THE RELATIONSHIP BETWEEN ASSET-LIABILITY MANAGEMENT AND PROFITABILITY OF COMMERCIAL BANKS IN KENYA

BY

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A MANAGEMENT RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION, SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI

NOVEMBER 2011

DECLARATION

This management research project is my original work and has not been presented for examination in any other university.

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This management research project has been submitted for examination with my approval as university supervisor.

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ACKNOWLEDGEMENTS

I would like to express my gratitude to all those whose contributions facilitated the completion of this project.

First and foremost, I thank the Almighty God for the gift of life and for giving me the skills, knowledge and energy to be able to complete this paper and the postgraduate degree of Master of Business Administration.

Second, I give special thanks to my supervisor, Mirie Mwangi, for providing unlimited, invaluable and active guidance throughout the study. His immense command and knowledge of the subject matter enabled me to shape this research project to the product it is now.

Finally, I owe my gratitude to a great pool of people who in one way or another contributed towards the completion of this project. To all of you, I say a big THANK YOU!

DEDICATION

This study is dedicated to my beloved parents Mr. Julius N. Gikonyo and Margaret

Gikonyo for the foundation they laid to make me the person I am today .Thank you

ABSTRACT

A number of studies have been done in various countries to link asset liability management and profitability of commercial banks. The issue of banks' profitability in developing countries has received little attention. Studies on asset liability management in Kenya have only focused on ALM practices of firms in general without being specific on inducing clear relationship between asset liability management and profitability of commercial banks in Kenya. This study sought to establish the relationship between asset liability management and profitability of commercial banks in Kenya.

The study was an empirical study that sought to establish the relationship between asset liability management and profitability of commercial banks in Kenya for the period 2005 to 2010.The population of the study was considered to be the 43 licensed commercial banks in Kenya. Secondary data was collected from the commercial banks' annual financial statements. Data was analysed using regression analysis and the results presented in tables.

The results indicate that there is a relationship between the asset allocation and profitability of commercial banks in Kenya. The study found a positive relationship between most assets and the profitability of commercial banks. The relationship between liabilities and profitability was found to be negative for most classes of liabilities. The study 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. Further, the study found that there is no significant difference between assets- liability management among the different sizes as well as between listed and non listed of commercial banks in Kenya. Comparison between domestic and foreign commercial banks showed that the coefficient for all the assets as well as the liabilities of domestic commercial banks were significantly higher than those of the foreign commercial banks. The study also found that private commercial banks are better than public commercial banks in terms of asset management, but they do not have any superiority over public banks in terms of liability management. The study recommends that banks entrench effective asset liability management policies so as to maximise their profits.

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ABBREVIATIONS

ALCO   Asset Liability Committee

ALM   Asset Liability Management

APT   Arbitrage Pricing Theory

CAPM   Capital Asset Pricing Model

IRR   Interest Rate Risk

ICAPM   Intertemporal Capital Asset Pricing Model

MPT   Modern Portfolio Theory

NII   Net Interest Income

NIM   Net Interest Margin

NEV   Net Economic Value

OBS   Off Balance Sheet

ROA   Return on Assets

ROE   Return on Equity

RSA   Rate Sensitive Asset

RSL   Rate Sensitive liabilities

SCA   Statistical Cost Accounting

VaR   Value at Risk

CHAPTER ONE

INTRODUCTION

1.1   Background of the Study

The banking sector is one of the important sources of financing for most businesses. Fabbozzi (1995) pointed that the main function of banks is to intermediate between other parties in which process, they operate within an underlying mismatch between highly liquid liabilities on one side of the balance sheet and long term assets on the other side of the balance sheet. Over the last few years the financial markets 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 commercial banks to maintain a good balance among spreads, profitability and long-term viability. These pressures call for structured and comprehensive measures and not just unplanned responses; the management of commercial banks have to base their business decisions on a dynamic and integrated risk management system and process in order to survive. The deregulation of interest rates and the flexibility given to commercial banks in pricing most of the assets and liabilities have further exposed the banking system to interest rate risk. Interest rate risk is the risk that changes in market interest rates might adversely affect a bank's financial condition. These changes in interest rates affect both the current earnings (earnings perspective) as well as the net worth of the commercial bank (economic value perspective). The risk from the earnings' perspective can be measured as changes in the Net Interest Income (NII) or Net Interest Margin (NIM).

Since one of the main objectives of commercial banks is to maximize income while reducing their exposure to risk, efficient management of net interest margin has become essential and in turn necessitated proper asset-liability management practices by commercial banks. Moreover, as the focus on net interest margin has increased over the years, the risk arising out of exposure to interest rate volatility has been built into the capital adequacy norms specified by the regulatory authorities.

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Commercial banks' profitability is of great concern in any 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. As such, profitability of commercial banks is directly affected by management of their assets and liabilities. (Presely, 1992) concluded from his study that there is a need for greater risk management in relation to more effective portfolio management, and this requires a greater emphasis upon the nature of risk and return in bank asset structure, and greater diversification of assets in order to spread and reduce the bank's risks.

Asset Liability Management
Asset Liability Management (ALM) can be defined as a mechanism to address the risk faced by a bank due to a mismatch between assets and liabilities either due to liquidity or changes in interest rates. Liquidity is an institution's ability to meet its liabilities either by borrowing or converting assets. Banks typically tend to borrow short term and lend long term, as such, they may also have a mismatch due to changes in interest rates. A comprehensive ALM policy framework focuses on bank profitability and long-term viability by targeting the net interest margin (NIM) ratio and Net Economic Value (NEV), subject to balance sheet constraints. Significant among these constraints are meeting liquidity needs, maintaining credit quality, and obtaining sufficient capital (Oracle financials services, 2008).

Asset Liability Management (ALM) has also been defined as the overall management of the balance sheet. It comprises of strategic planning and implementation as well as control processes that affect the volume, maturity, interest rate sensitivity, quality and liquidity of a bank's assets and liabilities (Greuning, 2003).According to Gardener and Mills (1994) ALM can also be defined as the management of the Net Interest Margin (NIM) to ensure that its level and riskiness are compatible with the risk/return objectives of that particular institution.

The subject of financial performance and research into its measurement is well advanced within the field of finance. Financial performance may be defined as measuring the results of a firm's operations in monetary terms. Financial performance of commercial banks and other financial institutions has been measured using a combination of financial ratios analysis, benchmarking, measuring performance against budget or a mix of these methodologies (Avkiran, 1995).

Tarawneh (2006) noted that for the enhancement of financial performance three principal factors can be argued; its asset management, institution size, and operating efficiency. There has been little published studies to explore the impact of these factors on the financial performance, especially the commercial banks. Stulz (1996) however found out that firms try to make profits by actively managing the financial risks of their business; they don't simply hedge passively.

ALM Vs Profitability

Commercial banks are exposed to various risks and these risks affect their short term profitability, their long-term earnings and long run sustenance capacity .ALM models should primarily aim to stabilise the adverse impact of the risks on the financial institutions (Rose ,1980). According to Rose (1989), the focus of ALM is described in terms of faces where two faces exist: an accounting one that emphasises on net interest (short run) and an economic one that stresses on the value of bank equity in the long run.

Changes in market liquidity and interest rates expose commercial banks to the risk of loss which may in extreme cases threaten the survival of the institutions. The function of ALM is however not just protection from risk. The safety achieved through ALM also opens up opportunities for enhancing net worth. As interest rate risk (IRR) largely poses a problem to a commercial bank's net interest income and hence profitability, changes in interest rates can significantly alter a bank's net interest income (NII), depending on the extent of mismatch between the asset and liability interest rate reset times. Changes in interest rates also affect the market value of a commercial bank's equity.

The immediate focus of ALM is interest-rate risk and return as measured by a bank's net interest margin.

NIM = (Interest income – Interest expense) / Earning assets

A bank's NIM, in turn, is a function of the interest-rate sensitivity, volume, and mix of its earning assets and liabilities. That is, NIM = f (Rate, Volume, Mix)

Although impact of the management of banks' asset and liability on their profitability has been studied by a number of researchers (Hester & Zoellner, 1966; Kwast & Rose, 1982; Vasiliou, 1996; Kosmidou et al, 2004; and Asiri, 2007), the issue of asset liability management and its link to banks' profitability in developing countries, including Kenya has received little attention from the researchers.

Context of the Study

This study focuses on commercial banks in Kenya. As at 31st December 2010, the banking sector comprised of the Central Bank of Kenya, as the regulatory authority, 44 banking institutions (43 commercial banks and 1 mortgage finance company), 2 representative offices of foreign banks, 5 Deposit-Taking Microfinance Institutions and 126 Forex Bureaus. Of the 43 commercial banks, 30 of the banking institutions are locally owned while 13 are foreign owned. The locally owned financial institutions comprise of 3 banks with public shareholding and 27 privately owned commercial banks. There were 1,063 bank branches operating in the eight provinces of the country.

The performance of the banking sector as at 31st December 2010 stood at a total assets of KShs 1.68 trillion, customer deposit of KShs 1.24 trillion, pre-tax profit of KShs 74.3 billion and gross loans of KShs. 914.9 billion. The ratio of non-performing loans to gross loans was at 6.3 percent in December 2010.

1.2   Statement of the Problem

Changes in the financial sector have put pressure on commercial banks requiring strategies to be employed in a proactive manner rather than dealing with problems on a reactive basis. These changes include the use of information technology, deregulation of interest rates as well as introduction of new financial products. Increasingly, managers of financial firms have focused on asset liability risk. The problem in this has not been that the value of assets might fall or that the value of liabilities might rise , rather it has been that capital might be depleted by the narrowing of the difference between assets and liabilities and that the value of the assets and liabilities might not move in tandem.

Kosmidou et al (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 et al (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.

With the onset of liberalization, Kenyan banks are now more exposed to uncertainty and global competition. In 1986, Kenya's financial sector experienced a crisis that resulted in 37 failed banks. To protect Kenya's commercial banks from undergoing a similar crisis, the Parliament passed a series of regulations to govern the banking industry, and the Central Bank of Kenya strengthened its regulatory role. The Banking Act was amended in 1999, and installed a capital requirement at commercial banks. Risk assessment and credit rating agencies were also created in Kenya to govern the distribution of loans.

Deregulation in financial markets over the past decades, coupled with the ensuing growth in new product offerings to customers, has made it necessary to have proper asset-liability management systems in place in commercial banks.The impact of the management of banks' asset and liability on their profitability has been studied by a number of researchers. Hester & Zoellner (1966) carried out their study on US banks and found statistically significant coefficients for most of the categories of assets. Vasiliou (1996) suggested that asset management rather than liability management play more prominent role in explaining inter-bank differences in profitability. Kwast & Rose (1982) found no evidence that differential returns and costs on different categories of assets and liabilities exist between high and low profit banks.

Kosmidou, (2004) studied the link between profits and asset-liability management of domestic and foreign banks in the UK .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.

Tektas and Gunay (2005) discussed asset and liability management in financial crisis. They argued that an efficient asset-liability management requires maximizing bank's profit as well as controlling and lowering various risks, and their study showed how shifts in market perceptions can create trouble during crisis. A search on studies on asset liability management in Kenya resulted to (Makori , 2010 and Odhiambo , 2006).

The issue of banks' profitability in developing countries has received little attention from the researchers. While the above research outcome provides valuable insights on asset liability management, they have not induced clear relationship between asset liability management and profitability of commercial banks in Kenya. Given the gaps poised by the above empirical studies, this study posed the research question: "what is the relationship between asset liability management and profitability of commercial banks in Kenya?"

1.3 Objective of the Study

The objective of the study is to establish the relationship between asset-liability management and profitability of commercial banks in Kenya.

1.4 Significance of the Study

This research makes significant contributions to the literature relating to assets and liability management of commercial bank in Kenya. It examines the factors that are responsible for differences between returns from assets and cost on liabilities experienced by different categories of commercial banks in Kenya. This research is of great importance to the following stakeholders of commercial banks in Kenya:

Management

Management, especially top level management of commercial banks will use the study to understand the relationship between asset-liability management and profitability and as such use this concept to improve the performance of their organisations.

Regulators

The findings of this research will also be of particular interest to policy makers to enable them set policies and regulations that govern commercial banks without negatively impacting on their profitability.

Shareholder, creditors and depositors

Shareholders can use the study in evaluating the status of the bank and to measure whether the bank is able to provide a reasonable ROA. 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.

Other researchers

Researchers will use the study to get information about asset liability management and how it links to profitability then use the information on other projects. The findings will also form a basis for further studies by other scholars and researchers.

CHAPTER TWO
LITERATURE REVIEW

2.1   Introduction

This chapter deals with various concepts in regard to risks, asset liability management as well as the relationship between asset liability management and profitability of commercial banks. In addition, the researcher has discussed various empirical studies done in the same field, theories of financial risk management and summary conclusion of the literature review.

2.1.1   Categories of Risk

Risk can be defined as the chance or the probability of loss. Cooper (2000) defined risk as uncertain future events that could influence the achievement of an organisation's strategic, operational and financial objectives. In its daily operations, a commercial bank is exposed to various kinds of risks which include:

Credit risk: This is the failure of counterparty to perform according to a contractual arrangement. It applies not only to loans but to other on- and off balance sheet exposures such as guarantees, acceptances and securities investments (Basel Committee, 1997) .

Interest rate risk : Interest rate risk refers to the exposure of a bank's financial condition to adverse movements in interest rates. The primary forms of interest rate risk to which commercial banks are typically exposed is repricing risk which arises from timing differences in the maturity (for fixed rate) and repricing (for floating rate) of commercial bank assets, liabilities and off balance sheet positions (Basel Committee,1997).

Liquidity risk: Liquidity risk arises from the inability of a bank to accommodate decreases in liabilities or to fund increases in assets. When a commercial bank has inadequate liquidity, it cannot obtain sufficient funds, either by increasing liabilities or by converting assets promptly, at a reasonable cost, thereby affecting profitability. In extreme cases, insufficient liquidity can lead to the insolvency of a bank (Basel Committee, 1997).

Capital risk: Vaidyanathan (1999) points out that "One of the important aspects of the banking practice is the maintenance of adequate capital on a continuous basis". Capital risk is the risk that a bank will lose the amount of an investment. It is normally limited to the amount one has invested.

Market risk: Market risk is defined as the risk of losses in on and off-balance sheet positions arising from movements in market prices (Basel Committee on Banking Supervision, 2006).It is the risk that an asset class or overall market will change in value according to economic conditions and it results from adverse movement in market prices.

2.1.2   ALM Conceptual Framework

Vaidyanathan (1999) defined ALM as the process by which an institution manages its balance sheet in order to allow for alternative interest rate and liquidity scenarios. It is the practice of managing risks that arise due to mismatches between the assets and liabilities of the bank.Asset liability management is an approach that provides institutions with mechanisms that makes such risk acceptable. The short term objective of ALM in a commercial bank is to ensure liquidity while protecting the earnings and the long term goal is to maximize the economic value of the bank i.e. "the present value of commercial bank's expected net cash flows, defined as the expected cash flows on assets minus the expected cash flows on liabilities plus the expected net cash flows on off balance sheet (OBS) positions." (Basel Committee on Banking Supervision, 2006) .Other objectives of ALM are maximizing profitability, ensuring structural liquidity, minimizing of capital and ensuring robustness in market risk management. ALM is based on 3 basic pillars

2.1.1.1 ALM Process

"Given the central role of market and credit risk in its core business, a financial institution's success requires that it be able to identify, assess, monitor and manage these risks in a sound and sophisticated way" (Rowe, Jovic and Reeves, 2004). ALM is a systematic approach that attempts to provide a degree of protection to the risk arising out of the asset/liability mismatch.

2.1.1.2 ALM Organisation

Satchidananda and Prahlad (2006) asserted that the Board of Directors would have the overall responsibility for ALM in any organisation and should lay down the organization's philosophy in relation to this. However, the Asset Liability Committee (ALCO) is responsible for deciding on the business strategies consistent with the laid down policies and for operationalising them. Typically, ALCO consists of the senior management, including the Chief Executive Officer

2.1.1.3 ALM Information System

Information is of great importance to the ALM process. There should be a proper management information system which provides accurate, adequate and reliable information to the relevant people, mainly ALCO so that the necessary information becomes available on a timely basis.

2.1.3   Evolution of ALM

Gardner and Mills (1994) stated that financial institutions in the US pioneered ALM, but its usage has spread to other regions. In the 1940s and the 1950s, there was an abundance of funds in commercial banks in the form of demand and savings deposits. The low cost of deposits necessitated commercial banks to develop mechanisms by which they could make efficient use of these funds. As such, the focus then was mainly on asset management. During the 1960s and early 70s, demand for loans had become strong and the availability of low cost funds started to decline, liability management therefore became the focus of bank management efforts. Liability management essentially refers to the practice of buying money to fund profitable loan opportunities.

The origin of asset and liability management date to the high interest rate periods of 1975-6 and the late 1970s and early 1980s in the United States, (Van Deventer, Imai and Mesler, 2004). With the increase in volatility in interest rates, inflation and a severe recession damaging several economies in the mid 1970s, banks started to concentrate more on the management of both sides of the balance sheet.

A coordinated management of the commercial banks entire balance sheet rather than a piecemeal approach was developed during the 1980s. In the 1990s, product expansion, globalisation of money and capital markets and change in regulations made the management of assets and liabilities even more challenging. ALM started with a simple way of gap management to match gaps between interest sensitive assets and liabilities and between market value of assets and liabilities, it developed to duration model until eventually taking into account the advent of derivatives activities and asset securitisation within its framework. ALM has evolved from the simple idea of maturity-matching of assets and liabilities across various time horizons into a framework that includes sophisticated concepts such as duration matching, variable rate pricing, and the use of static and dynamic simulation.

2.1.4   Risk Measurement Techniques

There are various techniques for measuring exposure of commercial banks to interest rate risks:

Gap analysis model:

This model looks at the repricing gap that exists between the interest revenue earned on the bank's assets and the interest paid on its liabilities over a particular period of time (Saunders, 1997). It highlights the net interest income exposure of the commercial bank's to changes in interest rates in different maturity buckets and measures the direction and extent of asset-liability mismatch through either a maturity or funding gap. It is computed for assets and liabilities of differing maturities and is calculated for a set time horizon. In this method, assets and liabilities are grouped into time buckets according to maturity or the time until the first possible resetting of interest rates. According to Vaidyanathan (1999), for each time bucket, the GAP equals the difference between the interest rate sensitive assets (RSAs) and the interest rate sensitive liabilities (RSLs). When interest rates change, the bank's NII changes based on the following interrelationships:

$\Delta NII = GAP \times \Delta r$

Duration model:

Duration basically refers to the average life of the asset or the liability. It is the weighted average time to maturity of all the preset values of its cash flows. This model takes into account the time of arrival of cash flows and the maturity of assets and liabilities. The larger the value of the duration, the more sensitive is the price of that asset or liability to changes in interest rates. The bank is therefore normally immunized from interest rate risk if the duration gap between assets and the liabilities is zero (Vaidyanathan,1999). One important benefit of the duration model is that it uses the market value of assets and liabilities.

Value at Risk (VaR)

Vaidyanathan (1999) defines value at risk as the maximum expected loss that a bank can suffer over a specified horizon, given a certain confidence interval. It enables a bank to calculate the net worth of the organization at any particular point of time so that it is possible to focus on long-term risk implications of decisions that have already been taken or that are going to be taken.

Simulation:

Simulation models help to introduce a dynamic element in the analysis of interest rate risk. The Gap analysis and duration analysis suffer from their inability to move beyond the static analysis of current interest rate risk exposure. Simulation models on the other hand utilize computer power to provide what if scenarios. This dynamic capability adds value to the traditional methods and improves the information available to management (Vaidyanathan ,1999).

2.1.5   Managing Interest Rate Risk

According to Oracle financials services (2008), risk can be controlled using a variety of techniques that can be classified into direct and synthetic methods. The direct method of restructuring the balance sheet relies on changing the contractual characteristics of assets and liabilities in order to achieve a particular duration or maturity GAP.

The synthetic methods on the other hand relies on the use of instruments such as interest rate swaps, futures, options and customised agreements to alter the balance sheet risk exposure. Commercial banks manage the risks of asset liability mismatch by matching the maturity pattern or the duration of the assets and liabilities. Since it is not always possible for financial institutions to restructure the asset and liability mix to directly manage asset/liability Gaps, strategies such as interest rate swaps, options, futures, caps, floors, forward rate agreements or swaptions can be used to create synthetic hedges to manage asset/ liability Gaps . Much of the hedging techniques stem from the delta hedging concepts introduced in the Black-Scholes model and in the work of Robert C. Merton and Robert A. Jarrow.

2.2   Financial Risk Management Theories

The theories presented in this section are Modigliani-Miller model and Portfolio theory.

2.2.1   Modigliani-Miller Model

Modigliani and Miller (1959) state that under the restrictive assumptions, corporate financial decisions do not influence the value of the firm. Their theorem states that in a world of perfect and complete markets, financial decisions are irrelevant as they do not alter the value of the shareholder's stake in the firm.

According to MM , neither the capital structure nor the risk management decisions have an impact on shareholder's wealth ,the only way to increase shareholder's wealth is to increase value of the firm's assets.Since risk management is part of an overall financing policy, the MM findings directly have important implications for the risk management strategy of the firm. Under the MM model, any investor's wealth position is unaffected by corporate risk management activities on the part of the firm (Gossy, 2008). Following this argument, a MM disciple would argue against doing any risk management at all since it is a purely financial transaction (Gossy, 2008).

The immense importance of the MM-framework for corporate risk management, however, becomes apparent when it is used as a starting point for identifying conditions under which corporate risk management makes economic sense. Such a positive theory of corporate risk management can be derived by relaxing the neoclassical assumptions of the MM-framework. Some important deviations from the perfect capital markets in the Modigliani Miller setting have been identified, giving motivations for firms to care about risk management, such as taxes, bankruptcy costs, agency costs and others (Gossy, 2008). When these reasons for risk management are incorporated into the firm's objective function, one finds the following basic result: When all risks are perfectly tradeable the firm maximizes shareholder value by hedging completely (Gossy, 2008).

2.2.2 Portfolio Theory

Modern Portfolio Theory (MPT) is a theory of investment which tries to maximize return and minimize risk by carefully choosing different assets (Markowitz, 1952). MPT is a mathematical formulation of the concept of diversification in investing, with the aim of selecting a collection of investment assets that has collectively lower risk than any individual asset. This is possible, in theory, because different types of assets often change in value in opposite ways. For example, when the prices in the stock market fall, the prices in the bond market often increase, and vice versa. A collection of both types of assets can therefore have lower overall risk than either individually (Mandelbrot, and Hudson, 2004). The Primary principle upon which the Modern Portfolio Theory (MPT) is based is the random walk hypothesis which states that the movement of asset prices follows an unpredictable path: the path as a trend that is based on the long-run nominal growth of corporate earnings per share, but fluctuations around the trend are random (Chandra, Siddharth and Shadel, 2007).

One of the basic theories that links together risk and return for all marketable assets is the capital asset pricing model (CAPM) initially developed by Sharpe (1964) and Lintner (1965) and later refined by Black (1972) and Merton (1973). It represents an extension and simplification of the model by Markowitz (1952).

The Markowitz model was the first theorizing a relationship between risk and return. In his model, there are as many efficient portfolios as there are investor risk preferences. All efficient portfolios must lie on the mean-variance investment frontiers where investors can get a higher return only by accepting a higher level of risk (Gossy, 2008). The CAPM extends this theory to a situation of equilibrium. The CAPM argues that all investors will hold the same efficient portfolio (the market portfolio) regardless of their individual risk preferences. Thereby, the CAPM is capable of determining the market price for risk and an appropriate risk measure for a single asset (Gossy, 2008).

There have been numerous anomalies of the CAPM that have been discovered by finance researchers. This has initiated a discussion of the usefulness of the CAPM for the field of strategic management starting with the contribution by Bettis (1983). In particular, he seriously questions the implications of the CAPM for strategic management but especially corporate risk management. The author identifies an implied recommendation in the CAPM to corporate management not to be concerned at all about firm-specific risks. Bettis (1983) argued that business risks are associated with firm specific resources and competencies and are strongly related to the firm-environment interface.

Cracks in Portfolio Theory by Markowitz and the CAPM began to appear resulting into strong criticisms in the later years. Attempts were made to come up with improvements on the weaknesses of CAPM. This led to possible alternatives to CAPM. The key ones being the Intertemporal Capital Pricing Model (ICAPM) by Robert C. Merton in 1973 and the Arbitrage Pricing Theory (APT) accredited to Stephen Ross in 1976. The two models, ICAPM and APT, borrow from CAPM, but with improvements resulting from making more "realistic" the assumptions of CAPM.

2.3   ALM Vs Profitability

Commercial banks incur costs for their liabilities and earn income from their assets. Thus profitability of commercial banks is directly affected by management of their assets and liabilities. Assets= Liabilities +Shareholders equity, while

Net Interest Income =Interest Income – Income Expenses ---(1).

Both income and expenses are a factor of assets and liabilities and as such , equation(1) may be expressed as follows:

$NII = \sum \alpha 2_i A_i - \sum \alpha 3_j L_j$

Where,

A_i = ith asset

L_j = jth liability

$\alpha 2_i$ = marginal rates of return on assets

$a3_j$ = marginal costs of liabilities.

As such, both income and expenses are a factor of assets and liabilities .The composition of assets and liabilities and the relationship between the different rates determine the net income of the bank (Mc Donald &Scott, 2006)

Fabbozzi (1995) noted that there are a number of widely differing views of risk management held by executives, regulators and investors. In his book, Asset-liability management ,he noted that some industry participants believe that any institution that diligently practices risk management or hedging is implicitly accepting low returns (earnings) in return for taking less risks and as such, many industry participants mistakenly believe that risk management inherently reduces profitability of financial institutions. Proponents to the view that ALM reduces profitability base their argument on the fact that there is a generally accepted relationship between risk and return, that is, the higher the risk the higher the expected return and vice versa.

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However, risk management has a frequently overlooked side; In addition to enabling the management of financial institutions to limit swings in earnings and net worth due to factors outside its control, the vigorous economic analysis that accompanies risk management is a key to consistent long run profitability (Fabbozzi , 1995).

Bitner and Goddard (1992) stated that the goal of ALM is to provide the bank with stable and competitive return on equity or surplus. Therefore ALM can be defined as the structuring and management of the balance sheet to influence the income statement. He further argues that the process has to be profit driven or it makes little sense. It therefore requires proper selection of earning assets and the optimal mix of assets and liabilities.

According to Fabbozzi (1995), the primary goal of asset liability management is to produce quality, stable, large and growing flow of interest rates income. This goal is accomplished by achieving the most optimal combination and level of assets, liabilities and financial risks.

Saunders &Cornet (2008) pointed out that mismatching the maturities of assets and liabilities expose a bank equity holder to risk of insolvency. They further argued that although asset- liability matching does reduce exposure to interest rate risk, matching maturities may reduce the financial institution's profitability because returns from acting as specialised risk asset transformer are reduced. As a result, some of the financial institutions emphasise asset- liability mismatching more than others.

The general formula that they used is as follows:
$NII= RSA*R_A- RSL*R_L$

Where R_A is the interest rates impacting assets and R_L is the interest rates impacting liabilities

If $R_A = R_L$ this equation may be expressed as

NII= (RSA – RSL)*R which may be further expressed as
NII= (GAPi)*R i

Where NII is the net interest income, R refers to the interest rates impacting assets and liabilities in the relevant maturity bucket and GAP refers to the differences between the book value of the rate sensitive assets and the rate sensitive liabilities. Thus when there is a change in the interest rate, one can easily identify the impact of the change on the net interest income of the bank. If the GAP (spread between RSA and RSL) decrease, when interest rates rise (fall), interest revenue increase (decrease) less (more) than interest expense and NII therefore decreases .

2.4   Empirical Studies

Several studies have analyzed the relationship between asset-liability management and Profitability of commercial banks. Fraser and Fraser (1991) argued that the financial performance of commercial banking is better if its profit is high and its risk is low. But since, generally, investors are assumed to be risk averse, high profit to them means accepting high risk. Management should therefore have a good trade-off between risk and return.

Kwast & 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

Hester & 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.

Vasiliou (1996), by employing SCA method, suggest that asset management rather than liability management play a more prominent role in explaining inter-bank differences in profitability. However, these findings contrast with the findings of Kosmidou et al (2004) who found that liability management contributes more in creating the profitability differences among banks.

Kosmidou, (2004) in his paper Linking profits to asset-liability management of domestic and foreign banks in the UK 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.

Asiri (2007) also used the Statistical Cost Accounting (SCA) method to test whether assets and liabilities of a bank could help forecast its profits. 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.

Kosmidou et al. (2004) 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 Vasilion (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 et al (2004) where they found a positive relation between fixed assets and profits.

Vasishth (1996) in an article on asset liability management in banks express the view that the ALM function if properly implemented , would enable the bank management to enhance the value of its earnings by imparting stability to its interest margins which would directly translate into higher shareholder value.

Louis (1997) in her article on asset liability management maintains the view that ALM focuses on profitability and long-term viability. She advances that increasing volatility regarding interest rates and the emergence of many hedging instruments in the financial markets have all resulted to importance of ALM in modern banking.

McGregor (1977) in his study argued that spread management, a potent tool for improving profit margins could be achieved by maximizing net interest margin. The technique of spread management is the relationship between asset yield and liability costs.

2.5   Summary of Literature Review

The literature has tackled the concepts of risk with a greater focus on asset liability management as well as profitability of firms. A commercial bank is exposed to various kinds of risks in its daily operations including credit risk, interest rate risk, liquidity risk and capital risk. Given the risks inherent in banking, it is the aim of asset and liability management to manage these risk exposures so that they are kept within acceptable levels and at the same time help to generate income and maintain profitability (Gardener and Molyneux, 1990).

An empirical review has been provided with studies on asset liability management and its link to commercial banks' profitability being evaluated. A number of authors (Hester & Zoellner, 1966; Kwast & Rose, 1982; Vasiliou, 1996; Kosmidou et al, 2004 ; and Asiri, 2007) have done studies about the influence of the composition of assets and liabilities on the profitability of bank. Hester & Zoellner (1966) found statistically significant coefficients for most of the categories of assets and liabilities in US banks 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 et al (2004) who found that liability management contributes more in creating the profitability differences among the banks.

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) applied SCA method and found that assets are positively and liabilities are negatively related to the profitability of the Kuwaiti banks.

As it can be noted, the debate on the relationship between ALM and profitability of banks is not yet settled. Further, most of these studies were done in different environments which cannot be generalized to developing countries especially Kenya. Hence, the present study seeks to bridge the gap.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1   Introduction

This chapter highlights the methods that were used by the researcher to undertake the research. These methods include research design, target population, sampling design, data collection procedures and data analysis procedures.

3.2   Research Design

According to Mugenda and Mugenda (1999), research design is the outline plan or scheme that is used to generate answers to the research problems. It is basically the structure and plan of investigation. The researcher conducted an empirical study to establish the relationship between asset-liability management and profitability of commercial banks in Kenya.

3.3   Target Population

A target population is one that the researcher wants to generalize the result of the study. Our population consist of all the licensed commercial banks in Kenya. At the time of the study, there were 43 licensed commercial banks in Kenya. These formed the target population. Since the population of the subject of the study was considered to be small, no sampling was done across the population. Census was preferred because it would give a better representation of the point of concern than if a sample was taken. Moreover, information on the asset liability structure and profitability of banks was readily available.

3.4   Data Collection

The data used was mainly secondary data collected from the commercial banks' financial statements and the annual bank supervision reports from the Central bank of Kenya.

3.5   Data Analysis

The data collected were edited, coded, tabulated and interpreted in relation to the research objectives. The Statistical Cost Accounting (SCA) method was used for regression analysis. SCA method assumes that the rate of return on earning assets is positive and varies across assets, whereas the rate of cost on liabilities is negative and varies across liabilities. According to Kosmidou et al (2004), this method was tested in American, Indian, Greek and Italian banks (Hester, 1964; Hester and Zoellner, 1966; Hester and Pierce, 1975; Kwast and Rose, 1982; Vasiliou, 1996;).

The commercial banks' profitability was estimated as net operating income. This study does not use net income after tax as a dependent variable as tax is fixed by the government from time to time and not influenced by ALM

The regression analysis was performed using the following model:

The variations in banks' net operating income, Y, *can* be expressed in terms of variations of assets and liabilities in the following way:

$$Y = \alpha_1 + \sum \alpha_{2i} A_i + \sum \alpha_{3j} L_j + e \text{ --- (1)}$$

Where,

Y = net operating income,

A_i = ith asset, i = 1, 2, ... m

L_j = jth liability , j = 1, 2, ... n

Variables Description

Assets are economic resources owned by the bank. For the purpose of this study, the assets were classified as follows:

A_1 Cash in hand balances

A_2 Deposits in banks and Investments in short term securities

A_3 Loans

A_4 Government securities

A_5 Fixed assets and other assets

Liabilities

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 liabilities were classified as follows:

L_1 Customer Deposits

L_2 Deposits due to other banking institutions

L_3 Borrowed Funds

L_4 Deposits due to other banking institutions

L_5 Other Liabilities

α_1 is a constant term

e is a stochastic term

α_{2i} = marginal rates of return on assets and indicates the changes in the commercial bank's profit by replacing one unit of cash with one unit of the ith asset and is expected to be positive.

α_{3j} =marginal costs of liabilities and indicates the changes in the commercial bank's profit by adding one unit of cash and one unit of jth liability and is expected to be negative.

As banks have wide variations in their business volume, to eliminate the size bias, all variables of model (1) are divided by the bank's total assets (Kosmidou et al, 2004).

Thus equation (1) takes the form of:

$$Y/ TA = \alpha_1/TA + \sum \alpha_{2i}A_i/TA + \sum \alpha_{3j}L_j/TA + u \text{ ---- (2)}$$

Where, the stochastic term $u = e/TA$

In model (2), the dependent variable is changed to ROA and the liability figures changed to risk ratios. Fraser and Fraser (1991) argued that ROA and ROE are the best measures of profitability.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1   Introduction

This chapter presents the results of the study. The study targeted commercial banks operating in Kenya in the period 2005 to 2010. Total number of observations is 252, being the 43 licensed commercial banks for six years .However Gulf African Bank was not in operation until 2007; First Community Bank in 2008 while Southern credit ceased operations in 2010.The Statistical Cost Accounting method applied in this study relates differences in profitability to differences in assets and liabilities. The source of data is mainly the commercial banks financial statements and the annual bank supervision reports provided by the Central Bank of Kenya. The period 2005 to 2010 is used for the study and this time is considered substantially sufficient for the study.

The chapter is organised as follows: first, the chapter presents the results of the first regression model with operating income as the dependent variable. This is followed by results of the second regression model with Return on assets (ROA) as the dependent variable. A presentation on the relationship between asset liability management and profitability of commercial banks is also presented and the differences in asset liability management among different sizes of banks also presented. The population is further split to test for differences between domestic vs foreign, listed vs non listed, public (those with government participation) vs private commercial banks. The following two models as explained in chapter 3 were used for our analysis

$$Y = \alpha_1 + \sum \alpha_{2i} A_i + \sum \alpha_{3j} L_j + e \text{ --- Model (1)}$$

$$Y/TA = \alpha_1/TA + \sum \alpha_{2i} A_i/TA + \sum \alpha_{3j} L_j/TA + u \text{ ---- Model (2)}$$

Regression is used for both models to test the null hypothesis that there is no relationship between profits generated by a bank and its assets or liabilities. T-test is used for all models at a significant level of 1%. Durban-Watson (DW) statistic is also used to test for autocorrelation. The variables used in these two models are listed in Chapter 3.The results are shown in Table 1, 2, 3, 4, 5 and 6.

4.2   Net Operating Income as the Dependent Variable

All variables in model (1), explained in chapter 3 ,were included in the regression and the statistical significant variables are summarized in table 1 below.

Table 1

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.981[a]	.963	.962	374286.42037	1.572

a. Predictors: (Constant), Other Liabilities, Borrowed Funds, Deposits due to other banking instituitions, Balances due to group companies, Deposits in banks and investments in securities, Fixed assets and other assets, Government bonds, Cash , Loans, Customer Deposits

b. Dependent Variable: Operating Profits

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-186835.798	31010.414		-6.025	.000
	Cash	.172	.054	.099	3.190	.002
	Deposits in banks and investments in securities	.203	.019	.519	10.566	.000
	Loans	.235	.016	2.683	14.786	.000
	Government bonds	.247	.015	1.229	16.095	.000
	Fixed assets and other assets	.210	.019	.547	11.341	.000
	Customer Deposits	-.218	.018	-3.316	-12.382	.000
	Deposits due to other banking instituitions	-.240	.020	-.394	-12.284	.000
	Borrowed Funds	-.274	.035	-.162	-7.809	.000
	Balances due to group companies	-.138	.031	-.097	-4.435	.000
	Other Liabilities	-.139	.024	-.159	-5.695	.000

a. Dependent Variable: Operating Profits

From the results in table 1, all assets have shown a positive relation in generating the net operating profit of commercial banks in Kenya .Investment in Government securities and Loans were found to have the greatest significance in generating net operating profits while cash and Fixed and other asset were found to be least significant in generating net operating profit .This could be explained by the fact that cash and fixed and other assets variable which is mainly land, building and investment in different small types of assets, is not only incapable of generating much profit but also reduces the opportunity for investment in profitable investments. The more money is invested in this kind of assets, the lesser the opportunity for investment on other profitable assets.

All liabilities have shown a negative relation in generating the net operating profit of commercial banks in Kenya. The coefficients of most of the liabilities are significant. However they are much lower compared to those of assets. For the liabilities, customer deposits were found to have the most significant influence on operating profit followed by deposits in other financial institutions and borrowed funds. Balances due to group companies were found to have the least significance. The reason could be that banks are not charged much for funds obtained from group companies unlike borrowing from customers and other third parties .The R^2 is high at 0.963 indicating that 96.3% of the variation in the profit is explained correctly by the assets and liabilities.

The coefficients for both assets and liabilities were found to be significant. These results are similar to those by Hester & Zoellner (1966) who 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. They however contradict the results reported by Vasiliou (1996), who by employing SCA method, suggest that asset management rather than liability management play a more prominent role in explaining inter-bank differences in profitability and those by Kosmidou et al (2004) who found that liability management contributes more in creating the profitability differences among banks.

4.3   ROA as the Dependent Variable

To eliminate the size bias, all variables of model (1) , as explained in chapter 3, are divided by the bank's total assets. Thus equation (1) takes the form of:

$$Y/ TA = \alpha_1/TA + \sum \alpha_{2i}A_i/TA + \sum \alpha_{3j}L_j/TA + u \text{ ----Model (2)}$$

Table 2 below summarizes the regression statistics for model (2) with ROA as the dependent variable.

Table 2

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Cash/Total Assets	.172	.054	.099	3.190	.002
Deposits in banks and investments in securities/Total Assets	.203	.019	.519	10.566	.000
Loans/Total Assets	.235	.016	2.683	14.786	.000
Government bonds/Total Assets	.247	.015	1.229	16.095	.000
Fixed assets and other assets/Total Assets	.210	.019	547	11.341	.000
Customer Deposits/Total Assets	-.218	.018	-3.316	-12.382	.000
Deposits due to other banking institutions/Total Assets	-.240	.020	-.394	-12.284	.000
Borrowed Funds/Total Assets	-.274	.035	-.162	-7.809	.000
Balances due to group companies/Total Assets	-.138	.031	-.097	-4.435	.000
Other Liabilities	-.139	.024	-.159	-5.695	.000

a. Dependent Variable: Operating Profits/Total Assets

The results are consistent with model (1) where all assets have shown a positive relation while liabilities have shown a negative relation in generating the net operating profit of commercial banks in Kenya.

4.4   Large Vs Medium Vs Small Commercial banks

To test for differences in the relationship between asset liability management and the profitability of various sizes of commercial banks, the sample was divided to include sub samples: small, medium and large commercial banks where large commercial banks are those with a market share larger than 5%, medium being the ones with a market share of greater than 1% but less than 5% and the small commercial banks had a market share less than 1%. The total number of observations is 36 for the large commercial banks, 90 for the medium size commercial banks and 126 for the small commercial banks.A regression analysis for model 1, explained in chapter 3 was done for these three categories and the results are as per table 3 below:

Table 3

Model	Large		Medium		Small	
	Standardized Coefficients	t	Standardized Coefficients	t	Standardized Coefficients	t
	Beta		Beta		Beta	
(Constant)		-0.814		-3.049		-1.347
Cash balances (both local and foreign)	0.073	0.674	0.139	2.049	-0.213	-2.062
Deposits in banks and investments in securities	0.681	3.473	0.635	3.551	0.333	1.891
Loans	2.637	4.869	1.98	4.825	2.053	4.2
Government bonds	1.273	5.726	1.282	4.935	1.409	4.511
Fixed assets and other assets	0.526	3.279	0.552	4.162	0.264	2.088
Customer Deposits	-3.038	-4.006	-2.457	-3.634	-2.383	-3.377
Deposits due to other banking instituitions	-0.639	-3.989	-0.253	-3.47	-0.248	-1.591
Borrowed Funds	-0.219	-2.008	-0.262	-3.503	-0.685	-4.072
Balances due to group companies	-0.161	-1.836	-0.092	-1.1	-0.059	-0.777
Other Liabilities	-0.221	-2.242	-0.086	-1.177	-0.316	-3.025

This table shows that the coefficients of assets are generally positive while that of is negative in all the three categories of commercial banks. There is however no evidence that differential returns and costs on different categories of assets and liabilities exist between the various categories of commercial banks since the coefficients of each variable for the three categories of commercial banks are close to each other and in the same direction. This findings are similar to those reported by Kwast & Rose (1982) .

From the regression in results in Table 3, all commercial banks generally generate profits positively with assets and negatively with liabilities. Small banks were however found to have a negative relationship between cash balances and profits. This could be explained by the fact that cash held is not only incapable of generating profit but also reduces the opportunity for investment in profitable investments. The larger the cash balances are held, the lesser the opportunity for investment on other profitable assets.

Government securities and loans were found to be the most significant in contributing to net operating profits for all sizes of banks. The findings are similar to those by Asiri (2007)who also used the Statistical Cost Accounting (SCA) method to test whether assets and liabilities of a bank could help forecast its profits. The study concluded that assets, mainly loans, are the key variable in generating profits whereas liabilities reduce profits.

All banks generally generate profits negative with liabilities. In all the three cases , customer deposits were found to be more costly than other sources of funding. This findings are similar to those reported by Komidou (2004).Small banks were however found to have the greatest negative relationship between borrowed funds and profits as well as other liabilities and profits and the least between deposits and profits as compared to the other two categories. This is because such small banks cannot generate many funds from customer deposits and therefore rely more on money borrowed from other sources.

Large commercial banks on the other hand enjoy investor confidence as well as support from their parent companies .They therefore have large amounts of deposits , both customer deposits and deposits due to other banking institutions as well as balances due to group companies. Deposits and balances to group companies therefore have a greater influence on their profits as compared to the medium and small banks.

Table 3 further shows that large banks earn significantly high net returns from loans and government securities compared to medium and small banks. Higher returns on these two assets are sufficient to create profitability differences among the various sizes of banks.

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4.5 Domestic Vs Foreign Commercial Banks

An important feature of commercial banks in Kenya is the mixed nature of their ownership. To test for differences in profitability between domestic and foreign commercial banks in Kenya, the sample has been divided to include sub samples: domestic and foreign commercial banks. As per appendix 2, of the 43 licensed commercial banks in Kenya, ownership of 30 is domestic while the remaining 13 are foreign owned . The total number of observations is 179 for the domestic commercial banks and 73 for the foreign commercial banks.

A regression analysis for model 1, as explained in chapter 3 was done for these two categories and the results are as per table 4 below:

Table 4

Model	Domestic		Foreign		Differences	
	Standardized Coefficients	t	Standardized Coefficients	t	Standardized Coefficients	t
	a		b		c=a-b	
(Constant)		-4.512		-4.794	0	0.282
Cash balances	0.158	4.55	0.037	0.62	0.121	3.93
Deposits in banks and investments in securities	0.917	12.31	0.128	3.188	0.789	9.122
Loans	3.525	17.371	1.498	4.529	2.027	12.842
Government bonds	1.342	17.233	0.879	6.092	0.463	11.141
Fixed assets and other assets	0.703	10.579	0.362	4.42	0.341	6.159
Customer Deposits	-4.579	-14.404	-1.477	-3.207	-3.102	-11.197
Deposits due to other banking instituitions	-0.596	-12.121	-0.13	-4.492	-0.466	-7.629
Borrowed Funds	-0.273	-9.352	-0.034	-1.488	-0.239	-7.864
Balances due to group companies	-0.11	-6.051	-0.101	-2.713	-0.009	-3.338
Other Liabilities	-0.234	-8.055	-0.12	-1.624	-0.114	-6.431

Table 4 shows that all the commercial banks, regardless of whether they are domestic of foreign owned generally generate profits positively with assets and negatively with liabilities. The table however clearly shows that differential returns and costs on different categories of assets and liabilities exist between the domestic and foreign commercial banks as evidenced by differences in the coefficients of the variables in these two categories of commercial banks

The coefficients for all the assets and liabilities of the domestic commercial banks are generally significantly higher than those of the foreign commercial banks. The operating profit that domestic commercial banks experience appeared to be generated mainly by the loans that they hold on their earning assets portfolio, government securities and deposits in banks and investments in securities while the operating profit of foreign banks was generated mainly by government securities, loans and fixed assets.

Liabilities, in customer deposits and deposits due to other banking institutions in both cases were found to be more costly than other sources of funding. Customer deposits, borrowed fund and other financial institutions funding were found to be more significant in reducing the operating profits of domestic commercial banks compared to their foreign counterparts. These findings are similar to those by Kosmidou (2004)

Since the coefficients for all the assets as well as the liabilities of domestic commercial banks are significantly higher than those of the foreign commercial banks, it is not clear whether the greater return on assets by domestic banks is sufficient to cover the higher cost of their liabilities. The results therefore do not provide evidence that domestic commercial banks generate greater profits compared to their foreign counterparts. It is however clear that the behaviors of assets-liabilities management differ for domestic commercial banks compared to foreign commercial banks in generating profits.

4.6   Listed Vs Non Listed Commercial Banks

There are 10 commercial banks in Kenya which are listed at the Nairobi stock exchange. The remaining 33 commercial banks are not listed .The total number of observations is 60 for the listed commercial banks and 192 for the commercial banks that are not listed. The researcher sought to understand differences in profitability of these two categories of commercial banks by performing a regression analysis for model 1, as explained in chapter 3. The results are as per table 5 below:

Table 5

Model	Listed		Non listed		Differences	
	Standardized Coefficients	t	Standardized Coefficients	t	Standardized Coefficients	t
	a		b		c=a-b	
(Constant)		-2.242		-6.298	0	4.056
Cash balances Deposits in banks and investments in securities	0.058	0.825	0.087	2.017	-0.029	-1.192
	0.594	4.88	0.785	5.996	-0.191	-1.116
Loans	2.638	7.415	2.119	7.551	0.519	-0.136
Government bonds Fixed assets and other assets	1.318	8.118	1.258	8.548	0.06	-0.43
	0.588	4.889	0.631	6.431	-0.043	-1.542
Customer Deposits	-3.153	-5.928	-3.079	-6.364	-0.074	0.436
Deposits due to other banking instituitions	-0.547	-5.681	-0.337	-6.051	-0.21	0.37
Borrowed Funds	-0.195	-3.406	-0.205	-5.271	0.01	1.865
Balances due to group companies	-0.134	-2.585	-0.119	-2.078	-0.015	-0.507
Other Liabilities	-0.189	-3.121	-0.095	-1.622	-0.094	-1.499

The results in table 5 above suggests that all the assets have significant and positive impact on net operating income of both the listed and non listed commercial banks in Kenya. For both categories, the coefficients of all assets are significant and positive while those of liabilities are significant and negative. However, from the results in (c) above, there is no evidence that differential returns and costs on different categories of assets and liabilities exist between the listed and non listed commercial banks in Kenya banks. The coefficients for both assets and liabilities are slightly higher for the non listed commercial banks as compared to their counterparts except for balances due to group companies and other Liabilities.

4.7 Government Controlled Vs Private Commercial Banks

As there are contradictory studies (Short, 1979; Bourke, 1989; Molyneux and Thornton, 1992; Demirgnuc-Kunt and Huizinga, 1998; Goddard et al, 2004; Ionnotta et al, 2007; Athanasoglou, 2008) regarding the relation between ALM and profitability of the public and private banks, the researchers examined the situation of these two categories of banks in Kenya.

Among the 43 commercial banks in Kenya 6 have government participation while the other 37 are privately owned as per appendix 2. The total number of observations is 36 for the banks with government participation and 216 for the private commercial banks. A regression analysis for model 1, as explained in chapter 3 was done for these two categories and the results are as per table 6 below:

Table 6

Model	Government		Private		Differences	
	Standardized Coefficients	t	Standardized Coefficients	t	Standardized Coefficients	t
	a		b		c=a-b	
(Constant)		-2.604		-5.171	0	2.567
Cash balances	0.4	4.478	-0.008	-0.243	4.486	4.721
Deposits in banks and investments in securities	0.961	4.944	0.214	5.409	4.73	-0.465
Loans	3.156	8.488	2.159	9.979	6.329	-1.491
Government bonds	1.144	8.32	1.076	11.891	7.244	-3.571
Fixed assets and other assets	0.689	4.125	0.511	10.795	3.614	-6.67
Customer Deposits	-4.151	-6.092	-2.505	-8.179	-3.587	2.087
Deposits due to other banking instituitions	-0.764	-5.278	-0.132	-6.561	-5.146	1.283
Borrowed Funds	-0.218	-6.256	-0.07	-2.431	-6.186	-3.825
Balances due to group companies	-0.112	-3.91	-0.103	-4.172	-3.807	0.262
Other Liabilities	-0.154	-3.847	-0.115	-2.941	-3.732	-0.906

The results in table 6 above suggest that all the assets have significant and positive impact on net operating income of government controlled commercial banks in Kenya. For both categories, the coefficients of all liabilities are significant and negative while those of most assets are significant and positive.

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Surprisingly, the coefficient of cash is negative for the private commercial banks in Kenya and it may be argued that cash balances held are not only incapable of generating profit but also reduces the opportunity for investment in profitable investments. The more money is invested in this kind of assets, the lesser the opportunity for investment on other profitable assets for private commercial banks.

Table 6 further shows that private commercial banks earn significantly higher net return from fixed assets, government securities and loans compared to the public/ government controlled commercial banks. Higher returns on these three assets are sufficient to create profitability differences between the two types of banks. In the liability side, coefficients of three variables are significantly different between the private and public commercial banks. Public commercial banks experience lower marginal costs on customer deposits and deposits due to other banking institutions which are the largest source of liabilities whereas private commercial banks experience lower marginal costs in borrowed Funds. Both groups of commercial banks have insignificant differences in marginal costs of other liabilities and balances due to group companies.

It is evident that private commercial banks are better than public (government controlled) commercial banks in terms of asset management, but they do not have any superiority over public banks in terms of liability management. It means that private commercial banks are employing significantly better asset management strategies than the public commercial banks as evidenced by the fact that the coefficients for all the assets, other than cash are higher in the private commercial banks than in their counterparts which have government participation. However, there is no conclusive evidence which banks are employing better liability management strategies. This therefore does not provide conclusive support that ALM in private banks is superior to ALM in public banks. These findings are similar to those by Sayeed (2009) who conducted a study on the impact of asset and liability management on profitability of public vs private commercial banks in Bangladesh and concluded that profitability differences between these two sets of banks could not be explained through analyzing ALM.

4.8   Summary of Research Findings and Interpretations

The study sought to establish the relationship between asset liability management and profitability of commercial banks in Kenya. All commercial banks in Kenya were examined in order to develop models for asset-liability management in relation to profit generation.The results provide evidence that generally assets positively contribute to the profit. The coefficients of assets are positive and significant as expected. The significance of individual assets differs: government securities are highly significant followed by loans and by deposits and investments, while cash and fixed and other assets were found to have the least significance in contributing to net operating profit of commercial banks in Kenya. This could be explained by the fact that the fixed and other assets variable which is mainly land and buildings which have a lower return reduces the opportunity for investment in profitable investments.

Liabilities were found to contribute negatively to profits of the banks. The coefficients of liabilities are negative and generally less significant compared to those of assets implying that commercial banks in Kenya pay nominal return on these liabilities. The significance of individual liabilities differs: customer deposits are highly significant followed by deposits due to other banking institutions and borrowed funds. Balances due to group companies and other liabilities were found to have the least significance in contributing to profit. This could be explained by the fact that banks are not charged much for funds obtained from group companies unlike borrowing from customers and other third parties.

A split of the population to sub samples: small, medium and large commercial banks show that there is no significant difference between assets- liability management among the different sizes of banks. All banks generally generate profits positively with assets and negatively with liabilities. The study found that there is no significant difference between assets- liability management among the different sizes of banks since there was no evidence that differential returns and costs on different categories of assets and liabilities exist between the various sizes of commercial banks in Kenya banks.

This findings are similar to those reported by Kwast & Rose (1982) where they found no evidence that differential returns and costs on different categories of assets and liabilities exist between high and low profit banks. The results were similar to those of the analysis of the listed vs. non listed commercial banks in Kenya where the researcher did not find significant differences in the coefficient of both assets and liabilities for both categories.

An analysis of the commercial banks in terms of domestic vs foreign commercial banks revealed that the coefficients for all the assets and liabilities of the domestic commercial banks were generally significantly higher. It is however not clear whether the greater return on their assets is sufficient to cover the higher cost of their liabilities since the coefficient for both the assets as well as the liabilities of domestic commercial banks are significantly higher than those of the foreign ones. The results therefore do not provide evidence that domestic commercial banks generate greater profits compared to the foreign commercial bank. It is however clear that the behavior of assets-liabilities management practice differ for domestic compared to foreign commercial banks

An analysis of private commercial banks vs. commercial banks with government participation revealed that private commercial banks are better than their counterparts in terms of asset management. The lower performance by government controlled commercial banks could be attributed to governance problem where the commercial banks' Board of Directors is normally constituted by inexperienced persons having little or no exposures to banking operations. Private commercial banks however do not have any superiority over public commercial banks in terms of liability management. This therefore does not provide conclusive support that ALM in private banks is superior to ALM in commercial banks with government participation.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1   Introduction

Asset liability management is a relatively new concept in risk management more so in developing countries. This has been shown in studies carried out in other developing countries such as in India and by the Bank of Bangladesh focus group. This chapter presents the conclusion of the study, recommendations for policy and practice, limitations of the study, and suggestions for further research.

5.2   Conclusion

The objective of this study guided the conclusion having been supported by the data collected and analyzed through the study. To a large extent, the objective of the study has been attained. All commercial banks in Kenya were examined in order to develop models for asset-liability managements in relation to profit generation. The results provide evidence that generally assets positively contribute to the profit but liabilities negatively contribute to the profit.The study 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. Both assets and liabilities play a significant role in influencing profitability of commercial banks in Kenya. Government securities and loans were found to have the greatest significance in generating net operating profits while cash and Fixed and other asset were found to be least significant in generating net operating profit.

Further, the study found that there is no significant difference between assets- liability management among the different sizes as well as between listed and non listed of commercial bank .This was based on the fact that there was no evidence that differential returns and costs on different categories of assets and liabilities exist between the elements in these categories. Comparison between domestic and foreign commercial banks showed that the coefficient for all the assets as well as the liabilities of domestic banks were significantly higher than those of the foreign banks. Private commercial banks were found to be better than their public counterparts in terms of asset management but they do not have any superiority over public banks in terms of liability management.

5.3   Recommendations for Policy and Practice

The results of this paper may help commercial banks to determine the factors which might generate more profit. In general; a statistical cost accounting analysis could be of particular interest to bank management, as the managers can employ this analysis to identify the relative position of their banks in relation to their main competitors. This will enable them to identify their competitive advantages and disadvantage and to change their policies towards asset and liability management while avoiding bank failure.

The study recommends that commercial banks employ proper asset liability management policies to help in maximising their profits. This can be done by commercial banks channelling more of their resources to assets which have the highest positive influence on profits while limiting their fixed assets and other assets which have a less significant influence on their profitability.

Policy makers and regulators may also use the results of this study to guide them in putting into place informed guidelines on the allocation of its resources among each asset class in a way that enhances maximisation of profits of commercial banks while taking into consideration the interest of other stakeholders such as the suppliers of fund and the shareholders.

Shareholder wealth maximization could be subordinated to an assortment of other managerial goals. To deal with this, shareholders can use the result of this study as well as the model to evaluate the status of the bank and to measure whether the commercial bank is able to provide a reasonable return on their investments in evaluating which is the best investment option for them.

Creditors and depositors are also interested in these performances of commercial bank. They can use the result of this study as well as the model to evaluate the ability of these banks for repaying debts and meeting the withdrawal requirements.

5.4   Limitations of the Study

Although this research was carefully planned, there were a number of limitations that would have a potential impact on the outcome of the study. For instance, it was not possible to include off balance sheet effect in our study. It was not possible to include the effect of items such as swaps, hedges, futures and forwards yet their impact on the profitability of commercial banks operating in Kenya can be substantial. Based on this the results of the study may not be conclusive.

In addition, the researcher experienced lack of prior research studies on the topic as the issue of commercial banks' profitability in developing countries has received little attention from the researchers. While there is some little research outcome which provides valuable insights on asset liability management, they have not induced clear relationship between asset liability management and profitability of commercial banks in Kenya.

Moreover the study did not consider all macroeconomic variables that can affect the financial performance of commercial banks. Some of the factors affecting financial performance of commercial banks are difficult to quantify yet their impact on the profitability of commercial banks can be substantial. Some factors such as political instability and regulations governing business practices of commercial banks were not considered.

5.5 Suggestions for Further Research

There is need to replicate these results to other sectors e.g. insurance companies and pension schemes so as to establish to what extent asset liability management influences their profitability .Since the nature of insurance companies and pension schemes is similar to that of banks, this research would be of great significance in enabling these institutions allocate their assets and liabilities in order to maximise their profits.

Research can also be done to examine whether difference in non balance sheet items such as swaps , derivatives and hedges are creating profitability differences among commercial banks in Kenya since our research only considered assets and liabilities which are essentially balance sheet items.

In addition, a number of additional ratios could be added to the models developed in order to get a better explanation of the profit of commercial banks in Kenya. Moreover, information from the stock market could be added to the model to see the effect of the market on the profit of firms in Kenya.

A comparison study could also be done between commercial banks and Islamic banks operating in Kenya since the two categories operate based on different concepts where Islamic banks are based on Sharia laws unlike the contemporary commercial banks and this might guide the assets and liabilities allocation of each category.

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APPENDICES

Appendix 1: Research Population

1.   African Banking Corporation
2.   Bank of Africa Kenya
3.   Bank of Baroda
4.   Bank of India
5.   Barclays Bank of Kenya
6.   CFC Stanbic Bank
7.   Charterhouse Bank Ltd
8.   Chase Bank Ltd
9.   Citybank
10.   City Finance Bank
11.   Co-operative Bank of Kenya
12.   Commercial Bank of Africa
13.   Consolidated Bank of Kenya Ltd
14.   Credit Bank Ltd
15.   Development Bank of Kenya
16.   Diamond Trust Bank
17.   Dubai Bank Kenya Ltd
18.   Equatorial Commercial Bank Ltd
19.   Equity Bank
20.   Family Bank
21.   Fidelity (Commercial) Bank Ltd
22.   Fina Bank Ltd
23.   First Community Bank Ltd
24.   Giro Commercial Bank Ltd
25.   Guardian Bank
26.   Gulf African Bank Ltd
27.   Habib Bank A.G. Zurich
28.   Housing Finance Co. Ltd

29. Imperial Bank

30. I&M Bank Ltd

31. K-Rep Bank Ltd

32. Kenya Commercial Bank Ltd

33. Middle East Bank

34. National Bank of Kenya

35. National Industrial Credit Bank Ltd (NIC Bank)

36. Oriental Commercial Bank Ltd

37. Paramount Universal Bank Ltd

38. Prime Bank Ltd

39. Southern Credit Banking Corp. Ltd

40. Standard Chartered Bank

41. Trans-National Bank Ltd

42. UBA Kenya Bank Ltd.

43. Victoria Commercial Bank Ltd

Appendix 2: Institutions in Terms of Shareholding

a). Foreign owned institutions

i). Foreign owned not locally incorporated

- Bank of Africa (K) Ltd.
- Bank of India
- Citibank N.A. Kenya
- Habib Bank A.G. Zurich

ii). Foreign owned but locally incorporated institutions (Partly owned by locals)

- Bank of Baroda (K) Ltd.
- Barclays Bank of Kenya Ltd.
- Diamond Trust Bank Kenya Ltd.
- K-Rep Bank Ltd.
- Standard Chartered Bank (K) Ltd.
- Ecobank Ltd
- Gulf Africa Bank (K) Ltd
- First Community Bank

iii). Foreign owned but locally incorporated institutions

- UBA Kenya Bank Limited

b). Insitutions with Government participation

- Consolidated Bank of Kenya Ltd.
- Development Bank of Kenya Ltd.
- Housing Finance Ltd.
- Kenya Commercial Bank Ltd.
- National Bank of Kenya Ltd.
- CFC Stanbic Bank Ltd

c). Institutions locally owned

- African Banking Corporation Ltd.
- Jamii Bora Bank Ltd.
- Commercial Bank of Africa Ltd.
- Co-operative Bank of Kenya Ltd.
- Credit Bank Ltd.
- Charterhouse Bank Ltd.
- Chase Bank (K) Ltd.
- Dubai Bank Kenya Ltd
- Equatorial Commercial Bank Ltd.
- Equity Bank Ltd.
- Family Bank Ltd.
- Fidelity Commercial Bank Ltd.
- Fina Bank Ltd.
- Giro Commercial Bank Ltd.
- Guardian Bank Ltd.
- Imperial Bank Ltd.
- Investment & Mortgages Bank Ltd.
- Middle East Bank (K) Ltd.
- NIC Bank Ltd.
- Oriental Commercial Bank Ltd.
- Paramount Universal Bank Ltd.
- Prime Bank Ltd.
- Trans-National Bank Ltd.
- Victoria Commercial Bank Ltd.

II. Institutions listed on the NSE

- Barclays Bank of Kenya Ltd.
- CFC Stanbic Bank Ltd.
- Equity Bank Ltd.
- Housing Finance Ltd.
- Kenya Commercial Bank Ltd.
- NIC Bank Ltd.
- Standard Chartered Bank (K) Ltd.
- Diamond Trust Bank Kenya Ltd
- National Bank of Kenya
- Co-operative Bank of kenya Ltd