.05481023	0.0549	0.0796
2014	6	0.013035138	0.081657797	0.001663227	0.450246842	0.048435941	0.54289318	0.20794244	0.101188753	0.05502599	0.0622	0.0798
2015	6	0.013779825	0.086057561	0.002271126	0.423698381	0.025365824	0.45244223	0.23342856	0.035531906	0.07540888	0.0279	0.0955
2016	6	0.007244178	0.037660843	0.001332903	0.563611719	0.1098262	0.38791134	0.242952	0.028609161	0.09924202	-0.051	0.1855
2007	7	0.025106629	0.340832802	0.013722443	0.213365634	0.107669827	0.23211465	0.26533864	0.023903933	0.08954397	0.0732	0.066
2008	7	0.032793355	0.293668433	0.010591198	0.269928363	0.09278846	0.43209374	0.21103429	0.069167455	0.00110796	0.072	0.15
2009	7	-0.060461935	0.147763917	0.012917665	0.362805944	0.120705218	0.23351907	0.25224458	0.084220066	0.12166024	0.0835	0.13
2010	7	-0.014668179	0.042228693	0.019843096	0.21136707	0.409133125	0.24622381	0.19767141	0.037893783	0.17777152	0.0954	0.118
2011	7	-0.13628116	0.080711053	0.022848833	0.166539656	0.29241031	0.20565254	0.09783316	0.001872564	0.03194025	0.0531	0.103
2012	7	0.003878313	0.045302256	0.019679221	0.1545256	0.31636675	0.2951714	0.10938692	0.003948253	0.03829918	0.0421	0.12
2013	7	0.004762515	0.029554573	0.014615173	0.238202828	0.32918942	0.22014926	0.17228604	0.003627719	0.05133222	0.0549	0.0796
2014	7	0.023475393	0.047709813	0.01462688	0.23839363	0.329453103	0.23668156	0.18240826	0.003630625	0.05137334	0.0622	0.0798
2015	7	0.01971355	0.035601969	0.009097726	0.328583072	0.210443041	0.23306999	0.22625322	0.019620095	0.08490812	0.0279	0.0955
2016	7	0.014288601	0.019089741	0.009405572	0.436045761	0.148430372	0.21330897	0.19989711	0.003872778	0.08172086	-0.051	0.1855
2007	8	0.024482287	0.376992565	0.005267846	0.290497193	0.067511349	0.43644475	0.27287572	0.003532967	0.00102962	0.0732	0.066
2008	8	0.035943196	0.345077571	0.009313246	0.277448814	0.063415199	0.00050227	0.22871298	0.021051344	0.08163754	0.072	0.15
2009	8	0.016410411	0.328243196	0.034047195	0.387820076	0.107478947	0.33024051	0.23602538	0.007195482	0.01053624	0.0835	0.13

2010	8	0.002577773	0.20293767	0.042717181	0.397388862	0.218938988	0.30296266	0.1761199	0.00354559	0.05860263	0.0954	0.118
2011	8	-0.022526601	0.137473157	0.040796997	0.360295748	0.269657166	0.30658214	0.16017796	0.013146155	0.11711392	0.0531	0.103
2012	8	0.023889523	0.265158699	0.034518756	0.295237874	0.273138255	0.22860949	0.15975252	0.011833539	0.05924271	0.0421	0.12
2013	8	0.023379004	0.169729014	0.03045751	0.359401051	0.264021156	0.25353689	0.14041833	0.000405878	0.02203735	0.0549	0.0796
2014	8	0.018119099	0.18908587	0.028876058	0.378213213	0.189369769	0.25818027	0.21412801	0.004652455	0.04865494	0.0622	0.0798
2015	8	0.022891374	0.143112261	0.030472351	0.371195355	0.256370308	0.24441229	0.20141702	0.001579182	0.05860842	0.0279	0.0955
2016	8	0.022700166	0.106022834	0.028536946	0.429343771	0.209883111	0.24657808	0.15655471	0.012003536	0.10235019	-0.051	0.1855
2007	9	0.007201762	0.233972369	0.00047525	0.180038781	0.006236284	0.34182116	0.27314936	0.014937392	0.04043411	0.0732	0.066
2008	9	0.113536451	0.431041211	0.000543945	0.142501905	0.043114074	0.45254451	0.34972994	0.00195834	0.00418406	0.072	0.15
2009	9	-0.081661388	0.205300125	0.006124917	0.341971004	0.024878231	0.44650037	0.01628255	0.057128027	0.03198679	0.0835	0.13
2010	9	0.043623172	0.103930817	0.006294361	0.373282879	0.135430785	0.40324508	0.20833301	0.00245154	0.05811767	0.0954	0.118
2011	9	0.008231597	0.163254547	0.00378414	0.303951848	0.151379413	0.45744514	0.15639651	0.00200122	0.11503746	0.0531	0.103
2012	9	0.016316398	0.034334582	0.001591107	0.477714695	0.202971966	0.40828939	0.11407537	0.041714072	0.13755806	0.0421	0.12
2013	9	0.08334224	0.018296806	0.008963455	0.483685347	0.192543514	0.37810066	0.18271832	0.066629773	0.13457669	0.0549	0.0796
2014	9	0.03300078	0.039095476	0.008447701	0.530686266	0.209677717	0.37999086	0.18354744	0.010157307	0.11008771	0.0622	0.0798
2015	9	0.005284358	0.041909464	0.007808062	0.555225497	0.154435064	0.21015855	0.20659091	0.091425942	0.15856288	0.0279	0.0955
2016	9	0.003686825	0.018926538	0.00702579	0.562664598	0.106479804	0.2490449	0.18000989	0.101881534	0.16625073	-0.051	0.1855
2007	10	0.011380425	0.118636481	0.048411363	0.416743964	0.144737105	0.42636514	0.21179167	0.112365605	0.13985674	0.0732	0.066
2008	10	-0.150782642	0.035592692	0.041574768	0.375452168	0.228637329	0.39624727	0.16389598	0.002838248	0.13108473	0.072	0.15
2009	10	-0.023176365	0.411312075	0.020271488	0.200556165	0.017262104	0.23293651	0.28264079	0.003276217	0.61476411	0.0835	0.13
2010	10	0.063817135	0.238964898	0.016431131	0.190198528	0.239456833	0.32299824	0.14603875	0.012740775	0.24647197	0.0954	0.118
2011	10	-0.016963848	0.073809796	0.006091216	0.302542493	0.27861947	0.20356185	0.33730759	0.011960877	0.22810238	0.0531	0.103
2012	10	-0.020114443	0.079882531	0.008338326	0.300139798	0.31720888	0.31710334	0.27823505	0.002974531	0.23201283	0.0421	0.12
2013	10	0.005885373	0.094642149	0.008960026	0.298096192	0.331124724	0.29373144	0.26252586	0.010267914	0.1740488	0.0549	0.0796
2014	10	0.008087415	0.136327799	0.007749394	0.390247142	0.107727611	0.29079343	0.29787887	0.00847762	0.15260711	0.0622	0.0798

2015	10	0.007676318	0.142620198	0.006233856	0.467800171	0.103611755	0.21750777	0.40650724	0.002891322	0.13179785	0.0279	0.0955
2016	10	0.007778254	0.065544466	0.006664691	0.538929756	0.140706643	0.20862516	0.33721624	0.088869982	0.06951763	-0.051	0.1855
2007	11	0.026346781	0.096682923	0.015391093	0.246968972	0.036110356	0.14915367	0.44201819	0.013782866	0.02482971	0.0732	0.066
2008	11	0.029141707	0.152965788	0.010080021	0.248253009	0.03176318	0.18076734	0.39944473	0.008059459	0.02057758	0.072	0.15
2009	11	0.020183753	0.184354016	0.091653551	0.425414888	0.143256784	0.41246037	0.17567169	0.022944376	0.02287318	0.0835	0.13
2010	11	0.024005593	0.209339364	0.096110107	0.373219154	0.160931969	0.47326956	0.12331387	0.020751535	0.01563323	0.0954	0.118
2011	11	0.023734483	0.11506544	0.009823582	0.342164827	0.12393762	0.05490244	0.12172851	0.016714987	0.00963748	0.0531	0.103
2012	11	0.385622791	0.835599419	0.101842664	3.671198839	1.053381498	5.46185513	1.34884741	0.199191426	0.06206998	0.0421	0.12
2013	11	0.032691225	0.086679615	0.008498649	0.391343919	0.073826212	0.51618113	0.14581305	0.022348684	0.0208949	0.0549	0.0796
2014	11	0.031499621	0.13731421	0.009647998	0.46154601	0.027405654	0.47937522	0.12642929	0.038167905	0.08499223	0.0622	0.0798
2015	11	0.030722654	0.071165528	0.008808032	0.49308367	0.040189562	0.42523305	0.13897961	0.017777916	0.09810585	0.0279	0.0955
2016	11	0.032664711	0.082732689	0.007704256	0.499127864	0.027691249	0.28375535	0.11728501	0.013324117	0.10417682	-0.051	0.1855

APPENDIX D

LITERATURE TABLE

S/N	Author(s) & Year	Title	Objective	Methodology	Findings
1.	Njogo. B. O, Ohiare. N & Omisakin. J. O (2014)	A Panel Data Analysis of Asset & aliability Management on Performance of some selected Nigerian commercial Banks	To examine the impact of asset and liability management and also to evaluate the impact of customers' deposit on performance of 15 Nigerian Commercial banks	Secondary data, SCA model, Panel OLR, Eview	Asset and liability management as well as customer deposit have positive impact on banks' performance.
2.	P. Sheela & Jejaswini Bastray (2015)	Asset liability management- A comparative study of a public & Private sector Bank.	To examine the effect of ALM in the commercial banks profitability in Indian by taking into consideration public & private sector banks.	Secondary data, Gap Analysis	Both Banks have seen exposed to interest rate risk and that the public bank has a better ALM framework.
3.	Saugat Das & C.A Manoj K R. Jain	A study of the ALM of top five public sector banks- A cramel Analysis.	To study the overall financial performance of the banks and to identify the financial strength or weakness of the banks using CRAMEL analysis. C - Capital Adequate A- Asset Quality R – Resource Deployed M – Management Quality E - Earning Quality L - Liquidity	Secondary data, CRAMEL Analysis findings	

4.	Dr. Kanhaiya Singh (2013)	ALM in Banks- A Dynamic approach	To evaluate the impact of ALM on profitability of banks by assessing the techniques of IRR measurement in banks.	Secondary Data, Duration Analysis	
5.	Anthony Muchaingi Guthua (2013)	The effect of ALM on the liquidity risk of commercial Banks in Kenya	To investigate the effect of ALM on liquidity risk of the commercial bank in Kenya	Secondary & Primary Data, SPSS	There is significant & positive relationship between independent variables (ROE, Capital adequacy, loan to deposit ratio, ROA, Total asset, ALM Policies, Liquidity stress testing & contingency funding plan) & the dependent variable risk of commercial bank
6.	Salvin Surjith FP & N. Sathyanarayana	A study in asset & liability management in ICICI Bank.	To examine the management of asset liability in ICICI Bank	Secondary Data, SPSS Ratio Analysis	The major finding are capital turnover ratio of the bank was satisfactory, the cash ratio has not been maintained according to the standard, the cash has been maintained less than the standard which indicates that company should maintain more balance. The net profit has been maintained in the increasing rate which shows that the company has been performing well during the study period.
7.	Asiri Batool K. (2007)	ALM in banks- A case of Kuwait	To develop models for asset liability management as a risk- return management of banking industry in Kuwait.	Secondary Data, SCA Models	Assets mainly loans, contribute positively to profit where liabilities (deposits) contribute negative profit. Also loans are highly significant followed by deposits & investments, while the fixed & other assets were found to be negatively related to profit.
8.	N Kavitha (2012)	An Assessment – Asset & liability management	To present the optimal mix of asset & liability of scheduled commercial	Secondary Data, Ratio Analysis	SBI and its associate bank group has secures the first place in liquidity and private bank got the second place i.e. SBI & its associates are better performers as

		of scheduled commercial banks in India.	bank in India.		compared to private bank groups & Nationalized banks group
9.	Prathap B N (2013)	An empirical study of asset liability management by Indian Banks.	To study and analyse the status of ALM approach in the Indian banking system		Majority of the banks have a good ALM frame work in place and that there is a strong relationship between fixed assets & net worth for all groups of banks.
10.	B. Charumathi (2008)	ALM in Indian Banking industry with special reference to Interest Rate Risk management in ICICI Bank.	To measure the IRR in ICICI bank using gap analysis technique.	Primary Data, Secondary Data, Gap Analysis	Reveals that the bank is exposed IRR.
11.	Ioan Trenca, Mihial Ioan Cociuba (2014)	How does ALM affect the profitability of banks?	How does ALM affect the profitability of banks?	Secondary Data, Canonical Correlation Analysis	The result of the analysis shows profits & income have decreased leading to high losses by bank. Mismatch in maturity between asset & liabilities, high leverage and over indebtedness in conjunction with deregulation made possible one of the biggest financial crises from the Great Depression.
12.	Kyriaki Kosimidou, Costantin Zopounidiis	A multi-criterial methodology for bank ALM	To Present an ALM technique which combines goal programming with simulation analysis to determine the balance sheet of a bank for year 2000	Secondary data, Goal Programming Model (Multi Objective) Simulation Analysis	Liability management contributes more than asset management in creating profitability among banks.
13.	Christinee A- Cole & Allen M. Featherston e (1997)	Asset liability management in Kansas Banks	To examine the asset/liability management techniques used in Kansas commercial banks.	Primary Data	

14.	Muhammad Abu Sayeed & Mohammad Ziaul Hoque	Impact of ALM in profitability: A study on public vs private commercial banks in Bangladesh.	To examine how asset & liability management together with external variable such as degree of market concentration & inflation rate impact the profitability of selected commercial banks in Bangladesh.	Secondary data, SCA Model	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.
15.	S. P. Sreekala (2011)	A study in asset & liability mgt in Salem Co-operative Bank	To study ALM as well as the effectiveness of performance in the bank and to suggest measures of improvement	Secondary data, Ratio analysis, least square analysis.	
16.	Faris Nasif Al-Shubiri (2010)	Impact of bank asset & liability management on profitability: Empirical investigation	To complete the gap in the area of this research and to provide suggestions for improving bank's profitability through best ALM in Jordan	Secondary data, SCA model	
17.	Anjichi Davis Anjili (2014)	Effects of asset & liability management on the financial performance of commercial banks in Kenya	To determine the effects of asset liability management on the financial performance of commercial banks in Kenya	Secondary data, CAMEL approach	The analysis showed that all the CAMEL factors had a statistically significant impact on financial performance.
18.	Mihir Dash, K.A Venkatsh & Bhargar	An analysis of asset liability management in Indian bank	To compare the maturity gaps in public, private & foreign banks	Secondary data, maturity gap analysis	The result of the study suggest that overall, public sector banks had better short term liquidity position than

	B.D		in Indian banking industry		private sector banks & foreign banks.
19.	Lina Novickyte, Indre Petraityte (2013)	Assessment of banks ALM: Problems & Perspectives (Case of Lithuania)	To analyze Lithuanian banking sector ALM activity & make assumption of how sustainable the sector was during different business cycle stages (how banks can manage their risk according to business cycle).	Secondary data	There is extremely close relationship among the asset & liabilities of commercial banks & foreign in the Lithuania & GDP, although the relationship between the cyclical components are moderate.
20.	Makau, Ngati Francis & Memba, Florence (2014)	Influence of asset liability management in financial performance of commercial banks in Kenya: A case study of Diamond trust bank (DTB)	To determine the influence of customer deposits; loans advanced to customers; management of loans advanced to customers and management of loan from other banks influence the Net Interest Income (NII) of DTB.	Secondary data, time series plots, tables & graphs	Customer deposits have a significant influence in the NII. Loans advanced to customers have a significant influence in the NII. Management of loans to customers as a function a non- performing loan has no significant influence on the NII.
21.	Gyekyi Samuel (2011)	The effects of ALM in profitability of National Investment Bank in the New Juabeng Municipality.	To identify the best possible strategy to manage the composition of financial institution's asset & liability by controlling the various types of business strategies to maximize profitability	Primary & secondary data, simple goal programming model	The value of asset & liability has a direct effect on profitability. Decrease in asset value leads to increase in bank's profit margin. Inflation rate has a direct effect in profitability.
22.	Mihir Dash (2009)	Canonical correlation analysis of asset liability management		Secondary data, canonical correlation analysis.	All the canonical correlations were found to be significant.

		of Indian banks.			
23.	Dr. Anuragh B Singh & Mrs. Priyanka Tandon (2012)	Asset liability management in Indian Banking industry	To examine strategies for ALM, describe the concept & application of ALM technique from the asset side as well as liability side, particularly in the Indian context.	Secondary data	ALM is a successful tool for risk management
24.	Simatwa Robi Martha (2014)	The effects of the asset liability management on the financial performance of commercial bank in Kenya.	To establish the effect of ALM on the financial performance banks.	Secondary data	The quality of asset affects the financial performance of banks. Also loans liability level & level of efficiency have a direct effect in the performance banks. The level of liquidity had a significant relationship with financial performance of banks & vice versa.
25.	Katarzyna Zawalinska (1999)	Asset & liability management: The institutional approach to ALM by commercial bank in Poland - A special focus on Risk Management.	To examine the ALM techniques used in commercial banks in Poland with special attention to risk mgt.	Primary & Secondary data	Private polish banks outperformed the foreign bank by ROA & ROE. It shows that privatization of banks contributes to the improvement of efficiency & to better risk management. The size of the polish private bank has also a positive effect on diverse methodology & sophistication of risk management.
26.	Mastoureh Mehri, Babak Jamshidinavid.	Designing a mathematical model of asset & liability management using goal programming (case study Eghtesed-eNovin bank)	Is to design a mathematical model of asset liability management using goal programming in Eghtesed-e-Novin Bank.	Secondary & Primary data, lingo software	Designing a qualitative model for the optimal management of asset & liabilities in bank is possible using goal programming model as a decision making tool in ALM, while risk is under control can increase return. Using GP model & combining requirements, policies & objectives &

					providing their desired values can lead to identification of an optimal combination of the balance sheet items.
27.	Amit Kumar Meana, Joydip Dhar (2014)	An empirical analysis & comparative study of liquidity ratios & ALM of banks operating in India		Secondary data	
28.	Tamiru Belete (2013)	Asset liability management and commercial banks profitability in Ethiopia.	To examine the effect of ALM on commercial banks profitability in Ethiopia	Secondary data, SCA model	Profitability of commercial bank in Ethiopia is positively affected by asset management except for fixed asset which is negatively affected by liability management. GDP & inflation rate have negative effect on the profitability of banks
29.	Mihir Dash & Ravi Pathak	A linear programming model for assessing ALM in Banks.	To examine the linear programming model for ALM in determining profitability.	Secondary data	The results of the study show that ownership and structure of the banks do affect their ALM procedure
30.	Christoph Memmel & Andrea Schertler (2009)	The dependency of the banks' assets and liabilities: Evidence from Germany		Secondary data	Bank profitability matters for the asset liability dependency, but not the same way for all three sectors. It is lower for private commercial banks with higher provision income, savings banks with lower ROE volatilities & Co-operative banks with higher ROES.
31.	Van Son Lai & M. Kabir Hassan (1997)	An empirical investigation of ALM of small US commercial banks.		Secondary data	Result of the study suggests that the NIM of small banks are sensitive to interest rate unlike those of large institutions.

32.	Dr. R. Umarani & M. Jayanthi (2013)	An analysis of ALM in Indian banks	To compare & analysis the asset liability maturity gap of SBI & Associate Banks to measure liquidity risk.	Secondary data	Revealed that the banks are exposed to liquidity risk.
33.	Obari, L. A (2015)	The effect of ALM on profitability or commercial Banks in Kenya	To determine the effect of ALM and profitability of commercial bank in Kenya	Secondary data, ANOVA	There is a statistically significant positive relationship between bank size and financial performance and statistically negative between capital structure & financial performance.
34.	Ajibola, J. O (2016)	The Effects of Assets and Liability Management on Financial Performance of Some Selected Nigerian Banks.	To examine the influence of assets management on financial performance of some selected Nigeria Deposit Money Banks.	Secondary data, Regression	Findings showed that loans and advances are positively related to return on equity especially when profitability is measured as proxy of financial performance, while the liability variables are negatively related to the measure of bank performance adopted in this study.
35.	Uddin, S. & Haque, A. (2016)	The Impacts of Asset Liability Management on Profitability of some selected Banks in Bangladesh.	To investigate the impacts of ALM policy on the profitability of sample banks working in Bangladesh.	(SCA) model, Time series, Financial ratios and different statistical tools like Pearson Correlation, Descriptive analysis and regression analysis have been applied to identify the relationship among the variables.	After analysis, Loans & Advances is found to have a significant positive relationship with banks' profitability.