RELATIONSHIP BETWEEN FOREIGN EXCHANGE RATE AND CENTRAL BANK RATE

BY

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DECLARATION

This research project is my original work and has not been presented for examination to any other university.

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

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DEDICATION

This work is first and foremost dedicated to My Father God Almighty! I could have done nothing without His sufficient Grace which saw me through it all. Secondly, to my earthly father Shem Obondi who has never stopped believing in me and who has been the source of my inspiration.

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ABBREVIATIONS AND ACRONYMS

ADF   -   Augmented Dickey-Fuller

BOP   -   Balance of Payment

BOT   -   Balance of Trade

CBK   -   Central Bank of Kenya

CBR   -   Central Bank Rate

d.g.p   -   data generating process

EME   -   Emerging Market Economies

EMP   -   Exchange Market Pressure

FII   -   Foreign Institutional Investors Inflows

GDP   -   Gross Domestic Product

GoK   -   Government of Kenya

KES   -   Kenya Shillings

MFC   -   Mortgage finance company

MPC   -   Monetary Policy Committee

NCF   -   Net Capital Flows

NER   -   Nominal Exchange Rates

OMO   -   Open Market Operations

RBI   -   Reserve Bank of India

RER   -   Real Exchange Rates

SDR   -   Special Drawing Rights

TB   -   Treasury Bill

TOT   -   Terms of Trade

USA   -   United States America

VAR   -   Vector Autoregression

ABSTRACT

Central Bank of Kenya (CBK)'s principal objective is formulation and implementation of monetary policy directed at achieving and maintaining stability in the general level of prices which includes the exchange rate. Monetary policy rests on the relationship between rates of interest in an economy. In Kenya the Central Bank's role is to set a short-term official rate of interest called the Central bank rate (CBR). The CBR serves as a signaling tool on the direction on which monetary policy is taking. This study aimed to establish if there is any relationship between Foreign Exchange rate and Central Bank rates (CBR) in Kenya. This study adopted explanatory research design. The target population of the study was time series data for Kenya on KES/USD Foreign exchange rate and CBR. Monthly nominal data was used for the period from the month of June 2006 to August 2013.

Secondary data was collected electronically from the Central Bank of Kenya data base. Data was analyzed using statistical software Strata version 7 and Excel. The findings of the study showed central bank rates for the period of study have a weak positive relationship to the foreign exchange rate and hence have no much effect on the exchange rates. The CBR was thus found not to be an effective tool for exchange rate determination. In view of this, the study recommends the monetary policy committee devises a mechanism in which the CBR can be a signal to both the domestic and exchange rate market.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Exchange rate and monetary policy are key tools in economic management and in the stabilization and adjustment policies in developing countries (Ndung'u, 1999). The Central Bank of Kenya (CBK)'s principal objective is formulation and implementation of monetary policy directed at achieving and maintaining stability in the general level of prices (Central Bank of Kenya (CBK), 2013). The aim is to achieve stable prices – that is low inflation-and to sustain the value of the Kenya shilling. In most developing countries low inflation and international competitiveness have become major policy targets. The real exchange is a measure of international competitiveness and inflation, on the other hand, mostly emanates from monetary expansion, currency devaluations and other structural factors (Ndung'u, 1999).

The real exchange rate is an endogenous variable (a by-product of market forces) that responds to both exogenous (manipulated deliberately by central banks in pursuance of their specific monetary policy objectives) and policy induced disturbances and that prolonged real exchange rate misalignment will usually generate macroeconomic disequilibrium. Part of the policy induced disturbances emanate from the money market (Khan & Montiel, 1987). Money market is a segment of the financial market in which instruments with high volatility and short maturities are traded.

The Central Bank Rate (CBR) plays a major role in the money market, all other short term rates relate to the CBR. In Kenya the CBR is the base for all monetary policy operations and serves as a signaling instrument for these instruments (CBK, 2013). The CBR became the official interest rate since August 2005 replacing the 91-day Treasury Bill (TB) rate (Trading Economics, 2013). In Kenya a combination of the monetary policy tools or instruments used are Open Market Operations (OMO), Repos including Reverse Repos, and Term Auction Deposits, Cash Reserve Ratio, Foreign Exchange Market operations, and statutory requirements stipulated by law (CBK, 2013).

According to Johnson (1969) monetary policy is a policy employing the central banks control of the supply of money as an instrument for achieving the objectives of general economic policy. CBK (2013) describes monetary policy as the process by which the Central Bank influences the level of money supply credit in the economy in order to minimize excessive price fluctuations, and promote economic growth. Monetary policy rests on the relationship between the rates of interest in an economy, that is, the price at which money can be borrowed, and the total supply of money (Hammed & Ume, 2011).

Where currency is under a monopoly of issuance, or where there is a regulated system of issuing currency through banks which are tied to a central bank, the monetary authority has the ability to alter the money supply and thus influence the interest rate to achieve policy goals (Gichuki, Oduor & Kosimbei, 2012). According to CBK (2013) monetary policy guards against inflation and ensures stability of prices, interest rates and exchange rates. This protects the purchasing power of the Kenya shilling and promotes savings,

investment and economic growth. The Central Bank formulates a policy to expand or contract money supply in the economy after detailed analysis and estimation of the demand for money in the economy (CBK, 2013).

Exchange rate is the price of a home currency expressed in terms of any foreign currency. The Central Bank of Kenya's (CBK's) primary responsibility is formulating and implementing monetary policy to achieve stability in the general price level, which includes the exchange rate which is the price of the Kenya Shilling expressed in other currencies (CBK, 2013). In our liberalized foreign exchange regime, the CBK allows the exchange rate to move in line with the fundamentals in the economy (CBK 2013). The CBK therefore provides the policy environment on the exchange rate and cannot target a particular level or direction of the exchange rate.

1.1.1   Central Bank Rate (CBR)

According to Darryl (1969), interest rates are a price for the use of funds and if rapid monetary expansion contributes to excessive demand and inflation, it also contributes to rising interest rates. Central Bank's role under the interest rate instrument is to set a short-term official rate of interest, which indicates the price at which it will make liquidity available to the banking system as a lender of last resort. In Kenya, this rate is called the Central Bank Rate. This rate is reflected in the CBK overdraft rates (CBK, 2013).

The CBR is the lowest rate of interest that Central Bank of Kenya charges on loans to banks (CBK, 2013). The level of the CBR is reviewed and announced by the Monetary Policy Committee (MPC) at least every two months and its movements, both in direction and magnitude, signals the monetary policy stance. The CBR is the base for all monetary

policy operations in order to enhance clarity and certainty in monetary policy implementation (CBK, 2013). Whenever the Central Bank is injecting liquidity through a Reverse Repo, the CBR is the lowest acceptable rate. Likewise whenever the Bank wishes to withdraw liquidity through a Vertical Repo, the CBR is the highest rate that the CBK will pay on any bid received. Changes in the CBR reflect the monetary policy stance that the Bank is pursuing (CBK, 2013).

1.1.2 Foreign Exchange Rate

According to Oanda (2013) an exchange rate is the price of a home currency expressed in terms of any foreign currency. Some countries float their exchange rate, which means that the central bank does not buy or sell foreign exchange, and the price is instead determined in the private marketplace. Like other market prices, the exchange rate is determined by supply and demand, in this case, supply of and demand for foreign exchange (Kamal, 2013).

Many central banks practice "managed floating," whereby they intervene in the foreign exchange market by "leaning against the wind." To do so, a central bank sells foreign exchange when the exchange rate is going up, thereby dampening its rise, and buys when it is going down. The motive is to reduce the variability in the exchange rate (Kamal, 2013). The stated exchange rate policy of the CBK has been and continues to be to pursue a market determined exchange rate, intervening only to smooth out erratic movement, service external obligations and achieve targeted level of foreign exchange reserves (CBK, 2013).

1.1.3 Central Bank Rate and Foreign Exchange Rate

According to Hammed (2011) monetary policy rests on the relationship between the rates of interest in an economy, that is, the price at which money can be borrowed, and the total supply of money. Changes in the CBR are meant to change the cost of the money i.e. interest rates and money stocks which will influence the target variables through other intermediate targets including credit, exchange rates and inflation forecasts. Exchange rates are like any commodity where the value of a currency rises and falls in response to the forces of supply and demand (Oanda, 2013). Further the supply and demand of a country's money is reflected in its foreign exchange rate.

Exchange rates play a vital role in a country's level of trade, which is critical to most every free market economy in the world. For this reason, exchange rates are among the most watched, analyzed and governmentally manipulated economic measures. With Kenya having a flexible exchange rate regime, the authorities are presumed to adjust their macroeconomic policies (especially fiscal and monetary policies) to fit the chosen exchange rate policy. This paper assesses whether the exchange rate is affected by the CBR being a monetary policy determined rate. Thus the observed relationship between exchange rate and CBR movements indirectly captures the policy action and hence the policy dilemma detailed in the preceding section.

1.2 Research problem

International economics have focused on the relationship between interest rates and exchange rates with most standard theoretical models of exchange rates predicting that

exchange rates are determined by economic fundamentals, one of which is the interest rate differential between home and abroad. However, most models do not explain exchange rates movements (Meese,1990). Obstfeld and Rogoff (2000) call it the "exchange rate disconnect puzzle" where they see a weak relationship except in long run between the exchange rate and virtually all macroeconomic aggregates. Moreover, studies that have directly examined the relationship between interest rates and exchange rates have typically found mixed and/or conflicting results. Calvo and Reinhart (2002) find that for developing countries there is no systematic relationship between the two variables.

Several international studies carried out on the effectiveness of Central Bank intervention in the foreign exchange market have been done, but very few in the developing countries context. The results, both at the international level and in the third world countries, lack unanimity about the efficacy of central bank intervention. Different models give different results, which may be due to lack of sound theory, differences in the choice of the model, the variables chosen and/or the data period. Hence, there is scope for further research and exploration. Earlier studies for Kenya have used a diverse portfolio of variables, long period time series data and different econometric methods. Our study may shed some new light on whether the Central Bank Rate has any impact on the foreign exchange market in Kenya.

Amdany (2006) study on Determinants of exchange rates in Kenya for the period 1970-2005 examined both structural and short-run factors determining variations of real

exchange rates (RER) and nominal exchange rates (NER) in Kenya. The structural factors examined were terms of trade (TOT), net capital flows (NCF), balance of trade (BOT) and trade policy while short-run factors are fiscal and monetary policies. A study done by Ndung'u (2000) on Monetary and Exchange Rate Policy in Kenya sought tolink the exchange rate policy and the monetary policy. His study sought to link between the nominal money supply and the nominal exchange rate. Another study on Capital Mobility, Monetary Policy, and Exchange Rate Management in Kenya (Maturu, Mwega, Ndung'u, Ngugi and O'Connel, 2010) looked at the two-way relationship between the exchange market pressure variable and domestic interest rates.

No study has been done linking the CBR and foreign exchange with most studies including studies done by Ndung'u (2000) and another by Maturu, Mwega, Ndung'u, Ngugi & O'Connel (2010) covering other variables in their study e.g. the 91 day Treasury bill rate, USA government Treasury bill and money supply. Amdany (2006) study has covered prior periods of 2005 when the Central Bank rate had not come into effect. My study will thus want to pick on the Central Bank Rate and cover the period since its inception. Most studieshave also concentrated on explaining the effect of various other variables for instance the domestic rate of inflation, where the nominal exchange rate enters as one of the explanatory variables. By limiting these study analysis to the exchange rate and central bank rate, however, we believe that other effects enter indirectly into the relationship. The key question in my study will be whether there is a linkage between the central bank rate which is both policy-controlled and market

determined and the nominal Kenya shilling to the USD exchange rate and in the process clarify the tradeoffs that are typically faced by policymakers.

1.3 Objective of the Study

To establish the relationship between Central Bank rate and foreign exchange rate in Kenya.

1.4 Significance of the study

This study will be useful policy makers in their formulation and determination of the Central Bank Rate to adopt to achieve stability in the general price level which includes the exchange rate. With respect to accountability and communication, the law stipulates that the CBK, at intervals of not more than six months, submit to the Minister for Finance a monetary policy statement. The Statement specifies the policies and the means by which the Bank intends to achieve the policy targets; state the reasons for adopting such policies and means; and reviews the progress of the implementation by the Bank of monetary policy during the period to which the preceding policy statement relates. Thus the study is relevant for determination of this monetary policy rates.

Financial Institutions will also find the study useful in the prediction of exchange rates movements by linking the CBR rate to the exchange rates. To the academic world this study will be important to institutions of higher learning and research in developing models to predict the exchange rate movements, since exchange rates play a vital role in a country's level of trade, which is critical to most every free market economy in the world.

Given also the vulnerability of African economies to external shocks, exchange rate movements are of immense interest to the policy makers and the business community.To investors exchange rates impact the real return of an investor's portfolio and to the public at large to enable them do their personal financial planning.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter will review the theoretical and empirical literature on how rates of interest relate to each other.

2.2 Theoretical Evidence

In the study of economics and finance there are several theories that attempt to explain how interest rates affect economies and how they can be used to forecast future changes (Oster, 2009). The concept of interest embraces theories of time preference, marginal productivity, liquidity preference and loanable funds (Mukherjee, 2002). The apparently diverse views of interest can be grouped into two broad classes:-real and monetary. Real theories are long run theories in which interest is the return for real abstinence and the yield on real capital. Monetary theories on the other hand are short run theories in which the monetary rate of interest is the cost of borrowing money and securities, and the yield on lending money and purchasing securities.

Expressed differently, the real rate of interest is determined by the supply of and demand for real savings, whereas the monetary rate of interest is determined by the demand and supply of money (Greenwald, 1982). These theories include classical, liquidity preference and rational expectations theories. Each of these theories makes assumptions regarding the behavior of aspects of the economy and focuses on the behaviors of other aspects as determinants of the prevailing interest rates.

2.2.1 The Classical Theory

The classical theory of interest rates applies the classical theory of economics to determining interest rates. Classical economic theory is rooted in the concept of a laissez-faire economic market. According to Vitez (2009) a laissez-faire also known as free market requires little to no government intervention. It also allows individuals to act according to their own self interest regarding economic decisions. This ensures economic resources are allocated according to the desires of individuals and businesses in the marketplace.

Classical economics uses the value theory to determine prices in the economic market (Gordon, 1979). Classical theory of interest rates compares the supply of savings with the demand for borrowing. Using supply and demand curves the equilibrium rate is calculated by determining the curves intersection point. Thus if savings are greater than investments the interest rate drops until they reach equilibrium and vice versa, if savings are less than investment the interest rate increases until the reward for savings encourages increased savings rates causing the market to again reach equilibrium. However the classical theory of interest rates fails to account for factors besides supply and demand that may affect interest rates such as the creation of funds, the importance of income and wealth and changes in the primary borrowers in an economy.

2.2.2 Liquidity Preference Theory

A second method of determining interest rates is the liquidity preference theory. According to Keynes (1936) interest is purely a monetary phenomenon because rate of

interest is calculated in terms of money. It is a monetary phenomenon in the sense that rate of interest is determined by the supply of and demand for money. Keynes (1936) defined interest as the reward for parting with liquidity for specified time. Liquidity preference theory asserts that economic units have a preference for liquidity over investing.

Applying this theory explains the premium offered in forward rates in comparison to expected future spot rates. This premium is used as payment for the use of scarce liquid resources. The preference for liquidity can be accounted for by the fact that economic units need to hold certain levels of liquid assets for purchase of goods and services and the fact that these near term future expenditures can be difficult to predict. Liquidity theory is limited by its short-term nature, the assumptions that income remains stable, and, like classical theory, only supply and demand for money are considered (Hart & Ferguson,2008)/ Eggertsson, 1978).

2.2.3 The Rational Expectations Theory

The theory of rational expectations was first proposed by John F. Muth of Indiana University in the early 1960s. He used the term to describe the many economic situations in which the outcome depends partly on what people expect to happen. The value of a currency and its rate of depreciation, for example, depend partly on what people expect that rate of depreciation to be. That is because people rush to desert a currency that they expect to lose value, thereby contributing to its loss in value.

The use of expectations in economic theory is not new. Many earlier economists, including A. C. Pigou, John Maynard Keynes, and John R. Hicks, assigned a central role in the determination of the business cycle to people's expectations about the future. Keynes referred to this as "waves of optimism and pessimism" that helped determine the level of economic activity. But proponents of the rational expectations theory are more thorough in their analysis of expectations (Fischer, 1980).

According to Patinkin (2013), economists who believe in rational expectations base their belief on the standard economic assumption that people behave in ways that maximize their utility or profits. He discusses, economists have used the concept of rational expectations to understand a variety of situations in which speculation about the future is a crucial factor in determining current action. Rational expectations is a building block for the "random walk" or "efficient markets" theory of securities prices, the theory of the dynamics of hyperinflations, the "permanent income" and "life-cycle" theories of consumption, and the design of economic stabilization policies.

Hicks (1982) noted that the rational expectations theory of interest rates is based on the idea that people formulate expectations based on all the information that is available in the market. He saw that rational expectation theory holds that the best estimation for future interest rates is the current spot rate and that changes in interest rates are primarily due to unexpected information or changes in economic factors. He further found the limiting factors of rational expectation theory were mostly related to the difficulty in

gathering information and understanding how the public uses its information to form its expectations.

2.3 Empirical Evidence

Among the people who carried out studies in this area is Kurihara (2012), exchange rate determination and structural changes in response to monetary policies. He conducted his study between 1975 and 2010. His aim was to analyze methods for determination of exchange rates in response to fundamental economic variables and changes in monetary policies. His paper undertook empirical examination of exchange rate movements and their structural changes in response to changes in macroeconomic variables and monetary policies in the USA, the Euro area, and Japan. The study used a monetary approach model with a hypothesis that a relationship between exchange rates and economic fundamentals holds continuously in most cases. His conclusion was monetary authorities have influenced exchange rate movements and are expected to take exchange rate movements into account when they conduct monetary policies in some cases.

A paper by Ndungu (2000), the Exchange Rate and the Interest Rate Differential in Kenya: A Monetary and Fiscal Policy Dilemma analyzed the relationship between the real exchange rate and the real interest rate differential on one hand and the implications they have on portfolio capital flows on the other. This study covered the period from 1995 to May-June 1999. He used the simplest version of the Dornbusch model (1988). The policy lessons that emanate from these results were seen by Ndung'u to relate to interest rate structure and exchange rate management. He found that the real interest rate

differential and the exchange rate absorb shocks from each other. His paper showed that closing the gap in the real interest rate differential (that is, lowering the domestic interest rate) will be consistent with a depreciation of the exchange rate. He also argued that the optimal approach is not to sterilize these capital flows but to allow exchange rate movements to stabilize them in the medium to long term. As a result, the effects on the interest rate structure would be transitory.

In a study by Sanchez (2005), the link between interest rates and exchange rates: Do contractionary depreciations make a difference?, he discussed that the link between exchange rates and interest rates features prominently in the theoretical and empirical literature on small open economies given the important role these variables play in determining developments in the nominal and real sides of the economy, including the behaviour of domestic inflation, real output, exports and imports. His paper revisited this relationship using a simple model that incorporates the role of exchange rate pass-through into domestic prices and distinguishes between cases of expansionary and contractionary depreciations. In doing so, it builded on the modeling approach of Gerlach and Smets (2000). The model results showed that the correlation between exchange rates and interest rates, conditional on an adverse risk premium shock, is negative for expansionary depreciations and positive for contractionary ones.

Bacchetta and Wincoop, (2009) on their study, On the Unstable Relationship between Exchange Rates and Macroeconomic Fundamentals, discussed that it is well known from anecdotal and survey evidence that the relationship between the exchange rate and macro

fundamentals is highly unstable. They argued that large and frequent variations in the relationship between the exchange rate and macro fundamentals naturally develop when structural parameters in the economy are unknown. In their study they used data on 5 currencies relative to the U.S. dollar: Swiss Franc, British pound, Canadian dollar, Japanese yen and German mark (Euro since 1999) with monthly data from September 1975 to September 2008. Using a generalized "canonical" exchange rate model derived from an interest rate parity equation, they showed that the reduced form relationship between exchange rates and fundamentals is driven not by the structural parameters themselves, but rather by expectations of these parameters.

Ndung'u (2000) on Monetary and Exchange Rate Policy in Kenya study sought to link the exchange rate policy and the monetary policy. He used an econometric model to analyze the relationships among money supply (MI and M2),cyclical and permanent real exchange rate movements, domestic credit, GDP, treasury bill discount rate, domestic rate of inflation, nominal exchange rate to the dollar, and the government share of domestic credit. The study was based on quarterly series data from 1970 to 1995. His study sought to answer whether the exchange rate regime has any effect on the real exchange rate, whether monetary shocks have any effect on the real exchange rate and if there is a link between the nominal money supply and the nominal exchange rate. The results of the study were that monetary shocks drive real exchange rate movements, and real exchange rate movements have an impact on monetary shocks. That is, they drive each other.

Hisali (2011) aimed to examine regime switching behaviour of the nominal exchange rate in Uganda to shed light on the necessity as well as efficacy of the participation of the central bank market. He employed the two-state Markov chain methodology to investigate the possibility of regime changes in the nominal exchange rate. His study used daily Uganda shilling/US dollar nominal exchange rate data covering the period 3rd January 2000 to 31st December 2004. His findings were that the results validate the expectation of the two distinct state spaces characterized as sharp and disruptive but short-lived depreciations as well as small appreciations occurring through a long period. The central bank intervention actions were shown to be largely successful in mitigating the disruptive effects of the sharp depreciations. His study lent empirical support to the intervention actions of the Bank of Uganda.

A study by Amdany (2006), Determinants of exchange rates in Kenya for the period 1970-2005 examined both structural and short-run factors determining variations of real exchange rates (RER) and nominal exchange rates (NER) in Kenya. The structural factors examined were terms of trade (TOT), net capital flows (NCF), balance of trade (BOT) and trade policy while short-run factors are fiscal and monetary policies. An empirical model linking the real exchange rate to its theoretical determinants was then specified. In contrast to previous analyses, this study augmented the cointegration and vector autoregression (VAR) analysis with impulse response and variance decomposition analyses to provide robust long run effects and short run dynamic effects on the real exchange rate. Results from these analysis showed that balance of trade in most cases was insignificant while terms of trade, net capital flows, nominal exchange rate policy

and monetary policy were very significant in determining variations in real exchange rates.

An earlier study to Amdany's by Mungule (2004), the determinants of the real exchange rate (RER) in Zambia attempted to explain the movements of Zambia's real effective exchange rate. The empirical purpose of his study was to investigate the factors that determine long run movements of the equilibrium RER of the Zambian kwacha against the currencies of major trading partners. This study used a vector error correction model and quarterly time series data between 1973 and 1997. He chose the multilateral RER because it takes into account the third country effects and is a very good measure of a country's competitiveness. He tested the behavior of the RER by applying cointegration analysis. His paper also tested the PPP theory. His study results were similar to most studies about the nature of the determinants of the real exchange rate. Through the use of purchasing power parity tests, impulse response and variance decomposition functions, the study indicated that Zambia's real effective exchange rate depends significantly on the prevailing real fundamentals, price differentials and real shocks.

The effect of monetary policy on interest rates in Kenya study by Abdirizack (2012) set to establish the effect of monetary policy on interest rates. In doing this, the study set to answer the question: how does the monetary policy relate to interest rates in Kenya?The study adopted a quantitative comparative design. The target population for this study included 44 banking institutions which included 43 commercial banks and 1 mortgage finance company (MFC), transacting business in Kenya between 31st January 2001 and

31st December 2011. The study focused on three major monetary policy instruments including: Central bank rate, 91-Day Treasury bill rate, and REPO rate. The researcher conducted a multiple regression analysis on the data. The study concluded that lending rates in Kenya were affected by various factors key among them being the 91 Day Treasury bill Rate which had the highest impact among the three variables studied, the repo rate was next and lastly the central bank rate.

Sifunjo (2011) study on Chaos and nonlinear dynamical approaches to predicting exchange rates in Kenya objective was to analyze market efficiency, volatility, and chaos in the foreign exchange market in Kenya. The study covered the period starting January 1995 to June 2007. His study examined the data generating process (d.g.p.) for exchange rates and volatility in the KSH/US$ market. The study used data for daily, weekly and monthly closing prices of the KSH/US$ exchange rates; the l-rnonth, 3-, 6- and 12-months forward and risk premia; the daily, weekly and monthly Government of Kenya (GoK) and the USA government Treasury Bills rate. His findings from the study were that the foreign exchange market is not efficient in the weak form, the foreign exchange market is highly volatile and that there are seasonal patterns in returns and volatility in the foreign exchange market. Other findings were that the term structure of the risk premiums rises with the investment horizon and lastly a strong indication that the foreign exchange rate market is nonlinear and chaotic.

Behera, Narasimhan, Murty (2006) case study on India, Relationship between Exchange Rate Volatility and Central Bank Intervention, empirically explored the

relationshipbetween central bank intervention and exchange rate behavior in the Indian foreignexchange market.The study used monthly data on Rupee-US Dollar bilateral exchange rate, net foreign institutional investors (FII) inflows, net dollar purchases of RBI, treasury bill rates of India and the US over the post-reform period, June 1995 through December 2005. Using the GARCH (1,1) model, he found that the intervention of the Reserve Bank of India(RBI) is effective in reducing volatility in the Indian foreign exchange market instead of reversing trend movement of exchange rate. He also observed that FII investments increase exchange rate volatility in India. However, the result did not support the theoretical positive association between exchange rate return and RBI intervention.

Connel, Maturu, Mwega, Ndung'u, Ngugi (2010) on Capital Mobility, Monetary Policy, and Exchange Rate Management in Kenya studied the two-way relationship between the exchange market pressure (EMP) variable and domestic interest rates. There study was undertaken for between 1990-2008. They used reduced-form dynamic models to characterize the relationship between Kenyan interest rates and exchange market pressures, conditional on foreign interest rates. The study saw that the relationship between Kenyan exchange market pressure (EMP) variable and domestic interest rates affects each other, as expected in a world in which market participants respond to interest rate differentials and the monetary authority must take cognizance of the capital account in setting domestic interest rates.

A study by Cheung and Chinn (2001), Currency Traders and Exchange Rate Dynamics: A Survey of the US Market used information drawn from a survey of US-based foreign exchange traders designed to elicit information about several aspects of exchange rate dynamics not observable in typical data sets. The survey was conducted between October 1996 and November 1997. Their survey attempted to ascertain directly how market participants behave, document their experiences, and solicit their views on the workings of the foreign currency market. They found that news about macroeconomic variables is rapidly incorporated into exchange rates; the importance of individual macroeconomic variables shifts over time, although interest rates always appear to be important; economic fundamentals are perceived to be more important at longer horizons, while short-run deviations from the fundamentals are attributed to excess speculation and central bank intervention does not appear to have a substantial effect, although there is general agreement that it increases volatility.

Engel and West (2005) paper on Exchange Rates and Fundamentals showed analytically that in a rational expectations present-value model, an asset price manifests near–random walk behavior if fundamentals are one and the factor for discounting future fundamentals is near one. They argued that this result helps explain the well-known puzzle that fundamental variables such as relative money supplies, outputs, inflation, and interest rates provide little help in predicting changes in floating exchange rates. As well, they showed that the data does exhibit a related link suggested by standard models i.e. that the exchange rate helps predict these fundamentals. The implication is that exchange rates and fundamentals are linked in a way that is broadly consistent with asset-pricing models

of the exchange rate. They presented some correlations calculated analytically in a simple stylized model assuming a simple univariate process for fundamentals, with parameters chosen to reflect quarterly bilateral dollar exchange rates, 1974–2001 data , for the dollar versus the currencies of the six other Group of Seven countries from the recent floating period.

2.4 Summary

While exchange rates are determined by numerous complex factors that often leave even the most experienced economists flummoxed, investors should still have some understanding of how currency values and exchange rates play an important role.Accordingly, the management of the exchange rate will influence domestic monetary conditions. To maintain its monetary policy target, the central bank will have to sterilize or offset its foreign exchange operations. It follows that turbulent activity in foreign exchange markets can cause a central bank to lose control of domestic monetary policy when it is also managing the exchange rate. Usually, the short term goal of open market operations is to achieve a specific short term interest rate target which affects the exchange rate. Open market operations benchmark in Kenya being the Central bank rate.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter dealt with research methodology that was used in the study. It encompasses the research design, target population, sampling design and techniques, sample size, data collection methods and data analysis methods that the researcher used in conducting the relationship between the central bank rate and the foreign exchange rate.

3.2 Research design

The research design for this survey was explanatory research design. The explanatory research method sought to determine the correlation between the dependent and independent variables and was appropriate for this study owing to the quantitative nature of the data for the study. The explanatory research design was also appropriate in order to be able to determine the nature of the correlation between Central bank rate and the exchange rate in Kenya using a quantitative approach.

3.3 Population

The population of study was time series data for Kenya on the CBR and KES/USD Foreign exchange rate. Monthly nominal data was used for the period between June 2006 and August 2013. The period from June 2006 to August 2013 was selected because there is no data available prior to 2006 on the CBR. The month August of the year 2013 is the cutoff date as it gives the latest available data in order to give an up to date state of affairs on the variables of interest. A monthly frequency for the data was selected in order to have an adequate number of observations required for a multiple regression analysis

technique adopted for the study. The buy and sell average dollar rate against the Kenya Shilling was selected since it is the usual anchor currency of choice as the largest share of Emerging Markets (Ems) external debt is denominated in US dollar and world trade is predominantly dollar invoiced.

3.4 Sample

The study investigated the entire population and as such there was no sampling undertaken.

3.5 Data Collection

Time series secondary data was used in the study. The consolidated data on the average buy and sell foreign exchange rates and on the central bank rate was collected by the researcher electronically from the Central Bank of Kenya data base. Secondary data on a monthly basis covering the period June 2006 to August 2013 was used in the estimations.

3.6 Data Analysis

Data analysis for this study was quantitative and utilized descriptive and inferential statistics to analyze data. In this regard, Strata statistical package and Microsoft excel software package was used in analyzing the data. These software packages were employed in the analysis owing to their versatility to manipulate quantitative data. To determine the relationship between exchange rate variability to Central bank rate, regression analysis was done. The independent variable was CBR while our dependent variable foreign exchange rate. The researcher was mainly testing to see whether Central bank rate has an effect on the foreign exchange rates.

Regression Model

The study adopted the regression model for data analysis: The regression model specifically connects the average values of y for various values of the x-variables. The regression equation is in no way a mathematical linking two variables but serves as a pointer to questions to be answered. The study borrows from Poole (1970), to better analyze national income to interest rates whereas my simplified version statistical model specification will use Forex being the y and CBR as the X variable, representing the monetary policy instrument. The regression model is as follows:

$$Y = f(X_1, X_2, X_3, X_4 \text{-------------------- } X_n)$$

$$FER = b_o + b_1 CBR + E_o$$

Where:

FER = Foreign Exchange Rate

CBR = Central Bank Rate

E_o = Error term e.g. caused by intervening variables

b_o = Constant term

b_1 = Percentage contribution of CBR to Foreign Exchange Rate

Regression analysis of the above model on Strata was done.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents the analysis and interpretations of the data collected on an investigation into the relationship between the central bank rate and the foreign exchange rate. This chapter will conduct descriptive statistics, give the data summary, regression analysis, model summary and the coefficients of regression equation.

4.2 Descriptive Statistics

This section sought to provide a description of the variables used in describing the relationship between the central bank rate and the foreign exchange rate. Results are presented using figures.

4.2.1 Central bank rates

Monthly data of central bank rates over the period June 2006 to August 2013 was used. The trend of data is described below.

Figure 4.1 presents central bank rates trend.

Figure 4.1: Central bank rate trend
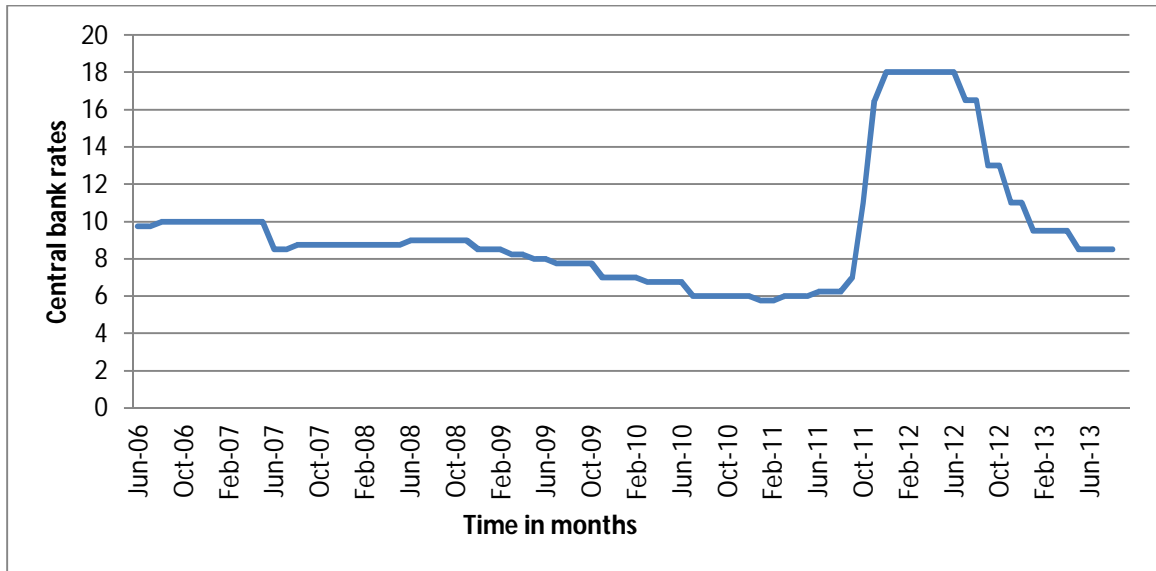
Source: Central bank of Kenya

From the results, in the early 2006, central bank rates averaged 9.75% but rose to 10% in the same year. A drop of the central bank rates occurred mid 2007 to 8.5% where it maintained a constant rate with a slight increase of 0.25% till mid 2008 and with yet another slight increase of 0.25% till end of 2008 and thereafter a continuous drop from 8.5% to mid-2011 to 6%. This represented a drop of 2.5%.

However, there occurred a tremendous increase of central bank rates the same year from 6% to 18%. This is shown on a graph above. The rates maintained a constant trend for a short period and started to drop in the year 2012 till March 2013 where the central bank rates were at 9.5% and with a further drop to 8.5% to the Month of August 2013.

4.2.2 Foreign exchange rate

Monthly data of foreign exchange rate over the period June 2006 to August 2013 was used. The trend is described below.

Figure 4.2 presents foreign exchange rate trend

Figure 4.2: Foreign exchange rate trend
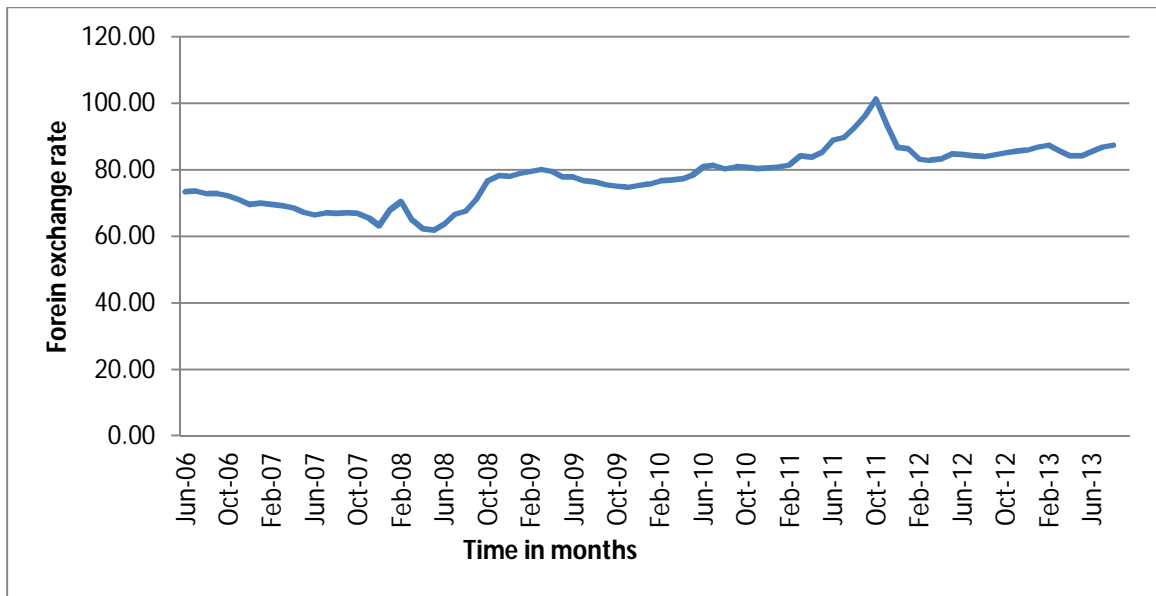
Source: Central bank of Kenya

From the results, mid 2006, foreign exchange rates averaged Ksh.73.41 with a slight rise in the next period followed by a slight drop. The drop maintained till the year 2007 where foreign exchange rate was at Ksh.64.This indicates that Kenyan shilling was gaining strength over the dollar.

However the shilling started losing against the dollar in the year 2008 to early 2009.Within that period of year 2009, it started to gain slightly against the dollar before it

started to lose value once again. The shilling continued to lose value till the 2011 where the rate reached Ksh.101.27. Thereafter the shilling again started to gain value to the year 2013 where the foreign exchange rate reached Ksh.87.49in the month of August, 2013.

4.2.3 Foreign Exchange Rate vs. Central Bank Rates

In order to determine the trends of Foreign Exchange Rate and Central Bank Rates, the researcher compared the variables on the same graph. Figure 4.3 presents the results

Figure 4.3: Foreign Exchange Rate vs. Central Bank Rates
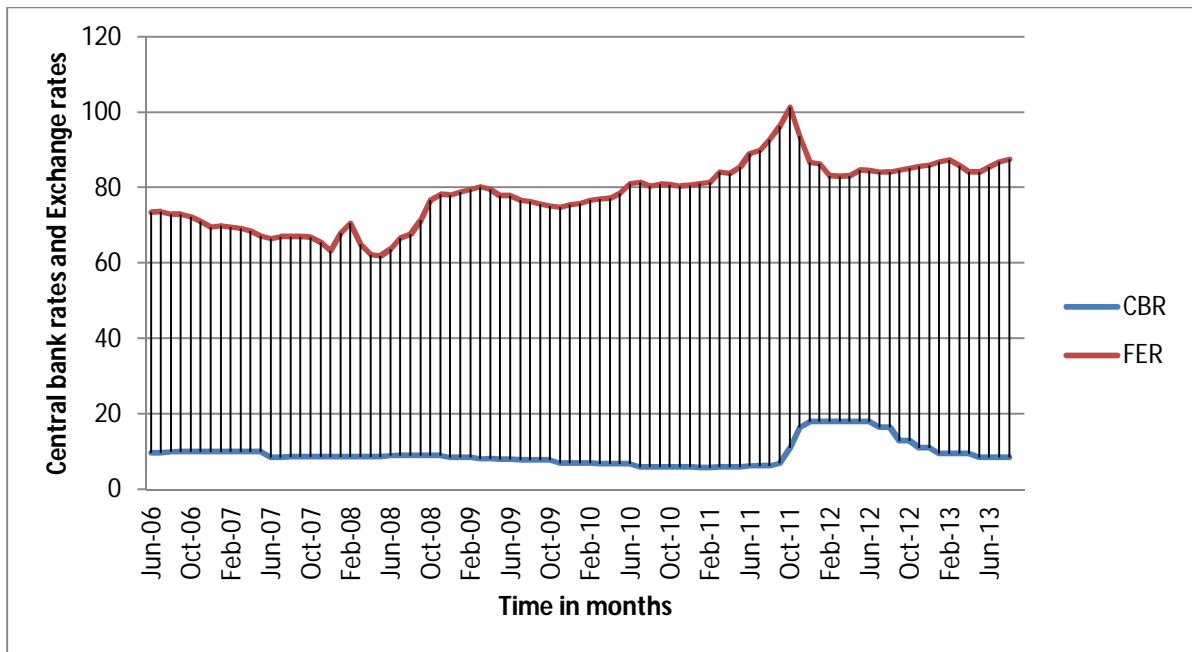
Source: Central bank of Kenya

From the results, change in central bank rate did not highly affect exchange rates in the months April, 2007 to December, 2008. However, an increase of central bank rate in the months July, 2011 to September, 2012 saw an increase in exchange rate.

4.3 Data Summary

This section sought to provide the summary of data that was used.

Table 4.1 presents summary of data

Table 4.1: Summary of Data

Variable	Obs	Mean	Std. Dev.	Min	Max
forexrates~d	87	78.06	8.325	61.9	101.27
cbr	87	9.42	3.33	5.75	18

Source: Central bank of Kenya

From the results, there 87 observations were used. Forex exchange rate had a mean score of 78.06 with a standard deviation of 8.325 while central bank rates had mean score of 9.42 with a standard deviation of 3.33.

4.4 Regression Analysis

4.4.1Relationship between Exchange Rate and Central Bank Rate

Table 4.2 presents Pearson Correlation coefficients

Table 4.2: Pearson Correlation coefficients

	exchange rate	central bank rates
exchange rate	1	.192
central bank rates	.192	1

Source: Central bank of Kenya

The Pearson product-moment correlation coefficient (or Pearson correlation coefficient for short) is a measure of the strength of a linear association between two variables and is denoted by *r*. Basically, a Pearson product-moment correlation attempts to draw a line of best fit through the data of two variables, and the Pearson correlation coefficient was conducted to examine the relationship between variables, *r*, indicates how far away all these data points are to this line of best fit (how well the data points fit this new model/line of best fit).

The Pearson correlation coefficient, *r*, can take a range of values from +1 to -1. A value of 0 indicates that there is no association between the two variables. As cited in Wong & Hiew (2005) the correlation coefficient value (r) range from 0.10 to 0.29 is considered weak, from 0.30 to 0.49 is considered medium and from 0.50 to 1.0 is considered strong. However, according to Field (2005), correlation coefficient should not go beyond 0.8 to avoid multicollinearity. Since the correlation coefficient is 0.193 which is less than 0.8, there is no multicollinearity problem in this research.

However as shown in Table 4.3, there is a weak positive correlation between foreign exchange rate and central bank rate as r = 0.192 and as cited by Wong & Hiew (2005) that a correlation coefficient value (r) range from 0.10 to 0.29 is considered weak.

4.4.2 Model Summary

Table 4.3 presents the model summary

Table 4.3: Model Summary

Summary	Values
Number of obs	87
F(4, 85)	3.27
Prob> F	0.0739
R-squared	0.0371
Adj R-squared	0.0258
Root MSE	8.2167

Source: Time series Data (2013)

Predictor: (Constant), central bank rates. Dependent Variable: exchange rate

Analysis in table above shows that the coefficient of determination (the percentage variation in the dependent variable being explained by the changes in the independent variables) R-squared equals 0.0371 that is central bank rates explains 3.71 percent only of exchange rate.

Table 4.2 presents coefficients of regression equation

Table 4.2: Coefficients of regression equation

forexrates~d	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
cbr	0.482	0.266	1.81	0.074	-0.0475	1.015
_cons	73.526	2.657	27.67	0.000	68.242	78.809

Source: Central Bank of Kenya (2013)

Dependent Variable: Exchange rate

Summary of table

The regression coefficient of CBR in the estimated regression line presented above is 0.482, positive and not statistically significant at 5% which implies that CBR is yet to have an impact on the forex rates. The calculated p value is 0.074. The accepted P-value value should be less or equal to 0.05 for CBR to be significant. This value is more than 0.05 which means that CBR is not significant.

The established multiple linear regression equation becomes:

$Y = 73.526 + 0.482b_1$

Where

Constant = 73.526, shows that if central bank rate = 0, then exchange rate would be 73.526

b_1= 0.482, shows that one unit change in central bank rate results in 0.482 units increase in exchange rate.

4.5 Summary and Interpretations of the Findings

The study found out that there is a weak positive relationship between central bank rates and foreign exchange rates for the period of study between June 2006 and August 2013. This is seen from a correlation of 0.192 between the two variables with this value falling between the range of 0.10 to 0.29 as cited in Wong & Hiew (2005) as weak. There thus appears to be a disjoint between the central bank rate and the foreign exchange market which shows that the CBR is has not yet assimilated into the Kenyan market.

Further, the regression coefficient of CBR in the estimated regression line presented is 0.482, positive and not statistically significant at 5% with a calculated p value of 0.074. The accepted P-value value should be less or equal to 0.05 for CBR to be significant. This value is more than 0.05 which means that CBR is not significant. This implies that CBR is yet to have an impact on the forex rates. Could be a research study with more variables can be more reliable.

Analysis in table above shows that the coefficient of determination (the percentage variation in the dependent variable being explained by the changes in the independent variables) R-squared equals 0.0371 that is central bank rates explains only 3.71 percent of exchange rate. This is very insignificant and this shows that although the CBR is used as a signal of monetary policy being pursued it is not yet an effective tool for exchange rate determination. These should be complemented with pursuit of interest rate path that is consistent with the exchange rate outcomes in formulation of monetary and fiscal policies.

From descriptive statistics, the results found that central bank rates are volatile across the period under study. This is evidenced from the study which shows fluctuations of rates period in period out. The study found that early 2006, central bank rates averaged 9.75% but rose to 10% in the same year until mid 2007. However, there occurred a tremendous increase of central bank rates in the year 2010 from 6% to 18% in 2012 which was quite a huge variation for any stable central bank rates. Foreign exchange rate was also volatile over the period. The study revealed huge variations of exchange rate especially in the period of October 2011 when the Kenyan shilling hit an average all time low of 101.27 to the US dollar and within a shorter period gained value to Kenyan shilling 87.49 to the US dollar. This shows that the country has not reached a state where there is a predictable central bank rate trend.

From the study results, it was found that central bank rates did not influence exchange rates significantly. The findings of this paper are not quite in agreement with those of others studies and this could be attributable to the various variables used in the diverse studies. Amdany (2006), who studied the Determinants of exchange rates in Kenya for the period 1970-2005 examined both structural and short-run factors determining variations of real exchange rates (RER) and nominal exchange rates (NER) in Kenya. Results from these analysis showed that balance of trade in most cases was insignificant while terms of trade, net capital flows, nominal exchange rate policy and monetary policy were very significant in determining variations in real exchange rates.

Ndung'u (2000) study found that monetary shocks drive real exchange rate movements, and real exchange rate movements have an impact on monetary shocks. Connel, Maturu, Mwega, Ndung'u, Ngugi (2010) saw that the relationship between Kenyan exchange market pressure (EMP) variable and domestic interest rates affects each other, as expected in a world in which market participants respond to interest rate differentials. Abdirizack (2012) established the effect of monetary policy on interest rates. His study concluded that lending rates in Kenya were affected by various factors key among them being the 91 Day Treasury bill Rate, followed by the repo rate and lastly the central bank rate. Engel and West (2005) explained the well-known puzzle that fundamental variables such as relative money supplies, outputs, inflation, and interest rates provide little help in predicting changes in floating exchange rates.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study sought to establish the relationship between the central bank rate and exchange rate. The results from the study revealed that there is a weak positive relationship between foreign exchange rate and central bank rate. This is seen from a correlation of 0.192 between the two variables. It is therefore evident that there is no significant relationship between foreign exchange rates and central bank rates. The study further found that one unit change in central bank rate results in 0.482 units increase in exchange rate. It was also seen that if the central bank rate was equal to zero then foreign exchange rate would be 73.526. The trend of the central bank rate was seen not to be stable since there was a high sequence of fluctuations seen.

From descriptive statistics, the results found that central bank rates are volatile across the period under study. This is evidenced from the study which shows fluctuations of rates period in period out. The study found that early 2006, central bank rates averaged 9.75% but rose to 10% in the same year until mid 2007. However, there occurred a tremendous increase of central bank rates in the year 2010 from 6% to 18% in 2012 which was quite a huge variation for any stable central bank rates. Foreign exchange rate was also volatile over the period. The study revealed huge variations of exchange rate especially in the period of October 2011 when the Kenyan shilling hit an average all time low of 101.27 to the US dollar and within a shorter period gained value to Kenyan shilling 87.49 to the US dollar.

5.2 Conclusion

From the findings, the study concludes that central bank rates has no significant effect on nominal exchange rate and thus cannot be used to predict the movement of the foreign exchange rate. This is because there is a weak but positive relationship of r = 0.192 between central bank rate and exchange rate. In conclusion also we find that one unit change in central bank rate results in 0.482 units increase in exchange rate. This means that there may be other more significant factors which impact on the foreign exchange rate besides the CBR. The study further notes that central bank rate is not yet stable since fluctuations in the trend were seen which means Kenya has not reached a point where one may predict the direction of movement of the central bank rate in relation to the foreign exchange rate.

From descriptive statistics, the study concludes that central bank rates are volatile across the period under study. This is evidenced from the study which shows fluctuations of rates period in period out. The study concludes that early 2006, central bank rates averaged 9.75% but rose to 10% in the same year. However, there occurred a tremendous increase of central bank rates in the year of 2010 to 2012 from 6% to 18% which is a huge variation for any stable central bank rates. The study concludes that foreign exchange rate also is volatile over the period. It concludes thatthere is huge variation of exchange rate which is unpromising for foreign investors. Theses may have been due to a bubble effect to the global crisis of 2009-2010 and thus the risk assessments that banks, investors, researchers and decision–makers all over the world were forced to make as a result of the crisis.

5.3 Recommendations to policy and practice

The study recommends that central bank should maintain a coherent monetary policy at all times with a focus on price stability as foreign exchange is also a price. Monetary authorities have influenced exchange rate movements and are expected to take exchange rate movements into account when they conduct monetary policies in some cases. Results from this study thus will assist monetary policy makers' assess the effectiveness of their policies and the appropriate changes that would lead to a more effective transmission of monetary policy to the aggregate economy. In addition the study recommends that central bank should design a framework of engaging with foreign exchange market players within the confines of the financial market laws and regulations and disseminating information to the market efficiently and effectively in order to avoid major fluctuations in the market and which may impact the market negatively.

Further, the study recommended that central bank should put in place thresholds or trigger values for which the foreign exchange should fluctuate in times of extreme crisis and at which the central bank would move in to restore stability. The Government and central bank should also take adequate steps to boost the reserve position to at least the 4 months of import cover to strengthen its ability to respond to market volatility. Finally central bank should develop tools to efficiently monitor financial markets. Some of these tools could be Electronic Brokerage System, foreign exchange swaps and carry trades that will quickly deal with the adverse effects of innovations in foreign exchange trades.

5.4 Limitations of the study

However, there were some problems with this study. There was a limitation on the sample period being too short a time since the CBR came into effect mid 2006. The researcher was thus faced with problems on selection of time series period to work with to get maximum data set periods forcing the researcher to opt for short sub periods. Since the data used was nominal data the researcher did not take into considerations other effects which may have affected the variables under study one of them being inflation factor.

Another limitation was data being reported in different time periods and thus the manipulation of data to fit the data analysis time period. In the process of gathering the rates for each period, data sets on the central bank rate were thus seen to be constant over some long period of time and thus a lot of assumptions had to be made. Further, selection of the model to use from a variety of different models due to lack of a sound theory was also lacking for the researcher.

5.5 Suggestions for further study

From the findings of the study, central bank rates explain 3.71 percent only of exchange rate. The study suggests that similar study be done to determine other factors that explain the remaining 96.29 percent of exchange rate movements.

The analysis that was used is always not sufficient to draw conclusions on a phenomenon, and to provide adequate information that can be used for policy

development. Further research focusing on the relationship between foreign exchange rate and central bank rates is suggested.

A study on other variables that may affect the foreign exchange rates in Kenya other than the ones that were studied since the study was limited to the central bank rate only and to come up with a model that can be used in the Kenyan market to predict the direction of the exchange rate.

A further study on the central bank rate to foreign exchange over a longer period of time of at least ten years or more so as to properly predict its effect over a longer period of time.

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APPENDIX

Appendix One: Secondary Data

MONTH,YR	CBR	FER
Jun-06	9.75	73.41
Jul-06	9.75	73.66
Aug-06	10	72.87
Sep-06	10	72.87
Oct-06	10	72.29
Nov-06	10	71.13
Dec-06	10	69.63
Jan-07	10	69.88
Feb-07	10	69.62
Mar-07	10	69.29
Apr-07	10	68.58
May-07	10	67.19
Jun-07	8.5	66.57
Jul-07	8.5	67.07
Aug-07	8.75	66.95
Sep-07	8.75	67.02
Oct-07	8.75	66.85
Nov-07	8.75	65.49
Dec-07	8.75	63.30
Jan-08	8.75	68.08

Feb-08	8.75	70.62
Mar-08	8.75	64.92
Apr-08	8.75	62.26
May-08	8.75	61.90
Jun-08	9	63.78
Jul-08	9	66.70
Aug-08	9	67.68
Sep-08	9	71.41
Oct-08	9	76.66
Nov-08	9	78.18
Dec-08	8.5	78.04
Jan-09	8.5	78.95
Feb-09	8.5	79.53
Mar-09	8.25	80.26
Apr-09	8.25	79.63
May-09	8	77.86
Jun-09	8	77.85
Jul-09	7.75	76.75
Aug-09	7.75	76.37
Sep-09	7.75	75.60
Oct-09	7.75	75.24
Nov-09	7	74.74
Dec-09	7	75.43

Jan-10	7	75.79
Feb-10	7	76.73
Mar-10	6.75	76.95
Apr-10	6.75	77.25
May-10	6.75	78.54
Jun-10	6.75	81.02
Jul-10	6	81.43
Aug-10	6	80.44
Sep-10	6	80.91
Oct-10	6	80.71
Nov-10	6	80.46
Dec-10	6	80.57
Jan-11	5.75	81.03
Feb-11	5.75	81.47
Mar-11	6	84.21
Apr-11	6	83.89
May-11	6	85.43
Jun-11	6.25	89.05
Jul-11	6.25	89.90
Aug-11	6.25	92.79
Sep-11	7	96.36
Oct-11	11	101.27
Nov-11	16.5	93.68

Dec-11	18	86.66
Jan-12	18	86.34
Feb-12	18	83.18
Mar-12	18	82.90
Apr-12	18	83.19
May-12	18	84.74
Jun-12	18	84.52
Jul-12	16.5	84.15
Aug-12	16.5	84.08
Sep-12	13	84.61
Oct-12	13	85.11
Nov-12	11	85.63
Dec-12	11	85.99
Jan-13	9.5	86.90
Feb-13	9.5	87.44
Mar-13	9.5	85.82
Apr-13	9.5	84.19
May-13	8.5	84.15
Jun-13	8.5	85.49
Jul-13	8.5	86.86
Aug-13	8.5	87.49