EFFECT OF INTEREST RATE COMPONENTS ON FINANCIAL PERFORMANCE OF BANKS LISTED AT NAIROBI SECURITIES EXCHANGE

BY

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DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

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ABSTRACT

This paper aim was to study the effect of the components of interest rates on the performance of banks listed at the Nairobi Securities Exchange. The study determined the effects of each of the five components of interest rates; real risk-free interest rates, liquidity premium, default risk premium, maturity premium and expected inflation, through the application of time series and regression Equation. The study used multiple correlations and multiple regression analysis to determine the level and extent of effects, and to test the regression equation, as reflected by the Return on Assets (ROA) of these banks listed at the exchange. The study analyzed data of these banks from 2015 to 2017. The choice of banks was a result of the availability of information through other channels like CBK, NSE, CMA and KNBS. The researcher did not encounter any limitation throughout the research period because the data intended for use was readily available and much of it is at no cost. The research results will assist policy makers and investors alike by using the information in decision.

Key words: real risk-free interest rates, liquidity premium, maturity premium, expected inflation, return on assets, bank performance, NSE

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ABBREVIATIONS AND ACRONYMS

BCBS	Basel Commission on Banking Supervision
BIS	Bank for International Settlements
Brexit	Britain Exit
CBK	Central Bank of Kenya
EU	European Union
G20	Group of 20 industrialized countries
GDP	Gross Domestic Product
IMF	International Monetary Fund
KDIC	Kenya Deposit Insurance Corporation
KBRR	Kenya Bankers Reference Rate
Ltd	Limited
MPC	Monetary Policy Committee
NPL	Non Performing Loans
NSE	Nairobi Securities Exchange
OECD	Organization for Economic Co-operation and Development
ROA	Return on Assets
SMEs	Small and Medium Enterprises
UK	United Kingdom
US	United States of America
WB	World Bank

OPERATIONAL DEFINITION OF TERMS

Components - elements that makes up a whole

Default risk rate - the excess of returns above the risk free rate of interest

Inflation rate - the rate at which the purchasing power of a currency is reduced

Liquidity Premium - the difference between the implicit forward short-term rate and the mathematical expectation of the future short-term rates of interest

Maturity premium - the additional interest rate risk associated with this component of the required return of a long-term bond or loan

Real risk-free rate - return of a riskless asset

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

According to Harvey (2012), the banking crisis of 2007 to 2009 devastated economies around the world and persisted in European economies until 2013. This was partly due to defects in banking regulations, supervision and lack of effective and efficient monitoring of interest rates components. During this financial crisis, banks failed to consider the effects of special purpose entities and structured investment vehicles risks that evolved in their creations. Banks traded and received debts by use of; asset-backed securities, asset-backed commercial papers, collateralized debt obligations all of which were not consolidated with the normal trading activities of the banks.

Banks ended up creating variable interest entities and expected loss notes, while structured investment vehicles risk was hedged by purchasing credit default swaps. The main issue in this scenario is that no consideration was made by these banks in determining the effects of real risk-free rates, expected inflation, default risk premium, liquidity premium and finally maturity premium. Periodic occurrences of banking crisis since the 1930s has had negative effects on world economies which in turn has led to negative economic growth, increased poverty, negative entrepreneurial culture, reduced economic activities and opportunities and labour market difficulties (Harvey, 2012).

Kenya has currently 43 banks, 11 of which are listed at the Nairobi Securities Exchange (NSE). The period between 2012 and 2016 has seen a number of banks and financial institutions in Kenya being placed under receivership and some ended up being wound up. The period has also seen a number of banks being acquired either by internal investing bank or foreign investors. Receiverships and liquidations took place before the introduction of interest rates capping and acquisitions took place after interest rates capping (CBK, 2017). The objective of this study is to determine the effects of interest rates components on the performance of banks listed at the Nairobi Securities Exchange.

1.1.1 Interest Rate

Interest rate can be viewed as the compensation received for deferring consumption (Bondone, 2011). Real rates are simply rates of returns adjusted for inflation and it is a component of

nominal interest rates and also considered as the growth rate of the money purchasing power in a given time period. Banks receive interest rates charged from loans and other advances to customers which are nominal in nature and do not reflect the real and actual returns considering the basic factors of supply, demand and CBK actions that determine the real interest rates and disregarding the expected inflation rate. The optimal real rate of interest is, according to the economist, where demand and supply for funds is at equilibrium. The CBK uses this mechanism through its monetary and fiscal policies to change the demand for money through banking institutions. The expected real return of a one month treasury bill remains constant in the long-run Fama (1975) as cited by Fama (1976). Further, the relationship between the expected returns on bills and the uncertainty in inflation on the returns is consistent with term structure literature where the risk in bills and bonds are equated with the uncertainties in their returns. This finding is inconsistent with the portfolio theory of risk-return approach.

The inflation premium is that portion or that part of a nominal interest rate that represent compensation for expected future inflation. The classical theory focuses on considering inflation in the absence of interest rates which is as a result of debasement of the currency and increase in erosion of purchasing power of money. The erosion of purchasing power of money decreases the interest rates on loans and advances made by banks to its customers. Expected inflation rate affects long-term loans and bonds, while the short-term loans and advances adjust for inflation changes rapidly. Sources of inflation are at the beginning of the period and the expected rates of change in purchasing power at the end of the period (Fama, 1976). The expected inflation, in this case, the change in purchasing power will affect the expected return which is fixed in loan agreements and indenture deeds.

Liquidity premium which is the difference between the forward rate of interest less expected future short interest rates, or that nominal interest rate portion that represent compensation for lack of liquidity (Woodward, 1983). Excessive liquidity is harmful to banks as no income is generated on tied up funds, to forgo liquidity, banks has to earn a premium on advancing these funds. Default risk premium is that portion of a nominal interest rate or bond yield that represents compensation for the possibility of default. Risk premium is the expected return from a risky asset or security in excess of return of a risk-free security. This acts as a shield or compensation towards the risky investment, or in other words, compensation investors

demand for bearing interest rate risk (Tibiletti, 2006). Maturity premium is that risky return required by the bank for risks connected to maturity of loans and advances and which is connected to the risk of time to maturity (Rodriguez, 1998).

1.1.2 Performance of Listed Commercial Banks

Performance of listed banks was measured using return on assets. Return was in the form of interest rates received or charged from loans and other advance to customer borrowing. CBK (2016) report indicated that asset quality registered declined with the non-performing loans ratio increasing to 9.2% in December 2016 from 6.8% in December 2015. This was attributed to a challenging business environment witnessed in 2016 (CBK, 2016). The period between 2012 and 2017 saw a number of banks failing and others acquiring other banks, four banks have fallen under receivership and two financial institutions being liquidated (CBK, 2016). A number of bank have announced dismal performance, example is Barclays Bank that announced a12% drop in its annual profit for the financial year ended December 2016 (CBK, 2017). Another report by Cynton Investments for the third quarter 2017 indicated that listed banks recorded negative earnings per share (EPS) of -8.25%. It was in comparison with the third quarter of 2016 which had a positive EPS of 14.1%. This was attributed to poor net interest income caused by capping of interest rates by CBK. Net interest margins also decreased to 8.4% from the previous 9.4%, that is, a decrease by 1.0% from the previous third quarter.

Stiroh (2006b) had commented that there was a positive link between non-interest income exposure and return volatility which many bank opted as a source of revenue. This, according to him increases bank risk but not bank returns, this as a revenue source, which is now an alternative to banks in Kenya, should not be depended upon as a source of bank returns as it increases the return volatility and thus risk exposure. The Austrian school of economics has stated that business cycles are as a result of distortion in interest rates and due to government's action to control money. Capital misallocation will be experienced when interest rates are kept at controlled or artificial levels, low or high through government intervention leading to the economy going through a recession.

To counter this claim research on components of interest rates was crucial to determine effects of each towards performance of banks in Kenya.

1.1.3. Nairobi Securities Exchange

NSE was founded in 1954 for the purposes of listing equity and debt securities in Kenya; in 2014 it demutualized and became listed. It plays a vital role in growth of Kenya's economy by encouraging savings and investment and assisting companies and investors' access cost-effective capital (NSE, 2018). The NSE operates under the Capital Market Authority of Kenya and is also a member of the World Federation of Exchanges, founder member of the African Securities Exchange Association (ASEA), the East African Securities Exchange Association and a member of the Association of Future Markets.

The NSE trading securities are divided into sectors trading blocks, thirteen in umber; Agricultural, Automobile and Accessories, Banking, Commercial and Services, Construction and Allied, Energy and Petroleum, Insurance, Investments, Investment Services, Manufacturing and Allied, Telecommunication and Technology, Real Estate Investment Trust and Exchange Traded Fund. In the banking sector section we have all listed banks, these are, Barclays Bank Ltd, Stanbic Holding Plc, I&M Holding Ltd, Diamond Trust Bank Kenya Ltd, HF Group Ltd, KCB Group Ltd, National Bank of Kenya Ltd, NIC Group PLC, Standard Chartered Bank Ltd, Equity Group Holding and The Co-operative Bank of Kenya Ltd (NSE, 2018)

The bank listed forms a sample of more than 25% of the total registered as of 31 May 2018 by the CBK were forty-two (42) and one (1) mortgage finance institution. The bank financial statements are readily available to the public at no cost on a quarterly basis with final annual statements at the end of the financial period (CBK Banking Regulations, 2015). The banking lending rates are also available at web of CBK at no cost to the researcher.

1.2 Statement of the problem

The banking sector has in the recent past suffered great losses, and this has been witnessed by closure of several banks and financial institution, acquisition and mergers. Gitonga (2014) indicated that from 1986 more than 40 banks had gone under due to profitability and other banking problems, and CBK (2016) reporting that bank profitability is on a decline. National Bank of Kenya reported a loss for the year 2014/2015 and Co-operative bank reported a drop in profits in 2014.

Between year 2012 and year 2016, four banks and two financial institutions fell under receivership (KDIC & CBK, 2016). Finance companies, Inter Africa Central Finance Ltd and

Central Finance (K) Ltd were placed under receivership and later wound-up on 7th September 2012. Heritage Bank Ltd was placed under receivership and later wound-up on 21st November 2014. Dubai Bank was placed under receivership on 13th June 2015 and it is currently under liquidation. Other institutions placed under receivership are; Imperial Bank which was placed under receivership on 13th October 2015 and Chase Bank placed under receivership on 7th April 2016. The banking sector has witnessed acquisitions of banks by other banks. For instance, I & M Bank Ltd acquired Giro Commercial Bank Ltd effective from 13th February 2017, Diamond Trust Bank (K) Ltd acquired Habib Bank Ltd effective as of 1st August 2017 and SMB Africa Holding Ltd, a foreign entity, acquired Fidelity Commercial Ltd effective from 10th May 2017 (KDIC, 2017). This is an indication that some banks are doing well while others are failing in performance. Further, share prices of listed banks at the Nairobi Security Exchange (NSE) which reflect the investor's view of the sector's performance have been on a downward trend since 2016, for instance performance of high ranking banks, like Barclays bank announced a 12% decrease in its 2016 profits (CBK, 2017). The CBK news further stated that banks are holding more than Kshs 400 billion in liquid cash that is yet to be given out as loans to the public. This seems to be an incentive to depositors who view interest rate income as a way of investing which has been motivated by capping interest on deposits.

A study conducted by Petitjean (2013), on 'Bank failures and regulation' in Europe and the US, stated that the Basel III which will be effective in 2019 requires an equity-capital ratio of 8.5%, while the Central Bank of Kenya recommends a 12%. This is in excess by 3.5% which in effect will lower the banks' ability to make profits in the short-run and influence the liquidity premium in its investment portfolios. The study found that banks that were operating with an average of 10.7% had excess liquid assets that were not making any returns to the institutions. Petitjean (2013) went on and commented that the regulatory attempts to prevent bank failures by defining the amount of capital required for covering risk are regrettably but constantly arbitraged by financial institutions. This action in effect increases risk premium. In this respect, the current strategy of increasing the discretionary price of risk through higher capital requirements is theoretically desirable but falls into many practical pitfalls. In this study the researcher focused on regulation on bank supervision, minimum capital requirements and equity-asset ratio, without

consideration for effects of interest rate components on bank performance which was the basis of this study.

In Kenya, Misati *et al*, (2011) study on 'Interest rate pass-through in Kenya' used autoregressive distributed lag specification re-parameterized as an error correction model and mean adjustment lag methods. The study found incomplete pass-through of policy rates both in the short and the long run. The study also showed that it takes approximately two years for a policy on interest rate to be fully transmitted to long-term rates. The study used interest rate pass-through; the researchers did not use interest rate components to test the interest rate pass-through. Other studies on these components has been taken with other unrelated variables, this make this study add another perspective in the determination of bank performance. These knowledge gaps led the study to consider investigating the effect of components of interest rate on the performance of commercial banks listed at the NSE.

1.3 Research Objectives

1.3.1 General Objective

To establish the effect of components of interest rate on financial performance of banks listed at Nairobi Securities Exchange.

1.3.2 Specific objectives

1) To determine the effect of risk-free interest rate on financial performance of banks listed at NSE
2) To establish the effect of inflation rate on financial performance of banks listed at NSE
3) To evaluate the effect of liquidity premium rate on financial performance of banks listed at NSE
4) To determine the effect of maturity premium rate on financial performance of banks listed at NSE

1.4 Research hypotheses

i) H_{01}: *Risk-free rate has no significant effect on financial performance of banks listed at NSE.*

ii) $H_{02:}$ *Inflation rate has no significant effect on financial performance of banks listed at NSE.*

iii) H_{03}*:. Liquidity premium rate has no significant effect on financial performance of l banks listed at NSE.*

iv) H_{04}*: Maturity premium rate has no significant effect on financial performance of banks listed at NSE.*

1.5 Significance of the Study

The study will be useful in decision making in the banking sector and contribute to knowledge that will be applied in future studies. In view of those studies that have been carried out, researcher in these studies overlooked the effects of components of interest rate. The research considered the effects of real risk-free interest rates, liquidity premium, maturity premium and expected inflation as factors crucial to determination of interest rates in general, and their significance in the overall contribution and the effect they had on bank's returns. This in itself is a new area of study that will enrich researchers in this field.

1.6 Justification of the study

The study was important in that it opened up new research fronts in determining the performance of banks in sub-Saharan Africa, where some countries within the region regulate interest rates without considering the effects of these components that adversely affect performance of banks. In determining performance of banks these components must be monitored adequately and to be considered as essential elements in determination of the overall bank performance. The study will also benefit policy makers in determining the effects of these interest rates components to form an optimal equilibrium by use of the optimal regression equation, this will enable banks operate profitably.

1.7 The scope of the study

The study covered all the 11 banks that are listed at the Nairobi Securities Exchange. These banks are headquartered in Nairobi and the information that the researcher require is readily available at all banks websites and all the regulators. The research did not use qualitative assessment form of study to obtain information from management of these banks regarding the operations of these banks but obtained quantitative information from CBK.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This research is based on the effects of components of interest rate perspective on performance of listed banks at the NSE. The five components are; real risk-free rate, expected inflation, liquidity premium and maturity premium. The research considered banking regulations recently introduced by the CBK. Banks in Kenya operates under the Banking Act Cap 488 (2015) revised. The banking act contains regulations that streamline and standardize these regulations. Some of these regulations which are in effect are: minimum capital requirement (Kshs One Billion) that all banks must deposit and maintain with the central bank in order to operate in this sector; interest rates on deposit by customers at 70% of the base interest rate; interest rate on advances and loans to customers at a maximum of 4% above the set base interest rate as directed by CBK after every three months (90 days). This chapter covers the theoretical review, empirical review, conceptual framework and the summary of literature.

2.2 Theoretical Review

The main theories discussed in this study are: Austrian Business Cycle Theory: The Neo-Classical Theory of interest; The Theory of Liquidity and The Theory of Loan (Spahija, 2016).

2.2.1 Austrian Business Cycle Theory

This theory was advanced by Bohm-Bawerk (1841-1914) and Mises (1881-1973). This theory states that interest is the price of time as a reward for time preference, and that individual prefers present income and consumption as opposed to future income and consumption. The decision is done subjectively rather than objectively based on time preference of borrowers and lenders. Becker and Mulligan (1997) stated that time preference which is the backbone of Austrian School Theory of interest rates, plays a fundamental role in theories of economic growth, saving and investment and asset pricing. Using empirical tests the researcher found that time preference varies across individuals and across countries, and also that wealth causes patience. Individuals tends to engage in activities that responds in the direction predicted by utility maximizing behaviour to changes in the level of resources, likelihood of an event or to the cost of accumulating future oriented capital.

In an analysis of Mises work (Gunning, 2005) and critics of the work, concluded that Mises view or praxeological axiom, on time preference, was that, in choosing between alternatives courses of action, individuals will consider effects of an alternative taken on a given time period, and that satisfaction of these alternatives would not be postponed indefinitely, the future in this case is a factor in their actions. Gunning (2005) further stated that, based on assumptions that valuation of present goods relative to future goods differ because of specialization in the satisfaction of wants.

Patruti and Topan (2012) on time preference, growth and civilization research found that economic progress is driven by savings and that people decide the proportion between savings and consumption according to their time preference, the preference of present to future consumption. The researcher observed that decrease in social time preference lead to lengthening of the structure of production and in turn increases the average productivity of labour. A given society displays a certain relationship between process of civilization and the social time preference, concluding that interest rate is the best measure or indicator of people's time preference. The theory is helpful as it can enable a researcher in deducing the rate of interest in relation to time preference of individual investors or entrepreneurs. It is also useful in assisting valuation of economic goods with an economic life due to their scarcity.

2.2.2 The Neo-Classical Theory of Interest

The main proponents are Jeremy Bentham (1748-1831), Carl Menger (1840-1921), Leon Walras (1834-1919) and Herman Heinrich Gossen (1810-1858). This theory views interest rates in several perspectives: as a factor of savings, investment and consumption; as a factor of profit rate from investments and investment risk compensation; as a factor of revenues, capital efficiency in productivity, the main theme and argument based on laws of decreasing marginal utility. According to this theory, the rate of interest is determined by the demand for and supply of loanable funds, loanable funds are flows over time.

Hsing (2010) when determining the impact of government debt on long-term interest rate for Greece focused the study on world long-term interest rate and exchange rates as these were considered to be potential variables that explained international capital flows in supplying loanable funds. Secondly, the study also considered and focused on the application of comparative-static analysis in determining the theoretical sign of a change in one of the

exogenous variable on the equilibrium long-term interest rates. Lastly, employment of the latest data available in empirical work which results would have more policy implication. The study by Hsing (2010) which used the extended open-economy loanable funds model showed that more government debt as a proportion GDP raises the government bond yield and a higher real short-term interest rate had a higher proportionate change in real GDP and a higher expected inflation rate, a higher EU governments bond yield, and a higher effective nominal exchange rate raised the Greek government bond yield (Hsing, 2010).

Using the conventional closed-economy loanable funds model, the researchers found similar results but with a lower explanatory power (Hsing, 2010). The study also found that, under the conventional open-economy loanable funds model, the same results as those of the closed-economy loanable funds model but with the exception of GDP, cash flows and expected inflation rate coefficients were insignificant at 10% level. The study strengthened the Maastricht Treaty's criteria, government debts not to exceed 60% of GDP and 3% of the budget deficit to GDP. The Greek government borrowing was 112% and budget deficit was 12%, both ceilings exceeding the treaty's criteria (Hsing, 2010).

During a credit crunch asset prices fell, reduced cash flows are experienced with higher interest rates. In 1980's and 1990's OECD countries suffered credit crunch, loan losses and lower asset prices affected equities of the banking sector which caused banks to pull back on their lending and to increase interest rates spread (Holmstrom & Tirole, 1997).

Holmstrom and Tirole (1997) in an empirical test on distribution of wealth across firms, intermediaries and informed investors on how it affects investments, interest rates and the intensity of monitoring in a credit crunch, regression analysis, the researchers' empirical model used, found that in a capital tightening credit crunch, a collateral squeeze and a savings squeeze, had a higher effect on poorly capitalized firms and each shock had a significant effect on interest rates, monitoring intensity, the solvency of the intermediaries and the firm's leverage.

Hayes (2010) contended that disequilibrium in the goods market affects the rate of interest, and that the theory of loanable funds relies on income. In this critically analyzed paper on the works of Robertson (1940), Hicks (1939) and Keynes (1930) was of the opinion that loanable funds theory postulates that disequilibrium in the goods market affects the rates of interest.

2.2.3 Liquidity Preference Theory of Interest

This theory is based on supply and demand for money, bonds demand, profit and price, investment risk on lending, speculative motives and role of money for public and private agents. This theory was advanced by Maynard Keynes (1883-1946), and the theory solely emphasized the role of money in demand and supply to explain interest rates.

Brechling (1957) formulated four models of regression analysis, when re-examining the basic relationship of the liquidity preference theory of interest and empirically tested these models, the researcher concluded that the amount of money which people hold as a store of wealth depend on the amount of wealth available and not only on the rate of interest alone. The quantity of money which is part of the wealth affects the rates of interest under normal open-market operations.

In a different research in the US a cross-section of 798 families were used to estimate the life-cycle of consumption using a regression model that incorporated endogenous liquidity constraints found that liquidity constraints shortened family's effective planning horizons and which showed that wealthier families had a substantial amount (bequest) to spend because no liquidity constraints while liquidity constrained families had short multi-period horizons in their planning (Mariger, 1987).

Bongaerts, Tong and Driessen (2011) brushed the notion that illiquid assets sell at low prices while liquid assets sells at higher prices. The paper was empirically testing derivative pricing with liquidity risk. The researchers used a Generalized Method of Moments model to a sample of credit default swaps bid and ask quotes over a period of five years (2004-2008). The researchers found that there was significant and robust evidence that liquidity affects credit default swaps prices consistent with predictions of the theoretical model, where the credit protection sellers received a liquidity premium. Bongaerts et al (2011) were of the opinion that optimally short selling investors can receive a higher price for illiquid assets than liquid assets sellers with a lower risk aversion, more wealth or a short horizon. The model also applied to derivative assets.

Mancini, Ranaldo and Wrampelmeyer (2013) research on market liquidities using regression analysis model between different currencies found variations in liquidity which was significant with substantial costs due to foreign exchange (FX) illiquidity for carry traders. They

also found that there was commonality in liquidities, strong co-movements across liquidity of different currencies which were developed by shock that affected the FX market as a whole, not an individual FX rates. Mancini et al (2013) also found that the liquidity co-movements was as a result of US equity and bond markets when illiquid, which also impaired the diversification ability of the markets in the international arena and cross-asset class diversification in order to reduce liquidity risks. Low interest rate currencies tended to have higher liquidity, low sensitivity (liquidity) to market wide liquidity and low betas.

Liquidity theory is an opener to determination of liquidity in assets and the costs of holding those assets. Interest rates are on the other hand a measure of benefits received or forgone in form of liquidity premium.

2.2.4 Time Preference Theory of Money

This theory was advanced by proponents such as Knut Wicksell (1851-1926), Woodford (2000, 2003), Bonfin (2001) and Neiss and Nelson (2003). The theory dwells on interest rates in the market and economy time-preference of money, productivity of capital goods, income today and in the future, population and supply of labour force, fiscal policies, borrowing and lending, risk-return phenomenon and inflation changes, market structure and its efficiency and distribution of risk, liquidity and savings.

Hurlin and Kierzenkowski (2001) on 'theoretical and empirical assessment of the bank lending channel and loan market disequilibrium in Poland' on the efficiency of the monetary policy transmission used a credit-augmented model with controlled interest rates, flexible prices and an imperfect nominal wage indexation, found that the banking lending channel amplifies the impact of monetary policy shocks on out and prices as compared to traditional interest rate channel. Variations between interest rate spread and the loan rate and Central Banks' intervention rate was found to be a good indicator to distinguish between amplification and attenuation effects of monetary policy shocks when there is a positive relationship between the two rates and loan interest rates is a market clearing variable. The above observation and findings becomes a good indicator to measure the efficiency of monetary policy impulses (Hurlin and Kierzenkowski, 2001).

2.3 Empirical Review

The banking industry is highly regulated and governed by state institution in all jurisdictions in the world. The key roles played by banks must be safeguarded by governments to prevent costly repercussions when they fail and cause instability in the economic system (Tchana, 2008). In this section of the study a review on the interest rate components is presented. The empirical review will be based on the effect of real risk-free interest rates, inflation rate, default risk premium, liquidity premium and maturity premium.

2.3.1 Risk-free interest rate and performance of commercial banks

Fisher-Black Model views the risk-free interest rate as the return of a riskless asset (Logue & Simkowitz, 1975). A riskless asset or portfolio has a covariance of zero with the market index and a beta factor of zero. Treasury bills and bonds yield rates are generally used to estimate the real risk-free interest rates on securities. The state preference model does not consider this to be a good approximation since subjective probabilities determine the price which an investor is willing to part with or pay for the asset, but in this case, the researcher will consider the CBK treasury bonds as the best approximation of risk-free interest rates. In all states of the economy the CBK treasury bonds will pay-off and the risk-free dictum prevails, other pay-offs of investment combinations cannot realize this dictum (Logue & Simkowitz, 1975).

Karagiannis *et al*, (2010) research on interest rates, used a regression analysis model, bank loans and credit expansion were found to be the three channels that central banks use as tools in its monetary policy to stimulate the main macroeconomic variables. When the CBK raises interest rates this correspondingly increases the funding costs of banks and reduces growth in loans. When the government through CBK sells securities to investors at risk free rate, it reduces liquidity in the economy by reducing the money supply and vice versa. Mankiw (2005) stated that money supply and risk-free interest rates can describe monetary policy. The action of investors in purchase and sale of government securities will establish equilibrium that will give a risk-free interest rate that is equal to, or equivalent to that of government securities in the open market operations.

Kamau and Were (2013) on what drives banking sector performance in kenya found that banks accounts for about 3% of the GDP in their income and that banks increased substantially new branches in the country to counter all possible sources of income from all corners. The interest rate spread between lending and borrowing was 11.1% in April 2016 but dropped to

5.8% in October 2016 after regulations on interest rates capping (CBK MPC report). This drop in spread is bound to contract earning capacity of banks given the volatile nature of other income to supplement the deficiency (Smith *et al.,* 2003). The relation between GDP and bank performance was found to be insignificant by Kamau and Were (2013) in determining the performance of banks, disregarding whether the economy is growing or not they made profits, an implication that the spread is wide enough for banks to depend solely on interest rate income.

According to Enyioko (2012) interest rate policies have not improved the overall performance of banks significantly and have contributed marginally to the growth of the economy for sustainable development. Khan & Sattar (2014) Opine that there is strong positive correlation between interest rate and commercial banks profitability meaning that as the value of interest rate increase/decrease bank profitability is affected either way. As banks are operating in very competitive environment, it has become obligatory to offer handsome rates to depositors to attract liquidity. A Stable banking system requires a stable macroeconomic environment which adds to efficient and effective growth of saving and investment decisions. Miller (2013) postulates that interest rates comprises; profit, overheads and cost of the funds, the rationale interest rate caps are used by Governments for range of political and economic reasons, most common of which is to support a specific industry or area of the economy. Interest rate ceilings can be justified on the basis that financial institutions are making excessive profits by charging exorbitant interest rates to clients, Government intervention is required to protect vulnerable clients from predatory lending practices (Miller, 2013). This behaviour of the legislature affects determination of interest rates and the components thereof.

Misati *et al,* (2011) tested interest rates pass-through and found a sticky pass-through in the short-run and the long-run. They also found that, policy interest rates and commercial banks rates both for lending and deposits a stickiness of policy transmission, this, in their opinion creates inefficiencies in the money markets and creates serious challenges for implementation of monetary policies and it impairs monetary policy effectiveness in achieving its objectives.

2.3.2 Inflation rate and performance of commercial banks

Inflation is the rate at which the general level of prices for goods and services is rising. Inflation rate, then, is the rate at which the purchasing power of a currency is reduced. Inflation rate is measured by taking the difference between nominal interest rates and real interest rates. I_n-I_r = I_f;

where I_n is nominal rate of interest, I_r is the real rate of interest and I_f is the Inflation rate. In this paper we shall present the effects of inflation rate on invested funds in the banking sector; loaned funds to investors and the real rate of return when inflation rate is factored in our model. In a real world situation, an increase in expected inflation rate always decreases wealth as it increases the opportunity cost of real balances and alternative decreases holding of real balances (Keynes, 1919)

There are two main sub-theories of inflation; institutional theory of inflation and money stock theory of inflation. The first theory is assumed to be people driven while the second theory is government driven through Central Banks. Keynes (1913, 1919) works, was of the view that inflation of a depreciating currency is not advantageous to the economy and trade but is a detriment to the country as a whole, he further condemned inflation by aligning it with capitalist states who deprive its citizens through currency debauch in a hidden format that no one will detect. Inflation reduces the purchasing power of currency which in turn deprives investors their hard-earned income indirectly. Matching of expected returns from actual returns becomes difficult because of changes in inflation rates, which makes banking businesses, operate in risky environments with high levels of uncertainty on the future (Keynes, 1913, 1919).

Buchanan and Wagner (1977) has condemned Keynes theory as the resultant of the current notion of inflation, which they argue could not be clear and a present danger to the free society as it has turned out to become. Keynes (1913) has referred to inflation as a rearrangement of riches that violates the principles of distributive wealth (justice). This justifies the notion that inflation affects outcomes of operations in the real world of business; actual outcomes from operations are a hard thing to determine when varying rates of inflation are experienced in a real world of operating business cycle. Stulz (1986) findings on the asset pricing and expected inflation, found that that there was an inverse (negative) relationship between expected real returns on common stocks and expected inflation. The empirical tests made revealed that the fall in real wealth emanating from an increase in expected inflation decreased the real rate of interest and real rate of return of the market portfolio. This explains the role of inflation in real investments when the level of inflation rise with the real rates of inflation on returns drops and vice versa.

Geske and Rolls (1983) empirical test using regression analysis on the real rate of return and expected inflation showed some evidence that negative relations between ex-ante stock returns and expected inflation may be partly spurious, that is, without a conclusive outcome. Other researchers like Hasbrouck (1984) stated that the argument does not hold when taken into account an ex-ante measure of variability of real activities, but Stulz (1986) empirical test using the regression model he developed found that variability of real activities and expected inflation are negatively related.

Fama and Gibbons (1982) hypothesized that a negative relation between endogenously determined ex-ante returns on risk assets and expected inflation, when the level of economic activity rises, inflation and desired capital expenditure rises with the resultant that an increase in demand for funds in production is experienced. Sarig, Ofer and Kandel (1996) in Israel tested the Fisher hypothesis that real interest rates are independent of inflation expectation, found that there was a negative correlation between real interest rates and expected inflation and that nominal interest rates includes an inflation premium, this premium is high when the inflation uncertainty is high and vice versa. Fisher (1896) suggested that the sum of the real rate and the rate of price change expected to occur is nominal rate of interest on a bond. This relation of inflation effect on nominal interest rate is the 'Fisher' effect.

Kaul (1990) in an regression analysis on the impact of changes in monetary regimes on the relation between stock return and changes in expected inflation in post war period from four developed countries; US, Canada, UK and Germany found that the relation between real stock returns and changes in expected inflation was significantly negative in the four countries. The researchers went on and stated that the relations were counter-cyclical monetary responses created by Central Banks of these countries. The counter-monetary measures generated by the Central Banks of these countries were relations between stock returns and expected inflation and money supply regimes and stock returns and expected inflation and interest regimes as compared to money supply regimes. According to Kaul (1990), where money supply regime is stable the country experienced negative inflation real activities relations, and inflation rates are dominated during unstable monetary regimes.

Fama (1975) and Fisher (1930) stated that a perfect well-functioning capital market, and perfect foresight, a one period nominal rate of interest and expected inflation can form the

equilibrium real return. Fama (1975) emphasized that in the previous periods, that is, after the Second World War; literature has found definite relationship between nominal interest rates and rates of inflation and that during this period Treasury Bills' market interest rates were predictors of future or expected inflation rates. Saracoghu (1984) concurred with Fama (1975) that expected inflation and real interest rates can form the basis of estimating nominal rates of interest but added an error term in the expected inflation rate to determine the actual rate of inflation.

2.3.3 Liquidity premium rate and performance of commercial banks

Woodward (1983) gave the definition of liquidity premium as the difference between the implicit forward short-term rate and the mathematical expectation of the future short-term rates of interest. The term is also explained in economics as the difference between two similar types of financial securities but with different liquidity. In some cases it is defined as the spread between the forward rate of interest and the expected short-term rate, which we shall apply in our case; Liquidity premium: L_p is thus calculated or obtained using the expression below; L_p = Forward rate – expected short-term rate. Interest rates ascends systematically through history, when historical stationarity of interest rates is observed, it implies the liquidity premium is positive. Hicks (1964) and Keynes (1930) had a similar opinion of the changes in forward rates to be greater than the expected future rates, this, as they noted is caused by risk aversion. Future interest rates variations affects the value of long-term bonds more than short-term bonds, and it will be normal to induce risk-aversion investors with a yield premium well above the normal interest rates to hold the less liquid long-term bonds which is more risky due to their dynamic market changes.

Liquidity regulation and activities restrictions also restrain banking risk but only in a case of a high level of institutional quality. Degryse and Ongena (2015) postulates that fiercer competitions in the banking sectors lowers the spread, but also spur banks to the customers in relationships that probably encompass more fee related products and cross selling. Relationships shield rents, providing an explanation for the steep growth in fee income sought by banks. Relationship duration seems not uniformly linked to higher loan spreads. As for location as a source for bank rents Degyse and Ongena (2013) found that close borrowers pay a higher loan rate. The effect of credit on availability saw small though distance effects on branch efficiency seem minimal, distance constraints lending to informational difficult but sound firms.

According to liquidity preference theory, holding money in liquid is dependent on the rate of interest in saving for future consumption, and also to equate the demand for and supply of money. It has been observed by many scholars that there is a liquidity premium attached to long-term bonds and loans over and above the short-term bond and loans. Cagan (1969) and Roll (1970) in their books do show the applicable rates of long-term bonds over short-term bonds. The gap between the two sets of preferences, that is, long-term and short-term preference is not consistent in different periods (McCulloch, 1975). From the current literature it is not clear whether this is due to liquidity preference or other factors in the market setting.

McCulloch (1975) in a paper on estimating the liquidity premium found that there is a liquidity premium and which was significantly greater than zero. The longer the maturity the greater is the uncertainty of the security and the higher the risk to the investors. The investors of long-term securities should be compensated for the high risk associated with the bond in form of a premium, which is attached to interest payable at the end of the period or on maturity due date (Horne, 1964). As Stated above the liquidity preference theory states that rates of return on default free securities are an inducement for sacrificing liquidity. The level of sacrifice is directly related to foregone money on maturity. The longer the maturity the higher the interest rates to induce investors in buying or committing their money up to the maturity date and therefore, differences in short-term and long-term interests are there to offset differences in liquidity.

Horne (1964) finding on 'liquidity premiums and the government bond market' paper produced evidence that the market connects risk with length of time to maturity and that a premium is anticipated for the sacrifice in liquidity forgone, and increased with the length of the maturity but on a diminishing rate and levels off after 10 years.

In a recent paper (Anson, 2010), the researchers were determining or measuring a premium for liquidity risk found that, it was difficult to quantify, parse, hedge and enhance liquidity risk, the findings concluded that the liquidity premium should be isolated for trading, if not so, this part of the financial market will remain least efficient.

This paper seek to determine the effects of liquidity premium rate towards long-term loans and bonds issued by listed banks at NSE, notwithstanding the regulations adopted by the CBK to regulate interest rates on advanced loans.

Banks in Kenya as we have mentioned in Chapter One, operates under the Banking Act Cap 488 (2015) revised. The banking act contains regulations that streamline and standardize these regulations. Some of these regulations that are the subject of this study are: minimum capital requirement (Kshs One Billion) that all banks must deposit and maintain with the central bank in order to operate in this sector; interest rates on deposit by customers at 70% of the base interest rate; interest rate on advances and loans to customers at a maximum of 4% above the set base interest rate directions issued by CBK after every three months (90 days). Under this kind of regulations banks are faced with challenges of breaking even and which has led shares of listed banking companies at the NSE dropping systematically when these regulations are put in place.

2.3.4 Maturity premium rate and performance of commercial banks

The maturity premium is the additional interest rate risk associated with this component of the required return of a long-term bond or loan, or, in other words, extra average returns from investing in long-term securities as compared to short-term securities. The longer the maturity of a bond or loan, the higher the risk on interests received. The maturity premium rate is obtained by solving the following expression; Maturity premium = $\text{Yield}_{\text{long-term}} - \text{Yield}_{\text{short-term}}$ (Rodriguez, 1998).

Lenders of funds in terms of fixed deposits interest bearing certificates and issuance of corporate bonds and bills in funding their operations, requires a higher return on their funds and this has some impact on performance of banks as the net interest cost increases, it reduces income which is a measure of performance. As cited in Chapter One, Macpherson (2016), stated that, an emerging pattern suggests widespread existence of systematic challenges in the Kenyan banking sector, which include, questionable governance practices, weak supervision and rampant fraudulent activities. The legislature, through the Banking (Amendments) Act 2015, enhanced bank regulation by capping interest rates chargeable by banks to borrowers and the interest rate that banks should pay to depositors. This action by the CBK and the legislature increased the net interest cost of borrowing by banks as result of paying higher interests rates on deposits, whether fixed or saving, to a minimum of 7%, initially the cost on saving was ranging between 1.5% to a high of 3.5% and for fixed deposit accounts a high of 8% (CBK 2016).

Rodriguez (1998) research using regression analysis on default risk, yield spread and time to maturity paper concluded that bond risk premium depend on maturity in a complex way. The researcher found that yield spreads could increase or decrease with maturity monotonically; in other maturity intervals there could be increases or decreases. These findings brought conflicting results in the empirical results of the research literature. Firms chose debt maturity structure for a number of reasons (Mendez, 2013) which include firm's options for growth, the maturity of existing assets, level of asymmetric information and the rate of income taxes. Firms in different countries have different maturities priorities depending on the level of economic activities, stock markets and the banking industry/sector.

The firm-bank relationship also plays a significant role in determining the maturity, where concentration of banks is high the longer the maturity of bank loans (Hernandez & Koeter, 2008). They also found that smaller firms tend to use short-term debts and bigger firms longer-term debts of the listed banks. The findings also show that firms with low credit score borrow on a shorter-term compared to firms with high credit scores. From the above evidence, the researchers concluded that term structure of interest rates and the probability of default are the determinants of the differential between the small firms and large firms. The higher the slope of the term structure of interest rates the longer the debt maturity in small firms in both low and high risk firms.

2.4 Conceptual Framework

The study determined the objectivity of the components of interest rates, that is, real risk-free rates, expected inflation rate, default-risk premium, liquidity premium and maturity premium, and determined the effect of these components on the performance of banks listed at the Nairobi Securities Exchange.

The conceptual framework model is depicted below, Figure 2.1.

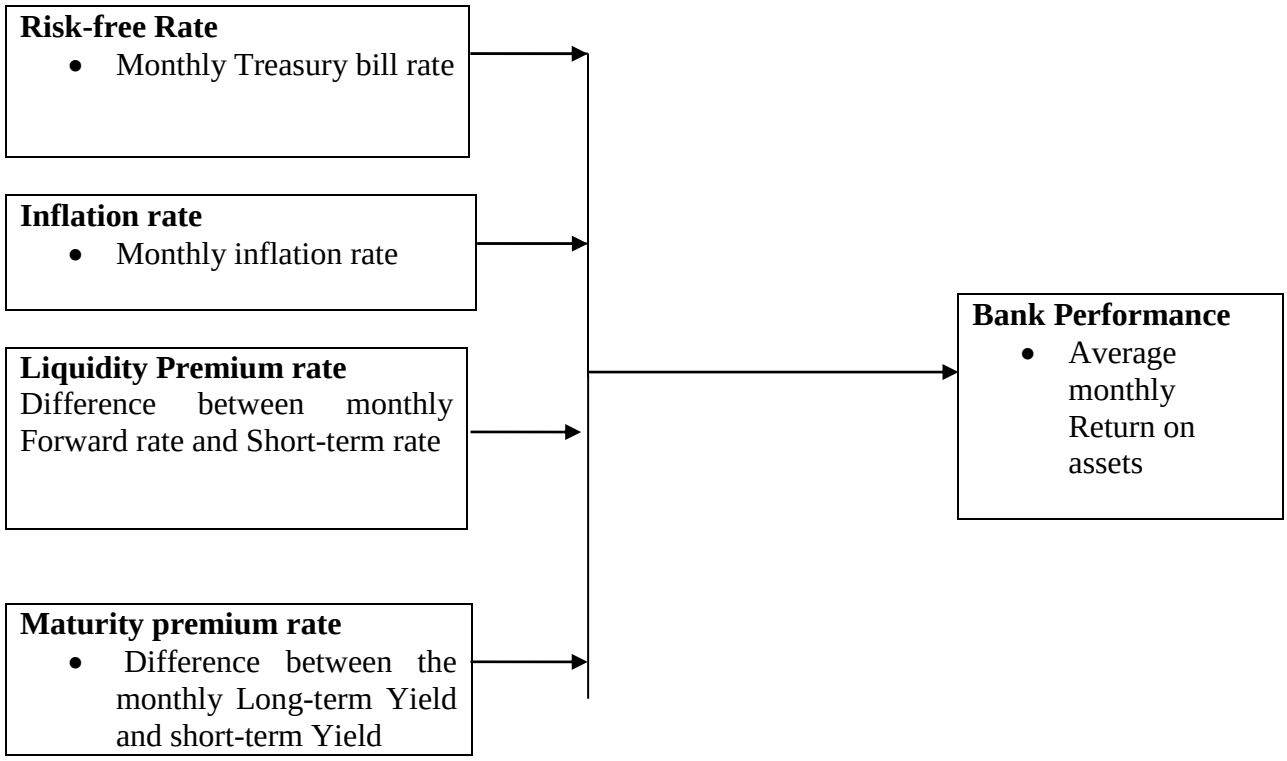

FIGURE 2.1: Conceptual Framework

Source: Author (2018)

2.5 Operationalization of Variables

The Operationalization of dependent and independent variables will be achieved through the expressing the data that will be obtained from the published financial statements of the study objects and data supplied to Central Bank of Kenya, in ratios that will facilitate analysis as ratios makes it possible to compare different values and obtain their relativity than comparing the absolute numbers. Risk-Free Interest Rates will be determined and measured by the rates prevailing at the time, of the treasury bills issued by the central bank of Kenya. Inflation rates will be the rates offered by the central bank and Kenya National bureau of statistics, these rates are published on monthly basis and distributed to the central bank statistic department for further use by the economic department. Liquidity premium will be the difference between Forward rate and Short-term rate of loans and advances made by banks. Maturity premium will be calculated

using the difference between the Long-term Yield and short-term Yield whose formula is as follows; **Maturity Premium=*Yield*** $_{long\text{-}term}$ **– *Yield*** $_{short\text{-}term}$.

The table below shows the list of variables both independent and dependent variables for the study, their definitions and how they will be expressed as ratios. Different ratios will be obtained to represent each of the variables as indicated in table 2.1.

Table 2.1 Operationalization of Variables

Variable	**Data to Measure/Measurement Scale**
Dependent Variable	
Bank Performance	Average monthly Return on Assets
Independent Variables	
Risk-Free Interest Rate	Monthly Treasury bill rate
Inflation Rate	Monthly inflation rate
Liquidity Premium	Difference between monthly Forward rate and Short-term rate
Maturity Premium	Difference between the monthly Long-term Yield and short-term Yield

2.6 Summary of Literature

The theories of interest rates as advanced by different scholars view interest rates in terms of time-preference, themes being current versus future gains as a return on investment or capital, investment compensation, inflation changes and distribution of risk, liquidity and savings. These theories support the objectives of this study. Researchers like Tchana (2008) cautioned governments to prevent costly repercussions when banks fail because they cause instability in the economy. Control of interest rates through its components might bring sanity in the banking sector and widen the view on causes of economic changes through the banking sector. Literature by various scholars like Fisher and Black, in their model and in their view that every asset has risk whether government guaranteed or individual asset is a foundation to open the gate for research to be conducted from different perspectives to close the gap in economic failure especially through the catalyst, banking sector. Researches in macroeconomic policies has found that these policies affect interest rates than any other external events (Rosseti et al, 2017), these findings gives a stimulant in determining which of the components of interest rates has more effects when these macroeconomic policies are in place.

Inflation theories, whether institutional or money stock theory has stated that inflation has a detrimental effect on the economy as a whole (Keynes, 1913). Other scholars like Stulz (1986) found that inflation has an effect on interest rates, that is, real rates of return. Hasbrouck (1984), Gibbons (1982), Geske & Rolls (1983) and Kaul (1990) had a similar opinion. Researchers has also found that above the normal interest rates charged or paid by banks on fixed and other similar deposits is well above the real risk-free interests, which comprises a premium on defaulting-risk, on liquidity or on maturity. The CBK has pegged (capped) interest rates on advances and on deposits, these are at 4% above the treasury bonds on loans advanced and 3% below the treasury bonds on customer deposits. These actions by the CBK creates a barrier that restricts the banking sector players to determine these premiums (maturity, liquidity and default-risk) to be passed to customers according to the terms of the loan contract or customer deposit contract.

Research conducted in Kenya has not touched on the effects of interest rates components on the banking sector, or in general the effects of interest rates. This research considered the effects of interest rates components on performance of listed banks at the Nairobi Securities Exchange which no other researcher has done.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

In this chapter a detailed outline of how the investigations were carried out is given. How data was collected, what instruments were employed, how data was analyzed and interpreted.

3.2 Research Design

The study adopted descriptive research design. Descriptive research design is defined as a type of research where the researcher inquires into a problem and reports as it is without interfering with it Mugenda and Mugenda (2003). The data intended for this research was obtained and/or collected from the websites of Central Bank of Kenya (CBK), Nairobi Securities Exchange (NSE), Capital Markets Authority (CMA), Kenya National Bureau of Statistics (KNBS) and individual banks' websites to answer the research hypotheses/questions and correlating it with the bank performance. There was no direct communication with any of the banking institution during the research period.

3.3 Target population

The study target population was all banks listed at the Nairobi Securities Exchange, they are eleven in number, out of a total of forty-three banks which are operating in the country. These banks have all the available information that the researcher requires, in the website of the Central Bank of Kenya (CBK), individual bank's websites, the Capital Market Authority (CMA) website and Nairobi Securities Exchange (NSE) website.

3.4. Sample Size and Sampling technique

The study adopted census method to select all the 11 listed banks. This is a method where every unit in the population is selected, that is, the universe. This method is necessary because the population of listed banks is small and only a few banks are listed, taking a sample of say 30% as recommended by Mugenda and Mugenda (2003) might lead to giving meaningless results.

3.5 Data collection

The study used secondary data from year 2013 to 2017. This was data that has already been collected and recorded and readily available. Data on risk free rate, inflation rate, liquidity premium and maturity premium; was collected from the listed banks websites, Capital Market Authority, the Kenya National Bureau of Statistics and Central Bank of Kenya. Secondary data

was faster to obtain, less expensive and involves less activity. The study used past financial statement of the banks for the desired period 2015 to 2017. The researcher obtained quarterly and monthly return on assets of these banks from the CBK and CMA websites at a fee, for the period 2015 to 2017.

3.6 Data Analysis and Presentation

Fixed Time series model was adopted in this study. The model was specified as follows:

$$Y_t = \beta_0 + \beta_1 I_{et} + \beta_2 R_{ft} + \beta_3 L_{pt} + \beta_4 M_{pt} + \mu_t \quad (1)$$

Where: Y_t = Financial performance = R.O.A = *Net income /Total assets,* β_0 = Constant related to the Time series Model; $\beta_1, \beta_2, \beta_3, \beta_4$, = The coefficients of the variables (I_{et}, R_{ft}, L_{pt}, and M_{pt}), I_{et} = Monthly inflation rate = *{(1+R) / (1+r)}-1, Where; R-nominal rate; r-real rate,* R_{ft} = Monthly risk-free rate = *{(1+R)/(1+i)}-1, Where; R-nominal rate; and i-inflation rate,* L_{pt} = Monthly Liquidity premium rate = Monthly *Forward rate – expected monthly short-term rate,* M_{pt} = Monthly maturity premium = Monthly *Yield* $_{long\text{-}term\ rate}$ *– Monthly Yield* $_{short\text{-}term\ rate}$ *and* $\boldsymbol{\mu_t}$ = Regression Error Term.

3.7 Diagnostic Tests

The procedures available for the analysis of the time series model which tested its validity are as outlined below;

3.7.1 Multicollinearity

The presence of multicollinearity was determined by the Variance Inflation Factor (VIF) tolerance level. VIF value more than 10 may indicate multicollinearity. The VIF measures the extent of inflated time series coefficients as compared to predictors variables not linearly correlated. The test indicated the level of correlation between predictors in the time series analysis.

3.7.2 Correlation

This measured whether there is any relationship between the dependent variable and one or more of the independent variable. The model tested whether there was any relationship between the variables in the time series equation.

3.7.3 Homoscedasticity

This measured the variance within the regression line whether it was the same for all predictor variables, or circumstances in which the variability of a variable was not equal across the range

of values of another variable that predicted it. This tested the variance of the error term if it was constant, that is, $Var(e_i)=E\{e_i-E(e_i)\}^2=E(e_i)$ otherwise it was heteroskedastic.

3.7.4 Normality Test

The test was done mainly to check if the data set was well modeled and suits normal distribution characteristics and also determined how likely a random variable in the data set was normally distributed. To test for normality on dependent variable, plots are used such as histogram, Box plots, Q-Q plots, and P-P plots where histograms were used to test whether the variable is normally distributed. When not normally distributed, the Box plot was used to identify if the variables has any outliers which was either mild or extreme, in case of extreme, we dropped the outliers from the analysis.

3.8 Data Analysis

This is the process of applying systematic statistical and logical techniques to describe, illustrate, condense and recap and evaluate data. Data was analyzed using descriptive statistics, correlation analysis and fixed time series regression analysis with the help of SPSS. The results of the analysis were presented using tables and graphs.

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the descriptive statistics, diagnostic tests and the output of the model; Sec. 4.2 deals with descriptive statistic, sec. 4.3 deals with Study Variables and Interpretation of the findings, 4.4 deals with Diagnostic Tests and 4.5 deals with Summary of the Regression Results.

4.2 Descriptive Statistics

The study used descriptive statistics which this section will outline in form of a discussion from the results of the analysis. The variables used include risk-free interest rates (these rates were obtained from the Central Bank of Kenya website for the entire period of the research, inflation rates, also obtained from the websites of Central Bank of Kenya and the Kenya National Bureau of Statistics website, liquidity premium (this was measured by the difference on short-term lending and long-term lending which are equivalent to current treasury bill rates and long-term treasury bond rates) and finally maturity premium (that was obtained by determining the long-term loan yields and short-term loan yields of these banks.

Table 4.1: Descriptive Statistics for the Study Variables

Variable	**MEAN**	**STD DEV.**
Performance	14.934	2.273
Interest rates	10.409	0.833
Inflation rates	7.071	1.690
Liquidity Premium	0.399	0.378
Maturity Premium	0.115	0.142

From table 4.1, the mean and the standard deviation of each variable under study indicate the average of each study variable for all the banks under study. The standard deviation of each study variable indicates the volatility of the variable in the entire period under study.

The performance indicator , measured by return on assets (ROA), mean of 14.93 and standard deviation of 2.27 implied that the average return on asset for all the eleven listed banks was

14.93% and a standard deviation of 2.27% which showed that volatility was mild for the even banks listed. Mild volatility on performance indicate mild response and sensitivity of the bank performance to changes of other fundamental bank factors like inflation rates, risk-free interest rates, the other fundamental factors, liquidity and maturity premium have a high volatility effect on performance as indicate by high standard deviations.

Risk-free interest rates showed a mean of 10.41% and a standard deviation of 0.833%, this indicates that risk-free interest rates are less volatile to and the effect on performance will vary less on a change on interest rates. During the period under review interest rates changed and the highest recorded rates during the eleven quarters was 11.5 % with a long period of rates stagnating at 10% during the entire study period. Inflation rates showed a mean of 7.07% and a standard deviation of 1.69%. This indicates that the volatility of inflation rates at 1.69 was mild and the effect on performance was also mild, also inflation at 7.07% is not harmful to investments and the economy as is considered to be useful and encourages growth.

Liquidity premium showed a mean of 0.399% and a standard deviation of 0.378%. This indicates that the liquidity premium is highly volatile and a small change, either positive or negative will affect the performance of the banks adversely. Measures taken by these listed banks on imposition of liquidity premium varied greatly from bank to bank and therefore, the high volatility of the liquidity premium and low mean. This is also an indication that most banks which had a negative liquidity premium do not factor in this component as a measure of source of return on assets to its long-term debt holders.

Maturity premium shows a mean of 0.115% and a standard deviation of 0.142%. The mean of 0.115% indicates that most banks do not factor this component as a measure of source of return and which is a major source to improve on performance, a standard deviation of 0.142% is very high and indicates that high volatility of this component. This also shows that maturity premium is not considered as a major component when considering the ROA of most of these listed banks. Some of the listed banks have negative maturity premium which indicates that these banks do not factor in this component when advancing loans to their customers (see also appendix Table 5).

4.3 Study Variables and Interpretation of the findings

This section outlines the study variables, both independent and dependent variable and explains their measurements and observations made over the study period. The study had initially

considered five independent variables risk-free interest rates, inflation rates, liquidity premium, maturity premium and default premium, default premium was dropped as non of the listed bank used corporate bonds and therefore no data available. The study also considered one dependent variable that was measured by return on assets as performance. The variables are analyzed below:

4.3.1: Risk-Free Interest Rates

Risk-free interest rates were used as one of the determinant and component of interest rates in considering the ROA of the listed commercial banks at NSE. Risk-free interest rates are considered as the baseline in determining the overall interest rates pegged on advances and loans made by commercial banks. Risk-free interest rates are issued by the Central bank as guidelines to determine the rate of interest to charge on advances and loans. The 91 days treasury bills are used as the base rate.

Figure 4.1 below, shows the graphical presentation on the movement of risk-free interest rates for the entire study period, the period has been divided into three months and referred to as quarters.

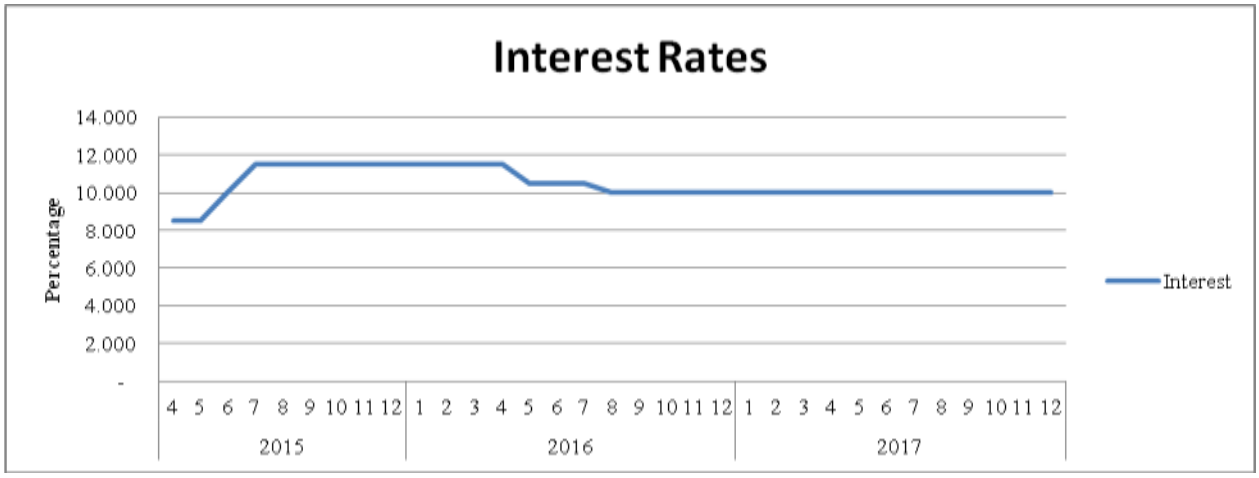

Figure 4.1: Risk-Free Interest Rates

From figure 4.1 above, the risk-free interest rates increased in the first, Jun 2015 and remained constant at 11.5% in quarters ending Sep 2015 to Mar 2016. The rates dropped in the fifth quarter to 10.5% and finally dropped further in quarter six to 10.5% and remained constant up to quarter eleven, which is the last quarter in the study. The variation in interest rates cause a change in ROA as an increase in the rate will cause banks to increase overall interest rates in

equal proportion or high which will determine the interest rate the banks will charge advances and loans to customers.

4.3.2: Inflation Rates

Inflation rate was used as one of the component and determinant of interest rates in considering the performance (ROA) of the banks listed at the NSE. Banks factor in the effects of inflation in determining the required rate of return on advances and loans to their customers. Inflation rates are computed by the Kenya National Bureau of Statistics (KNBS), which are then published by the CBK as official figure for use by analysts and other users. The inflation rates were computed on three month basis to tally with the other variables' three month figures, the three months figures were averaged and used as final figures for the quarter periods. These were consistently applied during the entire study period. Figure 4.2 below shows the movement of inflation during the study period, from quarters ending June 2015 up to Dec 2017.

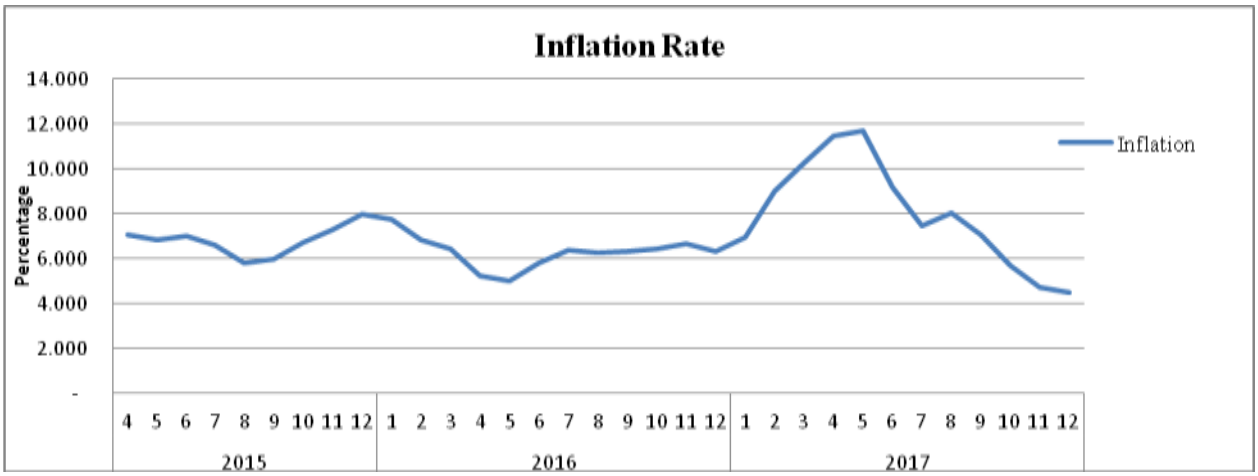

Figure 4.2: Inflation Rates

The inflation in the first seven quarters oscillated between 5% and 7%, but from the eighth quarter it jumped from 6.5% to 8% and in quarter nine to10.8%. The gradually in the last two quarters dropped to about 5%, the higher the inflation the higher the component factoring in the interest rates, the lower the inflation the lower the component factoring in the overall interest rates. In quarter nine inflation rate has gone above real interest rates, the high inflation rates drives interest rates higher and vice versa.

4.3.3: Liquidity Premium

Liquidity premium was used as one of the components of interest rates. In considering the required rate of return, banks factor in liquidity premium to cater for liquidity foregone. The

liquidity premium component was obtained from the difference between banks' short-term advances and loans and long-term corporate loans. These rates on short-term and long-term are forwarded to CBK by banks after every quarter from quarter ended June 2015, which is the first quarter of the study period. The rates are made available to the public by CBK through their website. The rates used has not further been computed or altered but taken as they are from the CBK website.

From figure 4.3 below, in the first six quarters, liquidity premium varied widely and oscillated between -5% and 5%, this was due to lack of lending ceiling which was later set by CBK in quarter six.

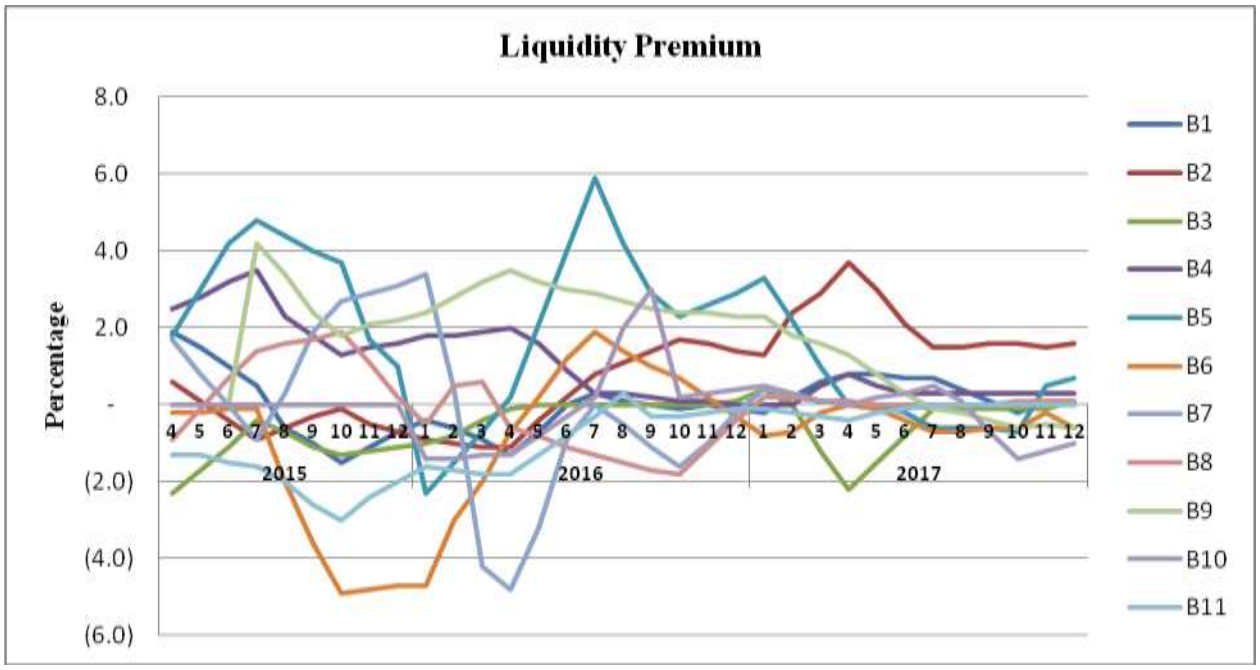

Figure 4.3: Liquidity Premium

From quarter seven to quarter nine, the liquidity premium oscillated between -2% and 3% which showed that banks were adjusting to the controlled interest rates ceiling set by CBK. From quarter ten to eleven the premium was between -2% and 2% for all the eleven banks. On average banks charge a positive liquidity premium but other charge a negative premium or do not consider it at all. Six banks do not charge a liquidity premium or they give a discount on long-term loans, while the other five banks charge a liquidity premium on long-term loan, figure 4.4 below shows this;

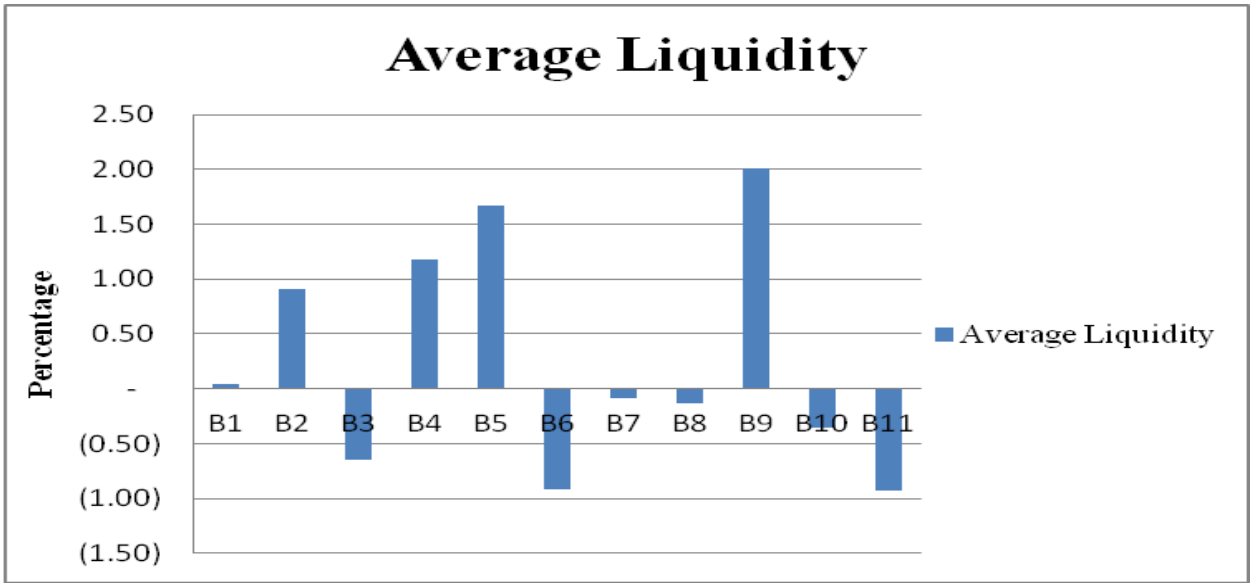

Figure 4.4 Liquidity Premium

4.3.4: Maturity Premium

Maturity premium is used as a component of interest rates in determining the required rate of return that the bank should use when advancing loans to borrowers of funds. The maturity premium was computed using long-term corporate loans of five and more years and short-term loans of one to five years. The rate is factored in long-term loans when advancing to borrowers.

Figure 4.5 below, show that in the first six quarters of the study period, on average, the maturity premium dispersion between different banks was wide and oscillated between -3% and 3%. From the seventh quarter the rates narrowed and oscillated between -1% and 1%. In the first six quarters bank regulation on interest rates were not in effect. Immediately the regulations were in effect, banks that charged high premium reduced and those that were giving a discount on premium increased to offset any losses. Figure 4.6 below shows individual bank maturity premium during the research period, five banks shows a positive premium while the other six show a discount on premium.

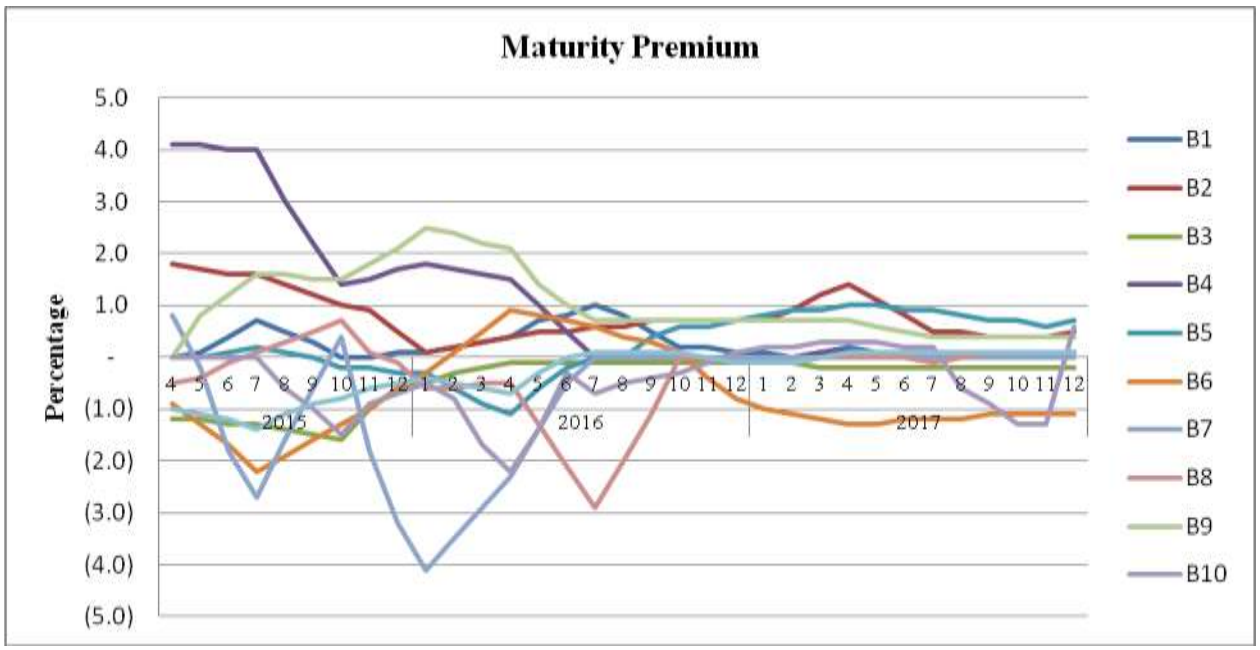

Figure 4.5: Maturity Premium

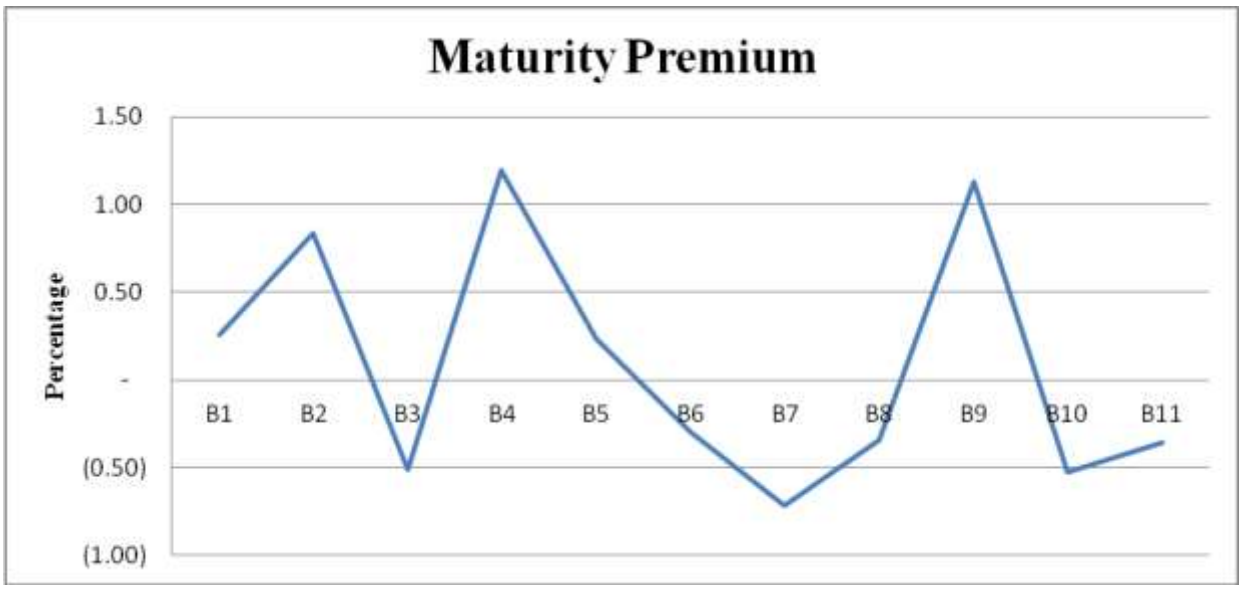

Figure 4.6: Average Maturity Premium

4.4 Diagnostic Tests

4.4.1: Result for Normality Test of Study Variables

Normality test for study variables was obtained by use of Skewness and Kurtosis tests. From table 4.2 below, it can be regarded that variables were univariate and normally distributed as the skewness for all the variables was within the interval -3.0 and 3.0 and the kurtosis test statistic for all variables was within the interval -10.0 and 10.0.

From table 4.2 below, it was shown that the skewness for variables lies within the range -3.0 and 3.0. This is an indication that the data was well distributed, and that it was suitable for the study analysis. . The kurtosis test results also show that the interval for the kurtosis was within the interval -10.0 and 10.0 which justifies the normality of the data. The summary for the data is as show on the table 4.2 below:

Table 4.2: Skewness and Kurtosis Results Summary

Variables	Skewness	Kurtosis
Return on Assets	0.157	-1.200
Inflation Rates	1.262	1.756
Interest Rates	-0.124	-0.081
Liquidity Premium	0.603	-0.651
Maturity Premium	1.257	0.810

4.4.2: Test for Multicollinearity

The study used inflation rates, interest rates, liquidity premium and maturity premium to test for multicollinearity. The multicollinearity was determined by use of variance inflated factor (VIF), this test measures the extent to which time series coefficients are inflated as compared to predictor variables not linearly correlated. The VIF values were obtained to detect whether the correlation could be problematic or not. Where the VIF value is 1 it indicates that there is no multicollinearity and a VIF value of 1 to 2 indicates moderate multicollinearity, which in this case may not pose a problem, and VIF of 5 and 10 implies high correlation that may be problematic. The results for VIF test is as shown below in table 4.3.

Table 4.3: VIF for the Independent Variable

Variable	VIF	Tolerance
Inflation Rates	1.128	0.887
Interest Rates	1.152	0.868
Liquidity Premium	2.224	0.450
Maturity Premium	2.479	0.403

From table 4.3 above, VIF results are between 1 and 2 for inflation rates and interest rates, this shows that they do not pose a problem. The VIF for liquidity premium and maturity premium are slightly above 2 which show that the variables could pose a weak problem in the correlation of between variables. This is an indication that there was no high correlation between the explanatory variables and makes the variables suitable and fit this study.

4.4.3: Correlation

Correlation analysis was used to test whether there was any relationship between independent variables that may pose problem in the analysis. Correlation coefficients between 0 and ±0.25 is assumed to be weak negative or positive correlation, correlation coefficient between ± 0.25 and ±0.75 is assumed to be fair negative or positive correlation, between ±0.75 and ±1.0 is assumed to be strong negative or positive correlation. Table 4.4 below analyses the correlation between independent variable

Table 4.4: Correlation between Variables

Variable Correlation	Inflation Rates	Interest Rates	Liquidity Premium	Maturity premium
Inflation Rates	1	-0.167	0.000	0.255
Interest Rates	-0.167	1	-0.231	-0.352
Liquidity Premium	0.000	-0.231	1	0.723*
Maturity premium	0.255	-0.352	0.723*	1

*. Correlation is significant at the 0.05 level (2-tailed).

All variable in the study coefficient of correlation lies within the range -0.25 and 0.75, this shows that none of the variable is directly related to the other variable, the correlation between maturity premium liquidity premiums is the only exception which shows a high fair positive correlation. The Durbin-Watson value of 0.430 shows that there a slight positive autocorrelation (see appendix 1, Table 4)

4.4.4: Homoscedasticity

This tested the variance of the error of the study variables and measured the variance within the regression line whether it is the same for all predictor variables, or circumstances in which the variability of a variable is not equal across the range of values of another variable that predicts it. This tests the variance of the error term if it is constant, that is, $Var(e_i)=E\{e_i-E(e_i)\}^2=E(e_i)$ otherwise it will be heteroskedastic. The standard error of skewness was 0.661 for all variables and the standard error of kurtosis was 1.279 for variables. This shows that the study variables are free of biasness since the variance of the error term is constant.

4.5 Summary of the Regression Results

Table 4.5: Summary of Regression on ROA

R-Squired=0.624

Return on assets	coefficients	Std. error	t-Value	Correlation	95% Lower bound	Conf.Inter. Upper bound
(Constant)	-7.503	3.907	-1.920	-	-15.505	0.500
Inflation Rates	-0.070	0.166	-0.424	-0.080	-0.409	0.269
Riskfree interest	2.178	0.339	6.420	0.772	1.483	2.873
Liquidity Premium	-2.307	1.039	-2.221	-0.387	-4.434	-0.180
Maturity premium	10.288	2.912	3.533	0.555	4.323	16.253

The above table 4.5 shows the regression on coefficient for the independent variables on dependent variable (return on assets). The findings showed that ROA is positively related to interest rates and maturity premium and negatively related to inflation rates and liquidity premium. The fixed time series linear regression equation was given as;

$$Y_t = \beta_0 + \beta_1 I_{et} + \beta_2 R_{ft} + \beta_3 L_{pt} + \beta_4 M_{pt} + \mu_t \quad \text{.....(1)}$$

From table 4.5 the coefficients for the parameters were fitted as shown below.

$Y_t = -7.503 - 0.070 I_{et} + 2.178 R_{ft} - 2.307 L_{pt} + 10.288 M_{pt}$ Where $\mathbf{Y_t}$ is financial performance, $\mathbf{I_{et}}$ = inflation rate, $\mathbf{R_{ft}}$ = risk-free rate , $\mathbf{L_{pt}}$ = liquidity premium rate, and $\mathbf{M_{pt}}$ = Maturity premium rate.

From the above model it is evident that risk-free interest rates, liquidity premium rate and maturity premium rate are statistically significant since their t-values are greater than absolute

value of 2. However inflation rate has an insignificant negative effect on the financial performance of listed banks in Kenya since its t-value is less than absolute value of 2.

A unit increase in risk-free interest rate increases banks financial performance by 2.178 units. Increasing maturity premium rate by one unit leads to increase in bank financial performance by 10.288 units. Inflation rate was found to negatively affect ROA of banks. A unit increase in inflation rate would decrease ROA of banks by 0.070. Liquidity premium also affected ROA of banks negatively, a unit increase in liquidity premium would decrease ROA by 2.307 units. The constant for the model which is the intercept was found to be negative. This has no economic interpretation. The R-squired of 0.624 shows that 62.4% of the variation in banks financial performance is influenced by the variations in inflation rate, risk free rate, liquidity premium rate and maturity premium rate.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusion and recommendations on policy implication and recommendation on future research in the related areas. Section 5.2 presents the summary of the empirical analysis, section 5.3 gives the general conclusion for the study, section 5.4 gives the recommendation on the policy action and section 5.5 outlines the recommendation for future research on the related objectives.

5.2 Summary of the Study

This section presents the summary findings of this study that is outlined according to the study objectives that includes; inflation rates, interest rates, liquidity premium and maturity premium.

5.2.1 Inflation Rate and Bank Performance

From the analysis on the effect of inflation rates on the performance of listed banks at NSE, it was found that inflation rates has a negative effect on return on assets/performance, where increase in inflation rate reduces the performance of banks. This means that when the rate of inflation increases it will affect bank performances and therefore banks will report reduced profits or returns. These findings concurs with the research by Stulz (1986) that variability of real activities and expected inflation are negatively related, it also concurs with Ofer and Kandel (1996) in Israel who found that real interest rates and expected inflation are negatively correlated.

5.2.2 Interest Rate and Bank Performance

Risk-free interest rate has a significant positive effect on bank performance. The study indicates that increase in risk-free interest rate leads to increase in ROA of banks in Kenya. This means that when risk-free interest rates are increased by the central bank, Commercial banks in Kenya performance will likewise increase and banks reports improve returns on assets and vice versa. This study concurs with the findings of Karagiannis (2010) who found that interest rates was one of the channels that central banks use as a tool in monetary policy to stimulate the main macroeconomic variables.

5.2.3 Liquidity Premium and Bank Performance

From the analysis, liquidity premium rate has a significant negative effect on performance of banks. Increase in liquidity premium reduces ROA of banks. This means that banks that factor in liquidity premium in the interest rates charged to customers are not attractive and therefore reduction in loan portfolio and loans to customers. High interest rates charged to customer borrowings, repel customer from the bank and therefore reduces the earning capacity of the bank. The finding of the study is contrary to McCulloch (1975) who found that liquidity premium is there but positive or greater than zero, where of we have found that some banks give a discount instead of charging a liquidity premium to its customers. Anson (2010) found that it was difficult to quantify liquidity premium as is our case.

5.2.4 Maturity Premium and Bank Performance

Maturity premium rate has a significant positive contribution towards bank performance in Kenya. Increase in maturity premium rate leads to increase in bank performance (ROA). Maturity premium is factored to cater for future changes in value of money, the longer the loan duration, the higher the maturity premium, as this will improves the ROA banks should be charging this premium to improve return on assets. Our finding concurs with Rodriguez (1998) that yield spreads increases or decreases with the maturity of bonds.

5.3 Study Conclusion

This section discusses on the conclusion derived from the study findings. From the study summary and analysis, it was found and indicated that inflation has a negative effect on performance of listed banks at NSE. It is therefore fundamental for banks to manage inflation rates as it has adverse effects on performance of banks. Banks should factor in this component of interest rates in loans and advances to maintain stability and long-term appreciation of their assets and improve return on assets.

Risk-free interest rates improve the ROA positively. Banks should therefore enhance the use of this component and respond to slight changes on risk-free interest rates when they are released by the central bank, this will improve performance and be the determinant of the required rate of return that investor and shareholders seek from the bank. If managers maintain good investment policy, this will enhance return on assets. Liquidity premium negatively affects bank performance and should be factored at minimal rates that will not deter borrowers and debt

holders feel that the advance and loans are highly overcharged. This action will keep borrowers and debt holders intact and improve performance. High debt charges drive away customers.

Finally, maturity premium contributed positively to ROA. This should be enhanced to improve ROA and increase shareholders wealth. Funds that are set aside for long-term funding should attract risk premium suitable achieve the required rate of return set by the bank.

5.4 Recommendation for Policy Action

Bank should establish well laid down mechanisms to factor in inflation in order to gain benefit which accrue with it. Banks and other financial institutions should design mechanisms of mitigating the negative effects of inflation rate. On risk-free interest rates, banks should maintain a spread that adequately covers losses that are apparent in the negative effect components. The contribution toward performance by risk-free interest rates, banks management should enhance the use of this component in all their loan portfolios in order to maximize return on assets.

The liquidity premium which is one of the components that affect ROA negatively, a policy should be established by banks in order to factoring this component that will maintain attractiveness of the banks' loan products to its customers without affect the clientele of the bank.

Maturity premium has a high contribution towards ROA, banks should establish a mechanism to determine the optimal level that will maximize the shareholders' wealth without affecting the clientele base of the bank. Categories of loans to customers should be charged differently according to their needs and requirements as this will safeguard the maintenance of the customers in the bank.

5.5 Limitations of the Study

The Study encountered a problem during data collection, liquidity premium and maturity premium data was in quarter years, the researcher used Cubic Spline data interpolation to to covert to monthly data in order to be consistent with the other data.

5.6 Suggestions for Further Research

The study recommends that further study in the same area be done on components of interest rates on all the banks in Kenya. The study also recommends the use of different dependent variable such as required rate of return using a different model.

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Appendix 1: Statistical Test Tables

Table 1: Anova Tests

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	103.165	4	25.791	11.614	.000[b]
	Residual	62.182	28	2.221		
	Total	165.346	32			

a. Dependent Variable: Return on Assets

b. Predictors: (Constant), Maturity premium, Inflation Rates, Interest Rates, Liquidity Premium

Table 2: Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-7.503	3.907		-1.920	.065	-15.505	.500					
	Inflation Rates	-.070	.166	-.052	-.424	.675	-.409	.269	-.041	-.080	-.049	.887	1.128
	Interest Rates	2.178	.339	.799	6.420	.000	1.483	2.873	.669	.772	.744	.868	1.152
	Liquidity Premium	-2.307	1.039	-.384	-2.221	.035	-4.434	-.180	-.102	-.387	-.257	.450	2.224
	Maturity premium	10.288	2.912	.645	3.533	.001	4.323	16.253	.074	.555	.409	.403	2.479

a. Dependent Variable: Return on Assets

Table 3: Coefficient of Correlation

Coefficient Correlations[a]

Model			Maturity premium	Inflation Rates	Interest Rates	Liquidity Premium
1	Correlations	Maturity premium	1.000	-.293	.235	-.724
		Inflation Rates	-.293	1.000	.091	.239
		Interest Rates	.235	.091	1.000	-.013
		Liquidity Premium	-.724	.239	-.013	1.000
	Covariances	Maturity premium	8.480	-.141	.232	-2.190
		Inflation Rates	-.141	.027	.005	.041
		Interest Rates	.232	.005	.115	-.005
		Liquidity Premium	-2.190	.041	-.005	1.079

a. Dependent Variable: Return on Assets

Table4: The Model Summary

Model Summary[b]

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	.790[a]	.624	.570	1.490224	.624	11.614	4	28	.000	.430

a. Predictors: (Constant), Maturity premium, Inflation Rates, Interest Rates, Liquidity Premium

b. Dependent Variable: Return on Assets

Table 5: Descriptive Statistics

Descriptive Statistics

	N	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Inflation Rates	33	7.071	0.294	1.690	2.857	1.262	0.409	1.756	0.798
Interest Rates	33	10.409	0.145	0.833	0.695	-0.124	0.409	-0.081	0.798
Liquidity Premium	33	0.399	0.066	0.378	0.143	0.603	0.409	-0.651	0.798
Maturity premium	33	0.115	0.025	0.142	0.020	1.257	0.409	0.810	0.798
Return on Assets	33	14.934	0.396	2.273	5.167	0.157	0.409	-1.200	0.798
Valid N (listwise)	33								

Appendix 2: Summary of Basic Data

Average Monthly data for Analysis

Year	Month	Inflation	Interest	Liquidity	Maturity	Performance
2015	4	7.080	8.500	0.420	0.310	15.580
	5	6.870	8.500	0.860	0.420	15.940
	6	7.030	10.000	1.170	0.480	16.120
	7	6.620	11.500	1.230	0.450	16.500
	8	5.840	11.500	0.970	0.310	17.110
	9	5.970	11.500	0.500	0.110	17.790
	10	6.720	11.500	0.060	(0.040)	18.230
	11	7.320	11.500	(0.220)	(0.080)	18.290
	12	8.010	11.500	(0.380)	(0.050)	18.100
2016	1	7.780	11.500	(0.470)	(0.020)	17.910
	2	6.840	11.500	(0.550)	(0.030)	17.900
	3	6.450	11.500	(0.640)	(0.080)	18.040
	4	5.270	11.500	(0.730)	(0.150)	18.250
	5	5.000	10.500	0.030	(0.220)	16.240
	6	5.800	10.500	0.670	(0.027)	14.480
	7	6.400	10.500	0.970	(0.060)	13.850
	8	6.260	10.000	0.890	0.050	13.070
	9	6.340	10.000	0.590	0.140	13.280
	10	6.470	10.000	0.360	0.180	13.610
	11	6.680	10.000	0.360	0.180	13.740
	12	6.350	10.000	0.520	0.130	13.720
2017	1	6.990	10.000	0.660	0.110	13.650
	2	9.040	10.000	0.670	0.140	13.640
	3	10.280	10.000	0.570	0.180	13.680
	4	11.480	10.000	0.420	0.210	13.740
	5	11.700	10.000	0.360	0.190	13.950
	6	9.210	10.000	0.260	0.130	13.960
	7	7.470	10.000	0.130	0.060	13.850
	8	8.040	10.000	(0.040)	(0.010)	12.790
	9	7.060	10.000	(0.170)	(0.070)	11.910
	10	5.730	10.000	(0.150)	(0.060)	11.520
	11	4.730	10.000	0.080	(0.040)	11.190
	12	4.500	10.000	0.410	(0.020)	11.200