2018

Effect of increasing core capital on the Kenyan banking sector performance

Anne W. Mwangi
Strathmore Business School (SBS)
Strathmore University

EFFECT OF INCREASING CORE CAPITAL ON THE KENYAN BANKING SECTOR PERFORMANCE

MWANGI ANNE WANGUI – MBA/6971/15

Submitted in Partial Fulfilment of the Requirements for the Master of Business Administration at the Strathmore Business School

Strathmore Business School
Nairobi, Kenya

2018

DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the report contains no material previously published or written by another person except where due reference is made in the thesis itself.

Mwangi Anne Wangui
MBA/6971/15

APPROVAL

The proposal of Mwangi Anne Wangui was reviewed and approved by the following:

Dr. Thomas Kibua
Strathmore Institute of Public Policy and Governance

Dr George Njenga
Dean Strathmore School of Business

Prof Ruth Kiraka
Dean of Graduate Studies

ABSTRACT

The Kenya Vision 2030 envisions a globally competitive financial sector and proposes transforming the banking sector to have fewer, stronger and larger scale banks. In this regard, the National Treasury proposed and implemented an increase in the minimum core capital requirement in 2008 and proposed a further increase in 2015 and 2016 to improve competition in the banking sector, increase the level of savings in the economy and strengthen banks. This study sought to find out the effect of the 2008 increase in the minimum core capital requirement from Kshs.250 million to Kshs.1 billion on bank performance in the Kenyan banking sector. The specific variables that were studied to evaluate their impact on bank performance following an increase in core capital were competition and profitability. The study focused on the Kenyan banking sector from 2003 to 2016 and adopted an exploratory study approach. The research relied on secondary data from CBK and therefore took a quantitative approach. The entire population of 39 banks as provided by the CBK as at 31st December 2016 was studied. The study was conducted according to the three peer group classification provided by CBK as presented in Appendix B. The paired t-test was used to evaluate whether there was a change in competition and profitability pre and post increase in the minimum core capital requirement. Regression models were further included to assess the strength of the relationship between the dependent variables competition and profitability and the independent variable core capital and control variables total deposits, profits before tax, inflation and GDP. Results indicate that the regulatory increase in the core capital requirement had an inconsistent effect on profitability and competition in the three banking peer groups. In particular, as indicated by the paired t-test, there was no statistically inferred difference for both competition and profitability in all the three peer groups except for competition in peer group one. The policy recommendation arising from this study is for the regulator to have similar policies for the entire industry as well as different policies tailored for each peer group to increase the attainment of desired outcome of regulation.

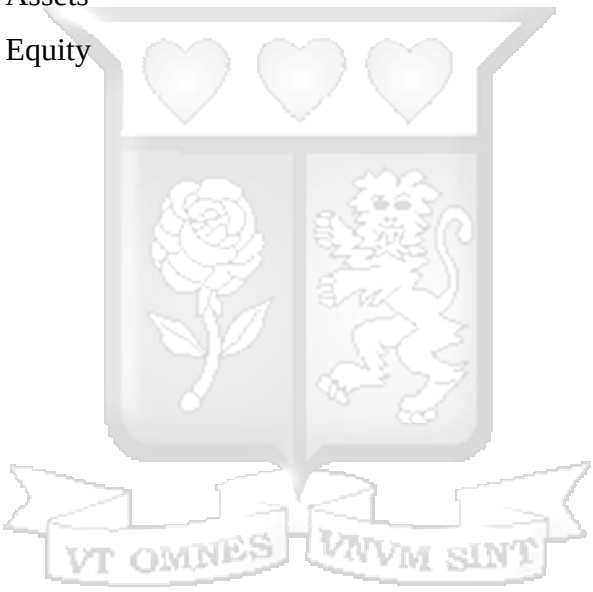
TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CAR	Capital Adequacy Ratio
CBK	Central Bank of Kenya
CIR	Cost to Income Ratio
GDP	Gross Domestic Product
HHI	Herfindahl Hirschman Index
NIM	Net Interest Margin
NPL	Non-Performing Loans
PBT	Profit Before Tax
SCP	Structural Conduct Performance
ROA	Return on Assets
ROE	Return on Equity



ACKNOWLEDGEMENT

I thank the Almighty God for His grace throughout this journey and acknowledge my family and classmates who supported and enabled me to successfully complete this study. I also acknowledge the dedication, support and guidance received from Dr. Thomas Kibua, my supervisor.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

This paper is about the effects of the 2008 regulatory increase in the minimum core capital requirement on performance of the Kenyan banking sector. It is organized as follows: chapter one gives an introduction of the study, including the background, problem statement, research objectives, research questions, scope and significance; chapter two provides a critical review of literature; chapter three presents the research methodology used in carrying out this study; chapter four presents the research findings; chapter five discusses the research findings, conclusion and areas of further study.

1.2 Background of the Study

Performance of the Kenyan Banking sector has been a topical subject amongst the regulator and law makers. Few large banks dominate the market by controlling industry net assets and profits (Kamau & Were, 2013). Market dominance is an indicator of low competition in the banking sector (Kamau & Were, 2013 and Sanya & Gaertner, 2012). The high cost of credit characterized by wide interest rate spreads has led to interest driven exceptional bank profitability (Republic of Kenya, 2013). Kamau & Were (2013) found that superior performance in the Kenyan banking sector was held by few large banks. The authors further posit that the superior performance was mainly caused by structure and collusive power and not efficiency that is, high concentration and relative market powers led to high profitability.

The *Kenya Vision 2030* (2007) envisages a vibrant and globally competitive financial sector in Kenya that will create jobs and promote high level of savings to finance Kenya's overall investment needs. The Vision notes that one of the most urgent steps to achieve a globally competitive financial environment in Kenya is to introduce legal and institutional reforms that will enhance transparency in

all transactions, build trust and make enforcement of justice more efficient. It also notes that transformation of the banking sector to have fewer, stronger and larger scale banks is a step required to make the financial sector globally competitive.

In 2008, the Kenya National Treasury proposed an increase in the minimum core capital requirement for banks from Kshs.250 million to Kshs.1 billion. The National Treasury (2008) noted that to achieve a vibrant and globally competitive financial sector, driving high level of savings and financing Kenya's investment needs as envisioned in the Kenya Vision 2030, several reforms were necessary in the banking sector including transforming the large number of small banks into fewer, larger and stronger banks. The National Treasury's proposal was enacted to law. In 2015 and 2016, the National Treasury proposed a further increase in core capital from Kshs.1 billion to Kshs.5 billion to make the banking system more competitive locally and regionally (National Treasury, 2015). The National Treasury backed their proposal with the need for Kenya to have strong well capitalized banks which can finance the large projects and withstand financial shocks and crises as envisaged in the Kenya Vision 2030. The proposal was shot down by the Kenya National Assembly and was not passed into law because the banking sector was already concentrated and increasing the capital requirement further would only create more concentration and encourage financial exclusion.

1.3 Overview of the Kenyan Banking Sector

The Kenyan banking sector comprises of the Central Bank of Kenya (CBK), as the regulator; 42 commercial banks; one mortgage finance company; eight representative offices of foreign banks; 13 microfinance banks; three credit reference bureaus; 17 money remittance providers; and 77 foreign exchange bureaus (CBK, 2016). Commercial banks are licensed and regulated in accordance with the provisions of the Banking Act and the Regulations and Prudential Guidelines issued thereunder. The

list of the 42 licensed commercial banks in Kenya are provided in Appendix A. The CBK supervises the commercial banks to ensure compliance with the stipulated regulations including capital adequacy requirements.

The Banking Act Chapter 488 (Republic of Kenya, 2015) stipulates that commercial banks should maintain: (a) a core capital of not less than eight per cent of total risk adjusted assets plus risk adjusted off balance sheet items as may be determined by the CBK; (b) core capital of not less than eight per cent of its total deposit liabilities; (c) total capital of not less than twelve per cent of its total risk adjusted assets plus risk adjusted off balance sheet items as may be determined by Central Bank; and (d) a core capital of at least one billion Kenya shillings.

The CBK classifies commercial banks into peer groups of large, medium and small banks based on a weighted composite market share index that comprises of net assets, customer deposits, capital and reserves, number of deposit accounts and number of loan accounts. This weighted composite index is also used to compute the weighted market share. The 2016 market shares held by the three peer groups are presented in the table below:

Table 1.1: 2016 Commercial Banks Peer Group Market Share

Peer Group	Weighted Market Share	No. of Institutions	Total Net Assets (Kshs. M)	Customer Deposits (Kshs. M)	Capital and Reserves (Kshs. M)
Large	65.32%	8	2,404,194	1,739,278	373,516
Medium	25.90%	11	981,099	654,602	159,814
Small	8.77%	20	310,651	211,273	59,094
Total*	100.00%	39	3,695,944	2,485,919	540,578
* Charterhouse Bank under Statutory Management, Fidelity Commercial Bank, undergoing acquisition and Imperial Bank & Chase Bank under Receivership have been excluded					

Central Bank of Kenya (2016)

According to the above 2016 market share figures, the eight banks in the large peer group controlled 65.3% of the industry market share in 2016 with the remaining 31 banks controlling 34.7% of the market share. A review of the distribution of net assets and shareholder funds of all the commercial banks in 2003 and 2016 reveals that large banks dominated the market shares in both years. This information is presented in Appendix A.

1.4 Policy, Legal and Institutional Reforms in the Kenyan Banking Sector

High interest rate spreads, high lending rates and persistent exceptional bank profits have necessitated institutional, legal and policy reforms targeted at the competitive landscape of the Kenyan banking sector. Reforms targeting reduction of interest rate spreads and exceptional profitability were first discussed in 2007 and are outlined in the *Kenya Vision 2030* (Republic of Kenya, 2007). The level of competition in a bank is, to a large extent, affected by the number of players in control of the market share and therefore, achieving a fair balance within a banking industry would involve implementation of well-crafted regulations (Rimaviciute & Vilys, 2014). The reform objectives in Kenya have been three-fold: increased outreach, improved efficiency and stability of the banking sector (Republic of Kenya, 2007). The *Kenya Vision 2030* acknowledges that Kenya's banking sector is highly segmented and dominated by few large banks resulting in reduced competition and high credit costs (Republic of Kenya, 2007). The *Kenya Vision 2030* envisages a vibrant and globally competitive financial sector in Kenya that will create jobs and promote high level of savings to finance Kenya's overall investment needs. The *Kenya Vision 2030* notes that transformation of the banking sector to have fewer, stronger and larger scale banks is a step required to make the financial sector globally competitive.

To operationalize the transformation of the banking sector, the Government of Kenya through the Kenya National Treasury proposed an increase in the minimum core capital requirement in 2008 for

banks from Kshs.250 million to Kshs.1 billion to be achieved in a graduated scale of Kshs.350 million, Kshs.500 million, Kshs.700 million and Kshs.1 billion by the years 2009, 2010, 2011 and 2012 respectively (National Treasury, 2008). The *Banking Act* Chapter 488 (2015) defines core capital as "permanent shareholders' equity in the form of issued and fully paid-up shares of common stock, or in the case of foreign incorporated banks, of the assigned capital, plus all disclosed reserves, less goodwill or any other intangible assets." The National Treasury's proposal was enacted to law and the Banking Act (Cap 488) laws of Kenya was amended in 2008. In 2015 and subsequently 2016, the National Treasury proposed a further increase in core capital from Kshs.1 billion to Kshs.5 billion to make the banking system more competitive locally and regionally (National Treasury, 2015). The National Treasury backed their proposal with the need for Kenya to have strong well capitalized banks which can finance the large projects and withstand financial shocks and crises as envisaged in the Kenya Vision 2030. Both proposals were shot down by the Kenya National Assembly and were not passed into law citing that the banking sector was already concentrated and increasing the capital requirement further would only create more concentration and encourage financial exclusion. The Kenya National Assembly members argued that increasing the minimum core capital requirement would stifle the banking sector's growth and lock out smaller players who were unable to raise the additional capital. The members noted that, the smaller banking players had been instrumental in increasing financial inclusion in the country. Sanya & Gaertner (2012) noted that lack of competition in the banking system was one of the causes of high level of financial exclusion. However, the Kenya Vision 2030 (Republic of Kenya, 2007) and Cytonn Investments (2015) viewed Kenya as being overbanked with a relatively high ratio of banks to Gross Domestic Product (GDP) and total population respectively.

1.5 Statement of Problem

Kamau & Were (2013) posit that the Kenyan banking sector has remained largely profitable despite the economy performing poorly in some years due to adverse effects of the post-election violence, global financial crisis and terrorism attacks in Kenya. As further postulated by the authors, superior performance has been held by a few large banks with the main source of this performance being structure and collusive power and not efficiency that is, high concentration and relative market powers have led to high profitability. Additionally, the high cost of credit characterised by wide interest rate spreads led to exceptional bank profits (Republic of Kenya, 2013). Were & Wambua (2013) found that interest rate spreads were higher for large banks in Kenya. Sanya & Gaertner (2012) also noted that Return on Assets (ROA) for East African banks was about three times higher than for South African banks while interest rates spreads were six to eight percent higher which suggested that the level of competition in the East Africa Community was much lower than in South Africa. The authors further highlight that a decline in lending spreads would provide some indication that competition was intensifying within the region.

Wambua & Were (2013) proposed that policies be put in place to enhance competition and promote the growth and image of small and medium sized banks in a bid to enhance their ability to penetrate the market to break market dominance by a few banks. The National Treasury had envisioned that the 2008 increase in minimum core capital requirement would motivate small banks to merge or seek other forms of consolidation. It was envisaged that the resulting banks from the mergers would be efficient due to economies of scale and enhanced capacity thereby be able to compete with large banks. The consolidation activities undertaken between 2008 and 2010 reduced the number of commercial banks from 45 in 2008 to 43 in 2012 (CBK, 2012). Between 2012 and 2016, there were not any mergers and acquisitions in the banking sector (CBK, 2016). Additionally, only eight out of 39 banks were

classified as large banks in 2016 using CBK's weighted composite index and controlled a market share of 65.3%. This means that the banking sector is still dominated by few large banks which hold majority of the assets and have exceptional profits hence the 2008 increase in core capital did not achieve the intended purpose.

The level of minimum core capital requirement is a topical issue having been periodically discussed in Parliament hence it is useful to study the effect of this policy on various aspects of the banking sector. This study sought to establish the extent that the 2008 increase in the minimum core capital requirement affected performance by specifically looking at competition and profitability in the Kenyan banking sector.

1.6 Research Objectives

i. General Research Objective

The overall research objective of this study was to investigate the effect of increasing the minimum core capital requirement in 2008 on the Kenyan banking industry performance by comparing the pre-regulatory increase period of 2003 to 2008 to the post-regulatory increase period of 2009 to 2016.

ii. Specific Research Objectives

The specific research objectives for this study were to:

1. Analyze the effect of increasing core capital on competition in the Kenyan banking sector.
2. Investigate the effect of increasing core capital on profitability in the Kenyan banking sector.

1.7 Research Questions

The research questions that were addressed in this study are:

1. What has been the effect of increasing core capital on competition in the Kenyan banking sector?
2. What has been the effect of increasing core capital on profitability in the Kenyan banking sector?

1.8 Scope

The study focused on the relationship between core capital and performance, specifically profitability and competition, with a view to draw conclusions as to what extent core capital accounts for performance of banks in Kenya. The study covered the performace of the Kenyan banking industry from 2003 to 2016 specifically, the period between 2003 and 2008 which represents the period pre-implementation of the core capital regulation, and the post-implementation period which is 2009 to 2016.

1.9 Significance

This study is significant on several fronts to law makers, regulators, academia and banks. Firstly, the study aimed to contribute to the existing literature on the low level of competition and dominance of profits by few large banks in the Kenyan banking sector. Secondly, the study aimed to contribute to the ongoing debate on exceptional profitability of banks in Kenya by examining the impact of regulation of core capital on bank performance.

Thirdly, by establishing the relationship between bank core capital and bank performance, the study aimed to unravel how bank competition and profitability responds to regulatory changes in the Kenyan banking sector. This would be valuable in making insightful policy recommendations for consideration by the regulator, CBK. Finally, the study aimed to assist banks to understand the impact of the level of core capital on their performance by establishing the relationship between bank core capital and

bank profitability. Establishing this relationship would assist the banks to determine the extent to which other strategies should be employed to boost their competitive advantage and profitability.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents the theoretical and empirical literature review regarding the relationship between bank core capital and competition as well as the relationship between bank core capital and profitability. Section 2.2 discusses the theories behind the relationships; section 2.3 discusses the application of the theories in studies and the various variables considered in assessing competition and profitability in the industry; section 2.4 presents the research gap arising from the literature review; and section 2.5 concludes the chapter by presenting the conceptual framework.

2.2 Theoretical Framework

Several theories have been advanced to explain a firm's capital structure and market performance in terms of competition and profitability. These theories are presented below.

2.2.1. The Modigliani-Miller Theorem

According to this theorem put forward by Modigliani and Miller (1958), in an unregulated environment without the costs associated with taxation and bankruptcy charges, the mode through which a bank is financed is inconsequential to its market value; this is because the market value of a bank is determined by its earning power and the risks associated with its assets. However, given that banks operate in an environment with taxation and other associated charges, it is necessary for the optimization of lending avenues for minimal expenditure. In light of this observation, banks with optimal debt financing are able to claim tax cuts on account of this mode of financing and are therefore able to perform better than those financed solely or over-proportionally by non-liability sources, such as shareholder funding. In relating this theorem to capital adequacy regulation, it is apparent to the regulators interest that the amount of capital assembled through equity capital and declared reserves

be regulated to curtail overreliance on risk taking through increased loan-based funding with the incentive of reduced taxation in markets that provide tax cuts through considering banks' capital structure. The Modigliani-Miller theorem is therefore important in optimization of a company's financing considering capital requirements by law.

2.2.2. Neo Classical Theory of Markets

The Neo-classical theory can be attributed to the contributions of Waras (1889), Marshal (1890), Pareto (1906) & Hicks (1979), as noted by Mitra-Kahn (2005). The theory argues that depending on a firm's or buyer's ability to influence price, markets can either be competitive, oligopolistic, monopolistic competition, monopsony or monopoly. The two extreme cases in the continuum are perfect competition and monopoly. Under perfect competition neither the buyer nor seller have the ability to influence the price given the quantity while under monopoly, the seller has absolute power to set the price given the quantity (Mitra-Kahn, 2005). Competition is therefore a measure of the firm's ability to influence price (Keat, Young, & Erfle, 2014). Under perfect competition, the power to influence price is zero and is maximum under monopoly. Competition and the power to influence price are therefore inversely related. As such, competition is highest when the market structure is perfectly competitive and least under monopoly. This study is relevant since it studies profitability and competition in a market set up. Specifically, it provides for the measurement of competition through estimation of determinants of profitability through the performance dynamic approach and non performance dynamic approach. Its shortcoming is that it looks at the two variables from a market only perspective and does not consider the effect of other variables.

2.2.3. Structure Conduct Performance Paradigm

The Structure Conduct Performance (SCP) Paradigm is credited to Bain 1958 and it postulates that markets which are highly concentrated are less competitive than markets which are lowly concentrated (Kamau & Were, 2013). The SCP model is a traditional industrial organization approach which argues that greater concentration causes less competitive bank conduct and leads to higher prices and higher profitability (Kamau & Were, 2013; Fungacova, Solanko & Weill, 2010). This implies that concentration has a positive relationship with profitability. Therefore, markets which are dominated by few large firms operate in highly concentrated markets and tend to exhibit anti-competitive behaviour resulting in poor market performance (Kamau & Were, 2013). The SCP paradigm therefore encourages limiting the number of competitors in the market to result in collusion and higher profits for the banks. Kamau & Were (2013) note that the number of competitors can be limited by encouraging mergers to achieve a larger market share and hence profitability. Goddard, Liu, Molyneux & Wilson (2010) note that according to the SCP paradigm, a small number of banks may be able to collude either implicitly or explicitly, or exploit their market power independently, to charge higher prices, pay lower rates on deposits hence earn excess profits.

2.3 Empirical Framework

2.3.1. Core Capital and Competition

Competition, in the banking industry, involves a banks ability to participate profitably and sustainably within the industry (Robinson, 2001). Keat et al (2014) define market power as the power of a firm to establish the price of its products. In a perfect competition, where there are many sellers offering the same product, a particular firm has virtually no control over the price of its products. In contrast, a monopoly has considerable market power given that it is the only seller in the market and can establish its price at whatever level it wants. Monopolistic competition and oligopoly are in between the two

extremes of perfect competition in terms of their market power Keat et al (2014). Sanya & Gaertner (2012) stated that "concentration ratios are perhaps the most frequently used indicator of banking sector competitiveness, with a high share of assets controlled by a small number of banks typically interpreted as indicative of a low level of competition". The authors further infer that it follows that presence of highly profitable banks, a large share of industry assets being controlled by a small number of banks and higher interest rate spreads reflect lack of competition in the banking sector. The Herfindahl Hirschman Index (HHI) will be used to determine the market power with the market share of each bank determined by its net assets relative to the industry's total net assets. Akomea & Adusei (2013) define HHI as:

$$HHI_{1\ldots n} = \sum_{n} S_n^2$$

where Sn represents the market share of firm i and there are n firms in the market.

In a comparative study of the American and Canadian banking industries, Joanna Baron, Janda, Velk, & Lemieux (2013) posit that it is not the number of regulations at play that is important but rather the quality of the regulations vis-à-vis their intended outcome. The authors pointed to the difference in the banking industries of the two countries and highighted that despite Canada having comparatively fewer regulations, those in effect had a more significant effect in achieving stability than had been the case in the United States. Furthermore, Joanna et al (2013) emphasized that the financial institutions responsible for the precipitous economic crisis of 2008 were among the most regulated, albeit, with misguided or ill-fitting regulations as assessed according to their intended aim and as a result, competition within the industry was stifled by the handful power-wielding main players in the industry (ibid).

In assessing the anticipated effects of China's entry into the World Trade Organization, Wong and Wong (2001) highlighted that the role of regulation in achieving equitable competition in an industry could be viewed in isolation. Particularly focusing on the situation in China, the authors highlighted that although entry into the World Trade Organization would, on paper, bolster competition, entrants to the market would be forced to contend with factors such as institutional inter-arrangements, interest rate and credit controls, directed lending, artificial business restrictions and state guarantees, particularly among government owned banks. Relating findings from this study and those posited by Rimaviciute & Vilys (2014) who brought to light the effects of collusions among banks in Lithuania where three banks commanded 68% total assets, loans and deposits, it is necessary to assess the role that multiple metrics have in determining the level of competition within the banking industry. This study therefore included total assets (included by market share), loans (included as total and gross non-performing loans) and total deposits in assessing the effects of regulation on competition within the Kenyan Banking industry.

Tan & Floros (2014) studied the Chinese banking industry and found a negative relationship to exist between bank profitability and competition positing that banks with high profitability generally tend to operate in less competitive environments. The authors focused on a variety of metrics as indicators of profitability and employed a Seemingly Unrelated Regression (SUR) model in analyzing data. Results from their study pointed to an inverse relationship between profitability metrics, among which ROE volatility was included, and competition. The findings of this study was that factors that positively correlate with ROE as a profitability metric also correlate negatively with indicators of competition in an industry (ibid).

Sanya & Gaertner (2012) studied the banking sector competition in Kenya, Tanzania, Uganda and Rwanda in a bid to estimate the degree of competition. They analysed bank level consolidated financial data from 2001 to 2008 using the Lerner index and the Panzar Rosse H-statistic to gauge market contestability. Their results showed that the East African banking systems had monopolistic competition with the degree of competition strongly linked to the level of economic development, contestability of markets and quality of institutions. They characterised the banking competition as monopolistic due to absence of barriers to entry but found structural impediments which enabled some banks to enjoy a degree of monopoly power. Empirical results from their panel data regressions indicated that greater market concentration reduced competition. They also found that the East African banking sector was less competitive than other countries that had a higher level of financial and economic development. They concluded that greater market concentration reduced competition and that the degree of competition was low due to a combination of structural and socio-economic factors.

Nekatibeb (2012) analysed the Ethiopian banking sector for evidence of market power using the Lerner Index with annual data from 2002 to 2011. Using a model of oligopolistic conduct, he found that Ethiopian banks exercised market power in setting prices. He found market power to be positively influenced by bank specific factors namely: operating efficiency and size. Inflation, elasticity of demand to loans and excessive size had a weakening effect on exercise of bank's market power. Furthermore, concentration, risk, reserve and proportion of non-interest income had an insignificant effect on market power. Greater market power of financial intermediaries and higher costs of financial intermediation lowered economic growth. Nekatibeb (2012) observed that Ethiopia's central bank did not implement available policy instruments to minimize the impact of market power on social welfare and economic growth. The author therefore concluded that the level of competition in the Ethiopian banking system was low and recommended that the regulatory authorities should design measures

aimed at creating further incentives for enhancing competitiveness in the banking sector for instance by creating an enabling environment for contestability in the banking industry. The author expected such measures to strengthen the degree of competition and in effect diminish the banks' exercise of market power and propagate efficiency gains across the banking market. However, he recommended against adjusting economic policy instruments which were expected to enhance the market power of commercial banks for example, abating inflation was expected to result in macroeconomic stability but also resulted in increased market power of banks which suggested that economic stability and bank market power have a positive relationship.

Simpasa (2010) evaluated the intensity of competition in the Zambian banking sector using a bank specific and time varying Lerner Index. He found that Zambian banks exercised market power in setting prices. The market power was mainly driven by market concentration, efficiency performance, diversity in revenue sources and regulatory intensity. Additionally, he also established that bank specific, structural and macroeconomic factors were important in explaining banks' exercise of market power. The level of concentration was found to reinforce banks' exercise of market power, indicating that market dominance was influential in the banks' pricing behaviour. On the contrary, credit risk and macroeconomic uncertainty had a weakening effect on the banks' exercise of market power. Simpasa (2010) concluded that there was a low level of competition in the Zambian banking system and recommended that the authorities should design measures aimed at creating further incentives for enhancing competitiveness in the sector. Particularly, he suggested that the authorities should create an enabling environment for contestability.

Fungacova et al (2010) analysed competition in the Russian banking sector by measuring the market power of banks between 2001 and 2006 using the Lerner index. They found that the Russian banking

industry did not suffer from excessive market power of banks and that the level of bank competition was similar to that observed in developed countries. They also found that concentration and risk influenced market power, ownership had no influence on market power while size had a nonlinear influence. Additionally, Fungacova et al (2010) found that bank competition was important for economic growth in emerging countries including Russia. These countries were characterized by low ratios of credit to GDP which could have resulted from financing obstacles that were created by subdued banking competition. Additionally, bank lending was the leading source of external finance in the emerging countries, owing notably to underdeveloped capital markets. However, they were not certain that designing a procompetitive policy in Russia was advisable given that bank size and market power had an inverse U-curve relationship; the banking sector did not suffer from a particularly weak level of competition; and that the country was going through a period of financial instability Fungacova et al (2010).

Tabak, Gomes & Junior (2012) examined the competitive behaviour of the Brazilian banking industry to investigate whether banks' risk-taking behaviour was affected by their market power. In their analysis, they used the Panzar and Rosse model and the local regression technique and relied on the market power at the bank level and H-statistic of the Brazilian economy as their variables. They found that market power was positively related to risk taking behaviour, specifically, banks with increasing market power engaged in riskier behaviour than banks with decreasing market power. Additionally, they also found that the capitalization of banks had an important influence on their market power. Particularly, an increase in capital caused banks with higher market power to behave more conservatively. This is because increased capitalization reduced the risk taken by banks. Based on their findings, Tabak et al (2012) observed that banks with greater market power increased their risk to increase collected rents. However, where banks with increased market power become more

capitalized, the bank become more conservative and reduced its risk. The converse was held whereby banks with decreased market power and decreased capitalization assumed more risk. They concluded that banks with higher market power assumed more risk to obtain increased rents. Tabak et al (2012) explained that an increase in bank capital led to the growth of the banks charter value and the possibility that the risky behaviour will result in increased losses to the charter value. They concluded that banks with monopoly rents were not conservative in the Brazilian banking industry until they achieved sufficiently high charter values, at which point the potential losses from risky actions became too exorbitant to justify the assumption of greater risks. They also suggested that the Brazilian banking industry included significant heterogeneities in the market power of banks and was characterized by monopolistic competition implying that the banking industry featured several banks with high market power and a large majority of banks with relatively little market power.

2.3.2. Core Capital and Profitability

Profitability in commercial banks is determined by the ability of the banks to retain capital, absorb loan losses, support future growth of assets and provide return to investors (Qin & Pastory, 2012). Gudmundsson et al (2013) and Goddard et al (2014) postulate that Return on Equity (ROE) is often the best measure of earnings and profitability of commercial banks. Nguyen et al (2018) suggest that ROE is one of the most comprehensive measures of profitability for commercial banks since it factors in off balance sheet activities and also considers a bank's ultimate goal which is to maximise shareholders' value. Berger & Bouwman (2013) define ROE as net income divided by shareholders equity. They argue that ROE is a comprehensive measure of profitability because banks must allocate capital against every off balance sheet activity that they engage in. Thus both net income and shareholders' funds reflect on balance sheet and off balance sheet activities.

Gilbert & Wheelock (2007) in a study of ROE as a performance metric highlighted that though ROE was frequently used as a measure of bank profitability, the metric could not be used in that capacity without sufficient scrutiny on its appropriateness. The authors, in particular, highlighted that differences in regulation may have misleading effect on the interpretation of the metric as a profitability indicator. Focusing on the American context, Gilbert & Wheelock (2007) suggested that small businesses, following implementation of the Subchapter S federal tax code, are not double taxed like in the case of larger businesses. This therefore leads to a fallacy in interpretation of ROE as a performance metric when assessing the performance of small and large companies. The researcher, in the ongoing study, has however ascertained the appropriateness of the metric in the Kenyan context, particularly from a regulation point of view, in that all reported metrics are collected from the central repository of the regulator with assured homogeneity of regulation as evidenced by reports on the various regulation at play across the industry.

Hauswald & Marquez (2006) studied Albania's banking industry to assess the efficiency of banks and used net interest margin as a proxy. According to the authors, regulating for equitable competition within banking industries must be done with sufficient caution given that excessive competition may result in instability. They found a negative relationship to exist between non-performing loans, as reported by the various banks, and efficiency. Given that the efficiency of banks has direct implications of profitability, they inferred that considering the relationship between non-performing loans and metrics of profitability would serve to establish a meaningful relationship that can be leveraged to understand trends in profitability. Non-performing loans were considered as control variables in regression models devised to assess the change in competition determining variables pre and post introduction of higher core capital requirements in Kenya.

Polodoo, Seetanah, Sannassee, Seetah & Padachi (2014) posit that non-performing loans have a significant effect on the profitability of banks and therefore there is need to assess factors that result in defaulting of loans. They studied the Mauritius banking industry and employed four estimation techniques namely: Fixed Effects, differenced GMM, System GMM and Random Coefficient estimation. Polodoo et al (2014) established that the most critical factors influencing the level of non-performing loans are decline in the construction sector and rise in cross-boarder loans. The authors also identified other macroeconomic contributors, such as inflation and rise in GDP among trading partners as important contributory factors in assessing trends in non-performing loans. This study includes the highlighted variables namely: gross loans, non-performing loans, GDP and inflation as additional explanatory variables in assessing their effect on the profitability of banks.

Mathuva (2009) examined the relationship between bank profitability and the capital adequacy ratios and cost to income ratio simulataneously for Kenyan banks between 1998 and 2007. Data was collected, analyzed and intepreted using different financial ratios and statistical tools including percentages, trend analysis, averages, regression, correlation and the significance test. The study yielded several findings. First, that increasing the core capital ratio and tier one risk based capital ratio may raise expected earnings by reducing costs of financial distress including bankruptcy. Secondly, that a negative relationship existed between the equity capital ratio and profitability. Thirdly, the study found that Kenyan banks are not competitive globally in terms of their efficiency as measured by the CIR. Fourthly, the CIR was found to be inversely related to the ROA and ROE measures. Fifthly, the CIRs of Kenyan banks was found to be higher than those of banks from developed countries.

Goddard et al (2010) examined the determinants of banks' profitability, and the persistence and convergence of profits amongst eight banks in Europe between 1992 and 2007. A dynamic panel

estimation model was used with bank profitability being measured as the difference between ROE and an estimated cost of capital. Their findings indicated that profitability was higher for the banks that were efficient and diversified compared to those that were more focused. Additionally, Goddard et al (2010) found that profitability was lower for the banks that were more capitalized. With regards to persistence and convergence of profits, the authors found that excess profits persisted from 1992 to 1998 compared to 1999 to 2007. This was due to an increase in the intensity of bank competition from 1999 following the integration of the European Union financial markets following the introduction of the Euro and implementation of the Financial Services Action Plan. The intensity of competition was measured by the speed at which convergence towards long run average profitability was achieved. They concluded that competition was effective in eliminating excess profit over time.

Goddard et al (2010) noted that several countries had banks with a higher loan to asset ratio outperforming those with a lower ratio. Furthermore, cost efficient banks were more profitable than the less efficient banks. They concluded that cost efficiency was a more important factor in determining performance than concentration or market share. The authors also found a negative relationship to exist between the capital ratio and profitability and interpreted this to mean that the opportunity cost of high capitalization reduced shareholder returns. However, they cautioned that improvements in competition could be reversed if policy measures to deal with the credit crisis prioritize stability over competition and new barriers to competition are introduced by insulating incumbent banks from rivalry.

Mehta & Bhavani (2017) sought to establish the determinants of commercial domestic banks' profitability in the United Arab Emirates between 2006 and 2013. A regression analysis using panel data was employed. The dependent variable, profitability, was measured using ROE, ROA and Net

Interest Margin (NIM). Bank specific, industry specific and macroeconomic variables were used to represent the independent variables. The bank specific variables used were size, capital adequacy, liquidity, cost efficiency, income diversity, asset quality, risk solvency ratios and growth. The industry specific variable used was market concentration while the macroeconomic variables used were GDP and inflation. The empirical results showed that the cost efficiency, maintaining a high capital adequacy ratio, and improving asset quality were the most significant variables affecting profitability across all the measures of profitability. Additionally, diversifying income into non-traditional sources also enhanced profitability but had a negative impact on NIM. They found GDP to only impact ROA and ROE (Mehta & Bhavani, 2017).

Nguyen, Thanh & Nguyen (2018) studied the determinants of the profitability of 13 commercial banks in Vietnam from 2006 to 2015 in a bid to understand the condition of the banking sector to assist in launching suitable policies. Panel data regression analysis was used for the analysis. The dependent variables used to measure profitability were ROE, ROA and NIM. The independent variables included bank specific and macroeconomic variables of 19 domestic banks. The bank specific variables that were examined are size, liquidity, capital adequacy, ownership structure, credit risk and cost to income ratio. The macroeconomic variables studied were GDP and inflation. Based on their empirical analysis, Nguyen et al (2018) found that capital structure was positively related to NIM and liquidity was positively related to ROE. Cost to income ratio was found to have a significantly negative effect on all the measures of profitability, whereby a negative correlation represents efficiency and higher profits. Credit risk and foreign ownership also negatively affected profitability. Capital structure only a recorded a negative effect for the ROE measure while liquidity had a negative effect on both NIM and ROE measures. State ownership, size of assets, GDP and inflation did not yield any obvious relationships with profitability.

Kamau & Were (2013) sought to find out the drivers of the splendid banking sector performance in Kenya between 1997 and 2011. Specifically, they focused on finding out whether the bank performance was driven by bank structure or operating efficiency. They carried out their study using the SCP approach and Data Envelopment Analysis. The found that the source of superior performance in the Kenyan banking sector emanated from structure and collusive power and not efficiency. They postulated that high concentration and relative market powers resulted in high profitability and suggested decreasing the high concentration and market powers to reduce the superior profits and hence make the banking sector more competitive. Additionally, they also proposed that efficiency be increased by improving operating scale to reduce market concentration and in effect make the banking sector to be more competitive. They implied that increasing the size of banks would result in economies of scale and scope. They proposed for policies fostering decrease in concentration and relative market powers to be instituted to make the banking sector more competitive and redistribute profitability more evenly amongst the players. They suggested that policy directives for instance increasing capital and liquidity requirements, and deposit insurance premiums could increase the size of banks and level out the relative market power of the players thereby foster competitive pricing and operational efficiency.

Qin & Pastory (2012) examined the profitability of three Tanzanian commercial banks from 2000 to 2009. They ran a regression model to determine whether there was a significant relationship between profitability, measured by ROA, and several independent variables namely: capital adequacy, liquidity and asset quality. They found that the banks had stable profitability and that there was no significant difference in probability amongst the banks studied. This was explained by the presence of market dominance amongst the three banks that were studied. The regression model also revealed that

liquidity and asset quality positively impacted profitability. Capital adequacy and Non-Performing Loans (NPLs) were found to have negative impact on profitability.

Tan & Floros (2012) examined the determinants of profitability of Chinese banking sector between the period 2003 to 2009. They investigated the effects of bank specific, industry specific and macroeconomic variables on profitability of 101 Chinese banks. They used the Generalized Method of Moments model using unbalanced panel data set to investigate the determinants of profitability. Their empirical findings indicated that bank profitability was positively related to cost efficiency and higher banking and stock market development. Conversely, bank profitability was found to be negatively related to high taxes, high levels of capital, higher GDP growth and high level of non-performing loans. Specifically, Banks that had higher level of cost efficiency and lower taxes had high profitability. Tan et al (2012) proposed for several policy implications to improve profitability specifically controlling overhead cost so as increase efficiency; controlling loan issuance to high risk clients; setting up of policies by government to lower economic development; reduction of banks capital by the banking regulatory authority and reduction of banking sector taxes by the government and liberalizing the financial system.

2.4 Literature Review Summary and Research Gap

Literature review presents determinants of market power to be mainly bank specific factors as well as structural and macroeconomic factors and recommends for policies to be put in place to foster contestability and in effect boost competition which is expected to diminish market power of dominant players (Nekatibeb 2012, Sanya & Gartner 2012, Simpasa 2010). Simpasa (2010) suggested that greater market concentration increased the market power of banks which in turn influenced their ability to set prices. Tabak et al (2012) found that banks with increasing market power engaged in riskier

activities. However, where banks with high market power increased their capital, they became more conservative and reduced their risky behaviour to protect their equity capital. However, it is not clear on the impact of a regulatory increase on minimum core capital requirements for the entire industry on market power and in turn on the level of competition. While there is consensus amongst various authors that market concentration does influence market power, a knowledge gap exists on the effect of core capital on market power and in turn on competition. The National Treasury had envisioned that increasing the core capital would decrease the number of banks through mergers hence decrease their respective market power and in turn boost competition in the sector.

Several authors have studied the determinants of profitability classifying them as bank specific, industry specific and macroeconomic variables. While a couple of the above authors have similar findings on the determinants of profitability being efficiency, diversification of revenue, size of the bank and higher asset quality, the effect of capital on profitability seems to elicit divergent findings (Goddard et al. 2010, Kamau & Were 2013, Mehta & Bhavani 2017, Nguyen et al 2018, Qin & Pastory 2012 and Tan & Floros 2012). Mehta & Bhavani (2017) found that maintaining a high capital adequacy ratio significantly affected profitability positively for all the measures of profits. Mathuva (2009) found that simultaneously increasing the CAR and improving the CIR improved the ROA and ROE for Kenyan banks. Nguyen et al (2018) found that capital structure was positively related to NIM but had a negative effect on ROE. Tan et al (2012) found that bank profitability was negatively affected by high levels of capital and recommended for the Chinese banking regulatory authority to reduce the banks' capital requirement. Similarly, Goddard et al (2010) found that profitability was lower for the European banks that were more capitalized. Capital adequacy was found to have negative impact on profitability of Tanzanian banks (Qin & Pastory 2012). Mehta & Bhavani (2017) and Nguyen et al (2018) noted different findings on the relationship between capital structure and profitability based on

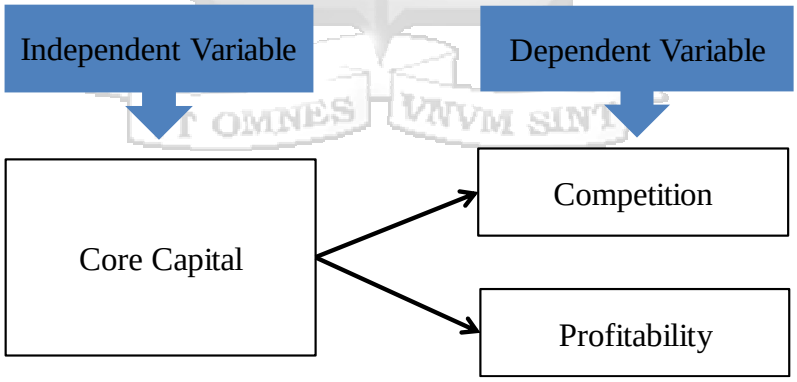
the measure of profitability that was used. A knowledge gap does exist on the effect of core capital on profitability and in turn on competition. Additionally, most studies have been done at the industry level and not at the tier peer groups that this study employs.

To the best of my knowledge, there is no study comparing the performance of the Kenyan banking sector pre and post implementation of higher core capital requirements in 2008. This study will therefore be useful in evaluating the effect of increasing core capital on competition and profitability by comparing the pre and post implementation periods.

2.5 Conceptual Framework

Core capital is the independent variable which affects the dependent variables competition and profitability in the banking sector. The conceptual framework diagram is presented in Figure 2.1 below:

Figure 2.1: Conceptual Framework



The conceptual framework implies that a policy change in the level of the minimum core capital requirement could have a positive, neutral or negative effect on competition and profitablity of banks. The National Treasury expected that bank performance would increase as a result of increasing the minimum core capital requirement. This study will look at the banking sector performance in the

period pre and post increasing the minimum core capital requirement to establish whether the increase in core capital had an effect on the level of competition and profitability.

Wong & Wong (2001) in addressing the anticipated effect of China's move to allow for participation of foreign banking entities suggested that market share is determined by a multiplicity of factors that go beyond regulation. The effects of regulation; though possible, would be affected by other market-specific factors such as institutional inter-arrangements and directed lending in the Chinese context. Rimaviciute & Vilys (2014) however posit that the level of competition in a bank is, to a large extent, affected by the number of players in control of the market share and therefore, achieving a fair balance within a banking industry would involve implementation of well-crafted regulations. To analyze the effect of increasing core capital on competition in the Kenyan banking sector, the following hypothesis was arrived at in appreciation of these opposing views emerging from literature:

Ho_1: The market power means of the two populations, that is pre- and post-higher core capital requirements, are equal hence there was no significant change in competition; and

Ha_1: The market power means of the two populations, that is pre- and post-higher core capital requirements, are not equal hence there was significant change in competition.

Polodoo et al (2014) highighted that bank perfromance as assessed through various metrics, such as ROE, is affected by several factors and is therefore impossible to establish regulation that would address all factets resulting in variability in competition. However, Joanna et al (2013) in a comparative study of regulation in Canada and USA postulated that well crafted regulations may serve to enhance competitiveness in the banking industry as has been the case in Canada whereby

profitability is dispersed among multiple players in the banking industry. To investigate the effect of increasing core capital on profitability in the Kenyan banking sector, the following hypothesis was derived from the two posited arguments and served as the basis for analysis in this study:

Ho_2: The ROE means of the two populations, that is pre- and post-higher core capital requirements, are equal hence there was no significant change in profitability; and

Ha_2: The ROE means of the two populations, that is pre- and post-higher core capital requirements, are not equal hence there was significant change in profitability.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology that was adopted for the study. It covers the following: research approach and design; population and sampling; data collection; data analysis; research quality and ethical considerations.

3.2 Research Design

This research studied the performance of the Kenyan banking industry for the period 2003 to 2016. The research adopted an exploratory study approach as it sought to gain useful insights on the effect of increasing core capital on banking performance in Kenya. The study took an exploratory approach given the nascence of the approach to regulation within the Kenyan context; that is there had not been prior adjustments to the capital requirements within the industry hence the effect resulting could not be investigated or anticipated based on data or previous research from the Kenyan market. The study applied a quantitative approach and reviewed available secondary data. The research compared the period prior to the 2008 increase in minimum core capital requirement, that is 2003 to 2008, to the period post the increase that is 2009 to 2016.

3.3 Data Collection Methods

The study relied on a quantitative approach and used secondary data. The use of secondary data enables panel studies to be carried out since it resolves the problems of costs and time constraints in collecting data (Saunders, Lewis & Thornhill, 2012). The study used available published data for 39 commercial banks for the period 2003 to 2016. This represents 93 % of the licensed banks in Kenya. The 39 commercial banks listed by the CBK as at 31st December 2016 are presented in Appendix A. This list excludes three banks that are either under receivership, under statutory management or in

receivership. Owing to the small population size, there was no sampling and the entire population was studied. The specific data that was used is core capital, ROE and net assets. Additional data that was used to represent control variables in the regression equations are gross loans and advances, non-performing loans, profit before tax, gross economic growth and inflation. This data was also obtained from CBK's Bank Supervision Annual Reports. Comparative research may be possible where comparable data is available (Saunders et al, 2012). Relying on published data from one source that is the CBK enabled comparison of the pre and post introduction of the 2008 increase in minimum core capital requirement.

3.4 Data Analysis and Presentation

Data was analysed according to the three peer groups as provided by CBK. The simple average figures of the banks in each peer group was used to represent the average for the respective group. Descriptive statistics have been presented to highlight trends in data for the various variables under study.

Profitability was measured using ROE. Berger & Bouwman (2013) define ROE as net income divided by shareholders equity. The authors argue that ROE is a comprehensive measure of profitability since both net income and shareholders' funds reflect on- and off-balance sheet activities. The authors further highlight the view that banks must allocate capital against every activity the engage in whether on- or off- balance sheet hence making the ROE measure of profitability to be comprehensive.

The Herfindahl Hirschman Index (HHI) was used to compute the market power. The basis of computing the HHI was the net assets which was used to compute the market share of each bank in the industry. The HHI was thereafter be computed for each year from 2003 to 2016 as the sum of the

squared market shares for banks competing in the same peer group. The HHI equation is provided below:

$$HHI_{1...n} = \sum_{n} \quad S_n^2$$

where S_n is the market share of firm n where n=1, 2, … and n.

However, the HHI has a limitation in that its value depends on the size of the industry such that a smaller number of banks in the industry would imply high market concentration which may not necessarily be the case. This is corrected by including the natural log of the number of banks in the market to the relationship between the H statistic and the HHI. It is however noteworthy that this correction was applied as a cautionary measure given that banks in Kenya are considered overpopulated in comparison to other African countries like Nigeria and South Africa (Cytonn Investment, 2015).

The dataset was paired with pairings being between the period 2003 to 2014 such that each pre 2008 year would be paired with a post 2008 year in ascending order. The regresssion and descriptive models would however include all post 2008 data in analyzing trends for the post-regualtion period.

To respond to the postulated hypotheses, data was analysed using the paired t-test and multi variate regression equations. A paired t-test was conducted to assess whether there was a change in competition in the banking sector following introduction of higher minimum core capital requirements. A paired t-test examines the means of individual differences of paired measurements and is therefore appropriate for pre-and post-situations (Park, 2009). The paired t-test is also appropriate in assessing two populations based on their means in cases where observations in either

dataset cannot be rendered as independent observations (Park, 2009). This test was chosen since the independence of the two study periods that is, pre- and post-2008, could not be established given that most banks in operation prior to the introduction of the higher capital requirements remained in the industry. This test compared profitability and market power given the level of core capital for the period 2003 to 2008 against the period 2009 to 2016.

Regression equations were formulated to assess whether there was a change in the relationship between the variables under study within the pre and post regulation periods. These models were used to shed light on the possible effects of regulation as a change in the relationship would be attributed to the change in regulation. Observed changes in relationships could be used to inform the potential impact of future increases in core capital, which is a topical issue in parliament.

Standard multiple linear regression equations were computed for each of the two periods with the intention of assessing any changes in association of variables. The significance value attached to each coefficient was used to assess its validity at alpha 0.05. The equations took the following forms:

For competition:

$HHI = a + b_1CC + b_2TD + b_3PBT + b_4GEG + b_5I + e$

Where:

HHI	=	HHI
'a'	=	represents the y-intercept;
'b_1'	=	magnitude of change in HHI with change in CC
'CC'	=	Core Capital
'b_2'	=	magnitude of change in HHI with change in TD
'TD'	=	Total Deposits

‘b_3’ = magnitude of change in HHI with change in PBT

‘PBT’ = Profit Before Tax

‘b_4’ = Magnitude of change in HHI with change in GEG

‘GDP’ = Gross Economic Growth

‘b_5’ = Magnitude of change in HHI with change in I

‘I’ = Inflation

‘e’ = error term

For profitability:

$ROE = a + b_1CC + b_2TD + b_3 PBT + b_4GEG + b_5I + e$

ROE = ROE

‘a’ = represents the y-intercept;

‘b_1’ = magnitude of change in ROE with change in CC

‘CC’ = Core Capital

‘b_2’ = magnitude of change in ROE with change in TD

‘TD’ = Total Deposits

‘b_3’ = magnitude of change in ROE with change in PBT

‘PBT’ = Profit Before Tax

‘b_4’ = Magnitude of change in ROE with change in GEG

‘GEG’ = Gross Economic Growth

‘b_5’ = Magnitude of change in ROE with change in I

‘I’ = Inflation

‘e’ = error term

The tools that were used to carry out the analysis are the Statistical Package for the Social Sciences (SPSS) software and Microsoft Excel 365/XLSTAT.

3.5 Measurement of Variables

The table below presents the measurement of variables used in the study

Variable	**Measurement**
Core Capital (CC)	The total shareholders' funds
Gross Domestic Product (GDP)	Annual percentage change in the gross domestic product
Gross Loans and Advances (GLA)	Gross loans and advances to customers before allowances for impairment
Herfindahl Hirschman Index (HHI)	$HHI_{1...n} = \sum_{n} S_n^2$ That is the sum of the square of the market shares of all the banks in the respective peer group
Inflation	Annual percentage increase in the level of prices of goods and services
Market share	Total assets of each bank divided by the total assets for all the banks in the respective peer group
Profit before tax	Profits before deducting tax
Return on Equity (ROE)	Net profit divided by total shareholders' funds
Total Deposits (TD)	Total deposits received from government, parastatals, private sector and individuals

3.6 Research Quality

Research quality is assured by ensuring that research findings established can be said to have reliability and validity. According to Saunders et al (2012), "reliability refers to whether your data collection techniques and analytic procedures would produce consistent findings if they were repeated in another

occasion or if they were replicated by a different researcher". Reliability will be assured in this study by having a clear research methodology which details the data analysis procedure. Additionally, adopting quantitative research methods fosters reliability, objectivity and independence of the researcher.

This research focused on 39 banks over a period of thirteen years hence sufficient data will be collected to ensure the validity of inferences to be presented. Data to be used for analysis is provided by the CBK hence boosting data quality. Further, adoption of a quantitative approach will boost internal validity for example absence of participants in the study will mitigate threats to internal validity which might be affected by threat of the impact of past or recent events which changes participants perceptions and present a threat of incorrect responses.

"External validity refers to the ability to generalize research findings to other relevant groups" (Saunders et al, 2012). External validity will be enhanced by using data from all the 39 commercial banks in Kenya as at 31st December 2016. This will boost the ability of the findings of this study to be used to predict the effect of future core capital increases in the banking sector.

3.7 Ethical Considerations

The study takes a retrospective data analysis approach; as such, information collected will be from published information that is publicly available. This approach thereby eliminates chances of breaching participants' confidentiality and anonymity. The collection of data primarily from the CBK repository further ensures that possible negative depictions of institutions are not arrived at because of analysis of contentious data.

CHAPTER 4: PRESENTATION OF FINDINGS

4.1 Introduction

This chapter presents the findings from the data analysis. The chapter is divided into three main sections namely: descriptive statistics, inferential statistics and regression analysis.

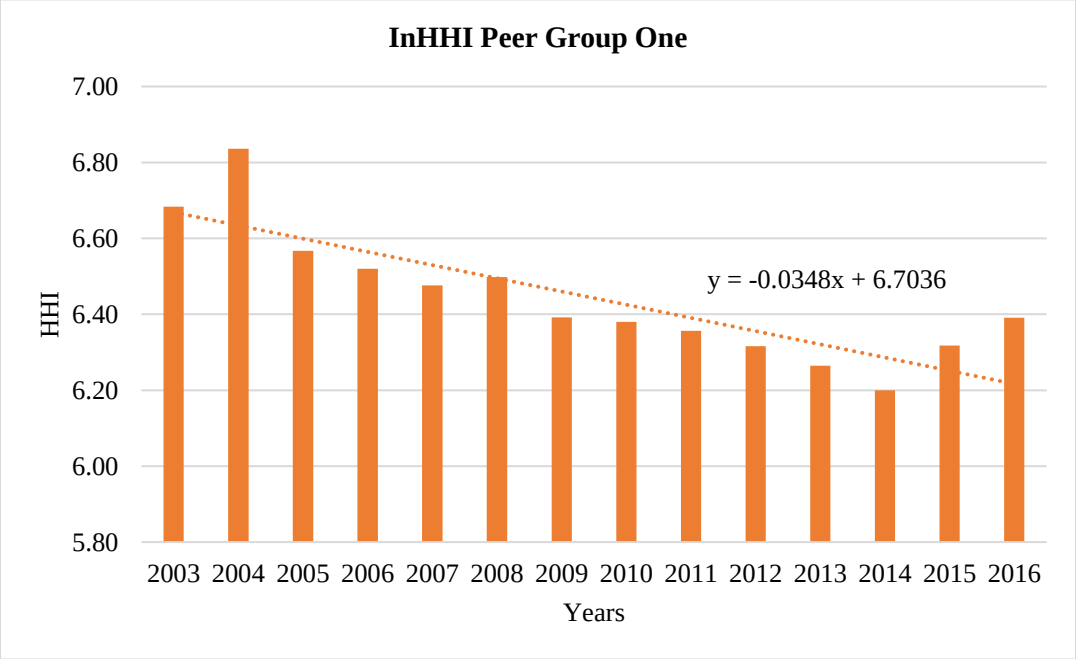
4.2 Descriptive Statistics

This section provides graphic representation of data to allow for highlighting of trends within the various datasets.

4.2.1 Competition

Data was collected and stratified according to the three peer groups as indicated in Appendix B. Graphs were then created to indicate the general trends for the various peer groups to provide a basis of comparison. Figures 4.1 to 4.3 indicate the trends for the various peer groups.

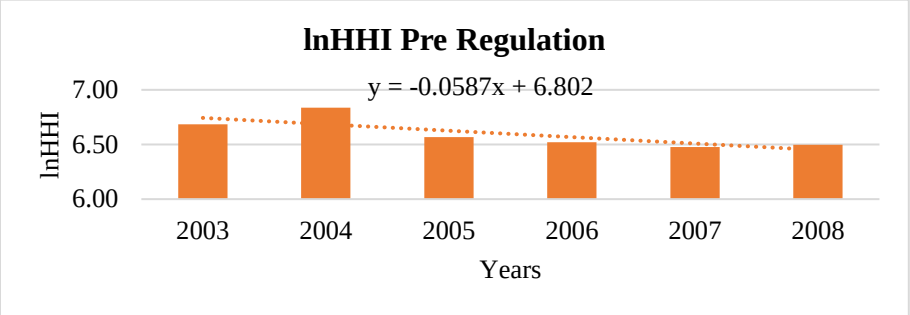
Figure 4.1 lnHHI Peer Group One



The general trend from 2003 to 2016 in the InHHI dataset presents a decline in market concentration indicating an increase in competition amongst peer group one banks. On average, peer group one had

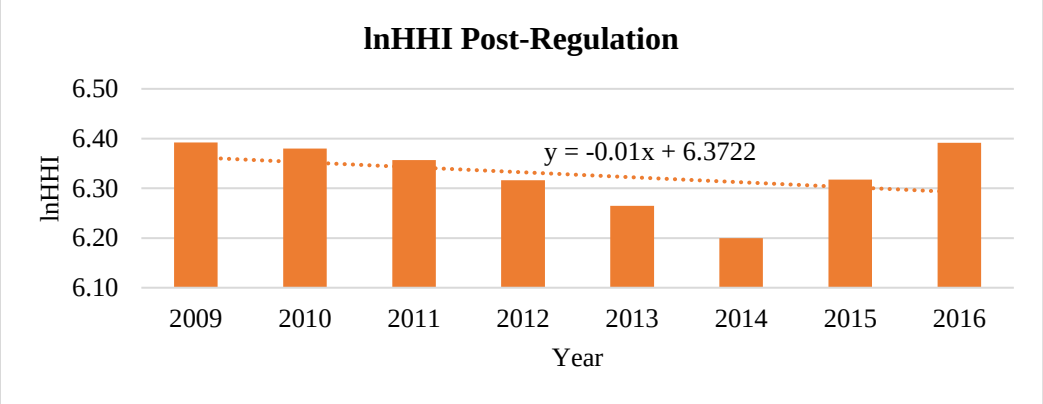
the highest level of market power amongst the three peer groups over the thirteen years as indicated by an average lnHHI of 6.44. The trend was further investigated to assess pre and post-regulation behaviour. Figures 4.2 and 4.3 provide the output derived from the segmented data.

Figure 4.2 Pre-Regulation Peer Group One



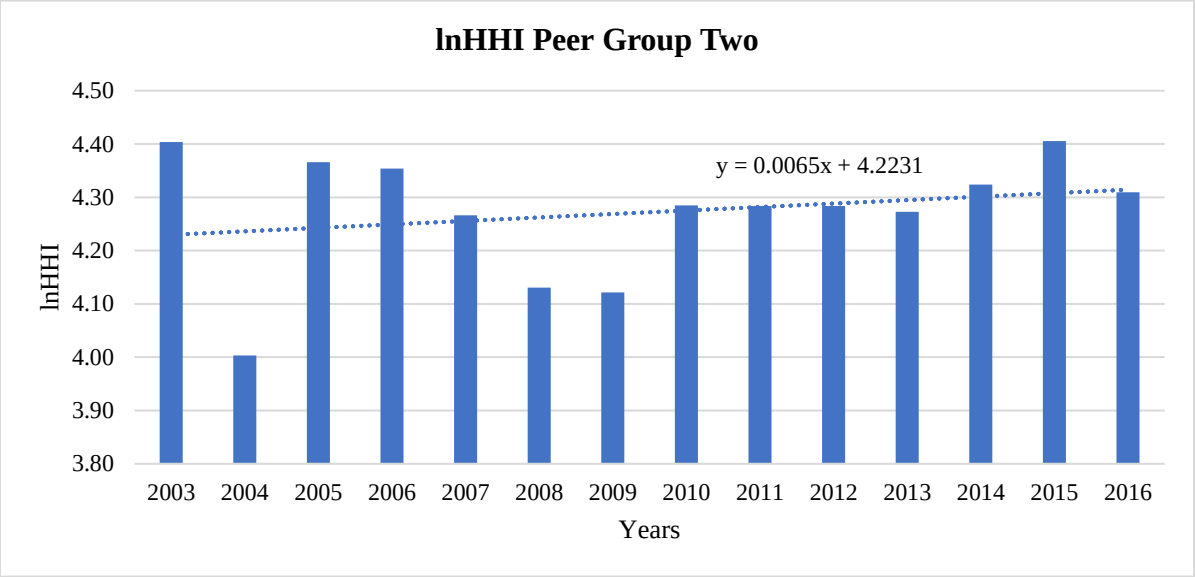
The trendline generated for the pre-regulation period, with change in HHI viewed as a function of time, indicated a coefficient of -0.0547. There was a general decline in competition for the stipulated period.

Figure 4.3 Post Regulation Peer Group One



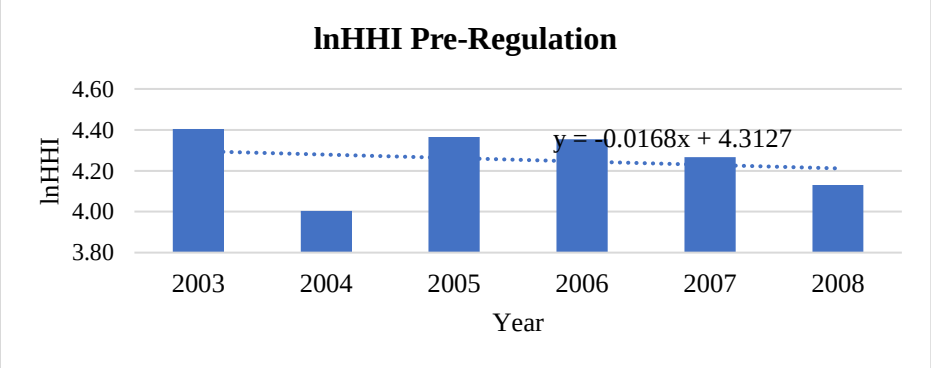
An analysis of the general trend in competition in the peer group one as indicated by HHI in the post regulation period indicated a less steep decline in competition as assessed from the trendline indicating competition (InHHI) as a function of time. This indicates that the general decline in competition was less pronounced in the post regulation period.

Figure 4.4 lnHHI Peer Group Two



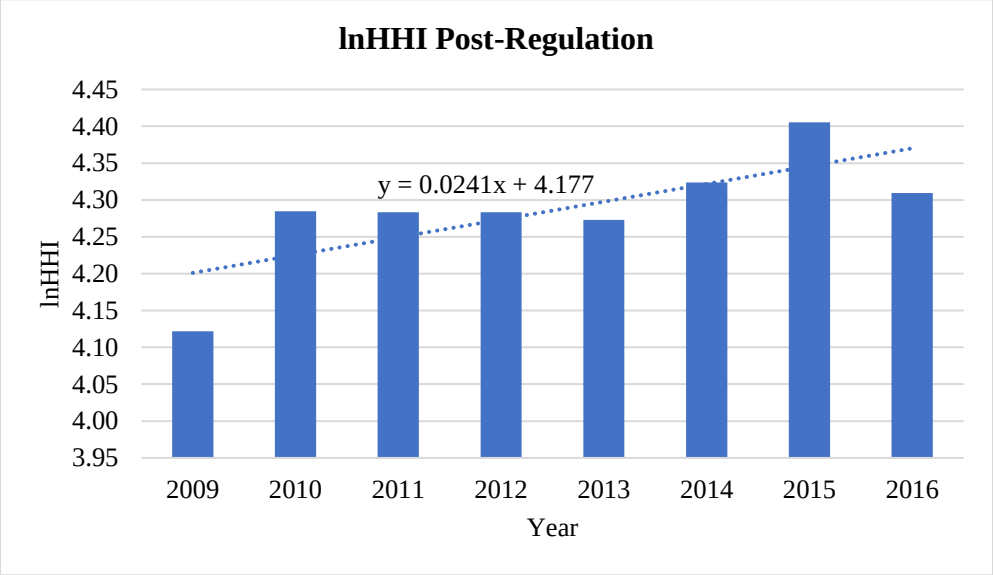
According to the trend observed in peer group two between 2003 and 2016, there was a gradual increase in market power among the banks in this category. The trend in this peer group contrasted with that of peer group one banks which were generally observed to decrease in market power. Peer group two banks had a lower average lnHHI of 4.27 over the thirteen-year period compared to peer group one bank's average of 6.44. However, peer group two had a higher average lnHHI than peer group three banks which averaged 1.18. To assess the general trend between the two periods, further graphs were generated and are presented in figures 4.5 and 4.6.

Figure 4.5 Pre-Regulation Peer Group Two



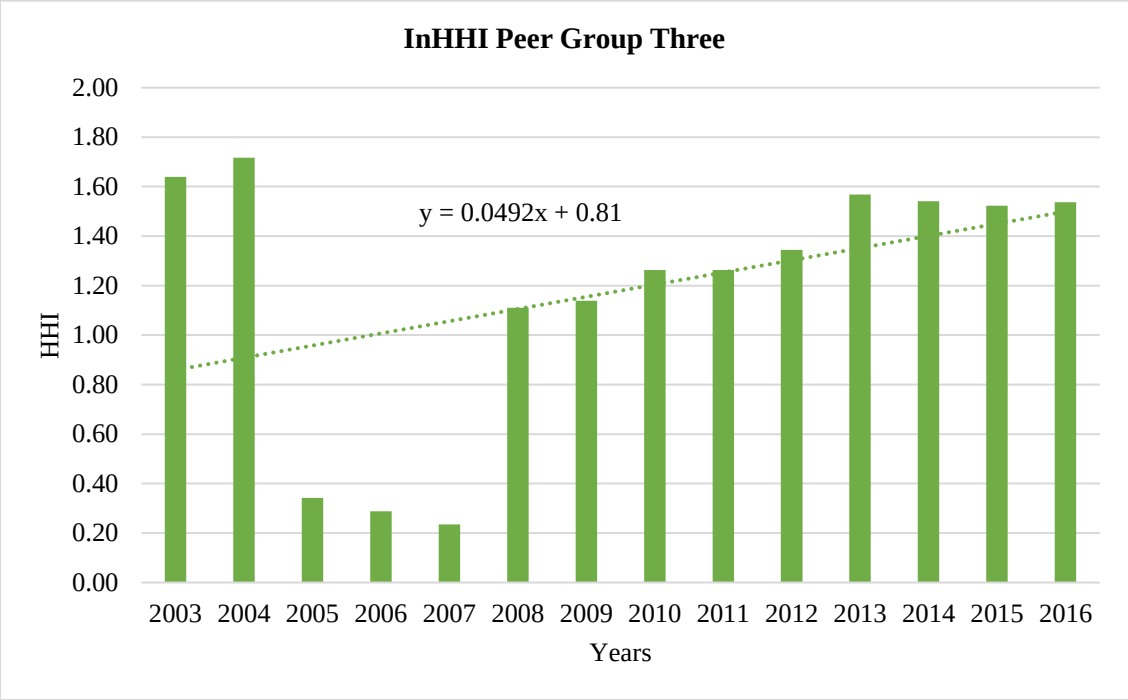
The coefficient, with change in HHI as a function of time, for the pre-regulation period was -0.0168 thereby indicating a general increase in competition within the peer group two. This indicated that prior to implementation of the regulation, there was a general increase in competition hence the effect of the regulation would be viewed in light of this pre-existing trend.

Figure 4.6 Post-Regulation Peer Group Two



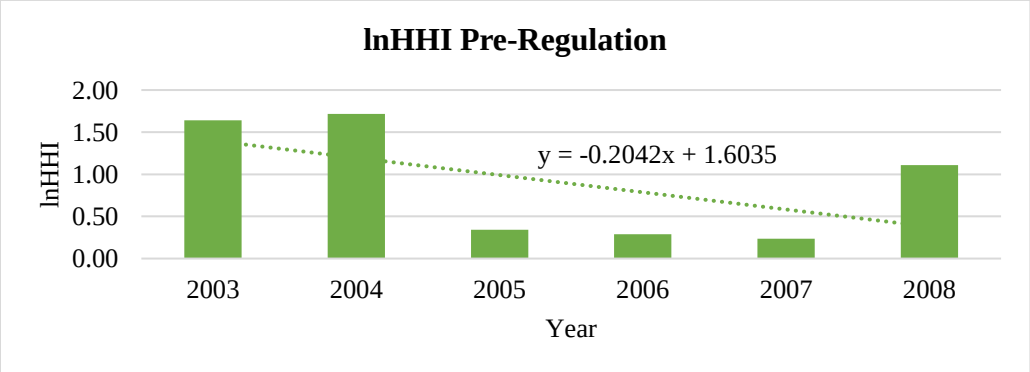
The coefficient, for the post-regulation period was 0.0241 indicating an increase in HHI with time. Contrasting this with the prior observed decline in competition in the pre-regulation period, it may be viewed that the regulation had an unanticipated impact for this peer group.

Figure 4.7 InHHI Peer Group Three



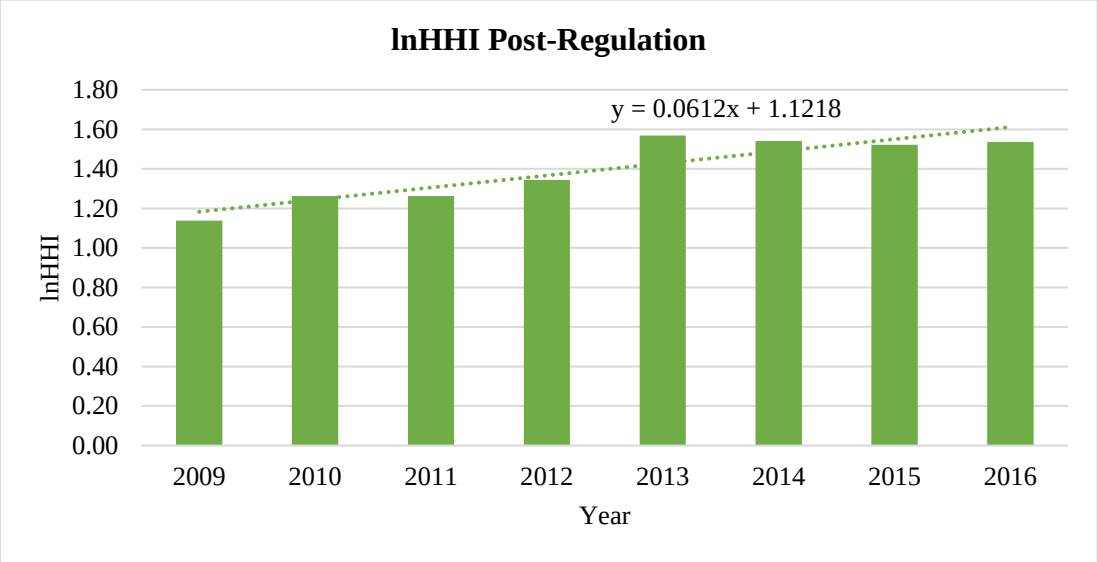
The HHI index increased in all years except 2005 to 2007 for the peer group three banks between 2003 and 2016. The overall increase in the HHI represents declining competition amongst the banks in this peer group. Overall, the increase in market power over the years was significantly steeper than that observed in the peer group 2 banks. However, on average, peer group three banks had the lowest level of HHI between 2003 and 2016 of 1.18. This implies that this is the most competitive peer group amongst the three groups. A further analysis of the data for the two periods is presented in figures 4.8 and 4.9.

Figure 4.8 Pre-Regulation Peer Group Three



There was a general decline in market power for the peer group leading up to 2008. This is inferred from the -0.2042 coefficient with competition (InHHI) viewed as a function of time. This therefore indicates that there was a trend towards decrease in disparity in market share for the peer group.

Figure 4.9 Post-Regulation Peer Group Three



Following the introduction of the regulation, it was observed that there was an increase in HHI within the group as inferred from the 0.0612 coefficient with competition viewed as a function of time. From the observation, it may be inferred that the regulation may contribute to a decrease in competition within the peer group.

4.2.2 Profitability

This section provides graphical representations of the trends observed in profitability of the banks by according to each peer group.

A pre and post analysis of trends in profitability indicated that there was a general increase in profitability in the pre-regulation period and a decline in profitability in the post regulation period among peer group one banks. This is indicated by the coefficients of 0.9158 and -0.0922 for the pre and post regulation periods respectively. This therefore indicated that there was a decrease in ROE for

the peer group following introduction of the regulation. The ROE trends for the pre and post regulation period for peer group one banks are presented in figures 4.10 and 4.11.

Figure 4.10 Pre-Regulation Peer Group One

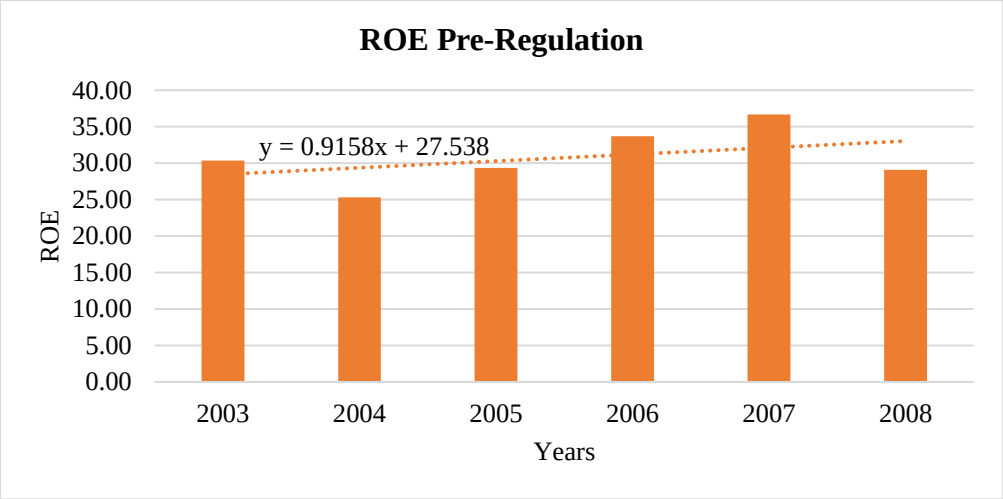
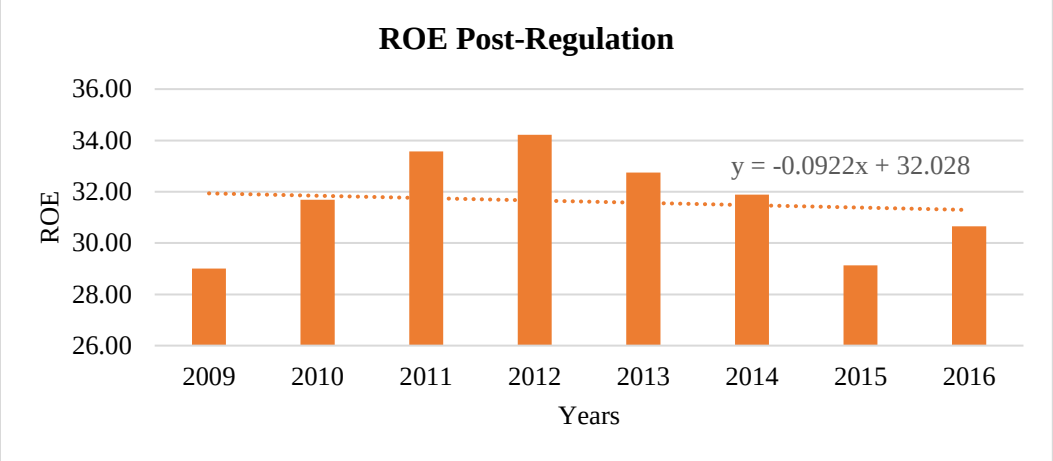


Figure 4.11 Post-Regulation Peer Group One



A trend analysis of profitability among peer group two banks indicated an increase in ROE during the pre-regulation period. This trend however revered following introduction of regulations thereby indicating that there was a decrease in profitability within this peer group. The pre and post regulation trend analysis of ROE is presented in figures 4.12 and 4.13.

Figure 4.12 Pre-Regulation Peer Group Two

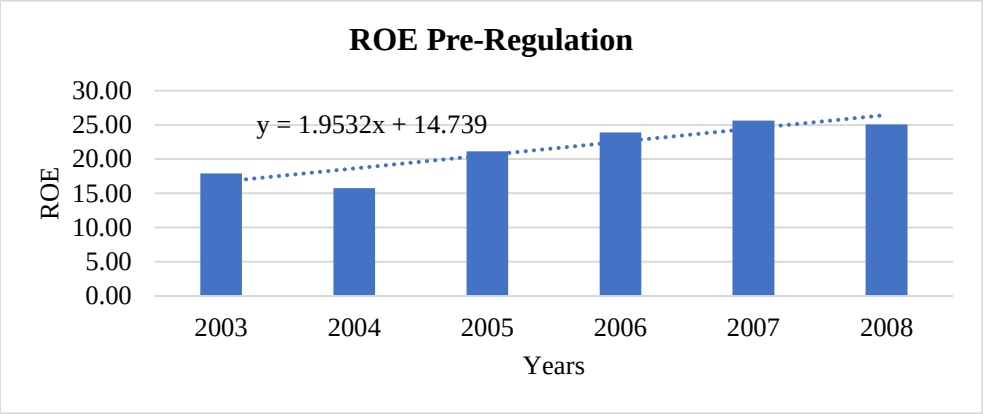
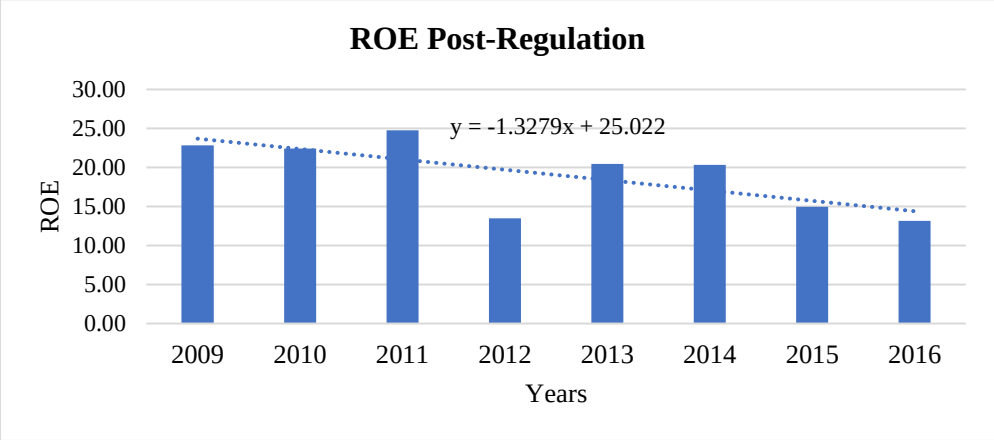


Figure 4.13 Post-Regulation Peer Group Two



A similar profitability trend analysis for peer group three banks was carried out. Both pre and post-regulation periods experienced a decline in ROE. The decline was however steeper following the introduction of regulation thereby indicating this may have had a negative impact on profitability within the peer group. The trends are presented in figures 4.14 and 4.15

Figure 4.14 Pre-Regulation Peer Group Three

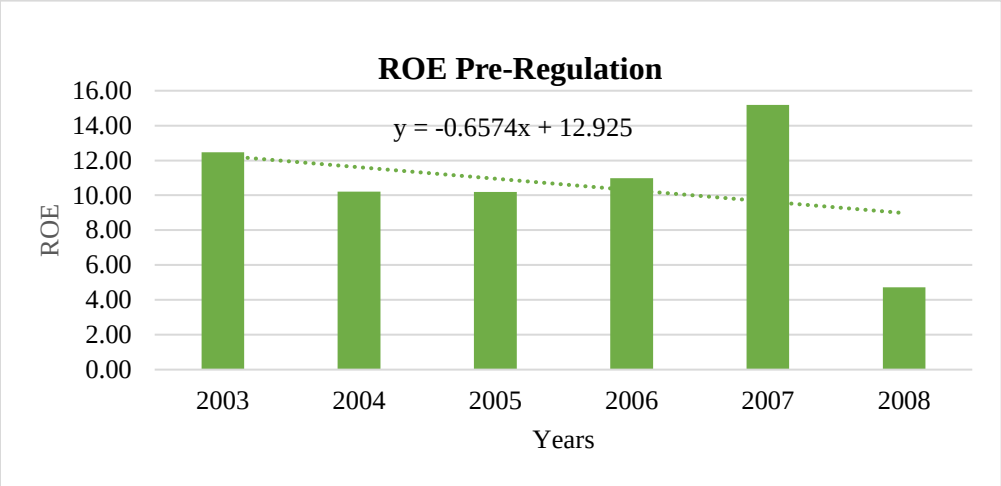
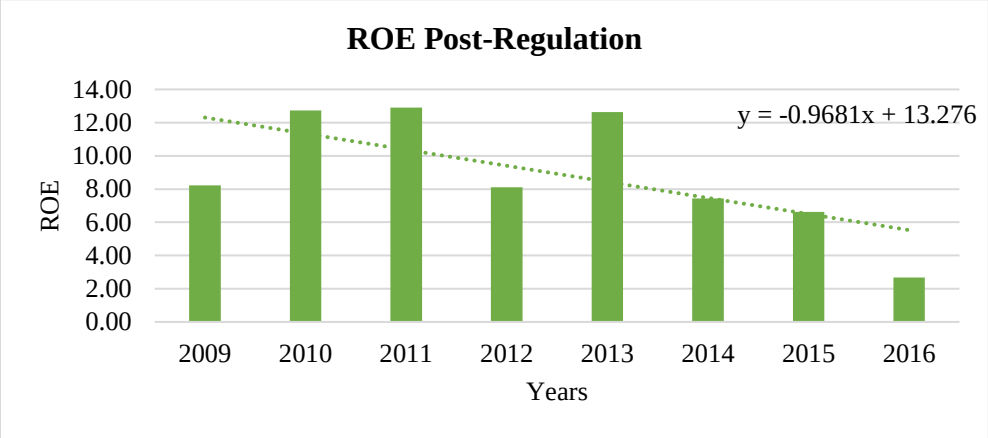


Figure 4.15 Post-Regulation Peer Group Three



4.3 Inferential Statistics

This section assesses the hypothesis constructed for the study. A total of four literature-derived hypothesis were put forward in assessing profitability and competition in the industry. These are addressed herein.

The two hypotheses put forward in assessing competition are:

Ho_1: The market power means of the two populations, that is pre- and post-higher core capital requirements, are equal hence there was no significant change in competition; and

Ha_1: The market power means of the two populations, that is pre- and post-higher core capital requirements, are not equal hence there was significant change in competition.

The hypotheses put forward in assessing profitability are:

Ho_2: The ROE means of the two populations, that is pre- and post-higher core capital requirements, are equal hence there was no significant change in profitability; and

Ha_2: The ROE means of the two populations, that is pre- and post-higher core capital requirements, are not equal hence there was significant change in profitability.

To address the hypotheses, paired Student's T-tests were conducted. Tables 4.1, 4.2 and 4.3 provide a summary of the resulting test statistics for the three groups.

Table 4.1 Objective One Paired Samples T-test

	Paired Differences							
	Mean	**Std. Deviation**	**Std. Error Mean**	**95% Confidence Interval of the Difference**		**t**	**df**	**Sig. (2-tailed)**
				Lower	**Upper**			
Peer Group One	0.28	0.10	0.04	0.18	0.38	7.034	5	0.001
Peer Group Two	-0.01	0.20	0.08	-0.22	0.21	-0.094	5	0.929
Peer Group Three	-0.46	0.79	0.32	-1.29	0.36	-1.447	5	0.208

Table 4.2 Objective Two Paired Samples T-test

	Paired Differences							
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Peer Group One	-1.44	3.78	1.54	-5.41	2.52	-0.936	5	0.392
Peer Group Two	0.86	6.87	2.80	-6.35	8.07	0.308	5	0.770
Peer Group Three	0.28	3.26	1.33	-3.14	3.71	0.212	5	0.841

The three peer groups were assessed for difference in competition (InHHI) and profitability (ROE) in the pre and post-regulation periods. Results indicated that only peer one had a significant change in competition within the period (t-statistic 7.034 and significance value lower that 0.01); neither peer group two nor three showed a significant change in competition during the periods as the means of the two periods were assessed to be of no statistically inferred difference. The alternative hypothesis indicating difference in the means of the two populations for competition was thereby accepted for peer group one. The null hypothesis of no difference could not be rejected for peer group two and three as pertains to both competition and profitability whereas for all groups, the null hypothesis of no difference in the means of the two periods for profitability could not be rejected.

4.4 Regression Analysis

Regression analysis was applied to assess pre and post regulation relationship between the dependent variables ROE and HHI and the independent variables core capital, total deposits, profit before tax, inflation and growth in GDP. Computation of the regression model for both dependent variables with the inclusion of all variables indicated an R-square value of 1 thereby pointing to the possible existence of multi-collinearity in the dataset. To address the concern, the financial indicators where regressed independently of the macro-economic indicators (GDP and Inflation) to assess the effect of the various variables in two distinct models per period; this addressed the multi-collinearity concern. The resulting

pre and post coefficients for banking and macroeconomic indicators are compared in subsequent sub-sections.

4.4.1 Competition

The influence of the various dependent variables in the pre and post-regulation periods was varied as indicated by the changes in coefficients. As depicted in table 4.3, the y-intercept (the base HHI value when all independent variables were at 0) changed from 1,305.51 to 573.057 between the pre and post regulation periods respectively for peer group one banks, 128.66 to 58.94 for peer group two banks and 12.34 to 1.95 in peer group three banks. The y-intercept was the only significant coefficient. The general trend in decrease in HHI across the peer groups, as indicated by the decrease in the intercept, therefore indicated that there was a change in the relationship between the variables in the two periods. In assessing the relationship between the macroeconomic indicators as explanatory variables to changes in competition, it emerged that, as with banking-sector metrics, the y-intercept was the only statistically significant coefficient at alpha 0.05. The changes in the base value (y-intercept) across the two periods – pre and post regulation – as indicated in table 4.4 were 545.38 to 555.94 for the peer group one, 105.54 to 62.4, and 2.285 to 3.711 for peer groups two and three respectively. This therefore indicated that there was a change in the relationship between the variables in the peer groups in the two periods. Full disclosure of results are provided in Appendix C.

Table 4.3 Banking Metrics Regression Coefficients - Competition

		Banking Indicators			
		Pre-Regulation		**Post Regulation**	
Peer Group 1	R-square	0.768		0.428	
		Coefficients	***P-value***	***Coefficients***	***P-value***
	Intercept	1305.51	0.05	573.057	0.00
	Core capital	0	1.00	0.009	0.21
	Total deposits	-0.01	0.40	0.002	0.24
	Profit before tax	0.05	0.66	0.002	0.686
Peer Group 2	R-square	0.442		0.814	
		Coefficients	***P-value***	***Coefficients***	***P-value***
	Intercept	128.66	0.23	58.94	0
	Core capital	0.02	0.41	0	0.16
	Total deposits	-0.01	0.43	0	0.09
	Profit before tax	0.06	0.55	0	0.8
Peer Group 3	R-square	0.573		0.966	
		Coefficients	***P-value***	***Coefficients***	***P-value***
	Intercept	12.34	0.21	1.95	0
	Core capital	0.03	0.45	0	0.31
	Total deposits	-0.01	0.34	0	0.68
	Profit before tax	0.01	0.84	0.01	0.07

Table 4.4 Macroeconomic Metrics Regression Coefficients - Competition

		Macroeconomic Indicators			
		Pre-Regulation		**Post Regulation**	
Peer Group 1	R-square	0.263		0.008	
		Coefficients	***P-value***	***Coefficients***	***P-value***
	Intercept	545.38	0.12	555.94	0.00
	GDP-Pre	14.6	0.68	-0.05	1.00
	Inflation-Pre	11.86	0.39	0.67	0.85
Peer Group 2	R-square	0.88		0.273	
		Coefficients	***P-value***	***Coefficients***	***P-value***
	Intercept	105.54	0	62.4	0
	GDP-Pre	-2.59	0.13	1.81	0.24
	Inflation-Pre	-2.12	0.02	0.05	0.92
Peer Group 3	R-square	0.437		0.072	
		Coefficients	***P-value***	***Coefficients***	***P-value***
	Intercept	2.285	0.611	3.711	0.018

	GDP-Pre	-0.22	0.696	0.098	0.609
	Inflation-Pre	0.165	0.442	-0.022	0.719

4.4.2 Profitability

The influence of the various dependent variables in the pre and post-regulation periods, as was with the case with competition, was different as assessed by the coefficients of the various explanatory variables as depicted in table 4.5. The y-intercept (the base ROE value when all independent variables were at 0) changed from 21.57 to 31.752 between the pre and post regulation periods respectively for peer group one banks, 11.314 to 25.206 for peer group two banks and 4.463 to 10.757 in peer group three banks. The y-intercept was the only significant coefficient. The general trend in increase in ROE across the peer groups, as indicated by the increase in the intercept, therefore indicated that there was a significant change in the relationship between the variables over the two periods. This difference could be as a result of the change in regulation. However, it is important to note that the intercept was the only statistically valid coefficient at alpha 0.05. In assessing the relationship between the macroeconomic indicators as explanatory variables to changes in profitability, it emerged that, as with banking-sector metrics, the y-intercept was the only statistically significant coefficient at alpha 0.05. The changes in the base value (y-intercept) across the two periods – pre and post regulation – as indicated in table 4.6 were 33.86 to 29.36 for the peer group one, 29.36 to 15.36, and 9.86 to 3.06 for peer groups two and three respectively. This therefore indicated that the general relationship between the variables changed between the two periods; this change may be attributed to the change in core-capital requirements. It is however noteworthy that the intercept was the only significant determinant in the model except for total deposits and profit before tax or peer group three banks in the post regulation period. Full disclosure of results are provided in Appendix C.

Table 4.5 Banking Metrics Regression Coefficients - Profitability

		Banking Indicators			
		Pre-regulation		**Post Regulation**	
Peer Group 1	R-square	0.765		0.408	
		Coefficients	***P-value***	***Coefficients***	***P-value***
	Intercept	21.57	0.19	31.752427	0.00
	Core capital	0.002606	0.22	-0.000075	0.88
	Total deposits	-0.000157	0.79	-0.000003	0.97
	Profit before tax	0.000417	0.92	0.000194	0.19
Pee r Gr	R-square	0.931		0.563	

		Coefficients	***P-value***	***Coefficients***	***P-value***
	Intercept	11.314	0.378	25.206	0.01
	Core capital	0.003	0.325	-0.002	0.465
	Total deposits	0	0.914	0	0.882
	Profit before tax	0.011	0.447	0.004	0.581
Peer Group 3	R-square	0.738097		0.96204	
		Coefficients	***P-value***	***Coefficients***	***P-value***
	Intercept	4.463	0.674	10.757	0.002
	Core capital	-0.012	0.798	0.003	0.235
	Total deposits	0.003	0.826	-0.003	0.012
	Profit before tax	0.083	0.219	0.081	0.004

Table 4.5 Macroeconomic Metrics Regression Coefficients - Profitability

		Macroeconomic Indicators			
		Pre-regulation		**Post Regulation**	
Peer Group 1	R-square	0.465		0.115	
		Coefficients	***P-value***	***Coefficients***	***P-value***
	Intercept	33.86	0.02	29.36	0.00
	GDP-Pre	0.23	0.83	0.3	0.59
	Inflation-Pre	-0.41	0.35	0.08	0.66
Peer Group 2	R-square	0.076		0.223	
		Coefficients	***P-value***	***Coefficients***	***P-value***
	Intercept	29.36	0.1	15.36	0.07
	GDP-Pre	-0.11	0.94	0.08	0.95
	Inflation-Pre	-0.21	0.69	0.43	0.29
Peer Group 3	R-square	0.597		0.238	
		Coefficients	***P-value***	***Coefficients***	***P-value***
	Intercept	9.86	0.2	3.06	0.59
	GDP-Pre	0.71	0.42	0.73	0.46
	Inflation-Pre	-0.25	0.43	0.24	0.45

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a discussion of the data analysis, conclusions, recommendations and areas for further studies. The objectives of the study were two-fold namely: to analyse the effect of increasing core capital on competition and to investigate the effect of increasing core capital on profitability in the Kenyan banking sector.

5.2 Discussion

This section provides an explanation of the various findings for each objective considering the literature review.

5.2.1 The Effect of Increasing Core Capital on Competition in the Kenyan Banking Sector

The descriptive assessment of trends in competition indicated a general decline in market power among peer group one banks and a general increase in peer group two and three banks. However, for peer group two, it was observed that the general increase was attributed to increase in post regulation increases as the pre-regulation period observed a decrease in HHI. This therefore indicates that there was higher market concentration in the post-regulation period than in the pre-regulation period. The regulation, particularly for this peer group, did not seem to have a positive impact on competition. This finding is in keeping with Wong & Wong's (2001) observations that increase in competition within an industry requires more than regulation and as such, factors like collusions may result in decreased competition even though policies combating competition may be at play. Inferencing based on the two hypotheses in assessing competition indicated that there was a significant change in competition in peer group one following introduction of regulation. From the regression equations assessing the relationship between banking and macroeconomic metrics in the pre and post-regulation periods, it emerged that, as deduced from the significant coefficients, that there was a marked change in the relationship between the metrics. This change however, could have arisen from many factors

including the change in core-capital requirements. This finding is in line with Joanna's et al (2013) observation that well-crafted regulations serve to decrease deleterious market power. However, given that the change in competition was observed solely for the first group as inferred from the t-test results, it was observed that the benefits may not have been felt by the lower peer groups. In relating these findings to the Modigliani-Miller Theorem, the changes in competition and profitability within the industry may be attributed to changes in the sourcing of finances to adhere to the core-capital requirements instituted by the change in regulation. The marginal change in competition observed in peer group two therefore indicate that the market structure, according to the Neo-Classical theory, tends towards an oligopoly as changes in regulation intended to increase the competitive ability of peer group two banks did not have the anticipated effect.

5.2.2 The Effect of Increasing Core Capital on Profitability in the Kenyan Banking Sector

The findings as depicted in descriptive statistics indicate that there is a general upward trend in ROE for pre-regulation periods as observed in peer groups one and two. This trend was however not observed in peer group three banks. In the post regulation periods, all three tier groups observed an average decline in ROE thereby indicating a possible negative effect on profitability resulting from introduction of the core capital regulations. However, as observed through the Paired-T-test results, it emerged that there was no statistically significant difference between the means of the three groups over the pre and post-regulation periods. However, as was the case with competition, all pre and post regression equations differed markedly in the composition of the explanatory variables and magnitude as deduced from the significant coefficients. This indicates that there was a change in profitability in the industry between the pre and post regulation period. This change however, could have arisen from many factors including the change in core-capital requirements. The general finding of decrease in profitability for peer group three banks is contrary to postulations by Kamau & Were (2013) who indicated that Kenyan banks remain profitable despite poor economic conditions. The mixed findings

are however in keeping with those put forward by Tan & Floros (2014) who indicated that the multiplicty of factors at play in a local economy render individual cause-and-effect models improbable and therefore establishing a casue-and-effect model for sole factors, such as regulation, may not be feasible. As inferred from the Neo-Classical and Structure Conduct Performance theories, peer group one banks continue to enjoy growing profitability possibly due to their control of the market by virtue of their high market shares.

5.3 Conclusion

The main objective of the study was the assess the change in competition and profitability, or lack thereof following the introduction of higher core capital requirements in 2008. The findings from the objectives assessing the two metrics, that is competition and profitability, indicated that the only statistically valid difference in competition, as indicated by HHI, was among peer group one banks, and that no statistically valid difference was observed in profitability of peer groups one through three for the period. This therefore indicated that the effectiveness of regulation could generally not be substantiated by differences in HHI and profitability means over the period for all peer groups. Regression equations for the relationship between the dependent variables HHI and ROE and the independent variables of core capital, profit before tax, total deposits, inflation and change in GDP however indicated that the contribution of each variable to respective dependent variables was varied over the two time periods. The coefficients for the variables were not significant at alpha 0.05 for the independent variables.

The trends assessment of the two metrics generally indicates that regulations, may not necessarily be viewed as having a directly inferable effect on competition and profitability. As observed from the trends in HHI and ROE, it was viewed that in both cases, most peer groups indicated an increase and decline, respectively, in the metrics therefore indicating a tendency towards decreased market concentration and profitability following an increase in core capital. The observed trend in decline in

ROE among peer group three banks was particularly noteworthy as regulations were aimed at improving the competitiveness of smaller banks. It was however observed that the reported ROEs following the 2008 regulations showed a steeper decline than they did pre-2008. This observation was further emphasized by trends in peer group two banks which observed an increasing trend in ROE pre-2008 but a decreasing trend post 2008. It is however noteworthy that the factors affecting the profitability and competition of banks are not restricted to regulation and thus the effectiveness of the regulation cannot be solely inferred from the aforementioned trends.

5.4 Recommendations

The findings therefore indicate that the regulatory approach in the industry may require modification to be more efficacious. The effect of increasing core capital affected the banking performance measures of competition and profitability for the different peer groups in different ways. The regulator could therefore explore the possibility of having some policies differentiated according to each peer group requirement while still maintaining other policies to cover the entire banking industry.

5.5 Limitations and Areas for Further Study

The main limitation observed in this study was the glaring size differential of the different banks in the industry hence the study could not be done at an industry level. Secondly, bank level data was could not be fully provided by the CBK due to legal constraints that limit the institution from availing certain data of the banks. Additionally, a gap was identified in the variability of the regression models generated. The equations differed widely in composition of explanatory variables and magnitude therefore indicating the presence of intervening variables that hinder the accurate depiction of relationships between the variables under study. It is therefore necessary for further studies to be conducted to assess the underlying factors behind the variability in both pre and post-regulation regression models so as to gain deeper understanding into the relationship between the various reported bank metrics.

REFERENCES

Akomea, S. Y., & Adusei, M. (2013). Bank Recapitalization and Market Concentration in Ghana's Banking Industry: A Herfindahl-Hirschman Index Analysis. *Global Journal of Busines Research*, 31-45.

Berger, A., & Bouwman, C. (2013). How Does Capital Affect Bank Performance During Financial Crises? *Journal of Financial Economics*, 147-176.

Central Bank of Kenya. (2003 to 2016). *Bank Supervision Annual Report.* Nairobi: Central Bank of Kenya.

Cytonn Investments. (2015). *Kenya Listed Commercial Banks Analysis: Cytonn Q3 2015 Banking Sector Report* . Nairobi : Cytonn Investments.

Fungacova, Z., Solanko, L., & Weill, L. (2010). Market power in the Russian banking industry. *Economie Internationale*, 154.

Goddard, J., Liu, H., Molyneux, P., & Wilson, J. (2010). *Do Banks Profits Converge?* Gwynedd: Bangor Business School, Bangor University.

Gudmundsson, R., Ngoka-Kisinguh, K., & Odongo, M. T. (2013). *The Role of Capital Requirements on Bank Competition and Stability: The Case of the Kenyan Banking Industry.* Nairobi: Kenya Bankers Association.

Kamau, A., & Were, M. (2013). What Drives Banking Sector Performance in Kenya? *Global Business and Economics Research Journal*, 45-59.

Keat, P., Young, P., & Erfle, S. (2014). *Managerial Economics: Economic Tools for Today's Decision Makers.* Essex: Pearson.

Mathuva, D. (2009). Capital Adequacy, Cost Income Ratio and the Performance of Commercial Banks: The Kenyan Scenario. *The International Journal of Applied Economics and Finance*, 35-47.

Mehta, A., & Bhavani, G. (2017). *What Determines Banks' Profitability? Evidence from Emerging Markets - The Case of the UAE Banking Sector.* Dubai: Institute of Management Technology.

Mitra-Kahn, B. (2005). *General Equilibrium Theory, its History and its Relation (if any) to the Market Economy.* London: City University London.

Modigliani, F., & Miller, M. (1958). The Cost of Capital, Corporation Finance, and the Theory of Investment. *The American Economic Review*, 261-297.

Myers, S., & Majluf, N. (1984). Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have. *Journal of Financial Economics*, 187-221.

National Treasury. (2008, June 12). Budget Speech for the Fiscal Year 2008/2009. Nairobi, Nairobi, Kenya: National Treasury.

National Treasury. (2015, June 11). Budget Statement for the Fiscal Year 2015/2016. Nairobi, Nairobi, Kenya: National Treasury.

Nekatibeb, H. (2012). *Market Power of Ethiopian Banks_Evidence and Explanations.* Addis Ababa: Addis Ababa University .

Nguyen, D., Thanh, H., & Nguyen, H. (2018). What Determines the Profitability of Vietnam Commerial Banks? *International Business Research*, 231-245.

Park, H. M. (2009). *Comparing Group Means: T-teasts and One-way ANOVA Using STATA, SAS, R and SPSS.* Indiana: The University Information Technology Services (UITS) Centre for Statistical and Mathematical Computing.

Qin, X., & Pastory, D. (2012). Commercial Banks Profitability Position: The Case of Tanzania. *International Journal of Business and Management*, 136-144.

Republic of Kenya. (2007). *Kenya Vision 2030.* Nairobi: Government Printer.

Republic of Kenya. (2013). *Kenya Vision 2030: Second Medium Term Plan (2013-2017).* Nairobi: Government Printer.

Republic of Kenya. (2015). The Banking Act Chapter 488. Nairobi: Central Bank of Kenya.

Sanya, S., & Gaertner, M. (2012). *Assessing Bank Competition within the East African Community.* Nairobi: IMF.

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research Methods for Business Students.* Essex: Pearson.

Simpasa, A. (2010). Characterising market power and its determinants in the Zambian banking indudstry.

Tabak, B. M., Gomes, G. M., & Junior, M. M. (2012). *The Impact of Market Power at Bank Level in Risk Taking: The Brazilian Case.* Brasilia: Banco Central do Brasil.

Tan, A., & Floros, C. (2012). Bank Profitability and GDP Growth in China: A Note. *Journal of Chinese Eonomics and Business Studies*, 267-273.

Were, M., & Wambua, J. (2013). *Assessing the Determinants of Interest Rate Spread of Commercial Banks in Kenya: An Empirical Investigation.* Nairobi: Kenya Bankers Association Centre for Research on Financial Markets and Policy.

APPENDICES

Appendix A: 2016 and 2003 Commercial Banks Market Shares

	2016					2003				
Name of Institution	Net Assets (Kshs M)	% of the Market	Ranking	Total Shareholders Funds (Kshs M)	% of the Market	Net Assets (Kshs M)	% of the Market	Ranking	Total Shareholders Funds (Kshs M)	% of the Market
Large Peer Group										
Kenya Commercial Bank Ltd	504,778	13.70%	1	80,990	13.70%	58,067	11.92%	3	4,681	8.17%
Equity Bank Ltd	379,749	10.30%	2	52,341	8.80%	N/A	N/A	N/A	N/A	N/A
Co-operative Bank of Kenya Ltd	349,998	9.50%	3	60,046	10.10%	32,518	6.68%	5	2,130	3.72%
Barclays Bank of Kenya Ltd	259,498	7.00%	4	42,095	7.10%	97,001	19.92%	1	11,022	19.24%
Standard Chartered Bank (K) Ltd	250,274	6.80%	5	43,905	7.40%	64,241	13.19%	2	6,368	11.12%
Diamond Trust Bank (K) Ltd	244,124	6.60%	6	36,432	6.10%	8,571	1.76%	12	1,175	2.05%
Commercial Bank of Africa Ltd	210,878	5.70%	7	27,470	4.60%	18,341	3.77%	7	1,648	2.88%
CfC Stanbic Bank (K) Ltd [1]	204,895	5.50%	8	30,238	5.10%	13,811	2.84%	8	1,601	2.79%
Stanbic Bank Kenya Limited [1]	N/A	N/A	N/A	N/A	N/A	9,974	2.05%	11	945	1.65%
Sub-Total	2,404,194	65.10%			62.90%					
Medium Peer Group										
NIC Bank Ltd	161,847	4.40%	9	30,288	5.10%	11,142	2.29%	10	2,576	4.50%
I&M Bank Ltd	164,116	4.40%	10	26,187	4.40%	12,130	2.49%	9	1,596	2.79%
National Bank of Kenya Ltd	115,114	3.10%	11	10,996	1.90%	25,977	5.33%	6	2,154	3.76%
Citibank N.A. Kenya	103,324	2.80%	12	19,629	3.30%	33,769	6.93%	4	4,172	7.28%
Bank of Baroda (K) Ltd	82,907	2.20%	13	14,225	2.40%	8,044	1.65%	13	823	1.44%
Family Bank Ltd.	69,432	1.90%	14	12,619	2.10%	N/A	N/A	N/A	N/A	N/A
Housing Finance Ltd	68,085	1.80%	15	9,775	1.60%	N/A	N/A	N/A	N/A	N/A
Prime Bank Ltd	65,338	1.80%	16	10,834	1.80%	5,232	1.07%	17	604	1.05%
Bank of Africa (K) Ltd [2]	55,996	1.50%	17	8,418	1.40%	N/A	N/A	N/A	N/A	N/A
Bank of India	47,815	1.30%	18	9,536	1.60%	5,829	1.20%	15	885	1.54%
Ecobank Kenya Ltd [3]	47,124	1.30%	19	7,307	1.20%	N/A	N/A	N/A	N/A	N/A
Sub-Total	981,099	26.50%		159,814	26.80%					
Small Peer Group										
Guaranty Trust Bank Ltd [4]	29,619	0.80%	20	8,366	1.40%	N/A	N/A	N/A	N/A	N/A
Gulf African Bank Ltd	27,156	0.70%	21	4,376	0.70%	N/A	N/A	N/A	N/A	N/A
African Banking Corporation Ltd	22,422	0.60%	22	2,997	0.50%	3,833	0.79%	24	426	0.74%
Victoria Commercial Bank Ltd	22,403	0.60%	23	5,060	0.90%	3,336	0.68%	27	492	0.86%
Sidian Bank Ltd [5]	20,876	0.60%	24	3,869	0.70%	2,174	0.45%	34	689	1.20%
Habib Bank A.G. Zurich	17,033	0.50%	25	2,965	0.50%	4,030	0.83%	23	409	0.71%
Development Bank of Kenya Ltd	16,418	0.40%	26	2,903	0.50%	2,693	0.55%	30	901	1.57%
Giro Commercial Bank Ltd	16,254	0.40%	27	3,077	0.50%	4,257	0.87%	20	420	0.73%
Jamii Bora Bank Ltd [6]	15,724	0.40%	28	3,590	0.60%	N/A	N/A	N/A	N/A	N/A
First Community Bank Ltd	14,962	0.40%	29	1,557	0.30%	N/A	N/A	N/A	N/A	N/A
Guardian Bank Ltd	14,705	0.40%	30	2,215	0.40%	4,066	0.83%	22	681	1.19%
Consolidated Bank of Kenya Ltd	13,918	0.40%	31	1,403	0.20%	2,442	0.50%	32	636	1.11%
Spire Bank Ltd [7]	13,803	0.40%	32	1,817	0.30%	2,941	0.60%	29	460	0.80%
Habib Bank Ltd	12,508	0.30%	33	2,454	0.40%	3,569	0.73%	25	406	0.71%
Credit Bank Ltd	12,202	0.30%	34	2,460	0.40%	2,145	0.44%	35	404	0.71%
Trans - National Bank Ltd	10,465	0.30%	35	2,073	0.30%	1,439	0.30%	38	867	1.51%
M Oriental Commercial Bank Ltd [8]	9,920	0.30%	36	2,931	0.50%	2,211	0.45%	33	650	1.13%
Paramount Universal Bank Ltd	9,427	0.30%	37	1,644	0.30%	1,209	0.25%	40	284	0.50%
UBA Kenya Ltd	5,601	0.20%	38	2,143	0.40%	N/A	N/A	N/A	N/A	N/A
Middle East Bank (K) Ltd	5,234	0.10%	39	1,192	0.20%	3,455	0.71%	26	711	1.24%
Sub-Total	310,651	8.40%		59,094	10.00%					
Grand-Total	3,695,943	100%		592,423	100%					

Appendix A: 2016 and 2003 Commercial Banks Market Shares (Continued)

Name of Institution	2016 Net Assets (Kshs M)	2016 % of the Market	2016 Ranking	2016 Total Shareholders Funds (Kshs M)	2016 % of the Market	2003 Net Assets (Kshs M)	2003 % of the Market	2003 Ranking	2003 Total Shareholders Funds (Kshs M)	2003 % of the Market
Banks existing in 2003 and no longer in 2016										
First American Bank Limited [9]	N/A	N/A	N/A	N/A	N/A	6,660	1.37%	14	1,243	2.17%
Fina Bank Limited [4]	N/A	N/A	N/A	N/A	N/A	5,851	1.20%	16	629	1.10%
Credit Agricole Indosuez [2]	N/A	N/A	N/A	N/A	N/A	4,809	0.99%	19	740	1.29%
Akiba Bank Ltd [3]	N/A	N/A	N/A	N/A	N/A	4,176	0.86%	21	689	1.20%
Southern Credit Banking Corp [7]	N/A	N/A	N/A	N/A	N/A	3,264	0.67%	28	463	0.81%
Charterhouse Bank Ltd [10]	N/A	N/A	N/A	N/A	N/A	2,632	0.54%	31	475	0.83%
Industrial Development Bank	N/A	N/A	N/A	N/A	N/A	1,486	0.31%	37	274	0.48%
City Finance Bank [6]	N/A	N/A	N/A	N/A	N/A	650	0.13%	42	406	0.71%
Daima Bank Limited [11]	N/A	N/A	N/A	N/A	N/A	404	0.08%	43	-274	-0.48%
Dubai Bank Limited [12]	N/A	N/A	N/A	N/A	N/A	783	0.16%	41	355	0.62%
Imperial Bank Limited [13]	N/A	N/A	N/A	N/A	N/A	4,921	1.01%	18	742	1.30%
Chase Bank Limited [14]	N/A	N/A	N/A	N/A	N/A	1,710	0.35%	36	471	0.82%
Fidelity Commercial Bank Ltd [15]	N/A	N/A	N/A	N/A	N/A	1,235	0.25%	39	260	0.45%

Source: Source: CBK 2003 and 2016 Annual Banking Supervision Reports

Notes:

(1) CFC and Stanbic Banks merged in 2008
(2) Bank of Africa acquired Credit Agricole Indosuez in 2004
(3) Akiba bank converted to EABS in 2004 which was later acquired by Ecobank in 2008
(4) Guaranty Trust Bank acquired Fina Bank in 2013
(5) Formely known as K-REP Bank
(6) Jamii Bora and City Finance Bank merged in 2010
(7) Southern Credit Banking Corp was acquired by Equatorial Commercial Bank in 2010 and rebranded to Spire Bank in 2016
(8) Previously known as Delphis Bank up till 2003
(9) First American Bank was acquired by Commercial Bank of Africa in 2005
(10) Under statutory management
(11) liquidated in 2005
(12) Under liquidation
(13) Imperial Bank Limited
(14) Chase Bank Limited
(15) Under acqisition by SBM holdings in 2016/2017

Appendix B: List of Commercial Banks as at 31st December 2016

Large Peer Group	**Small Peer Group**
1 Kenya Commercial Bank Ltd	20 Guaranty Trust Bank Ltd
2 Equity Bank Ltd	21 Gulf African Bank Ltd
3 Co-operative Bank of Kenya Ltd	22 African Banking Corporation Ltd
4 Barclays Bank of Kenya Ltd	23 Victoria Commercial Bank Ltd
5 Standard Chartered Bank (K) Ltd	24 Sidian Bank Ltd
6 Diamond Trust Bank (K) Ltd	25 Habib Bank A.G. Zurich
7 Commercial Bank of Africa Ltd	26 Development Bank of Kenya Ltd
8 CfC Stanbic Bank (K) Ltd	27 Giro Commercial Bank Ltd
	28 Jamii Bora Bank Ltd
Medium Peer Group	29 First Community Bank Ltd
9 NIC Bank Ltd	30 Guardian Bank Ltd
10 I&M Bank Ltd	31 Consolidated Bank of Kenya Ltd
11 National Bank of Kenya Ltd	32 Spire Bank Ltd
12 Citibank N.A. Kenya	33 Habib Bank Ltd
13 Bank of Baroda (K) Ltd	34 Credit Bank Ltd
14 Family Bank Ltd.	35 Trans - National Bank Ltd
15 Housing Finance Ltd	36 M Oriental Commercial Bank Ltd
16 Prime Bank Ltd	37 Paramount Universal Bank Ltd
17 Bank of Africa (K) Ltd	38 UBA Kenya Ltd
18 Bank of India	39 Middle East Bank (K) Ltd
19 Ecobank Kenya Ltd	

(Central Bank of Kenya 2016)

Appendix C: Standard Multiple Linear Regression Coefficients

Coefficients Peer Group One Pre-Regulation-HHI – Bank Indicators

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.876
R Square	0.768
Adjusted R Square	0.419
Standard Error	82.511
Observations	6

	Coefficients	***Standard Error***	***t Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intercept	1305.51	302.33	4.32	0.05	4.70	2606.33	4.70	2606.33
Core capital-Pre	0.00	0.04	0.00	1.00	-0.17	0.17	-0.17	0.17
Total deposits-Pre	-0.01	0.01	-1.07	0.40	-0.07	0.04	-0.07	0.04
Profit before tax-Pre	0.05	0.10	0.50	0.66	-0.39	0.50	-0.39	0.50

Coefficients Peer Group One Pre-Regulation-HHI – Macroeconomic Indicators

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.513
R Square	0.263
Adjusted R Square	-0.228
Standard Error	119.978
Observations	6.000

	Coefficients	***Standard Error***	***t Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intercept	545.38	252.66	2.16	0.12	-258.70	1349.46	-258.70	1349.46
GDP-Pre	14.60	32.06	0.46	0.68	-87.44	116.64	-87.44	116.64
Inflation-Pre	11.86	11.72	1.01	0.39	-25.43	49.16	-25.43	49.16

Coefficients Peer Group One Pre-Regulation-ROE – Banking Indicators

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.874433917
R Square	0.764634675
Adjusted R Square	0.411586688
Standard Error	3.034044656
Observations	6

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	21.57	11.12	1.94	0.19	-26.27	69.40	-26.27	69.40
Core capital-Pre	0.002606	0.00	1.79	0.22	0.00	0.01	0.00	0.01
Total deposits-Pre	-0.000157	0.00	-0.31	0.79	0.00	0.00	0.00	0.00
Profit before tax-Pre	0.000417	0.00	0.11	0.92	-0.02	0.02	-0.02	0.02

Coefficients Peer Group One Pre-Regulation-ROE – Macroeconomic Indicators

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.682
R Square	0.465
Adjusted R Square	0.108
Standard Error	3.735
Observations	6.000

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	33.86	7.87	4.31	0.02	8.83	58.90	8.83	58.90
GDP-Pre	0.23	1.00	0.23	0.83	-2.94	3.41	-2.94	3.41
Inflation-Pre	-0.41	0.36	-1.11	0.35	-1.57	0.76	-1.57	0.76

Coefficients Peer Group One Post-Regulation-HHI Banking Indicators

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.654
R Square	0.428
Adjusted R Square	-0.001
Standard Error	37.210
Observations	8.000

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	573.06	48.03	11.931	0.0003	439.706	706.409	439.7055	706.408
Core capital-Post	-0.01	0.009	-1.491	0.210	-0.038	0.0116	-0.0384	0.0116
Total deposits-Post	0.003	0.002	1.389	0.237	-0.003	0.0075	-0.0025	0.0075
Profit before tax-Post	-0.001	0.002	-0.435	0.686	-0.008	0.0055	-0.0075	0.0055

Coefficients Peer Group One Post-Regulation-HHI Macroeconomic Indicators

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.08809892
R Square	0.00776142
Adjusted R Square	-0.38913401
Standard Error	43.8383021
Observations	8

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	555.94	62.56	8.89	0.00	395.11	716.76	395.11	716.76
GDP-Post	-0.05	10.52	0.00	1.00	-27.09	27.00	-27.09	27.00
Inflation-Post	0.67	3.43	0.20	0.85	-8.15	9.49	-8.15	9.49

Coefficients Peer Group One Post-Regulation-ROE Banking Indicators

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.63889666
R Square	0.40818894
Adjusted R Square	-0.03566935
Standard Error	1.95883527
Observations	8

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	31.752427	2.53	12.56	0.00	24.73	38.77	24.73	38.77
Core capital-Post	-0.000075	0.00	-0.16	0.88	0.00	0.00	0.00	0.00
Total deposits-Post	-0.000003	0.00	-0.04	0.97	0.00	0.00	0.00	0.00
Profit before tax-Post	0.000194	0.00	1.58	0.19	0.00	0.00	0.00	0.00

Coefficients Peer Group One Post-Regulation-ROE Macroeconomic Indicators

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.340
R Square	0.115
Adjusted R Square	-0.238
Standard Error	2.142
Observations	8.000

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	29.36	3.06	9.60	0.00	21.50	37.22	21.50	37.22
GDP-Post	0.30	0.51	0.58	0.59	-1.02	1.62	-1.02	1.62
Inflation-Post	0.08	0.17	0.47	0.66	-0.35	0.51	-0.35	0.51

Coefficients Peer Group Two Pre-Regulation-HHI Banking Indicators

Regression Statistics	
Multiple R	0.665
R Square	0.442
Adjusted R Square	-0.395
Standard Error	12.516
Observations	6.000

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	128.66	74.99	1.72	0.23	-194.02	451.33	-194.02	451.33
Core capital-Pre	0.02	0.01	1.04	0.41	-0.05	0.08	-0.05	0.08
Total deposits-Pre	-0.01	0.01	-0.98	0.43	-0.05	0.03	-0.05	0.03
Profit before tax-Pre	0.06	0.09	0.71	0.55	-0.32	0.44	-0.32	0.44

Coefficients Peer Group Two Pre-Regulation-HHI Macroeconomic Indicators

Regression Statistics	
Multiple R	0.938
R Square	0.880
Adjusted R Square	0.799
Standard Error	4.747
Observations	6.000

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	105.54	10.00	10.56	0.00	73.73	137.36	73.73	137.36
GDP-Pre	-2.59	1.27	-2.04	0.13	-6.63	1.45	-6.63	1.45
Inflation-Pre	-2.12	0.46	-4.57	0.02	-3.60	-0.64	-3.60	-0.64

Coefficients Peer Group Two Pre-Regulation-ROE Banking Indicators

Regression Statistics	
Multiple R	0.965
R Square	0.931
Adjusted R Square	0.828
Standard Error	1.679
Observations	6.000

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	11.314	10.061	1.125	0.378	-31.975	54.604	-31.975	54.604
Core capital-Pre	0.003	0.002	1.295	0.325	-0.006	0.011	-0.006	0.011
Total deposits-Pre	0.000	0.001	-0.122	0.914	-0.005	0.005	-0.005	0.005
Profit before tax-Pre	0.011	0.012	0.940	0.447	-0.040	0.062	-0.040	0.062

Coefficients Peer Group Two Pre-Regulation-ROE Macroeconomic Indicators

Regression Statistics	
Multiple R	0.276
R Square	0.076
Adjusted R Square	-0.539
Standard Error	5.020
Observations	6

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	24.32	10.57	2.30	0.10	-9.33	57.96	-9.33	57.96
GDP-Pre	-0.11	1.34	-0.08	0.94	-4.38	4.16	-4.38	4.16
Inflation-Pre	-0.21	0.49	-0.44	0.69	-1.77	1.35	-1.77	1.35

Coefficients Peer Group Two Post-Regulation-HHI Banking Indicators

Regression Statistics	
Multiple R	0.902
R Square	0.814
Adjusted R Square	0.675
Standard Error	3.177
Observations	8

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	58.94	4.43	13.31	0.00	46.64	71.24	46.64	71.24
Core capital-Pre	0.00	0.00	-1.70	0.16	-0.01	0.00	-0.01	0.00
Total deposits-Pre	0.00	0.00	2.23	0.09	0.00	0.00	0.00	0.00
Profit before tax-Pre	0.00	0.01	-0.28	0.80	-0.02	0.01	-0.02	0.01

Coefficients Peer Group Two Post-Regulation-HHI Macroeconomic Indicators

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.523
R Square	0.273
Adjusted R Square	-0.017
Standard Error	5.624
Observations	8

	Coefficients	***Standard Error***	***t Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intercept	62.40	8.03	7.78	0.00	41.77	83.03	41.77	83.03
GDP-Post	1.81	1.35	1.34	0.24	-1.66	5.27	-1.66	5.27
Inflation-Post	0.05	0.44	0.11	0.92	-1.08	1.18	-1.08	1.18

Coefficients Peer Group Two Post-Regulation-ROE Banking Indicators

Regression Statistics	
Multiple R	0.750
R Square	0.563
Adjusted R Square	0.234
Standard Error	3.974
Observations	8.000

	Coefficients	***Standard Error***	***t Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intercept	25.206	5.541	4.549	0.010	9.820	40.591	9.820	40.591
Core capital-Post	-0.002	0.003	-0.807	0.465	-0.010	0.005	-0.010	0.005
Total deposits-Post	0.000	0.001	0.158	0.882	-0.002	0.002	-0.002	0.002
Profit before tax-Post	0.004	0.006	0.600	0.581	-0.014	0.022	-0.014	0.022

Coefficients Peer Group Two Post-Regulation-ROE Macroeconomic Indicators

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.472
R Square	0.223
Adjusted R Square	-0.088
Standard Error	4.739
Observations	8

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	15.36	6.76	2.27	0.07	-2.03	32.74	-2.03	32.74
GDP-Post	0.08	1.14	0.07	0.95	-2.84	3.01	-2.84	3.01
Inflation-Post	0.43	0.37	1.17	0.29	-0.52	1.39	-0.52	1.39

Coefficients Peer Group Three Pre-Regulation-HHI Banking Indicators

Regression Statistics	
Multiple R	0.757
R Square	0.573
Adjusted R Square	-0.069
Standard Error	2.044
Observations	6

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	12.34	6.71	1.84	0.21	-16.55	41.23	-16.55	41.23
Core capital-Pre	0.03	0.03	0.93	0.45	-0.10	0.15	-0.10	0.15
Total deposits-Pre	-0.01	0.01	-1.24	0.34	-0.05	0.03	-0.05	0.03
Profit before tax-Pre	0.01	0.03	0.23	0.84	-0.14	0.16	-0.14	0.16

Coefficients Peer Group Three Pre-Regulation-HHI Macroeconomic Indicators

Regression Statistics	
Multiple R	0.661
R Square	0.437
Adjusted R Square	0.062
Standard Error	1.915
Observations	6

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	2.285	4.033	0.566	0.611	-10.550	15.120	-10.550	15.120
GDP-Pre	-0.220	0.512	-0.430	0.696	-1.849	1.409	-1.849	1.409
Inflation-Pre	0.165	0.187	0.884	0.442	-0.430	0.761	-0.430	0.761

Coefficients Peer Group Three Pre-Regulation-ROE Banking Indicators

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.859126
R Square	0.738097
Adjusted R Square	0.345243
Standard Error	2.789736
Observations	6

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	4.463	9.164	0.487	0.674	-34.966	43.892	-34.966	43.892
Core capital-Pre	-0.012	0.040	-0.292	0.798	-0.184	0.161	-0.184	0.161
Total deposits-Pre	0.003	0.011	0.249	0.826	-0.046	0.052	-0.046	0.052
Profit before tax-Pre	0.083	0.047	1.768	0.219	-0.119	0.286	-0.119	0.286

Coefficients Peer Group Three Pre-Regulation-ROE Macroeconomic Indicators

Regression Statistics	
Multiple R	0.773
R Square	0.597
Adjusted R Square	0.328
Standard Error	2.826
Observations	6.000

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	9.86	5.95	1.66	0.20	-9.08	28.80	-9.08	28.80
GDP-Pre	0.71	0.76	0.94	0.42	-1.70	3.11	-1.70	3.11
Inflation-Pre	-0.25	0.28	-0.90	0.43	-1.13	0.63	-1.13	0.63

Coefficients Peer Group Three Post-Regulation-HHI Banking Indicators

Regression Statistics	
Multiple R	0.983
R Square	0.966
Adjusted R Square	0.941
Standard Error	0.160
Observations	8.000

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	1.95	0.24	8.07	0.00	1.28	2.62	1.28	2.62
Core capital-Post	0.00	0.00	1.16	0.31	0.00	0.00	0.00	0.00
Total deposits-Post	0.00	0.00	0.44	0.68	0.00	0.00	0.00	0.00
Profit before tax-Post	0.01	0.00	2.49	0.07	0.00	0.01	0.00	0.01

Coefficients Peer Group Three Post-Regulation-HHI Macroeconomic Indicators

Regression Statistics	
Multiple R	0.269
R Square	0.072
Adjusted R Square	-0.299
Standard Error	0.747

Observations	8.000

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	3.711	1.066	3.480	0.018	0.970	6.452	0.970	6.452
GDP-Post	0.098	0.179	0.545	0.609	-0.363	0.559	-0.363	0.559
Inflation-Post	-0.022	0.058	-0.381	0.719	-0.173	0.128	-0.173	0.128

Coefficients Peer Group Three Post-Regulation-ROE Banking Indicators

Regression Statistics	
Multiple R	0.98084
R Square	0.96204
Adjusted R Square	0.93357
Standard Error	0.93418
Observations	8.000

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	10.757	1.413	7.612	0.002	6.833	14.681	6.833	14.681
Core capital-Post	0.003	0.002	1.395	0.235	-0.003	0.010	-0.003	0.010
Total deposits-Post	-0.003	0.001	-4.377	0.012	-0.005	-0.001	-0.005	-0.001
Profit before tax-Post	0.081	0.014	6.009	0.004	0.044	0.119	0.044	0.119

Coefficients Peer Group Three Post-Regulation-ROE Macroeconomic Indicators

Regression Statistics	
Multiple R	0.488
R Square	0.238
Adjusted R Square	-0.066
Standard Error	3.743
Observations	8.000

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	3.06	5.34	0.57	0.59	-10.67	16.79	-10.67	16.79
GDP-Post	0.73	0.90	0.81	0.46	-1.58	3.04	-1.58	3.04
Inflation-Post	0.24	0.29	0.83	0.45	-0.51	1.00	-0.51	1.00