THE EFFECT OF COMPONENTS OF KENYA BANKERS' REFERENCE RATES ON THE INTEREST RATE SPREADS OF COMMERCIAL BANKS IN KENYA

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIRMENTS FOR THE AWARD OF MASTERS OF SCIENCE IN FINANCE DEGREE, SCHOOL OF BUSINESS, THE UNIVERSITY OF NAIROBI

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DECLARATION

STUDENT'S DECLARATION

I declare that this is research project is my original work and has never been submitted for a degree in any university of college for examination or any other academic purposes.

Signature:…….. Date:…….

Obura Polycarp Odhiambo **Reg: D63/63761/2013**

SUPERVISOR'S DECLARATION

This research project has been submitted for examination with my approval as the University Supervisor.

Signature ……. Date ….…….

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DEDICATION

To my late parents, Patrick Joseph Okumu and Margaret N. Obura, and grandmother, Valeria Awino Ojijo, who implanted in me the culture of hard work and commitment in my education.

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My utmost gratitude goes to the Almighty God for keeping me safe and healthy and enabling me realize this precious dream. May He continue showering His Blessings upon me and everyone who lent an idea or a hand to this work.

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ABSTRACT

Commercial banks play a vital role in the economy. By receiving and keeping money for their customers while lending some funds to those who need. The depositors should be able to get return for their savings while borrowers should be charged reasonably to enable them realize gains from the loans. Commercial banks should also get reasonable returns from the funds they lend to realize profitability and stay in business. Kenya Bankers Reference Rates (KBRR) was introduced and affected in 2014, as deviation from the initial base rates applied by commercial banks, to improve transparency and act as an indicator to the lending rates that banks should offer from time to time. This study therefore investigates the relationship between the parameters used to derive the KBRR rates and the interest rate spreads. The main aim of the study was to advise stakeholders on this relationship and its effects on the interest rate spreads which has become an issue of great concern in Kenya. The research used a descriptive research design. The target population was 43 commercial banks. Census approach was used since the target population is not big. The research used secondary data. The multiple linear regression analysis was used to determine the extent of influence of the independent variables on the dependent variable. The regression analysis established that, $IRS_i = b_0 + b_1TB_i + b_2CBKR_i + b_3IF_i + b_4OC_i + b_5GDPR_i + b_6RR_i + b_7DR_i$ = 22.404 + (-.055*91-day Treasury Bills+ (0.309*Central Bank Rate + (0.008*Inflation Rate + (-0.157*Operating Cost + (-0.055*GDP Rate + (-0.678*Reserve Requirement+ (-0.028*Deposit rate. The study further found a strong relationship between the dependent and the independent variables given an R value of.767 adjusted to .75 this shows that the independent variables (91-day Treasury Bills, Central Bank Rate, Inflation, Operating Cost, the GDP rate and the Reserve Requirement) account for 76.7% of variations in interest rate spreads.

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LIST OF ABREVIATIONS

β	Standard Beta
CBK	Central Bank of Kenya
CBLR	Central Bank Lending Rate
CBRR	Central Bank Reserve Requirement
CBR	Central Bank Rate
CR	Credit Risk
DR	Deposit Rate
ECCU	Eastern Caribbean Currency Union
GDP	Gross Domestic Production
GOK	Government of Kenya
HHI	Herfindahl-Hirschman Index
H_o	Null Hypothesis
IF	Inflation
IMF	International Monetary Fund
IRS	Interest Rate Spread
KBA	Kenya Bankers Association
KBRR	Kenya Bankers' Reference Rate
LTP	Liquidity Premium Theory
LR	Lending Rate
N	Number
OP	Operating Cost
R	Regression
SEACEN	South East Asian Central Banks
SSA	Sub-Saharan Africa
SPSS	Statistical Package for Social Sciences
UK	United Kingdom
VIF	Variance Inflation Factor

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Commercial banks play a vital role in the economic resource allocation in countries Ongore (2013). According to Otuori (2013), banks contribute to the economic growth of a country by availing funds for investors as well as financial deepening in the country. Lending interest rates arise because borrowers who do not have money and need it must pay back interest on top of the borrowed principal amount to the lender.

In Kenya, banks play a central role in provision of credit and mobilization of savings thereby helping in determination of both Monetary and fiscal policy of the country. An analysis of interest rate spreads is therefore important in understanding the financial sector which has been subject to public debate for high interest rates as well as low deposit rates. There has however been little research in this field in Kenya hence the need to carry out more research in future to bring out proper findings (Were & Wambua, 2013).

Commercial banks in the Sub-Saharan Africa (SSA) appear very profitable. This is due to high demand for banking services against the few banks resulting to high interest rates charged by banks. Reducing interest rate spreads is one of the main benefits expected from a mature financial sector and by extension, the economy. Thus, a wide deposit-lending interest rate spread could be indicative of banking sector inefficiency or a reflection of the level of financial development (Folawewol & Tennant, 2008). Embedded in the spread is the information on the efficiency of financial intermediation, profitability, monetary policy impact among others.

Studies on determinants of interest rate spreads generally fall into three categories, (1) bank specific factors such as operating costs, non-performing loans, return on assets, bank size, liquidity ratio, structure of the balance sheet among others; (2) industry specific factors such as the degree of competition and regulatory requirements such as minimum core capital

requirements; (3) macroeconomic indicators which include the growth rate of the real Gross Domestic Product (GDP) and the inflation rate.

In a past study, Demirguc-Kunt and Huizinga (1999) examined interest rate spread in a cross-country set up using data covering commercial banks from 80 countries across the world. The study found out that differences in interest margins and bank profitability are explained by several factors. For example, bank characteristics, macroeconomic factors such as bank characteristics, macroeconomic variables, explicit and implicit bank taxation and deposit regulation among others.

A more recent study on determinants of bank interest margins in SSA by Ahokpossi (2013) using a sample of 456 banks from SSA countries showed that bank-specific factors such as credit risk, liquidity risk and bank equity are important factors. These factors are however sensitive to economic growth.

Among the most cited studies on factors explaining interest rate spread in Kenya are Ndung'u (2000) and Ngugi (2001). The factors considered by the former are deposits, loans, Treasury bill rate and the interbank rate. They find that the spread are positively related to deposits but negatively related to loans. In addition to the above factors, Ngugi (2000) incorporates excess 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.

1.1.1 Kenya Bankers' Reference Rates

The Central Bank of Kenya (CBK) introduced Kenya Bank's Reference Rate (KBRR) to replace banks setting their own rates (CBK, 2014). This move was aimed at increasing transparency in credit lending and enhancing the transmission between the CBK rate and bank's lending rates. It is calculated as the weighted average of the CBK rate and the weighted 2 month moving average of the 91-day Treasury Bill rates and is adjusted every six months barring any extreme conditions in the markets. The current rate is 9.13%, effective from 8th July 2014 to January 2015. Banks will add their own premium to this rate to derive a rate which they charge their customers.

According to CBK press 2014, this was also aimed at keeping the current fiscal policy in line with the monetary policy. KBRR therefore, factors in CBK's monetary policy direction, based on the CBK rate, and the risk free rate of the market, which is the 91-day Treasury Bill rate (KBA, 2014).

The KBRR was announced by CBK through Monetary Policy Committee Press Release and operationalised via CBK Banking Circular. It is expected that the announcement will be made by CBK every 6 months (or more frequently depending on market conditions).
This study seeks to investigate whether the parameters used in deriving KBRR rates achieve the ultimate goal of reducing interest rate spread (IRS), besides enhancing credit transparency as intended (KBA,2014).

1.1.2 Interest Rate Spread

Interest rate is the centerpiece of commercial bank's core earnings. Interest rate is a key element in monetary policy since it helps match demand and supply thus determine profitability. Besides, interest rates reflect the bank's perception of risk (country and borrower), market liquidity status, the cost of doing business and the level of competition in the financial sector (Folawewo et al.., 2008). Hanson and Rocha (1986) emphasized the role of direct taxes, reserve requirements, cost of transactions and forced investment in defining interest spread rate. Although financial sector reforms in Pacific Islands Countries are in full swing with complete deregulation of interest rates, their impact has not been felt (Chand, 2002; Jayaraman, 2001). Remedies suggested by the media with a view of controlling IRS include bringing fees and charges under direct monitoring by the government, a move that curtails competition.

1.1.3 The Effect of Kenya Bankers' Reference Rates Components on Interest Rate Spread

Mugume (2000) noted that banking systems in Africa are characterized not only by low levels of intermediation but also high interest rates, wide intermediation spreads and substantial bank profitability. KBRR is a factor used by the regulators to benchmark interest borrowing rates in Kenya. Interest rate spreads are in most cases dependent on the parameters used to derive them.

Many economists blame the weak and inefficient financial institutions in developing countries as the prime cause of financial crisis. One element of the weaknesses is presumed to be the case of advancing loans without considering the main factors affecting the rates. A wide deposit-lending interest rate spread could be indicative of banking sector inefficiency or a reflection of the level of financial development (Folawewol & Tennant, 2008).

1.1.4 Commercial Banks in Kenya

Commercial banks are financial intermediary institutions that take deposits and gives credit alongside other financial services. The banking sector in Kenya comprises both local and international banks. It is regulated by the Central Bank of Kenya. Commercial Banks are licensed and regulated under the Banking Act Cap. 488. According to the Bank Supervision Report 2012, the banking sector consisted of the Central Bank of Kenya, as the regulatory authority, 44 banking institutions (43 commercial banks and one mortgage company –MFC).

Commercial banks in Kenya have adopted KBRR lending rates as a way of determining the rates offered to customers. Bank managers are struggling to balance their asset books (loans advanced to customers) and liabilities (savings from customers). Commercial banks are supposed to maintain a balance between their assets and liabilities. A bank with too much assets runs the risk of having liquidity problems while a bank with very high liabilities reduces profitability besides not guaranteeing liquidity in the long run. In Kenya, the Banking Act has been reviewed over time to give more time legal powers to the regulatory authority and to broaden its responsibilities. The CBK enhanced the Capital requirements in 1998 to guard against banking crisis. The Financial Act 2008 raised the minimum Core Capital from KES. 250M to KES. 1.0B to strengthen the institutional structures in the banking sector (Kandie, 2014).

Section 39 (1) of the CBK (Amendment) Act No. 4 of 2001 states that the maximum rate of interest which commercial banks may charge on loans or advances shall be the 91-day Treasury Bill rate, plus four per centum. Section 39 (2) states that the minimum rate of interest which commercial banks may pay on deposits held in interest earning accounts shall be seventy per-centum of the 91-day Treasury Bill rate published by CBK on the last Friday of each month, or

of the latest published 91-day Treasury Bill rate, plus four per-centum (CBK Amendment Act No. 4 of 2001).

This was proven in Kenya when the Kenya Shilling depreciated to a low of 107 against the US dollar which was reciprocated by commercial banks increasing their lending rates. In 2000, Kenya's average interest rates rose to 24% thereby becoming a national concern. The Central Bank of Kenya (Amendment) Act 2000 was passed by Parliament in December 2000 with the aim of regulating and reducing interest rates. The act required nominal interest rates to be pegged on the 91-day Treasury Bill rates by maintaining a constant margin between the lending rates and the deposit rates.

Bank performance is important for all stakeholders such us the owners, the investors, the debtors, the creditors, the depositors, the managers of banks, the regulators and the government (Podder, 2012).

1.2 Research Problem

Loans are a major source of income for commercial banks across the globe. According to the Economic Recovery Strategy published by the Government of Kenya
[GOK], (2003), the banking sector was experiencing difficulties such as a high ratio of non-performing loans, inadequate competition in the sector, persistence of wide interest rate spreads leading to a high cost of credit; insufficient qualities of credit among others. There was therefore need for reforms in the banking sector, with focus on loan advancements, to spur growth in the industry. This is achieved by lowering the cost of borrowing by investors while ensuring the interest rate spreads are reasonable enough to ensure profitability in the banking sector. Spread is a reward for liquidity risk generated by transforming money into loans and for selection and monitoring the right kind of borrowers (Boldbaatar, 2006). Spreads should therefore provide banks with reasonable operating margins.

Commercial banks in Kenya have, in the past, operated in an unregulated environment as pertains to interest rates. This has impacted the customers adversely hence the need for regulation. Kenyan commercial banks used to price their loans using a Base rate (CBK Report,

2013). The formulae used to calculate the base rate varied from bank to bank. This led to variation loan rates in the industry. This study seeks to examine how these factors as incorporated in the KBRR rates, affects the interest rate spreads. The KBRR rates is majorly expected to factor in all macroeconomic and industry specific factors while the bank specific factors play a central role in determining the interest premium (k). The value of K above the KBRR will depend on various factors such as the Lender's perceived customer risk profile, speed and cost of collateral perfection at the Lands Registry, and other costs arising from the due diligence process (CBK Monetary Transmission, 2015).

CBK regulations, credit risk and micro-economic environment plays a major role in influencing the extent of interest rates spread thereby contributing to the performance of commercial banks (Langat, 2013).In an environment where the exchange rate is volatile and the interest rates are sticky, downward expectations of exchange rate depreciation would result in higher lending rates (Ndung'u, 2011).

Several studies conducted in Kenya; Ndung'u & Ngugi (2000), Tarus, Yonas, Chekol & Mutwol, (2012), Wambua (2013) focused on other micro-economic factors that determine interest rate spreads in Kenya. The studies, however, did not incorporate all the components of KBRR. The study done by Kiptui (2014) on the determinants of interest rate spreads in Kenya used 39 banks and did not incorporate all the components of KBRR. There is therefore need to carry out more research in this area to bridge the knowledge gap. This study therefore factors all the components of KBRR across all the 43 commercial banks in Kenya. Furthermore, no study has been conducted in Kenya on interest rate spreads since the adoption of KBRR hence the need for this study. This study will therefore address the issues that have not been properly tackled by these previous studies and deepen scholarly understanding of KBRR.

The move by CBK and KBA to control these rates is laudable since it cushions customers from commercial banks who make exorbitant profits from loans. It is however, necessary to establish a regulatory measure based on the correct parameters in order to achieve the desired results favorable all the stakeholders in the industry. The study therefore attempts to analyze the regulatory parameters used in setting these rates and their overall effect on the interest rate

spreads that has been of great concern to industry stakeholders. The following research questions will therefore guide this study: what are the main parameters used to derive the KBRR rates in Kenya? How do these parameters affect interest rate spreads among commercial banks in Kenya?

1.3 Research Objectives

1.3.1 Main Objective

To establish the effect of the components used in deriving KBRR on interest rate spreads in Kenya.

1.3.2 Specific Objectives

The study will be guided by the following specific objectives:

i. To establish the effect of the components used in deriving KBRR on interest rate spreads.
ii. To establish determine how the KBRR rates affect interest rate spreads in Kenya.

1.4 Hypotheses

H_o1: There is no statistically significant relationship between treasury bill and interest rate spread

H_o2: There is no statistically significant relationship between CBK rate and interest rate spread

1.5 Value of the Study

The study is relevant to government and other policy makers in formulating appropriate parameters that will encourage lending and borrowing of funds in the industry. The findings of this study will act as a point of reference for future/other researchers and academicians in this topic and related ones. It can also be used as a basis for further studies. The study seeks to properly inform customer on the new KBRR rates, addressing the gains and potential adversities of these rates. The study will inform bank managers on the borrowing trends of customers resulting from the KBRR rates. Investors will derive information on whether or not to invest in the banking industry which derives most of its returns from loans. The findings of the study will help to guide regulators on how best to derive the KBRR rates in line with the Fiscal and Monetary policy.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter reviews various theories that are related to interest rate determination in the banking sector. The chapter also reviews empirical studies that are related to the intended study topic. The chapter is organized under three major sub sections: the theoretical review; empirical studies and finally, a brief summary of the reviewed literature highlighting the knowledge gap. Empirical studies review section has been thematized along the proposed research questions.

2.2 Theoretical Review

This study is guided by five theories namely: Loanable funds theory, Liquidity premium theory, Regulation Theory of Loan Determination, Adjustment through Lending conditions other than interest rate conditions, The Classical theory and The Econometric Approach to the Loan Market. According to a typical bank behavior model based on profit maximization; changes in the official discount rate do not affect the bank's loan supply and while changes in deposit rates may cause the bank's source of funds to shift between the deposit market and the money market, they do not directly affect the bank's loan supply schedule (Takeda, 1985). Loan rates are therefore determined at a level which equates the supply of and the demand for loans.

2.2.1 Regulation Theory of Loan Rate Determination

This theory has been applied in Japan 1960s was developed by Japanese economists Komiya 1964 and Suzuki 1966. This is the idea that loan rates are determined by regulatory institutions. The proponents of this theory argue that loan rates are basically fixed artificially at a level lower than the point where the supply and demand curves intersect (credit rationing occurs in the loan market as a result) (Takeda, 1985).

The problem with this line of thought is that their explanation contradicts economic agents' optimizing behavior. It is possible that the existence of the above regulations exerts direct influence on determination of face loan rates. However, it must be possible for effective rates to fluctuate, avoiding influences of such institutional factors and adjust themselves to their

equilibrium values (Takeda, 1985). The theory of regulation is based on the concept of demand and supply of loans which pays little or no attention to other factors.

2.2.2 Loanable Funds Theory of Interest Rates

This is a theory of the determination of real interest rates-the rate of return expressed in terms of real purchasing power. The theory derives from the notion that savers make a decision between consumption now and consumption in the future. The more people consume now out of present income (and the less they save and hence the smaller are the funds available for investment) the lower will be future income. Thus, a trade off always exists between present consumption and future consumption (Viney's , 2009).

According to this theory, the interest rate is calculated on the basis of loanable funds present in the capital market. The concept was formulated by Knut Wicksell, a Swedish economist and British economist D. H. Robertson among others. The theory advocates that both savings and investments are responsible for the determination of interest rates in the long run. On the other hand, short-term interest rates are calculated on the basis of the financial conditions of a particular economy (Economic Watch, 2010). The determination of the interest rates depends on the availability of loan amounts. The availability of such loan amounts is based on certain factors like the net increase in currency deposits, the amount of savings made, willingness to enhance cash balances and opportunities for the formation of fresh capitals.

In an attempt to develop the macro-economic theory, John Maynard Keynes studied the demand supply interaction of loanable funds. According to the theory, the nominal rate of interest is determined by the interaction between demand and supply. An increase in the demand for loanable funds would lead to an increase in the interest rate and vice versa. Conversely an increase in the supply of loanable funds would result in the fall in the rate of interest. If both the demand and supply of loanable funds change, the resultant interest rate would depend on the magnitude and direction of movement of demand and supply of the loanable funds (Viney, 2009).

The theory makes the following assumptions; That the market for loanable funds is one fully integrated (not segmented) market, characterized by perfect mobility of funds throughout the market, and; That there is perfect competition in the market, so that each borrower and lender is a 'price-taker' and one and only one pure interest prevails in the market at any time. The forces of competition are also supposed to clear the market pretty fast, so that the single rate of interest is the market-clearing (the equilibrium) rate of interest (Viney, 2009).

The loanable funds theory is however criticized because; The traditional statement of the theory mis-specifies various sources of supply and demand of loanable funds (Economic Watch ,2010). Not all savings are routed through the loan market, some are invested directly into physical assets by firms as well as households. All investment is not financed by borrowed funds, part of it is financed by owned funds. Furthermore, funds are borrowed for many purposes other than investment. It also assumes that all borrowing and lending is done through a perfectly homogenous bonds in one fully-integrated market (Economic Watch, 2010). This is not true even in the most well developed financial markets, where a variety of loan contracts and instruments are used in several imperfectly-competitive and segmented markets. The Kenyan loan market, being a developing country, is therefore segmented and imperfectly competitive and may therefore not fully advance loans in line with this theory.

2.2.3 The Classical Theory

The classical theory was the first modern school of economics thought. It began in 1776. Notable classical economist include; Adam Smith, Jean-Baptiste Say, David Ricardo, Thomas Malthus and John Stuart Mill (Boundless, 2014). The fundamental principle of the classical theory is that the economy is self regulating. According to classical economists, the economy is always capable of achieving the natural level of real GDP or output, which is the level of real GDP that is obtained when the economy's resources are fully employed. Adam Smith referred to the self regulating ability as the 'invisible hand' because markets move towards their natural equilibrium without outside intervention. The classical doctrine: that the economy is always at or near the natural level of real GDP; is based on two firmly held beliefs Say's Law and the belief that price, wages, and the interest rates are flexible (Boundless, 2014).

The classical theory assumes that supply creates its own demand, production will generate an income enough to purchase all the products and there will be a net saving or spending of cash or financial instruments. The theory also assumes that flexible interest rates will always maintain equilibrium and that the real GDP can be calculated without knowing the money supply or inflation rate (Boundless, 2014).

The classical theory, however, has its shortcomings. By assuming full employment, it has reflected changes in income level. It therefore has an error of viewing the rate of interest as the factor which brings about equality of savings and investments. According to Keynes, a major critic of the classical theory, equality between savings and investment is brought about not by changes in the rate of interest but by changes in the level of income (Boundless, 2014). The classic theory, besides ignoring other factors used in interest rates determination, does not apply in the Kenyan market where full employment has never been attained.

2.2.4 Liquidity Premium Theory

This concept of Liquid Premium Theory (LPT) was first expressed by the United Kingdom (UK) economist John Maynard Keynes (1883-1946). The LPT is also referred to as the liquidity preference hypothesis. The theory assumes that investors prefer short term to long term instruments. This is because short term instruments have greater liquidity, less risk of default and less maturity period. Long term instruments therefore require higher interest rate to compensate for less liquidity and higher default risk. The theory suggests that the premium demanded for parting with cash increases as the period (term) for getting the cash back increases. Keynes defines the rate of interest as the reward for parting with liquidity for q specified period of time. According to him, the rate of interest is determined by demand for and supply of money (Takeda, 1985).

According to the liquidity premium theory, there are three motives behind the desire of the public to hold liquid cash; transaction motive, precautionary motive and the speculative motive. Supply of funds on the other hand is a function of the rate of interest to a certain degree, yet it is considered to be fixed by monetary authorities. Interest rates are therefore determined at a level where the demand of money equals the supply of money (Tilly, 2010).

However, there are several other factors which influence the rate of interest by affecting demand for and supply of investible funds other than the liquidity preference. Besides, the liquidity preference theory does not explain the existence of different rates of interest prevailing in the market at the same time (Takeda, 1985).

The degree to which banks are exposed to liquidity risk varies from bank to another. A bank with a higher liquidity faces lower liquidity risk hence likely to be associated with lower spreads due to lower liquidity premium charged on loans (Were & Wambua, 2013). According to Ahokpossi (2013), banks with high risk tend to borrow emergency funds at high costs and thus charge liquidity premium leading to higher spreads.

Kenyan banks have adopted internal capital adequacy assessment processes in line with CBK regulations introduced in 2013. Despite higher capitalization, Kenyan banks have shown higher profitability than their peers in other SSA countries. (International Monetary Fund [IMF], 2014).

2.2.5 Econometric Approach to the Loan Market

The concept was originated by Fair and Jaffee in 1972. Under the Econometric approach to loans, in measuring the disequilibrium in the loan market, sample data are divided into those for the period with excess demand for loans and those for a period of excess supply of loans in accordance with the direction of the changes in loan interest rates in that period. The former is used to estimate the demand curve while the latter, a supply curve. The resultant curves are then compared to the convectional estimation results based on market equilibrium. The relative validity of the equilibrium or disequilibrium is then determined by comparing the goodness of fit of the estimated results (Masahiko,1985).

This theory is not very applicable in the Kenyan market where there are no clear patterns of excess supply and demand for loans among banks. The Kenyan loan market doesn't therefore derive its rates from this concept though specific banks can follow this pattern some times to respond to regulatory requirements.

2.3 Determinants of Interest Rate Spread

Interest rate spreads (IRS) can be defined in two ways: Interest rate spreads defined as the difference between the lending rates and the deposit rates, *ex ante* spreads and *ex post* spreads, defined as the difference between realized interest income and interest cost. This study is going to look at *ex ante* spread since we are investigating factors that influence interest rate spreads in commercial banks in Kenya.

2.3.1 Deposit Rate

Commercial banks rely on funds borrowed from other commercial banks or from central bank. Another source of funds for commercial banks is deposits held by customers. The rate of lending these funds therefore depends greatly on the rate of acquiring them.

Interest rate spreads have been described by Ngugi (2000) to be positively related to with deposits. An increase in deposit rates (DRs) will therefore increase the amount of deposited funds which will further reduce the interest rate spreads. Crowley (2007) notes that deposit rates have a robust negative effect on interest rate spreads, but a robust positive effect on net interest income. The positive effect on net interest income is caused by diversification of the financial system. Competition for deposits would lower spreads while a more risk-oriented composition of lending could raise the net interest income.

2.3.2 Central Bank Lending Rate

According to CBK, in November 2014, the average interbank lending rate was at 6.39 and 7.6 per cent (CBK, 2014). Commercial banks ordinarily on-lend at a rate greater than the rate at which they borrow. The inter-bank rate is therefore the first real cost that hits consumers. The average deposit rate in Kenya, in 2014, according to CBK was 6.42per cent.

2.3.3 The Central Bank Reserve Requirement

Commercial banks are required to maintain a certain percentage of total deposits and similar liabilities as determined by Monetary Policy Committee from time to time. Reserve requirements are used as a monetary policy instrument to ensure safety and soundness of the banking sector. The reserves are however non-interest bearing but impose tax implications and reduce commercial bank revenues.

According to Gelos (2006), higher reserve required reserve ratios could be expected to result in higher spreads, particularly if the required reserves are unremunerated, as banks would have to cover the increased costs of holding reserves. This resonates with Grenade (2007) who postulates that commercial banks therefore pass the loss of revenue to depositors, who will receive lower interest rates on deposits, or they can pass it to borrowers who will receive higher interest rates on loans, thereby increasing the spread. Chirwa and Mlachila (2004) found out that spreads in Malawi increased after financial liberation because of increases in reserve requirements and provisioning.

2.3.4 Credit Risk

According to (CBK, 2005), credit risk is the risk to earnings and capital arising from an obligor's failure to meet the terms of any contract with the bank or if an obligor otherwise fails to perform as agreed. Credit risk is generally found to have a positive relationship with interest rate margins. Demirguc-Kunt and Huizinga (1999), using loans to total asset ratio to measure credit risk, found a positive relationship between credit risk and interest loan margins in 80 developed and developing countries. Abreu and Mendes (2003) found a positive relationship between loans to total asset ratio and interest margins on commercial banks in Portugal, Spain, France and Germany. Tarus et al (2012) in their study on the determinants of interest margins in Kenya also established that there is a positive relationship between credit risk and interest rate margins.

2.3.5 Economic Activities GDP

Increased economic activities are generally expected to push demand for loans thereby increasing borrowing interest rates and hence the margins based on the law of supply and demand. Studies, however, have produced different findings. For instance, Claessens, Demirguc-Kunt and Huizinga, (2001), found a positive relationship between economic activities and interest rate margins while Maria and Agoraki (2010) did not find any effect of economic activities and interest rate margins in their study across Europe. Demirguc-Kunt and Huizinga (1999) found a negative relationship between economic activities and interest rate spreads.

Tarus et al (2012), argues that increase in economic growth could result in business activities and improved business activities among the borrowers. Improved economic activities lowers default risk rates, and so the risk premium is reduced, a situation which prompts banks to reduce interest rates. According to Maria and Agoraki (2010), low economic growth weakens the debt servicing capacity of domestic borrowers and contributes to an increase of credit risk which consequently increase the interest rate margins.

2.3.6 Inflation

Perry (1992) argues that the effects of inflation on bank interest depend on whether inflation is anticipated or unanticipated. If anticipated, then the banks may be slow in adjusting their interest rates and so may affect the interest margin negatively because of increased cost occasioned by inflation. Demirguc-Kunt and Huizinga (1999) found a positive relationship between inflation and net interest margin in a study of 80 developed and developing countries. Claessens et al.., (2001) also had the same findings in 80 countries.

However, Maria and Agoraki (2010) found out that there is a negative relationship between inflation and interest rate margins in South Eastern European countries. Sammy (2003) also found a negative relationship between inflation and interest rate margins of Tunisian banks. Despite lack of consensus on inflation, high inflation, anticipated or not, always results to higher interest rates thereby increasing the interest rate margins.

2.3.7 Lending Rates

Interest rates behavior in commercial banks is heterogeneous and is witnessed in the short run only. It is influenced by a wide range of micro and macro economic variables. These may be permanent and transitory changes in income, interest rate volatility, interest and risk, banks liability structure and banks' efficiency. For example, Gambacorta (2004) notes that interest rates on short term lending if liquid and well-capitalized banks in Italy react less to a monetary policy shocks while banks with a high proportion of long term lending tend to change their prices less.

2.3.8 Operating Costs

According to Williamson (1981), a transaction is regarded as a basic unit of analysis. He further stated that it occurs when a good or service is transferred across a technologically separable interface with one stage of activity terminating and another one beginning. Transaction cost refers to the cost of carrying out a transaction by means of an exchange in the open market and are associated to the division of work (Rotke and Gentgen, 2008). In another empirical study, (Pessali, 2006) advanced that transaction costs are not directly measured by banks. However, proxies such as uncertainty, transaction frequency, asset specifity, opportunism and other factors that are believed to critically affect transaction costs are used instead.

In the credit markets, transaction costs are therefore the direct financial costs generated by various processes, including the cost of searching and collecting various information. They are indirect costs caused by friction in the flow of credit funds, preventing credit markets from reaching efficient market equilibrium. Subsequently, transaction costs of lending consist of administering credit, coordinating costs and the cost of risk of default. It is further deduced by Saito and Villanueva (1981) that administrative costs are those that are directly attributable to processing, delivering and administering of loans while coordination costs are those resources a financial institution dedicates to ensure that clients adhere to the terms and conditions stipulated in loan contracts.

According to Polski and Kearney (2001), banking activities generate two types of transaction costs which are subject to different political and economic influences. Furthermore, they noted that one type of transaction costs, interest expense, reflects the costs of information and banking activities and the second one, noninterest expense, reflects the cost of information and coordination. Shankar (2007) went further to break down transaction costs into direct and indirect. Direct transaction costs consisting of training costs, cost of direct administrative activities and cost of monitoring. Shankar noted that indirect transaction costs include allocated fixed costs of the branch office, head office, depreciation and taxation costs.

Higher costs would logically require banks to charge higher spreads in order to remain profitable (Randal, 1998; Gelos, 2006).

2.3.8.1 Operating Costs and Lending Interest Rates

Despite the proliferation of banking services, the basic commercial lending process remains the lifeblood of commercial banks and other banking institutions (Altman, 1980). Banks are different from other financial institutions in that they produce financial services, the reward of which, according to Sharkar (2002), is an interest rate. Shankar (2007) however points out that that transaction costs of lending are not proportional to the amount lent.

In a study on the understanding and dealing with high interest rates on micro credit, Fernando (2006) acknowledged that interest charged on loans is the main source of income for institutions and because they incur huge costs, the rates are correspondingly high. According to Atieno (2001) high interest rates negatively impact the borrowers by reducing their incentive to take actions conducive to loan repayment and this leads to possibilities of credit rationing. It can therefore be established that transaction costs add to the high interest rates thereby increasing the spreads.

2.3.8.2 Operating Costs and Deposit Rates

High operating costs are likely to include costs due to inefficiency leading to higher spreads and hence this variable is commonly used as an indicator of operational inefficiency. A higher cost of financial intermediation will drive up interest rates on loans while pushing down the deposit rates.

2.3.9 Macroeconomic Variables

According to Were and Wambua, (2013), increased economic activity can heighten demand for loans leading to higher lending rates. On the other hand, increased economic activity can make projects more profitable, reduce defaults, and increase deposits all of which reduce spreads. Additionally, the policy rate which is the Central Bank Rate (CBR) is included as a monetary indicator to capture the effect of monetary policy.

Uncertainty may also cause higher spreads since banks would require a risk premium to compensate for the added volatility. Higher inflation or higher interest rates would be sources of uncertainty, (Demirguc-Kunt & Huizinga, 1999). Variations in inflation and interest rates are directly associated with uncertainty. Ho and Sanders (1981) found out that interest rate volatility

leads to higher spreads. This implies that variability in exchange rates is also a source of uncertainty.

2.4 Empirical Review

A number of studies have been conducted both internationally and locally on the determinants of interest rate spreads. Hanson and Rocha (1986) carried out one of the earliest investigations of factors that determine large spreads resulting from the concern that large spreads was an impediment to financial intermediation. High spreads were seen to discourage potential savers with low returns on their savings while discouraging potential investors with reduced feasible opportunities. Using aggregate data from 29 countries over the period 1973 to1983, they attributed high spreads to high operating costs, financial repression, lack of competition and high inflation rates as main factors.

Claeys and Vennet (2003) carried out a systematic comparative analysis of the determinants of interest rate spreads of banks in Central and Eastern Europe and Western European countries. According to their results, concentration levels, operative efficiency, capital adequacy and risk management are major determinants of interest rate spreads. They conclude that institutional reforms cause higher spreads initially but later result to smaller spreads in the long run. This study does not however delve much on institutional and behavioral reforms in banks and will therefore not borrow much from their findings.

Cihak (2004) analyzed the determinants of lending rates and interest rate spreads in Croatia between 1999 and 2003. Cihak established that interest rate spreads are a function of the deposit rate, total assets, market share, and a share of the non-performing loans, liquidity, capital adequacy, dummy variables for bank ownership and the treasury bill rate and the EURIBOR rate. The results showed that there is an inverse relationship between lending rates and interest rate spreads, on one hand, and bank size (total assets), liquidity and foreign ownership, on the other hand. The study also finds that market share, non-performing loans, deposit rates and money market rates have a positive effect on lending rates and interest rate spreads.

Boldbaatar (2006) studied the measurement and implication of commercial bank's interest rates in South East Asian Central (SEACEN) banks. The study applied Ho and Saunders model on panel data from 40 banks across 6 SEACEN countries from 1998 to 2004. The findings indicated that there is positive relation between GDP, Inflation, credit risk, operating costs, reserve requirements and interest rate spreads. Bank size, which was majorly associated with operation efficiency, was however found to have a negative relationship with interest rate spreads. The study was however carried across several countries, most of which, were experiencing financial problems during the period of study and is therefore differs broadly with this study.

Grenade (2007) estimated the determinants of commercial banks interest rate spreads in the Eastern Caribbean Currency Union (ECCU) using annual panel data of commercial banks within the period of 1993 to 2003. The empirical model includes regulatory variables (statutory minimum savings deposit rate) as well as market power, operating costs as a ratio of earnings assets, ratio of provision for loan losses to total earning assets as a measure of credit risk, liquidity risk proxied by the ratio of liquid assets to total assets and the GDP as an indicator of economic activities. Market power is proxied by the Herfindahl-Hirschman index (HHI) computed using the market shares of loans and advances in the banking industry. The spread is found to increase with an increase in market power, the regulated savings deposit rate, real GDP growth, reserve requirements, provision for loan losses and operating costs.

Vascov, Georgievska, Kabashi, Nora, and Mitreska (2011) used panel estimation of a sample of 17 Macedonian banks over the period 2001 to June 2009 to establish the determinants of lending interest rates and interest rate spreads in Macedonia. According to their findings, an increase in bank size and a further decrease in market share of certain banks would cause a fall in lending rates. A decrease in deposit rates would lead to a decrease in loan prices while arise in the central bank bill rate and the EURIBOR rate would raise lending rates thereby increasing spreads.

Entrop, Memmel, Ruprecht, Wilkens (2012) carried out a study on the determinants of interest rate margins with focus on maturity transformation in Germany. The study used Ho-Saunders model on the entire commercial sector of Germany. According to their findings, reserves, credit risk and operating costs all had a positive relation with interest rate spreads. The study is based in

a developed country with a vast and well developed banking sector and may not therefore relate much to this study.

Siddiqui (2012) estimated the rate of interest rate spread in Pakistan. The study used an annual panel data of 22 banks in Pakistan to interest rate percentage of total deposits of the banking sector, liquidity risk variable, administrative costs as a percentage of total assets, nonperforming loans as a percentage of net advances, net interest income as a percentage of total income and return on assets after payment of tax as a percentage of average assets. The spread was found to increase with an increase in administrative costs and an increase in non-performing loans.

Ansari (2013) carried a study on theoretical and empirical analysis of interest rate pass-through in India with regulatory requirements. The study gathered dynamic panel data methodology and annual accounts data from 33 Indian banks over a period 1996 to 2011. The study findings show a positive relationship between operating costs, profitability, capital adequacy, cost of deposits, GDP growth, inflation and interest rate spreads in India.

There are also studies on spreads in African countries. Crowley (2007) carried out a study on interest rate spreads in 18-English speaking counties in Africa. The study used secondary data from World Bank and central banks between 1975- 2004. According to his findings, inflation, bank concentration and deposit rates negatively affect interest rate spreads. Reserve requirements, operation costs and non-performing loans are found to have positive relation with interest rate spreads.

Folawewol and Tennant (2008) used dynamic data model to study the determinants of interest rate spread in 33 Sub-Saharan African (SSA) countries focusing on macroeconomic variables. According to their findings, interest rate spreads are determined by the extent of the crowding out effect of government borrowing, public sector deficits, discount rate, inflation, level of money supply, reserve requirements and population size.

A more recent study on determinants of interest rate spreads in SSA is by Ahokpossi (2013) using a sample of 456 banks in 41 SSA countries . The results show that the bank-specific factors

such as credit risk, liquidity risk and bank equity are major determinants of interest rate spreads. He however, concludes that interest rate spreads are not sensitive to economic growth.

Chirwa, Mlachila, (2004) used panel data to investigate the causes of interest rate spreads in Malawi over the period of the 1990s. Their findings point out that high spreads are attributed to monopoly power, high reserve requirements, high central bank discount rate and high inflation.

Aboagye, Akoena, Antwi-Asare and Gockel, (2008) studied the response of net interest margin of Ghanian commercial banks to changes in factors that are bank-specific, banking industry specific and macroeconomic factors. According to the findings, bank concentration, bank size, staff costs, administrative costs and inflation are directly related to interest rate spreads. Increase in excess reserves of banks, central bank lending rate and management efficiency on the other hand, decrease the interest rate spreads.

Nampewo (2013) investigated the determinants of the interest rate spreads among commercial banks in Uganda using time series data from 1995-2010. The study applied the Eagle and Granger two –step procedure to test for co-integration between the bank rate, treasury bill rate, exchange rate volatilities, the ratio of money supply to gross domestic product (GDP) and the proportion of non-performing loans to the total private sector credit. The findings showed that the interest rate spreads in Uganda is positively affected by the bank rate, the Treasury bill rate and non performing loans. The money supply to GBP ratio and real GDP were however found to have a negative influence on interest rate spreads. The study, however, omitted micro-economic factors and bank-specific factors.

Few studies have been conducted on interest spreads in Kenya. Ndungu and Ngugi (2000) used monthly time series data from April 1993 to June 1999 to derive and explain the factors that affect interest rate spreads in Kenya. According to their findings, deposits, loans, Treasury bill rates and the interbank rate are positively related with deposits but negatively related to loans. Ngugi (2001) contends that the monthly time series data to December 1999 and incorporating excess liquidity and non-performing loans ratio as explanatory variables. This implies that a rise in non-performing loans ratio causes an increase in spreads but excess liquidity is negatively

related to interest rate spreads. The studies however, did not incorporate macro-economic factors such as inflation and GDP.

Beck et al (2010) examines developments in Kenya's financial sector with specific focus on stability, efficiency and outreach. The study used, interest rate spreads as a proxy for efficiency of financial intermediation. Their analysis was based on ex post constructed spreads. They decompose the spreads into different components based on a set of factors such as overhead costs, loan loss provisions and taxes. Although their study may be related to the proposed study, this current study will focus more on the treasury bills and central bank rate which are the main components of KBRR rates.

Tarus et al (2012), studies of determinants of interest rate margins among commercial banks in Kenya. They use panel data from 44 commercial banks for the period 2000-2009. The study uses pooled and fixed effects model. They find a positive relationship between operating costs, credit risk and interest rate margins. They also established that economic growth and market concentration of banks have a negative impact on interest rate margins although inflation has minimum positive influence on the spreads. By using incorporating market concentration in their model, they fail to fully capture the effects of economic activities since it greatly influences market concentration of banks.

Were and Wambua, (2013), used panel data from the 43 commercial banks segmented into 3 tiers to assess the determinants of interest rate spread of commercial banks in Kenya. Using data from the period between 2002 and 2011, they found out that interest rate spreads are determined by certain factors positively. They include bank size, credit risk, liquidity risk, return on average assets, net interest income as a ratio of total income and operating costs. They further noted that macroeconomic factors such as real GDP and inflation rate do not significantly influence interest rate spreads. They however, incorporated the treasury bill rates with other macro-economic variables and therefore fails to analyze it to detail. This study therefore aims at investigating the effect of treasury bills, as a main component of KBRR rate, on the interest rate spreads.

In studying determinants of interest rate spread in Kenya's banking sector, Kiptui (2014) decomposed the spread using income and balance sheet of the 39 commercial banks in Kenya. According to the findings, operating costs, reserve provisions, provision for loan loss have positive effect on interest spreads. Macro-economic factors such as the treasury bill, GDP growth rate and the exchange rate instability also have significant positive effects on interest rate spreads. Maintaining macro-economic stability is essential in the pursuit of low interest margins as demonstrated by the significant role played by the Treasury bill rates and exchange rate in the determination of interest margins in Kenya's banking sector. This study does not however investigate the role played by the Central Bank Lending rate in determination of interest rate spreads in Kenya hence the need for further research in the area. The study was also not carried out on all the 43 commercial banks, which is the entire population in Kenya's banking sector.

This study therefore will seek to establish the role of the 91-Treasury Bills and the Central Bank Lending rate as used in determining the KBRR rates and their effect on the interest rate spreads. The study will be based widely on Grenade (2007) with focus on one country as opposed to Grenade (2007) that was based on a number of countries in the Caribbean. This study also borrow widely from Kiptui (2014) while incorporating the Central Bank Lending Rate on the entire population in the banking sector. It also covers a period, January 2009 to December 2014, which is recent and has incorporated numerous financial reforms in Kenya.

2.5 Summary of the Chapter

Following the recommendation of a task force on measures to reduce the cost of borrowing, the government introduced the Kenya Bank Reference Rate (KBRR) to allow customers to better compare lending rates across banks. The KBRR is defined as the 60-day average of the CBK policy rate and the 90-day T-bill rate. It is set for 6 months unless market conditions change significantly (Housing Finance, 2014). Staff noted, however, that its design may lead to undesirable side effects.

In particular, the use of the policy rate in the computation of the KBRR would put an additional burden on monetary policy decisions as the public could perceive that lending rates are set by the CBK. Moreover, fixing the reference rate for floating rate loans for six months would

paradoxically act against transparency, as banks would be required to adjust the risk premium for the same borrowers as market conditions change during the six-month period.

There are several factors at play that will not only ensure that interest rates do not go down but that they go up as well. The focus here is on external factors that inform rate setting rather than internal dynamics of banks, such as client risks and required rate of return on capital which are harder to influence and ascertain (Were, 2014). Furthermore, Were notes that banks ordinarily on-lend at a rate higher than that at which they borrow cash, so the interbank rate is the first real cost that hits consumers.

High interest rate spread has far reaching effects on the growth of an economy. This is because, according to Kiptui (2014), it works against the development of financial intermediation by discouraging savers. Rising spreads discourages savings and investments on one hand, and, as Khawaja and Din (2007) observe, raises concerns about the effectiveness of the bank lending channels of monetary policy, on the other.

Although KBRR is not meant to lower borrowing rates, cheaper credit would be a long term result, especially with an ongoing banking competition. This study will seek to examine prevailing interest rates in commercial banks in Kenya and their justification.
This study will therefore examine in depth, the factors that determine interest rate spreads. More focus will be on the 91-day Treasury Bills and the Central Bank Rates, which are key components used in deriving the KBRR rates. The study will therefore help broaden the understanding of stakeholders in the banking sector on KBRR.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter spells out the various stages that will be followed in completing the study. The chapter is divided into sections that include; research design, the target population, data collection instruments, the data collection procedures and the data analysis procedures.

3.2 Research Design

This study will use cross sectional descriptive research design. According to Cooper and Schindler (2006), a survey has three characteristics. The first characteristic is to produce quantitative descriptions of some aspects of the study population in which case it is concerned either with relationships between variables, or with projecting findings descriptively to a predefined population. The second characteristic of surveys is that data collection is done by asking people structured and predefined questions. Lastly, in surveys, data is collected from a fraction of the target population.

3.3 Target Population

Target population is the specific population about which information is desired. Ngechu (2004) asserts that a population is a well-defined or set of people, services, elements and events, groups of things or households that are being investigated. In this study the target population will comprise of all the commercial banks in Kenya as at December 2014. The study will use census approach since the population of 43 is not so large. According to (Hair, Celci, Money, Samouel, & Page, 2011), in a census data is collected from all members of the population.

3.4 Data Collection

The study will use secondary data. Secondary data includes data that has been collected by other people for other purposes but is still usable for this purpose. Secondary data will be obtained from annual reports submitted by commercial banks to the CBK between 2005 and 2014. Data from all commercial banks in operation during the five year period will be included for higher accuracy.

3.5 Data Analysis

Data analysis involves the utilization of the right analytical tools to address the research questions of the study. This study will involve assessment of the effect KBRR rates, given by the banking sector regulators, on interest rate spreads in Kenya. The collected, data will then analyze using Statistical Packages for Social Sciences (SPSS).

The multiple linear regression model will be adopted to examine the extent to which independent variable affect the dependent variable using the linear regression model below. The dependent variable is the interest rate spread.

3.5.1 Analytical Model

$Y = \beta_0+\beta_1 Dr_1+\beta_2 Tr+\beta_3 Cr+\beta_4 Rr+\beta_5 IF+\beta_6 Op+\beta_7 Gr+\varepsilon ijt$

Key:

Y is the interest rate spread

β_0 is the Y intercept

βi are the parameters that quantify the explanatory variables.

Dr is the deposit rate which is the savings deposits over the total deposits

Tr is the 91-day T-bill rate prevailing at a given time.

Cr is the central bank lending rate at a given time

Rr is the non-interest bearing reserve requirement

Ir is the Inflation rate of the economy at the given time

Op is the measure of operating cost incurred by the bank

Gr is the real GDP growth rate of the economy at a given time.

ε is the error term within a confidence interval of 5%.

3.5.2 Variable Measurements

Interest rate spread (margin) - interest on loans advanced and advances over loans and advances to customers less the interest on deposits over total loans.

Deposit rate – is the rate of deposits over the total deposits at a given time.

Operating Cost- It is determined by obtaining the ratio of total operating costs to total earning assets.

Inflation rate- Is the change in consumer price index. This rate is dependent on the economic performance of the country at any given time.

Treasury bill rate- is the 91-day Treasury bill rate.

$Tr= ((t_1+ t_2)/2) + (t_2+t_3)/2 + (t_1+t_3)/2)/3$

Where; t_1, t_2 and t_3 are the Treasury Bills for month 1, 2 and 3 respectively.

GDP growth rate is the real GDP growth rate at the given time.

The reserve requirements and the central bank lending rate are determined by Central bank of Kenya's Monetary Policy Committee.

CHAPTER FOUR

PRESENTATION, DISCUSSION AND INTERPRETATION OF THE FINDINGS

4.1 Introduction

This chapter presents analysis and findings of the study as set out in the research objectives and research methodology. The main objective of the study was to establish the effect of the components of KBRR on interest rate spread among commercial banks in Kenya. The data was collected exclusively from secondary sources which included financial records at CBK and Kenya Bureau of Standards records. The banking sector data was from all the 43 commercial banks.

4.2 Descriptive Statistics

Table 4.1 Descriptive Statistics

	Mean	Std. Deviation	N
Interestratespread	10.1747	.96119	103
Treasurybills	7.9780	3.46511	103
Cbkrates	9.2791	3.07610	103
Inflation	8.5562	5.12685	103
Operatingcost	68.1796	2.75209	103
GDPrate	5.2000	2.44300	103
Reserverequirement	5.2500	.56230	103
Depositrate	5.3279	1.40357	103

Table 4.1 tells us the mean and standard deviation of each variable in our data set so now we know that the average interest rate spreads was 9.94. Although this table is not necessary for interpreting the regression model, it is useful in giving the overall summary of the data used in the study.

4.2.2 Correlations between the Variables

Table 4.2 Correlation Matrix for the Variables

		IRS	TB	CBKR	IF	OC	GDPR	RR	DR
Pearson Correlation	IRS	1.000	.513	.612	.143	-.316	.011	-.352	.558
	TB	.513	1.000	.774	.517	.092	-.356	.140	.696
	CBKR	.612	.774	1.000	.285	.274	-.203	.282	.685
	IF	.143	.517	.285	1.000	.253	-.496	.079	.045
	OC	-.316	.092	.274	.253	1.000	-.517	.509	-.038
	GDPR	.011	-.356	-.203	-.496	-.517	1.000	-.139	-.291
	RR	-.352	.140	.282	.079	.509	-.139	1.000	-.003
	DR	.558	.696	.685	.045	-.038	-.291	-.003	1.000
Sig. (1-tailed)	IRS	.	.000	.000	.075	.001	.456	.000	.000
	TB	.000	.	.000	.000	.179	.000	.080	.000
	CBKR	.000	.000	.	.002	.003	.020	.002	.000
	IF	.075	.000	.002	.	.005	.000	.215	.327
	OC	.001	.179	.003	.005	.	.000	.000	.353
	GDPR	.456	.000	.020	.000	.000	.	.080	.001
	RR	.000	.080	.002	.215	.000	.080	.	.487
	DR	.000	.000	.000	.327	.353	.001	.487	.
N	IRS	103	103	103	103	103	103	103	103
	TB	103	103	103	103	103	103	103	103
	CBKR	103	103	103	103	103	103	103	103
	IF	103	103	103	103	103	103	103	103
	OC	103	103	103	103	103	103	103	103
	GDPR	103	103	103	103	103	103	103	103
	RR	103	103	103	103	103	103	103	103
	DR	103	103	103	103	103	103	103	103

Table 4.2 gives us a correlation matrix for the study variables. The table shows three things: the value of Pearson's correlation coefficient between every pair of variables; the one-tailed significance of each correlation (in this study, the correlation is significant $p < 0.05$; and the number of cases contributing to each correlation (N=103). The correlation matrix is useful to this study in that it presents a rough idea of the relationships between predictors and the outcome. It also enables us to make a preliminary look for multicollinearity. From Table 4.2, there is no substantial correlations ($r > .9$) between predictors hence we conclude that there is no multicollinearity.

Without looking at the interest rate spread, Table 4.2 shows that the highest correlation is between treasury bills and CBK rates which is significant at a 0.05 level ($r = .774$, $p = .000$).

Table 4.2 also shows that of all the predictors, the CBK rates correlates best with the outcome (r = .612, p < .05) and so it is likely that this variable will predict the interest rate spread.

4.3 Summary of Model

This section describes the overall model to tell us whether the model was successful in predicting the interest rate spread.

Table 4.3 Model Summary

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.513[a]	.263	.255	.82940	.263	35.989	1	101	.000	
2	.615[b]	.379	.366	.76528	.116	18.634	1	100	.000	
3	.876[c]	.767	.750	.48055	.389	31.722	5	95	.000	1.014

a. Predictors: (Constant), treasurybills

b. Predictors: (Constant), treasurybills, cbkrates

c. Predictors: (Constant), treasurybills, cbkrates, reserverequirement, GDPrate, inflation, operatingcost, depositrate.

d. Dependent Variable: interestratespread

Table 4.3 shows the value of the multiple correlation coefficient between the predictors and the outcome (R = 0.876). The R^2 column gives the measure of how the variability in the outcome is accounted for by the predictors. The value for R^2 is 0.263 and 0.379 for the first and second models respectively, meaning that Treasury bills accounts for 26% of the variation in interest rate spread while treasury bill and CBK rates jointly account for 38% of the variation in the interest rate spread. This shows that CBK rates account for about 12% variance in the interest rate spread. In this study, the third model, R^2 = 0. 767, which implies that adding additional five predictors to the model increases R^2 value to 77%. This means that reserve requirement, GDP rate, inflation, operating cost, and deposit rate account for an additional 29% of the variation in interest rate spread.

The adjusted R^2 gives us a hint of how well the model generalizes hence should be very close to the R^2. In this study model, the difference between R^2 and adjusted R^2: (0.767 – 0.750 = 0.017), which translates to about 1.7%. This implies that if the model was derived from the population

rather than a sample, it would account for approximately 1.7% less in the outcome. In the case of this study, this is true since the data set was derived from all the commercial banks in the country of study, Kenya.

The change statistic R^2 change = 0. 767 indicate that the regression model used in this study causes R^2 to change from 0 to 0.767 and this in the amount of variance explained gives rise to an F-ratio of 44.725 which is significant with a probability less than 0.001. Therefore, the change statistic tells us about the difference made by adding new predictors to the model

The last column of Table 4.3 presents the Durbin-Watson statistic. This statistic informs us whether the assumption of independent errors is tenable. It is recommended that values less than 1 and greater than 3 should raise alarm. In this model, the value is 1.014 indicating that that assumption has almost certainly been met.

4.4 ANOVA

Table 4.4 Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.757	1	24.757	35.989	.000[b]
	Residual	69.479	101	.688		
	Total	94.236	102			
2	Regression	35.670	2	17.835	30.453	.000[c]
	Residual	58.566	100	.586		
	Total	94.236	102			
3	Regression	72.298	7	10.328	44.725	.000[d]
	Residual	21.938	95	.231		
	Total	94.236	102			

a. Dependent Variable: interestratespread

b. Predictors: (Constant), treasurybills

c. Predictors: (Constant), treasurybills, cbkrates

d. Predictors: (Constant), treasurybills, cbkrates, reserverequirement, GDPrate, inflation, operatingcost, depositrate

Table 4.4 contains an ANOVA that tests whether the model is significantly better at predicting the outcome than using the mean as a 'best guess'. Specifically, the F- ratio represents the ratio of the improvement in prediction that results from fitting the model, relative to the inaccuracy that still exists in the model. If the improvement due to fitting the regression model is greater than the inaccuracy within the model, then the value of F would be greater than 1.

The first model has two coefficients, one for the treasury bills and one for the interest rate spread, the second has three (one for each of the two predictors and the outcome) whereas the third has eight (one for each of the seven predictor variables and one for the constant. Therefore, model one has 101 degrees of freedom, model 2 has 100 whereas model 3 has 95.

For the first model the F-ratio is 35.989 which is very unlikely to have happened by chance ($p <$ 0.001). The second regression model has F-ratio of 30.453 and is significant at ($p < 0.001$). In the third regression model, the value of F is high (44.725) and is also highly significant ($p < 0.001$). This study interprets these results as meaning that the initial models significantly improved our ability to predict the outcome variable. Notably, the third regression model (with extra predictors) was even better since the F-ratio is more significant.

4.5 Regression Models

The previous section shows several summary statistics telling us whether or not the model has improved the study's ability to predict the outcome variable. This section of the analysis output now addresses the model parameters (the beta values and the significance of these values) and determines how much of each of the components of KBRR impact interest spread rate.

Table 4.5 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	9.040	.206		43.889	.000	8.632	9.449					
	treasurybills	.142	.024	.513	5.999	.000	.095	.189	.513	.513	.513	1.000	1.000
2	(Constant)	8.403	.241		34.906	.000	7.925	8.880					
	treasurybills	.027	.035	.096	.773	.442	-.042	.095	.513	.077	.061	.401	2.497
	cbkrates	.168	.039	.538	4.317	.000	.091	.245	.612	.396	.340	.401	2.497
3	(Constant)	22.404	1.927		11.626	.000	18.578	26.230					
	treasurybills	-.055	.031	-.200	-1.805	.074	-.117	.006	.513	-.182	-.089	.200	5.012
	cbkrates	.309	.032	.990	9.654	.000	.246	.373	.612	.704	.478	.233	4.295
	inflation	.008	.015	.041	.525	.601	-.022	.037	.143	.054	.026	.395	2.530
	operatingcost	-.157	.028	-.451	-5.683	.000	-.212	-.102	-.316	-.504	-.281	.390	2.564
	GDPrate	-.055	.032	-.139	-1.740	.085	-.117	.008	.011	-.176	-.086	.382	2.619
	reserverequirement	-.678	.103	-.397	-6.586	.000	-.883	-.474	-.352	-.560	-.326	.675	1.482
	depositrate	-.028	.068	-.041	-.415	.679	-.163	.106	.558	-.043	-.021	.250	3.994

a. Dependent Variable: interestratespread

4.5.1 Effect of Treasury Bill Rate on Interest Rate Spread

The first step was to include treasury bills and therefore, the parameters for the first model shown in Table 4.5 indicate that b_0 is 9.040 implying that when no treasury bills are purchased by the any commercial bank (X = 0), the model predicts that interest rate spread will be approximately 9%. From the table, $b_1 = 0.142$ in the first model accounting for the change in outcome variable (interest rate spread) accounted for by the predictor variable (treasury bills). These results show that is the treasury bills increased by one unit, then our model predicts that 0.142% extra interest rate spread will be realized.

$$Y = b_0 + b_1 * \text{Treasury Bills}$$

$$\text{Interest rate spread}_i = b_0 + b_1 * \text{Treasury Bills}_i$$

$$= 9.040 + 0.142 * \text{Treasury Bills}_i$$

Following this, it is now possible to make prediction about the interest rate spread, by replacing Treasury Bills with a value of interest. For instance, if the treasury bills are offered at 7.5%, then by replacing the treasury bills with 7.5%, the interest spread rates should be around for the first quarter of business:

Interest Rate Spread$_i$ = 9.040 + (0.142 X 7.5)

= 9.040 + 1.065

= 150.15%

To test the first regression model, the study hypothesized that there would be no statistically significant relationship between treasury bills (TB) and interest rate spread. Table 4.5 shows that for the first regression model, the *t*-test tells us that the b value is not 0 (t = 5.999) and the observed significance is less than 0.05 (p = 0.000). This implies that there would be a statistically significant relationship between treasury bills and interest rate spread. Following these findings, this study rejects the null hypothesis: **H_o1:** There is no statistically significant relationship between Treasury Bills and interest rate spread. Therefore we can conclude that the Treasury Bills make a significant contribution ($p < 0.001$) to predicting interest rate spread.

4.5.2 Effect of Treasury Bills and CBK Rate on Interest Rate Spread

To test the second regression model, the study hypothesized that there would be no statistically significant relationship between CBK rate and interest rate spread. From Tables 4.5 all the b-values are not 0 and the observed significance for CBK rate is less than 0.05 (p = 0.000) indicating that there is a statistically significant relationship between CBK rates and the interest rate spread. Owing to this, we reject the null hypothesis: **H_o2:** there is no statistically significant relationship between CBK rates and interest rate spread and conclude that there is a statistically significant relationship between CBK rates and the interest rate spread.

4.5.3 Effects of Components of KBRR on Interest Rate Spread

Using the results in table 4.5, this study defines the multiple regression model used in this study as follows:

$IRS_i = b_0 + b_1TB_i + b_2CBKR_i + b_3IF_i + b_4OC_i + b_5GDPR_i + b_6RR_i + b_7DR_i$

$= 22.404 + (-.055TB_i) + (0.309CBK_i) + (0.008IF_i) + (-0.1570C_i) + (-0.055GDPR_i)$

$+ (-0.678RR_i) + (-0.028DR_i)$

The b-values inform us about the relationship between the interest rate spread and each predictor variable. In this model, only CBK rates and inflation had a positive relationship with the interest rate spread. The rest of the predictor had a negative relationship with the interest rate spread, gauging from the negative b-values shown in Table 4.5. The b-values also tell us to what degree each predictor affects the outcome if all the other variables are held constant.

Treasury Bills (*b* = -0.055; *standardized β* = -0.200): The *b*-value indicates that as Treasury Bills increase by one unit, interest rate spread decrease by 0.055 units. The *standardized β*-value on the other hand indicates that as treasury bills increase by one standard deviation (3.46511), interest rate spread decrease by -0.200 standard deviations. The standard deviation for interest rate spread is 0.96119, constituting a change of -0.192238; (-0.200 x0.96119). This interpretation is true only if the effects CBK rate, inflation, operating cost, GDP rate, reserve requirement and deposit rate are held constant.

CBK rates (*b* = 0.309; *standardized* β = 0.990): The *b*-value indicates that as CBK rates increase by one unit, the interest rate spread increases by 0.309 units while the *standardized β*-value indicates that as CBK rates increase by one standard deviation, (3.07610), the interest rate spread increases by 0.990 standard deviations. The standard deviation for interest rate spread is 0.96119. This translates into 0.95158 (0.96119 x 0.990). Significantly though, this interpretation holds only on condition that the effects of Treasury bills, inflation, operating cost, GDP rate, reserve requirement and deposit rates are held constant.

Inflation (*b* = 0.008; *standardized β* = 0.041): The *b*-value indicates that as inflation rates increase by one unit, the interest rate spread increases by 0.008. On the other hand, the *standardized β*-value indicates that as inflation rates increase by one standard deviation, (5.12685), the interest rate spread increases by 0.041 standard deviations. The standard deviation for interest rate spread is 0.96119. This translates into 0.03941 (0.96119 x 0.041). However, this interpretation holds only on condition that the effects of Treasury bills, CBK rates, operating cost GDP rate, reserve requirement and deposit rates are held constant.

Operating Cost (*b* = -0.157; *standardized* β = 0.451): The *b*-value indicates that a unit increase in opening cost translates into a decrease in the interest rate spread by -0.157 units. The *standardized β*-value indicates that as opening cost increase by one standard deviation, (2.75209), the interest rate spread increases by 0.451 standard deviations. The standard deviation for interest rate spread is 0.96119. This implies that (0.96119 x -0.451) = -0.433497. This

interpretation holds only on condition that the effects of Treasury bills, CBK rates, inflation, GDP rate, reserve requirement and deposit rates are held constant.

GDP rate (*b* = -0.055; *standardized β* = -0.139): The *b*-value indicates that as GDP rates increase by one unit, the interest rate spread decreases by 0.055 units while the *standardized β*-value indicates that as GDP rates increase by one standard deviation, (2.44300), the interest rate spread decreases by 0.139 standard deviations. The standard deviation for interest rate spread is 0.96119. This means that -0.13361 (0.96119 x -0.139). It is important to note that this interpretation holds only on condition that the effects of Treasury bills, CBK rates, inflation, operating cost, operating cost, reserve requirement and deposit rate are held constant.

Reserve Requirement (*b* = -0.678; *standardized β* = -0.397): The *b*-value indicates that as reserve requirement rates increase by one unit, the interest rate spread increases by 0.678. The standardized *β*-value, on the other hand, indicates that as reserve requirement increase by one standard deviation, (0.56230), the interest rate spread increases by -0.397 standard deviations. The standard deviation for interest rate spread is 0.96119, translating into -0.381592 (0.96119 x 0.397). Significantly though, this interpretation holds only if the effects of Treasury bills, CBK rates, inflation, operating cost, GDP rate, and deposit rate are held constant.

Deposit Rate (*b* = -0.028; *standardized β* = -0.041): The *b*-value indicates that as deposit rate increases by one unit, the interest rate spread also increases by -0.028 units. The *standardized β*-value indicates that as deposit rates increase by one standard deviation, (1.40357), the interest rate spread increases by -0.041 standard deviations. The standard deviation for interest rate spread is 0.96119. This translates into 0.039408 (0.96119 x -0.041). This interpretation holds only when the effects of Treasury bills, CBK rates, inflation, operating cost, GDP rate, and reserve requirement are held constant.

Within this regression model, multicollinearity tests were conducted to determine if two or more predictor (independent) variables in the multiple regression model are highly correlated. The study used tolerance and variance inflation factor (VIF) values for predictors as a detector of multicollinearity. Tolerance indicates the percent of variance in the independent variable that

cannot be accounted for by the other independent variables while VIF is the inverse of tolerance. From table 4.4, tolerance is found to range between 0.200 and 0.675 while VIF ranges between 1.482 and 5.012. With tolerance values above 0.1 and VIF below 10, the model is found to have no multicollinearity.

4.6 Discussion and Interpretation of Findings

From the determination coefficients, it can be noted that there is a strong relationship between dependent and the independent variables given an R2 of 0.876 and adjusted to 0.75. This shows that the independent variables (91-day treasury bills, the deposit rate, the central bank lending rate, the reserve requirement, the inflation rate, the operating costs incurred by banks and the inflation rate) account for 75% of variations in interest rate spreads. The ANOVA results shows that the margin of error is $p<0.001$. This indicates that the model has a probability of less than 0.1% of generating a false prediction.

It was also established that a unit increase in treasury bill rate, holding the other variables constant, will cause a decrease in the interest rate spread by 0.055 ($p=0.74$). This relationship, though negligible, is positive in nature. Cihak (2004), Nampewo (2013) and Kiptui (2014) established a positive relationship between Treasury bill rates and interest rate spreads. This is because when treasury bills rates increase, many investors turn to invest in them forcing commercial banks to adjust their deposit rates to match Treasury bill rates. The subsequent increase in savings rates will reduce the interest rate spreads, assuming that lending rates are held constant.

A unit increase in CBR rate while holding all the other variables constant will result in an increase in the interest rate spread by 0.309 ($p<0.001$). There are few studies on this parameter. The findings of this study are however in agreement with Vascov et al (2011) and Ndungu and Ngugi (2000) who also established that increase in CBR rates causes an increase in interest rate spreads. When CBK raise the CBR rate, commercial banks pass on the increase to their borrowers by increasing their lending rates resulting to increased interest rate spreads. High CBR rates are therefore found to increase interest rate spreads.

Furthermore, holding all the other variables constant, a unit increase in inflation will cause an increase in interest rate spread by 0.008 ($p=0.601$). Hanson and Rocha (1986), Boldbataar

(2006), Ansari (2013), Demirguc-Kunt and Huizinga (1999) and Chirwa, Mlachila (2004) also established a similar relationship in their studies. Increased inflation may reduce business activities among borrowers and increase their default rates. Commercial banks then increase lending rates to cover for high default rates which increase interest rate spreads.

Moreover, a unit increase in operating cost is found to result in a reduction of interest rate spread by 0.157 ($p<0.001$), if all the other variables are held constant. This is contrary to many findings. Studies by Hanson and Rocha (1986), Claeys and Vennet (2003), Boldbaatar (2006), Entrop, Memmel, Ruprecht, Wilkens (2012), Siddiqui (2012), Crowley (2007), Tarus et al (2012) and Were & Wambua (2013) all found a positive relationship between operating cost and interest rate spreads. These increased operating costs, if focused on mobilizing deposits and loans, may lead to high demand for loans by banks which reduce lending rates therefore reduce spreads. This argument however, only holds if these increased operating costs are attributed to increased loans advanced rather than operation inefficiencies as established in previous studies.

It is also established that a unit increase in GDP rate, holding all other factors constant, will cause the interest rates spread to decrease by 0.055 ($p=0.085$). This is in line with Nampewo (2013) and Tarus et al (2012) who indicate that GDP rate has a negative effect on interest rate spreads. Ahokpossi (2013) and Were and Wambua (2013) also deduced that the GDP rate has no significant effect on interest rate spreads. This study also established that GDP does not have a major impact on interest rate spreads though the effect is negative. This is because growth in GDP improves business activities among borrowers thereby reducing their default rate. Low default rates enable commercial banks to reduce their lending rates hence reduce interest rate spreads.

A unit increase in reserve requirement is found to cause a reduction of 0.678 ($p<0.001$) when all the other factors are held constant. The reserve requirement therefore has a major negative effect on interest rates spreads. This is in line with Aboagye et al (2008) who established that reserve requirements negatively affect interest rates spread. However, Chirwa and Mlachila (2004) found a positive relationship. The negative relationship can be attributed to mobilization of deposits by

commercial banks at competitive rates to meet these reserve requirements. This would therefore result to lower spreads assuming lending rates remain constant.

Lastly, a unit increase in the deposit rate was found to cause a decrease of 0.028 (p=0.679) if all the other variables remained constant. Cihak (2004), Ansari (2013) and Ndungu and Ngugi (2000) found a positive relationship between deposit rate and interest rate spreads. The findings of this study are however in agreement with Vascov et al (2011) and Crowley (2007). An increase in deposit rate is triggered by high demand for deposits by commercial banks. This would mean that money is in the hands of individuals, businesses and other sectors other than commercial banks at a given time hence lowering the borrowing appetite or need. Low borrowing appetite forces commercial banks to reduce their lending rates to attract borrowers which consequently reduce interest rate spreads. This effect is however minimal since most funds are always in the mainstream banking sector.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS OF THE STUDY

5.1 Introduction

The purpose of this study was to analyze the effects of the components of KBRR on interest rates among commercial banks in Kenya. This chapter is therefore a summary of the findings from the analysis of data, conclusions and recommendations based on the findings of the research study. The chapter also provides suggestions for further research in the field of interest rates spread.

5.2 Summary

The main objective of the study was to establish the effect of the components of KBRR on interest rate spreads in Kenya. There were two types of data involved in the study; descriptive analysis and inferential analysis. The descriptive analysis is the first step that enables us to summarize the information about the variables in the dataset, such as means and variance of variables. The Pearson correlation and Regression analysis were used in the inferential analysis. The Pearson correlation measures the degree of association between variables under consideration while Regression estimates the relationship between the dependent and the independent variables in the panel data.

The study used secondary data mainly from CBK to determine the effect of the two KBRR components on the interest rate spreads among commercial banks in Kenya from January 2005 and December 2014. The data used was for the entire banking sector as opposed to individual banks. Furthermore, certain variables such as the operating costs could not be obtained on monthly basis, since the study relied on annual financial report, and were therefore averaged for the respective years. However, the two main variables of interest (the 91-Day Treasury Bills and the CBR rates), were acquired on monthly basis therefore fulfilling the aim of the study.

5.3 Conclusions

The findings show that the variables used in determining the KBRR rates affect the interest rate spreads. The study found out that the 91-day Treasury bills have a negative effect, though small,

on the interest rate spreads. The study, however established a strong positive relationship between the CBR rates and the interest rate spreads.

The other variables that were included in this study (deposit rate, reserve requirement, operating costs) were found to found to affect interest rates spreads more significantly than the 91-day Treasury bills. The study established that the two macro-economic factors, GDP and Inflation, do not affect interest rate spreads significantly. The study therefore deduces that interest rate spreads amongst commercial banks in Kenya are majorly affected by the Banking sector factors as opposed to macro-economic factors.

5.4 Policy Recommendations

The study investigated the relationship between the parameters of KBRR and interest rate spreads with the aim of advising stakeholders on how to best derive interest rates to avoid high interest rate spreads. From the study findings, commercial bank borrowers are advised to pay keen attention to changes in CBR rates which are a key pointer to higher interest rates on loans.

Since loan advancements are a major source of revenue for commercial banks and by extension determine their returns, investors are advised to pay attention to Treasury Bill rates since an increase in these rates may indirectly affect the rate of returns of commercial banks.

The CBK and KBA, as the industry regulators, are advised to ensure the stability of CBR rates to enhance stability of lending rates and maintain interest rate spread stability.

Commercial bank senior managers and policy makers can use the study in deriving deposit rates, keeping 91-day Treasury bill rates in mind, in order to ensure interest rate spreads are kept as small as possible. This will enable them attract deposits for lending without being dependent on CBR rates. There is also need for banks to adopt KBRR rates when issuing most of their loans as proposed by policy framers.

Lastly, academics and scholars are advised to study more in this area of interest rate spreads in order to interrogate and establish the best ways of reducing interest rate spreads in Kenya. Besides, little studies have been conducted in this field since the implementation of KBRR rates hence the need for more research.

5.5 Limitations of the Study

The researcher encountered various limitations that may have affected the findings of this study. First, the study relied on secondary data which may be unreliable especially if used for purposes other than the intended ones. Data was pulled majorly from annual Bank Supervision Reports in the CBK website.

The study used banking sector data from CBK as opposed to data from the individual banks as earlier intended because of the bottle-necks encountered in obtaining data from individual banks. Furthermore, operating costs are incurred by commercial banks in other processes other than loan processing and are sometimes representative of operating inefficiencies and may therefore not truly represent reality. Moreover, certain monthly data could not be obtained, annual data was therefore averaged which could be a misrepresentation since these variables might have varied from one month to another.

There was no data on CBR rates from January 2005 to June 2006. This may have affected the findings of the study. The spreads as determined, neither takes into consideration the terms of loans nor other terms of deposits like fixed deposits which may also distort the findings. The reserve requirements do not change frequently like the other variables which may also affect the results.

5.6 Suggestions for Further Study

The study suggests that other research be done in the area using the real KBRR rates as determined by the Monetary Policy Committees from time to time. The 3 month moving averages of treasury bills should be used in the research to improve accuracy.

The deposit terms should be matched with the loan terms, like 9-Month fixed deposit rates and loans advanced for the same period, to represent interest rate spreads more accurately.

This study focused on parameters used in determining KBRR rates with the view of establishing how they affect interest rate spreads. However, commercial banks incorporate a risk factor, K, to the KBRR rate. A study should therefore be carried out on the individual banks to establish how each bank derives their risk factors.

This study was based on the Local Currency loans. The industry is, however, accepting deposits and advancing a huge chunk of loans in foreign Currencies. There is therefore need to carry out studies on Foreign currency loan spreads in the sector.

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APPENDICES.

Appendix 1: Central Bank Rates

YEAR	MONTH	Repo	Interbank	91-Day Tbill	Cash Reserve Requirement		Central Bank Rate
2005	JAN	7.25	8.72	8.26		6	
	FEB	7.23	8.14	8.59		6	
	MAR	7.26	8.13	8.63		6	
	APR	7.28	8.28	8.68		6	
	MAY	7.26	8.3	8.66		6	
	JUN	7.34	7.37	8.5		6	
	JUL	7.43	7.51	8.59		6	
	AUG	7.67	7.77	8.66		6	
	SEP	7.77	8.03	8.58		6	
	OCT	7.8	7.98	8.19		6	
	NOV	7.72	7.64	7.84		6	
	DEC	7.74	7.79	8.07		6	
2006	JAN	7.81	7.78	8.23		6	
	FEB	7.78	7.73	8.02		6	
	MAR	7.5	7.52	7.6		6	
	APR	6.78	6.97	7.02		6	
	MAY	6.68	8.11	7.01		6	
	JUN	6.39	6.41	6.6		6	9.75
	JUL	5.73	5.74	5.89		6	9.75
	AUG	5.94	5.66	5.96		6	10
	SEP	6.16	6.02	6.45		6	10
	OCT	6.23	6.08	6.83		6	10
	NOV	6.33	6.18	6.41		6	10
	DEC	6.34	6.34	5.73		6	10
2007	JAN	6.43	6.43	6		6	10
	FEB	6.75	6.52	6.22		6	10
	MAR	6.7	6.55	6.32		6	10
	APR	6.84	6.81	6.65		6	10
	MAY	7.03	7.11	6.77		6	10
	JUN	7.07	6.98	6.53		6	8.5
	JUL	7.19	7.07	6.52		6	8.5
	AUG	7.49	7.38	7.3		6	8.75
	SEP	7.81	7.59	7.35		6	8.75
	OCT	7.44	7.65	7.55		6	8.75
	NOV	6.42	6.5	7.52		6	8.75
	DEC	7.13	7.05	6.87		6	8.75

2008	JAN	7.75	7.66	6.95	6	8.75
	FEB	6.9	7.18	7.28	6	8.75
	MAR	6.46	6.35	6.9	6	8.75
	APR	6.67	6.59	7.35	6	8.75
	MAY	7.42	7.72	7.76	6	8.75
	JUN	7.61	7.79	7.73	6	9
	JUL	7.41	8.07	8.03	6	9
	AUG	6.35	6.92	8.02	6	9
	SEP	6.06	6.7	7.69	6	9
	OCT	6.03	6.81	7.75	6	9
	NOV	6.27	6.83	8.39	6	9
	DEC	6.36	6.67	8.59	5	8.5
2009	JAN	5.1	5.95	8.46	5	8.5
	FEB	5.08	5.49	7.55	5	8.5
	MAR	4.62	5.57	7.31	5	8.25
	APR	4.05	5.81	7.34	5	8.25
	MAY	6.18	5.55	7.45	5	8
	JUN	0	3.08	7.33	4.5	8
	JUL	0	2.69	7.24	4.5	7.75
	AUG	0	3.68	7.25	4.5	7.75
	SEP	0	3.38	7.29	4.5	7.75
	OCT	0	2.57	7.26	4.5	7.75
	NOV	0	3.11	7.22	4.5	7
	DEC	0	2.95	6.82	4.5	7
2010	JAN	0	3.69	6.56	4.5	7
	FEB	0	2.39	6.21	4.5	7
	MAR	0	2.21	5.98	4.5	6.75
	APR	0	2.46	5.17	4.5	6.75
	MAY	0	2.16	4.21	4.5	6.75
	JUN	0	1.15	2.98	4.5	6.75
	JUL	0	1.35	1.6	4.5	6
	AUG	0	1.66	1.83	4.5	6
	SEP	0	1.18	2.04	4.5	6
	OCT	0	0.98	2.12	4.5	6
	NOV	0	1.01	2.21	4.5	6
	DEC	0	1.18	2.28	4.5	6
2011	JAN	0	1.24	2.46	4.5	5.75
	FEB	0	1.13	2.59	4.5	5.75
	MAR	1.66	1.24	2.77	4.5	6
	APR	4.5	3.97	3.26	4.5	6
	MAY	5.72	5.54	5.35	4.5	6
	JUN	5.73	6.36	8.95	4.75	6.25

	JULY	0	8.61	8.99	4.75	6.25
	AUG	0	14.29	9.23	4.75	6.25
	SEP	0	7.46	11.93	4.75	7
	OCT	18.89	14.95	14.8	4.75	11
	NOV	0	28.9	16.14	4.75	16.5
	DEC	17.75	21.75	18.3	5.25	18
2012	JAN	17.88	19.27	20.56	5.25	18
	FEB	13.78	18.15	19.7	5.25	18
	MAR	0	24.02	17.8	5.25	18
	APR	15.47	16.15	16.01	5.25	18
	MAY	16.97	17.16	11.18	5.25	18
	JUN	17.6	17.09	10.09	5.25	18
	JULY	14.31	13.71	11.95	5.25	16.5
	AUG	9.65	8.97	10.93	5.25	16.5
	SEP	8.42	7.02	7.77	5.25	13
	OCT	9.74	9.14	8.98	5.25	13
	NOV	8.3	7.14	9.8	5.25	11
	DEC	6.39	5.84	8.3	5.25	11
2013	JAN	6.6	5.86	8.08	5.25	9.5
	FEB	9.1	9.25	8.38	5.25	9.5
	MAR	9.35	8.93	9.88	5.25	9.5
	APR	9.14	7.9	10.38	5.25	9.5
	MAY	7.96	7.16	9.46	5.25	8.5
	JUNE	7.93	7.14	6.21	5.25	8.5
	JULY	7.48	7.93	5.92	5.25	8.5
	AUG	0	8.88	10.03	5.25	8.5
	SEP	7.11	7.52	9.58	5.25	8.5
	OCT	0	10.66	9.72	5.25	8.5
	NOV	0	10.77	9.94	5.25	8.5
	DEC	7.95	8.98	9.52	5.25	8.5
2014	JAN	0	10.43	9.26	5.25	8.5
	FEB	0	8.83	9.16	5.25	8.5
	MAR	6.92	6.47	8.98	5.25	8.5
	APR	8.39	7.4	8.8	5.25	8.5
	MAY	8.42	7.76	8.82	5.25	8.5
	JUN	6.46	6.6	9.81	5.25	8.5
	JUL	0	8.08	9.78	5.25	8.5
	AUG	12.95	11.79	8.29	5.25	8.5
	SEP	8.39	7.43	8.38	5.25	8.5
	OCT	8.39	6.73	8.67	5.25	8.5
	NOV	8.17	6.86	8.64	5.25	8.5
	DEC	8.29	6.91	8.58	5.25	8.5

2015	JAN	8.08	7.12	8.59	5.25	8.5
	FEB	7.87	6.77	8.59	5.25	8.5
	MAR	8.08	6.85	8.49	5.25	8.5
	APR	8.38	8.77	8.42	5.25	8.5
	MAY	8.5	11.17	8.26	5.25	8.5
	JUN	9.7	11.78	8.26	5.25	10
	JUL	9.43	13.48	10.57	5.25	11.5

Appendix 2: Inflation rates

Inflation (%)

		Inflation (month-on-month) %	Inflation (annual average) %			Inflation (month-on-month) %	Inflation (annual average) %
2005	Jan	14.87	12.27	2010	Jan	5.95	8.64
	Feb	13.94	12.6		Feb	5.18	7.88
	Mar	14.15	13.07		Mar	3.97	7.03
	Apr	16.02	13.76		Apr	3.66	6.32
	May	14.78	14.61		May	3.88	5.85
	Jun	11.92	15.1		Jun	3.49	5.43
	Jul	11.76	15.34		Jul	3.57	5.03
	Aug	6.87	14.53		Aug	3.22	4.69
	Sep	4.27	13.24		Sept	3.21	4.4
	Oct	3.72	11.99		Oct	3.18	4.12
	Nov	4.4	10.89		Nov	3.84	4.02
	Dec	4.7	9.87		Dec	4.51	3.96
2006	Jan	8.39	9.36	2011	Jan	5.42	3.93
	Feb	9.39	9.01		Feb	6.54	4.05
	Mar	8.85	8.61		Mar	9.19	4.49
	Apr	5.44	7.77		Apr	12.05	5.2
	May	4.47	6.95		May	12.95	5.96
	Jun	4.28	6.33		Jun	14.48	6.88
	Jul	4.16	5.73		Jul	15.53	7.88
	Aug	4.92	5.57		Aug	16.67	9
	Sep	5.93	5.7		Sep	17.32	10.18
	Oct	6.55	5.94		Oct	18.91	11.49
	Nov	6.64	6.12		Nov	19.72	12.82
	Dec	7.98	6.39		Dec	18.93	14.02
2007	Jan	4.63	6.08	2012	Jan	18.31	15.1
	Feb	3.02	5.55		Feb	16.69	15.93
	Mar	2.19	4.99		Mar	15.61	16.45
	Apr	1.85	4.69		Apr	13.06	16.5
	May	1.96	4.47		May	12.22	16.4
	Jun	4.07	4.46		June	10.05	15.97
	Jul	5.48	4.57		Jul	7.74	15.27
	Aug	5.3	4.6		Aug	6.09	14.33
	Sep	5.53	4.57		Sep	5.32	13.29
	Oct	5.38	4.48		Oct	4.14	12.04

	Nov	6.08	4.45		Nov	3.25	10.67
	Dec	5.7	4.27		Dec	3.2	9.38
2008	Jan	9.4	4.69	2013	Jan	3.67	8.2
	Feb	10.58	5.32		Feb	4.45	7.24
	Mar	11.9	6.13		Mar	4.11	6.33
	Apr	16.12	7.32		Apr	4.14	5.61
	May	18.61	8.7		May	4.05	4.96
	Jun	17.87	9.86		Jun	4.91	4.56
	Jul	17.12	10.83		Jul	6.03	4.44
	Aug	18.33	11.92		Aug	6.67	4.5
	Sep	18.73	13.02		Sep	8.29	4.75
	Oct	18.74	14.13		Oct	7.76	5.05
	Nov	19.54	15.25		Nov	7.36	5.39
	Dec	17.83	16.27		Dec	7.15	5.72
2009	Jan	13.22	16.56	2014	Jan	7.21	6.01
	Feb	14.69	16.87		Feb	6.86	6.21
	Mar	14.6	17.07		Mar	6.27	6.39
	Apr	12.42	16.72		Apr	6.41	6.58
	May	9.61	15.93		May	7.3	6.85
	Jun	8.6	15.11		June	7.39	7.05
	Jul	8.44	14.35		July	7.67	7.19
	Aug	7.36	13.42		August	8.36	7.33
	Sep	6.74	12.41		September	6.6	7.19
	Oct	6.62	11.42		October	6.43	7.08
	Nov	5	10.24		November	6.09	6.97
	Dec	5.32	9.24		December	6.02	6.88

Source: Kenya National Bureau of Statistics

Appendix 3: Commercial Banks' Weighted Average Interest Rates (%)

YEAR	MONTH	Deposit	Savings	Lending	Overdraft
2005	JAN	3.08	0.97	12.12	13.14
	FEB	3.47	0.96	12.35	13.82
	MAR	3.75	0.98	12.84	14.03
	APR	3.91	1.1	13.12	14
	MAY	4.05	1.07	13.11	13.94
	JUN	4.21	1.24	13.09	13.83
	JUL	4.14	1.3	13.09	13.54
	AUG	4.3	1.3	13.03	13.81
	SEP	4.35	1.34	12.83	13.5
	OCT	4.43	1.32	12.97	13.56
	NOV	4.5	1.37	12.93	13.33
	DEC	4.52	1.38	13.16	13.67
2006	JAN	4.48	1.33	13.2	13.81
	FEB	4.48	1.36	13.27	13.34
	MAR	4.28	1.34	13.33	13.26
	APR	4.35	1.33	13.51	13.81
	MAY	4.36	1.31	13.95	14.02
	JUN	4.35	1.27	13.79	13.78
	JUL	4.31	1.32	13.72	13.48
	AUG	4.08	1.41	13.64	13.43
	SEP	4.04	1.36	13.54	13.42
	OCT	4.11	1.35	14.01	13.94
	NOV	4.15	1.37	13.93	13.96
	DEC	4.11	1.35	13.74	13.91
2007	JAN	4.35	1.42	13.78	14.11
	FEB	4.21	1.41	13.64	14.05
	MAR	4.19	1.43	13.56	13.95
	APR	4.11	1.35	13.33	13.26
	MAY	4.14	1.57	13.38	13.35
	JUN	4.18	1.54	13.14	13.2
	JUL	4.33	1.65	13.29	13.34
	AUG	4.31	1.6	13.04	13.39
	SEP	4.34	1.67	12.87	13.26
	OCT	4.27	1.64	13.24	13.29
	NOV	4.33	1.65	13.39	13.43
	DEC	4.32	1.67	13.32	12.96
2008	JAN	4.37	1.72	13.78	13.41
	FEB	4.37	1.7	13.84	13.26
	MAR	4.43	1.72	14.06	13.48
	APR	4.41	1.71	13.91	13.46

	MAY	4.45	1.71	14.01	13.53
	JUN	4.48	1.7	14.06	13.3
	JUL	4.54	1.67	13.9	13.46
	AUG	4.65	1.68	13.66	13.11
	SEP	4.62	1.73	13.66	13.43
	OCT	4.65	1.74	14.12	13.91
	NOV	4.86	1.61	14.33	13.85
	DEC	4.89	1.65	14.87	14.39
2009	JAN	5.19	2.1	14.78	13.84
	FEB	5.23	2.13	14.67	13.46
	MAR	5.09	1.9	14.87	13.78
	APR	5.12	1.91	14.71	13.66
	MAY	5.1	1.67	14.85	14.13
	JUN	5.28	2.08	15.09	14.41
	JUL	5.09	1.67	14.79	13.94
	AUG	5	1.65	14.76	13.9
	SEP	5.05	1.65	14.74	13.76
	OCT	5.03	1.85	14.78	14.03
	NOV	5.06	1.71	14.85	14.24
	DEC	4.84	1.73	14.76	14.13
2010	JAN	5	1.75	14.98	14.25
	FEB	4.89	1.81	14.98	14.25
	MAR	4.74	1.81	14.8	13.59
	APR	4.49	1.85	14.58	14.5
	MAY	4.58	1.76	14.46	14.38
	JUN	4.45	1.75	14.39	14.23
	JUL	3.85	1.55	14.29	14.03
	AUG	3.74	1.5	14.18	13.97
	SEP	3.53	1.47	13.98	13.81
	OCT	3.58	1.46	13.85	13.64
	NOV	3.54	1.4	13.95	13.77
	DEC	3.59	1.45	13.87	13.69
2011	JAN	3.43	1.25	14.03	13.93
	FEB	3.41	1.41	13.92	13.65
	MAR	3.47	1.37	13.92	13.6
	APR	3.47	1.38	13.92	13.68
	MAY	3.51	1.38	13.88	13.72
	JUN	3.68	1.37	13.91	13.59
	JULY	3.85	1.37	14.14	13.89
	AUG	4.07	1.37	14.32	14.28
	SEP	4.21	1.35	14.79	14.64
	OCT	4.83	1.33	15.21	14.87

	NOV	5.75	1.41	18.51	18.67
	DEC	6.99	1.59	20.04	20.2
2012	JAN	7.66	1.62	19.54	20.38
	FEB	8.01	1.69	20.28	20.53
	MAR	8.01	1.72	20.34	20.53
	APR	9.04	1.58	20.22	20.27
	MAY	8.42	1.59	20.12	20.41
	JUN	7.88	1.46	20.3	20.36
	JULY	8.25	1.66	20.15	19.96
	AUG	7.85	1.58	20.13	20.31
	SEP	7.4	1.55	19.73	19.8
	OCT	6.86	1.6	19.04	19.13
	NOV	8.71	1.58	17.78	18.77
	DEC	6.8	1.6	18.15	17.79
2013	JAN	6.51	1.65	18.13	17.97
	FEB	6.29	1.61	17.84	17.68
	MAR	6.54	1.42	17.73	17.54
	APR	6.39	1.45	17.87	17.71
	MAY	6.53	1.53	17.45	17.6
	JUNE	6.65	1.73	16.97	16.92
	JULY	6.59	1.64	17.02	17
	AUG	6.36	1.67	16.96	16.89
	SEP	6.55	1.64	16.86	16.42
	OCT	6.43	1.63	17	16.96
	NOV	6.61	1.58	16.89	16.5
	DEC	6.65	1.58	16.99	16.51
2014	JAN	6.55	1.56	17.03	16.82
	FEB	6.57	1.49	17.06	16.88
	MAR	6.61	1.56	16.91	16.44
	APR	6.48	1.53	16.7	16.44
	MAY	6.42	1.54	16.97	17.85
	JUN	6.56	1.5	16.36	15.88
	JUL	6.59	1.33	16.91	17.12
	AUG	6.51	1.5	16.26	16.2
	SEP	6.64	1.51	16.04	15.79
	OCT	6.64	1.55	16	15.77
	NOV	6.72	1.52	15.94	15.66
	DEC	6.81	1.85	15.99	15.86

The weights correspond to each bank's market share in either deposit liability in the case of deposit interest rates or loans and advances in the case of lending rates.
Source: Central Bank of Kenya

The data.

1	2005	January	8.26		14.87	73.40	2.60	6.00	3.08	12.12	9.04
2	2005	February	8.59		13.94	73.40	2.60	6.00	3.47	12.35	8.88
3	2005	March	8.63		14.15	73.40	2.60	6.00	3.75	12.84	9.09
4	2005	April	8.68		16.02	73.40	7.00	6.00	3.91	13.12	9.21
5	2005	May	8.66		14.78	73.40	7.00	6.00	4.05	13.11	9.06
6	2005	June	8.50		11.92	73.40	7.00	6.00	4.21	13.09	8.88
7	2005	July	8.59		11.76	73.40	7.40	6.00	4.14	13.09	8.95
8	2005	August	8.66		6.87	73.40	7.40	6.00	4.30	13.03	8.73
9	2005	September	8.58		4.27	73.40	7.40	6.00	4.35	12.83	8.48
10	2005	October	8.19		3.72	73.40	5.80	6.00	4.43	12.97	8.54
11	2005	November	7.84		4.40	73.40	5.80	6.00	4.50	12.93	8.43
12	2005	December	8.07		4.70	73.40	5.80	6.00	4.52	13.16	8.64
13	2006	January	8.23		8.39	71.50	4.10	6.00	4.48	13.20	8.72
14	2006	February	8.02		9.39	71.50	4.10	6.00	4.48	13.27	8.79
15	2006	March	7.60		8.85	71.50	4.10	6.00	4.28	13.33	9.05
16	2006	April	7.02		5.44	71.50	5.80	6.00	4.35	13.51	9.16
17	2006	May	7.01		4.47	71.50	5.80	6.00	4.36	13.95	9.59
18	2006	June	6.60	9.75	4.28	71.50	5.80	6.00	4.35	13.79	9.44
19	2006	July	5.89	9.75	4.16	71.50	7.40	6.00	4.31	13.72	9.41
20	2006	August	5.96	10.00	4.92	71.50	7.40	6.00	4.08	13.64	9.56
21	2006	September	6.45	10.00	5.93	71.50	7.40	6.00	4.04	13.54	9.50
22	2006	October	6.83	10.00	6.55	71.50	6.90	6.00	4.11	14.01	9.90
23	2006	November	6.41	10.00	6.64	71.50	6.90	6.00	4.15	13.93	9.78
24	2006	December	5.73	10.00	7.98	71.50	6.90	6.00	4.11	13.74	9.63
25	2007	January	6.00	10.00	4.63	69.10	7.00	6.00	4.35	13.78	9.43
26	2007	February	6.22	10.00	3.02	69.10	7.00	6.00	4.21	13.64	9.43
27	2007	March	6.32	10.00	2.19	69.10	7.00	6.00	4.19	13.56	9.37
28	2007	April	6.65	10.00	1.85	69.10	8.20	6.00	4.11	13.33	9.22
29	2007	May	6.77	10.00	1.96	69.10	8.20	6.00	4.14	13.38	9.24
30	2007	June	6.53	8.50	4.07	69.10	8.20	6.00	4.18	13.14	8.96
31	2007	July	6.52	8.50	5.48	69.10	6.30	6.00	4.33	13.29	8.96
32	2007	August	7.30	8.75	5.30	69.10	6.30	6.00	4.31	13.04	8.73
33	2007	September	7.35	8.75	5.53	69.10	6.30	6.00	4.34	12.87	8.53
34	2007	October	7.55	8.75	5.38	69.10	6.60	6.00	4.27	13.24	8.97
35	2007	November	7.52	8.75	6.08	69.10	6.60	6.00	4.33	13.39	9.06
36	2007	December	6.87	8.75	5.70	69.10	6.60	6.00	4.32	13.32	9.00
37	2008	January	6.95	8.75	9.40	71.50	1.40	6.00	4.37	13.78	9.41
38	2008	February	7.28	8.75	10.58	71.50	1.40	6.00	4.37	13.84	9.47
39	2008	March	6.90	8.75	11.90	71.50	1.40	6.00	4.43	14.06	9.63
40	2008	April	7.35	8.75	16.12	71.50	2.40	6.00	4.41	13.91	9.50
41	2008	May	7.76	8.75	18.61	71.50	2.40	6.00	4.45	14.01	9.56
42	2008	June	7.73	9.00	17.87	71.50	2.40	6.00	4.48	14.06	9.58
43	2008	July	8.03	9.00	17.12	71.50	2.60	6.00	4.54	13.90	9.36
44	2008	August	8.02	9.00	18.33	71.50	2.60	6.00	4.65	13.66	9.01
45	2008	September	7.69	9.00	18.73	71.50	2.60	6.00	4.62	13.66	9.04

46	2008	October	7.75	9.00	18.74	71.50	-.10	6.00	4.65	14.12	9.47
47	2008	November	8.39	9.00	19.54	71.50	-.10	6.00	4.86	14.33	9.47
48	2008	December	8.59	8.50	17.83	71.50	-.10	5.00	4.89	14.87	9.98
49	2009	January	8.46	8.50	13.22	71.60	5.60	5.00	5.19	14.78	9.59
50	2009	February	7.55	8.50	14.69	71.60	5.60	5.00	5.23	14.67	9.44
51	2009	March	7.31	8.25	14.60	71.60	5.60	5.00	5.09	14.87	9.78
52	2009	April	7.34	8.25	12.42	71.60	1.10	5.00	5.12	14.71	9.59
53	2009	May	7.45	8.00	9.61	71.60	1.10	5.00	5.10	14.85	9.75
54	2009	June	7.33	8.00	8.60	71.60	1.10	4.50	5.28	15.09	9.81
55	2009	July	7.24	7.75	8.44	71.60	.50	4.50	5.09	14.79	9.70
56	2009	August	7.25	7.75	7.36	71.60	.50	4.50	5.00	14.76	9.76
57	2009	September	7.29	7.75	6.74	71.60	.50	4.50	5.05	14.74	9.69
58	2009	October	7.26	7.75	6.62	71.60	3.30	4.50	5.03	14.78	9.75
59	2009	November	7.22	7.00	5.00	71.60	3.30	4.50	5.06	14.85	9.79
60	2009	December	6.82	7.00	5.32	71.60	3.30	4.50	4.84	14.76	9.92
61	2010	January	6.56	7.00	5.95	64.90	6.60	4.50	5.00	14.98	9.98
62	2010	February	6.21	7.00	5.18	64.90	6.60	4.50	4.89	14.98	10.09
63	2010	March	5.98	6.75	3.97	64.90	6.60	4.50	4.74	14.80	10.06
64	2010	April	5.17	6.75	3.66	64.90	7.60	4.50	4.49	14.58	10.09
65	2010	May	4.21	6.75	3.88	64.90	7.60	4.50	4.58	14.46	9.88
66	2010	June	2.98	6.75	3.49	64.90	7.60	4.50	4.45	14.39	9.94
67	2010	July	1.60	6.00	3.57	64.90	7.90	4.50	3.85	14.29	10.44
68	2010	August	1.83	6.00	3.22	64.90	7.90	4.50	3.74	14.18	10.44
69	2010	September	2.04	6.00	3.21	64.90	7.90	4.50	3.53	13.98	10.45
70	2010	October	2.12	6.00	3.18	64.90	11.60	4.50	3.58	13.85	10.27
71	2010	November	2.21	6.00	3.84	64.90	11.60	4.50	3.54	13.95	10.41
72	2010	December	2.28	6.00	4.51	64.90	11.60	4.50	3.59	13.87	10.28
73	2011	January	2.46	5.75	5.42	65.10	7.60	4.50	3.43	14.03	10.60
74	2011	February	2.59	5.75	6.54	65.10	7.60	4.50	3.41	13.92	10.51
75	2011	March	2.77	6.00	9.19	65.10	7.60	4.50	3.47	13.92	10.45
76	2011	April	3.26	6.00	12.05	65.10	6.70	4.50	3.47	13.92	10.45
77	2011	May	5.35	6.00	12.95	65.10	6.70	4.50	3.51	13.88	10.37
78	2011	June	8.95	6.25	14.48	65.10	6.70	4.75	3.68	13.91	10.23
79	2011	July	8.99	6.25	15.53	65.10	5.80	4.75	3.85	14.14	10.29
80	2011	August	9.23	6.25	16.67	65.10	5.80	4.75	4.07	14.32	10.25
81	2011	September	11.93	7.00	17.32	65.10	5.80	4.75	4.21	14.79	10.58
82	2011	October	14.80	11.00	18.91	65.10	4.40	4.75	4.83	15.21	10.38
83	2011	November	16.14	16.50	19.72	65.10	4.40	4.75	5.75	18.51	12.76
84	2011	December	18.30	18.00	18.93	65.10	4.40	5.25	6.99	20.04	13.05
85	2012	January	20.56	18.00	18.31	69.70	4.70	5.25	7.66	19.54	11.88
86	2012	February	19.70	18.00	16.69	69.70	4.70	5.25	8.01	20.28	12.27
87	2012	March	17.80	18.00	15.61	69.70	4.70	5.25	8.01	20.34	12.33
88	2012	April	16.01	18.00	13.06	69.70	4.30	5.25	9.04	20.22	11.18
89	2012	May	11.18	18.00	12.22	69.70	4.30	5.25	8.42	20.12	11.70
90	2012	June	10.09	18.00	10.05	69.70	4.30	5.25	7.88	20.30	12.42
91	2012	July	11.95	16.50	7.74	69.70	4.50	5.25	8.25	20.15	11.90

92	2012	August	10.93	16.50	6.09	69.70	4.50	5.25	7.85	20.13	12.28	
93	2012	September		7.77	13.00	5.32	69.70	4.50	5.25	7.40	19.73	12.33
94	2012	October		8.98	13.00	4.14	69.70	4.70	5.25	6.86	19.04	12.18
95	2012	November		9.80	11.00	3.25	69.70	4.70	5.25	8.71	17.78	9.07
96	2012	December		8.30	11.00	3.20	69.70	4.70	5.25	6.80	18.15	11.35
97	2013	January		8.08	9.50	3.67	65.30	4.30	5.25	6.51	18.13	11.62
98	2013	February		8.38	9.50	4.45	65.30	4.30	5.25	6.29	17.84	11.55
99	2013	March	9.88	9.50	4.11	65.30	4.30	5.25	6.54	17.73	11.19	
100	2013	April	10.38	9.50	4.14	65.30	4.50	5.25	6.39	17.87	11.48	
101	2013	May	9.46	8.50	4.05	65.30	4.50	5.25	6.53	17.45	10.92	
102	2013	June	6.21	8.50	4.91	65.30	4.50	5.25	6.65	16.97	10.32	
103	2013	July	5.92	8.50	6.03	65.30	4.70	5.25	6.59	17.02	10.43	
104	2013	August	10.03	8.50	6.67	65.30	4.70	5.25	6.36	16.96	10.60	
105	2013	September		9.58	8.50	8.29	65.30	4.70	5.25	6.55	16.86	10.31
106	2013	October		9.72	8.50	7.76	65.30	6.00	5.25	6.43	17.00	10.57
107	2013	November		9.94	8.50	7.36	65.30	6.00	5.25	6.61	16.89	10.28
108	2013	December		9.52	8.50	7.15	65.30	6.00	5.25	6.65	16.99	10.34
109	2014	January		9.26	8.50	7.21	66.30	7.00	5.25	6.55	17.03	10.48
110	2014	February		9.16	8.50	6.86	66.30	7.00	5.25	6.57	17.06	10.49
111	2014	March	8.98	8.50	6.27	66.30	7.00	5.25	6.61	16.91	10.30	
112	2014	April	8.80	8.50	6.41	66.30	6.80	5.25	6.48	16.70	10.22	
113	2014	May	8.82	8.50	7.30	66.30	6.80	5.25	6.42	16.97	10.55	
114	2014	June	9.81	8.50	7.39	66.30	6.80	5.25	6.56	16.36	9.80	
115	2014	July	9.78	8.50	7.67	66.30	3.00	5.25	6.59	16.91	10.32	
116	2014	August	8.29	8.50	8.36	66.30	3.00	5.25	6.51	16.26	9.75	
117	2014	September		8.38	8.50	6.60	66.30	3.00	5.25	6.64	16.04	9.40
118	2014	October		8.67	8.50	6.43	66.30	4.70	5.25	6.64	16.00	9.36
119	2014	November		8.64	8.50	6.09	66.30	4.70	5.25	6.72	15.94	9.22
120	2014	December		8.58	8.50	6.02	66.30	4.70	5.25	6.81	15.99	9.18