THE DETERMINANTS OF INTEREST RATES SPREAD IN THE KENYAN ECONOMY

BY

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(PG/MA/114/2011)

A THESIS SUBMITTED IN PARTIAL FULFILLMENT FOR THE REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER OF ARTS IN ECONOMICS

SCHOOL OF BUSINESS AND ECONOMICS

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Declaration

Declaration by the candidate

This thesis is my original work and has not been presented for a degree in any other university.

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Acknowledgements

I wish to thank my supervisors Professor M.S. Mukras and Dr.Gideon Momanyi for their tireless efforts, guidance and support during the time I was writing this thesis. Their objective criticism made my work better especially on concepts that I was not able to understand very easily and swiftly as they required. My class mates Mr Odhiambo Jimmy, Mr. Nyangweso Oscar and Ms Odiwa Mercy for their regular support to review my work and make timely corrections. I am also greatly indebted to DR. Patrick Ojera and Dr. Oginda together with DR. Deisteins Nyongesa, Dr. Juma Alphonse Odondo and other lectures in the school of Business and Economics Maseno University for their guidance, regular and timely review of my work. My other post graduate collegues in Maseno University for their criticism on the different parts of my work to assist in improving the presentation of the different concepts. The guidance from the School Of Graduate Studies Maseno University will not go unmentioned for their regular and periodic corrections on the areas that I could not get it right.Finally my Wife and my parents for their encouragement which made me to start the course.

Dedication

I dedicate this work to the almighty God for giving me the strength and ability to go through the preparation of this work, My Wife Celestine and My Son Daniel for encouragement and Patience and my parents Mr. Samuel Ondari and Mrs. Florence Mokeira Ondari for their ultimate guidance and support.

ABSTRACT

There has been an increasing disparity between the lending rates and the deposit rates in Kenya over the last decade. In the Kenyan history, 1982 saw the lowest interest rate spread at 2.3% with the highest spread experienced in 1996 at 16.2%.In 2005 after decreasing to 7.8% from 10.10% in 2004, the spread assumed an upward trend rising to 9.81% in 2010. Despite policy interventions and structural reforms in the financial sector, the spread has consistently risen from the year 2003 up to 2010 with an insignificant drop in year 2011. The causes of this persistently increasing interest rate spread despite the many reforms are not known. This study analyzed the determinants of interest rate spreads in Kenya by focusing on eight banking institutions that significantly control deposits and loans market in the past decade. The study used panel least squares estimation technique on annual data between 2002 to 2011 to analyze the determinants of interest rates spreads as grouped in literature under: Bank-Specific Factors, Industry-specific data and Macroeconomic factors. The main objective of the study was to analyze the determinants of interest rate spread in the Kenyan economy. Its specific objectives were to establish the bank specific factors that influence the interest rate spread, to investigate the macroeconomic factors that influence the interest rate spread and to examine the industry specific factors that influence the interest rate spread in Kenya. The interest rate spread experienced in Kenya over the last decade is higher than that of emerging and developed economies. According to vision 2030 it is recommended at an acceptable rate of five per cent for the purpose of mobilizing savings and credit expansion. Although many efforts have been undertaken in the financial services sector, this vision has not been attained but instead an upward trajectory has been witnessed. The study was carried out using panel quantitative data analysis which involved the panel unit root test; Levin-Lin Chu and Im-Pesaran-Shin tests among other diagnostic tests including normality test, heteroscedasticity, Multicollinearity and Hausman tests. The study also used descriptive statistics such as mean, standard deviation. Due to the nature of the study STATA software was used to analyze the data. The analyzed data was then presented using figures, tables and graphs. Explanatory research design was used. The results revealed that, among the bank specific factors non interest income (0.045), nonperforming loans (0.002) and loan asset ratio (0.004) were significant. In addition among the industry specific factors, liquid asset ratio (0.042) was significant. While the finding revealed that only Treasury bill (0.001) was significant among the macroeconomic factors. The results mean that all those variables which have a P value of below 0.05 are significant for the study and cause the interest rate spreads to widen while those variables whose P values were above 0.05 are statistically insignificant for the study and have little effect on the interest rate spreads in Kenya. The study concluded that non interest income, nonperforming loans, loan asset ratio, Liquid asset ratio and treasury bills rate are the determinants of interest rates spreads in Kenya. It recommends that, the high responsiveness of banks spreads to the Treasury bills rate suggests that private borrowing should be reduced by the government in order to allow banks to lend to the general public since the financial institutions will rather lend to the Government through risk free securities than to general public, banks must continue to seriously deal with the issues of the high levels of non- performing loans and the diseconomies of scale in their operations and if there is to be any success in reducing interest rate spreads to support long- term economic growth, the competitive environment in the banking system must be enhanced.

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ACRONYMS AND ABBREVIATIONS

A.D.F	Augmented Dickey Fuller
U.S.A	United States of America
C.R.R	Cash Reserve Ratio
C.B.K	Central Bank of Kenya
C.B.R	Central Bank Rate
G.D.P	Gross Domestic Product
I.P.S	Im Pesaran Shin Test
I.M.F	International Monetary Fund
L.D.C's	Least Developed Countries
M.P.C	Monetary Policy Committee
N.I.M	Net Interest Margin
N.P.L's	Non Performing Loans
O.C	Operating Cost
O.L.S	Ordinary Least Squares
S.T.D	Standard Deviation
STATA	Statistics and Data
S.P.C	Structure Conduct Performance
T.B	Treasury Bill
S.K	Skewness and Kurtosis
V.A.R	Vector Auto Regression
X.T	Cross Section

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The interest rate spreads (measured as the difference between deposit and lending rates) not only indicate the level of inefficiency of the banking sector but show the level of development of the financial system. Bank interest rate spreads have several important implications for growth and development of any economy, Quaden, (2004). Specifically, high interest rate spreads tend to discourage potential savers and thus limiting the quantum of funds available to potential investors. A reduction in lending arising from low savings often leads to low investment and thus the economic growth rate, Valverde, Del Paso and Fernandez, (2004).

These implications of banking sector inefficiency have spurred numerous debates in developed and developing countries on the determinants of banking sector interest rate spreads, Saunders and Schumacher, (2000). Studies have shown that there is a pervasive view amongst some stakeholders that high interest rate spreads are caused by the internal characteristics of the banks themselves, such as their tendency to maximize profits in an oligopolistic market, while many others argue that the spreads are imposed by the macroeconomic, regulatory and institutional environment in which banks operate. These studies that have indicated a pervasive view especially in the developed countries include those of Angbazo (1997), Saunders and Schumacher (2000), Brock and Rojas-Suarez, (2000).

Empirical studies in developed countries on the determinants of interest rates margin, Saunders and Schumacher,(2000) and Maudos and Guevara,(2004), in the European banking sector, Angbazo,(1997) in the USA and Froud and Williams,(2007), in Australia, have found margins to be positively related to the degree of market concentration. Another common consensus in this literature is the positive impact of operational costs banks are facing, which suggests that the technological regime of the bank plays an important role in its pricing strategy. However, there are also some contradictory results reported. For example, Froud and Williams,(2007), finds a negative relationship between credit risk and interest margin in Australia and interpret this finding by arguing that banks are mispricing the credit risk. Among these studies reviewed such as Saunders and Schumacher (2000), Maudos and Guevara (2004) in the European Union, Angbazo (1997),in the USA and Froud and Williams,(2007), in Australia has often lead to inconsistency in the results found on the

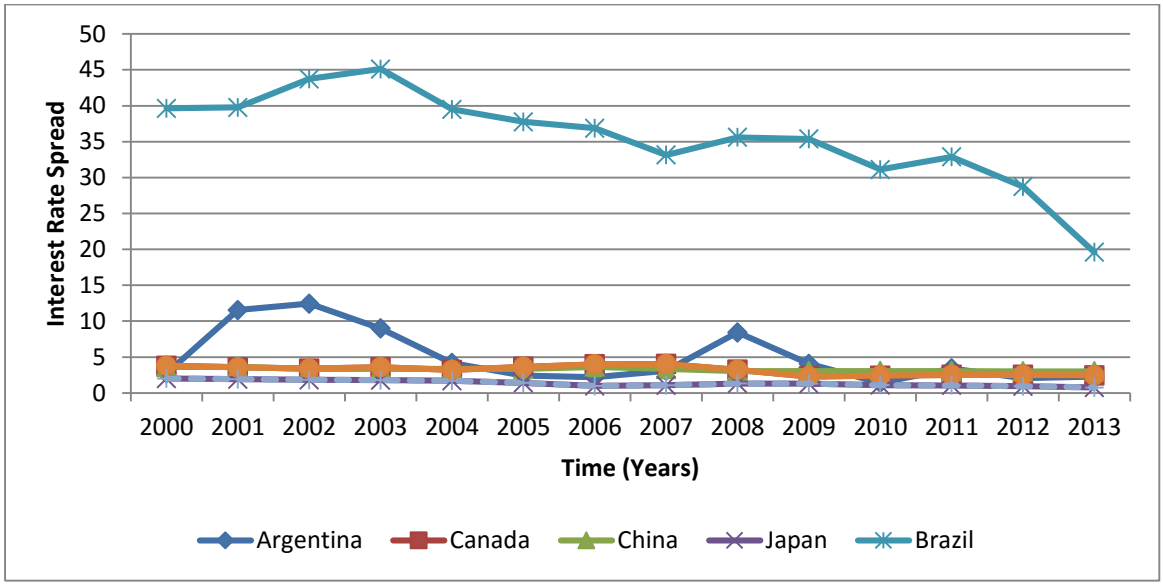
determinants of interest rates spread. Some of these inconsistencies are where factors are found to have a positive and significant effect on interest rate spread whereas in other scenarios the relationship is found to be negative. The current study therefore will establish the effect of these factors.

The study by Angbazo (1997), examined the determinants of bank net interest margins for a sample of US banks. The results suggested that ratio of net loan charge-offs to total loans, the opportunity cost of non-interest bearing reserves, leverage and management efficiency (ratio of earning assets to total assets) are all statistically significant and positively related to bank interest margins. The ratio of liquid assets to total liabilities, a proxy for low liquidity risk, was inversely related to the bank interest margins. Despite the effort to examine the interest rate spread by Angbazo (1997) this study only looks at the bank-specific factors overlooking the macroeconomic and bank-industry factors. Further, the study is conducted in a developed economy and thus the results could be inapplicable within the context of developing countries as the bank specific factors are varied across regions and continents.

Saunders and Schumacher (2000) while examining the interest rate spread for six European countries and the US for the period 1988-1995 found that the banks in these regions were affected by the degree of bank capitalization, bank market structure and the volatility of interest rates. This study looks at the three categories of factors affecting interest rate spread, however the three categories as adopted in the study is not inclusive of all the factors affecting interest rate. For instance the study looks at volatility which is a macroeconomic factor leaving out other factors such as inflation and real GDP growth.

The Figure 1.1 below presents the trends of interest rate spread among selected countries in the developed economies. The results indicate that the interest rate spread for Brazil for the period 2000 to 2013 has been highest compared to the interest rate spread of other selected countries such as Argentina, Canada, China and Japan.

Figure 1.1: Interest Rate Spread of Selected Developed Countries.



Source: *World Bank Indicators Database (2014)*

Figure 1.1 above further show that the interest rate spread of Brazil as compared to that of other developed economies such as Argentina, Canada, china and Japan has relatively been high over the period 2000 to 2012 with the highest interest spread being experienced in 2003. The Interest rate spread also rose sharply in the year 2008 through to 2009 before dropping slightly in 2010. This can be attributed to the global financial crisis that was experienced then.

Within the developing countries, studies on the interest rate spread that have been reviewed include those of Brock and Rojas (2000); Moore and Craigwell, (2002); Robinson (2002); Brock and Franken (2002); Bawumia, Belnye and Ofori (2005) among others show varied results. Brock and Rojas (2000) in their study of interest rate spreads in five Latin American countries (Argentina, Bolivia, Colombia, Chile and Peru) during the mid-1990's found that the capital ratio, cost ratio, and the liquidity ratio were statistically significant. In the second stage, the study also examined the effect of macroeconomic variables on interest rate spreads. The results indicated that interest rate volatility increased bank spreads in Bolivia and Chile; the same happened with inflation in Colombia, Chile and Peru. For the other cases, the coefficients were not statistically significant. Despite a tremendous effort to adopt a more comprehensive approach to interest rate spread this study was conducted in a developing economies and as with the study by Angbazo (1997) which was performed in a developed economy its finding cannot be generalized to the Kenyan context.

In the Caribbean, Moore and Craigwell (2000) noted that the specific characteristics of commercial banks that are usually theorized to have an impact on their spreads include the size of the bank, ownership pattern, the quality of the loan portfolio, capital adequacy, overhead costs, operating expenses, and shares of liquid and fixed assets. This study examined both the bank-specific factors and the bank-industry factors however it did not investigate the macroeconomic factors affecting interest rate spreads and this is further compounded by the fact that the continental differences may give rise to difference in bank-specific factors and as a result this study will look at the Kenyan context while also incorporating the macroeconomic factors.

In Jamaica, Robinson (2002), notes that interest rate spreads in Jamaica were due to the incidence of fraud, the ease with which bad credit risks survive due diligence, and the state of corporate governance within banks all lead to higher operating costs, asset deterioration and ultimately wider interest rate spreads. These studies all show that such bank-specific factors impact significantly on commercial banks net interest margins.

In Chile ,Brock and Franken (2002) note that individual bank characteristics are often not tightly correlated with interest rate spreads and asserted that this may be because spreads are largely determined at the industry level, thus making individual bank characteristics more relevant to other variables, such as bank profitability.

In the Czech Republic, more than 60% of the banks profit directly depends on the interest rate spread and therefore, they represent an important element for financial stability, Hainz, Horvath and lavage, (2014). Despite its prominence for bank performance, there is still little research on the determinants of interest rate spreads. Whereas in Pakistan, an increase in the interest spread implies that either the depositor or the borrower or both stand to lose if the key underlying issues are not critically addressed. They also indicated that in the context of developing economies, the lack of alternate avenues of financial intermediation aggravates the adverse impact of increase in spread Khawaja and Usleh, (2007).

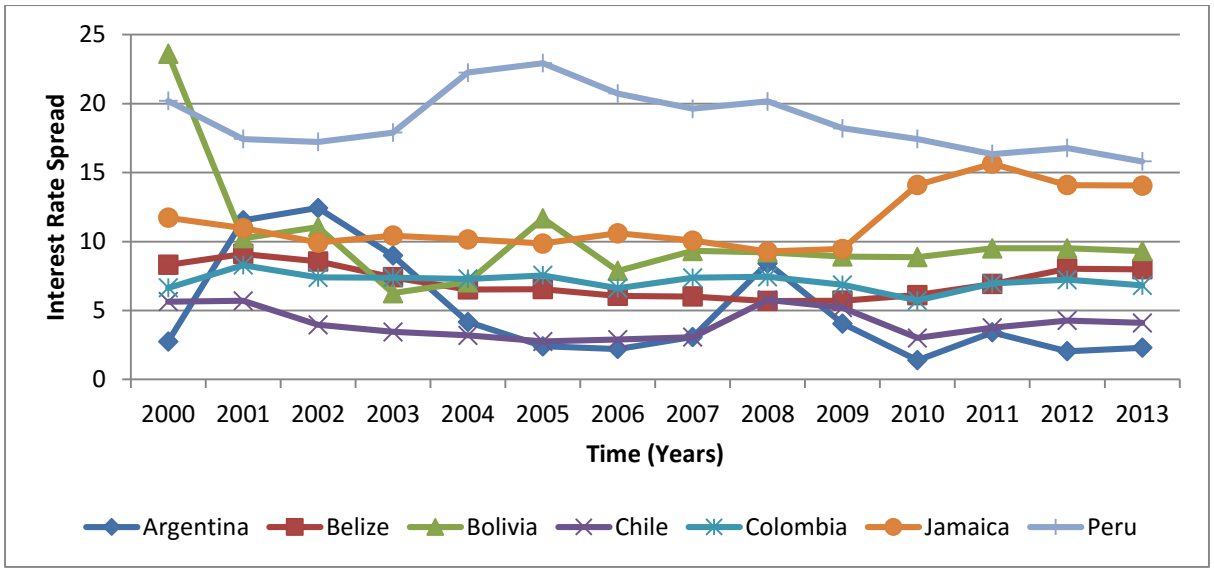
Hossain (2012) on a study of interest rate spreads in Bangladesh for the period 1990-2008 results revealed persistency in interest spreads and margins. Their findings indicated that high administrative costs, high non-performing loan ratio and macroeconomic factors are the key determinants of persistently high interest rate spreads and margins. Despite the fact that these studies examined macro-economic, industry-related factors as well as the bank-specific

factors, it was performed in Bangladesh as thus presenting a contextual gap that this study seeks to address by looking at the determinants of bank-interest rate spread in Kenya.

Dabla and Floerkemeier, (2007) while performing a study on bank efficiency and market structure in Armenia for the period 2002 to 2006 where their results show that bank-specific factors, such as bank size, liquidity, and market power, as well as the market structure are the significant determinants of bank interest rate spread. This study failed to examine the macro-economic and bank-industry factors affecting interest rate spread.

The trends for interest rate spread of developing countries such as Bolivia, Colombia, Chile, Peru and Jamaica as discussed above are presented in the Figure 1.2 below. The trends indicate that the interest rate spread of these selected countries have been moving together over time. For instance the interest rate spread of Argentina, Belize, Bolivia, Chile, Colombia and Jamaica have been within a range of 3 and 12 where the interest rate spread of Peru has been highest compared to the interest rate of the selected developing countries as presented in Figure 1.2 below.

Figure 1.2: Interest Rate Spread of Selected Developing Countries.



Source: World Bank Indicators Database (2014)

Within Africa, the studies reviewed which have examined interest rate spread include studies by: Bawumia, Belnye and Ofori (2005), Chirwa and Mlachila (2004), Eita (2012), and Samahiya and Kaakunga (2014). For instance in Ghana, according to Bawumia, Belnye and Ofori (2005) asserted that the advanced failure of interest spreads in developing countries to decline in the context of financial liberalization were mainly due to; lack of changes in the

structure and institutional behavior of the banking system, High reserve requirements, adverse selection and adverse incentive (moral hazard) effects which could result in mounting non-performing loans and provision for doubtful debts, High operational costs were also considered to be a source of persistent and wide intermediation spreads ,Bawumia, Belnye and Ofori,(2005). This study however, failed to examine the macro-economic determinants of interest rate spread which this study will also look into.

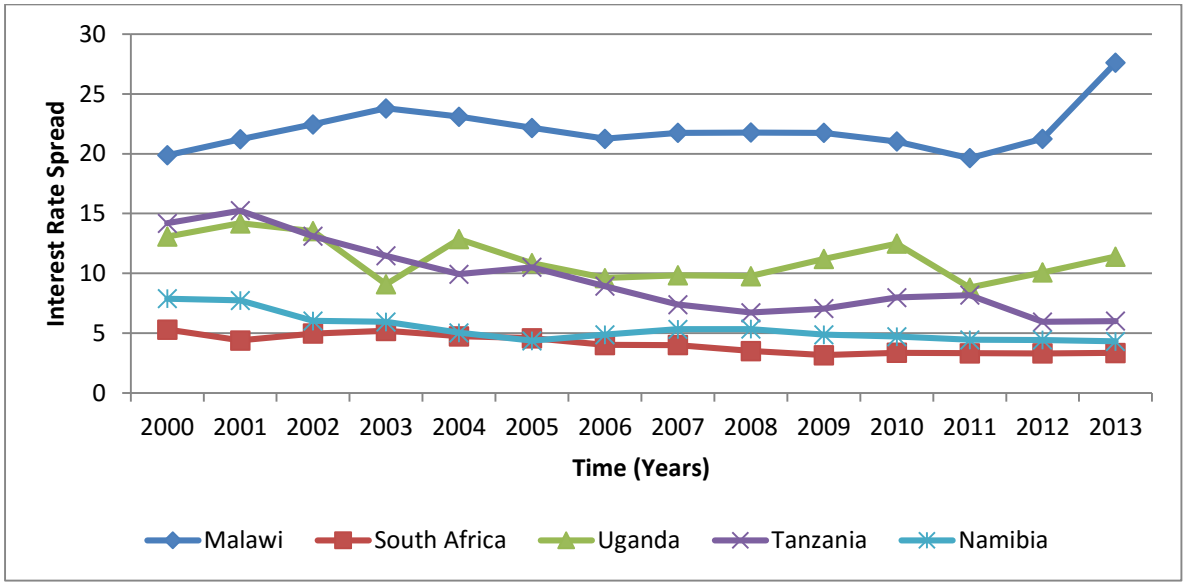
In Malawi, according to Chirwa and Mlachila, (2004) the failure of spreads in developing countries to converge to international level after financial liberalization, suggests that high interest rate spreads in developing countries will persist if financial sector reforms do not significantly alter the structure within which banks operate. They assert that the market-specific determinants of commercial bank interest rate spreads include lack of adequate competition in the banking sector and consequent market power of commercial banks, the degree of development of the banking sector, and explicit and implicit taxation-such as profit taxes and reserve requirements, Chirwa and Mlachila, (2004). This study looks at the market-specific determinants whereas the bank-specific and macroeconomic factors are not investigated.

Eita (2012) while looking at bank interest spread in Namibia for the period 1996-2010 the results indicated that the interest rate spread was determined by Treasury bill rate, inflation rate, the size of the economy, financial deepening, bank rate or discount rate and exchange rate volatility. Just like the reviewed studies above this study also failed to address the bank-specific and industry specific factors that affect interest rate spread. Similarly, there are no predetermined expectations that the only factors that affect interest rate spread are macroeconomic in nature. This study therefore seeks to take a more holistic approach to interest rate by incorporating both bank-specific and industry-related factors affecting interest rate spread.

Samahiya and Kaakunga (2014) conducted a study on determinants of commercial banks' interest rate spread in Namibia Over the period 2004-2011. The results of the study indicate that deposit market share, liquidity levels and operating costs are the main bank-specific determinants of interest rate spread in Namibia. However this study did not address the macro-economic and bank-industry related factors that affect interest rate spread.

Among the reviewed studies within Africa, Figure 1.3 below presents the trends of interest rate spread over the period 2000 to 2013 so as to show the movements of interest rates over time. The Figure 1.3 shows that the interest rate spread of South Africa and Namibia are the lowest while the interest rate of Malawi has been the highest over the period 2000 to 2013 when compared to the interest rate spread of the selected African countries.

Figure 1.3: Interest Rate Spread of Selected Developing Countries in Africa.



Source: World Bank Indicators Database (2014)

Beck, Cull and Gatenga, (2010) examined developments in Kenya's financial sector with a specific focus on stability, efficiency and outreach, and use interest rate spreads as a proxy for the efficiency of financial intermediation. They base their analysis on ex-post constructed spreads and decompose the spreads into different components based on a set of factors such as overhead costs, loan loss provisions and taxes.

Ndung'u and Ngugi, (2000) theoretically derived factors likely to explain the interest rate spread and empirically estimated an interest rate spread equation using monthly time series data for the period April 1993 to June 1999,while Ngugi (2001) extends the monthly time series data to December 1999 in her later study. The factors considered by the former are deposits, loans, Treasury bill rate and interbank rate. Ndung'u and Ngugi, (2000) found that the spreads are positively related with deposits but negatively related to loans. In addition to the factors above, Ngugi (2000) incorporates excess liquidity and non-performing loans ratio as explanatory variables and finds that a rise in non-performing loans ratio leads to a rise in spreads while excess liquidity is negatively related with spreads. Both studies are undertaken

at the macro level, mainly focusing on the macro industry-level variables. Nonetheless, they both ignore macroeconomic indicators such as GDP and inflation. The current study goes beyond these factors by considering not only macroeconomic variables but also bank-specific variables and industry factors using panel data for the commercial banks. Additionally, the study covers a more recent period ranging from 2002 to 2011 during which there have been significant changes both in the policy and macroeconomic environment. For instance, this is the period within which the Central Bank of Kenya introduced the policy rate (Central Bank Rate) which the Monetary Policy Committee (MPC) of the Bank currently uses to signal the monetary policy stance.

Tarus, Chekol and Mutwol (2012) conducted a study on the determinants of Net Interest Margins of Commercial Banks in Kenya using secondary data for the period 2000 to 2009. In their study, Operating expenses and credit risk has a positive and significant effect on net interest margin of the commercial banks in Kenya. The study also found that the higher the inflation, the wider the net interest margin, while growth and market concentration have negative effect on net interest margin. The study considered the macro-economic and bank-specific factors as factors affecting the interest rate spread but did not consider the industry-specific factors such as the market share concentration and deposit concentration and thus the current study seeks to include the industry-related factors affecting interest rate spread.

As shown in the Table 1.1 below the Kenyan interest rates spread remains higher than Uganda and Tanzania in 2003 but gradually declined steadily up to 7.8% by the year 2005.Although the spread appeared to stabilize at this level it again started increasing gradually for all the preceding years declining marginally by the year 2011 to 9.42%.Comparing the spread in the country with other African countries such as Rwanda, Tanzania, South Africa and Egypt it clearly indicates that Kenya which is the most developed financial sector in East Africa, demonstrates a high level of inefficiency in financial intermediation as compared to its, peers these African countries. Apart from Uganda, Kenya demonstrates a higher spread among all the other selected African countries over the end of the last decade.

Table 1.1: Interest Rate Spread of Selected Developing Countries

Country Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Kenya	13.00	12.44	10.1	7.8	8.5	8.18	8.71	8.84	9.81	9.42
Uganda	13.50	9.09	12.86	10.85	9.61	9.84	9.78	11.2	12.49	8.81
Tanzania	13.10	11.47	9.94	10.52	8.93	7.39	6.73	7.06	7.98	8.18
Rwanda	7.40	7.62	7.09	8.07	7.78	9.34	9.79	16.09	9.57	9.77
South Africa	5.00	5.2	4.74	4.58	4.03	4.01	3.51	3.17	3.37	3.33
Egypt, Arab Rep.	4.50	5.31	5.65	5.92	6.58	6.41	5.74	5.48	4.77	4.29
Ethiopia	4.90	3.65	3.62	3.54	3.44	3.39	3.32	-	-	-

Source: World Bank,(2012)

There has been an increasing disparity between the lending rates and the deposit rates in Kenya over the last decade. In the Kenyan history, 1982 saw the lowest interest rate spread at 2.3% with the highest spread experienced in 1996 at 16.2%.In 2005 after decreasing to 7.8% from 10.10% in 2004, the spread assumed an upward trend rising to 9.81% in 2010.

According to Arianna, (2002) the inflationary pressure created by the first oil crisis made the interest rate negative in real terms. As indicated in the 1974-1978 National Development Plan of Kenya, the government saw the need to review the interest rates to encourage savings through the banks and to create a disincentive to forestall speculation and inefficient use of savings by borrowers. In the l980s, the interest rate policy was reviewed with the following objectives: to keep the general level of interest rates positive in real terms in order to encourage savings and maintain financial stability; to allow greater flexibility and encourage greater competition among the banks and Non-Banking Financial Institutions to enhance efficient allocation of financial resources. In particular, the policy strove to ensure that funds flowed into those areas that are most productive, with the biases against long term lending

and lending to small business eliminated; and to reduce the differential to maximize lending for banks and Non-Banking Financial Institutions. One major flaw was that structural adjustment took place within an environment of severe fiscal laxity, Arianna, (2002)

According to Kenya Vision 2030 (2008),the vision on financial service sector, one of the constraints that will have to be overcome is to lower the present interest rate spread between lending and deposit rates. At 8.6 per cent in 2008, the spread was too high for the purposes of mobilizing savings and credit expansion. An acceptable range for interest rate spread would be between 5 per cent and 6 per cent. Institutional reforms are needed in several related segments, including; the commercial justice system; transparency and efficiency in the registration of collateral; improvements in land registration and the companies registry; and expansion of private credit reference bureaus. Completing these reforms will make the financial system capable of competing with others in the region.

1.1 Statement of the Problem

The widening interest rate spread in Kenya is a concern for both policy makers and households. Despite policy interventions and structural reforms in the financial sector, the spread has consistently risen from the year 2003 up to 2010 with an insignificant drop in year 2011. These spread is also higher than what is experienced by emerging and developed economies. The causes of this persistently increasing interest rate spread despite the many reforms are not known .As indicated in the Vision 2030, the bank interest rate spread needs to be maintained at a sustainable level of about 5 per cent to 6 per cent. Among the reviewed studies on interest rate spread there has been conflicting results on the determinants of interest rate spread globally. Such studies have looked at the macro-economic factors while others have explored the bank-specific factors and equally others have examined the bank-industry factors. Few studies within Kenya have adopted a comprehensive and combined approach of bank specific, industry specific and macro economic factors in analyzing the interest rate spreads in Kenya. Furthermore, the use of panel data methodology has been infrequent in establishing the factors influencing the interest rate spread in Kenya. This study therefore sought to find out the causes of continually widening interest rate spreads in Kenya by establishing the empirical evidence obtained from analyzing the bank specific, industry specific and the macro economic factors using a panel data methodology.

1.3 Objectives of the Study

1.3.1 General Objective

The purpose of this study was to analyze the determinants of interest rates spreads in the Kenyan economy.

1.3.2 Specific Objectives

The study was guided by the following specific objectives;

1. To establish the bank specific factors that influence the interest rate spread.
2. To investigate the macroeconomic factors that influence the interest rate spread.
3. To examine the industry specific factors that influence the interest rate spread

1.4 Research Questions

1. What is the effect of bank specific factors on interest rate spread?
2. To what extent do macroeconomic factors affect the interest rate spread?
3. What effect do industry specific factors have on the interest rate spread?

1.5 Research Hypothesis

H_0 Bank specific factors do not have a significant relationship with interest spread

H_1 Bank specific factors have a significant relationship with interest spread

H_2 Macroeconomic factors do not have a significant relationship with interest spread

H_3 Macroeconomic factors have a significant relationship with interest spread

H_4 Industry specific factors do not have a significant relationship with interest spread

H_5 Industry specific factors do not have a significant relationship with interest spread

1.6 Justification of the Study

Despite policy interventions and structural reforms in the financial sector, the interest rate spread has consistently risen from the year 2003 up to 2010 with an insignificant drop in year 2011 and this has emerged as a key public policy issue in Kenya. Interest rate spreads indicate how efficiently a financial system performs their intermediation role of savings mobilization and allocation. Large interest rate spreads are deemed to be inhibiting economic growth, as they act as a disincentive to private investment and otherwise constrain it to suboptimal levels. Inefficiencies in intermediation may emerge from structural problems: lack of adequate competition, scale diseconomies due to small market size or high fixed operating costs, the existence of regulatory controls, perceived market risks and the unsoundness of banks. The previous studies on the related topic have not succeeded because many of them used only one variable unlike the current study which uses all the three factor variables that is bank specific, industry specific and macroeconomic factors. This study uses 8 banks which controlled 62 per cent of bank profits in the last decade. Panel data methodological approach is suitable because it allows for differences in the aggregate function across the banks. This leads to results that are significantly different from those obtained from single bank regressions. The study by ,Chirwa and Mlachila (2004), in Malawi also used the same methodology while conducting a study on the interest rate spreads in Malawi using five Malawian commercial banks.

The study findings may be used by the government to reduce public borrowings in order to allow the banks to lend to the general public so as to reduce crowding effect of private investments. Additionally, policy makers will also benefit from the study by understanding the challenges and reassess some of the policies that lead to rising interest rate spread. The academicians could also use the findings of this study as a source of reference to get an insight of the determinants of interest rate spread.

1.7 Scope of Study

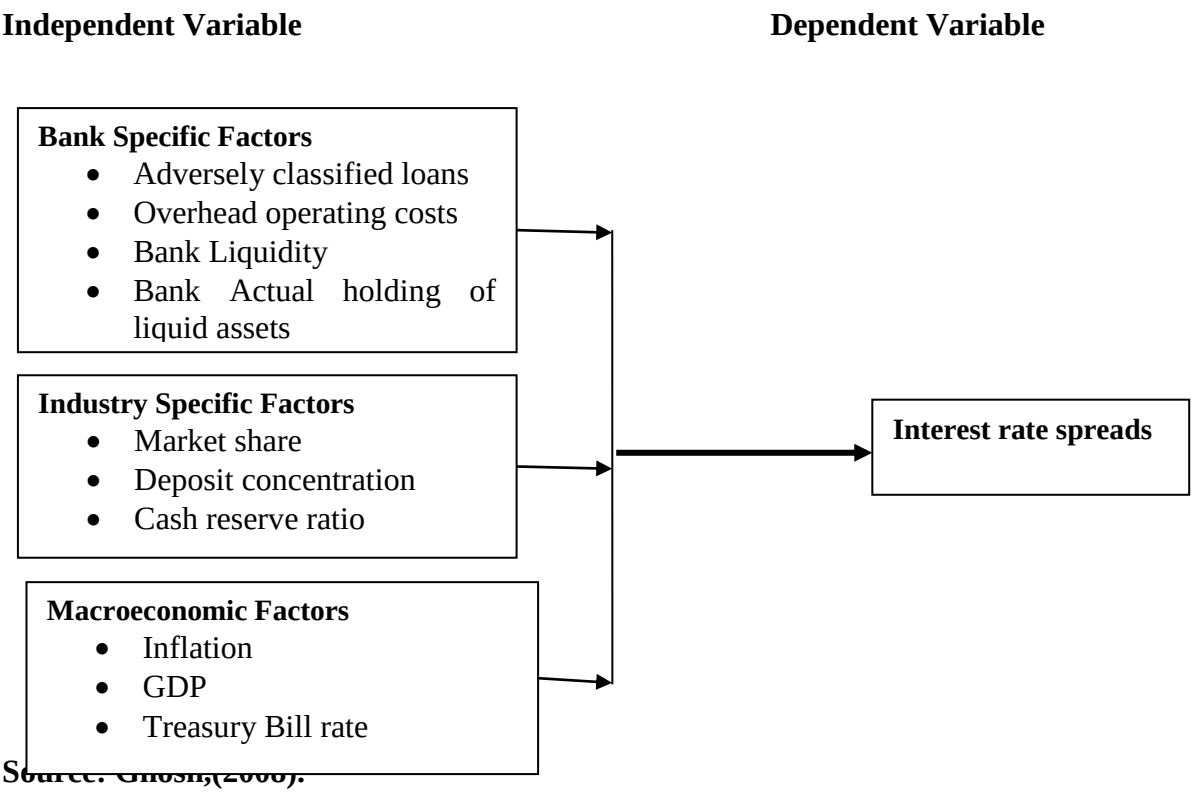
This study was conducted in Kenya which is the largest growing economy among the east African countries. It lies on latitude of $1^{0}00^{1}$N and Longitude of $38^{0}00^{I}$E (Map of Kenya Appendix I).This study focused on the determinants of interest rate spreads in the Kenyan economy by focusing on the bank specific factors, macroeconomic and industry specific factors. A balanced panel data of eight banks for the period 2002-2011 was adopted in the

study. Individual banks data was obtained from the Banking Survey 2012 publication. The Banks considered in the study included Barclays Bank, Cfc-Stanbic, Citibank, Cooperative Bank, Equity Bank, Kenya Commercial Bank, National Bank and Standard Chartered Bank.

1.7 Conceptual Framework

A conceptual framework refers to a network, or "a plane," of interlinked concepts that together provide a comprehensive understanding of a phenomenon or phenomena, Tarus, Chekol and Mutwol (2012). The conceptual framework adopted in this study is as presented in the Figure 1.1 below. This conceptual framework is based the study by Ghosh ,(2008) with extensions from later studies incorporating different factors to explain the interest rate spreads Perez, (2011); Randall, (1998); Carbo and Rodriguez, (2007).

Figure 1.2: Conceptual Framework of Interest rate spreads in Kenya.



Source: Ghosh,(2008).

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This section reviewed the theoretical and empirical literature on the factors influencing the size of the interest rate spread in the Kenyan economy.

2.1 Theoretical Literature Review

According to, Da Silva, Oreiro, Paula, and Sobreira, (2007). there are three theoretical approaches to interest rate spread, namely, the monopoly model by Klein (1971), Structure-Conduct-Performance (SCP) theory whose origin can be traced to the work of the Harvard economist Edward Mason in the 1930s and the dealership model of Ho and Saunders (1981). The monopoly model also known as the Klein-Monti Model considers a monopolistic bank as a firm whose main business is to produce deposit and loan services. The difference between deposits and loans can be borrowed on the interbank market. Thus, a firm can borrow funds on the interbank market in case it does not have sufficient deposits to make out more loans. It is believed that the bank has monopolistic power in either the deposit or credit (loan) market, which, in turn, affects its business operations. Consequently, this monopolistic power manifests itself in interest rate spreads. In this case, the bank is able to charge a price higher than its marginal cost. Therefore, the monopoly model predicts that due to monopolistic power, larger commercial banks exercise market control over smaller banks and influence the market price, which in this case, is the interest rate spread. Another outcome of the monopoly model is that the interest spread is an increasing function of banking sector concentration.

Similar to the monopoly model, the Structure-Conduct-Performance (SCP) theory of industrial organization maintains that market concentration encourages firms to adopt less competitive behavior which leads to inefficient markets. The SCP model argues that firms adopt anti-competitive strategies such as collusion and that such behavior impacts on their performance, Tushaj, (2010). Therefore, the SCP paradigm implies that market concentration is positively related to interest rate spread. However, the efficient market hypothesis argues to the contrary. Under the efficient market hypothesis, it is argued that bigger banks tend to have narrower spreads due to economies of scale. Thus, variables such as bank size and market power influence a firm’s price decision.

The dealership model views a bank as an intermediary between the borrower (firms) and the final lender (households). In this model, the bank faces two types of uncertainty. The first uncertainty is due to lack of harmonization between the loans and deposits which leads to an interest rate risk for the bank, Ho and Saunders, (1981).

The second uncertainty that the bank faces concerns the default risk by its customers. The dealership model postulates that a bank lacks knowledge, ex-ante, about the likelihood of default by its customers in the credit market and that this uncertainty exposes the bank to a credit risk. The more exposure to default risk the bank has, the more likely the bank will widen its interest rate spread in order to shield itself against the risk. This suggests that the interest rate spread is directly related to non-performing loans (NPLs), thus the higher the NPLs the wider the interest rate spread.

2.2 Empirical Literature

2.2.1 Bank-Specific Characteristics and Interest Rate Spread

Samahiya and Kaakunga (2014) conducted a study on determinants of commercial banks' interest rate spread in Namibia. The study adopted a panel data analysis of bank level data. It also applied the ordinary least squares (OLS) technique to identify the bank-specific variables that have been influencing interest rate spread in Namibia over the period 2004-2011. The results of the study indicate that deposit market share, liquidity levels and operating costs are the main bank-specific determinants of interest rate spread in Namibia. More specifically, they found that the deposit market share and operating costs reduces net interest margin whilst the liquidity levels of a commercial bank increases its net interest margin. Furthermore, it was revealed that the tax paid by a bank, non-performing loans and the capital ratio are not important determinants of the net interest margin. This study falls short by taking *apriori* that interest rate spreads are determined only by bank-specific characteristics. The interest rate spread is broad than the scope that this study examined and as a result a more broad approach to interest rate spread is necessary to investigate the determinants of interest rates spread.

Perez, (2011) conducted a study on the determinants of interest rate spread in Belize. This study examined the components of interest rate spreads using accounting data and identifies the factors that affect interest rate spreads using a panel dynamic least squares model. The study concludes that market share and adversely classified loans are two main determinants

of the spread. Based on these findings, the study suggests policy recommendations to reduce information asymmetries and increase competition in the Belizean financial sector. Despite the use of panel regression techniques and use of fixed and random effects model, the study only looks at the bank specific factors totally disregarding the impact of, industry-specific, and macroeconomic variables on the interest rate spread.

Tarus, Chekol and Mutwol (2012) conducted a study on the determinants of Net Interest Margins of Commercial Banks in Kenya using secondary data for the period 2000 to 2009. The study applied pooled and fixed effects regression to a panel of 44 Kenyan banks and the results from estimation showed that operating expenses and credit risk has a positive and significant effect on net interest margin of the commercial banks in Kenya. The study also found that the higher the inflation, the wider the net interest margin, while growth and market concentration have negative effect on net interest margin. The study considered the macro-economic factors and bank-specific factors as factors affecting the interest rate spread and thus not addressing itself to the industry-specific factors such as the market share concentration and deposit concentration and thus the current study seeks to include the industry-related factors affecting interest rate spread.

In his work, Brock and Rojas (2000) applied the two-step procedure for a sample of five Latin American countries during the mid-1990 (Argentina, Bolivia, Colombia, Chile and Peru). Their results showed positive coefficients for capital ratio (statistically significant for Bolivia and Colombia), cost ratio (statistically significant for Argentina and Bolivia), and the liquidity ratio (statistically significant for Bolivia, Colombia, and Peru). As for the effect of non-performing loans, the evidence was mixed. Apart from Colombia, where the coefficient for non-performing loans was positive and statistically significant, for the other countries the coefficient was negative (statistically significant for Argentina and Peru). In the second stage, Brock and Rojas (2000) ran a regression for the measure of “pure” bank spreads on macroeconomic variables reflecting interest rate volatility, inflation rate and GDP growth rate. Their results showed that interest rate volatility increased bank spreads in Bolivia and Chile; the same happened with inflation in Colombia, Chile and Peru. For the other cases, the coefficients were not statistically significant. The study did no address industry specific factors and it also portrays a contextual gap which can be realized by conducting a Kenyan study.

2.2.2 Macroeconomic Factors and Interest Rate Spread

Chirwa and Mlachila (2004) conducted a study on financial reforms and interest rate spreads in the commercial banking system in Malawi. The study used monthly panel data from five Malawian commercial banks for the period 1989–99. The study results showed that that spreads increased significantly following liberalization, and panel regression results further suggest that the observed high spreads can be attributed to high monopoly power, high reserve requirements, high central bank discount rates, and high inflation. However, this study only sought to assess the contribution of market characteristics and policy-driven factors to the behavior of commercial bank interest spreads. As a result, this study fails to examine other factors that affect the interest rate spread which includes the industry specific factors as well as the bank specific factors. There is no predetermined expectation that macroeconomic factors are the only factors that affect interest rate spread.

Eita (2012) conducted a study on the determinants of interest rate spread in Namibia for the period 1996-2010. The study adopted a co integrated vector auto regression (VAR) approach and the results indicated that interest rate spread in Namibia is determined by Treasury bill rate, inflation rate, the size of the economy, financial deepening, bank rate or discount rate and exchange rate volatility. Treasury bill rate, inflation rate and bank rate are associated with an increase in interest rate spread. The size of the economy and financial deepening are associated with a decrease in interest rate spread. The results suggest that an increasing interest rate policy pursued by the government can cause interest rate spread to rise. Increase in the cost of funds to commercial banks may be passed to consumers in the form of higher interest rate spread. An increase in the cost of doing business will cause interest rate spread to rise. The study thus concluded that interest rate spread can be reduced by increasing the size of the economy which allows for economies of scale and greater competition. It also concluded that financial deepening, which allows a high level of interbank competition, can also reduce the interest rate spread. Just like the reviewed studies above this study also failed to address itself to the bank-specific and industry specific factors that affect interest rate spread. Similarly, there are predetermined expectations that the only factors that affect interest rate spread are macroeconomic in nature. This study therefore seeks to take a more holistic approach to interest rate by incorporating both bank-specific and industry-related factors affecting interest rate spread.

2.2.3 Industry Specific Factors and Interest Rate Spread

Hossain (2012) conducted a study on the determinants of high bank interest spreads in Bangladesh. The study examined the interest rate spread of Bangladesh for the period 1990-2008 using Arellano-Bover / Blundell-Bond dynamic panel regression model to a panel of 43 banks and the results revealed persistency in interest spreads and margins. The results also found that high administrative costs, high non-performing loan ratio and some macroeconomic factors are the key determinants of persistently high interest rate spreads and margins. Persistently high spreads and margins in old private banks (established before 1999) are attributed to a certain degree of market power in the post-liberalization period (after 1999). The study concluded that these factors together imply a lack of competition and efficiency in the banking sector of Bangladesh despite financial reforms. Despite the fact that these studies examined macro-economic, industry-related factors as well as the bank-specific factors, it was performed in Bangladesh as thus presenting a contextual gap that this study seeks to address by looking at the determinants of bank-interest rate spread in Kenya.

Dabla and Floerkemeier, (2007) on a study on bank efficiency and market structure in Armenia notes that despite far-reaching banking sector reforms and a prolonged period of macroeconomic stability and strong economic growth, financial intermediation has lagged behind other transition countries, and interest rate spreads have remained higher than in most Central and Eastern European transition countries. Their study examined bank interest rate spread using bank-level panel dataset for the period 2002 to 2006 and their findings showed that bank-specific factors, such as bank size, liquidity, and market power, as well as the market structure within which banks operate, explain a large proportion of cross bank, cross-time variation in spreads and margins. The results also suggested that there is a large potential to increase cost efficiency and competition in the banking system.

The study by Angbazo (1997) examined the determinants of bank net interest margins for a sample of US banks using annual data for1989- 1993 in a country specific basis. The results for the pooled sample suggested that the proxies for default risk (ratio of net loan charge-offs to total loans), the opportunity cost of non-interest bearing reserves, leverage (ratio of core capital to total assets), and management efficiency (ratio of earning assets to total assets) are all statistically significant and positively related to bank interest margins. The ratio of liquid assets to total liabilities, a proxy for low liquidity risk, was inversely related to the bank interest margins.

Saunders and Schumacher (2000), in across country study found that between 1988-1995 interest margins in six European countries and the US were affected by the degree of bank capitalization, bank market structure, and the volatility of interest rates.US being a developed country may not necessarily be having same results as in Kenya a developing country.

2.3 Summary

Studies that examine determination of interest rate spreads generally use variables that fall in three categories mainly, Individual bank specific factors such as operating or administrative costs, non-performing loans. Return on asset, structure of the balance sheet, on interest income or non-core revenues, bank size, liquidity ratio of a bank, among others. Factors specific to the banking industry such as the degree of competition as could for instance be indicated by market concentration, regulatory reserve requirements or regulated minimum deposit rates and Macro economic factors which include growth rate of real gross domestic product (GDP), treasury bill rate, Excess liquidity among others. Some studies focus on one category of factors while others consider two or all the three categories of factors in estimating the interest rate spread. On the other hand, some studies focus on the micro level factors while others focus on the macro level factors. This study therefore seeks to examine the interest rate spreads in Kenya by examining the macro-economic factors, bank-specific factors as well as the bank-industry factors.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This section looked at the research methodology that was undertaken in the study carried out on the determinants of interest rate spreads in the Kenyan economy.

3.2 The Study Area

The study was carried out in Kenya which is a country within East Africa with latitude of $1^{0}00^{1}$N and Longitude of $38^{0}00^{I}$E.It Borders Uganda to the west, Ethiopia to the north, Tanzania to the south and Somalia to the East. The study analyzed data from eight major commercial banks in Kenya for a period between 2002 to 2011 .The eight commercial banks are purposively chosen because from the literature it depicted that they contributed over 68.2% of all the profits generated in the banking sector in 2009 and more than 62% within the period between 2003 to 2010, Central Bank of Kenya, Bank Supervision Report, (2010).

3.3 Research Design

According to Eriksson and Kovalainen (2008) research design is a plan that guides the research in the process of collecting, analyzing and interpreting observations; the researcher's blueprint for the methods and instruments used to gather information and to evaluate it, in order to respond to the research questions and the hypothesis of the study. The study employed explanatory research design. Both time series and cross section data were collected for the eight financial institutions. One of the institution was later dropped in order to obtain a balanced panel, since it gained a bank status in 2004 thereby lacking data for 2002 and 2003. In total, from the panel data a total of 70 observations were analyzed.

3.4 Population

According to the Central Bank of Kenya, Bank supervision reports (2010) there were 43 commercial banks in the country. All these 43 banking institutions constituted the population for this study.

3.5 Sample

A sample of eight major commercial banks in Kenya was drawn from the population.

Purposive sampling was used. The sample was selected from the cluster of financial institutions that commanded over 68.2% of all the profits generated in the banking sector in 2009 and more than 62% of the industry profits in the period 2002-2010, Central Bank of Kenya, Bank Supervision Report, (2010).

3.6 Data Collection Procedures

Data was collected from secondary sources which included but not limited to published financial statements of the eight commercial banks over the period 2002 to 2011, Government published figures from the Central bank of Kenya, Kenya National Bureau of Statistics, and Other Government Publications on the subject and other international bodies published documents such as IMF, World Bank databases among others.

3.7 Data Analysis and Presentation

The study used quantitative data analysis. This involved the panel unit root test Levin-Lin and Chu test and Im Pesaran shin test. The study also used descriptive statistics such as mean, standard deviation. Due to the nature of the study STATA software was used. The analyzed data was presented using figures, tables and graphs.

3.8 Econometric Model Specification

The study was based on the model by Ghosh,(2008), Perez (2011), the general model takes the following form:

$$WIMit=\beta 0+\beta 1Kit+\beta 2Zt+\beta 3Mt+\varepsilon it \ldots\ldots\ldots\ldots\ldots\ldots \varepsilon_{it} \sim N(0,\sigma^2) \ldots\ldots\ldots\ldots (1)$$

The current study modified the above model in attempt to assess the factors that affect interest rate spreads. The modified model can decomposed into;

K- Bank-specific variables,

Where K constitutes; adversely classified loans, overhead operating costs, bank liquidity, Bank Actual holding of liquid assets

Z- Industry specific variables

Where Z constitutes; cash reserve requirements, market share and concentration of deposits.

M- Macro-economic variables

Where M constitutes; GDP growth, Treasury bill rate and inflation

***i*- Indexes banks**

***t* - Denotes year**

WIM- Measures wide interest margin which measures the interest rate spread.

Apriori expectations from the literature review, Suzana and Tigran (2008), Perez (2011) suggest a positive correlation of interest rate spreads with adversely classified loans, cash reserve requirements, operating cost, the ratio of actual holdings to required holdings, excess liquidity, market share and GDP growth; while concentration of deposits, inflation, 91 day treasury bill rate and non-interest income should be negatively correlated with the interest rate margin.

3.9 Diagnostic Tests

The following tests were conducted in the study given that panel data set was used.

3.9.1 Test for Unit Roots

Most economic variables are usually non-stationary in nature and thus the univariate analysis (test for unit roots) was performed in order to check whether the variables have a unit root. Of the three popular panel unit roots tests (Levin-Lin Chu, Im-Pesaran-Shin Test and Maddala and Wu) the Levin-Lin Chu test is of limited use, because the null hypothesis and the alternative hypothesis are so strict that it is not realistic in practice Hoang and McNown, (2006). The Im-Pesaran-Shin (IPS) test is not as restrictive as the Levin-Lin-Chu test, since it allows for heterogeneous coefficients. The null hypothesis is that all individuals follow a unit

root process and thus the study adopted the Im-Pesaran-Shin Test and Levin-Lin-Chu test was used for comparison purposes.

3.9.2 Test for Normality of residuals

One of the assumptions of regression requires that error terms should be normally distributed and thus normal distribution curve of the histogram were presented as well as the skewness-kurtosis test for normality.

3.9.3 Test for Multicollinearity

According to Williams, Andrew, Ismail, Froud, Sukhdev, Adam and Michael, (2013), Multicollinearity refers to the presence of correlations between the predictor variables. In severe cases of perfect correlations between predictor variables, Multicollinearity can imply that a unique least squares solution to a regression analysis cannot be computed, Field, (2009). Multicollinearity inflates the standard errors and confidence intervals leading to unstable estimates of the coefficients for individual predictors, Belsley, Edwin and Roy (1980). In order to ascertain whether independent variables suffered from Multicollinearity, they were assessed in this study using the correlation coefficients.

3.9.4 Test for Heteroskedasticity

This study adopted the Modified Wald test to ascertain whether the error terms had a constant variance i.e. Homoskedastic. In this case the null hypothesis is that the error terms are Homoskedastic. In the case where the series are heteroskedastic then this is corrected using the robust standard errors in STATA.

3.9.5 Test for Autocorrelation

To test for serial/autocorrelation this study adopted Wooldridge test for autocorrelation. In this case the null hypothesis states that the error terms are not serially/auto-correlated. If serial/auto-correlation is found to exist this is corrected by adding the lags of the variables into the model.

3.9.6 Hausman Test

Given that panel data was used in the study, a Hausman test was used to determine an appropriate model between fixed effect and random effect model. In this case the null

hypothesis of the test of a Hausman test indicates that the random effect is the preferred model

CHAPTER FOUR: ANALYSIS, DISCUSSION AND PRESENTATION OF FINDINGS

4.0 Introduction

This section presents the results of analysis, the discussion and findings from the study on the determinants of interest rate spreads in the Kenyan Economy.

4.1 Descriptive Statistics

This section provides results on measures of central tendency of the variables; Banks interest rate spread, bank operating cost, adversely classified loans, banks liquidity ratio, banks non-interest income and actual holdings of liquid assets as a ratio to liquidity requirements, cash reserve requirements, banks liquid assets ratio, banks loans to assets ratio, market share and concentration of deposits, GDP growth and Inflation.

Results in Table 4.1 shows that the mean of interest rate spread during the period under study was 0.761429 with a standard deviation of 0.023853 implying that the interest rate spread had a minimum variation in that period. The results also further indicate that Bank operating cost had a mean of 0.0797143 with a standard deviation of 0.0210673 implying that there was a minimum variation in the banks operating cost in that period.

The mean of Liquidity ratio was 0.3886429 with a standard deviation of 0.1679373 which implies that the Liquidity ratio had a minimum variation in that period whereas the mean of Bank's liquid asset ratio was 0.3377143 with a standard deviation of 0.1415196. The results also indicated that the mean of the bank's non-interest income was 0.0288714 with a standard deviation of 0.0120252.

The Cash reserve requirements had a mean of 0.0615 with a standard deviation of 0.0157026 while the mean of Loans to asset ratio was 0.5806286 with a standard deviation of 0.2644129 implying that the variation in Loans to asset ratio in that period was minimum. The market share and concentration of deposits had a mean of 0.0885429 and a standard deviation of 0.049163 while the GDP Growth had a mean of 0.0421 and a standard deviation of 0.0209998.

The mean of inflation during the period under study was 0.0875 with a standard deviation of 0.0424021 while the mean of Treasury bill was 0.66 with a standard deviation of 0.0207399 which implies that there was a minimum variation in that period and non performing loans had a mean of 5587.386 and a standard deviation of 5645.558

Table 4.1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
spread_exp~t	70	.0761429	.023853	.03	.14
oc_ratio	70	.0797143	.0210673	.042	.122
liquidratio	70	.3886429	.1679373	.033	.82
liquid_ass~o	70	.3377143	.1415196	.03	.694
nii_assets~o	70	.0288714	.0120252	.009	.052
crr	70	.0615	.0157026	.045	.1
loans_asse~o	70	.5806286	.2644129	.254	1.664
deposit_conc	70	.0885429	.049163	.02	.203
gdpgrowth	70	.0421	.0209998	.005	.07
inflation	70	.0875	.0424021	.02	.151
tbill	70	.066	.0207399	.03	.09
npls	70	5587.386	5645.558	100	20920.08

4.2 Unit Root Tests

Most economic variables are usually non-stationary in nature and thus the univariate analysis (test for unit roots) was performed in order to check whether the variables have a unit root. Of the three popular panel unit roots tests (Levin-Lin Chu, Im-Pesaran-Shin Test and Maddala and Wu) the Levin-Lin Chu test is of limited use, because the null hypothesis and the alternative hypothesis are so strict that it is not realistic in practice Hoang and McNown, (2006). The Im-Pesaran-Shin (IPS) test is not as restrictive as the Levin-Lin-Chu test, since it allows for heterogeneous coefficients. The null hypothesis is that all individuals follow a unit root process and thus the study adopted the Im-Pesaran-Shin Test and the Levin-Lin-Chu test was used for comparison only.

The results in the table below indicates that Cash Reserve Requirements, GDP Growth, Inflation Rate and Treasury Bill Rate at level and therefore are said to be stationary and integrated of order zero i.e. I(0). Interest Rate Spread, Operating Costs Ratio, Liquidity Ratio, Liquid Assets Ratio, Non-interest Income assets ratio, Loans Asset Ratio and non performing

loans were established to be non-stationary at level as indicated in Table 4.2 below and they were therefore differenced and also tested for stationary.

Table 4.2: Unit Root Tests at Level

Variables	IPS t-stat	Critical Values			P-value	Decision
		1%	5%	10%		
Interest Rate Spread	-1.9463	-2.470	-2.170	-2.010	0.1381	Non-stationary
Operating Costs Ratio	-2.315	-2.470	-2.170	-2.010	0.0354	Stationary
Liquidity Ratio	-2.01	-2.470	-2.170	-2.010	0.3709	Non-stationary
Liquid Assets Ratio	-1.6144	-2.470	-2.170	-2.010	0.3478	Non-stationary
Non-interest Income assets ratio	-1.3815	-2.470	-2.170	-2.010	0.5331	Non-stationary
Cash Reserve Requirements	-4.4826	-2.470	-2.170	-2.010	0.0000	Stationary
Loans Asset Ratio	-2.088	-2.470	-2.170	-2.010	0.0737	Non-stationary
Deposit Concentration	-1.0855	-2.470	-2.170	-2.010	0.8704	Non-stationary
GDP Growth	-2.6906	-2.470	-2.170	-2.010	0.0032	Stationary
Inflation Rate	-3.7066	-2.470	-2.170	-2.010	0.0001	Stationary
Treasury Bill Rate	-3.3166	-2.470	-2.170	-2.010	0.0003	Stationary
npls	-1.1184	-2.470	-2.170	-2.010	0.8387	Non stationary

Given that Interest Rate Spread, Operating Costs Ratio, Liquidity Ratio, Liquid Assets Ratio, Non-interest Income assets ratio Loans Asset Ratio and non performing loans were non-stationary at level thus they were differenced and tested for stationarity. The Table 4.3 below presents the results for the unit root test where the results are indicative of the absence of a unit root i.e. the variables becomes stationary after first difference and as a result are said to be integrated of order one.

Table 4.3: Unit Root Analysis at First Difference

Variables	IPS t-stat	Critical Values			P-value	Decision
		1%	5%	10%		
Interest Rate Spread	-3.5587	-2.470	-2.170	-2.010	0.0008	Stationary
Liquidity Ratio	-3.3811	-2.470	-2.170	-2.010	0.0017	Stationary
Liquid Assets Ratio	-3.4285	-2.470	-2.170	-2.010	0.0016	Stationary
Non-interest Income assets ratio	-2.733	-2.470	-2.170	-2.010	0.0071	Stationary
Loans Asset Ratio	-2.8999	-2.470	-2.170	-2.010	0.0042	Stationary
Deposit Concentration	-2.9009	-2.470	-2.170	-2.010	0.0036	Stationary
npls	-2.9512	-2.470	-2.170	-2.010	0.0030	Stationary

4.2.1 Levin-Lin Chu test for unit root at level

The results in the table 4.3 below indicates that Cash Reserve Requirements, GDP Growth, Inflation Rate, Interest Rate Spread, Operating Costs Ratio, Liquidity Ratio, Liquid Assets Ratio, Non-interest Income assets ratio, Loans Asset Ratio and Treasury Bill Rate are stationary at level test and therefore are said to be stationary and integrated of order zero i.e. I (0). While non performing loans are non stationary at level test as shown in Table 4.3 below and they were therefore difference and also tested for stationarity.

Table 4.3: Unit Root Tests at Level

Variable	llc t statistic	P value	Decision
Spread expost	-5.0051	0.0060	Stationary
Oc ratio	-.4.7997	0.0394	Stationary
Liquid ratio	-4.4640	0.0482	Stationary
Liquid asset ratio	-4.4830	0.0287	Stationary
Nii asset ratio	-5.7490	0.0000	Stationary
Crr	-5.7334	0.0415	Stationary
Loans assets ratio	-7.8507	0.0000	Stationary
Deposit conc	-2.8793	0.0234	Stationary

GDP growth	-8.8849	0.0000	Stationary
Inflation	-14.4131	0.0000	Stationary
Tbill	-9.2801	0.0000	Stationary
Npls	-2.9013	0.2394	Non stationary

Given that a non performing loans was non-stationary at level thus it was differenced and tested for stationarity. The Table 4.4 below presents the results for the unit root test where the results are indicative of the absence of a unit root i.e. the variables becomes stationary after first difference and as a result are said to be integrated of order one.

Table 4.4: Unit Root Tests First Difference

Variable	**Llc t statistic**	**P value**	**Decision**
Npls	-5.6714	0.0064	stationary

4.3 Test for Normality of Residuals

The test for normality was first examined using the graphical method approach as shown in Figure 4.1 below. The results in the figure indicate that the residuals are normally distributed.

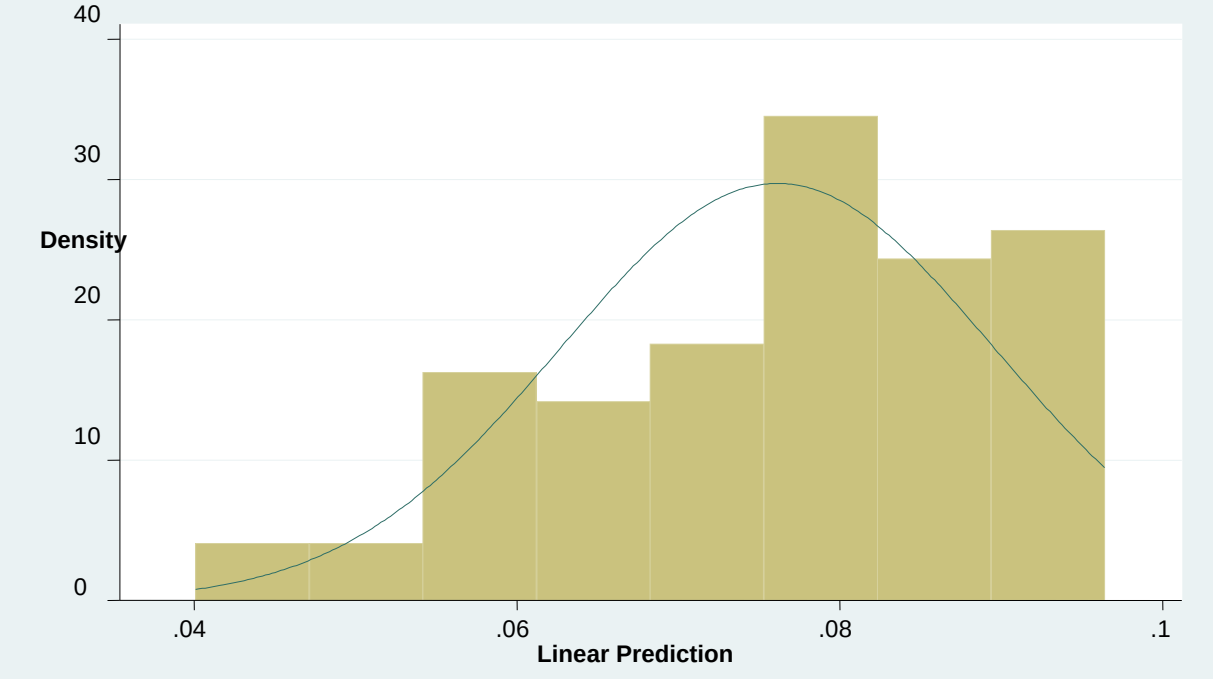


Figure 4.1: Graphical Examination of Normality of residuals

To further establish whether the residuals are normally distributed the study adopted the Jarque-Bera test which is a more conclusive test than the graphical inspection approach of testing for normality. The Table 4.4 below indicates the results of the Jarque-Bera test. The null hypothesis under this test is that the residuals are not significantly different from a normal distribution. Given that the p-value is greater than 5% for the residual, the null hypothesis is accepted and thus the conclusion that the residuals are normally distributed.

Table 4.4: Jarque-Bera Test for Normality of Residuals

```
. sktest r

                    Skewness/Kurtosis tests for Normality
                                                              ------- joint ------
    Variable |   Obs   Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)     Prob>chi2
-------------+-------------------------------------------------------------------
           r |    70       0.6369         0.0260         5.08          0.0787
```

4.4 Test for Multicollinearity

According to Williams, Andrew, Ismail, Froud, Sukhdev, Adam and Michael, (2013, Multicollinearity refers to the presence of correlations between the predictor variables. In severe cases of perfect correlations between predictor variables, Multicollinearity can imply that a unique least squares solution to a regression analysis cannot be computed, Field, (2009). Multicollinearity inflates the standard errors and confidence intervals leading to unstable estimates of the coefficients for individual predictors, Belsley, Edwin and Roy (1980). Multicollinearity was assessed in this study using the correlation coefficients. According to Field, (2009) correlation coefficients values in excess of 0.8 is an indication of the presence of Multicollinearity. The results in Table 4.5 present correlation coefficients results and were established to be less than 0.8 and thus according to Field , (2009) indicates that there is no Multicollinearity.

Table 4.5: Correlation Coefficients Matrix at 5% test

	spread~t	oc_ratio	l~dratio	liquid_~	nii_as~o	crr	loans_~o
spread_exp~t	1.0000						
oc_ratio	0.2974*	1.0000					
liquidratio	-0.0906	-0.4941*	1.0000				
liquid_ass~o	-0.1032	-0.4745*	0.9948*	1.0000			
nii_assets~o	0.2544*	0.7685*	-0.3688*	-0.3443*	1.0000		
crr	-0.2869*	0.2066	0.0335	0.0848	0.2664*	1.0000	
loans_asse~o	-0.1294	0.3461*	-0.6616*	-0.6578*	0.3761*	0.1058	1.0000
deposit_conc	0.3486*	0.4381*	-0.1551	-0.1221	0.6627*	0.1537	0.0611
gdpgrowth	0.0341	-0.1857	-0.0827	-0.1021	-0.0744	-0.5373*	0.0870
inflation	0.0637	-0.0875	-0.1108	-0.1302	-0.0812	-0.4262*	-0.0165
tbill	0.1207	0.0086	-0.0273	-0.0277	-0.0585	0.1651	0.0036
npls	0.0251	0.6281*	-0.5618*	-0.5491*	0.6915*	0.2177	0.7376*

	deposi~c	gdpgro~h	inflat~n	tbill	npls
deposit_conc	1.0000				
gdpgrowth	-0.0560	1.0000			
inflation	-0.0487	-0.1833	1.0000		
tbill	-0.0283	-0.2902*	0.0358	1.0000	
npls	0.4556*	-0.0423	-0.0614	-0.0724	1.0000

4.5 Test for Heteroscedasticity

The error process may be Homoskedastic within cross-sectional units, but its variance may differ across units: a condition known as group wise Heteroscedasticity. The xttest3 command calculates a modified Wald statistic for group wise Heteroscedasticity in the residuals. The null hypothesis specifies that $\sigma^2_i = \sigma^2$ for i =1...Ng, where Ng is the number of cross-sectional units. The results in Table 4.6 indicate that the null hypothesis of Homoskedastic error terms is not rejected as supported by a p-value of 0.1435.

Table 4.6: Test of Heteroscedasticity

```
. xttest3

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (7)  =         9.83
Prob>chi2 =       0.1987
```

4.6 Test for Autocorrelation

Because serial correlation in linear panel-data models biases the standard errors and causes the results to be less efficient, the study adopted the Wooldridge test for autocorrelation which identifies serial correlation in the idiosyncratic error term in a panel-data model. From the Table 4.7 the null hypothesis of no serial correlation is strongly rejected given that the p-value is significant (p-value = 0.0003). This is therefore corrected for in stata using the "Xtregar" Command which addresses for the presence of serial correlation.

Table 4.7: Test of Autocorrelation

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
     F(  1,        6) =     52.939
               Prob > F =      0.0003
```

4.7 Test for Fixed and Random Effects

The Hausman test is the standard procedure used in empirical panel data analysis in order to discriminate between the Fixed and Random Effects model. A fixed effect model assumes differences in intercepts across groups or time periods, whereas a random effect model explores differences in error variances. To establish an appropriate model a Hausman test was performed where the null hypothesis of test is that the preferred model is random effects vs. the alternative the fixed effects model. Table 4.8 illustrates the results of the Hausman test. A resultant p value of 0.000 was less than the conventional p value of 0.05 leading to the rejection of the null hypothesis that the unique errors (*ui*) are t correlated with the regressors and this therefore implies that fixed effects model is more appropriate.

Table 4.8: Random and Fixed Effects Test

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
oc_ratio	.2548478	.2907623	-.0359145	.134381
liquidratio	.3669538	.1230627	.2438911	.2320142
liquid_ass~o	-.4453535	-.1585561	-.2867974	.2615535
nii_assets~o	-.7960492	.3227989	-1.118848	.3977773
crr	-.2614285	-.803379	.5419505	.2029559
loans_asse~o	-.045085	-.0069866	-.0380984	.0073226
deposit_conc	.081496	.1655283	-.0840323	.0885047
gdpgrowth	-.0141063	-.2169222	.2028159	.
inflation	-.0417145	-.1093047	.0675902	.
tbill	.1642722	.1780185	-.0137463	.
npls	9.38e-07	-1.14e-06	2.08e-06	9.54e-07

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

Test: Ho: difference in coefficients not systematic

chi2(10) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 10.11
Prob>chi2 = 0.4309
(V_b-V_B is not positive definite)

4.8 Determinants of Interest Rates Spread Model.

The results presented in the Table 4.9 below shows the results on the determinants of interest rate spreads. The results indicate that the interest rate spread is affected by liquid asset ratio. More specifically, rate spread is found to be negatively (β = -0.3742) and significantly (p = 0.042) affected the liquid asset ratio. The study also found that interest rate spread is negatively and significantly affected by non interest income asset ratio (β = -6311, p =0.045) Treasury Bill Rate affects interest rate spread. More specifically, interest rate spread is found to be positively (β = 0.267) and significantly (p = 0.01) affected by the Treasury Bill Rate. The results further indicate that interest rate spread is negatively (β = -0.0341) and significantly (p = 0.004) affected by Loans Asset Ratio and nonperforming loans is negatively (β = -1.140) and significantly (p = 0.002) affected by interest rate spread.

Table 4.9: Determinants of Interest Rate Spread in Kenya

Variables	Coef.	Std.	t	P>t
oc_ratio	0.2216	0.2518	0.880	0.384
Liquidratio	0.3039	0.2762	1.100	0.277
liquid_assets_ratio	-0.3742	0.1880	-1.990	**0.042**
nii_assets_ratio	-0.6311	0.3187	-1.980	**0.045**
Crr	-0.2977	0.3461	-0.860	0.394
loans_assets_ratio	-0.0341	0.1148	-2.970	**0.004**
deposit_conc	0.0788	0.1159	0.680	0.502
Gdpgrowth	-0.0531	0.1658	-0.320	0.750
Inflation	-0.0517	0.0708	-0.730	0.468
Tbill	0.2670	0.0887	3.010	**0.001**
npls	-1.140	0.354	-3.220	**0.002**
_cons	0.1133	0.0409	2.770	0.008

4.9 Discussion

This section presents a discussion of the results in line with the study objectives. The results are presented and then corroborated with literature. The hypotheses were rejected on the basis of at least one variable being significant in determining the interest rate spread. The discussion formed the basis for summary and conclusions in chapter five.

4.9.1 Bank specific Factors

This study found that among bank specific factors non interest income, non performing loans and loan asset ratio were significant. While operating cost, deposit concentration and liquidity ratio were all found to be non significant. This study is inconsistent with that of, Dabla and Floerkemeier, (2007) who found out that bank-specific factors, such as bank size and liquidity were significant. In addition, among the variables which are used as proxy for market power that is deposit concentration and loan asset ratio, the study by Dabla and Floerkemeier, (2007) found both to be significant ,while this study finds only loans asset ratio to be significant while deposit concentration to be insignificant.

4.9.2 Industry Specific Factors

The study found out that among the industry specific factors only liquid asset ratio was significant. While cash reserve ratio was insignificant. This study is consistent with that of Angbazo (1997) who found out that the proxies for default risk (ratio of net loan charge—offs to total loans), the opportunity cost of non-interest bearing reserves, leverage (ratio of core capital to total assets), and management efficiency (ratio of earning assets to total assets) are all statistically significant and positively related to bank interest margins. But inconsistent with the ratio of liquid assets to total liabilities which it found to be insignificant.

4.9.2 Macro Economic Factors

This study found out that among the macroeconomic factors only Treasury bill was significant. While deposit concentration, GDP and inflation were insignificant. This study is consistent with that of Eita (2012) who found out that interest rate spread in Namibia is determined by Treasury bill rate ,but found inflation rate to be significant contrary to the current study.

CHAPTER FIVE: SUMMARY CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Findings

This section presents the summary of the findings in line with the objectives of the study.

5.2.1 Effects of Bank specific factors on interest rate spread

Objective of the study was to establish the effect of bank specific factors on interest rate spread. The results revealed that non interest income, nonperforming loans and loan asset ratio were significant. While operating cost, deposit concentration and liquidity ratio were all found to be non significant

These results imply that non interest income, nonperforming loans and loan asset ratio greatly affect interest rate spread margin. This is consistent with the study by Brock and Rojas (2000) who found out that nonperforming loan was positive and statistically significant to interest rate spreads.

5.2.2 Effects of industry specific factors on interest rate spread

Another objective of the study was to establish the effect of industry specific factors on interest rate spread. The results indicated that liquid asset ratio significant, While cash reserve ratio was found to be non significant.

These results imply that liquid asset ratio greatly contributes to the interest rate spread widening. This is consistent with the study by Angbazo, (1997) who found out that the proxies for default risk (ratio of net loan charge offs to total loans) negatively and significantly affects the interest rate spread.

5.2.3 Effects of Macroeconomic factors on interest rate spread

The third objective was to determine the effect of macroeconomic factors on interest rate spread. The finding revealed that only Treasury bill rate was found to be significantly affecting the interest rate spread. While GDP and inflation were found to be insignificant.

These results imply that treasury bill greatly contributes to the interest rate spread widening .This is consistent with the study by Eita, (2012) who found out that interest rate spread in Namibia is determined by Treasury bill rate.

5.3 Conclusions

5.3.1 Effects of Bank specific factors on interest rate spread

Based on the findings above the study concluded that non interest income, nonperforming loans and loan asset ratio are the bank specific factors that affect the interest rate spread. From these finding the study therefore asserts that there is a significant relationship between non interest income, nonperforming loans and loan asset ratio and interest rate spread.

5.3.2 Effects of industry specific factors on interest rate spread

Secondly, the study concluded that liquid asset ratio greatly affect the interest rate spread. These were guided by the findings that revealed that liquid asset ratio was significant in the analysis. From these finding the study therefore asserts that there is a significant relationship between liquid asset ratio and interest rate spread

5.3.3 Effects of Macroeconomic factors on interest rate spread

Lastly, the study concluded that Treasury bill affects interest rate spread. These were guided by the findings that revealed that only Treasury bill negatively and significantly affects the interest rate spread. From these finding the study therefore asserts that there exist a relationship between Treasury bill and interest rate spread.

5.4 Recommendations

Several policy implications emanate from the study. Firstly, the high responsiveness of banks spreads to the proxy for the Treasury bill suggests that existence of alternative and risk free investment options for banks drives the banks to lend to the government at lower rate while lending to the general public with high risk at a higher rate. This therefore calls for elimination of the current distortion and permit spreads to narrow. Secondly, banks must continue to seriously deal with the issues of the high levels of non- performing loans and the diseconomies of scale in their operations. Thirdly, if there is to be any success in reducing banks' interest rate spreads to support long- term economic growth, the competitive environment in the banking system must be enhanced. Lastly the governments need to reduce

public borrowings in order to allow the banks to lend to the general public so as to reduce crowding effect of private investments.

5.4 Limitations of the study

This study used eight Kenyan financial institutions as the sample size which may not have captured all the characteristics of the population. Equity bank did not have banking data for 2002 and 2003. Having become a bank in 2004. The number of variables in the model was also not exhaustive. The study only included liquid asset ratio, cash reserve ratio, GDP, Treasury bill, Inflation, non interest income, nonperforming loans, loan asset ratio, operating cost, deposit concentration and liquidity ratio which may not have been exhaustive.

5.5 Suggestions for further research

A similar study should be conducted with regard to the other banks which were not captured in this study for comparison purposes. A similar study need to be conducted using other independent variables like monopoly power, central bank discount rates, size of the economy, financial deepening and exchange rate volatility which were not captured in this model. This study can be extended by exploring the impact of financial sector development on interest rate spreads in the banking system. With the establishment of the credit reference bureaus, the Kenya Bank Reference Rate and insurance companies in recent times; it would be interesting to examine how those developments have influenced banks spreads in Kenya.

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APPENDICES

Appendix I: Map of Kenya