

**THE EFFECT OF INTEREST RATES CAPPING ON THE INTEREST RATE
SPREAD OF COMMERCIAL BANKS IN KENYA**

ANNJOY KENDI MUTHAMIA

D61/5181/2017

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

NOVEMBER 2020

DECLARATION

This is my original work and it has not been presented for any award in any other university.



2/12/2020

.....

.....

Ann Joy Kendi Muthamia

Date

D61/5181/2017

DECLARATION BY THE SUPERVISOR

This project has been submitted to the University of Nairobi with my approval as the University Supervisor.

.....

.....

Mr. James Ng'ang'a

Date

Lecturer, Department of Finance and Accounting

ACKNOWLEDGEMENT

I whole heartedly thank the Lord Almighty for his grace and favor which enabled me to undertake this project.

I am greatly indebted to my supervisor Mr. James Ng'ang'a for his guidance and support that made this project possible.

My sincere gratitude goes to my parents, sibling and friends for their words of encouragement and support throughout my studies.

DEDICATION

This project is dedicated to my parents Mr. & Mrs. Haron and Margaret Muthamia, My sibling Denis Muchai, My fiancé Dominic Mutua and My friend Dr. Fidelis Mbaka for your love, support and encouragement. You have been inspirational figures in my life. May the almighty God bless you abundantly.

DEDICATION

TABLE OF CONTENTS

DECLARATION	ii
ACKNOWLEDGEMENT.....	iii
DEDICATION.....	v
ABBREVIATIONS AND ACRONYMS.....	xii
ABSTRACT	xiii
CHAPTER ONE.....	1
INTRODUCTION	1
1.1 Background to the Study	1
1.1.1 Interest Rate Capping	2
1.1.2 Interest Rate Spread	3
1.1.3 Interest Rate Capping and Interest Rate Spreads.....	5
1.1.4 Commercial Banks in Kenya	6
1.2 Research Problem	8
1.3 Research Objective	10
1.4 Significance of the Study	10

CHAPTER TWO.....	12
REVIEW OF THE LITERATURE	12
2.1 Introduction	12
2.2 Theoretical Review	12
2.2.1 Loanable Funds Theory.....	12
2.2.2 The Credit Market Theory.....	13
2.3 Determinants of Interest spread by Commercial Banks.....	14
2.3.1 Interest Rate Capping	14
2.3.2 Credit Risk.....	17
2.3.3 Management Efficiency	17
2.3.4 Bank Size.....	18
2.3.5 Leverage	19
2.4 Empirical Review	20
2.5 Conceptual Framework	28
2.6 Summary of Literature and Research Gap	29
CHAPTER THREE.....	31
RESEARCH METHODOLOGY	31
3.1. Introduction	31
3.2. Research Design	31
3.3. Population and Sampling	32
3.4. Data Collection	32

3.5. Data Analysis.....	32
3.5.1 Analytical Model.....	33
3.5.2 Diagnostic Tests.....	35
CHAPTER FOUR	38
DATA ANALYSIS, RESULTS, AND FINDINGS	38
4.1 Introduction	38
4.2 Diagnostic Tests.....	38
4.2.1 Normality Test	38
4.2.2 Homoscedacity Test	39
4.2.3 Test for Multicollinearity	40
4.2.4 Tests for Autocorrelation.....	40
4.2.5 Unit Root Test.....	41
4.2.6 Test for Random and Fixed Effects	45
4.3 Inferential Statistics	46
4.3.1 Correlation Analysis.....	46
4.3.2 Multiple Linear Regression	47
4.3.3 Two-Sample T-Test	49
4.4 Interpretation and Discussion of Findings	50
CHAPTER FIVE	58
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS.....	58
5.1 Introduction	58

5.2 Summary of Findings.....	59
5.3 Conclusion.....	60
5.4 Recommendations.....	61
5.5 Limitations of the Study.....	62
5.6 Recommendations for Further Study.....	63
REFERENCES.....	64
APPENDICES.....	69
Appendix I: List of Licensed Commercial Banks in Kenya (as at 30 th June 2016).	69
Appendix II: Data Collection Form.....	71
Appendix III: Research Data.....	73

LIST OF TABLES

Table 3.1: Operationalization of the Study Variables	34
Table 4.1: Shapiro-Wilk Test for Normality.....	39
Table 4.2: Breusch-Pagan/Cook-Weisberg Test for Homoscedacity.....	39
Table 4.3: VIF Multicollinearity Statistics	40
Table 4.4: Unit Root Test for Financial Performance	41
Table 4.5: Unit Root Test for Interest Rate Capping.....	41
Table 4.6: Unit Root Test for Non-Performing Loans	42
Table 4.7: Unit Root Test for Management Efficiency	43
Table 4.8: Unit Root Test for Bank Size	44
Table 4.9: Unit Root Test for Leverage.....	44
Table 4.10: Hausman Test of Specification.....	45
Table 4.11: Correlation Analysis	47
Table 4.12: Panel Multiple Linear Regression.....	48
Table 4.13: Two-Sample T-Test	50

LIST OF FIGURES

Figure 2.1: Conceptual Framework..... 29

ABBREVIATIONS AND ACRONYMS

CBK	-	Central Bank of Kenya
IRS	-	Interest Rate Spread
NSE	-	Nairobi Securities Exchange
OLS	-	Ordinary Least Squares
ROA	-	Return on Assets
ROE	-	Return on Equity
SSA	-	Sub-Saharan Africa

ABSTRACT

The capping of the interest rate has resulted to the commercial banks having a poor financial performance (Aurello, 2015). Following interest rate, capping notable losses or rather drop in profit has been reported in various countries around the globe by banks. In fact, the adverse effect brought about by interest rate capping on the commercial banks performance has seen banks withdrawing and also closing some of their branches in different region across the world. Banks have chosen to reduce their cost since the interest capping has had an impact on their revenue in the corresponding countries. The objective of the study was to determine the influence of interest rate capping on interest rate spreads realized by Kenyan commercial banks. It also aimed at reviewing the increasing body of theoretical and empirical studies that have endeavored to examine the range of magnitude and effects of the interest rate capping on interest rate spreads of commercial banks. The target population was all the 42 licensed commercial banks. Secondary sources of data were employed. Panel data was utilized, data was collected for several units of analysis over a varying time periods. The research employed inferential statistics, which included correlation analysis and panel multiple linear regression equation with the technique of estimation being Ordinary Least Squares (OLS) so as to establish the relationship of the bank specific factors and sharia compliance, and the financial performance of commercial banks and also to establish the effect of interest rate capping on interest rate spreads of commercial banks. The study findings were that interest rate capping, NPL, management efficiency, and bank size have a significant association with interest rate spreads. Interest rate capping, credit risk, management efficiency have a negative significant association with interest rate spreads. Bank size has a positive significant association with interest rate spreads. Leverage however, does not have a significant association with interest rate spreads. Additionally, the study findings revealed that interest rate capping and the bank specific factors do significantly influence interest rate spreads. Thus, they can be utilized to significantly predict the interest rate spreads of commercial banks. The study findings also exhibited that only interest rate capping and bank size had significant relationships with interest rate spreads. Interest rate capping has a significant negative influence on interest rate spreads whereas bank size has a significant negative influence on interest rate spreads. Credit risk, management efficiency, and leverage however do not have significant effects on interest rate spreads. Final findings were that there was a significant change in the interest rate spread of the commercial banks from before the interest rate capping legislation was enacted and after it was enacted. Policy recommendations are made to the National Treasury and CBK to institute interest capping because it reduces the interest rate spread which has been higher than the African average. Additionally, the regulator, the CBK, can utilize the CAMEL framework, which mainly entails the bank specific factors, to gauge the performance and going concern status of the individual banks. Recommendation were made to the commercial bank practitioners, and by extension other financial institutions

practitioners and consultants to employ other strategies to lower the cost of funds in case of an interest rate capping regime because the lending rate is fixed. Further recommendations were made to them to increase bank size in order to augment the financial institutions' financial performance.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Globally, changes in regulations that impact on interest rates have always influenced the operations of commercial banks. Certainly, the capping of the interest rate has resulted to the commercial banks having a poor financial performance (Aurello, 2015). Following interest rate, capping notable losses or rather drop in profit has been reported in various countries around the globe by banks. In fact, the adverse effect brought about by interest rate capping on the commercial banks performance has seen banks withdrawing and also closing some of their branches in different region across the world. Banks have chosen to reduce their cost since the interest capping has had an impact on their revenue in the corresponding countries (Aliko, 2015).

The study is going to be anchored on two theories, which are the Loanable Funds Theory and the Credit Market Theory. The Loanable Funds Theory stipulates the basis of calculating the interest rate is dependent on the demand and supply of loanable fund prevailing in the capital market whereas the economic condition prevalent in a specific economy are the basis of calculating the short term interest rates. The Credit Market Theory alludes that when the collateral needed for a loan, along with various other requirements, are removed from the equation, the most significant factor that influences how banks lend personal loans is the interest rate. Commercial banks are more likely to lend personal loans to borrowers they consider to be associated with a relatively low risk of default. Conversely, when the borrower is likely to default, the bank may resort to charging a higher interest rate on the loan.

In Kenya, the banking industry has experienced significant growth despite the various challenges that affect the sector (Gikandi & Bloor, 2010). However, in 2016, the Kenyan Parliament adopted a new piece of legislation whose purpose is to cap the interest rates charged by commercial banks. The news was not received well by some stakeholders in the banking industry who believed that the new law would have a negative impact on the operations of banks, as well as on consumers. On the other hand, lawmakers have insisted that the new law is intended to protect the interests of consumers who rely heavily on bank financing and who, in the absence of the regulation, would otherwise be exploited by the financial institutions (Ng'ang'a, 2017).

1.1.1 Interest Rate Capping

Although they have had limited use resulting from the supposed challenges they pose to an economy, interest rate caps have existed for decades. Interest rate capping implies that there can be fluctuation in the rate though within a stipulated limit. For example, in Kenya, the interest rate for lending has been set at a value of 4 % above the CBR rate while the interest rate for deposit has been set at a minimum of 70% of CBR rate. Different governments, which could comprise of flexible system or completely rigid system, use different strategies where there can be differences in capping dependent on the type of loan or the kind of customer. A flexible cap implies that interest rates are attached to a base rate set by the central bank for example the one adopted by Kenya and Zambia. On the other hand, when the government sets a particular interest that is to be applied by all the commercial banks that is referred to as a fixed interest rate cap (Miller, 2013).

It is important to understand the interest rate composition in order to appreciate the effect that capping would have on commercial banks. There are four main composition of banking interest rate and they are profitability of the bank, provision for NPLs, the actual cost of funds and the overheads. The main reason for existence of a financial institution is maximization. The shareholders, through profitability and in order to attain it, the borrowers need to bear the cost. Additionally, the borrower is passed on the cost of loans that are possibly going to be written off. Further, the cost of running the institution, which includes, loan processing fees, salaries, expansion cost and technological costs are also borne by the borrower. These cost a different amongst banks suggesting that when caps are introduced they pose a financial constraint to some of commercial banks (Miller, 2013).

The interest rate has been considered to be a short-term solution implying that other better ways need to be explored by CBK in order to come up with a desirable economy as well as designing a market structure where the competition is founded on the assortment of financial products that would eventually accommodate the cost of the organization. Interest rate measurement is done by an analysis of the impact capping had just before capping and in the capping period (Miller, 2013).

1.1.2 Interest Rate Spread

Interest rates entail the cost paid by the borrower to the lender in order to compensate the lender for using the funds for a given time frame and at some risks which are significant in the process of borrowing and lending. Both high and low interest rates affect interest rate spread (Howells & Bain, 2008). Banks realize profits from the variations between the rate paid to the depositors and rate charged on borrowers. The

difference is what is referred to as the Interest rate spread (IRS), and it is a crucial indicator of profitability within the sector (Thygerson, 1995).

Aziakpono, Wilson and Manuel (2005) state that the difference or the spread between the deposit and deposit rates is that main indicator of how well the bank sector is performing and its efficiency. A high spread acts as a hindrance to the growth and development of financial intermediation. The reason behind is that the potential savers are discouraged as the returns are low on their deposits and this constrains the funds available to advance to potential borrowers. In other words, the credit availability is lower because of the reduced savings. On the other hand, when the rates of lending are high, the demand for credit and the supply of money is depressed since the borrowing cost is high (Aziakpono, Wilson & Manuel, 2005).

There are two models, which are used to describe the spread: These are the accounting value of net interest margin and the firm's maximization behavior. The accounting value of net interest margin applies the commercial banks income statement, suggesting that bank interest rate margin is the variance between the banks interest income and interest costs that are shown as a percentage of average earning assets (Howells & Bain, 2008). As indicated by Njuguna and Ngugi (2009), this approach has received a lot of criticism saying that it fails to show if there is existence of equilibrium in economic sense. On the contrast, the maximization behavior of the firm permits derivation of profit maximization rule for interest rates and considers elements of market structure.

1.1.3 Interest Rate Capping and Interest Rate Spreads

Interest rate capping will generally make a misrepresentation in the market and eventually lead to biases in the market. By the virtue of commercial banks inclining to lend to borrower who exhibit low risks, they create inefficiency in the market by mediation, which was anticipated to have a positive effect. It has been highlighted by some studies that those kind of discrimination have led to some client being deprived from getting credit as they are considered high risk. They suggest that both bank and the borrower lose and borrowers are made to look for financing from other sources. In the same way, capping might lead to banks choosing to lend to the government, which is considered low risk, which ultimately takes all the funds from the public and renders the condition unprofitable. The bank's main source of income being interest implies that they are put to be unprofitable which could force them to consider measure like cutting cost through downsizing so as to continue being sustainable. It is necessary for the study to look into both the positive and the negative effect which capping has brought on the financial performance of commercial banks (Miller, 2013).

Hassan and Khan (2010) contend that on average, the banks seem to attract a riskier collection of projects which require higher returns on investment as the lending rates rises. Further, they contested that creditworthy borrowers are pushed away from borrowing by rise of interest rates, justifying the failure in domestic credit in the context Pakistan private sector. Hamid (2011) concurred with the aforementioned analysis through an investigation conducted on the impact of interest rate spread in developing countries that revealed that interest rate spread and portion of non- deposit based financing is correlated positively and significantly. Additionally, the investigation

proved that the volume of credit to the private sector and the share of deposit held in foreign banks is negatively correlated.

Hawtrey and Liang (2008) conducted a study of bank interest margins and suggested that there are two problems related with high interest spread, one of the problems being that it can lead to overall scarcity of money and consequently limit borrowing for the purpose of consumer spending, business investment, and construction to lead to or worsen a recession. Ndung'u and Ngugi (2009) document that vast spreads happen in emergent nations because of high operating expenses, financial taxation or control, absence of a competitive banking industry and macroeconomic uncertainty meaning risks are high.

Therefore, it is essential that the effect of the changes on interest rates is analyzed with a focus on the interest spreads realized by commercial banks. Just as it is the case with various other sectors, the banking sector is expected to adopt changes that are intended to help it to shoulder itself from the negative implications associated with such amendments.

1.1.4 Commercial Banks in Kenya

Banks play a significant role and are an integral part of the financial system and more so they are significant drivers of the economic growth. Banks being the primary source of credit directly influence the investment level and expenditure in an economy. Banks function as intermediaries through whom consumers deposit monies, in addition to getting loans and other advances (Howells & Bain, 2008). Kenya has 44 commercial banks. Out of these 44 banks, the seven largest ones are popularly referred to as the

"Tier One," and they constitute 52.4% of the total assets in the industry (CBK, 2018). This imbalance results to a few banks being market monopolies, just as it is the case with various other economies across the globe.

Some of the primary laws that govern the banking sector of Kenya include the Companies Act, the Central Bank of Kenya (CBK) Act and the Banking Act. Recent developments have resulted in some of these pieces of legislation being amended and in a manner that has affected the banking industry. In 2016, for instance, Kenya adopted new amendments on the Banking Act, which caps the interest rates for bank deposits and lending. Specifically, the new amendment caps banks' lending interest rates to a figure that does not exceed four percent above the Central Bank Rate (CBR) currently at 10.5 percent. Thus, in line with the new law, commercial banks in Kenya are expected to charge a maximum of 14.5% as the interest rate. Initially, Kenyan banks have enjoyed interest rate spreads of approximately 11.4%, way above the global average rate of 6.6%. Furthermore, it is worth noting that the new law directs banks to pay depositors at least 7.35% as the interest rate on deposited funds. The new law means that Kenyan banks have to contend with the narrowest spreads since the liberalization of the country's financial markets that took place in the 1990s (Ng'ang'a, 2017).

Nevertheless, it should be underscored that Kenyan banks have been registering high profits as other sectors remain entangled. According to a report by the Central Bank of Kenya, Equity bank, which boasts the largest customer base registered return on equity of 47.2 percent in 2015. Furthermore, in 2017, the banks recorded an average return on equity of 13 percent even as more than ten firms quoted at NSE issued profit warnings to the public. However, there is a concern that large banks do not extend their benefits

of scale to their customers. Moreover, there are some concerns with regard to this piece of legislation in that the government does not have genuine intentions. The National Treasury is considered one of the significant contributors to high-interest rates through its borrowing instruments such as Treasury bonds and T-bills. Thus, there is a concern that banks will have to increase their lending to the government as part of the efforts intended to allow them to sustain their profit margins (Nyasha & Odhiambo, 2014).

1.2 Research Problem

The capping of the interest rate has resulted to the commercial banks having a poor financial performance (Aurello, 2015). Following interest rate, capping notable losses or rather drop in profit has been reported in various countries around the globe by banks. In fact, the adverse effect brought about by interest rate capping on the commercial banks performance has seen banks withdrawing and also closing some of their branches in different region across the world. Banks have chosen to reduce their cost since the interest capping has had an impact on their revenue in the corresponding countries (Aliko, 2015).

The interest rate spread in Kenya remains high even after liberation of the money markets. In fact, the interest rate spread was so high such that in the year 2010 the members of parliament had to intervene where they fronted a debate on financial bill aimed on capping the interest rate. Financial liberation together with expansion of the financial sector is expected to bring benefits one of which is a reduction in the interest rate spread. This is expected on the appreciation of the fact that efficiency and competition are improved by liberalization in the financial sector. Therefore, when the interest rate spread widens. This would show that there is inefficiency in the banking

sector or portray the financial development level (Folawewo & Tennant, 2008). The spread shows the information pertaining to the efficiency of financial intermediation, financial policy impact, profitability, among others. The interest rate spread in Kenya for the period between 2002 to 2013 was at an average of 9.68% that is higher in comparison to an average of 6.9% for African countries and a 7.13% for East African countries (CBK, 2012). Kithinji and Waweru (2007) contends that the banking problems in Kenya started as early as 1986 leading to failure of major banks after the emergency of crises in 1985 to 1989, 1993/1994 and 1998. The crises were related to non-performing assets that are attributed to of interest rate spread occasioned by high lending rates.

Hassan and Khan (2010) contend that averagely the banks seem to attract a riskier collection of projects, which require higher returns on investment as the lending rates rises. Further, they contested that creditworthy borrowers are pushed away from borrowing by rise of interest rates, justifying the failure in domestic credit in the context Pakistan private sector. Hamid (2011) concurred with the aforementioned analysis through an investigation conducted on the impact of interest rate spread in developing countries that revealed that interest rate spread and portion of non- deposit based financing is correlated positively and significantly. Additionally, the investigation proved that the volume of credit to the private sector and the share of deposit held in foreign banks is negatively correlated. As indicated by Hawtrey and Liang (2008) in their study of bank interest margins they suggested that there are two problems related with high interest spread, one of the problems being that it can lead to overall scarcity of money and consequently limit borrowing for the purpose of consumer spending, business investment and construction to lead to or worsen a recession. Crowley (2007),

Sologoub (2006), Grenade (2007) additionally have revealed that is a general perception by stakeholders that the cause of the high interest rate spreads are the bank internal characteristics for example the propensity to maximize profit in a competitive market whereas other researcher like Hassan and Khan (2010) contends that the regulatory authority, environment and the macroeconomic where the banks operate impose the spreads.

Regardless of the above conclusions, empirical studies are still scarce on determination of interest rate spread as for African countries, especially at the bank level, considering that various African countries for example Kenya are still struggling with the problem of higher interest rate spreads. These concerns and discussions could only be settled through objective, quantitative examination of the interest rate spread determinant of the banking sector in developing countries such as Kenya, with focus on interest rate capping. The Kenyan case is interesting after the enactment of the interest rate capping bill, interest rate capping is one of the factors touted to influence IRS. The study sought to answer the research question; what is the effect of interest rate capping on interest rate spreads among commercial banks in Kenya?

1.3 Research Objective

The objective of this research was to determine the influence of interest rate capping on interest rate spreads realized by Kenyan commercial banks.

1.4 Significance of the Study

The proposed study is expected to provide extensive and valuable insights that will be of use of various stakeholders in the banking sector. Specifically, the government of

Kenya, as well as Kenyan commercial banks, consumers, scholars, and management consultants could benefit from the project's findings. Future scholars and researchers in the field of banking sector studies can benefit from this study as it will help build knowledge on existing literature. The current study will make additions to the existing knowledge, as it will give recommendations for financial sector improvement. In any case, the study is a foundation of the future research on the effect of interest rate capping on the interest rate spread.

Regarding the government, it is expected that policymakers will obtain information and an understanding of the behavior of interest rates and its impact on interest rate spread, which enables them to come up with appropriate policies and formulate legal frameworks that encourage market growth by protecting depositors, borrowers as well as shareholders. Other countries that are keen on pursuing changes in their market interest rates could also use the study's results as a point of reference.

On the other hand, decision-makers engaged in implementing interest rates for their banks will draw an inference in advancing techniques and policies to adjust to the interest rate capping law regime. Management consultants could also use the study's findings to expand their knowledge on interest rates spread and its relationship with the interest rate capping law. Future scholars and researchers in the field of banking sector studies can benefit from this study as it will help build knowledge on existing literature. The proposed research project is, therefore, significant.

CHAPTER TWO

REVIEW OF THE LITERATURE

2.1 Introduction

Information contained in the section includes insights drawn from a review of various scholarly works whose content relates to relationship amongst interest rate capping and IRS of commercial banks and also the effect of other IRS determinants on IRS. It entails a theoretical framework upon which the study will be based, in addition to providing an analysis of empirical research. The section will also include a conceptual framework, which will depict the conceptualized relationship between the study variables. A summary of research gaps and knowledge gaps will also be enumerated.

2.2 Theoretical Review

A theory is created to identify, elaborate, and comprehend certain phenomenon and in other instances, to challenge the present knowledge on this within the brackets of present bounding assumptions. A theory entails many concepts brought together and existing approaches used for a particular study (Saad & Siha, 2000). The theories included in this study are the credit market theory and loanable funds theory

2.2.1 Loanable Funds Theory

Loanable funds theory states that rate of interest is computed on bases of demand and supply of loanable assets existent in capital market. The theory established by an economist, Wicksell (1952), is among the vital economic theories. It stipulates that investments and resources are accountable for rates of interest resolve in the long haul. If interest rates are high, savings are low consequently sum of cash in circulation. Hence decreases not reusable revenue for individuals.

According to Wicksell (2011), low interest rates encourage investments via loaning of moneys thus yielding high profits and investments. Disposable income for persons and enterprises rise as an outcome. Dependable variable of the nonrefundable revenue depends on advance interest rates and differs in variation of interest rate. Temporary interest rates are derived from economic circumstances of an economy. Determination of interest rate according to loanable funds theory is subject to obtainability of advance totals. Obtainability of such advance totals is dependent on net rise in money deposits, investments amount present, readiness to improve money balances and chances in development of new assets.

The theory suggests associations amongst demand and supply of lendable monies determine nominal rate of interest. Maintaining constant supply level, a rise in demand of lendable funds leads to a rise in interest rate and vice versa. Thus consequently lessens disposable income accessible in an economy. Conversely, a rise in supply of lendable funds would lead in decrease in rate of interest. If demand and supply of lendable monies change, the resulting interest rate will be contingent to the course of undertaking on demand and supply of lendable moneys. However, the theory only addresses determinants of the loaning rate and not borrowing rate. Combining the two rates result in the interest rate spread. Determinants of short-range interest rates could be ascribed in factors examined in the study.

2.2.2 The Credit Market Theory

Another theory that could be used to examine the phenomenon that informs the basis of research on credit market theory. This neoclassical theory states when the collateral needed for a loan, along with various other requirements, are removed from the

equation, the most significant factor that influences how banks lend personal loans is the interest rate (Bongaerts, De Jong, & Driessen, 2011). Commercial enterprises are probable to lend personal advances to borrowers they consider to be associated with a relatively low risk of default.

Conversely, when the borrower is likely to default, the bank may resort to charging a higher interest rate on loan. This strategy intends to insure bank against the risk of default. However, with interest rates capping, a commercial bank is bound to find itself unable to charge higher interest rates on its loans, including those advanced to high-risk borrowers (Bongaerts, De Jong, & Driessen, 2011). This theory also only addresses the causes of loaning rate and not borrowing rate. It also only highlights asset quality as a determinant of interest rates, it does not include other factors that might influence the interest rates. Interest rate capping can also be utilized in the theory as a commercial bank is bound to find itself unable to price higher interest rates on its loans, including those advanced to high-risk borrowers.

2.3 Determinants of Interest spread by Commercial Banks

The determinants of IRS covered in this section include; interest rate capping, credit risk, management efficiency, bank size, and leverage.

2.3.1 Interest Rate Capping

Interest rates generate noteworthy share of income for banks. According to Ngugi (2001) greater interest rate margin in banks result to greater profits. Banks make best use of their IRS to increase their presentation. Bigger spread warrant banks more income hence growing their returns. In times when interest rates were very low as a

result of macro-economic circumstances, banks stated lesser profit margins in comparison to times when interest rates were high (Aliko, 2015). Interest rate capping is a system of regime control in financial industry. There has been a drop in the number of nations using this system over the years, primarily since major nations are targeting to have open-minded economic strategies (Peirce & Klutsey, 2016).

The second danger is that the high cost of financing may lead to particular groups or sector within the economy bearing an unbalanced share of the effect of the credit shortages and high interest rates. Increment in the cost of borrowing funds can eat so much into the profits of small business, which generally have a small profit margin and mostly fail as a result of lack of funds which can make them to no longer borrow money. This lead to small investors shying off from borrowing and consequently posing it hard for survival of small and medium investors (Aliko, 2015).

Capping of interest rates be done in three different methods: the effective interest rate can be capped, or the yearly percentage rate or nominal interest rate. Capping of the effective interest rate involves defining an interest rate ceiling covering financial expenses meaning the interest rate itself inclusive of fees and commission. It is stated as a percentage of loans utilized for the period of every compensation. Annual Percentage Rate (APR) is interest rate multiplied by the number of periods in a year, as effective interest is mentioned where APR is concerned then it includes all fees and commissions. The nominal interest rate includes the coupon rate paid on the principle and does not include fees and commission (Maimbo & Gallegos, 2014).

There exist two approaches used when capping interest rates which are; absolute cap or a relative cap. Absolute cap is a static nominal rate. Relative cap is computed against an endogenous benchmark in credit market or exogenous benchmark like interbank refinancing rate. Countries practicing absolute cap rates include; Egypt with an absolute cap of 7% on commercial engagements and Greece at 6.75% on non-bank institutions. Relative interest rate ceilings are witnessed in 32 nations mostly located in Sub Saharan Africa and Western Europe (Maimbo & Gallegos, 2014). The amendment of the Banking Act enacted on September 2016, entails the nominal interest rate method and utilizes a relative cap approach. The amendment instituted a cap on lending rates at 4% above Central Bank base rate and a floor on deposit rate at 70% of the CBR thus enforcing a uniform interest rate spread (Cytton, 2017).

The new law poses a significant impact on the banking sector of Kenya, as banks will be required to reconsider their business plans in addition to adopting strategies that will enable them to adapt to the new regulations. Moreover, it is worth noting that interest capping has failed in some countries such as India and Nigeria. The strategy has however, been successful in states such as Zambia, France, Argentina and Canada where the countries have used it to protect consumers against market failures (Greenwood, Landier & Thesmar, 2015). In Kenya, the reason for introducing the interest rate cap was mainly as a result of the huge profits that were being reported by bank at the cost of the borrowers. With the aim of ensuring that the consumers are protected, the government through its body CBK had to intervene. The main aim being to create an incentive for lenders to grow the number of loan because many people can access credit. Conversely, the result turned around as banks constrained lending by

creating high limit such that only high end customers who had high level security to get credit leaving the other out (Miller, 2013).

2.3.2 Credit Risk

Another critical factor that affects interest spread is concerned with credit risk. Even as banks seek to leverage the profits realized through lending funds to borrowers, these organizations are also keen to avoid the risk of default (Dehejia et al., 2012). In some instances, borrowers may be unable to pay back the loan along with interest. In other cases, the borrower may intentionally default on the loan. Thus, it is imperative to understand how credit risk affects the interest spread. Ngugi (2001) conducted a study incorporating non-execution advances proportion as descriptive factors and established that increase in non-execution lends proportion creates an increase in spreads. Mannasoo (2012) studied role of latest worldwide financial catastrophe on interest spreads in Estonia. Study follows Ho and Saunders (1981) works where pure spread is clarified by degree of threat aversion in bank plus marketplace organization of banking industry. The research established credit risk played a negligible role and greater bank liquidity was related with lesser interest margin.

2.3.3 Management Efficiency

Commercial banks incur some expenses when advancing loans, as well as while undertaking their various other operations. The interests charged on loans are intended to allow the banks to recoup these costs, along with the profits (Ireland, 2016). A bank that has high operational costs, which can be attributed to management inefficiency, may choose to increase the interest charged on its loans. Such an approach however,

could end up pushing away potential borrowers who would then consider alternative financing options.

The measure of management efficiency is a subjective process and is usually qualitative. An evaluation of the control systems, management systems, and the culture of the organization can easily help determine the efficiency of the management (Nampewo, 2015). Calculation of key financial ratios can also help gauge the efficiency of the management. The ratios include; loan growth rate, earnings growth and asset growth (Nampewo, 2015). This is used as a proxy to measure the capacity of administration of deploying the bank's assets resourcefully in order to maximize income.

An increase in any of the above ratios signifies the management's ability to deploy resources effectively to the benefit of shareholders. Shareholders are in a better position to appraise their agents on the above parameters since they are bank specific and are not subject to influence by any external factors. The above metrics are considered objective in analyzing and appraising bank's managers. According to Muiruri (2014), recent trends in the country have seen commercial bank executives being dropped due to perceived non-performance after the board of directors used the above metrics to appraise their performance.

2.3.4 Bank Size

Bank size has an influence on banks financial performance. According to Bakker, Schaveling, and Nijhof, (2014) big banks attract low-priced sources of finance and competitively advance to debtors at great margins whereas lesser banks were required

to extravagantly pay for credits due to acuity that creditors are threats thus needful a high return for threat undertaken.

Nampewo (2013) did a study on determinants of commercial bank performance which he used all the licensed banks in Kenya. Results indicated interest rate spread, bank size, administration efficacy and macro-economic factors as determinants of bank performance. The study results also showed a positive correlation amongst IRS and bank performance. There also positive correlation amongst bank size, management efficiency, macro-economic environment and financial presentation of the banks. In another study by Kamau (2011) investigated determinants of financial presentation of Kenyan commercial banks licensed and listed. Results in this study revealed interest rate spread, bank size, asset worth and management efficacy as the four most significant elements that affect performance of the banks.

2.3.5 Leverage

Leverage beyond a certain limit has an adverse influence on financial presentation of a firm due to the high interest costs associated with high leverage levels (Malenya& Muturi, 2013). Still in their research, they identified firm age and firm size which have positive influences on financial performance of enterprises. This was because of economies of scale enjoyed by large firms as opposed to small firms.

Chuthamas *et al.* (2015) in their paper argued that leverage significantly affects firm performance as cheap credit acts as a cheap source of capital while expensive credit hinders firm growth and better financial performance as the firm will be bogged down by heavy interest cost. In their study that covered both small sized firms and big firms

in Thailand, they found out that small firms reported lower ROA and ROE because of high cost of credit while large firms reported superior ROA and ROE due to cheap credit.

2.4 Empirical Review

Beck et al (2011), in their research titled “Why are interest rate spreads in Uganda so high?” revealed overseas banks use lower interest rate spreads. In addition, there was lack of an economically noteworthy association amongst privatization, overseas bank entrance, marketplace configuration and bank productivity. Likewise, macroeconomic factors can clarify over-time disparity in bank spreads. Bank characteristics like size, functioning expenses and structure of advance portfolio give details to a huge section of cross-bank, cross- period variants in spreads. They implemented bank- even data information on Ugandan banking system to study causes responsible for constantly high interest rate spreads and margins.

Variations in interest margins and bank cost-effectiveness according to Demirguc and Huisinga (2008), who conducted a study on the implications of bank activity and short-term funding strategies for bank risk and return using an international sample of 1334 banks in 101 countries, is a result of a number of determinants which include; characteristics of banks, macroeconomic circumstances, taxation of banks, deposit cover policy, economic organization, and lawful and organization indicators. Regulatory variances in bank undertakings and influence on macroeconomic surroundings establish a greater bank capital to GDP ratio and lesser market place concentration proportion resulting in lesser margin and incomes. Banks in developed countries have greater margins and returns matched with banks in emergent nations,

contrary to developed countries. In addition, corporate tax weight is handed down to clients.

Bennaaceur and Goaid (2008) researched on influence of characteristics of banks, financial configuration plus macroeconomic pointers on net interest margins and productivity in banking sector in Tunisia between 1980 to 2000. The findings showed Tunisian financial system were favorable to the banking industry sustainability. Aliko (2015) research on bank performance determinants in commercial banks in Mauritius, found interest rates capping, resources value, administration productivity and macro-economic circumstances resolute bank presentation respectively. In addition, interest rate capping was found as an important influence on bank presentation. In a similar study conducted by Mwege (2016) found that interest rate capping, administration competence, resources value and overall macro-economic environments respectively, determined performances of commercial banks.

According to a Kenya Bankers Association (2017) publication, interest rate changes affect bank performance than any other variable. In their study, tier one and tier two banks in Kenya were sampled and restricted their data collections to the operations of the banks in Kenya and ignored income from subsidiaries in other Eastern Africa countries. Even though organization efficacy, accounts quality and bank possessions had an effect in financial presentation, interest rate capping was the most sensitive to its performance.

According to Tan (2016) who conducted a study assessing China's interest rate liberalization, established that capping of interest rate has unavoidably led to deprived

economic performance of banks that posted substantial losses or income drop in light of laws on interest rate capping in several nations worldwide. Closing of bank outlets occurs as a result of the negative effect interest rate capping has had on the performance of banks. Therefore, banks have scaled down on their costs since their profits have been influenced by the new interest rate capping law.

In a study covering countries in Latin America that have interest rate caps in place, World Bank (2015) in their paper reported significant poor financial presentation of banks in Ecuador, Mexico, Chile, Colombia and Brazil. They found significant drop in the profits of listed banks after governments in the respective countries introduced interest rate controls. The controls varied from country to country with different countries advancing different reasons and mechanisms to impose interest rate controls.

Tan (2016) conducted a study in Mauritania on influence of interest rate capping and financial presentation in profitable banks listed in Securities Exchange. Eight banks were used in the sample of listed banks the study from 2003 to 2013 by Ordinary Least Square regression (OLS). The research revealed a strong positive correlation amongst IRS and financial presentation of commercial banks. Mohamed argued by capping interest rate the commercial banks were performing dismally as opposed to when the free market forces were allowed to apply. According to Tan (2016) imposition of interest rate caps not only led to poor financial presentation of commercial banks, but also significant negative effects on consumers. He argued in Ecuador, it led to the flourishing of illegal lending which exploited consumers due to the opaque manner they operated in. He argued in Mexico and Chile, the lending to the vulnerable and the poor

slowed down with the imposition of caps making those countries lag after Latin America in financial presence.

Mia (2017) conducted a study on the financial performance of banks in Mauritius, Egypt and Ethiopia established that the first two countries had a weak financial sector due to the interest rate caps. In Mauritania where the government imposed a fixed margin above a benchmark, financial inclusion as well as bank performance was low. The study pointed out that Mauritania had among the weakest financial sector in Africa and this in turn affected the economy of the country. In Ethiopia the ceilings were removed in 1998, there was however, an effective ceiling for micro finance institutions imposed for political reasons he argued that the banking system in Ethiopia is fairly closed and relies heavily on government support.

In the same study Mia (2017) found that despite Egypt imposing interest rate caps on civil and commercial credit at 7%, it had a strong banking system and financial presentation of their banks were among best in that region. The study argued that despite the country imposing a 7% ceiling on commercial and civil credit, commercial banks determined interest rates for other loans. The study stated that the banking system in Egypt is largely market based and that imposition of interest rate caps was not blanket but was specific to certain sectors in the economy. The study further stat that interest rate capping did not upset financial performance of commercial banks negatively as banks still relied on market principles to set interest rates.

In Japan, the banking industry has consistently enjoyed strong financial performance over the years despite the country having forms of interest rate capping, according to

Miller (2013). The reason for the strong financial performance has been attributed to a dual regulatory system where banks and consumer finance houses are treated differently. The bank regulatory regime has stepped up maximum rates for different sizes of bank credit. The rates are 15% for loans of over 1 million to 20% for loans under 100,000. The study argued that the approach safeguarded the consumers as well as provided banks with flexibility in their credit program to customers.

In another study covering Mauritania, Zambia, Ethiopia and Egypt Aziz *et al.* (2015) investigated the effect of interest rate caps on financial performance of banks of named countries. Return on Asset (ROA) accounting method was used. A solid positive correlation amongst interest rate capping and poor financial presentation was found. In their study, significant drop in financial presentation of banks was found once interest rate caps were applied. They argued government control of the market was not the best way of promoting access to credit and promotion of financial inclusion.

Siddiqui (2012), basing on discrete bank factors, estimated IRS in Pakistan and found credit threat, liquidity threat and bank equity were significant factors of interest margins but not subtle to financial development. Mannasoo (2012) examines influence of current worldwide financial catastrophe on interest spread in Estonia. The research precedes Ho and Saunders (1981) works where spread is disintegrated into a pure and residual spread expounded by market configuration, rule and bank aspects. Results revealed credit risk played a negligible role and greater bank liquidity was related with lesser interest. Siddiqui (2012) also found an affirmative influence of assets returns on interest spreads. Moreover, liquidity negatively associated with interest rate spreads. Extremely liquid banks are related to lesser spreads because they do not sustain

additional expenses of obtaining assets when confronted with amplified plea for advances.

Gambacorta (2004) research explored issues enlightening cross-sectional variances in bank interest rates in Italy. The finding found that interest rate on short stint loaning for assets and capitalized banks respond not as much to economic policy setbacks due to their risks exposure. Ahokposi (2013) study established bank factors like threat, liquidity threat and bank impartiality are vital influencers of interest margins. The named spreads however, are not considerate to financial development. The research used 456 banks in 41 Sub-Saharan Africa nations. Studies by Chirwa and Mlachila (2004) and Sidiqqi (2012) in addition established a positive influence of non-execution finances ratio on interest spreads of banks in Malawi and Pakistan as a result of contact to liquidity threats

Mwega (2016) research on controlling developments and its influence on competitiveness and productivity in Kenyan banking industry, gave proof with regards profit perseverance in the sector. However, positive association can be counteracted along comparable discussions for size of bank if a person contends as efficacy measure of banks, a greater profit on average resources related to lesser spreads. Aboagy *et al.* (2008) research examined reply of banks net interest margin on variations of causes that are bank- precise, banking sector particular and Ghana macroeconomic elements. The study established that a rise bank market power, size of bank, work expenses, organizational expenses, bank's extent to threat averse and price increases, rises net interest margin.

Maudos and Guevara (2004) integrated functioning expenses in their theoretical model based on Angbazo (1997) research. Additionally, in their research on banks in Europe, they implemented lerner index, a straightforward extent of market control than concentration ratios adopted by past researches. The findings established interest margin was determined by competitive circumstances, interest rate threat, credit threat, average functioning expenditures and banks risk aversion. In addition, interest payments, opportunity costs of reserves and value of organization variables not integrated in the theoretical model.

Ngugi (2001) executed a research to determine interest rate spread in Kenyan banking industry pre and post liberalization. The study established that IRS rises as a result of yet to be achieved efficacy plus high intermediation expenses. In addition, inherent and explicit taxes broaden interest spread because it rises intermediation expenses. Wong and Zhou (2008), study carried out in China on banks net interest margins, established that extension of IRS as a result of working expenses. Folawewo and Tennant (2008) cross-county research established statutory backup necessity, price cut rate and level of cash amount decided by central bank utilized a noteworthy positive influence on IRS in Sub-Saharan Africa (SSA) for the time 1988-2005.

Mlachila and Chirwa (2004) delved into financial reforms and interest rate spreads in the Malawian commercial banking, which revealed macroeconomic instability and guidelines having a noteworthy influence on interest rate margins in banks. The findings recommended a trade-off amongst warranting bank creditworthiness, distinct by high asset ratios together with reducing prices of financial amenities to customers, as assessed by low interest rate margins. Hawtrey and Liang (2008) state that

explanations provided by commercial banks' are that reasonably huge IRS are as a result of high prices related with doing trade in Jamaica. However, some executives and strategy consultants tone down the reasons as they seem to be unrelated.

Maudos and Guevara (2004) conducted a study founded on the Angbazo (1997) research and only included functioning expenses in the theoretical model. The findings showed average functioning expenses influence interest margin, banks threat aversion and factors not exclusively included in the model like reserves of opportunity cost, expense implied in interest and value of administration.

Williams (2007) established proof in backing of a research conducted by Guevara and Maudos (2004) in insertion of operating expenses in the model in Australia cases and influence of market power of banks proposed in a prior research on Australian net interest margins by Sharpe and McShane (1985). Wong and Zhou (2008) in their research titled China commercial bank net interest margins established proof and support Ho & Saunders model regarding operating expenses.

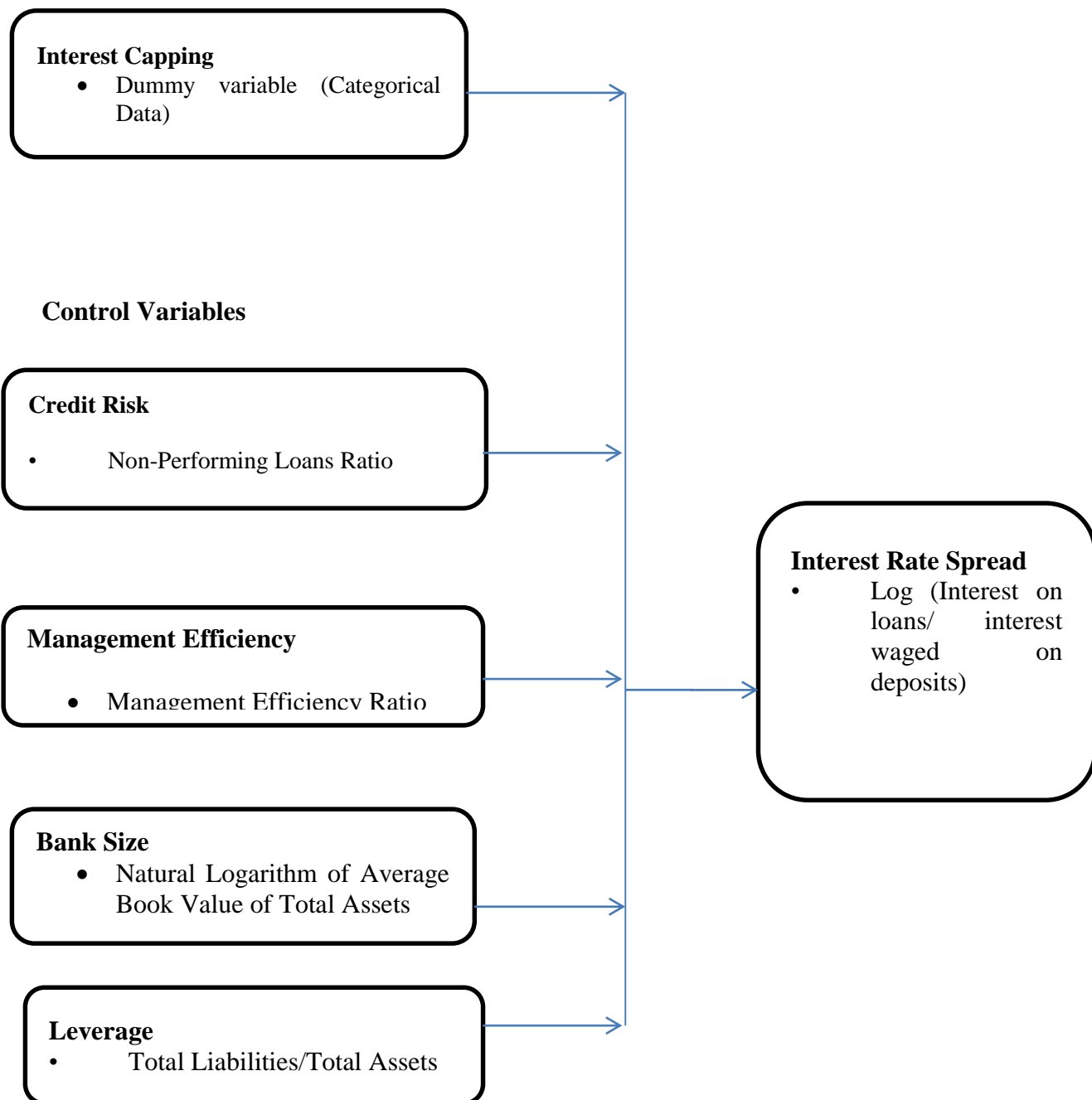
The Pakistan State Bank (2006) noted that bank-related factors like managerial costs, affect level of finance spreads in the Country. Siddiqui (2010) research carried out found that overhead expenses are peak for overseas banks, causing lowermost ROA related to banking industry. The researches revealed high overhead expenses is mostly revealed in worker expenses, extremely mechanical, well planned, and equipped bank outlets contribute towards interest rate spread.

2.5 Conceptual Framework

Provided below is a graphical illustration depicting the conceptual framework used by the researcher in studying the phenomenon. According to a Kenya Bankers Association (2017) publication, interest rate changes affect bank performance than any other variable. Aziz *et al.* (2015) established a solid positive correlation amongst interest rate capping and banks' financial performance and further that a significant drop in financial performance of banks was found once interest rate caps were applied. Interest rate capping will serve as the main independent variable and conversely, the interest spread will be the dependent variables. The control variables include credit risk, liquidity risk, and operational costs.

Independent Variable

Dependent Variable



2.6 Summary of Literature and Research Gap

The appropriate literature reviewed show presence of numerous studies in urbanized and growing economies and shortage of researches in Africa apart from a few like Chirwa and Mlachila (2004) in Malawi, Apaa and Ojwiya (2009) and Folawewo and Tennant (2008) in Uganda and Aboagye et al (2008) in Ghana. This research replicated

such researches in a Kenyan setting. Numerous studies reviewed focused on factors determining interest rate spread while this researched used interest capping as a primary determinant. However, financial performance measures used were mainly ROA and ROE. This research therefore sought to fill the gap on how has interest rate capping affected interest rate spread in Kenyan commercial banks.

There is conflicting outcomes on the relationship between interest rate capping and interest rate spreads. Interest capping has failed in some countries such as Nigeria and India but has however been successful in countries such as France, Zambia, Canada, and Argentina where the countries have used it to protect consumers against exploitation (high interest rate spreads) (Greenwood, Landier & Thesmar, 2015). This research therefore sought to fill the gaps on how has interest rate capping affects interest rate spread in Kenyan commercial banks.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

In this section, the methodology, which will be applied, is laid out. This chapter contains several sections, which includes research design explaining the design applied, data collection to explain procedure for gathering data, the population, and the data analysis methods to be applied.

3.2. Research Design

A research design can be defined as the blue print for executing a study with full control over factors that have an effect on the validity of the findings. Research designs are either experimental or non-experimental (Cooper & Schindler, 2003). The research design utilized for this study is an exploratory, ex-post facto, and causal research design. This is because it had a hypotheses that emanated from established theories and empirical literature, the variables were not be manipulated but simply measured as they are, and the study sought to establish the cause and effect relationship between two or more variables. It is a field setting with the unit of analysis being the country. It was panel data because data was collected across the various units of analysis over a period of time. It was a survey because several units of analysis were analyzed and it was a census because the whole population was analyzed. Thus, this research design took into account aspects like method of analysis, the variables used in the research, and data gathering methods.

3.3. Population and Sampling

A population is characterized as a collection of objects or people with mutual noticeable traits (Mugenda & Mugenda, 2013). The population of the study was made up of the 43 licensed commercial banks, which operated during the study period. The list of all the 43 commercial banks is provided in Appendix I. The research used the census approach and no sample was derived. This is because the population is scalable and feasible, and it did not encounter time and financial constraints.

3.4. Data Collection

The process of data collection is very critical in research as it ultimately impacts on the validity of the results. In this regard, the research utilized secondary data. In particular, the investigator will rely on data provided by the Central Bank of Kenya, which highlights the quarterly data, as well as bank supervision reports, for commercial banks in Kenya. The research supplemented this data with that that was obtained from the published individual commercial bank's financial statements. The research analyzed the interest rate spreads of commercial banks before and after the implementation of the new law capping interest rates. Data was collected for five quarters preceding the enactment of the interest capping law on September 16 2016, and five quarters after the enactment of the law. The quarter during which the law was enacted, from July to September 2016, was not considered.

3.5. Data Analysis

Data collected was organized, tabulated and simplified so as to make it easier to analyze, interpret and understand. Because panel data was employed for the study, STATA version 13 was the statistical analysis program utilized for the study because it

is able to perform panel multiple linear regression. The study objectives were met by the correlation and regression analyses of the variables. The study adopted a confidence interval of 95%. The results were set to be statistically significant at the 0.05 level, which indicates that the significance value should be less than 0.05. A statistical inference technique was used in making conclusions relating to the accuracy of the model in predicting the interest rate spreads. The model significance was tested using the significance values at 95% confidence. The significance of the relationship between each individual predictor variable and response variable was also determined by the significance values, which illustrates how much standard errors indicate that the sample deviates from the tested value. The study also utilized the two-sample t-test to determine whether the difference between means of interest spreads before and after interest capping is significantly different from the hypothesized difference between means. A two-tailed test will be utilized with the significance level of 5% being adopted.

3.5.1 Analytical Model

The aim of the study was achieved through the use of a multiple linear regression analysis model. Multiple regression analysis was used to test whether the predictor variables utilized in the study have any effect on interest rate spreads. Research variables were analyzed using variable effects panel regression model. This was done in order to do panel regression as the data is panel data, data collected for several units over a period of time. The statistical tests were done at 95% significance level implying that the study allows for an error of up to 5%. The model is illustrated below.

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + \mathcal{E}$$

Where;

Y = Interest rate spread

a = constant (The interest rate spread that is exhibited when all the predictor variables are set at 0).

X_1 = Sharia Compliance dummy variable (Categorical Data)

X_2 = Credit Risk as measured by non-performing loans ratio

X_3 = Management Efficiency

X_4 = Bank Size

X_5 = Leverage

ε = Disturbance Term

Table 3.1: Operationalization of the Study Variables

Variable	Measurement
Interest Rate Spread	Interest rate spread is computed as; $\log((\text{Interest income}/\text{interest Bearing Assets})/(\text{Interest expense}/\text{Interest Earning Liabilities}))$
Interest Rate Capping	Interest rate capping will be introduced as a dummy variable where the quarters preceding interest rate capping will be denoted as 0 and the quarters after the interest rate capping will be denoted as 1.
Management Efficiency	Management efficiency is going to be given by total operating expenses divided by total interest income.
Leverage	Leverage is going to be measured by total liabilities divided by total assets.

Credit Risk	Asset quality will be denoted by the Non-Performing Loans Ratio, which is calculated as; (Net Non-Performing Loans/Net Loans and Advances)
Bank Size	Natural logarithm of average book value of total assets of the bank during the period.

3.5.2 Diagnostic Tests

For the validity of regression analysis, a number of assumptions are done in conducting linear regression models. These are; no multi-collinearity, observations are sampled randomly, conditional mean ought to be zero, linear regression model is “linear in parameters”, spherical errors: there is homoscedasticity and no auto-correlation, and the optional assumption: error terms ought to be distributed normally. According to the Gauss-Markov Theorem, the first 5 assumptions of the linear regression model, the regression OLS estimators, are the Best Linear Unbiased Estimators (Grewal *et al.*, 2004).

The aforementioned assumptions are of great importance since when any of them is violated would mean the regression estimates will be incorrect and unreliable. Particularly, a violation would bring about incorrect signs of the regression estimates or the difference of the estimates would not be reliable, resulting to confidence intervals that are either too narrow or very wide (Gall *et al.*, 2006).

The diagnostic tests are conducted so as to guarantee that the assumptions are met to attain the Best Linear Unbiased Estimators. Regression diagnostics assess the model assumptions and probe if there are interpretations with a great, unwarranted effect on the examination or not. Diagnostic examinations on normality, linearity,

multicollinearity, and autocorrelation were done on the collected data to establish its suitability in the formulation of linear regression model. Normality was tested by the Shapiro-Francia test, which is suitable for testing distributions of Gaussian nature which have specific mean and variance. Linearity indicates a direct proportionate association amongst dependent and independent variable such that variation in independent variable is followed by a correspondent variation in dependent variable (Gall et al., 2006). Linearity was tested by determining homoscedasticity, which was determined by the Breusch-Pagan Cook-Weisberg Test for Homoscedasticity.

Tests for multicollinearity of data was carried out using variance inflation factors (VIF) to determine whether the predictor variables considered in the research are significantly correlated with each other. According to Grewal *et al.* (2004) the main sources of multicollinearity are small sample sizes, low explained variable and low measure reliability in the independent variables. Auto-correlation test was carried out through the Durbin-Watson Statistic.

Additionally, to avoid spurious regression results unit root test was carried out on the panel data. The aim of conducting unit root test is to check whether the macroeconomic variables under study are integrated of order on (1, 1) or not before estimation procedure can be proceeded into. Unit root test was conducted through the Fisher-type unit root test. The study also utilized the Hausman specification test to ascertain if the variables used in the study possess fixed influence overtime or if they have varying and random influence over time. The null hypothesis is that that the variables have a random effect and the alternate hypothesis is that the variables have a fixed effect. If the significance

value is less than α (0.05), the null hypothesis will consequently be rejected and if the significance value is greater than α (0.05), the null hypothesis will not be rejected.

CHAPTER FOUR

DATA ANALYSIS, RESULTS, AND FINDINGS

4.1 Introduction

This chapter entails of the data analysis, interpretation and the discussions of the outcomes. The section hence is fragmented to four sub sections, which entail diagnostic tests, inferential statistics, and interpretation and the arguments regarding the outcomes. Precisely this chapter summarizes the platform for data presentations, analysis, interpretations, and discussions.

4.2 Diagnostic Tests

Diagnostic tests that are a precursor to conducting linear regression were conducted. Diagnostic tests done in this study included; normality tests, homoscedacity tests, multicollinearity tests, and autocorrelation tests. Normality test was carried out using the the Shapiro-Wilk test and the homoscedacity test was conducted through the Breusch-Pagan Cook-Weisberg Test for Homoscedacity. Test on Multicollinearity of data was carried out using Variance Inflation Factors (VIF) while the autocorrelation test was done through the Durbin-Watson statistic. Unit root test was conducted through the Fisher-type unit root test. Additionally, the Hausman test was conducted to determine whether fixed or variable effects panel regression should be conducted.

4.2.1 Normality Test

The normality tests for all the variables employed in the study are highlighted in Table 4.1.

Table 4.1: Shapiro-Wilk Test for Normality

Variable	Obs	W	V	z	Prob>z
InterestRa~d	340	0.39449	144.176	11.739	0
InterestRa~g	340	0.99974	0.062	-6.578	1
NonPerform~o	340	0.81006	45.227	9.001	0
Management~y	340	0.91482	20.283	7.107	0
BankSize	340	0.783	51.669	9.315	0
Leverage	340	0.86211	32.832	8.245	0

In the test, the null hypothesis holds that the data has a normal distribution. The level of significance adopted in the study is 5%. The significance value obtained for the variable interest rate capping (1) is greater than the α (0.05). Thus, the null hypothesis is not rejected. Hence, the data series is normally distributed. The significance values of the IRS, NPL, management efficiency, bank size, and leverage variables are less than α (0.05), thus the null hypothesis is rejected. Hence, the data series of the variables are not normally distributed.

4.2.2 Homoscedacity Test

The homoscedacity tests for all the predictor variables employed in the study are enlisted in Table 4.2.

Table 4.2: Breusch-Pagan/Cook-Weisberg Test for Homoscedacity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	
Ho: Constant variance	
Variables: fitted values of InterestRateSpread	
chi2(1)	= 63.02
Prob > chi2	= 0.0000

The null hypothesis is that there is homoscedacity. The level of significance adopted in the study is 5%. Since the significance value is less than α (0.05), the null hypothesis is rejected. Hence, the data series of all the predictor variables are heteroscedastic.

4.2.3 Test for Multicollinearity

Results on Test for Multicollinearity of data carried out using Variance Inflation Factors (VIF) are displayed in Table 4.3.

Table 4.3: VIF Multicollinearity Statistics

Variable	VIF	1/VIF
NonPerform~o	1.69	0.590733
Management~y	1.37	0.732472
Leverage	1.32	0.757623
BankSize	1.2	0.834398
InterestRa~g	1.12	0.892686
Mean VIF	1.34	

The common rule in statistics is that the VIF values should be less than 10 and greater than 1. The findings indicate that the individual and mean VIF values fall below 10 and are greater than 1. Hence, there is no presence of multicollinearity amongst the predictor variables utilized in the study.

4.2.4 Tests for Autocorrelation

Test for Autocorrelation of data was carried out using the Durbin Watson statistic. The findings displayed that Durbin-Watson d-statistic (6, 340) = 1.952824. The Durbin-Watson statistic ranges from point 0 and point 4. If there exist no correlation between variables, a value of 2 is shown. If the values fall under point 0 up to a point less than 2, this is an indication of an autocorrelation and on the contrast a negative autocorrelation exist if the value falls under point more than 2 up to 4. As a common rule in statistics, values falling under the range 1.5 to 2.5 are considered relatively normal whereas values that fall out of the range raise a concern (Shenoy & Sharma, 2015). Field (2009) however, opines that values above 3 and less than 1 are a sure

reason for concern. Therefore, the data used in this panel is not serially autocorrelated since it meets this threshold.

4.2.5 Unit Root Test

The results for the unit root test conducted for the data series interest rate spread is displayed in Table 4.4 below.

Table 4.4: Unit Root Test for Financial Performance

Fisher-type unit-root test for InterestRateSpread			
Based on augmented Dickey-Fuller tests			
Ho: All panels contain unit roots	Number of panels	=	34
Ha: At least one panel is stationary	Avg. number of periods	=	10.00
AR parameter: Panel-specific	Asymptotics:	T ->	Infinity
Panel means: Included			
Time trend: Not included			
Drift term: Not included			
		ADF regressions:	0 lags
Statistic	p-value		
Inverse chi-squared(68) P	0.0000	1.0000	
Inverse normal Z	.	.	
Inverse logit t(4) L*	.	.	
Modified inv. chi-squared Pm	-5.8310	1.0000	

The null hypothesis is that interest rate spread has a unit root and the alternate hypothesis is that the variable is stationary. Since the significance values for the P and Pm tests are all greater than the critical value (α) at the 5% confidence level, then the null hypothesis is not rejected. Thus, the panel data series has unit root.

The results for the unit root test conducted for the data series interest rate capping are displayed in Table 4.5.

Table 4.5: Unit Root Test for Interest Rate Capping

Fisher-type unit-root test for InterestRateCapping

Based on augmented Dickey-Fuller tests

Ho: All panels contain unit roots Number of panels = 34
Ha: At least one panel is stationary Avg. number of periods = 10.00
AR parameter: Panel-specific Asymptotics: T -> Infinity
Panel means: Included
Time trend: Not included
Drift term: Not included ADF regressions: 0 lags

Statistic	p-value		
Inverse chi-squared(68) P	0.0000	1.0000	
Inverse normal Z	.	.	
Inverse logit t (4) L*	.	.	
Modified inv. chi-squared Pm	-5.8310	1.0000	

The null hypothesis is that interest rate capping has a unit root and the alternate hypothesis is that the variable is stationary. Since the significance values for the P and Pm tests are all greater than the critical value (α) at the 5% confidence level, then the null hypothesis is not rejected. Thus, the panel data series has unit root.

The results for the unit root test conducted for the data series non-performing loans are displayed in Table 4.6.

Table 4.6: Unit Root Test for Non-Performing Loans

Fisher-type unit-root test for NonPerformingLoansRatio

Based on augmented Dickey-Fuller tests

Ho: All panels contain unit roots Number of panels = 34
Ha: At least one panel is stationary Avg. number of periods = 10.00
AR parameter: Panel-specific Asymptotics: T -> Infinity
Panel means: Included
Time trend: Not included
Drift term: Not included ADF regressions: 0 lags

Statistic	p-value		
Inverse chi-squared(68) P	0.0000	1.0000	
Inverse normal Z	.	.	
Inverse logit t (4) L*	.	.	
Modified inv. chi-squared Pm	-5.8310	1.0000	

The null hypothesis is that non-performing loans has a unit root and the alternate hypothesis is that the variable is stationery. Since the significance values for the P and Pm tests are all greater than the critical value (α) at the 5% confidence level, then the null hypothesis is not rejected. Thus, the panel data series has unit root.

The results for the unit root test conducted for the data series management efficiency are displayed in Table 4.7.

Table 4.7: Unit Root Test for Management Efficiency

Fisher-type unit-root test for ManagementEfficiency			
Based on augmented Dickey-Fuller tests			
Ho: All panels contain unit roots	Number of panels	=	34
Ha: At least one panel is stationary	Avg. number of periods	=	10.00
AR parameter: Panel-specific	Asymptotics: T -> Infinity		
Panel means: Included			
Time trend: Not included			
Drift term: Not included			
		ADF regressions:	0 lags
Statistic	p-value		
Inverse chi-squared(68) P	0.0000	1.0000	
Inverse normal Z	.	.	
Inverse logit t(4) L*	.	.	
Modified inv. chi-squared Pm	-5.8310	1.0000	

The null hypothesis is that management efficiency has a unit root and the alternate hypothesis is that the variable is stationery. Since the significance values for the P and Pm tests are all greater than the critical value (α) at the 5% confidence level, then the null hypothesis is not rejected. Thus, the panel data series has unit root.

The results for the unit root test conducted for the data series bank size are displayed in Table 4.8.

Table 4.8: Unit Root Test for Bank Size

Fisher-type unit-root test for BankSize			
Based on augmented Dickey-Fuller tests			
Ho: All panels contain unit roots		Number of panels = 34	
Ha: At least one panel is stationary		Avg. number of periods = 10.00	
AR parameter: Panel-specific		Asymptotics: T -> Infinity	
Panel means: Included			
Time trend: Not included			
Drift term: Not included		ADF regressions: 0 lags	
Statistic			p-value
Inverse chi-squared(68) P	0.0000		1
Inverse normal Z	.	.	
Inverse logit t (4) L*	.	.	
Modified inv. chi-squared Pm	-5.8310		1

The null hypothesis is that bank size has a unit root and the alternate hypothesis is that the variable is stationary. Since the significance values for the P and Pm tests are all greater than the critical value (α) at the 5% confidence level, then the null hypothesis is not rejected. Thus, the panel data series has unit root.

The results for the unit root test conducted for the data series leverage are displayed in Table 4.9.

Table 4.9: Unit Root Test for Leverage

Fisher-type unit-root test for Leverage			
Based on augmented Dickey-Fuller tests			
Ho: All panels contain unit roots		Number of panels = 34	
Ha: At least one panel is stationary		Avg. number of periods = 10.00	
AR parameter: Panel-specific		Asymptotics: T -> Infinity	
Panel means: Included			
Time trend: Not included			
Drift term: Not included		ADF regressions: 0 lags	
Statistic			p-value
Inverse chi-squared(68) P	0.0000		1
Inverse normal Z	.	.	
Inverse logit t (4) L*	.	.	
Modified inv. chi-squared Pm	-5.8310		1

The null hypothesis is that leverage has a unit root and the alternate hypothesis is that the variable is stationary. Since the significance values for the P and Pm tests are all greater than the critical value (α) at the 5% confidence level, then the null hypothesis is not rejected. Thus, the panel data series has unit root.

4.2.6 Test for Random and Fixed Effects

The study carried out the Hausman test to determine if the variables have fixed influence overtime or if the variables have varying and random influence over time. Before the Hausman test was conducted, the variables had to be transformed because they did not meet the conditions of stationarity and homoscedasticity. Additionally, the all the variables apart from interest rate capping did not meet the condition of normality. Thus, a logarithmic function was introduced to all the variables to transform them. The finding are presented in Table 4.10.

Table 4.10: Hausman Test of Specification

	— Coefficients —			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
InterestRa~g	-.0910049	-.087857	-.0031479	.0032858
LogNonPerf~o	.0014643	.0006863	.000778	.0048996
LogManagem~y	.0716293	.0112986	.0603307	.0381598
LogBankSize	-.2036009	.3383057	-.5419066	.550025
LogLeverage	.1039428	-.1171847	.2211275	.2189186

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\chi^2(5) = \frac{(b-B)'[(V_b-V_B)^{-1}](b-B)}{4.41}$$

Prob>chi2 = 0.4916
 (V_b-V_B is not positive definite)

□

The null hypothesis assumed that “variables have a random effect and alternate hypothesis was that the variables have a fixed effect. If the p value is less than 0.05 then the null hypothesis will be rejected and if greater than 0.05 then the null hypothesis will not be rejected. When the Hausman chi-square test statistic is negative, the alternate hypothesis is adopted because asymptotically, the p value is equal to 1. The significance value obtained from the study findings (0.4916) is greater than the critical value (α) at the 5% confidence level. Thus, the null hypothesis is not rejected and hence the study variables have a random effect and consequently a random effect panel model shall be utilized.

4.3 Inferential Statistics

Inferential statistics were used in determining the direction, relationship, and strength of the association between the predictor variables and the response variable. The section entails the inferential statistics employed in the study, which included correlation and panel multiple linear regression analysis.

4.3.1 Correlation Analysis

Correlation analysis establishes whether there exists an association among two variables. The association falls between a perfect positive and a strong negative correlation. The study used Pearson Correlation. This study employed a Confidence Interval of 95% and a two-tail test. The correlation test was done to ascertain the association between financial risk and financial performance.

Table 4.11: Correlation Analysis

	LogInt~d	Intere~g	LogNon~o	LogMan~y	LogBan~e	LogLev~e
LogInteres~d	1.0000					
InterestRa~g	-0.6558*	1.0000				
	0.0000					
LogNonPerf~o	-0.1345*	0.1498*	1.0000			
	0.0131	0.0056				
LogManagem~y	-0.1312*	0.1858*	0.3833*	1.0000		
	0.0155	0.0006	0.0000			
LogBankSize	0.1326*	0.0134	-0.1751*	-0.1032	1.0000	
	0.0144	0.8062	0.0012	0.0574		
LogLeverage	0.0469	-0.0728	0.2973*	0.0354	0.3915*	1.0000
	0.3887	0.1808	0.0000	0.5156	0.0000	

Table 4.11 displays that interest rate capping, NPL, management efficiency, and bank size are significantly correlated at the 5% significance level to IRS. Interest rate capping, NPL, management efficiency have a negative significant association with IRS. Bank size, on the other hand, has a positive significant association with IRS. However, leverage does not have a significant association with IRS at the 5% significance level.

4.3.2 Multiple Linear Regression

The fixed effects panel regression model assessed the effect of interest rate capping and the bank specific factors on interest rate spread. The regression analysis was established at the 5% significance level. The significance critical value exhibited from the Analysis of Variance and Model Coefficients were compared with the values obtained in the analysis. The findings are displayed in Table 4.12.

Table 4.12: Panel Multiple Linear Regression

```

Random-effects GLS regression              Number of obs   =       340
Group variable: A                          Number of groups =        34

R-sq:  within = 0.4951                      Obs per group:  min =        10
        between = 0.1794                      avg =       10.0
        overall = 0.4531                      max =        10

                                           Wald chi2(5)    =       304.73
corr(u_i, X) = 0 (assumed)                 Prob > chi2     =       0.0000
    
```

LogInterestRateSpread	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
InterestRateCapping	-.087857	.0053244	-16.50	0.000	-.0982926	-.0774214
LogNonPerformingLoansRatio	.0006863	.0082922	0.08	0.934	-.0155661	.0169388
LogManagementEffeciency	.0112986	.0198516	0.57	0.569	-.0276098	.0502071
LogBankSize	.3383057	.1414946	2.39	0.017	.0609814	.6156301
LogLeverage	-.1171847	.1432507	-0.82	0.413	-.3979608	.1635814
_cons	-1.032171	.1792983	-5.76	0.000	-1.383589	-.6807525
sigma_u	.01798183					
sigma_e	.0459349					
rho	.13288054	(fraction of variance due to u_i)				

The overall R^2 indicates deviations in response variable as a consequence of differences in predictor variables. The overall R^2 value is 0.4531, a discovery that 45.31% of the deviations in IRS are caused by interest rate capping and the bank specific factors. Other factors not incorporated in the model justify for 54.69% of the variations in financial performance.

The null hypothesis is that interest rate capping and the bank specific factors do not significantly influence IRS. The significance value obtained in the study ($\text{Prob}>F=0.000$) is less than the critical value of 0.05. Consequently, the null hypothesis is rejected. Thus, interest rate capping and the bank specific factors do influence financial performance. Thus, they can be utilized to significantly predict IRS.

The null hypothesis was that there was no significant relationship between interest rate capping and each of the bank specific with IRS. The study findings exhibited that only

interest rate capping and bank size had significant relationships with IRS. This is because their significance values are less than the critical significance value (α) of 0.05. Thus, the null hypothesis is rejected. Interest rate capping has a significant negative influence on IRS whereas bank size has a significant positive influence on IRS. NPLs, management efficiency, and leverage however do not have significant effects on IRS. This is because their significance values are greater than the critical significance value (α) of 0.05. The following model was thus developed;

$$Y = -1.032171 - 0.087857X_1 + 0.3383057X_2$$

Where;

Y = Interest Rate Spreads

X₁ = Interest Rate Capping

X₂ = Bank Size

This implies that when there is no interest rate capping and bank size is equal to zero, the interest rate spread is -1.032171. Subsequently, when the interest rate law was legislation was instituted, there was a decrease in interest rate spread by 0.087857 units. In addition, when bank size increases by one unit, there is an increase in IRS by 0.3383057 units.

4.3.3 Two-Sample T-Test

Additionally, the study utilized the two-sample t-test to determine whether the difference between means of commercial banks that are sharia compliant and those that

capping. The variables employed in the study did not meet the conditions of stationarity and homoscedasticity. Additionally, the all the variables apart from interest rate capping did not meet the condition of normality. Thus, a logarithmic function was introduced to all the variables to transform them.

The study findings established that interest rate capping, NPL, management efficiency, and bank size are significantly correlated at the 5% significance level to IRS. Interest rate capping, NPL, management efficiency have a negative significant association with IRS. Bank size has a positive significant association with IRS. Leverage however, does not have a significant association with IRS at the 5% significance level. Additionally, the study findings revealed that interest rate capping and the bank specific factors do significantly influence IRS. Thus, they can be utilized to significantly predict the IRS of commercial banks. The study findings also exhibited that only interest rate capping and bank size had significant relationships with IRS. Interest rate capping has a significant negative influence on IRS whereas bank size has a significant positive influence on IRS. NPLs, management efficiency, and leverage however do not have significant effects on IRS. Findings from the two-sample t-test revealed that there was a significant change in the interest rate spread of the commercial banks from before the interest rate capping legislation was enacted and after it was enacted.

The study finding that that interest rate capping and bank specific factors have a significant impact on IRS is congruent to Beck et al.'s (2011) study finding that bank characteristics like size, functioning expenses and structure of advance portfolio give details to a huge section of cross-bank, cross- period variants in spreads. Beck et al.'s

(2011) implemented bank data information on Ugandan banking system to study causes responsible for constantly high interest rate spreads and margins.

The study finding that interest rate capping has a significant negative association and relationship with interest rate spread is in agreement with the the Loanable Funds Theory which stipulates the basis of calculating the interest rate is dependent on the demand and supply of loanable fund prevailing in the capital market whereas the economic condition prevalent in a specific economy are the basis of calculating the short term interest rates. Interest rate capping is a prevailing economic condition. The study finding is also in sync with the Credit Market Theory which alludes to commercial banks being more likely to lend personal loans to borrowers they consider to be associated with a relatively low risk of default and conversely, when the borrower is likely to default, the bank may resort to charging a higher interest rate on the loan. Interest rate capping implies a commercial bank is bound to find itself unable to price higher interest rates on its loans, including those advanced to high-risk borrowers, thus decreasing the interest rate spread.

The study finding that interest rate capping has a significant negative association and relationship with interest rate spread is congruent to the assertion by Aurello (2015) that the capping of the interest rate has resulted to the commercial banks having a poor financial performance. The study finding is also congruent to the assertion by Aliko (2015) that following interest rate capping notable losses or rather drop in profit has been reported in various countries around the globe by banks. In fact, the adverse effect brought about by interest rate capping on the commercial banks performance has seen banks withdrawing and also closing some of their branches in different region across

the world. Banks have chosen to reduce their cost since the interest capping has had an impact on their revenue in the corresponding countries.

The finding confirms Folawewo and Tennant's (2008) stipulation that in the case of an interest rate capping regime where the interest rate spread widens, this would show that there is inefficiency in the banking sector or portray the financial development level.

The study finding is congruent to the findings of a study conducted Aliko (2015), which research on bank performance determinants in commercial banks in Mauritius. The study established that interest rates capping impacted negatively on banks' performance respectively. The study finding is also in tandem to the finding of a similar study conducted by Mwege (2016) which found out that interest rate capping determined performances of commercial banks.

The study finding is tandem to the Kenya Bankers Association (2017) publication which stipulated that interest rate changes affect bank performance than any other variable. Even though organization efficacy, accounts quality and bank possessions had an effect in financial presentation, interest rate capping was the most sensitive to its performance. The study finding is also in agreement to the finding of the study conducted by Tan (2016), which assessed China's interest rate liberalization. The study established that capping of interest rate has unavoidably led to deprived financial performance of banks that posted substantial losses or income drop in light of laws on interest rate capping in several nations worldwide. Closing of bank outlets occurs as a result of the negative effect interest rate capping has had on the performance of banks.

Therefore, banks have scaled down on their costs since their profits have been influenced by the new interest rate capping law.

In a study covering countries in Latin America that have interest rate caps in place, World Bank (2015) in their paper reported significant poor financial presentation of banks in Ecuador, Mexico, Chile, Colombia and Brazil. They found significant drop in the profits of listed banks after governments in the respective countries introduced interest rate controls. The controls varied from country to country with different countries advancing different reasons and mechanisms to impose interest rate controls. This is in tandem with the current study findings.

Tan (2016) conducted a study in Mauritania on influence of interest rate capping and financial presentation in profitable banks listed in Securities Exchange. The research concluded that capping interest rate the commercial banks were performing dismally as opposed to when the free market forces were allowed to apply. The study further concluded that imposition of interest rate caps not only led to poor financial presentation of commercial banks, but also significant negative effects on consumers. He argued in Ecuador, it led to the flourishing of illegal lending which exploited consumers due to the opaque manner they operated in. He argued in Mexico and Chile, the lending to the vulnerable and the poor slowed down with the imposition of caps making those countries lag after Latin America in financial presence. This is in congruent to the current study findings.

Mia (2017) conducted a study on the financial performance of banks in Mauritius, Egypt and Ethiopia established that the first two countries had a weak financial sector due to the interest rate caps. In Mauritania where the government imposed a fixed margin above a benchmark, financial inclusion as well as bank performance was low. The study pointed out that Mauritania had among the weakest financial sector in Africa and this in turn affected the economy of the country. In Ethiopia the ceilings were removed in 1998, there was however, an effective ceiling for micro finance institutions imposed for political reasons he argued that the banking system in Ethiopia is fairly closed and relies heavily on government support.

In the same study Mia (2017) found that despite Egypt imposing interest rate caps on civil and commercial credit at 7%, it had a strong banking system and financial presentation of their banks were among best in that region. The study argued that despite the country imposing a 7% ceiling on commercial and civil credit, commercial banks determined interest rates for other loans. The study stated that the banking system in Egypt is largely market based and that imposition of interest rate caps was not blanket but was specific to certain sectors in the economy. The study further stat that interest rate capping did not upset financial performance of commercial banks negatively as banks still relied on market principles to set interest rates. This is similar to the current study findings.

In Japan, the banking industry has consistently enjoyed strong financial performance over the years despite the country having forms of interest rate capping, according to Miller (2013). The reason for the strong financial performance has been attributed to a dual regulatory system where banks and consumer finance houses are treated

differently. The bank regulatory regime has stepped up maximum rates for different sizes of bank credit. The rates are 15% for loans of over 1 million to 20% for loans under 100,000. The study argued that the approach safeguarded the consumers as well as provided banks with flexibility in their credit program to customers. This is not congruent to the current study findings.

In another study covering Mauritania, Zambia, Ethiopia and Egypt Aziz *et al.* (2015) investigated the effect of interest rate caps on financial performance of banks of named countries. A solid positive correlation amongst interest rate capping and poor financial presentation was found. In their study, significant drop in financial presentation of banks was found once interest rate caps were applied. This is similar to the current study findings.

The study finding that management efficiency did not have a significant relationship with interest rate spread is not in sync to the statement by Miller (2013) that the bank's main source of income being interest implies that they are put to be unprofitable which could force them to consider measure like cutting cost through downsizing so as to continue being sustainable. The findings however found a negative significant association between management efficiency and interest rate spread.

The study finding that NPLs have non-significant effect on IRS contradicts the study findings by Ngugi (2001), which established that increase in NPLs creates an increase in interest rate spreads. The study finding however is in agreement to the findings of Mannasoo's (2012) study which assessed the role of latest worldwide financial catastrophe on interest spreads in Estonia. The research established credit risk played a

negligible role in interest margins. Mannasoo (2012) examines influence of current worldwide financial catastrophe on interest spread in Estonia. Results revealed credit risk played a negligible role and greater bank liquidity was related with lesser interest. This is congruent to the current study findings. The findings however found a negative significant association between NPLs and interest rate spread.

The study finding that bank size has both a significant effect and association with interest rate spreads is parallel to the study finding by Bakker, Schaveling, and Nijhof, (2014) that big banks attract low-priced sources of finance and competitively advance to debtors at great margins whereas lesser banks were required to extravagantly pay for credits due to acuity that creditors are threats thus needful a high return for threat undertaken. The study finding is also congruent to Malenya and Muturi's (2013) assertion that firm size has a positive influence on financial performance of enterprises because of economies of scale enjoyed by large firms as opposed to small firms.

The finding that leverage neither has a significant association nor relationship with interest rate spread is in contrast to Malenya and Muturi's (2013) assertion that leverage beyond a certain limit has an adverse influence on financial presentation of a firm due to the high interest costs associated with high leverage levels. The finding is also not in agreement with Chuthama's *et al.* (2015) study finding that leverage significantly affects firm performance as cheap credit acts as a cheap source of capital while expensive credit hinders firm growth and better financial performance as the firm will be bogged down by heavy interest cost.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This section shows the study findings summary, offered conclusions, and recommendations on the impact of interest rate capping on interest rate spreads realized

by Kenyan commercial banks. Additionally, the research limitations and further research suggestions are also outlined.

5.2 Summary of Findings

The study endeavored to assess the impact of interest rate capping on interest rate spreads realized by Kenyan commercial banks. The study also sought to establish joint effects of interest rate capping and select bank specific factors on interest rate capping. The study employed the use of correlation analysis, regression analysis, as well as the two-sample t-test. The correlation analysis employed in the study established that that interest rate capping, NPL, management efficiency, and bank size are significantly correlated to IRS of Kenyan commercial banks. Interest rate capping, NPL, management efficiency have a negative significant association with IRS of Kenyan commercial banks. Bank size has a positive significant association with IRS of Kenyan commercial banks. The analysis also exhibited that leverage however does not have a significant association with IRS of Kenyan commercial banks.

The panel multiple linear regression revealed that that interest rate capping and the bank specific factors do significantly influence IRS. Thus, they can be utilized to significantly predict the IRS of commercial banks. The study findings also exhibited that only interest rate capping and bank size had significant relationships with IRS. Interest rate capping has a significant negative influence on IRS whereas bank size has a significant negative influence on IRS. NPLs, management efficiency, and leverage however do not have significant effects on IRS. Findings from the two-sample t-test revealed that there was a significant change in the interest rate spread of the

commercial banks from before the interest rate capping legislation was enacted and after it was enacted.

5.3 Conclusion

In this section, the conclusion of the study is given; the conclusion is affiliated to the study main objective, which was to assess the impact of interest rate capping on interest rate spreads realized by Kenyan commercial banks. The study concluded that the interest rate capping has both a significant association and relationship with interest rate spread.

The study conclusion is in agreement with the the Loanable Funds Theory which stipulates the basis of calculating the interest rate is dependent on the demand and supply of loanable fund prevailing in the capital market whereas the economic condition prevalent in a specific economy are the basis of calculating the short term interest rates. Interest rate capping is a prevailing economic condition. The study conclusion is also in sync with the Credit Market Theory which alludes to commercial banks being more likely to lend personal loans to borrowers they consider to be associated with a relatively low risk of default and conversely, when the borrower is likely to default, the bank may resort to charging a higher interest rate on the loan. Interest rate capping implies a commercial bank is bound to find itself unable to price higher interest rates on its loans, including those advanced to high-risk borrowers, thus decreasing the interest rate spread.

The study conclusion is congruent to the assertion by Aurello (2015) that the capping of the interest rate has resulted to the commercial banks having a poor financial

performance. The study conclusion is also congruent to the assertion by Aliko (2015) that following interest rate capping notable losses or rather drop in profit has been reported in various countries around the globe by banks. In fact, the adverse effect brought about by interest rate capping on the commercial banks performance has seen banks withdrawing and also closing some of their branches in different region across the world. Banks have chosen to reduce their cost since the interest capping has had an impact on their revenue in the corresponding countries.

The study conclusion confirms Folawewo and Tennant's (2008) stipulation that in the case of an interest rate capping regime where the interest rate spread widens, this would show that there is inefficiency in the banking sector or portray the financial development level.

5.4 Recommendations

The study findings will aid in further researches to be conducted on the field of interest rate capping and their impact on the financial performance of commercial banks. Later scholars keen in research on interest rate capping and its impact on the financial performance of commercial banks will use the study findings as referral. Policy recommendations are made to the National Treasury and CBK since it has been established that the interest rate capping has a significant negative effect on the interest rate spreads of Kenyan commercial banks, the policy makers should institute interest capping because it reduces the interest rate spread which has been higher than the African average. The interest rate spread in Kenya for the period between 2002 to 2013 was at an average of 9.68% that is higher in comparison to an average of 6.9% for African countries and a 7.13% for East African countries (CBK, 2012). Additionally,

the regulator, the CBK, can utilize the CAMEL framework, which mainly entails the bank specific factors, to gauge the performance and going concern status of the individual banks. The recommendation will guide government regulators in making policies and practices to boost the financial system and mitigate collapse of banks.

The finding that interest rate capping had a significant negative effect on interest rate spreads generates the recommendation to the commercial bank practitioners, and by extension other financial institutions practitioners and consultants to employ other strategies to lower the cost of funds in case of an interest rate capping regime because the lending rate is fixed. The finding that bank size was the only bank specific factor that had significant positive relationships with interest rate spreads of commercial banks will guide the commercial bank practitioners, and by extension other financial institutions practitioners and consultants to increase bank size in order to augment the financial institutions' financial performance. The finding that the credit risk, management efficiency, and leverage do not have significant effects on financial performance of commercial banks will guide the commercial bank practitioners, and by extension other financial institutions practitioners and consultants not to focus entirely on them when augmenting the financial institutions' financial performance.

5.5 Limitations of the Study

The study was conducted only in the Kenyan commercial banks' context, due to time and cost constraints, which does not give clear indication of findings if other financial institutions were also incorporated in the study. More uncertainties would occur if similar studies were replicated in different financial institutions and countries. Although the research engaged secondary sources of data, there were some major

challenges like some of the data being not readily available; leverage and it took great lengths and costs to obtain it. The data was not utilized in their raw form and further calculations and manipulations of the data were required. Impending delays were experienced due to data processing and further editing before the compilation by the researcher.

5.6 Recommendations for Further Study

Exploring the influence the interest rate spreads on the interest rate spreads of commercial banks is of great importance the policy makers in the National Treasury and CBK, practitioners in the banking sector, and consultants. However, the current study was carried out in the commercial banks' context, the same study could be carried out across other financial institutions to establish if the study findings would hold. The study was only carried out in the Kenyan context, further studies can be conducted out of Kenyan context, they can be conducted in the African or global jurisdictions to establish whether the study findings would hold.

The study only considered that in addition to interest rate capping, credit risk, management efficiency, leverage, and the size of the bank as influencing interest rate spreads. A study can be conducted to ascertain if there are other factors that influence interest rate spreads. Additionally, further studies can be conducted to ascertain if there are factors that moderate on the relationship between interest rate capping and the bank specific factors and interest rate spreads. This study used secondary data, a subsequent research should be undertaken applying primary data to ascertain if the study findings would hold and either complement or criticize the finding of this study. Multiple linear regression and correlation analysis were applied in the study; Other analysis technique

for example cluster analysis, discriminant analysis, granger causality and factors should be incorporated in the subsequent research.

REFERENCES

- Ahokpossi, C., (2013). *Determinants of bank interest margins in Sub-Saharan Africa*. IMF Working Paper WP/13/34 International Financial Fund, Washington, DC.
- Angbazo, L., (1997). Commercial bank net interest margins, default risk, interest- rate risk, and off-balance sheet banking. *Journal of Banking and Finance* 21, 55–87.
- Asia Development Bank (2013). *ADB annual report*.
- Aziakpono, M., Wilson, M. K., & Manuel, J., (2007). Adjustment of commercial bank's interest rates and the effectiveness of financial policy in South Africa. *The African Finance Journal, Africa Growth Institute, vol. 9(1), pages 1-20*.

- Bakker, A., Schaveling, J., & Nijhof, A., (2014). Governance and microfinance institutions. *Corporate Governance*, 14(5), 637-652.
- Beck, T., Cull, R., Fuchs, M., Getenga, J., Gatere, P., Randa, J., & Trandafir, M., (2010). *Banking sector stability, efficiency and outreach in Kenya*. World Bank
- Beck, T., Thorsten, P., & Hesse, H., (2006). *Bank efficiency, ownership and market structure: Why are interest spreads so high in Uganda?* World Bank Policy Research Working Paper 4027.
- Bennaceur, S., & Goaid, M., (2008). The determinants of commercial bank interest margin and profitability: evidence from Tunisia. *Frontiers in Finance and Economics*, 5 (1), 106 – 130.
- Birungi, P., (2005). *Determinants of interest rate spreads in Uganda*. University of Pretoria, South Africa, Mimeo.
- Bongaerts, D., De Jong, F., & Driessen, J. (2011). Derivative pricing with liquidity risk: Theory and evidence from the credit default swap market. *The Journal of Finance*, 66(1), 203-240.
- Central Bank of Kenya (2012). *Quarterly report on Development in the Kenyan banking Sector for the period ended 30th June 2011*. www.centrabank.go.ke/downloads.
- Central Bank of Kenya (2013). *The role of Development Financial Institutions in Kenya*. Paper presented at the 2018 Annual Association of African Development Finance Institutions Forum. Serena Beach Hotel, Mombasa, Kenya.
- Central Bank of Kenya. (2018). *Annual Economic Reviews*.
- Chirwa E.W., & Mlachila, M., (2004). *Financial reforms and interest rate spreads in the commercial banking system in Malawi*. IMF Staff Papers 51(1), 96 – 122.
- Chuthamas C., Aminul I., & Thiyada K., (2015). Factors affecting business success of Small & Medium Enterprises (SMEs) in Thailand. *Asian Social Science Vol. 7, No. 5*.
- Cooper, D.R., & Schindler, P.S., (2003). *Business research methods*, 8th edition. McGraw-Hill Irwin, Boston.
- Crowley, J., (2007). *Interest rate spreads in English-speaking African countries*. IMF Working Paper No. wp/07/101. Washington D.C. World Bank.
- Cytonn (2017). *Kenya retail sector real estate report*. <https://cytonn.com/research?page=13>.
- Dehejia, R., Montgomery, H., & Morduch, J. (2012). Do interest rates matter? Credit demand in the Dhaka slums. *Journal of Development Economics*, 97(2), 437-449.
- Demirguc-Kunt, A., & Huizinga, H., (2008). *Determinants of commercial bank interest margins and profitability: Some international evidence*. World Bank Econ. Rev., 13 (2) , pp. 379–408.
- Folawewo, A., & Tennant, D., (2008). *Determinants of Interest rate spreads in Sub-Saharan African countries: a dynamic panel analysis*. Paper prepared for the 13th Annual African Econometrics Society Conference, 9 – 11 July, 2008, Pretoria, Republic of South Africa.
- Gall, K., Knight, D. W., Carlson, L. E., & Sullivan, J. F., (2006). Making the grade with students: The case for accessibility. *Journal of Engineering Education* 92 (4): 337-43.
- Gambacorta, L., (2004). *How banks set interest rates?* National Bureau of Economic Research Working Paper 10295, Cambridge.
- Gikandi, J. W., & Bloor, C. (2010). Adoption and effectiveness of electronic banking in Kenya. *Electronic commerce research and applications*, 9(4), 277-282.

- Greenwood, R., Landier, A., & Thesmar, D. (2015). Vulnerable banks. *Journal of Financial Economics*, 115(3), 471-485.
- Grenade, K. H. I., (2007). *Determinants of commercial banks interest rate spreads: some empirical evidence from the Eastern Caribbean Currency Union*. Eastern Caribbean Central Bank Staff Research Paper No. WP/ 07/01.
- Grewal, D., Janakiraman, R., Kalyanam, K., Kannan, P. K., Ratchford, B., Song, R., & Tolerico, S., (2010). Strategic online and offline retail pricing: A review and research agenda. *Journal of Interactive Marketing*. 24. 138-154. 10.1016/j.intmar.2010.02.007.
- Gujarati, D.N., (2004). *Basic econometrics, 4th edition*. McGraw-Hill Companies.
- Hamid, R., (2011). *Credit to private sector, interest spread and volatility in credit flows: do bank ownership and deposits matter?* DESA(Working Paper No. 105 ST/ESA/2011/DWP/105), New York. Department of Economic and Social Affairs, United Nations Headquarters.
- Hassan, M., & Khan, B., (2010). What drives interest rate spreads of commercial banks in Pakistan? Empirical evidence based on panel data. *SBP Research Bulletin* , 6(2).
- Hawtrey, K., & Liang, H., (2008). Bank interest margins in OECD countries. *North American Journal of Economics and Finance*, 19, 249–260.
- Ho, T., & Saunders, A., (1981). The determinants of bank interest margins: theory and empirical evidence. *Journal of Financial and Quantitative Analysis*, 16 (4),581-600.
- Howells, P., & Bain, K., (2007). *Financial markets and institutions*. 5th ed. Pearson Educación, p.241.
- Ireland, P. N. (2016). Financial transmission mechanism. *The New Palgrave Dictionary of Economics*, 1-7.
- Kamau, A. W. (2011). Intermediation efficiency and productivity of the banking sector in Kenya. *Interdisciplinary Journal of Research in Business*, 1(9), 12-26.
- Kamau, A., W., (2009). *Efficiency in the banking sector: An empirical investigation of commercial banks in Kenya*. PhD Thesis Submitted to the University of Nairobi.
- Kenya Bankers Association (2017). *Kenya bankers' economic bulletin*. Quarter two of 2017.
- Khawaja, I., & Din, M., (2007). *The determinants of interest rate spread in Pakistan*. Pakistan Institute of Development Economics, PIDE Working Papers 2007 (p. 22).
- Kithinji, M., & Waweru, M., (2007). Merger restructuring and financial performance of commercial banks in Kenya. *Journal of Economics, Management and Financial Markets*, 2,(4).
- Levine, R., (1988). Financial development and economic growth: views and agendas. *Journal of Economic Literature* (35), 688-726.
- Maimbo, S. M., & Gallegos, H. C. A., (2014). *Interest rate caps around the world: still popular, but a blunt instrument*. New York, Harper.
- Malenya, M., & Muturi, M., (2013). Merger restructuring and financial performance of commercial banks in Kenya. *Journal of Economics, Management and Financial Markets*, 2, (4).
- Mannasoo, K., (2012). *Determinants of bank interest spread in Estonia*. EESTIPANK Working Paper No 1/2012.
- Maudos, J., & Guevara, J. F., (2004). Factors Explaining the Interest Margin in Banking Sectors of the European Union. *Journal of Banking and Finance*, 28: 2259-2281.

- McShane, W., & Sharpe, G., (1985). A time series/cross section analysis of the determinants of Australian trading bank loan/deposit interest margins: 1962-1981. *The Journal of Banking and Finance*, 9, 115-136.
- Mia, A., (2017). Interest rate caps in microfinance: Issues and challenges. *International Journal of Industrial Distribution and Business*. 8. 19-22. 10.13106/ijidb.2017.vol8.no3.21.
- Miller, H., (2013). *Interest rate caps and their impact on financial inclusion*. Economic And Private Sector Professional Evidence And Applied Knowledge Services.
- Mugenda, O. M., & Mugenda, A. G., (1999). *Research methods. Quantitative and Qualitative Approaches*. ACTS Press, Nairobi.
- Mugenda, O. M., & Mugenda, A. G., (2013). *Social science*. Applied Research & Training Services, Nairobi Kenya.
- Muiruri, T., (2014). The effect of corporate governance practices on the financial performance of commercial banks in Kenya. An Unpublished MBA Research Project, University of Nairobi.
- Mujeri, M.K., & Islam, M.E. (2008). *Rationalizing interest rate spread in the banking sector: Some policy suggestions*. Policy Paper No. PP 0804, Policy Analysis Unit, Bangladesh Bank, Dhaka.
- Mwega, F. M. (2016). Financial Regulation in Kenya: Balancing inclusive growth with financial stability. In *Achieving Financial Stability and Growth in Africa* (pp. 99-122). Routledge.
- Naidu, S., & Chand, A., (2012). A comparative study of the financial problems faced by micro, small and medium enterprises in the manufacturing sector of Fiji and Tonga. *International Journal of Emerging Markets*, Vol. 7 No. 3, pp. 245-262.
- Nampewo, D., (2013). What drives interest rate spreads in Uganda's banking sector? *Int. J. Econ. Finance.*, 5 (1), pp. 76–85.
- Ndung'u, N., & Ngugi, R.W., (2009). *Banking sector interest rate spreads in Kenya*. KIPPRA Discussion Paper No. 5. Nairobi: Kenya Institute for Public Policy Research and Analysis (KIPPRA).
- Ng'ang'a, A. K. (2017). The impact of interest rate capping on the financial performance of commercial banks in Kenya. *Unpublished MBA Project, University of Nairobi*.
- Ngugi, R. (2001). An Empirical Analysis of Interest Rate Spread in Kenya, AERC Research Paper 106. Nairobi: African Economic Research Consortium (AERC).
- Njuguna, S.N., & Ngugi, R.W., (2000). *Banking sector interest rate spread in Kenya. macroeconomic and econometric modeling*. Kenya Institute for Public Policy Research and Analysis (KIPPRA) Discussion Paper No 5, 6-8.
- Nyasha, S., & Odhiambo, N. M. (2014). Do banks and stock markets spur economic growth? Kenya's experience. *International Journal of Sustainable Economy*, 7(1), 54-65.
- Peirce, H., & Klutsey, B., (2016). *Reframing financial regulation: Enhancing stability and protecting consumers*. Arlington, VA: Mercatus Center at George Mason University.
- Saad, G. & Siha, S. (2000). Managing quality: Critical links and a contingency model. *International Journal of Operations and Production Management*, 20(10):1146-1164.
- Siddiqui M. A., (2012). Towards determination of interest spread of commercial banks: empirical evidences from Pakistan. *African Journal of Business Management*, 1 6(5) 1851 – 1862.

- Sologoub, D., (2006). *The determinants of bank interest margins and profitability: Case of Ukraine*. www.bof.fi/bofit/seminar/bofcef06/sologub.pdf.
- State Bank of Pakistan, (2006). *Efficiency of financial intermediation: An analysis of banking spreads*. Financial Stability Review (FSR), the State Bank of Pakistan: 28-31.
- Tan, Y., (2016). The impacts of risk and competition on bank profitability in China. *Journal of International Financial Markets, Institutions and Money*, 40, 85-110.
- Thygeson, K. J., (1995). *Management of financial institutions*. New York: Harper Collins College Publishers.
- Wagacha, M., (2008). IPAR policy quarterly. November 2008 Issue.
- Wicksell, K., (1952). *A new principle of just taxation*. Translated by James Buchanan, in: Richard Musgrave and Alan Peacock (Eds) *Classics in the Theory of Public Finance* (New York: Macmillan and Company), pp. 72–118.
- Wicksell, K., (2011) *Selected essays in economics*. Vol. 1 (London: Routledge), pp. 240–52.
- Williams, B., (2007). Factors determining net interest margins in Australia: Domestic and foreign banks. 16. 10.1111/j.1468-0416.2007.00122.x.
- Wong, M., & Zhou, K., (2008). *The determinants of net interest margins of commercial banks in Mainland China*. *Emerging Markets Finance and Trade*, 44. 41-53. 10.2753/REE1540-496X440503.
- World Bank (2015). *Kenya economic update: Reinvigorating growth with a dynamic banking sector*.

APPENDICES

Appendix I: List of Licensed Commercial Banks in Kenya (as at 30th June 2016)

1. Absa Bank Limited
2. African Banking Corp. Ltd
3. Bank of Africa Kenya Ltd
4. Bank of India
5. Bank of Baroda (K) Ltd
6. Stanbic Bank Ltd
7. Chase Bank (K) Ltd (In Receivership)
8. Citibank N.A.
9. Consolidated Bank of Kenya Ltd
10. Co-operative Bank of Kenya Ltd
11. Credit Bank Ltd
12. Development Bank (K) Ltd
13. Diamond Trust Bank (K) Ltd
14. Dubai Bank Ltd (In Receivership)
15. Dubai Islamic Bank (Kenya) Ltd
16. Ecobank Limited
17. Spire Bank
18. Equity Bank Ltd
19. Family Bank Ltd
20. Guaranty Trust Bank
21. First Community Bank Ltd
22. Guardian Bank Ltd

22. Gulf African Bank Ltd
24. Habib Bank A.G. Zurich
25. HFC Ltd
26. Imperial Bank Ltd (In Receivership)
27. I & M Bank Ltd
28. Jamii Bora Bank Ltd
29. KCB Bank Kenya Ltd
30. Mayfair Bank Ltd
31. Middle East Bank (K) Ltd
32. M Oriental Bank Ltd
33. National Bank of Kenya Ltd
34. NCBA Bank Kenya
35. Paramount Universal Bank Ltd
36. Prime Bank Ltd
37. Sidian Bank

38. Standard Chartered Bank (K) Ltd
39. SBM Bank (Kenya) Ltd
40. Transnational Bank Ltd
41. UBA Kenya Bank Ltd
42. Victoria Commercial bank Ltd

Source: Kenya Bankers Association Website (2020)

Appendix II: Data Collection Form

Name of Commercial Bank										
Year	2015			2016			2017			
Quarter	Q2	Q3	Q4	Q1	Q2	Q4	Q1	Q2	Q3	Q4
Data										
Interest Income										
Interest Bearing Assets										
Interest Expense										
Interest Earning Liabilities										
Interest Rate Spread										
Net Non-Performing Loans										
Net Loans and Advances										

Non-Performing Loans Ratio										
Operating Expenses										
Interest Income										
Operational Efficiency										
Total Liabilities										
Total Assets										
Leverage										
Log Total Assets										

Appendix III: Research Data

	Year	Quarter	Log Interest Rate Spread	Interest Rate Capping	Log Non-Performing Loans Ratio	Log Management Efficiency	Log Bank Size	Log Leverage
1	2015	2	-0.62361	0	-0.9987	-0.38164	1.228031	-0.05705
1		3	-0.62015	0	-0.90413	-0.30777	1.283508	-0.05784
1		4	-0.60642	0	-0.74352	-0.24558	1.228123	-0.05978
1	2016	1	-0.62617	0	-0.70049	-0.56098	1.227735	-0.06213
1		2	-0.62397	0	-0.69854	-0.47237	1.230326	-0.0567
1		4	-0.71422	1	-0.69984	-0.43747	1.228543	-0.06228
1	2017	1	-0.73072	1	-0.67081	-0.4573	1.228835	-0.06263
1		2	-0.727	1	-0.62124	-0.42102	1.229969	-0.06078
1		3	-0.72239	1	-0.59774	-0.2898	1.229969	-0.06158
1		4	-0.71806	1	-0.63865	-0.37851	1.231126	-0.05918
2	2015	2	-0.6347	0	-1.19179	-0.36071	1.254069	-0.07412
2		3	-0.63097	0	-1.10237	-0.31265	1.255054	-0.07048
2		4	-0.59843	0	-0.58872	-0.16463	1.256566	-0.0568
2	2016	1	-0.63209	0	-0.62875	-0.37893	1.255573	-0.05874
2		2	-0.63526	0	-0.55052	-0.34592	1.254198	-0.06278
2		4	-0.73636	1	-0.82074	-0.39383	1.251414	-0.07073
2	2017	1	-0.73684	1	-0.47978	-0.25197	1.252941	-0.06636
2		2	-0.73684	1	-0.45333	-0.25019	1.253661	-0.06364
2		3	-0.73613	1	-0.42424	-0.26512	1.251956	-0.0691
2		4	-0.73542	1	-0.41341	-0.26793	1.250616	-0.07381
3	2015	2	-0.59278	0	-1.40561	-0.91721	1.254729	-0.08035
3		3	-0.58469	0	-1.1549	-0.69422	1.25512	-0.07417
3		4	-0.57203	0	-1.11805	-0.70575	1.256179	-0.07847

3	2016	1	-0.61475	0	-1.1343	-0.83357	1.257476	-0.07811
3		2	-0.59261	0	-1.16368	-0.87354	1.259528	-0.07727
3		4	-0.63827	1	-1.03058	-0.82565	1.260864	-0.08176
3	2017	1	-0.71019	1	-1.01278	-0.79751	1.26156	-0.08344
3		2	-0.67244	1	-1.10624	-0.88406	1.262393	-0.0882
3		3	-0.64724	1	-1.15927	-0.88941	1.263339	-0.08693
3		4	-0.63171	1	-1.27901	-0.90066	1.263883	-0.08666
4	2015	2	-0.60276	0	-2.27572	-0.88907	1.242454	-0.08529
4		3	-0.58536	0	-2.284	-0.88907	1.241561	-0.08799
4		4	-0.57463	0	-1.69037	-0.84588	1.244452	-0.08113
4	2016	1	-0.61243	0	-2.02687	-0.96617	1.244016	-0.08799
4		2	-0.59397	0	-1.64207	-0.91542	1.245346	-0.09334
4		4	-0.64035	1	-1.84771	-0.91901	1.247552	-0.09658
4	2017	1	-0.70885	1	-1.92812	-0.94195	1.248519	-0.09724
4		2	-0.69144	1	-1.6038	-0.86934	1.253075	-0.08767
4		3	-0.66474	1	-1.50864	-0.88807	1.251973	-0.09184
4		4	-0.63752	1	-1.67572	-0.91865	1.251688	-0.0998
5	2015	2	-0.58704	0	-1.35164	-0.30548	1.284968	-0.07284
5		3	-0.56447	0	-1.2993	-0.29843	1.283615	-0.0792
5		4	-0.55052	0	-1.43533	-0.29551	1.285578	-0.07816
5	2016	1	-0.61261	0	-1.28592	-0.27474	1.285649	-0.08349
5		2	-0.595	0	-1.2426	-0.26217	1.286933	-0.07196
5		4	-0.67654	1	-1.16685	-0.25088	1.287225	-0.07681
5	2017	1	-0.71602	1	-1.15864	-0.24811	1.287305	-0.07967
5		2	-0.69551	1	-1.1349	-0.2488	1.287948	-0.07084
5		3	-0.67244	1	-1.11464	-0.24972	1.288071	-0.07391

5		4	-0.65758	1	-1.12552	-0.25003	1.288252	-0.07588
6	2015	2	-0.59671	0	-1.36051	-0.52476	1.268756	-0.08192
6		3	-0.56511	0	-1.3851	-0.49093	1.263714	-0.10663
6		4	-0.53062	0	-1.17783	-0.51428	1.262321	-0.10802
6	2016	1	-0.61137	0	-1.22403	-0.38881	1.262594	-0.11199
6		2	-0.58419	0	-1.31069	-0.50307	1.26606	-0.09887
6		4	-0.6169	1	-1.53313	-0.53432	1.266076	-0.09151
6	2017	1	-0.7093	1	-1.21042	-0.40034	1.265568	-0.09783
6		2	-0.66134	1	-1.22768	-0.51004	1.262821	-0.09936
6		3	-0.62727	1	-1.23958	-0.52317	1.26251	-0.10552
6		4	-0.60537	1	-1.33913	-0.53062	1.264885	-0.09985
7	2015	2	-0.60642	0	-1.25026	-0.50473	1.278867	-0.04813
7		3	-0.5904	0	-1.31515	-0.52172	1.279519	-0.04745
7		4	-0.58037	0	-1.34104	-0.48135	1.281175	-0.05276
7	2016	1	-0.62088	0	-1.0752	-0.44406	1.280884	-0.0566
7		2	-0.60607	0	-1.02457	-0.42366	1.282055	-0.05448
7		4	-0.65916	1	-1.12901	-0.44081	1.282549	-0.06063
7	2017	1	-0.71422	1	-1.07779	-0.45519	1.281652	-0.06677
7		2	-0.69637	1	-1.07831	-0.43239	1.283133	-0.06108
7		3	-0.67902	1	-1.03668	-0.42551	1.283406	-0.06344
7		4	-0.66776	1	-1.02319	-0.41263	1.283755	-0.06419
8	2015	2	-0.62986	0	-0.44721	-0.34151	1.217344	-0.05071
8		3	-0.63171	0	-0.45513	-0.33087	1.217076	-0.05066
8		4	-0.62912	0	-0.67305	-0.17672	1.216541	-0.05271
8	2016	1	-0.6319	0	-0.67182	-0.19709	1.216795	-0.05115
8		2	-0.62746	0	-0.71897	-0.19179	1.217065	-0.04915

8		4	-0.69229	1	-0.65287	-0.15033	1.216131	-0.04614
8	2017	1	-0.73353	1	-0.62654	-0.18456	1.215709	-0.04422
8		2	-0.71197	1	-0.59722	-0.13602	1.215561	-0.03962
8		3	-0.68909	1	-0.55768	-0.11351	1.215175	-0.03517
8		4	-0.66595	1	-0.53062	-0.09264	1.215239	-0.03593
9	2015	2	-0.58889	0	-1.38828	-0.4105	1.291828	-0.06732
9		3	-0.57316	0	-1.38195	-0.39459	1.29217	-0.06961
9		4	-0.564	0	-1.4045	-0.37748	1.293211	-0.06814
9	2016	1	-0.60995	0	-1.39469	-0.43902	1.293776	-0.07412
9		2	-0.58553	0	-1.33255	-0.42113	1.294504	-0.075
9		4	-0.62949	1	-1.32148	-0.36876	1.29388	-0.08176
9	2017	1	-0.71019	1	-1.33913	-0.37059	1.29546	-0.08476
9		2	-0.68466	1	-1.31336	-0.37192	1.295697	-0.07925
9		3	-0.66234	1	-1.1831	-0.36998	1.295949	-0.08171
9		4	-0.64532	1	-1.1296	-0.34737	1.295855	-0.08523
10	2015	2	-0.63264	0	-0.8791	-0.33489	1.265291	-0.05725
10		3	-0.63116	0	-1.04287	-0.23988	1.207819	-0.05899
10		4	-0.60415	0	-1.13906	-0.15329	1.208076	-0.06313
10	2016	1	-0.6306	0	-1.18111	-0.33442	1.210245	-0.07993
10		2	-0.62197	0	-1.21254	-0.31256	1.210351	-0.09055
10		4	-0.71693	1	-1.06753	-0.27035	1.212643	-0.09778
10	2017	1	-0.72793	1	-1.08831	-0.25798	1.214347	-0.09194

1 0		2	-0.71919	1	-1.02965	-0.25626	1.216209	-0.09039
1 0		3	-0.71175	1	-1.05899	-0.25877	1.21705	-0.0889
1 0		4	-0.70863	1	-1.04383	-0.25111	1.217148	-0.08842
1 1	2015	2	-0.6347	0	-0.6482	-0.6482	1.220102	-0.08954
1 1		3	-0.62875	0	-0.58872	-0.62069	1.220196	-0.08381
1 1		4	-0.59151	0	-0.56912	-0.61529	1.220356	-0.08276
1 1	2016	1	-0.63358	0	-0.55596	-0.58922	1.220359	-0.08202
1 1		2	-0.6347	0	-0.53121	-0.56896	1.220443	-0.08391
1 1		4	-0.72354	1	-0.5271	-0.56336	1.220472	-0.08449
1 1	2017	1	-0.73377	1	-0.51456	-0.55284	1.220499	-0.08492
1 1		2	-0.73565	1	-0.51741	-0.5106	1.220933	-0.08307
1 1		3	-0.72561	1	-0.58369	-0.6073	1.220005	-0.08799
1 1		4	-0.67667	1	-0.60015	-0.54775	1.220315	-0.08592
1 2	2015	2	-0.60102	0	-1.89963	-0.51371	1.27686	-0.09189
1 2		3	-0.58236	0	-1.83863	-0.51798	1.277094	-0.08218
1 2		4	-0.57122	0	-1.53611	-0.521	1.280294	-0.07422

1 2	2016	1	-0.61888	0	-1.50169	-0.51584	1.281961	-0.07155
1 2		2	-0.60067	0	-1.38195	-0.52681	1.283727	-0.08948
1 2		4	-0.65837	1	-1.39362	-0.54242	1.285854	-0.07017
1 2	2017	1	-0.71919	1	-1.36051	-0.51899	1.286286	-0.0713
1 2		2	-0.70115	1	-1.29414	-0.537	1.287109	-0.07022
1 2		3	-0.67162	1	-0.27786	-0.56495	1.287479	-0.07227
1 2		4	-0.65876	1	-0.24169	-0.53224	1.287946	-0.07053
1 3	2015	2	-0.63414	0	-1.00966	-0.26138	1.248065	-0.07345
1 3		3	-0.63432	0	-1.1261	-0.26785	1.25104	-0.06163
1 3		4	-0.63227	0	-1.08355	-0.27401	1.249808	-0.06763
1 3	2016	1	-0.63339	0	-0.98548	-0.25995	1.249304	-0.07294
1 3		2	-0.63283	0	-0.90274	-0.24703	1.24691	-0.08139
1 3		4	-0.61172	1	-0.65956	0.068297	1.247195	-0.07319
1 3	2017	1	-0.734	1	-0.42148	-0.08922	1.2476	-0.07196
1 3		2	-0.73189	1	-0.36906	-0.20712	1.246139	-0.0793
1 3		3	-0.72469	1	-0.37851	-0.21638	1.245671	-0.08197

1 3		4	-0.67778	1	-0.29568	-0.00301	1.250282	-0.05571
1 4	2015	2	-0.57774	0	-1.37469	-0.37079	1.291771	-0.07048
1 4		3	-0.5516	0	-1.36754	-0.35773	1.291977	-0.07376
1 4		4	-0.52724	0	-1.51713	-0.3713	1.293326	-0.065
1 4	2016	1	-0.60119	0	-1.4437	-0.39233	1.293726	-0.07058
1 4		2	-0.57251	0	-1.35655	-0.375	1.294531	-0.07058
1 4		4	-0.61404	1	-1.14086	-0.32587	1.295677	-0.06439
1 4	2017	1	-0.69058	1	-1.15366	-0.31641	1.296119	-0.05779
1 4		2	-0.65443	1	-1.15802	-0.30671	1.296585	-0.06183
1 4		3	-0.63639	1	-1.16052	-0.35389	1.296969	-0.06672
1 4		4	-0.61979	1	-1.16241	-0.35853	1.297166	-0.07176
1 5	2015	2	-0.59482	0	-1.22548	-0.30733	1.258389	-0.07012
1 5		3	-0.5779	0	-1.22695	-0.30998	1.260178	-0.06859
1 5		4	-0.57365	0	-1.55909	-0.32267	1.260365	-0.069
1 5	2016	1	-0.62434	0	-1.13312	-0.31903	1.261719	-0.06692
1 5		2	-0.61172	0	-1.04818	-0.28626	1.260044	-0.07053

1 5		4	-0.71602	1	-0.85449	-0.19518	1.256618	-0.08709
1 5	2017	1	-0.72793	1	-0.74958	-0.09334	1.255654	-0.08895
1 5		2	-0.72033	1	-0.75498	-0.0962	1.256604	-0.08334
1 5		3	-0.71287	1	-0.73377	-0.09135	1.257317	-0.07883
1 5		4	0.042615	1	-0.66294	-0.06672	1.256486	-0.07993
1 6	2015	2	-0.62672	0	-1.83565	-0.6258	1.216727	-0.0692
1 6		3	-0.61925	0	-1.78252	-0.59057	1.218114	-0.07707
1 6		4	-0.63432	0	-1.70333	-0.6073	1.219484	-0.08582
1 6	2016	1	-0.62379	0	-1.70115	-0.58536	1.221506	-0.08103
1 6		2	-0.61798	0	-1.67985	-0.55783	1.221293	-0.0882
1 6		4	-0.73049	1	-1.67162	-0.58436	1.220198	-0.09066
1 6	2017	1	-0.72654	1	-1.64782	-0.56004	1.21977	-0.0837
1 6		2	-0.724	1	-1.62709	-0.60783	1.21811	-0.08218
1 6		3	-0.71602	1	-1.59176	-0.57545	1.217535	-0.07857
1 6		4	-0.70841	1	-1.55596	-0.55893	1.214808	-0.07857
1 7	2015	2	-0.60572	0	-1.266	-0.37161	1.236093	-0.12738

1 7		3	-0.59176	0	-1.29328	-0.35922	1.235235	-0.13472
1 7		4	-0.5822	0	-1.33819	-0.34266	1.235418	-0.13614
1 7	2016	1	-0.61834	0	-1.35952	-0.3851	1.235313	-0.13966
1 7		2	-0.61154	0	-1.36051	-0.37551	1.234905	-0.14582
1 7		4	-0.65956	1	-1.11351	-0.35497	1.235628	-0.14418
1 7	2017	1	-0.71647	1	-1.06098	-0.27368	1.234028	-0.15677
1 7		2	-0.71287	1	-1.21254	-0.30138	1.234643	-0.15527
1 7		3	-0.6908	1	-1.08355	-0.28117	1.234774	-0.13507
1 7		4	-0.66274	1	-0.96819	-0.2468	1.233867	-0.09969
1 8	2015	2	-0.61654	0	-1.06702	-0.4807	1.219292	-0.05571
1 8		3	-0.60485	0	-1.07366	-0.48109	1.218301	-0.06143
1 8		4	-0.60206	0	-0.95311	-0.41828	1.21741	-0.06339
1 8	2016	1	-0.62269	0	-0.96297	-0.49826	1.218773	-0.06158
1 8		2	-0.60959	0	-1.00087	-0.40044	1.218709	-0.06148
1 8		4	-0.68719	1	-1.057	-0.38101	1.217582	-0.07089
1 8	2017	1	-0.72955	1	-1.07779	-0.42934	1.213822	-0.07099

1 8		2	-0.72033	1	-1.07366	-0.41465	1.218575	-0.07063
1 8		3	-0.71783	1	-1.05552	-0.4159	1.218999	-0.07053
1 8		4	-0.71693	1	-0.93293	-0.39126	1.219472	-0.07073
1 9	2015	2	-0.61261	0	-1.07988	-0.48452	1.255593	-0.06814
1 9		3	-0.59585	0	-1.10347	-0.51428	1.254994	-0.06283
1 9		4	-0.59534	0	-1.11182	-0.54121	1.256401	-0.06153
1 9	2016	1	-0.62819	0	-1.07212	-0.55006	1.256511	-0.06379
1 9		2	-0.6258	0	-0.9987	-0.53269	1.256778	-0.06459
1 9		4	-0.69101	1	-0.94424	-0.49349	1.256147	-0.06732
1 9	2017	1	-0.72262	1	-0.84588	-0.4045	1.256112	-0.06814
1 9		2	-0.71647	1	-0.82391	-0.39957	1.25597	-0.06783
1 9		3	-0.7073	1	-0.80052	-0.40727	1.25569	-0.06875
1 9		4	-0.70421	1	-0.78146	-0.40044	1.253936	-0.07593
2 0	2015	2	-0.58519	0	-1.60033	-0.63209	1.274031	-0.07588
2 0		3	-0.57057	0	-1.43415	-0.63264	1.275063	-0.07489
2 0		4	-0.55972	0	-1.30452	-0.64187	1.274428	-0.08465

2 0	2016	1	-0.61422	0	-1.25649	-0.62543	1.275926	-0.07977
2 0		2	-0.6005	0	-1.24795	-0.59825	1.276875	-0.08291
2 0		4	-0.67572	1	-1.11295	-0.49377	1.276831	-0.09189
2 0	2017	1	-0.72079	1	-1.13906	-0.5021	1.279147	-0.07484
2 0		2	-0.71444	1	-1.11295	-0.4828	1.278605	-0.08186
2 0		3	-0.69854	1	-1.0804	-0.45805	1.279302	-0.08218
2 0		4	-0.71829	1	-0.83446	-0.41885	1.279443	-0.09173
2 1	2015	2	-0.6059	0	-1.15739	-0.30347	1.219627	-0.09593
2 1		3	-0.59431	0	-1.23359	-0.31462	1.221446	-0.08932
2 1		4	-0.57398	0	-1.11577	-0.31795	1.221043	-0.09071
2 1	2016	1	-0.61852	0	-1.09259	-0.42539	1.22181	-0.08788
2 1		2	-0.59998	0	-1.01547	-0.3851	1.221539	-0.08836
2 1		4	-0.65817	1	-0.64035	-0.18669	1.219341	-0.11255
2 1	2017	1	-0.72125	1	-0.62617	-0.16159	1.219193	-0.11509
2 1		2	-0.7093	1	-0.6059	-0.14491	1.217686	-0.12194
2 1		3	-0.6925	1	-0.60119	-0.12056	1.215666	-0.12866

2									
1		4	-0.68803	1	-0.59619	-0.11379	1.21402	-0.13596	
2	2015	2	-0.61762	0	-1.17783	-0.37284	1.298318	-0.08166	
2		3	-0.59998	0	-1.23062	-0.38028	1.299187	-0.08092	
2		4	-0.59074	0	-1.20901	-0.4022	1.300235	-0.08244	
2	2016	1	-0.62379	0	-1.07831	-0.39179	1.300202	-0.06535	
2		2	-0.61172	0	-1.05651	-0.40143	1.300253	-0.07232	
2		4	-0.68952	1	-1.09637	-0.38112	1.30189	-0.07593	
2	2017	1	-0.73236	1	-1.08513	-0.36331	1.302555	-0.06905	
2		2	-0.73119	1	-1.09205	-0.35962	1.303348	-0.07191	
2		3	-0.72839	1	-1.07417	-0.35922	1.303623	-0.07873	
2		4	-0.72239	1	-1.07883	-0.34804	1.30395	-0.07956	
2	2015	2	-0.58704	0	-1.00568	-0.11611	1.271425	-0.02849	
2		3	-0.56735	0	-0.96819	-0.15583	1.270865	-0.03405	
2		4	-0.54061	0	-0.7607	-0.13835	1.27059	-0.03958	
2	2016	1	-0.60977	0	-0.62617	-0.16482	1.270206	-0.0411	
2		2	-0.58419	0	-0.3752	-0.1926	1.268823	-0.04412	

2									
3		4	-0.62727	1	-0.2636	-0.15095	1.267955	-0.02701	
2	2017	1	-0.7122	1	-0.30155	-0.16425	1.268678	-0.04345	
3		2	-0.6874	1	-0.28777	-0.17698	1.268896	-0.04402	
2		3	-0.66898	1	-0.28416	-0.17257	1.268272	-0.03787	
3		4	-0.64956	1	-0.2772	-0.16999	1.267535	-0.02877	
2	2015	2	-0.63023	0	-0.87128	-0.35892	1.272287	-0.07852	
4		3	-0.62893	0	-0.90101	-0.36391	1.273146	-0.08166	
2		4	-0.63153	0	-0.90868	-0.36683	1.274262	-0.08323	
4	2016	1	-0.63526	0	-0.91222	-0.36927	1.275107	-0.08629	
2		2	-0.63395	0	-0.92227	-0.37304	1.275847	-0.08804	
4		4	-0.66878	1	-0.92775	-0.38038	1.276512	-0.08996	
2	2017	1	-0.71942	1	-0.92445	-0.37758	1.277135	-0.09012	
4		2	-0.69724	1	-0.92592	-0.38743	1.277621	-0.08318	
2		3	-0.6784	1	-0.92263	-0.41409	1.279754	-0.07852	
4		4	-0.61529	1	-0.92775	-0.42148	1.280516	-0.07063	
2	2015	2	-0.58687	0	-0.92372	-0.45992	1.204634	-0.08624	
5									

2									
5		3	-0.56928	0	-0.87778	-0.42424	1.204268	-0.09881	
2									
5		4	-0.55052	0	-0.80217	-0.40649	1.202901	-0.13289	
2									
5	2016	1	-0.61225	0	-0.83446	-0.47873	1.204539	-0.12534	
2									
5		2	-0.58303	0	-0.91614	-0.38595	1.203784	-0.1762	
2									
5		4	-0.62051	1	-0.8911	-0.27458	1.207098	-0.15212	
2									
5	2017	1	-0.70952	1	-0.90798	-0.32864	1.207329	-0.152	
2									
5		2	-0.68048	1	-0.9333	-0.33942	1.208582	-0.14575	
2									
5		3	-0.656	1	-0.95585	-0.35076	1.208606	-0.14746	
2									
5		4	-0.61997	1	-0.95507	-0.30086	1.208821	-0.14648	
2									
6	2015	2	-0.63414	0	-0.9017	-0.55783	1.209986	-0.0574	
2									
6		3	-0.63264	0	-0.88074	-0.56928	1.209468	-0.06183	
2									
6		4	-0.59363	0	-0.85792	-0.57708	1.208692	-0.06849	
2									
6	2016	1	-0.63451	0	-0.78701	-0.60889	1.206916	-0.07562	
2									
6		2	-0.63395	0	-0.80493	-0.58905	1.203618	-0.07753	
2									
6		4	-0.69357	1	-0.87225	-0.56257	1.205721	-0.08323	
2									
6	2017	1	-0.73542	1	-0.79237	-0.38817	1.2066	-0.08113	

2								
6		2	-0.73471	1	-0.82681	-0.44141	1.206619	-0.08323
2								
6		3	-0.73142	1	-0.78595	-0.46801	1.206154	-0.0865
2								
6		4	-0.71829	1	-0.80327	-0.4734	1.206047	-0.08852
2								
7	2015	2	-0.62727	0	-1.70246	-0.63097	1.2536	-0.06278
2								
7		3	-0.6178	0	-1.67162	-0.64035	1.254784	-0.05958
2								
7		4	-0.61119	0	-1.61798	-0.49675	1.255029	-0.06258
2								
7	2016	1	-0.63171	0	-1.61083	-0.61888	1.255409	-0.06535
2								
7		2	-0.62875	0	-1.42946	-0.60818	1.255029	-0.06925
2								
7		4	-0.73589	1	-1.32698	-0.46942	1.255154	-0.07873
2								
7	2017	1	-0.73613	1	-1.4023	-0.5447	1.25609	-0.07774
2								
7		2	-0.73283	1	-1.41117	-0.54061	1.257142	-0.07629
2								
7		3	-0.72446	1	-1.37675	-0.52564	1.25769	-0.08418
2								
7		4	-0.72148	1	-1.23657	-0.49812	1.258924	-0.09023
2								
8	2015	2	-0.5938	0	-1.01055	-0.36081	1.218925	-0.10986
2								
8		3	-0.58303	0	-0.97306	-0.32569	1.221812	-0.1043
2								
8		4	-0.56719	0	-0.89143	-0.27679	1.224418	-0.09734

28	2016	1	-0.62015	0	-0.84285	-0.25594	1.225436	-0.09184
28		2	-0.59722	0	-0.78146	-0.21481	1.225596	-0.09028
28		4	-0.65797	1	-0.74184	-0.18072	1.226705	-0.089
28	2017	1	-0.71851	1	-0.70664	-0.14551	1.227423	-0.08911
28		2	-0.69789	1	-0.68048	-0.11053	1.226707	-0.08852
28		3	-0.68487	1	-0.66454	-0.07753	1.225439	-0.0864
28		4	-0.67244	1	-0.64302	-0.05794	1.224681	-0.08545
29	2015	2	-0.62764	0	-0.38648	-0.33479	1.221161	-0.05794
29		3	-0.6216	0	-0.37665	-0.27221	1.219511	-0.05844
29		4	-0.62654	0	-0.3903	-0.11588	1.217156	-0.06702
29	2016	1	-0.63023	0	-0.42574	-0.0846	1.218292	-0.05948
29		2	-0.62912	0	-0.54121	-0.00877	1.217497	-0.06093
29		4	-0.72862	1	-0.74982	0.000608	1.215911	-0.06133
29	2017	1	-0.73002	1	-0.73189	0.002814	1.215622	-0.06717
29		2	-0.72148	1	-0.48585	0.091526	1.21361	-0.06188
29		3	-0.71287	1	-0.3919	0.138618	1.211668	-0.05183

2 9		4	-0.71175	1	-0.34833	0.201233	1.210232	-0.04891
3 0	2015	2	-0.63432	0	-1.33442	-0.41162	1.281203	-0.06824
3 0		3	-0.63395	0	-1.32239	-0.40066	1.281285	-0.06178
3 0		4	-0.6066	0	-1.28819	-0.3886	1.28135	-0.05784
3 0	2016	1	-0.62819	0	-1.27409	-0.38479	1.281537	-0.06223
3 0		2	-0.62415	0	-1.2644	-0.35262	1.281611	-0.06389
3 0		4	-0.71153	1	-1.21681	-0.3493	1.281897	-0.06936
3 0	2017	1	-0.73565	1	-1.21396	-0.31858	1.282737	-0.06429
3 0		2	-0.72862	1	-1.25964	-0.24734	1.283996	-0.06404
3 0		3	-0.72262	1	-1.19928	-0.23935	1.28428	-0.06058
3 0		4	-0.71377	1	-1.23136	-0.23403	1.285144	-0.0649
3 1	2015	2	-0.59981	0	-1.16941	-0.33115	1.284348	-0.08328
3 1		3	-0.58071	0	-1.06956	-0.34631	1.284686	-0.08486
3 1		4	-0.56655	0	-0.89381	-0.26817	1.284913	-0.08339
3 1	2016	1	-0.62051	0	-0.85263	-0.38785	1.286362	-0.08386
3 1		2	-0.60995	0	-0.8716	-0.39513	1.286912	-0.08009

3 1		4	-0.65956	1	-0.91151	-0.36785	1.286404	-0.08376
3 1	2017	1	-0.71942	1	-0.88107	-0.34804	1.288443	-0.07915
3 1		2	-0.70268	1	-0.82507	-0.29852	1.28961	-0.06951
3 1		3	-0.68782	1	-0.82769	-0.283	1.29119	-0.06616
3 1		4	-0.67965	1	-0.85543	-0.30408	1.289331	-0.07386
3 2	2015	2	-0.61618	0	-0.97551	-0.27868	1.208515	-0.09093
3 2		3	-0.60537	0	-1.03105	-0.285	1.209391	-0.09114
3 2		4	-0.59295	0	-0.96778	-0.30129	1.208711	-0.09313
3 2	2016	1	-0.62709	0	-0.87648	-0.31114	1.208646	-0.09583
3 2		2	-0.61529	0	-0.84619	-0.30173	1.207242	-0.0905
3 2		4	-0.70224	1	-0.8617	-0.25135	1.208535	-0.09588
3 2	2017	1	-0.73471	1	-0.88041	-0.19321	1.208897	-0.09523
3 2		2	-0.71693	1	-0.88207	-0.18191	1.21167	-0.09507
3 2		3	-0.70443	1	-0.90101	-0.17561	1.213879	-0.0897
3 2		4	-0.68867	1	-0.90868	-0.15571	1.213989	-0.08852
3 3	2015	2	-0.63414	0	-1.67162	-0.35982	1.189383	-0.21545

3									
3		3	-0.63134	0	-1.63451	-0.33951	1.189939	-0.21226	
3		4	-0.6293	0	-1.6216	-0.32294	1.192496	-0.20936	
3	2016	1	-0.63432	0	-1.61798	-0.31194	1.193217	-0.20789	
3		2	-0.61404	0	-1.61083	-0.2777	1.192197	-0.20712	
3		4	-0.71647	1	-1.64782	-0.21875	1.191409	-0.2095	
3	2017	1	-0.73565	1	-1.60906	-0.1507	1.194599	-0.18184	
3		2	-0.73495	1	-1.60906	-0.14594	1.200385	-0.14146	
3		3	-0.73495	1	-1.43771	-0.15621	1.202048	-0.15627	
3		4	-0.7333	1	-1.33348	-0.16184	1.202928	-0.17548	
3	2015	2	-0.61475	0	0	-0.87128	1.226194	-0.06885	
3		3	-0.5938	0	0	-0.78068	1.226333	-0.07237	
3		4	-0.58303	0	0	-0.72932	1.226838	-0.0751	
3	2016	1	-0.61798	0	0	-0.7093	1.227024	-0.0816	
3		2	-0.60206	0	0	-0.69208	1.227159	-0.08582	
3		4	-0.65995	1	0	-0.64226	1.228522	-0.1112	
3	2017	1	-0.73377	1	0	-0.63264	1.229053	-0.11413	

3 4		2	-0.69336	1	-2.92082	-0.62397	1.229114	-0.11748
3 4		3	-0.6784	1	-2.85387	-0.58905	1.230151	-0.12361
3 4		4	-0.65817	1	-2.11919	-0.55517	1.231103	-0.11964

