

ANALYSING HIGH INTEREST RATE SPREADS: EMPIRICAL EVIDENCE FROM THE
KENYAN BANKING SECTOR

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Declaration

This research paper is my original work and has never been presented for a degree award in any other University.

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Dedication

*I dedicate this report to my dear parents, Mr. & Mrs. Maende for impacting the best values in
me*

Acknowledgement

First and foremost, I am indebted to the almighty God for giving me good health and guidance throughout my study at the University of Nairobi.

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List of Abbreviation/Acronyms

BOP	Balance of Payment
BLR	Base Lending Rate
BS	Bank Size
CBK	Central Bank of Kenya
CR	Credit Risk
EAC	East African Community
FoB	Foreign Owned Bank
GDP	Gross Domestic Product
GoB	Government Owned Bank
IEA	Institute of Economic Affaires
IRS	Interest Rate Spread
INF	Inflation
LR	Liquidity Risk
MC	Market Concentration
NBFIs	Non-Banking Financial Institutions
OLS	Ordinary Least Squares
PoB	Private Owned Bank
RGDP	Real Gross Domestic Product
USA	United States of America

Definition of terms

Adverse selection refers to a situation where sellers have information that buyers don't have or buyers have information which sellers don't have about some aspects of the product quality.

Hoarding is the practice of acquiring and holding money or scarce resources in order to gain profit after creating scarcity.

Interest rate is the amount of money which is expressed as the percentage of the amount borrowed.

Interest spread in this study refers to average rate of lending minus average rate of borrowing for banks.

Moral hazard is defined as the danger that a business deal has not been executed with sincerity with respect to liabilities, assets or credit.

Real Gross Domestic Product refers to the gross domestic product adjusted for changes in price.

Abstract

Banking industry plays a crucial part in growth and development of an economy. Banks/financial institutions mobilize funds from depositors and channels them to borrowers for investment. Efficient banking industry is imperative for economic development because of its role of mobilizing resources for investment purposes. Interest rate spread is a major indicator of the banking sector efficiency. Kenya has very high interest rate spreads which is a major challenge not only to financial deepening but, economic growth as well. Existing literature on the determinants of interest rate spread is inconclusive and hence, this study sought to investigate further on whether bank, industry and macro-economic specific factors explain the high interest rate spreads within the Kenyan banking sector. Regression approach based on Ho and Saunders (1981) was applied to a panel data of 38 commercial banks covering the period 2006-2015. Results were analysed based on Pooled OLS, random and fixed effect model estimations. The size of the bank, return on average assets, reserve requirements and real Gross Domestic Product were found to be significant factors determining interest rate spreads. The study recommended the need to explore both internal and industry-led strategies to reduce the effects of some of the bank specific factors which are driving high interest rate spreads in Kenya. Additionally, even though there is high competition in the banking sector, there is need to enhance it further so as to reduce interest spreads.

Table of Contents

Declaration	i
Dedication	ii
Acknowledgement	iii
List of Abbreviation/Acronyms	iv
Definition of terms	v
Abstract	vi
Table of Contents	vii
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background	1
1.1.1 Interest rate spread.....	1
1.1.2 Banking industry and interest rates in Kenya.....	3
1.2 Problem Statement	6
1.3 Research questions	7
1.4 Research Objectives	8
1.5 Importance of the Study	8
1.6 Organization of the Paper.....	9
CHAPTER TWO	10
LITERATURE REVIEW	10
2.0 Introduction	10
2.1 Theoretical Literature	10
2.2 Empirical Literature	13
2.3 Overview of Literature	17
CHAPTER THREE	19
METHODOLOGY	19
3.0 Introduction	19

3.1 Theoretical framework	19
3.2 Empirical Model.....	21
3.4 Variable definition, measurements and hypothesized sign	22
3.5 Data type and Sources	24
3.6 Estimation process.....	24
3.6.1 Diagnostic Tests	24
CHAPTER FOUR.....	25
RESULTS AND DISCUSSION	25
4.0 Introduction	25
4.1 Descriptive statistics.....	25
4.2 Econometric Results and Discussion	30
CHAPTER FIVE	35
SUMMARY OF FINDINGS, CONCLUSION AND POLICY RECOMMENDATIONS.....	35
5.0 Introduction	35
5.1 Summary of findings.....	35
5.2 Conclusion.....	35
5.3 Policy Recommendations.....	36
References.....	37
Appendix I: List of Commercial Banks in Kenya	43
Appendix II: Correlation Matrix.....	44
Appendix III: Pooled OLS Results	45
Appendix IV: Random Effect Model Results.....	46
Appendix V: Fixed Effect Model Results.....	47
Appendix VI: Hausman Test Results.....	48
Appendix VII: Pasaran Test Results	49

List of Tables

Table 1: Variables	23
Table 2: Means of Explanatory variables from 2006-2015	29
Table 3: Pooled Descriptive Statistics	29
Table 4: Correlation Matrix	30
Table 5: Pooled OLS, Random Effect (RE), and Fixed Effect (FE) results	32

List of Figures

Figure 1: Interest spread across East Africa (2005-2014)	2
Figure 2: Interest spread in Kenya as at end of December (1991-2015)	6
Figure 3: Interest Rate Spread across bank categories.....	26
Figure 4: Percentage share of loans and advances by Bank Categories	27
Figure 5: Percentage share of deposits by Bank Categories	28

CHAPTER ONE

INTRODUCTION

1.1 Background

Effective financial intermediation is a fundamental element in economic growth process because it affects mobilization of savings for investment purposes. Interest rate refers to the money borrowers pay for the use of borrowed money or the amount given in exchange for assets borrowed (Crowley, 2007). Commercial bank interest rate represents costs incurred by the banks in the intermediation process. This implies that, more welfare benefits can be realized when the interest rates are low. Interest rates exhibited by African countries are usually higher as compared to those of developed economies (Mensah& Abor, 2012). Higher interests are an indication of inefficiencies within the financial sector and this has serious consequences on both private and public sector operations. This is because, investments are often financed by loans and higher interest are therefore likely to reduce the levels of investments in the economy.

1.1.1 Interest rate spread

Provision of loans and deposit services is probably the most distinguishing feature between banks and other financial service providers. Deposits are liabilities while loans are bank assets. The bank's key role is that of financial intermediation between borrowers and depositors. The bank pays interest to depositors and receives income from borrowers. Interest rate spread (margin) is therefore, the lending rate minus the deposit rate or simply the difference between the two. Interest rate spread (IRS) is an important indicator for the bank's system and the intermediation process. In the perspective of the bank, IRS determines its revenue in terms of profits but, economically, if combined with both country and market risks, competition and other macroeconomic factors, IRS is the key factor affecting interest levels within the private sector (Mirna & Tomislav, 2012).

High interest rate in an economy implies high cost of borrowing which is a major challenge with respect to the expansion/deepening of the financial sector. The reason is that low deposit rates discourage the public from savings which negatively affects the role of banks in mobilization of savings for investment. This then, hinders the contribution of the banking sector to an economy. In addition, high interest rate raises questions about how effective financial institutions are in lending as part of monetary policy (Khwaja & Din, 2007). This adversely affects output and

employment of in an economy. According to the East African Community Facts and Figures (2015), Kenya has the highest IRS followed by Uganda, Rwanda and Burundi, while Tanzania has the lowest IRS on average (see Figure 1).

Various studies have established that both institutional (bank) and industrial (banking sector) factors play a crucial role on interest rate spread (Ramful, 2001; Barajas, Teiner, and Salazar 1999; Brock and Suarez ,2000). On their part, Jayaraman and Sharma (2003) observed that high interest rate spreads are caused by high intermediation costs which reflects weaknesses in the financial industry. Profit after tax, administrative costs and loan provision expenses have also been found to be contributing to the size of interest spreads. The banking industry plays a critical role in any economy; that of credit creation (mobilization of money in form of savings and provision of loans (Were & Wambua, 2014). It is therefore imperative to examine what determines IRS in order to understand financial intermediation process and the macroeconomic surroundings of the banking sector.

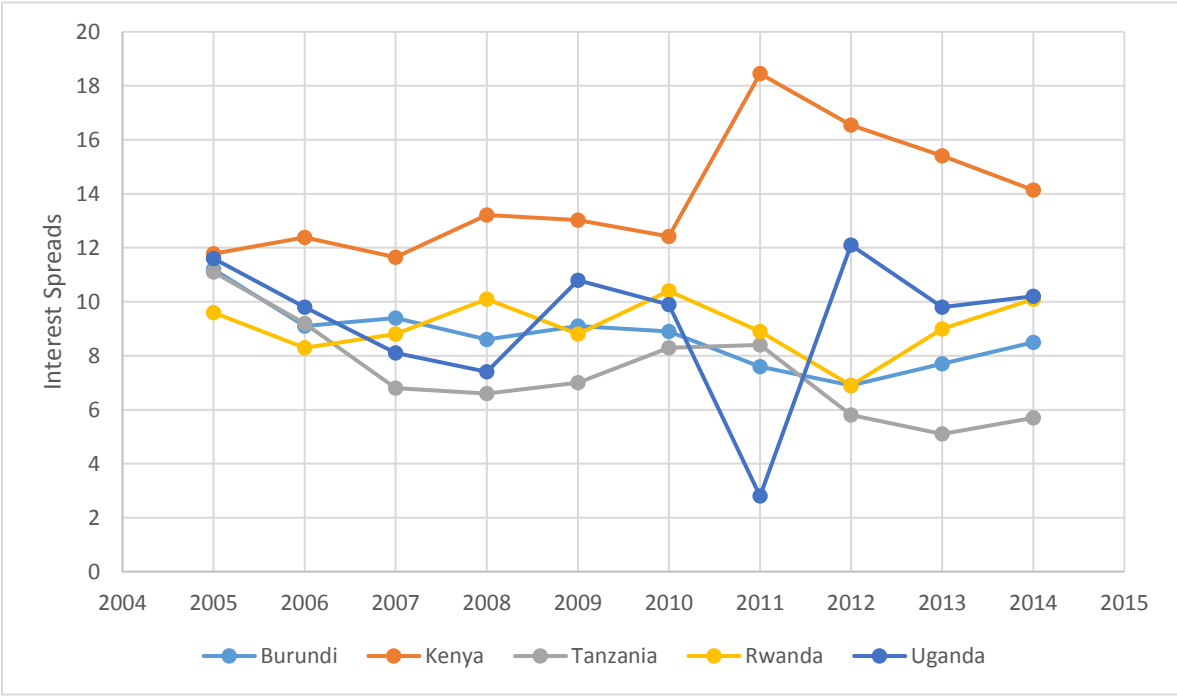


Figure 1: Interest spread across East Africa (2005-2014)

Source: EAC Facts & Figures (2015)

Figure 1 shows that Kenya has maintained the highest interest rate spreads in the region from the year 2005-2015, followed by Rwanda, Uganda and Burundi, while Tanzania has had the lowest interest spreads on average.

Due to wide spread public debate on high interest rate spread in Kenya, the member of parliament for Juja Hon Judy Njomo introduced a bill in Parliament to amend the banking Act (2015) to allow the government through CBK to control the lending and deposit rate of commercial banks. This was aimed at reducing the IRS in Kenya so as to reduce the cost of borrowing and hence boost economic activities through increased investments. The bill which is already in force after sailing through the parliament and subsequent assent by the president, sets a maximum lending rate at 4% and deposit rate at 7% above the Central bank's base lending rate. While this appears to be a positive move, the World Bank Policy Research Working Paper No. 7070 suggests that such policies have failed to achieve the intended objectives of lowering the cost of doing business particularly to the small and medium term enterprises (Munzele & Alejandra, 2014). This paper established that at least 76 countries around the world apply some form of interest rate caps on loans. Some of the effects of these policy experienced by these countries include: withdrawal of banking institutions from the poor or other sections of the economy, an increase in the cost of loans among others. This therefore implies that interest capping policy may not sit well with Kenya and other alternative measures have to be sought by establishing the real determinants of interest rate spreads.

1.1. 2 Banking industry and interest rates in Kenya

The banking industry plays a key role in the facilitation of Kenya's economic development, especially through mobilization of surplus cash and provision of loans (Were & Wambua, 2013). As at the end of December 2015, the Kenyan financial sector was composed of the Central Bank, forty-one (41) commercial banks, nine (9) Non-Banking Financial Institutions (NBFIs), microfinance institutions, a hundred and one (101) forex bureaus and two (2) credit reference bureaus (CBK, 2015). These financial institutions are licensed and controlled by the provisions of the Banking Act and guidelines issued there under.

In this section, the study analyses interest rates and interest margins based on changes in terms of policy in the banking industry from 1966, the year when the Central Bank of Kenya (CBK) was

established up to 2016. This is discussed in two phases where phase I covers the period from 1966 to 1990 while phase II spans from 1991 when Kenya liberalized its financial sector up to 2016.

1.1.2.1 Phase I (1966-1990)

Upon its inception in 1966, Central Bank of Kenya (CBK) pursued policies which were aimed at keeping interest rates as low as possible to encourage investment (Ngugi, 2001). CBK achieved this objective by introducing minimum interest rates on lending and savings which were applicable to all financial institutions in the country. As a result, interest rates remained constant because of two reasons. First, there was fear that any changes on the interests could negatively affect investment, and secondly, the country had good economic performance which sustained positive real interest rates. However, CBK became under pressure to adopt a control policy regime following the balance of payment (BOP) crisis of 1971-1972 which had induced negative inflationary pressures leading to negative real saving rate (Were & Wambua, 2014). A cash ratio of 5% was introduced on commercial banks to reduce this inflationary pressures. The control policy occasioned inefficiencies¹ in the financial sector where few commercial banks dominated the market and left the stock market almost dormant.

The period between 1974-1979, saw the first review of interest rate under CBK where the maximum lending rate was increased by 1% (Beck et al.,2010). This reduced the spread by 1% because the saving rate had gone up by 2%. The coffee boom of 1976/1977 reduced inflation and increased money supply which led to the increase in liquidity ratio in 1978. This prompted the CBK to reintroduce the cash ratio that was abolished in 1972 following the introduction of liquidity ratio (Beck et al., 2010). These developments led to a downward shift in inflation which resulted into positive interest rates. This led to some structural changes within the financial sector because the policy encouraged most Kenyans to invest in the sector and also NBFIs started to come up following the coffee boom. This was made possible due to low minimum capital requirement of NBFIs as compared to that of commercial banks. As a result, NBFIs deposits grew faster in relation to commercial bank deposits.

Interest rates underwent a series of reviews in a period spanning 1980-1990 to enable commercial banks compete favorably with NBFIs whose interest rates were very low (Beck et al., 2010). These

¹ This resulted from high transaction costs of interest rates and credit control

adjustments were also aimed at controlling inflationary pressures. During this period, NBFIs grew rapidly i.e. from 23 in 1981 to 48 in 1985 and on the other hand also, the country witnessed an increase in commercial banks from 16 to 24 during the period 1981-1988. There was a lot of competition between commercial banks and NBFIs as the deposit ratio of NBFIs to that of commercial banks increased from 34% in 1980 to 66% in 1990.

1.1.2.2 Phase II (1991-2016)

Due to trade reforms that were taking place across the globe, interest rates were liberalized in Kenya in 1991. In return, minimum saving rate declined from 13.5% up to 6.6% in the year 1995. However, the lending rates (maximum) increased to 38.6% (Tarus et al., 2012). As a result of this, interest spreads assumed an upward trend. Similarly, lending rates reached their peak at 38.6% in 1993, a phenomenon which resulted into upward trend in the IRS. Liberalization of interest rate happened at a time when the economy was performing poorly due to increasing inflationary pressures which resulted from fiscal policy expansionary measures of that time. Interest rates increased further due to financing of the fiscal deficit through domestic borrowing. These changes saw a decline in the saving rates and an increase in the lending rates during the first half 1990's. The interest spread reached its peak in 1996 (see Figure 2).

There was a widespread public debate on high interest rates in Kenya in early 2000. This debate prompted Joe Donde, the then member of parliament for Gem to come up with a bill which sought to address high levels of interest rates witnessed in the banking sector (Institute of Economic Affairs, 2000). This bill sought to harmonize lending and borrowing costs for the true market interest rates. The intention was to make the treasury bills, a risk-free security, the standard for determining interest rates in the banking industry. The imposition of this requirement was to ensure that the spread on the interest rate may not exceed 6% and that CBK was to ensure that all financial institutions adhere to the provision. Even though the bill sailed through parliament, it was not signed by the president into law.

In the year 2012, CBK initiated various reforms with the intention of improving financial access, stability and efficiency in the banking industry while conducting off-site and online supervision to ensure that they comply with regulatory framework (CBK, 2012). From 2012, there was no any significant development in policies to reduce interest rates apart from the normal regulatory

mechanism by the CBK, until September 2016 when a banking amendment Act 2015 that seeks to curb high interest rates charged by commercial banks was enacted into law. The new act bars commercial banks from charging more than 4% interest above the CBK base lending rate. In addition, commercial banks are obliged pay a deposit rate of 7% under this law.

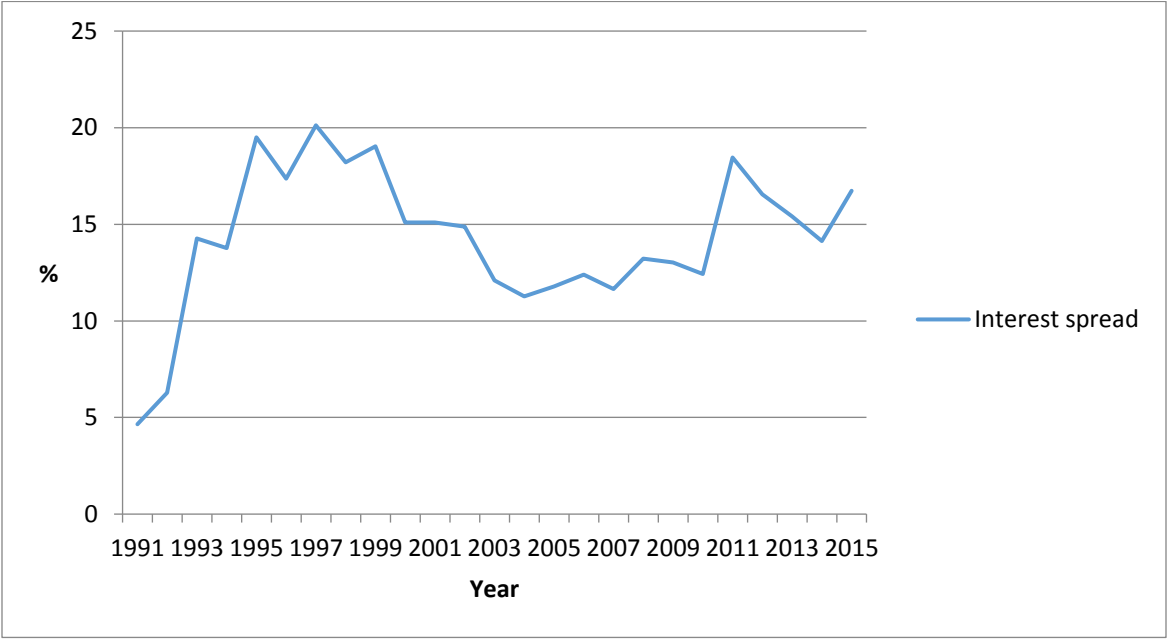


Figure 2: Interest spread in Kenya as at end of December (1991-2015)

Source: Central Bank of Kenya

1.2 Problem Statement

Mobilization and allocation of resources is very critical in economic growth and development. Resource mobilization takes place through savings and hence, paving the way for resource allocation for both consumption and investments. Banks provides avenues through which resources are mobilized from depositors and then lend to borrowers for either consumption or investment. This therefore means that bank loans contribute to the generation of economic activities which translates to higher national Gross Domestic Product (GDP) (Afzal, 2011). In Developing countries, such as Kenya, financial sector is characterized with high IRS on average than developed countries (Mensah & Abor, 2012; Kiptui, 2014). High IRS in an economy is likely to discourage financial deepening by keeping away those who would like to save due to low returns on deposits and this limits the sector’s ability to advance loans. Possible business opportunities are therefore reduced and hence the economy’s potential growth. Lower interest rates on the other

hand, encourages financial deepening and more development of financial markets which enhances investment activities and promote economic growth (Dumicic & Ridzak, 2013).

Several studies have examined various factors behind IRS for both developing and developed economies. In developed countries, Angbazo (1997), Maundos & Guevara (2004) and Gunter et al. (2013) have exclusively examined this issue in USA, European Union and Austria respectively, while similar studies were conducted in developing and sub-Saharan countries by Ramful (2001), Becky and Hesse (2009), Were and Wambua (2014), Kiptui (2014) among others. In the general sense, finding from developed countries and those of developing and sub-Saharan African countries differ in terms of bank, industry and macroeconomic specific factors which determine interest rate spread, but shows variations in results because countries differ by their economic, financial and operating environments. For example, Maundos & Soil (2009) found interest variability as a significant factor in determining interest spread in Mexico, which contradicted Afzal (2011) who established interest rate volatility as insignificant for determining interest spread in Pakistan.

Regionally, Beck and Hesse (2009) established the significance of GDP and inflation on determination of interest IRS within the Ugandan banking sector. These findings were inconsistent with those of Were & Wambua (2014) who found GDP to be insignificant in Kenya. Furthermore, a more recent study in Kenya by Kiptui (2014) found that macroeconomic, bank specific, and industry specific factors are significant determinants of interest spread. These most recent studies in Kenya also differ in terms of the methodology. For example, Were and Wambua used both fixed and random effect regressions while Kiptui on his part employed ordinary least squares approach. Moreover, the results of these studies were found to be outdated considering the fact that the most recent study (Kiptui, 2014) used data of up to 2011. Arising from these concerns, this study was set to bridge this gap by estimating the determinants of interest rates spread using commercial banks micro-data for the period 2006-2015 from the Central Bank of Kenya (CBK).

1.3 Research questions

- I. Do bank and industry level factors influence interest rate spreads in Kenya?
- II. Do macro-economic factors influence interest rate spreads in Kenya?

1.4. Research Objectives

The purpose of this study was to investigate determinants of interest rate spreads in Kenya. Specifically, the study sought:

- I. To analyze the effects of bank and industry level factors on interest rate spreads;
- II. To investigate the effects of macroeconomic factors on interest rate spreads;
- III. To suggest appropriate policy measures for dealing with interest rate spreads based on the study findings.

1.5 Importance of the Study

The impact of interest rate on economic development is very important because it determines the cost of loans and hence investment in an economy. For instance, high interest rates reduce household welfare and can also discourage investments. Currently (2016), high IRS in Kenya have generated a lot of debates which led to the passage of legislation in parliament on 27th July, 2016. A banking amendment Act which compels commercial banks not to charge more than 4% above the Central Bank base lending rate has since been enacted after its signing by the president on 27th of August. While this is seen as a good move to the already overburdened Kenyans, there is fear that banks could target big borrowers leaving out small ones so as to earn substantial profits. Another school of thought to this move holds that, reducing interest rate to a maximum of 4% above the base lending rate, and minimum of 7% deposit rate, could drastically reduce profitability margins of commercial banks which could lead to laying off of employees as well as reduced government revenue.

The study has therefore investigated the degree to which bank, industry and macroeconomic factors affect the determination of IRS in Kenya. In addition, the identification of factors responsible for high interest rates, is projected to signal management of the banks and policy makers to consider the key factors that influence interest rate spread of banks and as a result, it will help them improve on their intermediary efficiency and achieve financial deepening. Furthermore, this paper also generate academic debate on the factors leading to high interest spread. This is therefore hoped to serve as a springboard for more studies in this area.

1.6. Organization of the Paper

Following this introduction, the remaining chapters of this research paper are organized as follows: Chapter two presents theoretical as well as empirical literature on factors driving IRS. The chapter ends with the overview of the reviewed literature which establishes the identified research gaps. Chapter three presents explanation of the theoretical framework used by this study, the estimated model, description of variables, data type and sources as well as the estimation process. Chapter four presents analysed results and discussion, while chapter five provides conclusion and policy recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

In this chapter, the study reviewed and evaluated various works done by other researchers related to the research aim which was to investigate the determinants of interest margins. There are many components of IRS which include profits and operating costs. Others are provisions for non-performing loans and reserves. The components reflect both macro and micro factors which influence determination of interest rate spreads such as bank size, type of bank ownership, management efficiency, liquidity risk, credit risk, competition, regulatory framework and macroeconomic climate. The reviewed literature is wide both in terms of its approaches and application. In this chapter, the study reviewed findings and methods of various studies related to interest rates and their determinants. The review is given in order to gain more understanding into the most suitable approach for Kenya.

2.1. Theoretical Literature

The study of IRS is traced back to 1945, when Samuelson explicated how a rise in interest spreads impacts the banking system (Samuelson, 1945). Ho & Saunders (1981) was also among the earliest author who applied a two-step approach to study the determinants of IRS using panel data samples. This model has since been modified and tested by several authors. Studies have used several theoretical perspectives in analysing the determinants of interest rate spread. To begin with, Beck and Hesse (2009) found that information asymmetry between the participants in the financial intermediation system is very important. This study argued that information asymmetry between the lenders and borrowers may result in a moral hazard or adverse selection problems. Moral hazard or adverse selection may reduce the lender's ability to assess the potential borrower's credit worthiness. Hence, lenders may be tempted to impose a certain rate in order to take care of the risks that might occur such as inability of the borrowers to repay the loan. This situation is likely to increase IRS (Demirguc-Kunt et al., 2004) and Beck and Hesse, 2009). Stiglitz & Weiss (1981) investigated further on the adverse selection effect on interest rate and proposed that, for a bank to reduce excess demand for loans, they ought to select loan borrowers rather than reducing the size

of loans. Hence, differentiation of loan quality can bar banks from competition through interest rate reduction.

Demand and supply for loans in the financial markets was theorized to influence bank interest rates. In his theoretical view on credit, Anyanwu (1990) links interest rates with lack of savings, hoarding of money and inability to invest from government, businesses and consumers on the demand side, with savings and dishoarding of money on the supply side by private individuals and companies. This implies that banks determine interest rates based of supply and demand for loanable funds forces. It is expected that a higher demand for loans by the bank's customers, is likely to attract higher interest rates on loans and vice versa.

Keynesian in his liquidity theory postulated that it is demand and supply of money which determines interest rates in an economy. In his school of thought, Keynes stated that interest rate is a purely monetary, not a reward for hoarding money but for giving out liquidity for a certain time period (Pandey,1999). The theory makes two assumptions; one is that the economy is operating in the short run and two, money supply is given. The supply of money comes from banks and government while demand for money is the preference for liquidity. People and institutions like to hoard money because of liquidity preferences (Anyanwu,1990). Therefore, when banks lend money, they have to sacrifice liquidity preference, for the reward called interest rate. This then implies that the rate of interest is the reward that banks get for parting with cash (Crowley, 2007).

Theoretical studies on determinants of interest rates found the role of financial institutions in regulating money creation and financing of the economy as a significant factor (Fama, 1980 & Merton, 1995). These studies held that the inherent risks and concerns of solvency in a financial system requires monetary and sensible supervision which is not possible with direct interaction of depositors and borrowers. This supervision is expensive but the potential benefits that comes in terms of safety for depositors are great and considered as the main economic rent for monitoring and control (Mathews & Thompson, 2005).

Interest rate spread can also be explained by uncertainties related to deposits and loan markets, hedging behavior and expected utility maximization (Ho and Saunders, 1981). According to Ho and Saunders, banks are risk-averse in their role as financial intermediaries. They receive deposits

at random and the requests for loans come in at random as well. This randomness and therefore the uncertainty by which deposits are made and the manner in which customers make loan requests implies that banks face an inventory risk which must be taken care off by imposing a fee on loans and hence widening the gap the gap between loan and deposit rates. Therefore, interest rate spread is determined by the compensation for risks imposed by banks. This model further argued that interest spreads emanate from transaction uncertainties which banks encountered and which are always present. This model theorizes that pure IRS are determined by four factors which include market structure, variation of interest rate, managerial risk aversion and the bank size. Allen (1988) explained that IRS is the fee for providing deposit and loaning services by banks given the uncertainties surrounding deposits and loan requests in the short-run (McShane and Sharpe (1984). McShane and Sharpe assumed that banks seek to maximize expected benefits and risk aversion in loan and deposit markets, which eventually explains the interest spread.

Business cycles represented by gross domestic product can also explain IRS because, the credit worthiness of borrowers keep on varying over the cycles (Bernanke & Gertler, 1989). This then implies that the GDP growth rate affects lending rates. A neoclassical argues that lending and deposit rates are supposed to be equal due to lack of market frictions, or costs of transactions. That notwithstanding, intermediation expenses associated with screening, processing and monitoring of loans bring the difference between lending and deposit rates (Rajan & Zingales, 1998). The larger the intermediation costs, the wider the IRS. Higher spreads negatively affect demand for loans and hence investment thereby reducing economic growth.

Good and efficient governance protects the rights of creditors through the enforcement of legal contracts. This is likely to improve the financial development of the country and hence leading to lower IRS (La Porta et al., 1997). But, this theory argues that the net effect of good governance on IRS is unclear because of two countervailing effects. On one side, good governance can reduce interest spreads by reducing non-performing loans, while on the on the other side, good management, can negatively affect IRS due to its influence of the credit portfolio of the bank. This is because, banks ration loans to some borrowers with the increase in risks. Merton (1995) hypothesized that some decisions made in a bank have are very important determinants of interest rate spreads. For instance, this study indicated that a decision to increase bank equity is likely to induce banks to increase IRS to cater for high cost of capital.

2.2. Empirical Literature

Studies on interest rate spreads dates back to 1945, when Samuelson explicated on how the banking system affects IRS (Samuelson, 1945). Another earlier study is that of Ho & Saunders (1981). This is the most influential study in which a two-step process was employed to explain the drivers of interest rate spread using panel data samples. This model has since been modified by various authors (e.g. Angbazo, 1997; Maudos & de Guevara ,2004; Carbo et al., 2007) and tested in numerous studies such as Demirguc-Kunt & Huizinga (1999), Gambacorta (2004), Beck & Hesse (2009), Were & Wambua (2014) just to mention a few.

Existing literature, reveals three categories of factors which influence interest rate spread: bank-specific factors, market structure and macroeconomic factors. Studies employing different methodologies have been carried out on these factors across the world. Literature has established that operating costs, bank size, liquidity and credit risks are among the key determinants of IRS (Demirguc-Kunt & Huizinga, 1999). Using data from 80 banks across the world, Demirguc-Kunt & Huizinga, found that differences in profitability and interest rates are determined largely by macroeconomic factors. In addition, this study associated lower profitability and lower IRS with large bank assets to GDP ratio and low market power. This implies that banks with large capital base are likely to have lower chances of bankruptcy, and may therefore receive little funding costs which in turn leads to reduced deposit rates (Demirguc-Kunt et al.,2004). This is likely to lower IRS.

A study done in the USA, found credit and liquidity risks as significant factors in the determination of interest margins (Angbazo (1997). Similar findings were observed by Carbo and Rodriguez (2007) and Brook & Rojas (2000) in Europe and Latin America respectively, who applied Ho & Saunders (1981) model and concluded that IRS are explained by bank liquidity, capital, interest rate volatility, inflation and GDP with some variations across countries. These findings contradict a study by Gambacorta (2004) who argued that the size of the bank does not in any way influence interest rate margins. Using Ho & Saunders (1981) framework, Gambacorta (2004) observed that GDP and inflation significantly explain IRS in banks. Dabla-Norris & Floerkemeier (2007) in Armenia, and Horvath (2009) in Czech Republic, indicated that banks with more capital have lower spreads due to their lower risk of bankruptcy. Siddiqui (2012) used of 22 commercial banks in Pakistan to examined the effects of bank specific factors which included: market concentration,

liquidity risk, intermediation expenses, credit risk as a ratio of total non-performing loans to total loan advances, net interest earnings, and return on average assets. The study established that interest rate spread were significantly influenced by intermediation expenses, credit risk, and the return on average assets in all the estimated equations (pooled OLS, fixed, and random effects regressions). Moreover, Randall (1998) observed that intermediation costs played a dominant role in influencing interest rate spreads in East-Caribbean area. His study argued that intermediation expenses accounted for 23% of IRS in the period ranging from 1991-1996. In another study, Beck & Hesse (2007) found no significant relationship between interest rate spreads and entry of foreign banks, privatization, market power and banking efficiency. In addition, this study argues that macroeconomic variables such as GDP and inflation, have very little impact on the variations of interest spreads. With regard, to bank specific factors, the authors that interest spreads are largely explained by the time-invariant bank-level fixed effects.

A systematic comparative investigation of the drivers of IRS in Eastern and Western European countries found that market concentration, intermediation costs, capital and risk management, are vital determinants of IRS (Claeys & Vennet, 2003). In addition, this study further established that initial stages of institutional reforms bring about risky bank behaviours which translates into high IRS, but as the reforms advance, interest rate spreads reduce because of intense competitive pressures in the industry. These findings are however, inconsistent with Barajas et al. (1999) who concluded that liberalization does not have any direct effect on narrowing the interest margins. The efficiency of the judiciary system in enforcing debt contract was found to have an impact on interest rate spread. Using commercial bank data for 106 countries from the year 2000 up to 2006, Leaven & Majnoni (2005), concluded that judicial efficiency and inflation rates explain greatly interest margins across countries. The results from this study indicate that judicial efficiency in the enforcement of debt contracts reduce intermediation costs for firms and households which results to lower interest rate spreads.

The role of market structure and regulatory environment within the banking industry has been emphasized by many studies. Carbo & Rodriguez (2007) used Ho and Saunders (1981) framework to examine how market concentration affects IRS in seven European countries. This study found that there is significant variation in the link between market concentration and IRS based on the bank specialization. In addition, the study discovered that regulations related to the entry of new

banks, market structure and information exchange on borrowers influence the efficiency of intermediation process. The more a market is segmented, the higher the likely market power, which in turn increases interest spread (Saunders & Schumacher, 2000). In another similar study, Demirguc-Kunt et al. (2004) also found that higher market power in the banking industry reduces competition and thereby increasing interest margins. However, greater market concentration can also result into more profits because of probably higher lending rates (Berger and Hannan, 1989). On the other hand, a study by Crower (2007) observed that market concentration does not reduce competition. In an earlier study, Hanson & Rocha (1986) had also established that lack of competition drives interest spreads upwards. In addition, this study observed that intermediation costs, financial repression, and inflation rates are positively correlated with interest rate spreads in an economy. In a similar study, Chirwa & Mlachila (2004) using panel data approaches, attributed high interest rate spreads to low competition, high reserve requirements, high inflation and high central bank discount rate within the Malawian banking sector.

Imperfect institutions and high returns on Treasury bills are related to high IRS as observed by (Beck & Hesse, 2009) in Uganda. In their study, Beck & Hesse using cross-country regressions on bank microdata sets found that bank markets weakly explain IRS. However, this study had one limitation in the sense that it did not control for bank specific factors. Had this been accounted for, may be the results would have been different. Ahokposi (2012) investigated the impact of bank specific variables on IRS using a sample of 456 banks in sub-Saharan Africa. The findings indicated that provision for non-performing loans, capital, non-interest activities and inflation positively explained IRS. However, this study did not consider the influence of institutional factors which might have altered the results. A study by Wakemann-Linn et al. (2010) found lack of credit reference bureaus, poor legal systems and the presence of foreign banks significantly determine IRS in East Africa from 1998 to 2010. In an analysis of individual bank IRS in Nigeria, Hesse (2007) argued that big banks enjoy lower administrative costs than smaller banks and in turn, they have lower spreads. This study further revealed that liquidity risk and asset base were negatively correlated to the interest rate spreads.

Market structure, bank capitalization and the volatility of interest rates were cited to be the major determinants of IRS. This was reported in a study which comprised seven OECD countries from 1988-1995 (Saunders & Schumacher, 2000). On the other hand, Afanasieff et al. (2002) found

macroeconomic factors play a key role in the determination of interest rate spreads. According to Cihak (2004) for the case of Croatia, interest spreads are explained by deposit rates, market share, total assets, the ratio to non-performing loans to total loans, liquidity ratio, capital abundance, dummy variables for new entrants and privatized banks, and the return on the Treasury bill. This study further noted that there is an inverse relationship between lending rates, size of the bank, liquidity risk, foreign ownership and IRS, while market share, credit risk was found to be positively correlated with IRS. Banks with large capital were found to have higher spreads than those with low levels of capital.

Several studies have found macroeconomic factors to play an important role in determining IRS. For example, Angbazo (1997) found positive relationship between interest margins, credit and macroeconomic risk premia, while Demirguc-Kunt & Huizinga (1999) showed that macroeconomic variables such as taxation, and institutional frameworks influence interest spreads. Saunders & Schumacher (2000) revealed that volatility of interest rates increases interest margins, while Were and Wambua (2014) in the most recent study in Kenya noted that macro-economic factors were not significant determinants of interest spread.

The macroeconomic factors such as GDP and inflation affects the banking industry performance, by influencing borrower's ability to repay loans or to borrow (Ngugi, 2001). Poor economic performance proxied by GDP negatively affects returns on investment, which is likely to affect repayment of borrowed funds and thereby squeezing the bank margins (Ngugi, 2001). Inflation rates can influence IRS in the case where shocks within the monetary market managed well (Beck and Hesse, 2009). Similar findings were established by Bennaceur & Goaid (2008) for Tunisia, Chirwa & Mlachila (2004) for Malawi in studies which employed a sample of commercial banks from the sub-Saharan countries.

The economic growth rates (GDP) can influence particularly the lending rates the credit worthiness of borrowers varies over business cycles. Grenade (2007) established that macroeconomic variables such as GDP and regulatory activities are significant factors with regard to interest spread determination in his study in Eastern Caribbean Currency Union using annual panel data of commercial banks. While many studies find evidence of macroeconomic factors as important determinants of interest IRS (Crowley, 2007; Ngugi ,2001; Beck & Hesse, 2009), a more recent study by Were & Wambua (2014), reveal that macroeconomic factors are not significant in

determining IRS in Kenya. Saunders & Schumacher (2000) investigated the effects of regulatory and market specific factors on interest spreads. The study found that high interest spreads are as a result of high reserve requirements and monopoly power of a few banks. A study which focused on the theoretical modelling of the determinants of IRS in the Colombian banking system, revealed that there is a relationship between lending rates, deposit rates, intermediation expenses and interest margins (Barajas et al., 1999). This relationship was presented in a profit maximization equation formulated by the authors.

Various studies present contradictory results on the relationship between credit risk and interest spreads. While Maudos & Fernandez de Guevara (2004); Angbazo (1997) and Maudos & Solis (2009) observe that credit risk exerts a positive impact on spreads, Williams (1997) and Hess (2007) establish a negative relationship attributing this to weak banks which reduce interest margins to cover expected loss.

2.3. Overview of Literature

There is a lot of empirical evidence on the factors influencing IRS according to the reviewed literature. However, there is no universally accepted findings on what determines IRS probably because, countries differ in terms of their economic, regulatory and operating environment. For instance, Beck & Hesse (2009) found inflation as a determinant of IRS in the Ugandan, findings which were inconsistent with Were and Wambua (2013) who found inflation as insignificant factor for explaining interest rate spread in the Kenyan banking industry.

In Kenya, Ndung'u & Ngugi (2000) and Ngugi (2001), and recently, Were & Wambua (2013) and Kiptui (2014) are among the most cited studies on the determinants on IRS. Ndung'u & Ngugi (2000) investigated IRS using data from April 1993 to June 1999. On the other hand, Ngugi (2001) extended the data to December 1999. The first study investigated loans, treasury bill rate, deposits and interbank rate where it was found that IRS is positively associated with deposit rates and negatively linked to loans. Ngugi (2001) included two additional variables (liquidity and credit risk) as independent variables, and found that an increase in credit risk, increases IRS. In summary, Ndung'u & Ngugi (2000) and Ngugi (2001), studies focused only on macro industry level factors, i.e. they all ignored macro-economic factors such as inflation and GDP. This study went beyond this by including real GDP as a macroeconomic factor.

Turning to the most recent studies on the determinants on IRS, literature show that even though the two studies, Were & Wambua (2013), and Kiptui (2014) investigated bank specific, industry level and macro-economic factors using panel data from 2002-2011 and 1999-2008 respectively, their findings were inconsistent on macroeconomic factors. While Were & Wambua (2013) found macroeconomic factors to be insignificant, Kiptui (2014) found them significant. A further investigation was therefore necessary to find out about these inconsistencies in the coefficients of macroeconomic factors. Moreover, this study, in addition to the explanatory variables (Bank size, operating costs, Credit risk, return on average assets, market concentration, market power, GDP, Inflation, and Central bank rate) estimated by Were & Wambua (2014) and Kiptui (2014), included additional explanatory variables which were: reserve requirements and dummy variables for bank ownership to find out if they have an influence on interest spread. The study also used a more recent panel data for commercial banks from January 2006- December 2015 during which there has been some changes in macroeconomic climate such as central bank rate, inflation and GDP.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

According to the reviewed literature, interest rate spread is determined by various factors associated with the bank itself, the banking industry and the macroeconomic environment within which the bank operates. This study therefore, utilized the approaches which captured all this factors. The chapter explains the theoretical framework, the estimated model and the procedure for estimation as well as data and variables which were estimated.

3.1 Theoretical framework

This study used the most influential work of Ho and Saunders (1981) and its subsequent modifications to analyze determinants of IRS. In their paper, the bank was presented as a risk averse agent between borrowers and depositors of money, where it asks for a positive interest spread by giving out immediate liquidity services and risking a possible mismatch between the arrival of deposit surplus and loan demanded. In their framework, Ho & Saunders argued that the aim of the bank is to maximize the anticipated shareholder's profits. They further argued that imposing a fee for the anticipated risk-free interest rate r , is the best way for the bank to strike a balance between deposits and loans demanded. This r , is projected to reduce rates on deposits (R_D) by a and increase interest on loans (R_L) needed for loans by b . Summing up $a + b$ gives us the IRS necessary for the bank to provide loan and deposit services.

$$R_L = r + b \quad (1)$$

$$R_D = r - a \quad (2)$$

Where R_L and R_D are interest rates charged on loans and deposits respectively, a is the fee banks charge for providing immediate liquidity services while, b refers to the risk premium imposed by the banks to cater for risk refinancing. The framework also assumes a one planning period in which the rates of interest on loans and deposits remain the same after being reviewed at the commencement of a decision period. This assumption holds that only one transaction with a deposit of equal size and a loan take place within a pre-determined period.

Subsequent studies have extended Ho and Saunders model by modifying some of its assumptions. For example, Allen (1988) relaxed the assumption of loan homogeneity and showed that by considering loan heterogeneity, interest margins may be reduced due to diversification of bank services and products. By relaxing those assumptions, IRS were therefore assumed to be determined by risk premium and the monopoly strength. This means that in the case where risks are neutral, interest spreads are supposed to decline because risk premiums are not necessary; there are no uncertainties on loan demands and the arrival of deposits to be compensated for.

Angbazo (1997) introduced credit and liquidity risks and how they interact with the risks inherent within the model. Credit risk was measured as a ratio of non-performing loans to total loans whereby, higher ratio indicates higher cost of bad debts, which is expected to lead to higher IRS (Maudos & De Guevara, 2004). The concept of liquidity was also introduced in the model where banks that have more liquid assets, are likely to get lower income from interest rate (Hesse, 2007). This in turn leads to lower spreads if the market for deposits is very competitive. On the other hand, banks holding more liquid assets, forgoes higher interest income and hence are likely to have higher spreads. Based on these observations, the liquidity ratio can impact IRS either positively or negatively.

Maudos and Fernandez de Guevara (2004) modified Ho & Saunders (1981) framework to account for bank's operating costs and used the model to calculate degree of market competition and market concentration index (Herfindahl index). Carbo et al. (2007) theorized that the changes in the degree of market concentration throughout the study period reduced the interest spreads. This was attributed to improvements made in efficiency as a result of economies of scale or improved level of competition in the industry. The concentration ratio was measured based on total loans advanced by the bank as well as assets base. The impact of capital was also introduced in the model where it was found out that more capitalized banks are said to be more cautious in their investment because they have more capital at risk (Maudos & Solis, 2009). Therefore, capital is positively correlated to interest spreads.

Taking into account all the modifications on Ho & Saunders (1981) framework, Maudos & de Guevara (2004), maximized the anticipated bank's utility by applying Taylor expansion and symmetric and the linear loan demand and deposit supply functions. Then finally, they solved first

order differentials in the fees imposed on deposits and loans separately. Resulting from these calculations, is the pure IRS, $s = a + b$ is thus estimated by four factors:

- 1) Industry market power denoted as β ;
- 2) Risk aversion, R of the bank
- 3) Variance of interest rate (δ_I^2), the difference between interest rate on loans and deposits and finally,
- 4) Bank size, Q which was measured as a log of assets

Based on the above factors, IRS is defined as follows:

$$s = R_L - R_D = (a + b) = \beta + \frac{1}{2}R\delta_I^2Q \quad (3)$$

Where, R is the coefficient of the bank's risk aversion.

3.2 Empirical Model

This study had sought to describe factors determining IRS in Kenya. To do that, regression analysis based on Ho & Saunders (1981) framework and its extensions were used. The current version of this model is that of Maudos & de Guevara (2004), which postulates that IRS are determined by both bank and industry specific. In this paper, regulatory and macroeconomic variables are also included. In particular, the empirical model was expressed as :

$$r_{it} = z + \beta_1 B_{it} + \beta_2 MS_{it} + \beta_3 ME_t + \varepsilon_{it}, \quad (4)$$

Where r_{it} is IRS for bank i in year (period) t , z is the intercept representing pure spread which is time variant and equal across banks. This intercept captures the effects of unobserved or omitted variables, B_{it} is a vector of determinants of banks interest spread according to the theoretical framework, MS is a vector of market structure (market power), ME (Real GDP, Inflation, Exchange rate) represents vectors for macroeconomic variables while ε_i is a statistical error term. In addition, the study adds reserve requirements as a regulatory variable following (Crowley, 2007). Reserve requirement is the amount of money commercial banks are required to deposit with the central bank for monetary policy purposes. These reserves are non-interest bearing assets on the side of the commercial bank and therefore impose a tax on banks hence reducing their revenues.

Furthermore, dummies for bank ownership to establish if ownership of the bank have any impact on IRS. Banks were categorized as owned by government, private or foreign owned.

Based on the factors influencing of IRS as suggested by Ho and Saunders (1981) theoretical model, and the subsequent extensions, the study estimated the following regression equation using Pooled OLS, Random and Fixed effect models:

$$IRS_{it} = z_0 + \alpha_1 BS_{it} + \alpha_2 CR_{it} + \alpha_3 LR_{it} + \alpha_4 ROA_{it} + \alpha_5 MC_{it} + \alpha_6 RR_{it} + \alpha_7 RGDP_t + \alpha_8 FoB + \alpha_9 GoB + \alpha_{10} PoB + e_{it} \quad (5)$$

Where z_0 is the intercept

FoB, GoB and PoB are dummies for Foreign, Government owned and Private owned banks respectively.

e_{it} = error term and i , represents bank i , while t represents time t (years)

3.4 Variable definition, measurements and hypothesized sign

Table 1 presents definition of explanatory variables, how they were measured and their expected impact on the dependent variable (interest rate spread).

Table 1: Variables

Variables	Proxy/measurement)	Hypothesized relation
Interest rate spread	IRS=average lending rate-average deposit rate	Is the dependent variable
Bank Size	BS=log bank's Capital	Positive correlation with IRS for big banks
Credit Risk	$CR = \frac{Non - performing\ loans}{Total\ loans}$	Higher ratio leads to higher IRS
Liquidity Risk	$LR = \frac{Liquid\ assets}{Total\ assets}$	Higher ratio means lower LR and hence lower IRS
Return on Average capital employed	$ROA = \frac{Profit(loss)}{Average\ Capital\ employed}$	Positive correlation with IRS is expected
Market Concentration	$MC: HHI = \sum_{i=1}^N s_i^2$	This measures the level of competition each bank faces in the market. a more concentrated banking sector implies less competition and hence high IRS for a bank.
Reserve Requirement	RR: Reserve Requirement (Given)	RR is hypothesized to have a positive relationship
Economic Activity	RGDP: Real Domestic Product (given)	Higher RGDP is projected to increase demand for loans. This is likely to increase lending rates. But, also increase in GDP (economic activities) can make businesses more profitable, reduce amounts of bad debts, and increase deposits all of which may reduce lending rates.

3.5 Data type and Sources

The data for all the variables included in the empirical analysis for this paper was obtained from the Central Bank of Kenya's supervision database and Economic survey reports. CBK has consistent micro-data for all commercial banks from 2006 to 2015. Included in the data sets are all proxies of hypothesized determinants of commercial banks IRS. CBK compiles this data from banks published financial statements. The data consisted of annual observations of deposit and lending rates, loans and non-performing loans, operating expenses, bank assets, market share index and capital, real GDP, bank profitability, reserve requirements and inflation among other variables. Real GDP annual data was obtained for various economic survey reports.

3.6 Estimation process

The study utilized pooled OLS, Random and Fixed effect regression equations to estimate the determinants of IRS (equation 5). This is because OLS sometimes fails to account for individual specific effects as well as controlling for outliers which might result into biased results. This approach was advantageous because it allowed modelling for individual heterogeneity (Wooldridge, 2006). Panel data gives more insights than either cross-sectional or time series. This is because panel data allow for isolation of specific effects and actions (Hsiao,2003), and therefore takes into consideration bank specific factors for the case of this study.

3.6.1 Diagnostic Tests

Hausman test

To check the model specification so as to control accurately the probability of wrongly rejecting the null hypothesis, the study employed Hausman test. With $Prob > \chi^2 = 0.4547$ which is more than 0.05, the study accepted null hypothesis that random effect is the most suitable model.

Pasaran CD Test

After ascertaining the suitable model, the study had to check whether there was serial correlation in the model. To do this, Pasaran CD test was used. This tests for the correlation of variables with residuals. One of the causes of this problem is endogeneity in the data sets. The null hypothesis of this test was that there is no serial correlation against the alternative hypothesis that there was serial correlation. With $Prob \geq 0.0712$, the study accepted the null hypothesis which had stated that there was no serial correlation in the model implying that findings were valid.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

Interest rate spread has a lot of bearing on the Kenya's economy due its impact on savings, deposits and hence, investments. A total of 38 commercial Banks were included in the panel out of the 41 which were targeted. The study eliminated three banks (Family bank, Uba bank and Habbib AG Zurich) due to serious data inconsistencies. This was to make the panel stronger in order to generate more accurate results. Data contained all the factors which are theoretically believed to be the determinants of interest rate spreads. These included bank assets, capital, loans and advances to customers, non-performing loans, quick cash, bank profitability, interest margins, reserve requirements, interest expenses, real GDP among others. This chapter presents the findings and discussion in two sections. Section one presents descriptive statistics while section two presents econometric results.

4.1 Descriptive statistics

For a better understanding of the research findings, descriptive statistics were considered to be very important. Among the issues examined are the trends in interest rate spread by bank categories, the share of loans and deposits by bank categories, the means of explanatory variables and the correlation matrix. To begin with, Figure 3 summarizes the trends in IRS form 2006 up to 2015 by bank size.

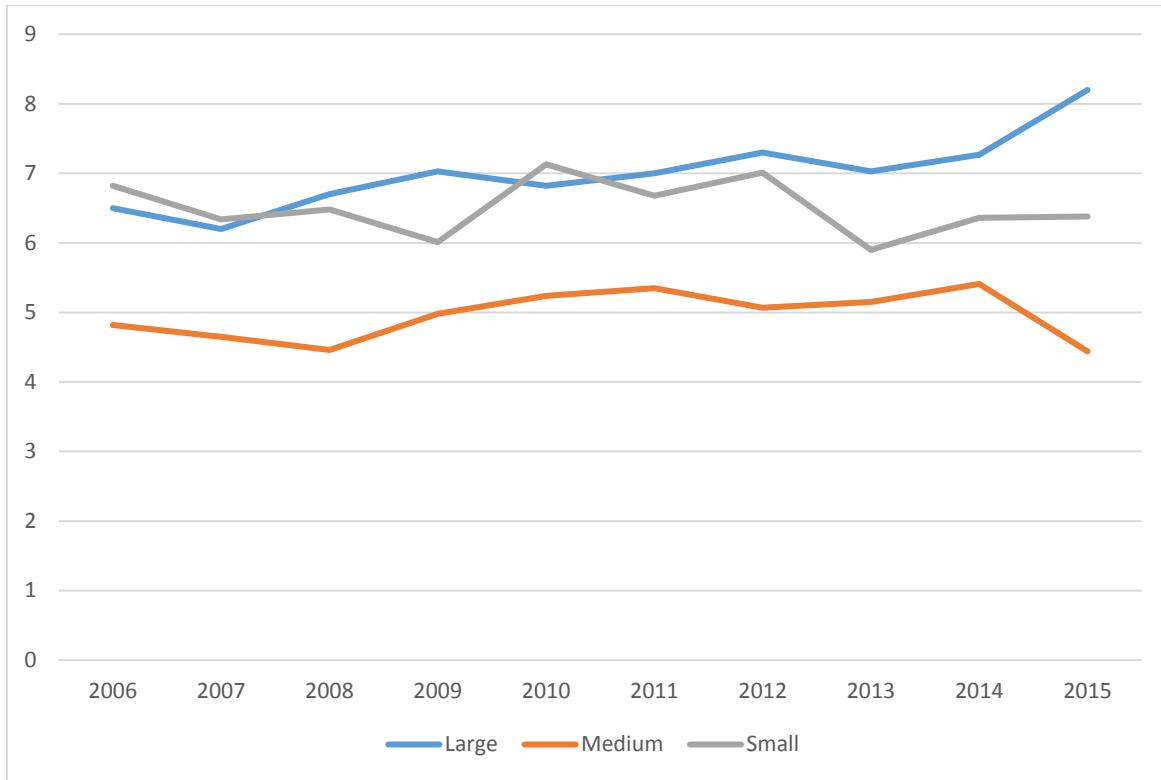


Figure 3: Interest Rate Spread across bank categories

Source: Computed from CBK data

The results indicate that IRS for large banks were very high than those of medium and small banks between 2006 and 2015. According for Figure 3, medium banks had on average lower spreads. Trend analysis further reveals that there have been fluctuations with no definite trend in IRS for the entire period of the study for all banks (small banks, medium and large). This could be attributed probably to the fluctuations in economic activities, the crisis like political turmoil in 2007/2008, economic crisis of 2008 among other shocks.

Turning to loans and advances, Figure 4 presents a summary of the results by bank categories for the years 2006, 2010 and 2016

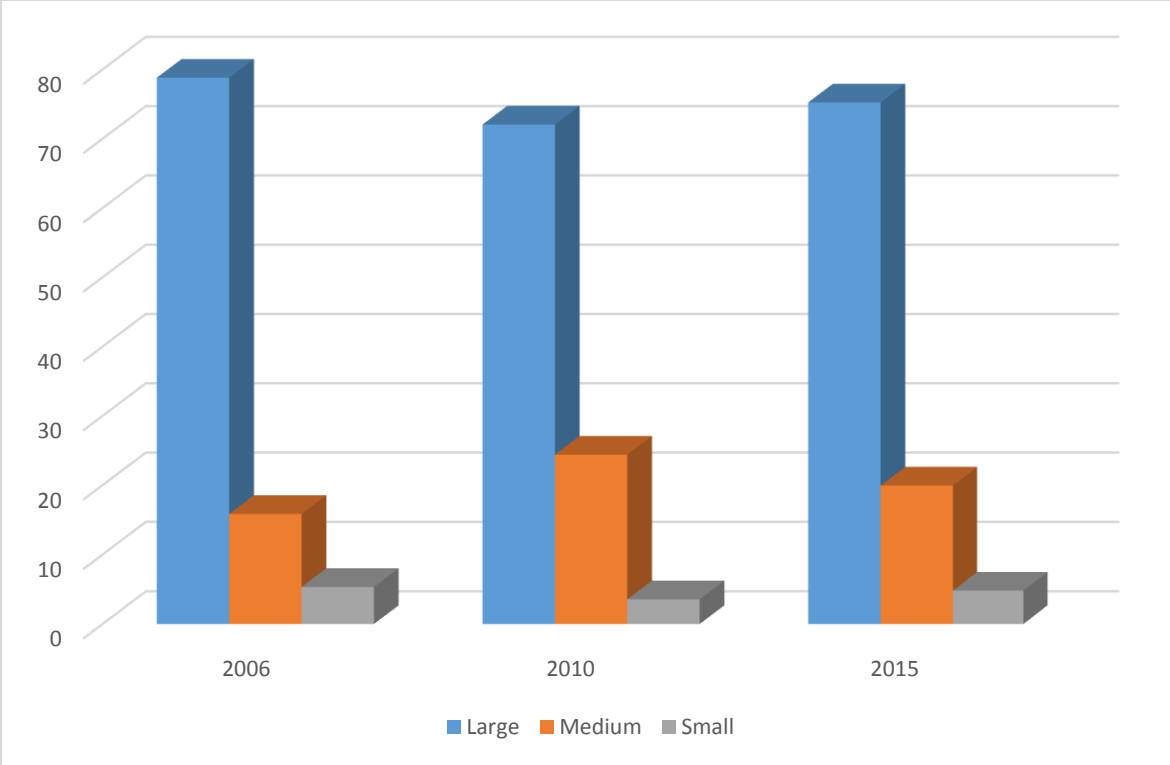


Figure 4: Percentage share of loans and advances by Bank Categories

Source: Computed from CBK data

According to the findings of Figure 4, large banks accounts for more than 70% of loans and advances and therefore, they are dominant players in the industry. Medium banks on the other hand, account for slightly over 15% of the loans and advances in the sector, while the small banks have a less than 6% of the share of loans and advances in the banking industry.

Similar trend is reflected in the share of deposits where the study finds that big banks accounts for more than 70% of the deposits, medium banks account for more than 10% while the small banks accounts for less than 5% of the deposits in the banking industry (see Figure 5). These results indicate the existence of market segmentation in the banking industry, particularly the skewed distribution of loans and deposits. This implies also that there is market dominance by a few banks. However, there was a general decline in the share of both loans and deposits in the year 2010, except for large bank’s deposits which increased from 78.09% (2006) to 82.09% in 2010.

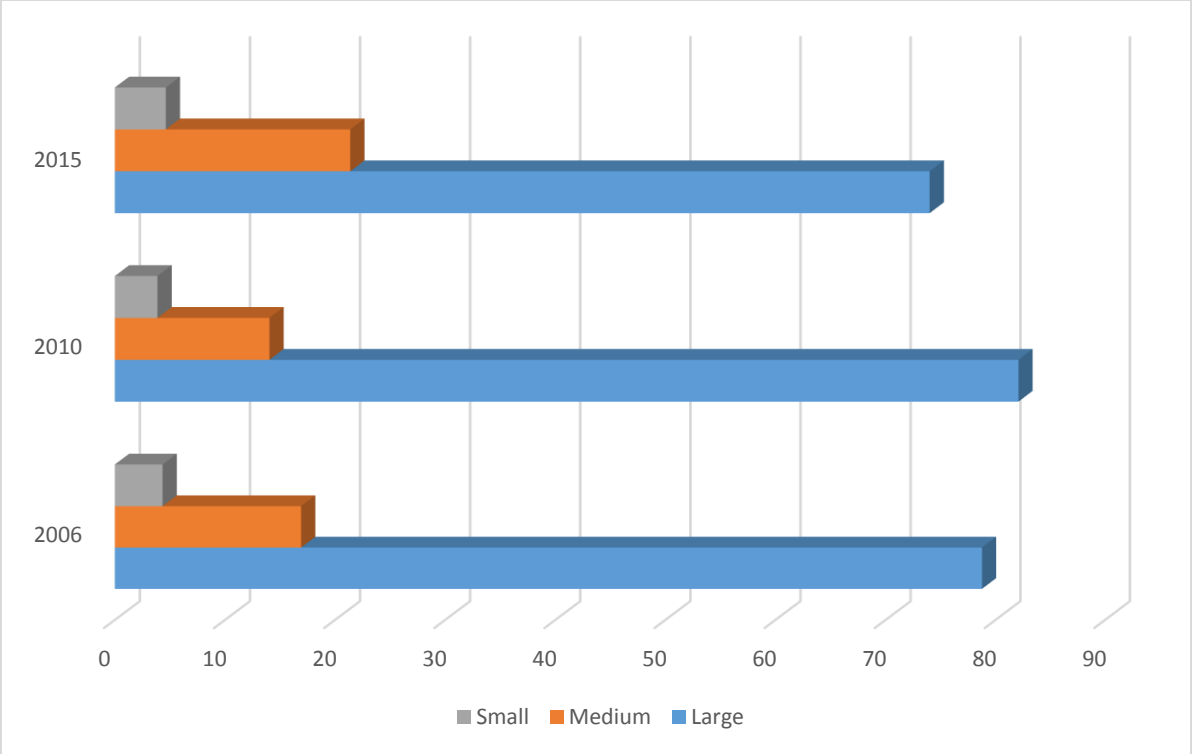


Figure 5: Percentage share of deposits by Bank Categories

Source: Computed from CBK data

4.1.1 Means of explanatory variables from 2006 to 2015

The study also analysed the means of explanatory variables for the study period. The results are presented in Table 2

Table 2: Means of Explanatory variables from 2006-2015

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Reserves	1074.89	1281.26	1460.8	1664.18	1952	2413.6	2587.1	3447.1	3402.71	5338.5
CR	0.21	0.19	0.16	0.15	0.12	0.1	0.1	0.09	0.07	0.06
LR	0.34	0.32	0.31	0.31	0.29	0.27	0.41	0.32	0.37	0.38
BS	8.59	8.71	8.86	9.03	9.27	9.47	9.62	9.93	10.08	10.25
RealGDP	1056	1109	1173	1249	2766	2772	2864	3104	3294	3444
MC	5958.98	5981.07	6001.2	6019.98	6038.2	6054.2	6069.9	6086.1	6102.69	6119.45
ROA	13.03	15.09	21.07	26.4	34.48	31.19	26.63	41.23	36.31	30.25

Source: Computed for CBK data

Table 2 indicates that credit risk (CR) and liquidity risk (LR) have been fluctuating from 2006 to 2015 while on the other hand, the means of bank reserve requirements, bank size (BS), Real GDP and Market Concentration (MC) have been on an upward trend during this period under study.

4.1.2 Pooled descriptive statistics

Table 3 presents pooled summary statistics (Means, Standard Deviation (S.D), Minimum(min), Midian, Maximum (max), skewness & kurtosis) for both dependent and independent variables.

Table 3: Pooled Descriptive Statistics

Variable	Obs	Mean	S. D	Min	Midian	Max	Skewness	Kurtosis
IRS	363	6.2	2.95233	-0.04	5.575	22.87	1.881254	8.520657
BS	363	9.4	1.37687	0	9.188606	12.6252	-0.4365	6.447862
CR	363	0.1	0.13579	0	0.073996	0.83247	2.265857	9.329069
LR	363	0.3	0.2247	0	0.295049	3.0569	4.951558	56.74298
ROA	363	27.6	27.546	-128.53	26.19	130.89	-0.79412	8.086964
MC	363	6043.2	1526.65	142.0864	6612.89	6976.41	-2.1731	6.727141
RealGDP	363	2283.1	951.996	1056	2769	3444	-0.27506	1.269176
Reserves	363	2465.87	4091.47	0	766	26998	2.923324	12.7119

Source: Computed from CBK data

According to statistics from Table 3 above, the average IRS for the period of this study was 6.2 while the maximum was 22.87. The same results indicate that an average rate of return on bank's assets was 27.6 with the maximum ROA of 130.89. During this period (2006-2015), banks maintained relatively low levels of CR (0.1) and LR (0.3) on average, though these ratios went as higher as 0.8 for CR and 3.1 for LR. The study used the mean-based coefficients of skewness and kurtosis to test the normality of variables used. Skewness was the tilt in distribution and was expected to range between -2 and +2, for normally distributed variables while Kurtosis was expected to range between -3 and +3 if data was normally distributed. The skewness results indicate that IRS, CR, LR, Reserves are positively skewed while BS, ROA, MC and RealGDP are negatively skewed. IRS, BS, ROA, RealGDP are normally distributed according to skewness tests, while kurtosis results find normality in RealGDP.

Table 4: Correlation Matrix

	IRS	BS	CR	LR	ROA	MC	Reserves	RealGDP
IRS	1.000							
BS	-0.045	1.000						
CR	0.0269	-0.4612	1.000					
LR	-0.105	-0.0184	-0.11	1.000				
ROA	0.1397	0.5954	-0.53	0.0715	1.000			
MC	-0.028	-0.6168	0.179	0.1041	-0.419	1.000		
Reserves	0.1542	0.7266	-0.21	-0.124	0.4141	-0.66	1.000	
RealGDP	0.0421	0.4126	-0.33	0.0783	0.2618	-0.03	0.281	1.000

Source: Computed from CBK data

The correlation matrix is an important sign which tests the relationship between dependent variable and the explanatory variables. This matrix also helps to determine which variables best explain the dependent variable. According to the results (Table 4), the size of the bank, liquidity risk and market concentration are negatively correlated to the interest rate spreads while credit risk, return on average assets, reserve requirements and real gross domestic product are positively correlated to the interest rate spreads.

4.2 Econometric Results and Discussion

The aim of the study was to determine factors influencing interest rate spread in the Kenyan banking sector. To achieve this, the study formulated two specific objectives which were: to

establish the effects of bank and industry specific factors on IRS and to determine the influence of macroeconomic environment on IRS. The study employed pooled OLS, Fixed Effect (FE) and Random Effect (RE) regression models to analyze the determinants of IRS.

For the model suitability, the study employed Hausman test to determine which model between FE and RE was suitable for the study. In this test, the null hypothesis stated that the random effect model is preferred while the alternative hypotheses is that fixed effect model was favorable. The test predicts whether the unique errors (ε_i), are correlated with the predictors with the null hypothesis stating that they are not. The null hypothesis that RE model is the correct specification was accepted at 10% significance level (see Appendix VI), which confirmed the suitability of the model for this study. This means that bank heterogeneity (differences across banks) such management style or quality, work force competencies, among others leads to variations in the interest rate spread. That notwithstanding, the three models used; Pooled OLS, FE and RE, yielded almost similar results as shown in Table 5. F-Statistics tests for all the three models (0.000 for Pooled OLS, 0.0019 for RE and 0.0001 for FE) rejected the null hypothesis that the coefficients of explanatory variables are zero (0) hence ascertaining the validity of the models. On the other hand, the R-squared statistics of the three models showed that explanatory variables weakly explain the dependent variable. For OLS, explanatory variables explained the dependent variable by 18.68% and this percentage dropped to 12.37%, 9.2% for RE and FE models respectively.

Table 5: Pooled OLS, Random Effect (RE), and Fixed Effect (FE) results

Variable	Pooled OLS	RE	FE
	Coef	Coef	Coef
BS	-1.17 (0.195) ***	-0.867 (0.218)***	-0.81(0.24) ***
CR	0.320 (1.343)	-0.144(0.94)	-0.0084(0.919)
LR	-1.729(0.653) ***	0.188(0.381)	0.355(0.365)
ROA	0.035(0.007) ***	0.01(0.004) ***	0.01(0.004) ***
MC	0.0002(0.0001)	-0.000(0.000)	0.003(0.001) ***
RR	.0003(0.0001) ***	0.0001(0.000)**	-9.70(0.000)
RGDP	0.0003(0.0002) *	0.0004(0.0001) ***	0.0003(0.00) **
FoB	0.76(0.684)	0.74 (1.62)	0.00
GoB	1.7(0.815) **	1.987(1.94)	0.00
PoB	-0.394(0.663)	-0.283(1.56)	0.00
Constant	14.16(2.37)	12.87(3.29)	-2.86 (5.87)
Number of obs	363	363	363
Number of groups	0.00	38	38
Prob > F	0.000	0.0019	0.0001
R-squared	0.1868	0.1237	0.092
sigma_u		1.93	5.26
sigma_e		1.33	1.33
Rho		0.68	0.94

NB Standard errors in brackets, ***, ** and * significant at the 1,5 and 10 percent level.

The econometric results for bank specific factors included in the study indicates that the size of the bank (BS), and the return on average assets (ROA) are highly significant at 1% level for all the three models. Credit risk (CR) and Liquidity risks (LR), were not found to be significant in both FE and RE models but LR was significant in the OLS model. The negative relationship between IRS and the size of the bank indicates that the bigger the bank, the smaller the IRS. Dabla-Norris & Floerkemeier (2007) in Armenia, and Horvath (2009) in Czech Republic found similar results

where large banks were found to have lower spreads due to their lower risk of bankruptcy. Although, these results are inconsistent with other findings which established a positive relationship where the bigger the bank the higher the IRS, it is consistent with the theory of economies of scale coupled with large banks capacity to invest in sophisticated technologies. Nevertheless, the impact of the BS on IRS is very huge given the size of the coefficient.

If higher IRS can be associated with inefficiencies, then the conclusion from this study is that large banks are more efficient than small ones. This is a more logical conclusion since big banks can afford better, and cost reducing technologies which may result into lower pricing of their products. In addition, there is a positive relationship between IRS and ROA, although its impact is very small. This relationship could imply the behavior of the commercial banks to maximize profits, where banks with higher profits compared to their average assets are likely to charge higher borrowing rates as compared to deposit rate. This finding can also be interpreted to mean that there is little competition in the Kenyan banking sector. That notwithstanding, this positive relationship can be disputed based on the similar arguments on bank size, meaning that higher ROA should be linked to lower IRS. These results are consistent with those of Siddiqui (2012) who established a positive correlation between interest rate spread and the return to assets.

In addition, Credit risk (CR) is found to lower the interest spreads while an increase in Liquidity risk (LR) increases IRS, though these two variables are not statistically significant. The reason why the coefficient of CR is negative could be that even though the ratio of non-performing loans to total loans is high, commercial banks may not after all pass on the risks to their customers in the form of high lending rates. This move may be aimed at encouraging customers to repay their loans in an effort to reduce non-performing loans. Similar findings were observed by Hesse (2007) who found negative correlation between interest spread and the ratio of non-performing loans to total loans. These results are however, inconsistent with those found by Ngugi (2001), Becke et al. (2010) for Kenya who found a positive and significant relationship between CR, LR and the interest spreads. Market concentration (MC) a proxy for macro-industry specific factors was only found to be highly significant but less impactful under FE model. The OLS results indicate that the coefficient of MC was positive but not significant.

Turning to macroeconomic variables, an increase in economic activities capture by Real Gross Domestic Product (GDP) has the effects of increasing interest rate spreads. Although RGDP is

highly significant (1%) under RE results, its coefficient (0.00004), indicates that the variable has less impact on IRS. Both FE and OLS models also found RealGDP as a significant factor at 10% and 5% levels respectively. Other studies in Africa have produced similar findings. For example, Bennaceur & Goaid (2008) for Tunisia, Chirwa & Mlachila (2004) for Malawi, Becke & Hesse (2009) for Uganda and Kiptui (2014) for Kenya establish a significant effect of increased economic activities on interest rate spreads. However, Were & Wambua (2013) for Kenya, argued that economic growth rate does not impact on the IRS. It was found that Were and Wambua did not include other variables such as reserve requirements, and bank ownership as was the case for the study. This might have occasioned the differences.

With respect to regulatory environment (monetary policy), the study found a positive relationship between commercial bank reserve requirements (RR) and the interest spreads for both OLS and RE models, where an increase in RR leads to a higher IRS. although the coefficient is statistically significant, its impact on IRS is very small. Bank ownership exerts no influence on IRS according both fixed and random effect results except for government owned banks (GoB) under OLS results where there exists a positive relationship between IRS and bank ownership.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND POLICY RECOMMENDATIONS

5.0 Introduction

The main objective of the study was to find out factors driving high interest rate spreads in Kenya. This chapter presents summary of findings, conclusions of the results of the study based on the objectives, and policy recommendations thereafter.

5.1 Summary of findings

The aim of liberalizing the financial sector was to achieve efficiency in the financial intermediation process so as spur economic growth and development. However, there has been no tangible results particularly in the African countries including Kenya for more than two and half decades of embracing these policies. In fact, IRS in Kenya are closely comparable to the mean IRS for the Sub-Saharan region and higher in the EAC (Were & Wambua, 2014). While the drivers of IRS are expected to be many-sided, this report empirically gives some insights based on bank, industry and macroeconomic factors using the same approaches applied in other studies.

By applying panel data investigation, the results indicate that bank-specific factors are significant towards determining IRS in the banking industry. This factors are the size of the bank, return on average assets, credit and liquidity risks. Real Gross Domestic Product as proxied for macroeconomic environment was also found to be statistically significant determinants on interest rate spreads in the Kenyan banking sector. The impact of monetary policy proxied by reserve requirements was also asserted vividly by the study. Although it was found to be positively related to IRS, its weakly significant. This could arguably mean that there is a weak response by commercial banks to monetary policy indicators.

5.2 Conclusion

The results of this study confirm that bank specific, industry and macroeconomic factors play a significant role towards the determination of interest rate spreads in the Kenyan banking sector. However, these factors (bank size, credit risk, liquidity risk, rate of return on assets, market concentration, reserve requirements, and real gross domestic product) have little impact on interest rate spread according to these findings. In addition, bank ownership has no influence on interest rate spread as indicated by the results.

5.3 Policy Recommendations

Summing up, the relatively high IRS in Kenya remains a topic of discussion and continues to pose policy challenges. The recent introduction of interest rate capping policy may not provide the highly-sought solution of effective financial intermediation in Kenya because such a policy has failed in other economies such as Romania, Panama and Cyprus (Munzele & Alejandra, 2014).

The study therefore recommends the need to explore both internal and industry-led strategies to reduce the effects of some of the bank specific factors which are driving high IRS. These could range from adopting cost-effective technologies and diversification of bank products which can reduce over reliance on interest income and its related perils. Additionally, even though there is high competition in the banking sector, there is need to enhance it further. This should also be accompanied by strategies to improve the growth of medium and small banks so as to break the dominance of the few big banks in the industry. This may take the form of public education of the importance and stability of the medium banks in the sector.

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Appendix I: List of Commercial Banks in Kenya

1. Kenya Commercial Bank (KCB)
2. Co-operative Bank of Kenya
3. Equity Bank
4. Standard Chartered Bank
5. Diamond Trust Bank
6. Barclays Bank
7. Bank of Africa
8. Bank of Baroda
9. Bank India
10. Cfc Stanbic
11. Chase Bank
12. Citi Bank
13. Commercial Bank of Africa
14. Development Bank
15. Eco Bank
16. Fidelity Bank
17. Fina Bank
18. I&M Bank
19. Imperial Bank
20. National Bank of Kenya
21. NIC Bank
22. Prime Bank
23. Consolidated Bank
24. Equatorial Commercial Bank
25. African Banking Cooperation
26. Giro Bank
27. Guardian Bank
28. K-Rep Bank
29. Victoria Commercial Bank
30. Habib Bank
31. Trans-National Bank
32. Oriental Commercial Bank
33. Credit Bank
34. Paramount Universal Bank
35. Middle East Bank
36. Jamii Bora Bank
37. Housing Finance Cooperation Bank
38. Dubai Bank

Appendix II: Correlation Matrix

```
. correlate IRS BS CR LR ROA MC Reserves RealGDP FoB GoB PoB
(obs=363)
```

	IRS	BS	CR	LR	ROA	MC	Reserves	RealGDP	FoB	GoB	PoB
IRS	1.0000										
BS	-0.0450	1.0000									
CR	0.0269	-0.4612	1.0000								
LR	-0.1051	-0.0184	-0.1068	1.0000							
ROA	0.1397	0.5954	-0.5312	0.0715	1.0000						
MC	-0.0275	-0.6168	0.1790	0.1041	-0.4192	1.0000					
Reserves	0.1542	0.7266	-0.2118	-0.1243	0.4141	-0.6553	1.0000				
RealGDP	0.0421	0.4126	-0.3329	0.0783	0.2618	-0.0302	0.2810	1.0000			
FoB	0.0892	0.1399	-0.1467	0.2244	0.0842	-0.1327	0.1133	0.0164	1.0000		
GoB	0.1403	0.2061	0.1877	-0.0617	0.0219	-0.2219	0.2593	0.0101	-0.1905	1.0000	
PoB	-0.1271	-0.3058	0.0583	-0.1397	-0.0886	0.2193	-0.2531	-0.0264	-0.7489	-0.3413	1.0000

Appendix III: Pooled OLS Results

```
. reg IRS BS CR LR RealGDP MC ROA Reserves FoB GoB PoB
```

Source	SS	df	MS	Number of obs	=	363
				F(10, 352)	=	8.09
Model	561.13718	10	56.113718	Prob > F	=	0.0000
Residual	2442.41825	352	6.9386882	R-squared	=	0.1868
				Adj R-squared	=	0.1637
Total	3003.55543	362	8.29711444	Root MSE	=	2.6341

IRS	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
BS	-1.17123	.1953676	-6.00	0.000	-1.555464 - .7869952
CR	.320414	1.342633	0.24	0.812	-2.320178 2.961006
LR	-1.729423	.6528328	-2.65	0.008	-3.013366 -.4454791
RealGDP	.0002945	.0001741	1.69	0.092	-.0000479 .0006369
MC	.0001716	.0001415	1.21	0.226	-.0001067 .00045
ROA	.0345162	.0068382	5.05	0.000	.0210673 .047965
Reserves	.000257	.0000544	4.73	0.000	.0001501 .0003639
FoB	.759994	.6844697	1.11	0.268	-.5861705 2.106158
GoB	1.698819	.8156591	2.08	0.038	.0946412 3.302997
PoB	-.3935789	.6634869	-0.59	0.553	-1.698476 .9113183
_cons	14.16457	2.370116	5.98	0.000	9.503204 18.82594

Appendix IV: Random Effect Model Results

. xtreg IRS BS CR LR ROA MC Reserves RealGDP FoB GoB PoB, re

Random-effects GLS regression Number of obs = 363
 Group variable: ID Number of groups = 38

R-sq: Obs per group:
 within = 0.0643 min = 5
 between = 0.1237 avg = 9.6
 overall = 0.1095 max = 10

 Wald chi2(10) = 27.88
 corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0019

IRS	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
BS	-.866672	.2184007	-3.97	0.000	-1.294729	-.4386146
CR	-.1442177	.9382618	-0.15	0.878	-1.983177	1.694742
LR	.1882454	.3810703	0.49	0.621	-.5586387	.9351295
ROA	.0133507	.0043228	3.09	0.002	.0048781	.0218233
MC	-.0000422	.0002451	-0.17	0.863	-.0005225	.0004381
Reserves	.0000759	.0000344	2.21	0.027	8.55e-06	.0001434
RealGDP	.0003741	.0001408	2.66	0.008	.0000982	.0006501
FoB	.7376967	1.615611	0.46	0.648	-2.428842	3.904236
GoB	1.987563	1.941706	1.02	0.306	-1.818111	5.793236
PoB	-.2828443	1.555041	-0.18	0.856	-3.330669	2.764981
_cons	12.87349	3.287775	3.92	0.000	6.429567	19.31741
sigma_u	1.9326872					
sigma_e	1.3251894					
rho	.68020456	(fraction of variance due to u_i)				

Appendix V: Fixed Effect Model Results

```
. xtreg IRS BS CR LR ROA MC Reserves RealGDP FoB GoB PoB,fe
note: FoB omitted because of collinearity
note: GoB omitted because of collinearity
note: PoB omitted because of collinearity
```

```
Fixed-effects (within) regression      Number of obs   =    363
Group variable: ID                    Number of groups =    38
```

```
R-sq:                                Obs per group:
    within = 0.0920                    min =          5
    between = 0.0001                    avg =         9.6
    overall = 0.0000                    max =         10
```

```
corr(u_i, Xb) = -0.8567                F(7,318)       =    4.60
                                          Prob > F        =    0.0001
```

IRS	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
BS	-.8063976	.2382312	-3.38	0.001	-1.275106	-.3376892
CR	-.0084631	.9191658	-0.01	0.993	-1.816878	1.799951
LR	.354703	.3655594	0.97	0.333	-.3645176	1.073924
ROA	.01171	.0041678	2.81	0.005	.00351	.0199101
MC	.0025152	.0008635	2.91	0.004	.0008163	.0042141
Reserves	-9.70e-06	.0000406	-0.24	0.811	-.0000895	.0000701
RealGDP	.0003382	.0001499	2.26	0.025	.0000434	.0006331
FoB	0 (omitted)					
GoB	0 (omitted)					
PoB	0 (omitted)					
_cons	-2.859294	5.871685	-0.49	0.627	-14.41155	8.692963
sigma_u	5.2556159					
sigma_e	1.3251894					
rho	.9402223 (fraction of variance due to u_i)					

```
F test that all u_i=0: F(37, 318) = 31.17                Prob > F = 0.0000
```

Appendix VI: Hausman Test Results

	— Coefficients —			
	(b) fe	(B) re	(b-B) Difference	$\sqrt{\text{diag}(V_b - V_B)}$ S.E.
BS	-.8063976	-.866672	.0602744	.0951591
CR	-.0084631	-.1442177	.1357546	.
LR	.354703	.1882454	.1664576	.
ROA	.01171	.0133507	-.0016406	.
MC	.0025152	-.0000422	.0025575	.000828
Reserves	-9.70e-06	.0000759	-.0000857	.0000215
RealGDP	.0003382	.0003741	-.0000359	.0000514

b = consistent under H_0 and H_a ; obtained from xtreg

B = inconsistent under H_a , efficient under H_0 ; obtained from xtreg

Test: H_0 : difference in coefficients not systematic

$\chi^2(6) = (b-B)'[(V_b - V_B)^{-1}](b-B)$
 = 5.56
 Prob> χ^2 = 0.4745
 ($V_b - V_B$ is not positive definite)

Appendix VII: Pesaran Test Results

. xtcsd,pesaran abs

Pesaran's test of cross sectional independence = 1.804, Pr = 0.0712

Average absolute value of the off-diagonal elements = 0.336