EFFECTS OF NEW BANK REFORMS ON THE PERFORMANCE OF COMMERCIAL BANKS IN KENYA: A Camel Model

BY

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DECLARATION

I confirm that this research is my original work and has not been presented for any partial fulfillment of award of degree in any other institution.

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X51/82735/2015

This research project has been submitted to the School of Economics, The University of Nairobi, with approval from the University supervisor.

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DEDICATION

This research project is dedicated to my dear parents, Mr. Francis Kiruja and Mrs. Felister Kageni for their love, support and encouragement throughout the journey.

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I would like to that the God for granting me hope, strength and courage throughout the study project.

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ABBREVIATIONS

CAMEL	Capital adequacy, asset quality, management efficiency, earnings and liquidity
CBK	Central Bank of Kenya
CBR	Central Bank Rate
CCG	Centre of Corporate Governance
CRR	Cash Reserve Ratio
FDIC	Federal Deposit Insurance Corporation
FFIEC	Federal Financial Institution Examination Council
GDP	Gross Domestic Product
IAS	International Accounting Standards
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
KDIC	Kenya Deposit Insurance Corporation
MPC	Monetary Policy Committee
NPLs	Non-Performing Loans
NSE	Nairobi Securities Exchange
OECD	Organization for Economic and Co-operation and Development
UFIRS	Uniform Financial Institution Rating System

ABSTRACT

This study critically examines the effects of new bank policies on the financial performance of Kenya's commercial banks. The principal goal of this research is to evaluate the determinants of banks performance in Kenya, in order to provide policy advice to the main players in the banking sector. The CAMEL Model approach was adopted for this study. The approach was backed up by the market power theory, efficient structure theory and signaling theory. The reforms which have been introduced over the years introduced controls on deposits and interest rate caps which together have indispensable repercussions in the banking sector. This study thus intends to shed light on banks' performance in Kenya amidst the introduced policies. A panel model approach using 11 NSE listed commercial banks in Kenya as cross section series and period 2014 to 2017 was utilized. The findings reveal that the regression coefficients are positive for capital adequacy, asset quality, management efficiency, earnings and liquidity. It therefore illustrates positive relationship between Earnings per share and the capital adequacy ratio, asset quality ratio, management efficiency ratio, earnings ratio and liquidity ratio however they were not statistically significant at 95% confidence level in both random and fixed effects model.

CHAPTER ONE

INTRODUCTION

1.0 Background

In Kenya, the banking sector dominates the financial sector and therefore bank failures pose a significant negative impact on the economy. Bank failures have become a threat to both developing economies and developed economies. Calls have been there to counter the risks involved that lead to the collapse of a bank. Economists and other researchers have developed many policies and models to evaluate the factors that lead to the collapse of banks. CAMEL Model approach which was utilized in this research is among the models that have been developed as in Barr *et al* (2002). Researchers such as Emmanuel (2009) explained that the cost incurred when a bank collapses has been immense and therefore efforts should be made to save banks from future collapse. Kenya's financial sector has greatly improved over the last few years subsequently making it the largest in East Africa.

Effective regulation is therefore meant to reduce failure and loss to depositors as in Peter (1996). Since 1983, 32 banks have been liquidated and others put in receivership despite the Kenyan governments attempts to streamline the banking sector through the introduction of statutory regulatory measures. The rapid growth in these financial institutions in Kenya has facilitated control of the money supply by easy cash deposits and withdrawals which play a vital role in an economy and normal running of businesses. The Government of Kenya through the administrative role of the CBK, has tried to establish a financial system which is relatively developed in contrast with other Sub - Sahara African countries. Commercial banks in Kenya have grown over the last three decades with a diversified product offering. The country also boasts of several Savings and

Credit associations (SACCOs) in which many Kenyan citizens save with confirming the level of monetization in the Kenyan economy.

1.1 Review of the Central Bank of Kenya Regulatory Policy

In conformity to the important task undertaken by banks in an economy, it's imperative to note the increased initiatives by the Central Banks among other institutions globally such the OECD in a bid to upscale performance and decision makers in the banking sector.

It is therefore the mandate of every regulator to promote liquidity and ensure a stable banking sector. The CBK continuously seeks to review all regulations and guidelines of all its financial institutions which include, commercial banks, micro finance banks, foreign exchange bureaus, money remittance providers, non-bank financial institutions and other institutions within their jurisdiction licensed under the CBK Act. The Bank Supervision Department has to be led by a team of great moral standing, high integrity and professionalism so as to minimize moral hazard behavior, connected lending, conflicts of interest, fraud and mismanagement by ensuring an effective regulation.

Most bank failures are due to lack of clear communication between the bank and its customers. Banks take up the risk of lending to customers whose ability to pay is not guaranteed. Customers fail to disclose this information for fear of being locked out of credit facilities. Banks also fail to disclose their true financial position by indicating incorrect market signals so as to maintain their liquidity and make short term payments on demand. High leverage and the illiquidity and in transparency of bank assets render banks particularly vulnerable to losses of creditors confidence due to weak buffers.

In Kenya's Banking act section 107, commercial banks are barred from lending to persons or institutions a percentage not greater than 25% of its capital and reserves cumulatively CBK, (1998). Despite the veto, banks fail to adhere to these guidelines which has caused many banks to fail. Therefore, the supervisory department needs to be keener on ensuring that section 107 is adhered to.

The other concern has been lending to shareholders and bank staff amounts exceeding the approved limits by the Central Bank. In the interim, CBK established guidelines to ensure a healthier financial sector such as continuous monitoring of banks to ensure adherence with rules set, making sure banks work on their shortcomings identified according to CBK (2015). Banks are regulated to protect depositors' funds and to deter subsequent bank distress that may shake up the entire industry that may have a spillover effect to the entire economy as in Peter (1996).

CBK kept on enhancing its oversight guidelines since 2015 through legal adjustments. With an intent of enforcing regulations in the banking sector, an individual together with their partners were required to consolidate their shareholding rather than owning individual shares so as to broaden sources of capital build up. However, it's imperative to note that the shareholding of an individual and their partner must not go beyond 25 percent of the bank's core capital.

The CBK may decide to investigate an individual who own a shareholding of less than 5 percent if in its point of view the individual knowingly minimized their shareholding so as evade investigations. If such persons are found, they will have no say in the company in one way or another. This is done to make sure persons of integrity are the ultimate decision makers in a bank. According to CBK, (1998), no financial institution shall lend in excess of 5 percent of its core

capital to a single borrower. In 2015, CBK began issuance of open ended licenses which was the course internationally as opposed to issuance of licenses with a validity of 12 months CBK (2015)

1.2 Commercial Banks in Kenya

Kenya's banking sector comprises of forty-three banking entities where forty-two are commercial banks and one mortgage finance institution with the CBK as the oversight authority. Some foreign banks have also set up eight representative offices in Kenya. The banking sector also comprised of three credit reference bureaus, twelve microfinance banks, eighty foreign exchange bureaus and fifteen Money Remittance Providers as in CBK (2016).

Government policies have been established to encourage financial liberalization which has witnessed growth of over 70 percent from 10 banks in 1969 to 36 banks in 2004 according to the Bank Supervision Annual Report (2004). Despite the tremendous growth from the 1980's through 1990's, many banks faced closure mainly due to competition, inadequate supervision, inadequate monitory policy and weak regulatory policies that led to undercapitalization as in Mwangi (2002). Failed banks are better off being acquired to merge or recapitalize for their survival. Over time, Kenya's banking sector has had several banks rebrand and merge with foreign and local investors to guarantee their survival in the banking industry as shown on table 1:

Table 1: Acquisition of commercial banks in Kenya

Acquired institution	Acquiring Institution	Rebranding name
Fina Bank Group	GT Bank	GT Bank
K-Rep Bank	Centum	Sidian Bank
Equatorial Commercial Bank	Mwalimu Sacco	Spire Bank
Giro Bank	I & M Holdings	I & M Holdings
Fidelity Commercial Bank	SBM Holdings	SBM Kenya
Habib Bank	Diamond Trust Bank	Diamond Trust Bank

Source: (Kenya Bankers Association, 2017).

1.3 Statement of the Research Problem

The banking sector has undergone innumerable reforms in a bid to bring sanity in the industry both locally and internationally. In Kenya, several policies have been introduced and implemented by the CBK. In June 2015, CBR was increased from 8.5% to 10% in June 2015 to a further 11.5% in July 2015. It is during this period that Dubai and Imperial bank were placed under receivership in August and October in the year 2015 respectively CBK (2015). In January 2016, CBK introduced a reform to curb money laundering and illegal cash transactions whereby customers were required to provide additional information and documentation on cash transactions above usd 10,000 or its equivalent CBK (2016). In September 2016, CBK enforced an interest rate cap of not more than 4% above the CBR to all commercial banks in Kenya. During the same year, Chase Bank Limited was placed under receivership as it was experiencing liquidity challenges CBK (2016). Finally in 2017, CBK introduced the International Financial Reporting Standards, 9 (IFRS) a financial

instruments to replace International Accounting Standards, (IAS). IFRS 9 introduced expected credit losses which sought to allow banks to plan for future expected losses as a result of loan defaults. All these are new reforms which have been introduced and imposed to commercial banks in Kenya, how banks have responded in terms of performance is an important aspect for policy makers.

Earlier studies on banks performance in Kenya like; (Obiero, 2002, Benedicto, 2007, Olweny & Shipho, 2011, Ongore & Kusa, 2013) using the CAMEL model found mixed results in their study to determine performance of Kenyan banks. Though their studies point out on performance of Kenyan banks, they have not captured the new bank reforms that have been introduced so far since 2015. These reforms on control of deposits and withdrawals together with interest capping have important consequences on bank performance. It is within this framework that the study explored effects of new bank reforms in Kenyan banks performance using the conventional CAMEL model.

1.4 Research Questions

The study attempted to answer the subsequent questions which are critical to the prime objective;

i. What is the effect of capital adequacy on the financial performance of commercial banks in Kenya?
ii. What is the effect of asset quality on the financial performance of commercial banks in Kenya?
iii. What is the effect of management efficiency on the financial performance of commercial banks in Kenya?
iv. What is the effect of earnings on the financial performance of commercial banks in Kenya?
v. What is the effect of liquidity on the financial performance of commercial banks in Kenya?

1.5 Research Objective

The general study objective is to examine the effects of new bank policies on the financial performance of commercial banks in Kenya using CAMEL Model. The specific objectives include;

i. To analyze the effects of asset quality, capital adequacy, management efficiency, liquidity and earnings on Kenyan banks financial performance.
ii. To determine the effects of new bank reforms on the financial performance of commercial banks in Kenya.
iii. To suggest policy recommendations in the formulation and enhancement of new bank reforms.

1.6 Significance of the Research

This research is crucial for the following reasons. To begin with, this research facilitate identification of weak areas in a bank and predictively mitigate future collapse of banks. Secondly, the study will empower commercial banks decision makers ensue proper process in liquidity management.

Furthermore, the study will contribute to enhance predictability of future bank failures thus building a steady banking sector. Finally, this study will add knowledge to existing literature especially with the recent bank reforms, mergers, acquisitions in the Kenyan banking industry and policy recommendations.

1.7 Scope of the Study

The research focused on the operations of 11 NSE listed commercial banks in Kenya for the period 2014-2017. This period is critical as major policies were implemented during this period. Firstly, in 2014, CBK retained the CBR at 8.5% during the same year interbank rates reduced from 7.14% to 6.60% in June. Secondly, in June 2015, the CBK revised the CBR from 8.5% to 10% and to a further 11.5% in July 2015. KBRR also rose to 9.87% from 8.54% the same year in July. In January 2016, the CBK introduced a reform to curb money laundering and illegal cash transactions whereby customers are to provide documentation for cash transactions above usd 10,000 or its equivalent. In September 2016, CBK implemented an interest rate cap of not more than 4% above. In 2017, CBK introduced IFRS 9 to replace IAS which incorporated expected credit loss to allow banks plan for future loan defaults.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Recent episodes of distress in the banking sector have occurred due to the subsequent reasons; Firstly, banks start to develop cash flow issues in terms of liquidity problems due to an increase in non-performing loans. However, even though liquidity distress persisted, banks have survived by getting financial reinforcement from their central banks and governments. In the event a financial institution fails to recover, the burden increases and as soon as it becomes public knowledge, more often than not it leads to a bank run, uncertainty in the market and finally the collapse of a bank.

Bank failure has been an area where many researchers have researched on due to the importance of banks in an economy. Following the banking crisis in 1930's economic researchers such as Calomiris (1994) have looked at what leads to the failure of a commercial bank. Researchers such as Meyer & Pifer in 1970 came up with a model to study distress of banks. The study linked a bank that failed with a bank in the same ranking which was still in operation under the similar state of economy. The authors also established variables, which can subsequently lead to liquidity issues.

2.1 Theoretical Review

Theoretical literature of performance of Kenyan commercial banks is based on three theories as discussed below namely market power theory, efficient structure theory and signaling theory.

2.1.1 Market Power Theory

Bain developed the theory of market power in 1951. It highlights that high market power leads to monopoly in the market and profitability as in Athanasoglou *et al* (2005). This theory argues that

a firm's market presence is the best measure for market power as such monopolists are the price setters for products according to Mirzaei (2012). According to Nkegbe & Yazidu (2015), a firm that has a huge market presence with diversified products and services can easily earn monopolistic profits. Market power theory appeals to the banking industry as it explains how market share impacts a bank's profitability. However, researchers such as Onunga (2014) emphasizes that a bank's earnings reflects its industrial market share.

2.1.2 The Efficiency Theory

According to the efficiency theory, in order for a bank to be more profitable it has to be operating at low costs. It also assumes that a more efficient bank has comparative advantage hence greater profits when a firm operates on low costs. Furthermore, banks that's more efficient holds greater market share since efficiency is regarded as a key factor of competitiveness.

According to Birhanu (2012), a positive correlation linking an entity's industrial market share and its profit arises from its low operational costs that are achieved through increased efficient managerial and production process. Birhanu goes further to explain that efficient firms result to an improved market share, growth in size of the firm due to its resilient production and management techniques.

Odunga *et al* (2013) supports Birhanu's findings as he confirms that maximum production can be achieved through economies of scale. Efficiency theory assumes that in-order for a bank to be of good financial standing and achieve a high market share, its operational costs need to be reduced for it to attain higher profits. Large commercial banks that have experienced management and advanced up to date technology are in a position to reduced operational costs by being efficient

thereby realizing huge profits compared to smaller banks in the industry Soana, 2011 & Onuonga (2014)

2.1.3 Signaling Theory

The signaling theory was developed by Arroe (1972) & Spence (1973). In this theory, firms that earn huge profits, feed the market with positive information as in Bini, Dainelli & Giunta (2011). Signaling theory assumes that an established capital structure is a reliable indicator to the market worth of any organization as in Adeusi, Kolapo & Aluko (2014). In the banking industry, a bank's management may signal better and improved future expectations of the bank by relaying new and important information to the market by increasing the bank's capital. Increased capital translates to reduced debt ratios than that of their competitors Alkazaleh & Almsafir (2014).

Additionally, if the banks top management believe that their institution stands to outperform others in the industry, such important information will be relayed to its shareholders in order to attract additional investment. Increasing disclosures which poor performing banks cannot make, managers will wish to earn more benefits as the bank will be of high reputation with an improved market value Muzahem (2011).

2.1.4 The Camel Theory

CAMEL is an acronym of five components utilized to gauge the health of a bank. It comprises of; capital adequacy, asset quality, management efficiency, earnings and liquidity as in Dang (2011). CAMEL is an administrative ranking system that was first employed in 1979 by the Federal Financial Institution Examination Council (FFIEC to rank commercial banks in the United States. In 1997, Sensitivity was introduced as an additional performance area to assess how specific risk exposures such as market risk would affect the performance of commercial banks. This

development now changed the acronym to CAMELS Opez (1999). CAMEL is a tool used by regulators to determine the performance and soundness of a financial institution to avert potential risks that may lead to bank failure.

Most regulators and commercial banks have used this model and such include; FFIEC (1979), Central Bank of Kenya, Bank Supervision Department, (2013) and Basel III (2013). Regulators use the CAMEL model to rank and rate banks from 1 to 5 i.e. from the best to worst. According to Basel III (2013), Federal Depositors Insurance Corporation (FDIC) labels banks with a CAMEL rating of 4 or 5 as problematic banks. However, like any other model, the CAMEL Model has its pros and cons. Its advantages are its flexible as it can be used both locally and internationally and it is easy to understand a rating of 1 to 5 indicates from best to worst ranking. Its disadvantages is that the model overlooks loan provisions and ignore communication with the top management of the bank Uyen (2011).

Researchers such as Nurazi & Evans (2005) and Benedicto (2007) highly recommend the implementation of the CAMEL model due to its ability to gauge the financial performance of banks, its accuracy and reliability in predicting potential bank failure. Barr *et al* (2002) also described the CAMEL model as an indispensable tool used in tracking the performance of commercial banks.

2.1.4.1 Capital Adequacy

In 2005 researchers such as Athanasoglou *et al* described capital as the amount of funds owed by a financial institution such as a bank to support and maintain a balance in the operational, credit and market risks a financial institution might be exposed to. Capital acts as a buffer in order to reduce costs and safeguard the bank customers' deposits. Since deposits are prone to bank runs, a capital intensive institution is more stable and sounder due to the ease of liquidity creation as in

Diamond (2000). Commercial banks' ability to maintain the required level of capital is critical to its day to day financial needs UFIRS (1997). This study adopted capital adequacy ratio (CAR) so as to gauge capital adequacy as recommended by Karlyn (1984). According to Uyen (2011), capital adequacy can only be gauged using capital adequacy ratio. The current capital requirement in Kenya is 10.5 percent. However if the capital declines below this level, the bank is considered at risk of financial stability and potential collapse. This may be as a result of reduced earnings that impacted the ability to accumulate capital.

2.1.4.2 Asset Quality

A needful asset quality is the major contributor to bank distress Grier (2007). A commercial banks greatest asset portfolio are credit facilities otherwise known as loans. Because of the risks involved in loans such as high default rates, this portfolio poses the greatest risk. Loans are the greatest income generating assets that banks rely on for profitability. Credit analyst are therefore urged to carry out quality asset assessment through credit risk management and evaluating loan portfolio before advancing any credit facility. However this can be biased and inaccurate as it only depends on the analysts' point of view. In Kenya, Non-performing loans **(**NPLs) are those facilities that are due 90 days and above. Loans in Kenya are categorized from normal, watch, substandard, doubtful and loss CBK (2016).

Sangmi & Nazir (2010) defined a healthy and sound bank is a bank whose non-performing loans does not exceed its total loans. NPLs ratios are the proxies of asset quality Frost (2004). The statutory requirement of the total asset is currently at 14.5 percent CBK (2016). If the total asset declined below this level, the commercial bank is at risk of financial stability.

2.1.4.3 Management Efficiency

An efficient management team translates to the profitability of a financial institution. The management performance is mostly evaluated by control systems, staff quality and management systems. More often than not the financial statements of an organization are used to determine management efficiency. Management efficiency is also considered as the most important performance area of the CAMEL model as in Grier (2007). The greater the management efficiency of a bank the greater its financial performance.

2.1.4.4 Earnings

Earnings are the ability of an organization to gain value from the risk it takes. This is essentially the main business conducted by banks when it accepts the risk of lending to their customers so as to generate positive earnings Zedan & Daas (2017). Profitability is key to any organization so as not to eat up on its capital and most importantly for its survival. Performance not only reflects the amount of income earned and the course of earning but it also considers what might influence earnings that is maintainable. Inefficient management may result to an increased number of non-performing loans, huge loan provisions which contribute to future market risks. According to the CBK (2018), persistent decrease in the earnings of a commercial banks places the institution to potential risk of collapse.

2.1.4.5 Liquidity

Liquidity is the availability and simplicity of an asset to be converted into cash in a timely fashion without adversely affecting its operations and with minimal loss UFIRS (1997). According to Basel III compliance, (2013), liquidity is one of the two most crucial CAMEL performance areas for a community bank. Researchers such as Ishaq *et al* (2016) regarded cash ratio as the proxy of liquidity. According to Amuzu, cash ratio is the institutions aggregate cash and other cash

equivalents ability to pay off its current liabilities. According to the CBK (2018), following the cap of interest rates, most small and medium sized banks have significantly reduced their reserve ratios held by the Central Bank. It is however imperative to note that although the reserve ratios are higher than the statutory requirement, if the reduction persists, smaller banks would be susceptible to shocks and eventually collapse.

2.2 Empirical Literature

Many researchers and economists have carried out studies to analyze the banks performance using the CAMEL approach as predictors to banks collapse. As stated by Barr *et al* (2002), CAMEL approach is a crisp and necessary model in the banking sector. The Model rates banks by analyzing the banks' ability to meet its day to day financial requirements whilst safeguarding customers' deposits.

Athanasoglou *et al* (2005) run a panel data across banks in Greece for the period 1985 to 2001. The authors found out that all bank specific factors are positively related with performance of a bank with the exemption of bank size.

Obumuyi (2008) studied the impact of economic conditions, interest income, bank size, capital and management costs on banks profitability in Nigeria. Obumuyi applied fixed effect regression model on panel data which consisted of 20 banks in Nigeria from the year 2006 to 2012. He found out that for a bank to be profitable, it recorded improved capital and non-funded income as well as manageable managerial expenditure and favorable economic conditions. This narrows down to a bank that records better performance and growth in the banking industry.

In a study conducted by Aburime (2005) to determine a bank's potential to make profit in Nigeria, levels of capital and credit and ownership extent were significant to banks performance. However liquidity, labor productivity and ownership are insignificant.

In Turkey, a study conducted by Deger & Adem (2011), studied bank performance using aspects that were unique to a bank and macroeconomic variables for the year 2002 to 2010. By employing Return on equity and Return on assets as the independent variables against a panel data, the authors found out that only real interest rate and asset size has a significant positive effect on banks performance.

Rostami (2015), studied the effect of each CAMEL element on performance which were later analyzed and interpreted. Rostami found a notable correlation between each CAMEL element and Q-Tobin's ratio as a proxy for banks' performance.

Nurazi & Evans (2005), employed logistic regression to analyze whether CAMEL was efficient in predicting bank failure. The authors' findings indicate that CAMEL elements and bank size notably determined bank failures. Mishra (2012), studied banks performance in India from both public and private sectors from the year 2000 through 2011 using the CAMEL model. He found out that private banks were better in financial performance and operational soundness as compared to public and government owned banks.

A study conducted by Adeusi, Kolapo & Aluko (2014), investigated factors that influenced levels of profitability in Nigerian Commercial banks. The authors used panel data against 14 banks between the years 2000 to 2013. Profitability of a bank was gauged using Return on Assets against, asset quality, capital adequacy, management expenses, liquidity ratio, economic growth and inflation. The authors confirmed these elements were also the determinants of banks profitability

in Nigeria and were statistically significant in both random and fixed effects models. However, asset quality has the highest significance levels confirming that credit risk is the major contributing factor for Nigerian commercial banks profitability.

Olweny & Shipho (2011), studied industry specific factors that affect performance of a bank of 38 Kenyan banks from the year 2002 to 2008. The research employed an explanatory approach using panel data and multiple linear regression method. The findings were that all bank specific factors were statistically significant on bank profitability.

Ongore & Kusa (2013), analyzed factors that determined a sound financial institution in Kenya. In a bid to shed more light on bank ownership structures, both researchers adopted both multiple linear regression model and generalized least square (GLS) on panel data for analysis. Ongore & Kusa's findings were that in Kenya, banks performance is largely contributed by the bank trustees' decision whereas macro-economic aspect had no significance.

Tsuma & Gichinga (2016), on their study to analyze factors that influence a bank's financial performance, found out that capital adequacy, credit risk, inflation and interest rate influenced a bank's financial performance. However this study was only limited to National Bank of Kenya which may not be a representation of the entire Kenyan banking industry.

2.3 Commercial banks regulation

Commercial banks role not only involves provision of credit facilities and deposit taking but also ensure a stable economy. Commercial banks are regulated due a number of reasons. According to Rose (1991), banks are the leading deposit taking institutions of the public. Their customers are faced with information asymmetry and therefore do not know the true financial condition of the

bank. Therefore, it is the role of oversight authorities like Central Bank which have been accorded the mandate to protect depositors against loss through financial misconduct.

Commercial banks are closely guarded because they are required to meet their short term obligation as and when demand arises. This is because; the amount of money in circulation in any economy is an indication of the national economic conditions. Consequently, due to the substantiality of banks in an economy, it is of grave importance that guidelines are enforced by the regulatory bodies. Commercial banks other role is provision of credit facilities to both business entities and individuals which propel the economy by allowing consumers and investors to spend more. Therefore, banks oversight authority comes in to deter any form of prejudice in the accessibility of loan facilities. Moreover, this prejudice in access of credit facilities in turn depresses standards of living and increased market activity. Therefore the regulatory bodies should come up with regulations to block any form of bias within banks thus enhancing competitiveness in the banking industry Benedicto (2007).

Commercial banks regulation create transparency within the banking industry subjecting banks to some of the following restrictions, requirements and guidelines. They include; capital requirements, reserve ratio requirements financial reporting and disclosure restrictions, huge exposure restrictions and corporate governance. CAMEL is a rating system that is used to gauge commercial banks financial performance to aid in identification and neutralization of possible peril that may lead to collapse of banks. According to Uyen (2011), CAMEL rating system has demonstrated its invaluable use internationally, particularly in the US and has been adopted by other countries as well. This study proposes to use CAMEL rating system due to its accuracy.

2.4 Summary of Literature and Research Gap

A stable and profitable bank is the ultimate objective for any commercial bank. Therefore all decisions made by the management and actions take thereof is to maximize this objective. The Camel Model is one important tool that has been developed and employed by most if not all regulators in the world to track a bank's performance.

Globally, researches have been carried out on the issue of banks performance by Athanasoglou *et a*l (2005), Naceur (2003), Obumunyi (2008), Deger & Adem (2011) among others. Majority of these authors have focused on the effect of CAMEL components on banks performance as discussed on the empirical literature above.

In Kenya, the research on banks performance has been done by Ongore & Kusa (2013) and Tsuma & Gichinga (2016) among others that majorly focused on individual CAMEL components on the bank performance Kenyan commercial banks.

Both global and local scholars found CAMEL to be a very important model used to gauge banks performance and eventually a tool that can be used to deter future bank failures. The Kenyan scholars utilized available data on the selected commercial banks but none of them incorporated the aspect of the impact of banking policies that have been introduced in Kenya's banking industry on the CAMEL components which are used to proxy bank specific factors as in Uyen (2011). This is therefore the gap that this research sought to address on banks performance.

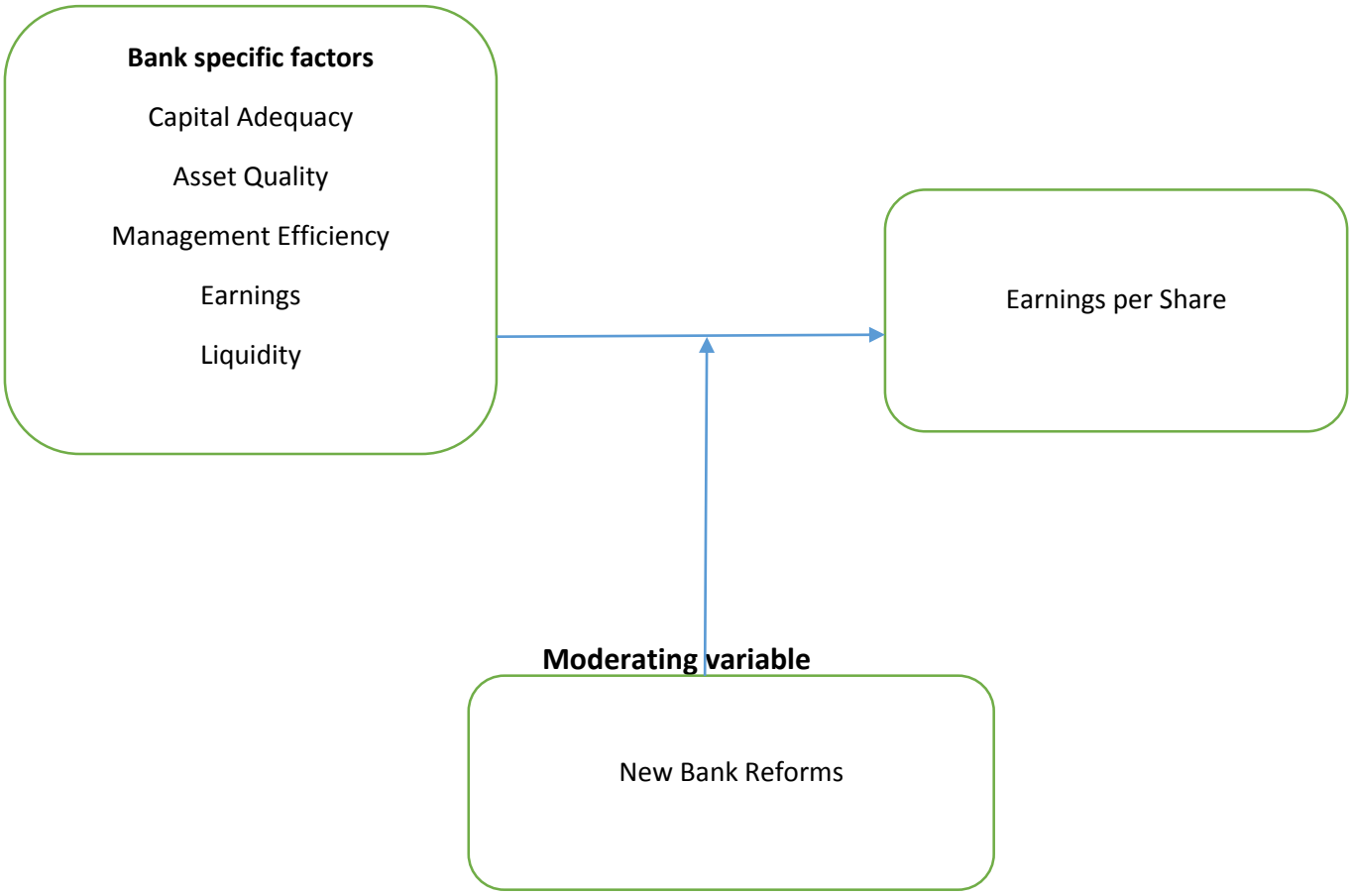
2.5 Conceptual Framework

Table 2 represents the conceptual framework. Variables on the left represent the independent variables and the variable on the right represents the dependent variable. While the moderating variable is in the middle. The conceptual framework sought to express the relationship amid the

independent and dependent variables. The framework reveals that the change in the dependent variables is as a result of the changes in the independent variables amidst the moderating variable.

Table 2: Variables

Independent Variables **Dependent Variable**



CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter elaborates on the theoretical framework, empirical framework, estimation tests and sources of data of the study.

3.1 Theoretical Framework

The literature review has indicated that a bank's performance notably its ability to generate profit may be affected by three theories. First, Market power states that a firm with a high market influence realizes the greatest profit. This theory also argues that a firm with a diversification of products and a larger market share has a comparative advantage to other firms in the industry and may earn monopolistic profits.

Second theory, the efficiency theory argues that an efficient management leads to reduced operational costs which translates to increase profits. Shareholders return which in this study is measured using earnings per share and a firms profit greatly influences shareholders' investment decisions that determines a bank's performance eventually its profitability. Finally, the signaling theory argues that a well-established capital structure has a positive indication to the market. According to Adeusi *et al* (2014), when a firm's shareholders pump in more capital signals improved future expectations. This results to a greater uptake of it products thus increased profitability.

The above theories confirm that a bank's performance can be influenced by bank specific aspects. These are aspects than are within the authority of the management and can be elucidated using the

CAMEL framework as in Athanasoglou *et al* (2005) & Uyen (2011). The CAMEL framework includes capital adequacy, asset quality, management efficiency, earnings and liquidity. This framework has been adopted by many regulators to assess the financial performance, management quality and compliance in regulations of banks.

Other than the CAMEL framework, the Z-score application is another method adopted to estimate the health of banks according to Altman (1998). However this study sought to focus on the CAMEL framework.

According to Lopez (1999) the banks performance is estimated using capital adequacy, asset quality, management efficiency, earnings and liquidity (CAMEL).

The market power theory, efficiency theory and signaling theory are related in that they indicate the importance of banks health that eventually leads to its profitability. Therefore, banks performance is represented as:

$$PB = f\ (CAMEL) \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (1)$$

Where PB is the performance of banks, CAMEL represents a combination of the market power theory, efficient structure theories on bank specific factors.

The relationship between banks performance and CAMEL components which are used use as bank specific factors is described as below by the following scholars.

According to Onay & Ozsoz (2013) and Ishaq *et al* (2016), capital adequacy ratio was negatively related to earnings per share and return on equity as a measurement of banks performance. Capital adequacy is measured as:

$$Capital\ adequacy = \frac{Total\ deposits}{Total\ equity} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

However, according to Uyen (2011) capital adequacy ratio was positively related to banks performance. Adeusi *et al* (2014), found that an increase in capital adequacy ratio positively impacts Return on Assets as a measurement of banks performance. Conforming to these findings, increased capital adequacy allows a bank to lend more hence increased income earned which translates to a banks improved performance.

According to Uyen (2011) & Leykun (2015) asset quality ratio was negatively related to earnings per share. Asset quality ration is measured as:

$$Asset\ quality = \frac{Non - performing\ loans}{Gross\ advances} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Asset quality ratio was found to be negatively related between asset quality ratio and return on assets as a measurement of banks performance as in Adeusi *et al* (2014) & Leykun (2015). A higher level of non-performing loans to total advances ratio results to a reduced banks performance in that non-performing loans is an opportunity cost realized from unpaid loans.

According to Ishaq *et al* (2016), administrative expense was negatively related to interest income and earnings per share. Management efficiency is measured as:

$$Management\ efficiency = \frac{Administrative\ expense}{Interest\ Income} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Management efficiency was negatively related between management efficiency and return on assets as a measurement of banks performance as in Adeusi *et al* (2014) & Dawood (2014). An increased in the administrative expense to interest income ratio eats up a bank's earnings hence a reduced performance.

Uyen (2011) found a negative relationship between income earned from loans to total value of assets and banks performance which is measured using earnings per share. Earnings ratio is measured as:

$$Earnings\ ratio = \frac{Interest\ Income}{Total\ assets} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

In the event total assets surpass the income realized as interest from the assets, banks performance is affected negatively.

Cash ratio is described as cash and any cash equivalent divided by total liabilities. Liquidity ratio is measured as:

$$Liquidity\ ratio = \frac{\text{Cash and Cash equivalent}}{\text{Total Liability}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

An increased cash ratio leads to the better performance of a commercial bank as it's more stable and able to meet its financial obligation. Amuzu (2010) and Ishaq *et al* (2016) found cash ratio was positively related to earnings per share. Conversely, Adeusi *et al* (2014) found liquidity was negatively related to return on assets as a quantifier of banks performance.

3.2 Empirical Framework

The model is derived from the CAMEL Model to represent the dependent and independent variables. Positive earnings of a bank indicate the financial health and its capability to fulfill its financial needs both currently and subsequently as in Sarker (2006). The performance of banks is measured using EPS as in Ishaq *et al* (2016). Earnings per share is measured as:

$$\text{EPS} = \frac{\text{Net Income} - \text{Preffered Dividends}}{\text{Outstanding Shares}} \quad \ldots\ldots (7)$$

EPS has been chosen due to its ability to provide consistent results and it is not affected by government intervention according to Onay & Ozsoz (2013). Banks performance is represented by EPS as a function of Capital Adequacy Ratio (CAR), Asset Quality Ratio (AQ), Management Efficiency Ratio (ME), Earnings Ratio (ER) and Liquidity Ratio (LQ).

The expression for the CAMEL model is as follows:

$$EPS_{it} = \beta_0 + \beta_1 CAR_{It} + \beta_2 AQ_{it} + \beta_3 ME_{it} + \beta_4 E_{it} + \beta_5 LQ_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots \quad (8)$$

EPS_{it} represents Earnings per Share of bank *i* at year *t* to measure bank performance at time *t*.

t represents time in terms of years.

i represents individual bank.

ε_{it} represents the error term for bank *i* at time *t.*

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4 \ and \ \beta_5$ represents the regression coefficients.

CAR_{it} represents capital adequacy ratio for bank *i* at time *t*.

AQ_{it} represents asset quality ratio for bank *i* at time *t*.

ME_{it} represents management efficiency ratio for bank *i* at time *t*.

E_{it} represents earnings ratio for bank *i* at time *t*.

LQ_{it} represents liquidity ratio for bank *i* at time *t*.

3.3 Diagnostic tests

3.3.1 Hausman specification test

This study adopted the Hausman specification test to advice amid random effects and fixed effects model. This model tests if there's an interaction around the error term and each of the independent variables. The Hausman specification test is adopted if under the null hypothesis provides efficient and consistent results while the alternative model provides consistent but inefficient results. Conversely, under the alternative hypothesis, the former model provides inconsistent results with the subsequent model provides consistent results.

The Hausman test was formulated as follows based on the null and alternative hypothesis

H_0: Random effects is the appropriate model.

There is no correlation amid independent variables and the error term in the model.

$$\text{Cov}\ (\alpha_0, x_{it}) = \ 0 \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (9)$$

H_a: Fixed effects is the appropriate model.

The correlation amid the independent variables and the error term in the model is statistically significant.

$$Cov\ (\alpha_{0,} x_{it}) \neq 0 \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (10)$$

If the null hypothesis is rejected, use the fixed effect if not, use the random effect model.

3.3.2 Breusch Pagan test for Random effects

In the event a random effects is advised by the Hausman results, then a Breusch Pagan test will be conducted to verify between a pooled model and a random effects model.

If H_0 is rejected, random effect exists. Do not reject H_0 indicates no random effect.

3.3.3 Wald Test or the F-test

The F-test is employed to test for fixed effects where the variables are correlated with the explanatory variables in the model. Under the Wald test the hypothesis are:

$H_{o:}$ Pooled model (intercept does not vary with individual)

$H_{a:}$ Variable intercept model.

In the event the null hypothesis is rejected, the Hausman test will be conducted.

Table 3 summarizes the diagnostic tests.

Table 3: Data analysis tests

Fixed Effect (Wald Test/F-test)	**Random effect (Breusch-Pagan test)**	**Model Recommended**
Do not reject H_0 (No fixed effect)	Do not reject H_0 (No random effect)	Pooled OLS Model
Reject H_0 (Fixed effect)	Do not reject H_0 (No random effect)	Fixed Effect
Do not reject H_0 (No fixed effect)	Reject H_0 (Random effect)	Random effect
Reject H_0 (Fixed effect)	Reject H_0 (Random effect)	Hausman test recommended

Source: (Park, 2010)

3.4 Sources of data

The study employed secondary data from annual audited financial statements of the 11 NSE listed banks in Kenya and from the CBK reports for the year 2014 to 2017. These banks include Cooperative Bank, National Bank of Kenya, Diamond Trust Bank, Barclays Bank, I & M Holdings, Stanbic Holdings, Housing Finance Group, KCB Group, NIC Group, Standard Chartered Bank and Equity Group Holdings.

Table 4: Variable Descriptions

Variable	**Measurement**
Dependent Variable	
Earnings Per Share	Net Income/Outstanding shares
Independent Variable	
Capital Adequacy	Total Capital/Total Assets
Asset Quality	Non-Performing Loans/Total Loans
Management Efficiency	Administrative expense / Interest Income
Earnings	Interest Income/Total Assets
Liquidity	Cash and cash equivalent/ Total Liabilities

CHAPTER FOUR

DATA ANALYSIS, ESTIMATIONS AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter outlines the results of the analysis and findings of the study with reference to the study objectives. In particular, discusses summary statistics, the empirical model, presents the discussion and the summary.

4.2 Descriptive Statistics

The study used STATA 9 software to carry out the analysis.

Table 5: Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max
EPS	overall	43.5209	133.533	-3.96	544.6
	between		118.086	0.095	398.845
	Within		69.7113	-350.99	189.276
CAR	overall	5.95908	3.81349	3.78434	28.5941
	between		3.00599	4.4106	14.9228
	Within		2.47733	0.70101	19.6303
AQ	overall	0.14675	0.38533	0.01259	2.58767
	between		0.18845	0.03898	0.67922
	Within		0.33978	-0.494	2.0552
ME	overall	-0.5364	0.28956	-1.2991	-0.0055
	between		0.20566	-0.7857	-0.166

	Within		0.21096	-1.1489	-0.0913
E	overall	0.0887	0.03078	0.00296	0.12187
	between		0.01578	0.0578	0.10937
	Within		0.02675	0.01979	0.14859
LQ	Overall	0.08418	0.03242	0.00063	0.16199
	between		0.01944	0.04835	0.11735
	Within		0.02644	0.01634	0.13138

From table 5, the mean and median are very close and this implies that data does not suffer outlier problem. An outlier is an observation with an extreme deviation from other observations. Inconclusive explanations of statistics derived from data sets that include outliers may not provide accurate results. An outlier problem may occur as an error or a computational discrepancy. It is also clear that the standard deviation values are close to the mean, which implies that data values of the variables are also clustered around the mean hence the data set is normal. The standard deviation shows the researcher the proximity of the data set to the data sets average value. This means that data sets with high standard deviations have their data scattered over broad spectrum of values. Overall variation means variation over individuals and time; between variation means variation between individuals over time; within variation means variation within individual over time.

4.3 The general model

The expression for the CAMEL model is as follows:

$$EPS_{it} = \beta_0 + \beta_1 CAR_{It} + \beta_2 AQ_{it} + \beta_3 ME_{it} + \beta_4 E_{it} + \beta_5 LQ_{it} + \varepsilon_{it} \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (11)$$

Table 6: Summary of Results

EPS	Pooled OLS regression	Population-averaged estimator	Between		Within or fixed effects		Random effects	
CAR	-4.52531	0.4496086	-2.32124	-0.13	1.54219	0.31	0.4247	0.09
AQ	-28.98184	10.22632	-220.032	-0.93	14.4237	0.41	10.1213	0.29
ME	-114.3741	55.22366	-477.327	-1.76	82.3661	1.25	54.573	0.86
E	1233.204	858.7594	887.8878	0.32	769.916	1.33	860.791	1.53
LQ	-383.4024	164.9623	-2723.61	-0.85	257.416	0.46	162.81	0.31
Constant	-63.71952	-21.09455	-15.8815	-0.05	-13.564	-0.18	-21.279	-0.27
R2	0.0772							
R2-within			0.1245		0.2491		0.2447	
R2-between			0.4114		0.1952		0.1275	
R2-overall			0.0159		0.0013		0.0061	
Sigma u (□)					128.748		122.537	
Sigma e					74.8599		74.8599	
Rho					0.74734		0.72822	
Theta							0.70787	

4.4 Breusch-Pagan Lagrange Multiplier test

A Breusch Pagan test was used to verify between a random effects and a pooled model.

```
. quietly xtreg $ylist $xlist, re

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects:

        eps[id,t] = Xb + u[id] + e[id,t]

        Estimated results:

                     |       Var     sd = sqrt(Var)
             ---------+-----------------------------
                  eps |   17831.13       133.5333
                    e |   5604.004        74.8599
                    u |    15015.4       122.5373

        Test:   Var(u) = 0

                             chi2(1) =    22.00
                          Prob > chi2 =     0.0000
```

Breusch-Pagan Lagrange Multiplier test is a test for the random effects model based on the Ordinary Least Squares (OLS) residual. Breusch-Pagan tests if variance/covariance is significantly different from zero. If the Lagrange Multiplier test is significant, employ the random effects model instead of the ordinary least squares model.

4.5 Hausman specification test

This study adopted the Hausman specification test to advice amid a random effects and fixed effects model. This model tests if there's a correlation amid the error term and each of the independent variables.

```
. quietly xtreg $ylist $xlist, fe

. estimates store fixed

. quietly xtreg $ylist $xlist, re

. estimates store random

. hausman fixed random

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |     fixed        random       Difference          S.E.
-------------+------------------------------------------------------------
-
capitalade~y |    1.542192      .424699        1.117493        1.863716
assetquality |    14.42372     10.12133        4.302382        6.941531
management~y |    82.36606     54.57302        27.79304        17.90596
earningratio |    769.9157     860.7911        -90.8754         139.679
liquityratio |    257.4161     162.8096        94.60649         167.794
------------------------------------------------------------------------------
-
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        4.35
```

```
Prob>chi2 =      0.5006
```

The p value is 0.5006 and therefore we fail to reject the null hypothesis. The Hausman specification test shows notable differences around the coefficients for the fixed effects and random effects model. Therefore, we recommend the use of the fixed effects model.

4.6 Discussion of Results

The expression for the CAMEL model after regression is as follows:

$$EPS_{it} = -13.564 + 1.54219CAR_{It} + 14.4237AQ_{it} + 82.3661ME_{it} + 769.916E_{it} + 257.416LQ_{it} + \varepsilon_{it}. \cdots\cdots\cdots (12)$$

The regression coefficients are positive for all the bank unique factors; asset quality, capital adequacy, management efficiency, liquidity, earnings and negative for constant. This indicates positive correlation between earnings per share and the independent variables. Capital adequacy with the coefficient (1.54219) show that a growth in capital adequacy ratio by one percent will lead to rise in earnings per share by 1.54219 percent. A higher capital adequacy ratio act as a buffer with reduced costs when commercial banks are faced with financial distress.

Asset quality has a positive coefficient (14.4237) which shows that a growth in asset quality by one percent will lead to a rise in earnings per share by 14.4237 percent. Management efficiency has a positive coefficient (82.3661) which shows that a rise in the management efficiency by one percent will lead to the growth in earnings per share by 82.3661 percent. The more efficient the management processes, the less the administrative expenses therefore increased earnings. Earnings ratio also has a positive coefficient (769.916) which shows that a growth in the earnings ratio by

one percent will lead to the growth in earnings per share by 769.916 percent. Increased interest income to total assets borne from performing loans contribute to an improved banking sector.

Liquidity is characterized by a positive coefficient (257.416) which shows that an increase by one percentage change in liquidity ratio results to a corresponding growth in earnings per share by 257.416 percent.

CHAPTER FIVE

CONCLUSION AND RECOMMEDATION

5.1. Introduction

From the analysis of the data gathered, the subsequent discussions, conclusion and recommendations were arrived at. The results were based on the general and specific objectives of the study. The study aimed to find out the effects of the new bank policies on the financial performance of the 11 NSE listed Kenyan commercial banks. The financial performance determinants were structured from the CAMEL model amidst the new bank reforms for the period under study.

5.2 Conclusion

There may be no strong argument that a specific variable has an effect on the financial performance of commercial banks in Kenya amidst new bank policies. This study adopted fixed effects model since there was no correlation between the independent variables and the error term. From the findings of this study, asset quality, capital adequacy, management efficiency ratio, liquidity ratio and earnings ratio were found not to be statistically significant at 95% confidence level. However, this does not mean that bank specific factors and the new policies do not affect the financial performance of commercial banks. All the variables have a positive coefficient indicating a positive correlation with earnings per share as a measure of banks performance in Kenya. However not statistically significant at 95% confidence level. Thus it is possible to conclude that all CAMEL variables have a positive reaction to earnings per share amidst the new bank policies though not significant on the 11 NSE listed Kenyan commercial banks for the period under review.

5.3 Recommendation

The banking policies introduced during this period aimed at intensifying the banking sector stability and strengthen financial institutions efficiency. Commercial banks in Kenya should maintain a strong capitalization so as to act as buffers to reduce expected costs in the event of financial distress. Most commercial banks in Kenya are well capitalized with a capital adequacy ratio greater than 8% which is the statutory requirement. Commercial banks in Kenya should strive to have a thorough credit analysis team to deter mismatch of assets and liabilities so as to reduce levels of non-performing loans and improve banks assets. Bearing in mind that loans comprise the largest portion of commercial banks assets and the largest contributor to commercial banks interest income. Banks management should also ensure management efficiency to reduce of costs, embrace technological advancements so as to continue to be relevant in the developing economies. CBK should ensure all commercial banks comply with the new bank reforms and continuously conduct impromptu checks to ensure compliance. Finally, CBK should as well adopt a holistic approach on enhancing prudential regulations in Kenya's banking industry while promoting competition and technological advancements.

5.4 Suggestions for Further Research

The study's shortcoming is that it only extends for a period of 4 years on the 11 NSE listed commercial banks in Kenya. Therefore, this study suggests that an area for further research should investigate whether macroeconomic variables such as inflation and interest rates are affected by the new bank policies on the financial performance of Kenyan commercial banks. Further, a broader scope should also be considered by studying more commercial banks in the sample. Finally, another area of research would be to inculcate sensitivity which is the last acronym of the CAMELS model.

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APPENDICES

Ratios

t	id	Capital Adequacy ratio	Asset Quality ratio	Management Efficiency	Earnings ratio	Liquidity ratio	EPS
2017	1	6.188662	0.083033	-0.35293	0.114458	0.05563	5.3
2017	2	4.831075	0.066568	-0.65196	0.098727	0.085502	544.6
2017	3	5.074891	2.587666	-0.65099	0.080708	0.058611	1.98
2017	4	4.883022	0.107614	-0.72931	0.099809	0.086391	1.23
2017	5	6.344757	0.126401	-1.25433	0.047552	0.05902	18.5
2017	6	5.920496	0.075878	-0.33846	0.09491	0.071923	20.23
2017	7	5.48669	0.076482	-0.0055	0.020471	0.000626	4.75
2017	8	5.135469	0.11198	-0.46022	0.088114	0.057343	6.45
2017	9	28.59406	0.405822	-0.91142	0.090614	0.074878	1.17
2017	10	4.506445	0.139145	-0.00715	0.022828	0.001136	8.78
2017	11	4.456616	0.156033	-1.29909	0.002957	0.099047	10.22
2016	1	5.324414	0.075953	-0.52871	0.111295	0.067614	5.45
2016	2	5.410449	0.069929	-0.63953	0.113424	0.059067	507.27
2016	3	4.997049	0.046699	-0.61834	0.106233	0.065463	2.22
2016	4	4.743807	0.065053	-0.20579	0.108368	0.074969	1.31
2016	5	5.292366	0.113497	-0.56473	0.102923	0.083139	24.8
2016	6	5.706592	0.038955	-0.32236	0.101604	0.088022	23.1
2016	7	4.222396	0.05919	-0.53305	0.094014	0.070672	25.94
2016	8	4.104027	0.112435	-0.28255	0.108185	0.057088	6.47
2016	9	9.664758	0.437028	-0.65659	0.107092	0.086805	0.5
2016	10	4.202578	0.048628	-0.23569	0.121866	0.064199	3.76
2016	11	4.478913	0.109059	-0.82595	0.005155	0.075082	3.7
2015	1	6.197565	0.059482	-0.48672	0.104146	0.090361	0.37
2015	2	4.964645	0.029783	-0.59909	0.109228	0.129781	539.18
2015	3	6.092669	0.038498	-0.64104	0.098277	0.111367	1.78

2015	4	4.668652	0.035849	-0.61781	0.104855	0.109943	1.55
2015	5	5.172615	0.119588	-0.70393	0.097796	0.082777	17.6
2015	6	4.96554	0.028503	-0.2587	0.09444	0.11549	19.8
2015	7	4.177968	0.046921	-0.56399	0.073853	0.104318	6.02
2015	8	4.886154	0.118568	-0.28396	0.098935	0.069316	6.86
2015	9	11.30642	0.161198	-0.60659	0.097755	0.145719	-3.96
2015	10	4.403455	0.048628	-0.23166	0.121553	0.056656	3.61
2015	11	5.174552	0.075004	-0.32214	0.11769	0.128607	3.43
2014	1	4.787648	0.051935	-0.61186	0.107596	0.080215	5.3
2014	2	4.963396	0.038705	-1.25239	0.015253	0.055976	4.33
2014	3	5.770487	0.044009	-0.74506	0.095957	0.115056	1.71
2014	4	4.338573	0.035522	-0.63598	0.10149	0.149097	1.54
2014	5	5.322934	0.083499	-0.52869	0.099355	0.099848	33.11
2014	6	4.567049	0.012587	-0.29051	0.101121	0.076361	17.9
2014	7	3.784344	0.037529	-0.69978	0.067925	0.098251	2.77
2014	8	4.928875	0.060918	-0.31007	0.090281	0.09814	6.9
2014	9	10.12608	0.106281	-0.64845	0.087065	0.161986	2.67
2014	10	4.529913	0.020984	-0.18941	0.071501	0.071403	10.51
2014	11	7.500516	0.089991	-0.29908	0.105384	0.11094	4.21

Stata Output

```
. reg $ylist $xlist

      Source |       SS       df       MS              Number of obs =      44
-------------+------------------------------           F(  5,    38) =    0.64
       Model |  59208.1726     5  11841.6345           Prob > F      =  0.6735
    Residual |  707530.427    38  18619.2218           R-squared     =  0.0772
-------------+------------------------------           Adj R-squared = -0.0442
       Total |  766738.599    43  17831.1302           Root MSE      =  136.45

------------------------------------------------------------------------------
         eps |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
capitalade~y |   -4.52531   5.696208    -0.79   0.432    -16.05668    7.006061
assetquality |  -28.98184   55.58532    -0.52   0.605    -141.5084    83.54476
management~y |  -114.3741   88.33079    -1.29   0.203    -293.1904    64.44228
earningratio |   1233.204   828.4205     1.49   0.145    -443.8455    2910.254
liquityratio |  -383.4024   761.8069    -0.50   0.618      -1925.6    1158.795
       _cons |  -63.71952    91.9781    -0.69   0.493    -249.9195    122.4804
------------------------------------------------------------------------------

. xtreg $ylist $xlist, pa

Iteration 1: tolerance = 1.2899563
Iteration 2: tolerance = .64449162
Iteration 3: tolerance = .03375242
Iteration 4: tolerance = .00186908
Iteration 5: tolerance = .00010585
Iteration 6: tolerance = 6.002e-06
Iteration 7: tolerance = 3.403e-07

GEE population-averaged model                   Number of obs      =        44
Group variable:                         id      Number of groups   =        11
```

```
Link:                             identity      Obs per group: min =         4
Family:                           Gaussian                     avg =       4.0
Correlation:                  exchangeable                     max =         4
                                                Wald chi2(5)       =      9.30
Scale parameter:                  17987.66      Prob > chi2        =    0.0976

------------------------------------------------------------------------------
         eps |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
capitalade~y |   .4496086   4.278653     0.11   0.916    -7.936397    8.835614
assetquality |   10.22632   31.91967     0.32   0.749    -52.33508    72.78772
management~y |   55.22366   58.68676     0.94   0.347    -59.80027    170.2476
earningratio |   858.7594   521.2799     1.65   0.099    -162.9304    1880.449
liquityratio |   164.9623   489.4895     0.34   0.736    -794.4195    1124.344
       _cons |  -21.09455   73.69696    -0.29   0.775    -165.5379    123.3488
------------------------------------------------------------------------------

. xtreg $ylist $xlist, be

Between regression (regression on group means)  Number of obs      =        44
Group variable (i): id                          Number of groups   =        11

R-sq:  within  = 0.1245                         Obs per group: min =         4
       between = 0.4114                                        avg =       4.0
       overall = 0.0159                                        max =         4

                                                F(5,5)             =      0.70
sd(u_i + avg(e_i.))=  128.1265                  Prob > F           =    0.6481

------------------------------------------------------------------------------
         eps |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
capitalade~y |  -2.321235   17.48486    -0.13   0.900     -47.2675    42.62503
assetquality |  -220.0321   235.7869    -0.93   0.394    -826.1415    386.0773
```

```
management~y |   -477.327   271.9317    -1.76   0.140     -1176.35    221.6958
earningratio |   887.8878   2741.142     0.32   0.759    -6158.441    7934.217
liquityratio |  -2723.609   3199.195    -0.85   0.433     -10947.4    5500.183
       _cons |  -15.88145   297.4535    -0.05   0.959    -780.5099    748.7471
------------------------------------------------------------------------------
```

```
. xtreg $ylist $xlist, fe

Fixed-effects (within) regression               Number of obs      =        44
Group variable (i): id                          Number of groups   =        11

R-sq:  within  = 0.2491                         Obs per group: min =         4
       between = 0.1952                                        avg =       4.0
       overall = 0.0013                                        max =         4

                                                F(5,28)            =      1.86
corr(u_i, Xb)  = -0.2859                        Prob > F           =    0.1340

------------------------------------------------------------------------------
         eps |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
capitalade~y |   1.542192   4.973485     0.31   0.759     -8.64553    11.72991
assetquality |   14.42372   35.13515     0.41   0.685    -57.54738    86.39481
management~y |   82.36606   65.78034     1.25   0.221    -52.37887     217.111
earningratio |   769.9157   579.4259     1.33   0.195    -416.9846    1956.816
liquityratio |   257.4161   553.8825     0.46   0.646    -877.1608    1391.993
       _cons |  -13.56438   74.71074    -0.18   0.857    -166.6024    139.4736
-------------+----------------------------------------------------------------
     sigma_u |  128.74819
     sigma_e |  74.859896
         rho |   .7473409   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(10, 28) =     9.83              Prob > F = 0.0000
```