

**DETERMINANTS OF CAPITAL ADEQUACY OF COMMERCIAL  
BANKS IN KENYA**

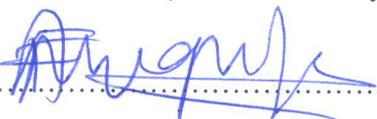
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**A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE  
DEGREE OF MASTER OF BUSINESS ADMINISTRATION, SCHOOL OF  
BUSINESS, UNIVERSITY OF NAIROBI**

**NOVEMBER 2014**

## DECLARATION

This research project is my original work and has never been presented for an award of diploma or a degree in this or any other university.

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This research project has been submitted for examination with my approval as the University supervisor.

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## **DEDICATION**

This research project is a special dedication to my wife Beatrice K.B. Ambale and our children Shantel, Patience ,Sydney, Prudence & Remson who had to put up with my late home arrivals and who by the grace of God gave me a peace of mind so needed to accomplish my task.

## **ACKNOWLEDGEMENT**

I thank God for enabling me to complete this course. My special appreciation and gratitude to my supervisor Dr. Fredrick Ogilo for the invaluable guidance, understanding and patience. He indeed gave me the intellectual and moral support that made this research a success.

I acknowledge the university of Nairobi lecturers, especially those who took us through the course work, the university librarians and MBA 2014 colleagues for their warm company in this long journey. I also extend my utmost appreciation to my larger family members, Church and colleagues at work for their encouragement provided throughout the study. Without your cooperation & support , this study would not have been complete.

May God bless you all!

## **ABSTRACT**

This study aimed at identifying the most important factors that determine Capital Adequacy of Commercial Banks in Kenya for the period 2009 – 2013 using Multiple Linear Regression Analysis and the Correlation Coefficient (Pearson Correlation). The target population comprised all registered commercial banks in Kenya in a five year period 2009 to 2013. Secondary data was used from Nairobi Securities Exchange for listed banks and management of banks that are not listed. Following the financial crisis of the 2007-2009, stringent regulatory measures, such as higher capital requirements have become more prominent as a move towards having stable and more competitive banking sector. Banks play a critical role in the allocation of society's limited savings among the most productive investments, and they facilitate the efficient allocation of the risks of those investments. The study showed that there existed a significant relationship between capital adequacy and capital risk. There was no existence of a significant relationship between capital adequacy and the following: liquidity risk, credit risk, interest rate risk, return on assets ratio, return on equity ratio and revenue power ratio. As shown by the findings of the study, the liquidity risk, credit risk, capital risk, interest rate risk, return on asset ratio, return on equity ratio and revenue power ratio combined with a relatively high effect on the Capital Adequacy and the changes that occur within, as the percentage of the interpretation reached approximately eighty one percent. Since the P-value of the F-test is less than alpha, the overall conclusion of the study was that there is a significant relationship between the Liquidity Risky Assets, Credit Risks, Capital Risks, Interest Rate Risks, Return on Asset Ratio, Return on Equity Ratio and Revenue Power Ratio and Capital Adequacy. On this basis of the findings the study recommends that report of financial statements and data should include rules and basis on which capital adequacy measurement is based, which will lead to raising banking and finance awareness that will enhance banks competitive positions with regional and international banks.

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## LIST OF ABBREVIATIONS

CAMEL	Capital, Assets, Management Quality, Equity, Liquidity
CA	Capital Adequacy
CAR	Capital Adequacy Ratio
CBK	Central Bank of Kenya
CPR	Capital Risk
CR	Credit Risk
IR	Interest Rate Risk
KBA	Kenya Bankers Association
KES	Kenya Shillings
LR	Liquidity Risk
NIM	Net Interest Margin
NSE	Nairobi Securities Exchange
ROA	Return on Assets
ROE	Return on Equity
RP	Revenue Power
SFP	Statement of Financial Position
SPSS	Statistical Package for Social Scientists

# CHAPTER ONE: INTRODUCTION

## 1.1 Background of the Study

Capital adequacy refers to amount of capital relative to a financial institution's loans and other assets (Barsel II , 1988). It represents the most critical element of banks stability and solidarity (Wen, 2010). Investors and stakeholders do not seem to understand what really determines capital adequacy and why some banks do better than others (Ongore, 2012). In Kenya today investors and stakeholders do not appear to understand what really determines capital adequacy and why some banks perform better than others (Ongore, 2012). In an effort to promote efficiency in the banking industry, to control weaknesses resulting from worldwide liberalization and deregulation, the Basel Capital Accord of 1988 (Basel I) which led to the endorsement of a new capital adequacy framework (Basel II) in 2004 (operational from 2007) marked the beginning of a new phase of re-regulation with an attempt to bring about an international harmonization of banking regulations (Bichsel and Blum, 2005). In assessing bank's efficiency, the level, nature and composition of capital and the cost income ratio are some of the key measures used to determine performance of a bank (Bourke,1989). Kwan and Eisenbeis (1995) and Hughes and Moon (1995) argued that it is necessary to recognize explicitly the concept of efficiency in the empirical models linking bank capital to risk and to distinguish between efficient and inefficient risk undertaking. There are conflicts in capital theories for example Capital buffer theory encourages high capital while capital structure theory does not (Modigliani and Miller, 1958).

Capital adequacy has been the focus of a number of theories and studies as it is considered to be one of the main drivers of any financial institution's profitability (Bourke, 1989; White and Morrison, 2001). In contrast, some theories argue that in a world of perfect financial markets, capital structure and hence capital regulation is irrelevant (Modigliani and Miller, 1958). As per capital buffer theory, capital buffer is the excess capital a bank holds above the minimum capital required. The capital buffer theory implicates that banks with low capital buffers attempt to rebuild appropriate capital buffer by raising capital and banks with high capital buffers attempt to maintain their capital buffer. This theory is relevant to this study because it explains why capital adequacy is critical to commercial banks as per Marcus (1984) However, White and Morrison (2001) posited that the regulator ensures that banks have enough of their own capital at stake. There exist a conflict in the above theories hence this study. In measuring the profitability of a bank, bank regulators and analysts have used Return On Assets (ROA) and return on equity (ROE) to assess industry performance and forecast trends in market structure as inputs in statistical models to predict bank failures and mergers and for a variety of other purposes where a measure of profitability is desired (Gilbert and Wheelock, 2007; Mostafa, 2007; Christian *et al.*, 2008). Navapan and Tripe (2003) explained that comparing banks' Returns On Equity (ROE) is one way of measuring their performance relative to each other. The return on equity looks at the return on the shareholder's investment (Gilbert and Wheelock, 2007).

In Kenya, Central Bank of Kenya (CBK) increased the minimum capital requirement, aimed at strengthening institutional structures and improving resilience of the banking industry In respect to the international standards. According to the Banking Act (2008), every bank was expected to maintain a minimum core capital of at least KES 1 billion (USD 12 million) by 2012. It was

further expected that the small banks that found difficulties raising their capital to the required levels would be encouraged to merge (Kenya Finance Act, 2008 ). In line with the capital buffer theory (Whalley, 2001) banks aim at holding more capital than required (i.e., maintaining regulatory capital above the regulatory minimum) as insurance against breach of the regulatory minimum capital requirement. The outline of the study is as follows: after the introduction, there is the literature review, which is also followed by the methodology of the study.

### **1.1.1 Capital Adequacy**

Capital is one of the bank specific factors that influence the level of bank profitability. Capital is the amount of own fund available to support the bank's business and act as a buffer in case of adverse situation (Athanasoglou et al., 2005). Banks capital creates liquidity for the bank due to the fact that deposits are most fragile and prone to bank runs. Greater bank capital reduces the chance of financial distress. Adequacy of capital is judged on the basis of capital adequacy ratio (CAR). CAR ratio shows the internal strength of the bank to withstand losses during crisis as cited by Dang (2011).

Prior to the 2007-2009 crisis the banking sector of many countries had built up excessive on and off- statement of financial position (SFP) leverage that was accompanied by the gradual erosion of the level and quality of the banks' capital base (Bank of International Settlements (BIS), (2009). As a result, the banking system was not able to absorb the resulting systemic trading and credit losses nor could it cope with the re-intermediation of large off-SFP exposures that had built up in the shadow banking system (BIS, 2009). Capital adequacy regulation is often viewed

as a buffer against insolvency crises, limiting the costs of financial distress by reducing the probability of insolvency of banks. Irrespective of the viewpoint, a general consensus is that banks with higher capital and liquidity buffers are better able to support businesses and households in bad times since buffers enhance the capacity of banks to absorb losses and uphold lending during a downturn (Barrell et al., 2009).

### **1.1.2 Determinants of Capital Adequacy**

Capital adequacy ratio (CAR) is the ratio that is set by the regulatory authority in the banking sector, and this ratio can be used to test the health of the banking system, this ratio has mandatory requirement imposed by the state bank because this ratio ensures that the bank has the ability to absorb the reasonable amount of losses (Brealey and Myers, 2003). Risk level is critical as a determinant of capital adequacy. It is generally accepted that the capital is considered as shock absorber, due to unexpected losses, which reducing the probability of the insolvency and the cost of bankruptcy will be managed (Aggarwal and Jacques, 2001). A bank has many risks that must be managed carefully, especially since a bank uses a large amount of leverage. Without effective management of its risks, it could very easily become insolvent (Aburime, 2005).

Capital adequacy of previous period also plays a role as a determinant of capital adequacy. The risk level of banking sector can be measure through the RWA (risk weighted assets/Total assets). Banks face a number of risks in order to conduct their business, and how well these risks are managed and understood is a key driver behind profitability, and how much capital a bank is required to hold (Aburime, 2005). Risk level or size of assets do not fully describes the

adjustment costs, the capital of the previous period is one of the major factors which determine adjustment cost. Banks are also required to disclose in their balance sheet the quantum of Tier I and Tier II capital fund, under disclosure norms as per Basel I (1988). Huge capital holding affect the profitability, efficiency and the effectiveness of operations of banks, while the lower level of capital or insufficient funds make certain results to be negative (Rime, 2001). Capital adequacy ratio is directly proportional to the resilience of the bank to crisis situations. It has also a direct effect on the profitability of banks by determining its expansion to risky but profitable ventures or areas (Sangmi and Nazir, 2010).

Alternative capital cost is a major component of CAR in the banking system and determinant of Capital adequacy. ROE is a more suitable tool for the analysis of the alternative cost of capital, when the cost of capital is low, then holding of excess capital than the regulatory requirements does not effect on the profitability . A business that has a high return on equity is more likely to be one that is capable of generating cash internally.ROE is the ratio of Net Income after Taxes divided by Total Equity Capital ( Khrawish, 2011). As the rate of alternative cost of capital increases there is willingness to decrease the holding more capital (Rime, 2001).

### **1.1.3 Commercial Banks in Kenya**

Central Bank makes and enforces rules which govern the minimum capital requirement for Kenyan banks and are based on the international standards developed by the Basel Committee. In the year 2008, CBK reviewed the minimum capital requirements for commercial banks and mortgage finance institutions with the aim of maintaining a more stable and efficient banking

and financial system. According to the Banking Act (2008) every institution was expected to maintain:- A minimum core capital of at least KES 1 billion (USD 12 million) by 2012 , core capital of not less than 8% of total risk adjusted assets plus risk adjusted off-SFP items, a core capital of not less than 8% of its total deposit liabilities and a total capital of not less than 12% of its total risk adjusted assets plus risk adjusted off-SFP items as per Kenya Banking act (2008)

The history of banking in Kenya dates back to the colonial period. British commercial banks started operations in Kenya during 1890s. As Kenya became more and more part of this capitalist world economy, the banks established themselves in the colony to provide services for financing exports and imports (CBK, Kenya Bankers Association and Reuters 2009). Three British banks dominated banking in colonial Kenya. The National Bank of India (later National and Grindlays Bank) began operations in 1896. It was followed in 1910 by the Standard bank of South Africa (later standard Bank and Standard Chartered), and shortly thereafter the national Bank of South Africa entered the field. In 1925, the latter merged with two other British banks to form Barclays Bank Dominion Colonial and overseas (later Barclays Bank) with a primary interest to finance external trade. Kenyan financial services industry is dominated by the banking sector. During the period 2007 – 2011, the Kenyan banking system showed resilience, which was attributed to the low financial integration in the global financial market and the strict supervision and sound regulatory reforms (Bank Supervision Annual Report 2009, 2010; IMF, 2009). According to the Central Bank of Kenya the financial sector performance indicators with return on asset indicator went up from 2.6 percent in 2007 to 4.4 percent in 2011 while the ratio of gross non-performing loans to gross loans improving from 10.6 percent to 4.4 percent over the same period.

## 1.2 Research Problem

Investors and stakeholders do not appear to understand what really determines capital adequacy and why some banks perform better than others (Ongore, 2012). There are conflicts in capital theories, for example Capital buffer theory encourages high capital while Modigliani and Miller (1958) does not. In line with the capital buffer theory (Marcus, 1984, Milne and Whalley, 2001) banks aim at holding more capital than required as insurance against breach of the regulatory minimum capital requirement.

Banks with high capital buffers attempt to maintain their capital buffer. In contrast, some theories argue that in a world of perfect financial markets, capital structure and hence capital regulation is irrelevant (Modigliani and Miller, 1958) while in capital buffer theory, capital buffer is the excess capital a bank holds above the minimum capital required.

Despite financial sector reforms and regulation by CBK for all financial institution with an aim of improving profitability, efficiency and productivity, commercial banks' determinants of capital adequacy are still not understood by many investors (Mathuva , 2009). Nag and Das (2002) studied the impact of capital requirement norms on flow of credit to the business sector by public sector banks in India and found that in the post reform period, public sector banks shift their portfolio in a way that reduced their capital requirements this did not capture determinants of capital adequacy. A study conducted by Al-Tamimi (2013) on Commercial banks capital adequacy in Jordan found out that there is negative non-significant relationship between capital adequacy and capital risk. In a study conducted by Ogilo (2012) on Impact of credit risk

management on financial performance of commercial banks in Kenya , the study found out that there is a strong impact between CAMEL components on financial performance of commercial banks. Another study conducted by (Agoraki et al., 2011) found out that imposing high capital requirements, banks will be constrained to some extent by competitive pressures, which would occur due to competition on loans, deposits and even the sources of equity and debt investments.

Discussion in previous studies seem to have suggested a number of factors that may influence the failure pattern of banks, bank products and management. There is little done on a model designed on determinants of capital adequacy of commercial banks in Kenya. The study attempted to address the following research question: What are the factors that determine capital adequacy of commercial banks in Kenya ?

### **1.3 Research Objectives**

To establish factors that determine capital adequacy of commercial banks in Kenya.

### **1.4 Value of the study**

The findings of this study will be of great importance to the policy makers when making policies touching on Capital. For regulators especially CBK , the findings will help them in their efforts to monitor the commercial banks financial performance in relation to capital adequacy. The study will as well assist the CBK as a regulator to know when there are distress symptoms and to form measures to further securitize the banking system and restore depositor's confidence.

It is hoped that the findings of this study will help the customers and investors to know whether the banking system is performing better in terms of capital adequacy. The study results might help different policy holders, either individuals or groups, in maintaining their investments and achieving the highest possible return with the lowest possible risks. Furthermore the study will provide financial organizations management with success and failure indicators. The study will contribute to the Capital Buffer Theory by giving insight to what determines capital adequacy and performance of commercial banks. The study will as well contribute to Trade Off Theory and Theory of Moral Hazards by showing how determinants of capital adequacy affects performance commercial banks while keeping in line with these theories.

The findings of the research will be helpful to other researchers and academicians who will carry out related research and using the findings of this research to explore more on areas untapped in this research. Finally public institution might benefit from this study through taking preventive measures to avoid the occurrence of financial crisis affecting the national economy.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter provided theoretical and empirical information from publications on topics related to the research problem.

### **2.2 Theoretical Review**

This chapter reviewed literature which contains information related to area of study which investigates the determinant of capital adequacy of commercial banks in Kenya. It involves reviews of empirical studies, historical records, government reports and newspaper accounts. This chapter also reviews literature on various theories and concepts that have been brought forward by other scholars and researchers in the area of capital adequacy of commercial banks.

#### **2.2.1 Capital Structure Theory**

The fundamental concept of capital structure was introduced by Modigliani and Miller (1958), the theory of capital structure was also introduced by Modigliani and Miller (1958). Capital structure theory suggests the value a firm is irrelevant to the capital structure of a company. Whether the is highly levered or has lower debt component , it has no bearing on its market value. The market value of a firm is dependent on the operating profits of the company (Modigliani and Miller, 1958).

Capital structure which determines capital adequacy of a company is the way a company finances its assets. A company can finance its operations by either debt or equity or different combinations of these two sources. Capital structure of a company can have majority of debt component or majority of equity , only one of the tow components or an equal mix of both debt and equity. Each approach has its own set of advantages and disadvantages (Kwan and Eisenbeis , 1995).

Capital structure theory has been used by many researchers in their theoretical and empirical research on capital structure of financial or non-financial sectors. These studies are mainly focused on the non-financial sector; only limited studies were previously conducted on the capital structure of the financial sector and only few of them on the determinants of Capital Adequacy Ratio (CAR) in banking sector especially in developing countries as per Bourke (1989).

### **2.2.2 The Capital Buffer Theory**

In capital buffer theory, banks aim at holding more capital than recommended. Regulations targeting the creation of adequate capital buffers are designed to reduce the procyclical nature of lending by promoting the creation of countercyclical buffers (Milne & Whalley, 2001). Moreover these regulations are designed to reduce the procyclical nature of lending by promoting the creation of countercyclical buffers (Khawish, 2011).

The capital buffer is the excess capital a bank holds above the minimum capital required. The capital buffer theory implicates that banks with low capital buffers attempt to rebuild an

appropriate capital buffer by raising capital and banks with high capital buffers attempt to maintain their capital buffer. More capital tends to absorb adverse shocks and thus reduces the likelihood of failure. Banks raise capital when portfolio risk goes up in order to keep up their capital buffer as sighted by (Marcus, 1984) which appear to relate to determinant of capital adequacy and performance of commercial banks.

### **2.2.3 Trade-Off Theory**

The trade-off theory of capital structure refers to the idea that a company chooses how much debt finance and how much equity finance to use by balancing costs and benefits. The classical version of the hypothesis goes back to Kraus and Litzenberer (1973) who considered a balance between the dead-weight costs of bankruptcy and tax saving benefits of debt. It states that there is an advantage to financing with debt, the tax benefits of debt and there is a cost of financing with debt, the costs of financial distress (Brealey and Myers, 2003). In order to generate an “adequate” return on equity, commercial banks have to incur higher risks to receive higher risk premium on their investments. Thus, increased risk requires greater proportions of equity in the firm’s capital structure to prevent an inefficient cost of capital. The net effect of this negative incentive effect and the buffer effect is ambiguous (Brealey and Myers, 2003).

### **2.3 Determinants of Capital Adequacy**

The relationship between capital adequacy and other business factors guides the overall performance of a bank (Heffernan , 1996). Profit is the ultimate goal of commercial banks. All the strategies designed and activities performed thereof are meant to have a relationship that

realize this grand objective (Murthy and Sree, 2003;Alexandru et al., 2008). The determinants of capital adequacy can be classified into bank specific (internal) and macroeconomic (external) factors (Al-Tamimi, 2010; Aburime, 2005).

### **2.3.1 Liquidity Risk**

Liquidity risks (LR) represented in those current and potential risks related to a bank profitability and capital which result from bank inability to meet its obligations which incurred including the inability to manage unexpected reductions or changes that might occur on market conditions and affect the ability to liquidate assets rapidly and with the least possible losses in their values; Liquidity risk is compounded when banks cannot forecast the demand on loans or deposits withdrawal accompanied by its inability to reach new sources of money to cover these demands (Abdelkareem & Salah, 2007).

Liquid assets are represented by cash at hand and at the central bank in addition to cash at other banks or financial institutions, while total liabilities are represented by all short and long-term liabilities such as demand deposits, time deposits, saving deposits in addition to borrowing processes from banks and financial institutions. This ratio reflects ability of bank liquid assets in meeting withdrawal process by customer (depositors); In other words there is an inverse relationship between liquidity risks and degree of capital adequacy (Heffernan , 1996).

### **2.3.2 Credit Risk**

Credit risk (CR) refers to risks that originate as a result of a bank giving loans or credits to both

individuals and various economic sectors with its inability to get back its rights represented by the loan principal and interests in the due date or being capable to pay it back but does not want that, for different reasons, therefore risks are represented in losses that the bank might bear due to customers inability or unwillingness to pay back the loan principal and its interests (Ruzaig & Korthd, 2007).

This ratio measures the bank's ability to employ its cash in financial credits, and existing literature shows the existence of an inverse relationship between credit risks and banking credit. In other words, when credit risks are low, banking credits are high, which, in turn, increases owner equity to risk assets ratio as well as increased security margin in the face of investment risks.

### **2.3.3 Capital Risk**

Capital risks (CPR) represent the probability of the bank inability to meet its obligations, and this occurs when there is a negative owners equity and net owners' equity is determined by the difference between assets market value and liability market value. Paid capital is the invested capital, while risk weighted assets are all assets other than cash accounts in other banks and financial institutions and this ratio measures the extent to which assets value decreases before affecting depositors and owners funds. Capital risk usually occur when banks assets market value drops to a level lower than banks liability market value (AL – Jinabi, 2005, p. 273) Furthermore, banking and finance literature shows a close relationship between capital risks and capital adequacy as expressed by owner's equity to risk weighted assets ratio. In other words the

increase of capital risks requires an in turn of capital adequacy to meet investment risks, therefore, which intern requires the bank to increase owners' equity to meet capital risk, there is an inverse relationship between capital risks and capital adequacy (Ruzaig & Korthd, 2007).

### **2.3.4 Interest Rate Risk**

Interest Rate Risk (IR) refers to risks resulting from interest rate fluctuations and might have a negative effect on bank's capital and revenues as banks face these risks as part of being a financial intermediaries (brokers), meaning that interest rates risks might involve a big threat to its profits and capital, which requires a good interest rate management from the part of the bank, through maintaining acceptable levels of interest rates (Heffernan , 1996). Interest rate risks have multiple aspects, the most important of which different maturation dates against fixed interest rate, pricing against variable interest rate for bank assets and liabilities its financial centers, apart form its balance sheet (Abdelkareem & Salah, 2007).

Interest rate sensitive assets represent financial credits while liabilities represent customers, other banks and financial institutions deposits at the bank as well as borrowed money by part of the bank, meanwhile, existing literature showed an inverse relationship between interest rate risk and capital adequacy (Heffernan , 1996).

### **2.3.5 Return on Assets**

Return on Assets (ROA) represents all assets owned by the bank and their ability in generating profits during a specific time period, in other words it explains the degree to which

the bank succeeds in investing its assets and its efficiency in directing them towards profitable investment opportunities.

This ratio measures the management efficiency in using the available resources and its ability in realizing revenues from funds or resources available from various financing resources, therefore it reflects the effect of the bank financial and operation activities, meanwhile, this ratio was employed as a measure of banks performance in several previous studies of, which polios and Samuel (2000) study, and a direct relationship, between return on assets ratio and Capital adequacy, was documented.

### **2.3.6 Return on Equity**

Return on Equity (ROE) is a financial ratio that refers to how much profit a company earned compared to the total amount of shareholder equity invested or found on the balance sheet (Athanasoglou et al.,2005). ROE is what the shareholders look in return for their investment. A business that has a high return on equity is more likely to be one that is capable of generating cash internally. Thus, the higher the ROE the better the company is in terms of profit generation. It is further explained by Khrawish (2011) that ROE is the ratio of Net Income after Taxes divided by Total Equity Capital. It represents the rate of return earned on the funds invested in the bank by its stockholders. ROE reflects how effectively a bank management is using shareholders' funds. Thus, it can be deduced from the above statement that the better the ROE the more effective the management in utilizing the shareholders capital (Oloo, 2010).

### **2.3.7 Revenue Power Ratio**

Revenue power ratio (RP) is based on the relationship between operations profits and assets contributing to its realization, in measuring profitability, Revenue power is defined as the ability of certain investment to generate a revenue in turn of its use, or it is the institution's ability to generate profits for the use of its assets in its basic activity, put in other terms, it is the ratio of operations profits to institution assets (Abu- Zeiter, 2006). This ratio is better than profits as a measure for judging the institution efficiency, since profit is an absolute number that does not indicate the realized investments, while revenue power finds out this relationship, which in turn facilitates comparison with revenues from other time periods and institutions, in addition to identifying that institutions Performance will take, it is also a measure of the institution's operational performance efficiency, therefore, when it is computed, we should be confined on the assets actually participating in the institution's typical operation along with profits generated from operation of these assets before tax, and other expenditures and revues (Abu Zeiter, 2006).

Total revenues include credit interests, net commissions, profits of financial assets and tools, and other operational revenues, in addition, literature indicates a positive relationship between Revenue power ratio and capital adequacy (Abu- Zeiter, 2006).

### **2.4 Empirical Review**

Bevan (2000) conducted a study that addressed commercial bank leverage (debtedness) and its determinant factors in , Hungary ; where they expressed the dependent variable as Leverage, while bank size, risky Assets, long term debts, short term debts and retained earnings, as independent ones. The study indicated an inverse relationship between debtedness (Leverage) and each of risky assets, it also revealed

the importance of increasing commercial banks capital to safeguard or protect depositors funds against the exposure to leverage risks (Bevan, 2000).

Al – Maleeji (2002) conducted a study aimed at developing an accounting model for judging the Egyptian commercial banks and to establish a standard that includes various element needed to assess capital adequacy, which reflects most of the risks facing commercial banks in general and credit, inflation liquidity and market risks in particular. The study reheatated that capital adequacy established according to Basel banking decisions (1988) and Egyptian central bank decisions (1991), are not effective, as well as the new framework for capital adequacy (Basel, 1999).

Berrosptide et al. (2008) study which sought to find out the effects of companies finance policy on their performance and value, focusing on the macroeconomics environment, using fixed effects statistical analysis methods, the study revealed a direct relationship between book and market values of the company, and security decisions with operational profits margin, Brazilian currency derived contracts, capital expenditures, Monetary budgets, but no statistically significant relationship between company size, sales growth rate with security banking decisions.

Barakat (2009) conducted a study which aimed at checking the extent to which (Basel 2) standards requirement are applied by commercial banks operating in Jordan. Data was collected through a questionnaire administered to more than (40) bank employees in Jordan. The study revealed that all banks operating in Jordan applied basils standards, as well as the existence of great differences in applying Basel 2 standards among local end foreign banks.

Mathuva (2009) study provides evidence that supports the Central Bank of Kenya's move to gradually raise bank capital levels by 2012 and to tightly monitor the operations of banks so as to ensure that Kenyan banks are more efficient in their operations while at the same time being profitable.

## **2.5 Summary of Literature Review**

A general conclusion drawn from the body of literature above is that research on determinants of capital adequacy and performance of commercial banks in developing countries has received little attention despite rapid growth in this literature over the years. This is rather unfortunate given the dominance of banking sector in the financial system in these countries including Kenya.

Capital adequacy modeling has not been in the mainstream of econometric research into the financial sector in Kenya. Analysis of the banking sector have so far focused on qualitative assessment of growth trends and sectorial behavior patterns in the industry. Discussion in the above mentioned studies has, for instance, suggested a number of factors that may influence the failure pattern of banks, bank products and management. There has been few models designed on determinants of capital adequacy of commercial banks in Kenya.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter discussed the research design, population, data collection, data analysis and analytical model. It further shows the data collection methods used, techniques and instruments.

### **3.2 Research Design**

This study adopted a descriptive research design. Descriptive research is a process of collecting data in order to test hypothesis or answer questions concerning the current status of the subject matter that was used in this study. A descriptive survey design allows researchers to gather information, summarize, present and interpret it for the purpose of clarification (Mugenda and Mugenda, 1999).

### **3.3 Population of the Study**

The target population comprised all registered commercial banks in Kenya in a five year period 2009 to 2013. The researcher chose this period because it has got a relatively normal business environment while avoiding year 1997 and 1998 when there was post election violence in the country. The commercial banks that comprised of the population are banks that operated in Kenya registered and regulated by Central Bank of Kenya (CBK) and Kenya Bankers Association (KBA).

### 3.4 Data Collection

Secondary data was used from NSE for listed banks and management of banks that are not listed. The compulsory requirement of publishing listed companies financial reports made it easy to obtain secondary data for the period 2009-2013 that was relevant for the study while special requests were made to management of unlisted banks to provide the researcher with their financial reports. All registered banks were approached.

### 3.5 Data Analysis

Linear regression analysis and correlation coefficient (person correlation) analysis was used to identify factors that determine capital adequacy of commercial banks in Kenya . Statistical Package for Social Sciences (SPSS) was used to aid in the data analysis.

#### 3.5.1 Analytical Model

The study will use Regression analysis and correlation Coefficient (Pearson Correlation).

$$CA = a + \beta_1 LR + \beta_2 CR + \beta_3 CPR + \beta_4 IR + \beta_5 ROA + \beta_6 ROE + \beta_7 RP + \epsilon$$

Where; CA = Capital Adequacy

LR = Liquidity Risky Assets

CR = Credit Risks

CPR = Capital Risks

IR = Interest Rate Risks

ROA = Return On Assets Ratio

ROE = Return On Equity Ratio

RP = Revenue Power Ratio

$\epsilon$  = Error term

### 3.5.2 Measurement of Variables

CA: Capital Adequacy defined as awareness of and caution from various types of risks, that might face commercial banks in their operational processes which represents the dependent variable that can be expressed by the following equation as per Brealey and Myers (2003).

$$CA = \text{Owner's equity risky ratio} = \frac{\text{Owners Equity}}{\text{Risky Assets}}$$

$$LR = \frac{\text{Current Liabilities}}{\text{Total Liabilities}}$$

$$CR = \frac{\text{Total Loans}}{\text{Total Assets}}$$

$$CPR = \frac{\text{Paid Capital}}{\text{Risk Weight Assets}}$$

$$\text{IR} = \frac{\text{Interest rate Sensitive Assets}}{\text{Rate Sensitive Liability}}$$

$$\text{ROA} = \frac{\text{Net Profit after Tax}}{\text{Total Assets}}$$

$$\text{ROE} = \frac{\text{Net Profit after Tax}}{\text{Total Owners' Equity}}$$

$$\text{RP} = \frac{\text{Total Revenues}}{\text{Total Assets}}$$

## **CHAPTER FOUR: DATA ANALYSIS RESULTS AND FINDINGS**

### **4.1 Introduction**

This chapter reported major findings in the study as they relate to the research objective. The research areas considered in this study were the analysis of determinants of capital adequacy of commercial banks in Kenya. The study used secondary data contained in annual audited reports in responding to the study objectives.

### **4.2 Regression Analysis**

A regression analysis was conducted on Capital adequacy against determinants of capital adequacy, which was proxied by liquidity risky assets, credit risk, capital risk, interest rate risk, return on asset ratio return on equity ratio and revenue power. The regression equation was as follows:

$$CA = a + \beta_1 LR + \beta_2 CR + \beta_3 CPR + \beta_4 IR + \beta_5 ROA + \beta_6 ROE + \beta_7 RP + \epsilon$$

## 4.2.1 Test of Significance

**Table 4.1: Model summary**

Model Summary <sup>b</sup>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.440 <sup>a</sup>	.194	.107	.8940507	2.141

a. Predictors: (Constant), Revenue Power Ratio, Interest Rate Risk, Liquidity Risky Assets, Return on Equity Ratio, Credit Risk, Capital Risk, Return on Asset Ratio.

b. Dependent Variable: Capital Adequacy

Source: Computation from raw data obtained from audited accounts

Table 4.1 indicates that the predictor variable only influenced 10.7% of variations in leverage as indicated by the adjusted R square statistic (0.107). This meant that the model less than convincingly suitable for (less than the requisite threshold of about 60%-100% for good fit) explaining determinants of capital adequacy of commercial banks in Kenya.

Auto correlation was tested using Durbin-Watson value. From table 4.1, the value of Durbin-Watson was 2.141 hence there was no existence of autocorrelation since

the value was below the threshold for autocorrelation of 7.

**Table 4.2: ANOVA for determinants of capital adequacy**

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.498	7	1.785	2.234	.042 <sup>b</sup>
	Residual	51.956	65	.799		
	Total	64.455	72			

a. Dependent Variable: Capital Adequacy.

b. Predictors: (Constant), Revenue Power Ratio, Interest Rate Risk, Liquidity Risky Assets, Return on Equity Ratio, Credit Risk, Capital Risk, Return on Asset Ratio.

Source: Computation from raw data obtained from audited accounts

Significance test (F) on table 4.2 demonstrates the usefulness of overall regression model at a 5% level of significance. Since the P-value of the F test is less than alpha it was concluded that there was a significant relationship between the dependent and Independent variables used in the study. Table 4.2 also clearly indicates that the regression only accounted for less than 12.498 (19.39 %) out of 64.455, the rest of the variations being accounted for by other factors external to the model as indicated by sum of squares. Residual represents unexplained variation after fitting a regression model.

## 4.2.2 Coefficients of the model

**Table 4.3: Regression results on capital adequacy**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-.637	.532		-1.198	.235	-1.699	.425
	Liquidity Risky Assets	.017	.100	.019	.167	.868	-.183	.216
	Credit Risk	.394	.323	.143	1.220	.227	-.251	1.040
	Capital Risk	1.683	.617	.332	2.730	.008	.452	2.915
	Interest Rate Risk	-.008	.017	-.054	-.478	.635	-.042	.026
	Return on Assets Ratio	1.070	6.633	.021	.161	.872	-12.177	14.318
	Return on Equity Ratio	-.184	.181	-.124	-1.019	.312	-.546	.177
	Revenue Power Ratio	6.999	4.147	.213	1.688	.096	-1.282	15.280

a. Dependent Variable: Capital Adequacy

Source: Computation from raw data obtained from audited accounts.

Table 4.3 depicts the numerical relationship between the independent variable and the predictor variables in the following resultant equation.

$$CA = -.637 + .017LR + .394CR + 1.683CPR -.008IR + 1.070ROA -.184ROE + 6.999RP$$

From the above equation it meant that when liquidity risky assets increased by one unit, capital adequacy increased by 0.017. When credit risk increased by one unit capital adequacy increased by 0.394. When capital risk increased by one unit capital adequacy increased by 1.683. When interest rate risk decreases by one unit, capital adequacy decreases by 0.008. When return on assets ratio increases by one unit, capital adequacy increases by 1.070. When return on equity ratio decreases by one unit capital adequacy decreases by 0.184. When revenue power ratio increases by one unit, capital adequacy increases by 6.999.

### **4.3 Interpretation of Results**

The study result revealed that there was no statistically significant relationship existed between liquidity risks and banking capital adequacy. Data analysis in table 4.3 showed the existence of a non significant direct relationship between liquidity risk and commercial banks capital adequacy at ( $\alpha = 0.05$ ), where (t) value was (0.167) and ( $\alpha = 0.868$ ), but Pearson correlation coefficient was (0.017). No statistically significant relationship existed between credit risk and banks capital adequacy. As per table 4.3 data analysis it was revealed that there was existence of an inverse non significant relationship between credit risk and banks capital adequacy at ( $\alpha \leq 0.05$ ) level where (t) was 1.220 and ( $\alpha = 0.227$ ) but Pearson correlation was (0.394), meaning that the higher

credit risk, the lower capital adequacy. Statistically significant relationship exists between capital risks and banks capital adequacy.

Data analysis in table 4.3 revealed existence of an inverse significant relationship between capital risks and capital adequacy ( $\alpha = 0.008$ ), while Pearson correlation coefficient was 1.683, meaning that the higher the capital risks, the lower the bank's capital adequacy. Data analysis in table 4.3 shows there was existence of a direct relationship between liquidity risk and commercial banks capital adequacy at ( $\alpha = 0.05$ ), where (t) value was (0.167) and ( $\alpha = 0.868$ ), but Pearson correlation coefficient was (0.017). Data analysis in table 4.3 showed existence of a strong direct and statistically significant relationship between ROA and capital adequacy among the study sample, where "t" value was (0.161) and ( $\alpha = 0.872$ ), but Pearson correlation coefficient was (1.070). Data analysis in table 4.3 revealed the existence of an inverse and statistically significant relationship between ROE and capital adequacy at ( $\alpha = 0.05$ ) level, where "t" value was (-1.019) and ( $\alpha = 0.312$ ), but person correlation coefficient was (-0.184). Data analysis in table 4.3 showed an inverse and non statistically significant relationship between revenue power and banks capital adequacy at ( $\alpha = 0.05$ ) level, where "t" value was (1.688) and ( $\alpha = 0.096$ ), but person correlation coefficient was (6.999).

The study showed in table 4.1 and table 4.2 that in the model determinants of capital adequacy (LR; CR; CPR; IR; ROA; ROE; RP) influenced 19.4% of variations in banks capital adequacy as depicted by R square statistic of 0.107(refer table 4.1) . Table 4.2 further indicated that the regression model was also found to account for only 12.498 (19.39 %) out of 64.455 variations

in capital adequacy, with the majority of variations (in capital adequacy) being accounted for by residual / other exogenous factors (80.61 %).

## **CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter summarized the analysis in chapter four and underlined the key findings. It also drew conclusion and implications from the findings. Limitations of the study , recommendations and suggestions for further studies were outlined.

### **5.2 Summary of Findings**

This study was conducted with the aim of establishing factors that determine capital adequacy of commercial banks in Kenya. To achieve the above objective , a regression analysis as conducted whereby capital adequacy was regressed against the predictor variables; liquidity risky assets, credit risks, capital risks, interest rate risks, return on asset ratio, return on equity ratio and revenue power ratio for a period year 2009 to 2013. Data for both dependent and predictor variables were obtained from NSE and management of unlisted banks. The data was then subjected to a regression analysis.

#### **5.2.1 Liquidity Risk**

Data analysis in table 4.3 showed no existence of a direct relationship between liquidity risk and commercial banks capital adequacy at ( $\alpha = 0.05$ ), where "t" value was (0.167) and ( $\alpha = 0.868$ ), but Pearson correlation coefficient was (0.017). This implies that when liquidity risk is high capital adequacy is low.

### **5.2.2 Credit Risk**

Data analysis in table 4.3 revealed the existence of an inverse non significant relationship between credit risk and banks capital adequacy at ( $\alpha \leq 0.05$ ) level where "t" was 1.220 and ( $\alpha = 0.227$ ) but Person correlation coefficient was (0.394), meaning that the higher credit risk, the lower capital adequacy. This finding is consistent with banking status; and is in consistent with Mathuva (2009).

### **5.2.3 Capital Risk**

Data analysis in table 4.3 indicated that there was existence of an inverse statistically significant relationship between capital risks and capital adequacy at ( $\alpha = 0.008$ ), while Pearson correlation coefficient was (1.683), meaning that the higher the capital risks, the lower the banks capital adequacy. An increase of capital risks requires an in turn of capital adequacy to meet investment risks.

### **5.2.4 Interest Rate Risk**

Data analysis in table 4.3 showed no existence of a direct relationship between liquidity risk and commercial banks capital adequacy at ( $\alpha = 0.05$ ), where (t) value was (0.167) and ( $\alpha = 0.868$ ), but Pearson correlation coefficient was (0.017). This implies that when interest rates are high banks capital adequacy was low, and this is consistent with banking status, because fluctuation (Changes) of interest rates might have a negative effect on banks capital and revenues.

### **5.2.5 Return on Assets Ratio**

Data analysis in table 4.3 revealed no existence of a strong direct and statistically non significant relationship between ROA and capital adequacy among the study sample, where "t" value was (0.161) and ( $\alpha = 0.872$ ), but Pearson correlation coefficient was (1.070). This finding is consistent with banks trading policies.

### **5.2.6 Return on Equity Ratio**

Data analysis in table 4.3 indicated that there was existence of an inverse and statistically non significant relationship between ROE and capital adequacy at ( $\alpha = 0.05$ ) level, where "t" value was (-1.019) and ( $\alpha = 0.312$ ), but person correlation coefficient was (-0.184). This finding clearly states why some banks in the period of study had very low return on equity.

### **5.2.7 Revenue power Ratio**

Data analysis in table 4.3 showed an inverse and statistically non significant relationship between revenue power and banks capital adequacy at ( $\alpha 0.05$ ) level, where "t" value was (1.688) and ( $\alpha =0.096$ ), but person correlation coefficient was (6.999) . This finding might be attributed to the low operational performance of the assets involved in bank usual operations which might cause the decrease of the revenue power to have a negative effect on capital adequacy.

## **5.3 Conclusions**

The results indicated that liquidity risky Assets, credit Risks, capital risks, interest rate risks, return on asset ratio, return on equity ratio and revenue power ratio significantly influence capital

adequacy of commercial banks in Kenya. The study revealed that there exist a significant relationship between capital adequacy and capital risk. There was no existence of a significant relationship between capital adequacy and the following: liquidity risk, credit risk, interest rate risk, return on assets ratio, return on equity ratio and revenue power ratio. Since the P-value of the F-test is less than alpha, the overall conclusion of the study was that there is a significant relationship between the independent variables and Capital Adequacy.

#### **5.4 Recommendations**

Overall, results revealed that independent variables combined have a relatively high influence on the dependent variable and changes occurring in it, where those variables explained about eighty one percent of the total variance. On this basis of the findings the study recommended that report of financial statements and data should include rules and basis on which capital adequacy measurement is based, which will lead to raising banking and finance awareness that will enhance banks competitive positions with regional and international banks.

#### **5.5 Suggestions for Further Studies**

we can argue that findings of this study reflect the actual status of commercial banks under study, and suggest urgent need and high importance of conducting more research to include other variables not included in this study such as financial leverage multiplier, and return on deposits ratio, working on measuring capital to deposits ratio or capital to debts ratio along with variables of the current study.

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## APPENDICES

### Appendix I: List of Commercial Banks In Kenya

ABC Bank (Kenya)

Bank of Africa

Bank of Baroda

Bank of India

Barclays Bank (Kenya)

CFC Stanbic Bank

Chase Bank (Kenya)

Citibank

Commercial Bank of Africa

Consolidated Bank of Kenya

Cooperative Bank of Kenya

Credit Bank

Development Bank of Kenya

Diamond Trust Bank

Dubai Bank Kenya

Ecobank

Equatorial Commercial Bank

Equity Bank

Family Bank

Fidelity Commercial Bank Limited

First Community Bank

Giro Commercial Bank

Guaranty Trust Bank

Guardian Bank

Gulf African Bank

Habib Bank

Habib Bank AG Zurich

I&M Bank

Imperial Bank Kenya

Jamii Bora Bank

Kenya Commercial Bank

K-Rep Bank

Middle East Bank Kenya

National Bank of Kenya

NIC Bank

Oriental Commercial Bank

Paramount Universal Bank

Prime Bank (Kenya)

Standard Chartered Kenya

Trans National Bank Kenya

United Bank for Africa

Victoria Commercial Bank

Source: CBK (2014)