Analysis of Interest Rate Channel of Monetary Transmission Mechanism in Kenya

Maina Vincent Gitonga

The Department Of Commerce and Economic Studies

Jomo Kenyatta University of Agriculture and Technology

Nairobi Kenya

Vincentmaina@gmal.com

Abstract

This study sought to investigate the impact of interest rate channel of monetary transmission mechanism in executing monetary policies in Kenya, during the period 2005-2013. The study employed a VAR methodology using impulse response graphs and variance decomposition to test the relative impact of the different variables tested being repo rate,NEER,M3, CPI, GDP and savings, which data sets were quarterly. The empirical analysis found two interesting results. First, all variables were stationary at level I(0) using KPSS. Second, with exception of innovation (M3), there exists significant influence of interest rate channel of monetary transmission shock to GDP and CPI, although weak and a strong significant influence on NEER.

Abbreviations

CBK	: Central Bank of Kenya
CPI	: Consumer Price Index
GDP	: Gross Domestic Product
IMF	: International Monetary Fund
IRF	: Impulse Response Function
LIC	: Low Income Countries
MPC	: Monetary Policy Committee
TB	: Treasury Bills Rate
VAR	: Vector Auto Regression

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Monetary transmission is important to policy formulators, decision making and implementing authorities. The policies are used to enhance stability in key economic variables and promote social and political welfare in any country. In the USA, monetary policy is the responsibility of the Federal Reserve System. The policy goals are generally the same all over the world, with objectives of promoting stable prices, exchange rates, maximum employment and long term interest rates. Most studies have been done using Vector Autoregressive framework. Notable in the developed economies include, Karagiannis et al, (2010) in their study on the Euro-zone and the USA, Morsink and Bayoumi (2001) and Jean Boivin et al, (2008) used a factor Augmented Autoregressive model in his study on monetary transmission in the six largest European economies.

Some authors in developing economies also support the same opinion on the importance of monetary transmission. For instance, Cheong and Boodoo (2008) used a VAR decomposition IRF and found weak pass through from inter- bank rate and Treasury bill rate to prime lending rate in Trinidad and Tobago. Kendall Patrick (2001) in his study on the Caribbean found that it was difficult to discern pattern of Tb rate in Barbados, Belize, Guyana and Jamaica. Davoodi et al, (2013) note that transmission channels differ in East African Countries (EAC) with exchange rate and credit channel being important to Kenya, credit channel in Rwanda and interest rate in Burundi. Morales and Raei (2013) concluded generally that there was evidence for existence of interest rate and exchange rate channels in EAC.

Kenya is not exempted, notable studies include Mburu (2012), with findings suggesting that money supply changes is the predominant determinant of changes in inflation. Misati and Nyamongo (2011) found that instability in the stock market prices creates instability in Gdp and inflation and that the asset price channel of monetary transmission mechanism in Kenya is not compelling. But interesting study by Cheng (2006) who analyzed the interest rate channel with an objective of finding out whether a monetary shock affect output, prices exchange rate as well as other key economic variables. The author used monthly data running from 1997-2005 and the framework was a VAR model including Forecasting Error Variance Decomposition and an Impulse Response Function.

Findings suggest that effects of monetary policy shock on output appear to be insignificant, has significant persistent impact on prices and that the nominal effective exchange rate respond strongly to monetary shock. The researcher noted that the reason for little impact of monetary policy on real output was because of structural weaknesses of the financial sector characterized by weak legal framework, poor governance and insufficient infrastructure.

Since his study, lots of issues he raise have been addressed while others are work in progress. There has been the implementation of the new constitution advocating for minimum government intervention on regulatory authorities such as Central Bank (CBK), Capital Markets Authority (CMA) and Insurance Regulatory Board (IRB) and has promoted political stability with an independent and transparent judiciary. Financial innovation has taken root with OTC, demutualization, dematerialization and automation of the Nairobi Securities Exchange (NSE), a market capitalization of over one trillion shillings, M-pesa, Agent banking and SMEs has increased the levels of commercialization in the economy. The high level of globalization of the economy together with fast tracking of EAC integration

to a Monetary Union, introduction of futures market, forward market, together with a minerals market in the near future.

More so, the data used by the author was a short sample period and therefore never considered the explicit analysis of long run behavior of the economy. Further, since the author used a short term sample period, analysis by VAR which requires relatively long time series with consistent policy framework is likely unfruitful. A further diagrammatical representation of the relationship between Repo rate, Tb rate, Exchange rate and CPI until 2013 July is as under.
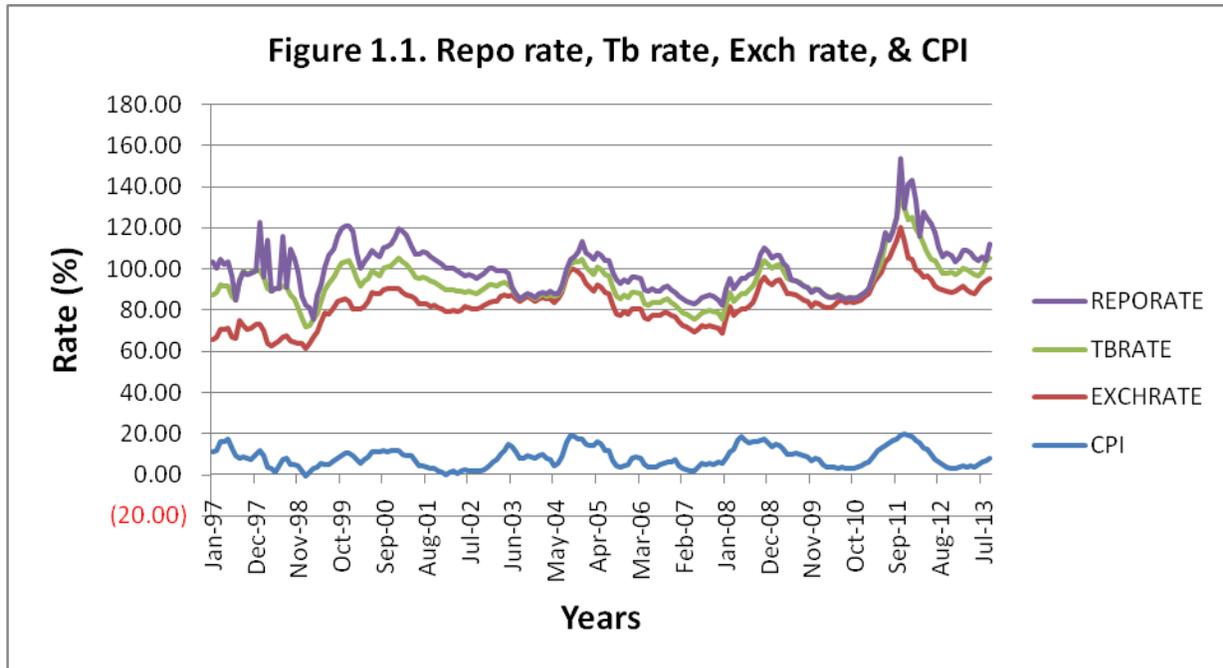

Figure 1.1 suggests that the movement of the nominal exchange rate seem to be following the both the Tb rate and Repo rate, with an appreciation following an increase in nominal interest rate and vice versa. This kind of observation can be attributed by inflow of capital induced by interest rate movements since investors will channel their capital flow to areas where interest rate is highest as payment for the factor of production.

1.2 Problem Statement

Cheng (2006) study found that monetary policy shock had little impact on real output suggesting the reason for this was structural weaknesses in the financial sector which was likely to hamper transmission of monetary policy. The endogenous variables he used were gross domestic product,consumer price index , money stock, short term interest rate and nominal effective exchange rate. However, a lot has happened in the financial sector since 2006 including increased levels of financial innovation, deregulation of financial regulatory authorities by the government and Economic integration. Misati et al (2010) results suggest that with financial innovation in Kenya, the effectiveness of the interest rate channel in monetary policy is weakened but at the same time, due to intensified financial innovation this has led to efficiency in access of finances to households, private firms and institutions therefore investing more and hence increased output bearing in mind that Cheng (2006) concluded that the interest rate shock has insignificant effect on real output which extent is subject to concern.

Further, the author did not consider the explicit analysis of longrun behavior of the economy.Berg et al, (2013) note that analysis by VAR framework requires relatively long time series with consistent policy framework and so, a small sample period would be unfruitful. There is therefore a need to find out whether interest rate channel has become more effective or ineffective.

1.3 Objective of the Research

General Objective

The general objective of the study is to analyze the interest rate channel of monetary transmission mechanism in Kenya. Specifically the study sought:

1.   To estimate the dynamic effects of interest rate channel on the exchange rate

2.   To estimate the relative importance of interest rate channel on inflation

3.   To determine the influence of financial innovation on interest rate channel

1.4 Research Questions

The research paper sought to answer the following questions

i. How does the exchange rate respond to interest rate dynamics?

ii. How does inflation rate respond to variations in the interest rate?

iii. How does financial innovation affect interest rate channel?

1.5 Justification of the Study

It is the desire of every nation's government to achieve economic stability and growth. Because of this, in line with vision 2030's objective to have an average annual growth of 10% per annum every year, the interest channel of monetary transmission mechanism should be thoroughly studied and understood. The study therefore sought to be of great contribution to the government, international financial institutions, policy formulators, private sector, the society at large and future scholars and students.

In other words, the study's result was highly relevant in the formulation and implementation of an effective interest rate channel that will promote growth and improve the welfare of the people. The study will be used by the government as a benchmark for comparison of past years monetary policies and review them basing on results found in the study and therefore enable them formulate and implement an interest rate considered to be optimal for economic growth and development of Kenya.

Thirdly, the study sought to serve as a contributing foundation in guiding students who wish to further their research in this topic as they will use the work as a baseline study and subsequently work on them for better results. The study will also be important to forex dealers, securities markets dealers, the government and the public as a whole, to understand the degree of responsiveness of foreign exchange, financial securities and the economy at large to interest rate changes.

1.6 Scope of the Study

The study covered the period 1993 - 2013 which. The focus was establishing the impact of interest rate channel on exchange rate and inflation with a keen interest on year 2011-2012 when the Kenya shilling was at its lowest ever exchange rate against the USD. The study used quarterly data on Tb rates, Repo rate, Exchange rate, Consumer price Index and GDP to ensure that the model is not under specified.

1.7 Limitations of the Study

The model has used a 91 day Tb rate which is consistent with the Keynesian theory on money demand. However, monetary policy in Kenya is signaled through the CBR and in year 2011-2012 it became the pivot rate for repos and reverse repos and so the CBR rate and the 91 Tb rate are expected to move in the same direction, In addition the overnight rate was set at the CBR rate to eliminate its role as a regular source of funding.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews both the theoretical literature on monetary policy transmission channels and empirical literature that focuses both on effectiveness of the monetary policy transmission channels and those that focus on interest channel in particular.

2.2 Theories on Monetary Policy Transmission

2.2.1 Monetarist View

Both the monetarist and Keynesians have come up with their theory of a monetary transmission. According to the monetarists they identified the monetary transmission mechanism influence the economy through the wealth channel and financial asset prices. With the contraction of monetary policies it leads to decline in stock prices through reduced demand and therefore an overall decrease in individual wealth since there are limited capital gains from stocks. Expectations in the market are that consumption declines and therefore leading to a fall in aggregate demand.

A loose monetary policy will lead to an increase in demand for financial assets which in turn will lead to realization of greater wealth, boosting expenditure and aggregate demand. The relative asset price is best explained by Tobin q's theory on investment. It states that if q is greater than one then managers can raise the market values of their firms by increasing investments and if less than one, then will choose not to invest in new capital. With a tight monetary policy, consumers demand will fall and therefore will reduce spending in more specifically one area i.e. stock markets which will lead to a fall in stock prices and therefore lower the value of the Tobin q.

2.2.2 Keynesian View

In the Keynesian theory, the key channel is the interest rate channel. With the adoption of a contractionary monetary policy, interest rates will shoot up leading to crowding out of local investments this increases unemployment and low aggregate demand due to low consumption levels. This is clearly illustrated by Mishkin (1996)

$$M \downarrow = r \uparrow = I \downarrow = Y \uparrow$$

Another way in which the interest rate is effective is in the exchange rate channel when specifically using a floating exchange rate regime. With loosening (tightening monetary policy, interest rates fall (rises) this leads to capital flight (capital inflow) since domestic interest rates are lower (higher) than foreign interest rates and causing a depreciation of the local currency (appreciation).The depreciation (appreciation) makes local goods competitive (.uncompetitive) in the world market and so, leading to the

appreciation of the exchange rate (depreciation of the exchange rate). The overall net effect of a rise (fall) in the net exports is projected by an increase (decrease in aggregate demand).

2.2.3 Channels of Monetary Transmission Theory

Monetary policy adopted by MPC has an impact on financing condition in the economy because of its influence on expectations about economic activities and inflation. It can affect the prices of goods, asset prices, exchange rate as well as consumption and investments. Mishkin, (1995) notes that the main transmission mechanism include interest rate effects, exchange rate effects, other asset price effects and the so called the credit channel.

The Interest Rate Effect

It has been the mainstay of teaching macroeconomics and it's the key transmission mechanism according to Keynesian textbook model. The interest rate channel works on the presumption that the policy rate has a pass through on short term market rates such as interbank rate and short term Treasury bill rates. In return, these short term market rates have a pass through on long term market rates according to, Cheong and Boodoo (2008).

The channel functions in such a way that a monetary shock impact on liquidity conditions and real interest rates which in turn affects investments and consumption due to their level of sensitivity on interest rate. Private investments are either crowded in or crowded out therefore to a larger extent account for output fluctuations, Mishkin (1995). With a combination of sticky prices and rational expectations, the real long term interest rate rises due to a contractionary monetary policy whereby short term nominal interest rates are originally raised. These higher real interest rates lead to a decline in aggregate output.

The Exchange Rate Channel

It can be seen through the monetary policy transmission operating through the exchange rate effects on net exports. This channel mainly involves interest rates effects whereby, foreign direct investments   (capital flows) from areas of low interest rates to areas of high interest rate since the factor payment for capital is interest. An increase in domestic interest rates relative to foreign interest rates leads to the appreciation of the exchange rate, which lowers the price of imported goods and services and therefore pushing down domestic inflation. This leads to loss of competitiveness of domestic goods and services in the world market with a net effect of a fall in aggregate output and an adverse current account. The effectiveness of the exchange channel depends on the exchange rate regime whereby foreign interest rates track domestic interest rates in case of a flexible exchange rate.

Credit Channel/Bank Lending Channel

This channel functions through response of credit aggregates to changes in interest rates, and other policy instruments. Barnanke and Gertler, (1995) suggests that it was improvised from the interest rate channel. This channel can be split in to two that is balance sheet channel and lending channel.

Balance Sheet Channel

It is experienced because change in policy affects interest rates and the financial position of borrowers. Fast rising interest rates directly increase interest rate expenses, reducing net cash flow and weakening the borrower's financial position. Also, rising interest rates are typically associated with declining asset price which in return shrinks the value of the borrower's collateral. The indirect effect of

the monetary policy adopted is on net cash flow and collateral values and therefore deterioration in consumer expenditure.

Bank Lending Channel

States that an expansionary monetary policy results in an increase in deposits which stimulates an increase in loans, investments and eventually output while if monetary policy tightens, will result in a decrease in loans, investments and eventually output.

Asset Price Effect/Channel

The Keynesian paradigm for analyzing monetary policy effects on the economy is that it focuses on only one relative asset price through the interest rate channel. It's therefore necessary to study on how monetary policy affects the world of real wealth and asset prices.

According to Tobin's q theory of investment and wealth effects on consumption, Tobin (1969) a link exists between Tobin q and investment spending in that when money supply falls, the public finds it has less money at its disposal and so cuts down on spending and the one place the public can spend less is in the securities market.

Therefore, a rise in interest rates because of a tight monetary policy makes the bond more attractive to equities therefore causing the price of equities to fall. The fact that lower equity prices will lead to lower q (market value of a firm) which causes lower investment spending since a firm cannot acquire new capital and machinery. Also, when stock prices fall, the value of shareholders wealth decreases which leads to decreasing the lifetime resource of consumers and consumption falls.

2.4 Empirical Literature:

Findings by Boivin et al, (2008) suggest that there was evidence of important changes in the transmission of monetary policy since the start of European Monetary Union. They also found that the exchange rate channel had become more powerful in the monetary union period than in the previous decade. They used a Factor Augmented Vector Autoregression model proposed by Barnanke. The author limited the sample data to six largest European economies Germany, France, Italy, Spain, Netherlands and Belgium.

James and Tamim(2001) suggst that policy measures to strenghen banks were a probable prerequisite to restoring the effectiveness of monetary transmission mechanism. They used a VAR framework in evaluation of monetary policy in Japan with results showing that both bank's balance sheet and monetary are important sources of shocks and that banks play an important role in transmsitting monetary shock to economic activites

Karagiannis et al,(2010) suggest that Money Market (MM) rate compared to the Central Bank (CB) rate is more effective as a policy vehicle variable in the Euro-Zone. They used monthly data from the USA and Euro-zoneMore so and found that not all of the change in the policy rate is transmitted to the loan rates. His findings in the USA analysis were that CB rate increases and decreases are both transmitted to the deposit and loan rates and that MM rate is not transmitted to the retail rates which probably show that the MM does not work effectively as a policy vehicle variable in the USA.

Findings by Opiyo (2010), in the author's study on monetary policy transmission on Economic growth in Kenya suggests that there is positive contribution of treasury bill rate and required reserve ratio to the cost of credit. Monetary transmission mechanism has strong influence on credit growth, cost of

credit and amount of deposit in Kenya. Further analysis by the author suggests that there is an inverse relationship between real money supply, required reserve ratio and Treasury bill rate. The researcher therefore concludes that an action by CBK to lower the required reserve ratio, Treasury bill rate or both will immensely increase the amount of money supply in the economy. The author used data between 1997 and 2009 and the Structural Vector Autoregressive Model (SVAR). In contrary however, Cavik and Teksoz (2012) notes that one weakness of the SVAR model is that the estimation results are sensitive to the identifying assumptions which sensitivity can lead to substantial variations in the estimated effects of monetary policy and in their relative importance over the sample period.

Munyanzwe (2011) noted that the exchange rate transmission channel is not significant in explaining the variability of the consumer price index when it's interacted with financial innovation variables M2/M1 (ratio of broad money to narrow money and bank credit to GDP. The researcher's study sought to examine the effectiveness of exchange rate transmission chance of monetary policy in Kenya amidst rapid financial innovation using the regression analysis. The research observed the impact of exchange rate in explaining CP1 volatility when the exchange rate is interacted with financial innovation variables. The author used data from 2001q1-2010q4 . The results are consistent with Misati et al, (2010) who used financial innovation variables represented by (Bank to Gdp ratio and M3/M2). They found that with increased financial innovation will lead to efficiency in access of finances to households and firms and therefore, more investments which lead to increased output. However, the overall effects suggest that with financial innovation, the effectiveness of interest rate channel in monetary transmission is weakened and so, as financial innovation intensifies, the more positive the output gap is likely to be.

Results by Mburu (2012) suggests that changes in money supply are the predominant determinants of changes in inflation, as the coefficient of change in money supply is highest at 41%, which was consistent with the monetarists theory that the effe3ct of an expansionary monetary policy on an economy operating at optimum is inflationary in nature. Also, the results suggest that change in interest rate follow closely with changes in exchange rate being the last significant variable with a coefficient rate of 21%.

The author used the error correction model and granger causality test and found that changes in money supply, granger cause change in prices and that changes in exchange rate granger cause changes in money supply and changes in interest rate. The researcher however failed to find direct causality between interest rate and prices. These findings however contradicts Njuguna and Duravell (1997) who noted that exchange rates, foreign prices and terms of trade have long term effects on prices while interest rates and money supply have short term effects.

Masati and NyamOngo (2011) in their paper on asset prices and monetary policy in Kenya, results shed light on issues on linkages between monetary policy and financial stability. Empirical analysis based on quantitative analysis which incorporates both descriptive analysis and empirical approach where the study employed use of the VAR approach. Findings were that while monetary policy effects on stock prices volatility don't last for long, instability in the stock market prices creates instability in GDP and inflation and that the asset price channel of monetary transmission mechanism in Kenya is not compelling.

Maturu (2006) found that contrary to other researcher's evidence that inflation is one of the most dominant determinants of money, the researcher's results suggest it's not. Moreover, results suggest that interest rate shock temporarily reduced real output for the first 4 months and permanently reduces money

demand / supply and inflation. That interest rate interpreted as monetary tightening significantly and permanently reduces headline inflation and therefore interest rate channel is operational in Kenya. The author noted that repo rate is potentially more useful as a policy instrument compared to reserve money. This is because it's predominantly self driven and hence more of an exogenous variable than reserve money. He used a SVAR considering eight endogenous variables assuming a small open economy. Consistent to Cheng (2006) whose results found that monetary policy effects on output appeared to be insignificant but however notes that there was persistent significant impact on prices and nominal effective exchange rate.

Findings by Davoodi et al (2013) suggest that channel of monetary transmission mechanism differ across EAC with exchange rate and credit channel being important in Kenya, credit in Rwanda and interest rate in Burundi. More so, a loose policy stance increases prices significantly in Kenya and Uganda and output in Burundi, Kenya and Rwanda. Also, monetary policy measured by shock to policy rate has long lags to prices and output of all countries while policy measured by shock to reserve money, has short lags in Uganda but long lags in Burundi and Rwanda. They applied the use of a Bayesian VAR model which has affected way of dealing with problem of over-parameterization by using previously acquired information.

Morales and Raei (2013), in their study on the evolving role of interest rate and exchange rate channels in monetary policy transmission in EAC countries, generally concluded that there was evidence for the existence of interest rate and exchange rate channels of transmission of monetary policy in the EAC. Move over, for countries with imperfect financial markets the exchange rate channel proves a strong vehicle. They noted that deposit rates are more responsive to changes in discount rate in across all EAC countries in the short run. More so for leading rate, the contemporaneous pass through of both discount and Treasury bill rate is significant only for Kenya and Tanzania.

Ludi and Ground (2006) used the VAR approach to investigate the Bank lending channel in South Africa. Citing its ability to incorporate endogenity and the fact that it is pervasive in nature, because everything affects everything else. Results suggest that loans in South Africa are governed by consumer demand and not by bank supply which tends to disapprove the fact that bank lending channel has effectively worked as a tool of monetary policy in South Africa. They suggest further research since with presence of demand driven loans in essence nullifies the bank lending channel.

Kendall Patrick (2001) examined determinants of interest rates in the Caribbean he used the VAR estimation model and impulse response function (IRF) in his analysis. The author emphasized on the timing and effects of monetary policies on the economy. The researcher used five variable VAR i.e. the lending rate, deposit rate, discount rate Tb rate and found that the R^2 was greater than 0.7 after running the regression. In addition he found that it was difficult to discern response pattern of Tb rates in Barbados, Belize, Guyana and Jamaica but response was strongest and most consistent in Bahamas and Trinidad.

Cheong & Boodoo, (2008) in their paper on the monetary transmission mechanism: A closer look at the interest rate channel in Trinidad and Tobago used IRF and the variance decomposition of the VAR model. The authors used the analysis to provide an idea of the strength of interest rate transmission and also the time it takes on interest rate policy on target variables. The aim of the study was to determine the relative importance of the Repo rate in explanation of market interest rates, the importance of interest

rates on credit and finally, the importance of credit in the explanation of movements in inflation and income. Consistent with the IRF, the variance decomposition suggest that there was weak pass through from interbank rate and Tb rate to prime lending rate and that there was no strong relationship and pass through effects among the variables, particularly between short term interest rates and lending rates. But the positive aspect was that while the relationship may not have been strong, they never the less existed. The results also shows that the model also suggest high liquidity in financial systems was one of the reasons for incomplete Repo pass through. The results are not consistent with Kendall (2001) whose findings suggest that Trinidad's interest rate response was strongest and most consistent.

Cheng (2006) discovered that Kenya's nominal exchange rate is highly susceptible to monetary policy with appreciation following an increase in the short term interest rates and that monetary policy seemed to have little impact on real output. The author used the vector autoregressive model, using data between 1997 and 2005. His findings suggest that the possible explanation for the sluggish response of output to monetary policy shock is the weak financial system, plagued with structural weaknesses.

Saborowski and weber (2013), in their study on Assessing the determinants of interest rate transmission through conditional impulse response function, they employed the use of a panel VAR framework and supported their choice of the panel VAR being that it uses monthly instead of annual data to assess how a country's affects not only long run pass through but also its dynamics over time. In addition, the model permits computing a country's specific pass through and decomposing these in to the respective contributions of the different country characteristic. Results suggest that structural characteristics that matter for interest rate transmission are exchange rate flexibility, regulatory quality, financial development, dollarization, inflation and finally, banking sector related variables such as competition, ratio of liquidity to assets and as an indicator of asset quality, the performance of bank's loan portfolios. Their findings suggest that an increase in banking sector liquidity from 20th to 80th percentile is associated with a fall in pass through of around 20 percentage points. An increase of between 25 and 50 percentage points was as a result of moving from a pegged to a floating exchange rate regime.

The major weakness with the approach was that they imposed coefficients to be the same across countries, which may be problematic because the characteristics they used did not fully explain pass through heterogeneity across countries. The researchers were however observant that it was necessary to distinguish between facts on the ground and the methodological deficiencies and that interpretation of the absence of evidence for strong monetary transmission would have to await and pay careful attention to studies on individual countries and not geographical regions.

Michal Andrle et al, (2013) in their study Forecasting and monetary policy analysis in low income countries, with a focus on Kenya, they developed a semi structural new Keynesian open-economy model, by use of existing Forecasting and Policy Analysis (FPAS) frame works which embody the fairly general view that aggregate demand and monetary policy matter for output dynamics in the short run. At their core, they consist of a forward looking IS equation, a hybrid Philips curve with two separate Philips curve, one for food and the other for nonfood, a monetary policy rule and an uncovered interest parity equation. They used in sample and out of sample forecasting where the results suggest that imported food price shocks accounted for some inflation dynamics in 2008 and that an accommodative monetary policy played an important role. They noted that the out of sample performance together with its in sample properties and more generally its ability to provide a plausible interpretation of recent events in Kenya validates the use of the models in policy analysis in low income countries.

Andrew Berg et al, (2013) found clear evidence of a working transmission mechanism after a large policy induced rise in short term interest rate, lending and other interest rate rise, the exchange rate tend to appreciate, output growth tend to fall and inflation declines. The case study illustrates that the policy frame work made a big difference to the strength of transmission of policy decisions. Where countries target money, such as Rwanda and Tanzania, short rates are less likely to be informative or to move long rates. Their results suggest that transmission of monetary policy was less evident in Tanzania and Rwanda which conduct monetary policy under dejure and defacto exchange rate respectively. Also, transmission was clearest in Kenya and Uganda where the regimes most resembled inflation targeting in that the authorities prioritized inflation, emphasized the role of the policy rate, allowed the exchange rate a large degree of flexibility and broadly avoided multiple objectives. Contrary, to Davoodi et al, (2013), whose results generally suggest that monetary policy measured by shock to policy rate has long lags to prices and output of all EAC nations. The results are equally shared by Morales and Raei (2013) who suggest there was evidence for existence of interest rate and exchange rate channels of monetary policy in EAC.

Nyamongo and Ndirangu (2010), paper on financial innovation and monetary policy in Kenya, noted that financial innovation has dad positive outcomes and seems to improve the interest rate channel of monetary policy transmission. The study was conducted using data from period 1998-2012. Tests were carried out on stability of velocity of circulation, money multiplier and money demand with use of impulse response function with results showing that innovation has improved the monetary policy environment in Kenya.

Results from Misati et al, (2010) differ from those of Nyamongo and Ndirangu (2013). In their study on financial innovation and Monetary policy transmission, applied use of two stage least square (2SLS) and monthly data covering period 1996-2007. Based on their findings, they concluded that financial innovation poses complex challenges to the conduct of monetary policy and thus financial innovation dampens the interest rate channel of monetary transmission mechanism.,

2.5 Summary

Most of the available studies have investigated the effects of interest rate channel of monetary transmission mechanism. However the current study unlike the prior studies focuses interest rate channel analysis using long term data variable to enable capture the long term analysis and effects on the economy and also seek to clarify as suggested by Cheng (2006) that development of infrastructure inform of financial innovation would translate in to a more effective interest rate channel in Kenya. There has been mixed results since Munyonzwe (2011) and Misati et al, suggest that financial innovation weakens the effectiveness of monetary policies while output in the case of interest policy shock changes insignificantly, it changes significantly in the case of financial innovation. On that vein therefore, the study seeks to analyze the interest rate channel and its long term effects on exchange rate, inflation and relationship with financial innovation.
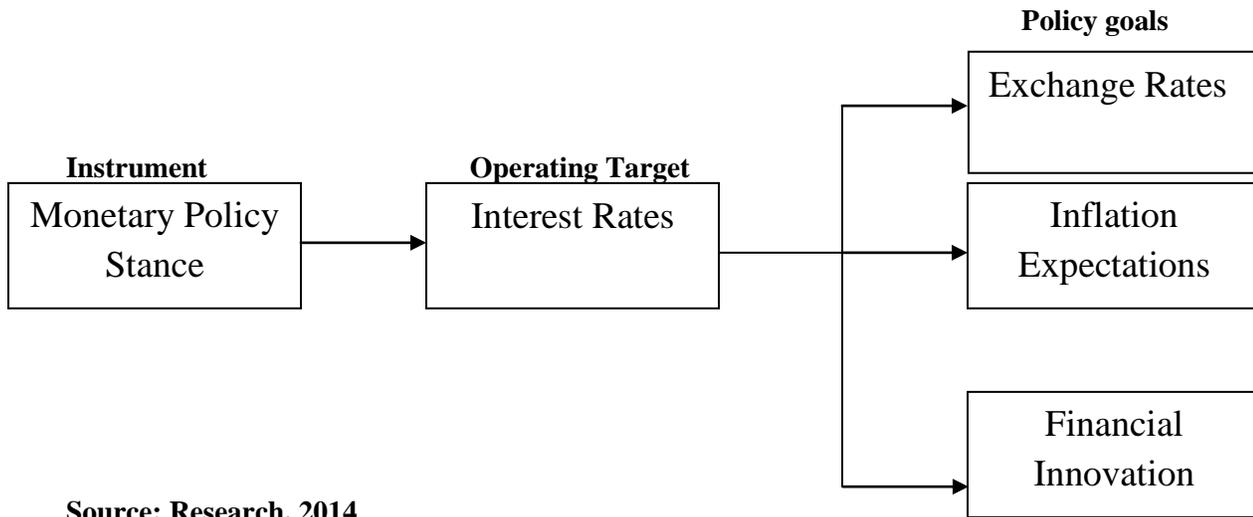
2.6 Research Gap

From literature, different authors have given mixed results, some bearing results that agree while others results that contradict each other, there is limited literature on the long run effects of interest rate channel effects on financial innovation as the economy grows more dynamic and diversified.

2.7 Conceptual frame work

(Independent) *(Dependent Variables)*

Policy goals

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                                                         ┌──────────────────┐
                                                         │  Exchange Rates  │
                                                         └──────────────────┘
  Instrument          Operating Target                   ┌──────────────────┐
┌────────────────┐   ┌──────────────────┐                │    Inflation     │
│ Monetary Policy│──▶│  Interest Rates  │───────────────▶│   Expectations   │
│     Stance     │   │                  │                └──────────────────┘
└────────────────┘   └──────────────────┘
                                                         ┌──────────────────┐
                                                         │    Financial     │
                                                         │   Innovation     │
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Source: Research, 2014

Monetary policy objectives/goals have traditionally included price stability, stable exchange rates and mitigating financial crises mostly as a result of asset price bubble.

Under this study, monetary policy stance is proxied by the CBR. Monetary policy targets are classified as either operating targets or intermediate targets. Operating targets are tactical goals that the Central Bank of Kenya can use directly such as short term interest rates to influence to influence the short run, with pass through effects to the exchange rate, inflation levels and financial innovation as the set objectives/goals.

CHAPTER 3

RESEACH DESIGN AND METHODOLOGY

3.1 Introduction

Research design is the structure and plan of investigation undertaken to obtain answers to research questions. According to (Robson, 2002) the overall scheme or programme of research is the plan. (Cooper & Schindler, 2003) there are many definitions of research design but no one definition impacts the fool range of important aspects but should be noted that however, all definitions provides answers for questions such as ; what kind of sampling will be used ? What techniques will be used to gather data? How will time and cost constraints be dealt with? According to (Leedy, 1989) the study design should include an outline of what the researcher will do from writing hypothesis and their operational implications to the final analysis of the data.

3.2 Research Design

In line with the main objectives of this study which is to identify the effectiveness of the interest rate channel as a monetary transmission mechanism in Kenya this study employed an explanatory research design in order to assess its effectiveness.

3.3 Data Collection

The study totally depended on secondary data. The time series data of inflation, gdp, Tb rate, Repo rate and exchange rate was collected from CBK, KIPPRA and KNBS.

3.4 Definition and Measurement of Variables

This study will use monthly data covering the period between 1993 when a new era of monetary policy was adapted to 2013. The data set is limited because the CBR became the official rate since August 2005 and the introduction of new inflation series in November 2009 whereby inflation was revised downwards from 17.5% per annum to 6.5% per annum. This suggests that some of the sharp rise in food and overall inflation from the mid 2000 made have been spurious due to methodological errors in calculation of price indices. All variable data will be expressed in logarithms except interest rates and will be differenced once.

The Consumer Price Index data will be used to measure inflation. Inflation refers to the general rise in price levels over time. Interest rates generally have a direct relationship with inflation by affecting both consumption and investments. This can also be deduced from the fact that mild inflation is an incentive to investors.

The 91 treasury bill rate which is considered to be the short term interest rate and money market rate, the repo rate which is the bank's main interest rate policy tool used to provide short term funding to commercial banks and the exchange rate data to be used is the United States Dollar and the Kenya shilling this is because it is the world currency and international trade is basically transacted using the US$.

3.5 Model Specification

Using the VAR model, the study will seek to analyze the dynamic interaction among four variables Tb rate, Repo rate, Nominal Effective Exchange rate and Inflation rate. The two variables, Tb rates and Repo rate are based on the fact that it is the various rates/prices that send signals to the real sector and not the monetary aggregates, Taylor (1995). It is therefore the two variables that are the focus of the study.

For the VAR model to be stable and avoid under specification of the model, there is need to put in to consideration some control variables, bearing the fact that interest rates also affects other channels either directly or indirectly.

The VAR model will be specified as unrestricted reduced form to a structural model where there are no exogenous variables. It will be presented as follows:

$$Z_t = \sum_{i=1}^{p} \phi_i \, x_{t-i} + \varepsilon_t \qquad \text{..............................(i)}$$

Where ϕ is 7by 7 matrix of coefficients, x_{t-i} is a 7by1 vector of endogenous variables and ε_t is a 7by1 vector of error terms.

Let B be contemporaneous coefficient matrix in the structural form and E be coefficient matrix in (i) without contemporaneous coefficient.. Therefore the structural equation can be.

$$Z_t = -G^{-1} \, \phi \, X_{t-1} \quad \text{and the error term} \quad \mu_t = G^{-1} \, \varepsilon_t$$

Throughout the paper, endogenous variable $\sum \phi$ is assumed to contain

Repo rate (Rr): Central Bank's main interest rate policy used as policy rate

Nominal Effective Exchange rate (NEER): Kenya shilling to US dollar

Inflation (CPI): The Consumer price Index

Gross domestic product (gdp):

Savings (savins)

Extended Broad Money (M3) :

ε =Stochastic error term

Depending o measures or proxy adopted, various approaches have been used to model financial innovation. Financial innovation is assumed to involve technological progress in transactions and policy changes such as final regulation or deregulation. Some authors have adopted bank assets/Gdp ratio and M2/M1. However, the study adopted M3 which comprise of currency outside banking system, demand deposits of banks, quasi money and resident foreign currency deposits.

CHAPTER FOUR

4.1 Introduction

This chapter covers the analysis of the secondary data presentation and interpretation; the results from an unrestricted VAR analysis are also presented. In this chapter, the data was tested for normality, stationarity of the variables and stability of the system. This was followed by running of the VAR, the Impulse Response Function and Variance Decomposition.

4.2 Findings and Diagnostic Tests for Normality.

When analyzing time series data, it's of importance to know whether the variables are normally distributed and are stationary, failure to which will lead to spurious results (nonsensical) results. During the test for normality, the researcher's main concern was the Jargue-Bera (JB) probability as our main focus was measures of variability and dispersion. Therefore, the researcher used J-B probability to draw inferences from it. Also provided in the table were the central tendency measures of mean, mode and median.

The J-B descriptive statistics test is a joint hypothesis test that comprise of Skewness and Kurtosis whereby, for a normal distribution, the value of skewness must be 0 and the value of Kurtosis must be 3 (S=0 and K=3). A null hypothesis of normal distribution against an alternative hypothesis of non normal distribution is used when using the J-B test.

Ho : JB=0 (normally distributed)

H1 : JB 0(not normally distributed)

Table 1: Descriptive Statistics

	REPORATE	SAVINS	NEER	M3	CPI	GDP
Mean	5.877143	1.522857	77.56286	1053396	101.5429	603577.5
Median	6.6	1.5	76.6	935889	101.9	586300.8
Maximum	16.7	2	93.9	1849249	141	956429.4
Minimum	0	1	62.6	512470	70.4	339301
Std. Dev.	3.920616	0.230199	7.726162	424113.9	22.92411	188436.6
Skewness	0.117229	-0.21029	0.122406	0.424826	0.288647	0.374909
Kurtosis	3.296572	2.665315	2.398958	1.876716	1.742737	1.956734
Jarque-Bera	0.208433	0.421319	0.614227	2.892862	2.791218	2.407168
Probability	0.90103	0.81005	0.735567	0.235409	0.247682	0.300117
Sum	205.7	53.3	2714.7	36868874	3554	21125214
Sum Sq. Dev.	522.6217	1.801714	2029.582	6.12E+12	17867.51	1.21E+12
Observations	35	35	35	35	35	35

Table 1 indicates the normality test for Reporate is 0.90103, Savins is , 0.81005 NEER is 0.735567 , CPI is 0.235409, Gdp is 0.300117 and for M3 is . 0.247682 The study failed to reject the Ho and concluded that the data is normally distributed since JB probability is greater than 5% p-value, we can't reject null hypothesis that the residuals are normally distributed which according to the researcher, was desirable.

4.3 Stationarity test for Variables.

When estimating a model that includes time series data, it's important to ensure that the time series variable are stationary, which means they are integrated at same order. Failure to which will lead to nonsensical results with a high R^2 and t-statistics Pyndick,(1998). This is done by conducting unit root test on each variable to find the order of integration. If all the variables are integrated at the same order and stationary, then we can run our VAR model, if integrated of same order but not I(0), then the analysis will call for an error correction model to be conducted.

Table 2: Summary of results of KPSS stationarity Test

KPSS Unit root

Variable	KPSS:t-Sstatistic	1%	5%	10%	Remarks
REPORATE	0.124513	0.216	0.146	0.119	Stationary I(o)
SAVINS	0.178485	0.216	0.146	0.119	Stationary I(o)
NEER	0.502403	0.739	0.463	0.347	Stationary I(o)
CPI	0.68154	0.739	0.463	0.347	Stationary I(o)
GDP	0.687546	0.739	0.463	o.347	Stationary I(o)
M3	0.683806	0.739	0.463	0.347	Stationary I(o)

According to Table 2, all the variables were found to be integrated at order Zero i.e. I(O). This meant that the variables in this series were all stationary at 5% significance level with intercept and trend. This therefore meant that the researcher could go ahead and run the VAR model.

4.4 VAR Analysis

4.4.1 Determination of lag length

Table 3:   VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1076.037	NA	1.22E+21	65.57801	65.8501	65.66956
1	-886.5707	298.553	1.16E+17	56.27701	58.18166	56.91787
2	-801.158	103.5306*	7.29e+15*	53.28231*	56.81951*	54.47247*

 * indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike   information criterion

SC: Schwarz   information criterion

HQ: Hannan-Quinn information criterion

In this case, all the criteria indicate a 2 order VAR as optimal. Compared to the AIC criterion, the Schwartz criterion is generally more conservative in terms of lag length as it selects a shorter lag than the other criterions. In this case, the appropriate number of lags is 2, since all the criterion pointed to 2 but however, the Hannan –Quin (HQ) is typically more appropriate for monthly and quarterly data

4.4.2 Estimation of VAR.

Table 4: Estimated Results of the selected optimal lag

Standard errors in ( ) & t-statistics in [ ]

	REPORATE	SAVINS	NEER	M3	CPI	GDP
REPORATE(-1)	-1.90E-14	0.011938	0.401822	-1914.968	0.222205	254.1594
	-3.10E-14	-0.00921	-0.24386	-1810.79	-0.07807	-183.428
	[-0.61280]	[1.29624]	[1.64776]	[-1.05753]	[2.84609]	[1.38561]
REPORATE(-2)	-1.62E-14	0.027047	0.566367	176.4892	0.021329	2.145998
	-3.80E-14	-0.01118	-0.29592	-2197.38	-0.09474	-222.588
	[-0.42854]	[2.42010]	[1.91391]	[0.08032]	[0.22513]	[0.00964]
SAVINS(-1)	-1.53E-12	0.594401	0.973	-12031.24	6.294571	12168.61
	-8.30E-13	-0.24742	-6.55122	-48646.4	-2.09744	-4927.75
	[-1.83473]	[2.40240]	[0.14852]	[-0.24732]	[3.00108]	[2.46941]
SAVINS(-2)	8.41E-13	0.042748	5.092965	-31319.86	2.486042	7640.123
	-8.00E-13	-0.23603	-6.24966	-46407.2	-2.00089	-4700.92
	[1.05645]	[0.18111]	[0.81492]	[-0.67489]	[1.24247]	[1.62524]
NEER(-1)	1.48E-14	0.016366	0.890424	-357.561	0.206104	300.464
	-2.70E-14	-0.0081	-0.21435	-1591.64	-0.06863	-161.229
	[0.54374]	[2.02165]	[4.15413]	[-0.22465]	[3.00332]	[1.86358]

NEER(-2)	-7.69E-15	0.018243	0.255816	-1267.302	0.067875	19.35052
	-2.70E-14	-0.00796	-0.21082	-1565.47	-0.0675	-158.577
	[-0.28638]	[2.29118]	[1.21342]	[-0.80954]	[1.00561]	[0.12203]
M3(-1)	-1.15E-17	-1.15E-06	-3.12E-06	0.625523	1.06E-05	0.077223
	-4.50E-18	-1.30E-06	-3.60E-05	-0.26492	-1.10E-05	-0.02684
	[-2.52142]	[0.85330]	[0.08734]	[2.36116]	[0.92882]	[2.87760]
M3(-2)	8.45E-18	-1.65E-06	-1.61E-06	0.168564	-1.01E-05	0.045727
	-4.50E-18	-1.30E-06	-3.50E-05	-0.26325	-1.10E-05	-0.02667
	[1.87160]	[1.22930]	[0.04527]	[0.64031]	[0.88602]	[1.71475]
CPI(-1)	4.74E-14	0.011225	0.851072	-36.76379	0.950059	49.51743
	-6.00E-14	-0.01788	-0.47333	-3514.71	-0.15154	-356.03
	[0.78584]	[0.62791]	[1.79807]	[-0.01046]	[6.26936]	[0.13908]
CPI(-2)	-5.91E-14	0.013043	0.014726	3460.786	0.404639	187.4474
	-5.70E-14	-0.01691	-0.44776	-3324.84	-0.14335	-336.797
	[-1.03644]	[0.77130]	[0.03289]	[1.04089]	[2.82267]	[0.55656]
GDP(-1)	-5.90E-17	3.93E-06	4.90E-05	0.465744	0.000195	1.586095
	-1.70E-17	-4.90E-06	-0.00013	-0.96831	-4.20E-05	-0.09809
	[-3.55342]	[0.79854]	[0.37538]	[0.48099]	[4.67451]	[16.1703]
GDP(-2)	6.95E-17	1.98E-06	0.000126	-0.254845	0.000149	0.848027
	-1.70E-17	-4.90E-06	-0.00013	-0.96911	-4.20E-05	-0.09817
	[4.17814]	[0.40266]	[0.96166]	[-0.26297]	[3.57230]	[8.63853]
REPORATE	1	0.018062	0.404426	-1148.673	0.133054	107.9844
	-3.40E-14	-0.01008	-0.26697	-1982.42	-0.08547	-200.814
	[2.9e+13]	[1.79133]	[1.51486]	[-0.57943]	[1.55666]	[0.53773]
R-squared	1	0.768961	0.894332	0.997854	0.998627	0.999886
Adj. R-squared	1	0.630338	0.830932	0.996566	0.997803	0.999818
Sum sq. resids	3.48E-24	0.305532	214.2058	1.18E+10	21.95657	1.21E+08
S.E. equation	4.17E-13	0.123598	3.272658	24301.3	1.047773	2461.654
F-statistic	2.49E+26	5.547123	14.10606	774.903	1211.872	14620.51
Log likelihood		30.43149	77.68706	-371.8056	40.10219	296.2456
Akaike AIC		1.056454	5.496186	23.32155	3.218315	18.74216
Schwarz SC		0.466921	6.085719	23.91108	3.807848	19.33169
Mean dependent	5.793939	1.551515	77.62727	1085960	103.3455	619367.2

S.D. dependent	4.025772	0.203287	7.959204	414701.2	22.35165	182284

Determinant resid covariance(dofadj.)	6.41E-11
Determinant resid covariance	3.18E-12
Log likelihood	155.8889
Akaike information criterion	-4.72054
Schwarz criterion	1.183341

Testing at 10% significant level and 5% level of significance with respect to critical t values of 1.282 and 1.645 respectively the estimated results from VAR translates as a change in repo rate now, has significant direct effect on savings during the first quarter and the relationship is inversely related. Therefore repo rate change now is inversely related to savings in the first quarter.

Repo rate change now will affect M3 positively in both the first quarter and second quarter the same applies to gdp that a change in repo rate now will influence Gdp positively both in the first and second quarter.

Savings influence savings in that a change in savings now will influence positively influence savings in the first quarter alone while will have an inverse influence in the second quarter.

Results suggests that a change in NEER now influences savings positively in the first quarter and inversely influence in the second quarter

The above interpretation are actually traceable on cheng (2006), whose results suggests that monetary shock had significant persistent impact on prices and NEER with the current study adding financial innovation as having a significant positive change from the same shock.

4.4.3 Impulse Response Function

Table 5: Estimated Results from impulse response Function

Response to Cholesky One S.D. Innovations ± 2 S.E.
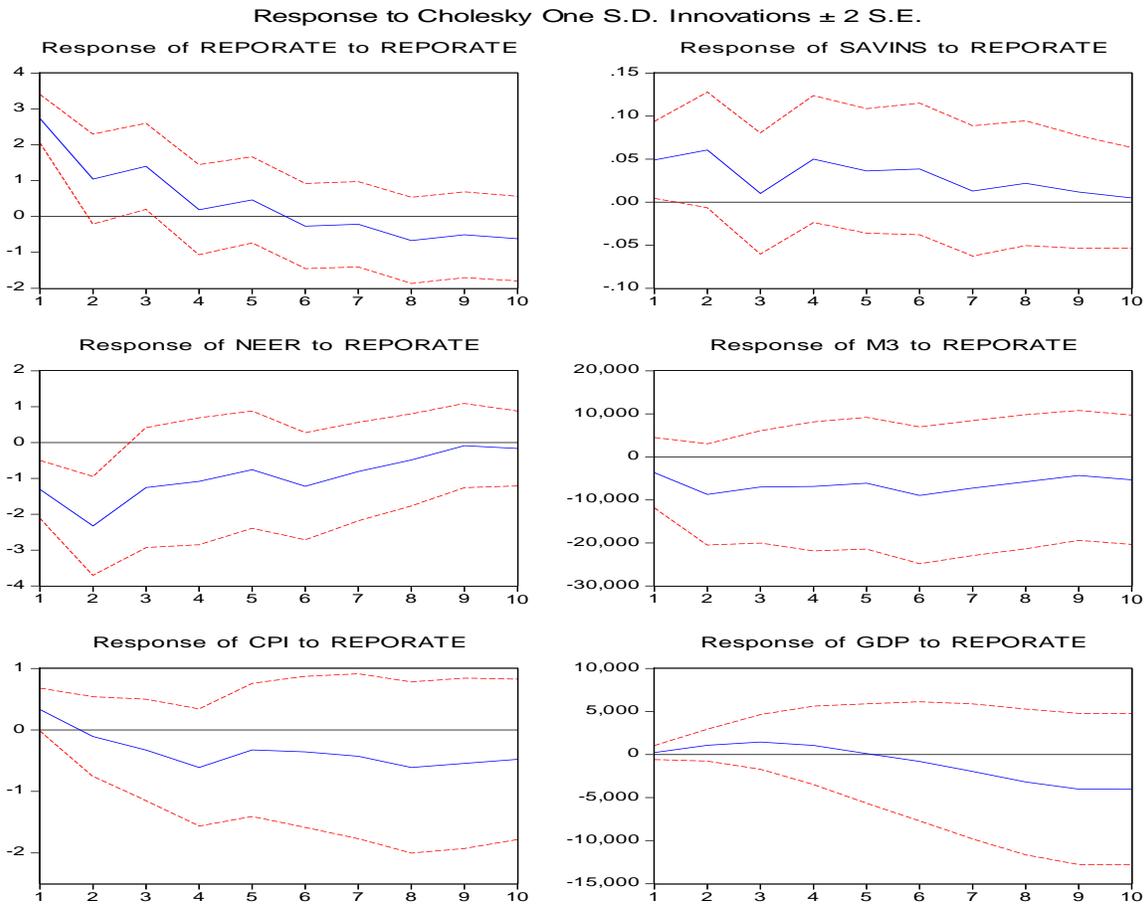
In response to a shock in the repo rate (equivalent of one standard deviation of the repo rate variable) impact of shock in Repo rate is felt for four quarters after which it normalizes. Savings on repo rate has a positive impact after which lasts for seven quarters after which it normalizes.

The shock on NEER has a negative impact which lasts for nine quarters then neutralizes while M3 has no significant impact all through with Gdp's impact positive until quarter five after which it turns negative all through the quarters.

4.4.4 Variance Decomposition

Table 6: Analysis of Variance Decomposition

Variance Decomposition of REPORATE:

Period	S.E.	REPORATE	SAVINS	NEER	M3	CPI	GDP
1	2.732082	100	0	0	0	0	0
2	3.028699	93.22987	1.917663	0.27208	3.334686	0.876211	0.369492
3	3.399939	90.95867	1.974291	0.550785	4.922697	0.819661	0.773895
4	3.50684	85.79291	2.107904	0.652005	8.816488	1.624919	1.005773
5	3.715039	77.99666	4.353587	0.956123	13.80374	1.991212	0.898682
6	3.914976	70.7061	5.318952	2.160987	18.64323	2.256193	0.914544
7	4.097999	64.80908	8.043435	3.022165	20.6901	2.134741	1.300474
8	4.28342	61.75357	10.00067	4.108925	20.20075	1.985321	1.95076
9	4.419745	59.32808	12.41021	4.60634	19.08484	1.871939	2.698598
10	4.522889	58.52815	13.40764	4.665709	18.3245	1.849309	3.224687

Variance Decomposition of SAVINS:

Period	S.E.	REPORATE	SAVINS	NEER	M3	CPI	GDP
1	0.132912	13.60915	86.39085	0	0	0	0
2	0.169822	21.09106	74.17622	3.324183	0.710192	0.224137	0.474207
3	0.187609	17.57409	70.28643	3.009423	6.601039	0.549128	1.979887
4	0.202842	21.11897	64.24195	2.575187	7.185925	0.825871	4.052095
5	0.221432	20.41489	63.9947	2.422256	6.187516	0.731141	6.249501
6	0.237768	20.32939	61.62307	3.413769	6.232932	1.183809	7.217032
7	0.242807	19.77834	61.44778	3.305615	6.904905	1.135379	7.427977
8	0.247223	19.86462	59.55385	4.050966	7.831422	1.513075	7.186074
9	0.251753	19.37626	57.81199	5.320124	8.81269	1.748143	6.930797
10	0.253124	19.20479	57.4758	5.552361	9.161609	1.747709	6.857733

Variance Decomposition of NEER:

Period	S.E.	REPORATE	SAVINS	NEER	M3	CPI	GDP
1	2.492647	27.46543	4.693203	67.84137	0	0	0
2	3.841176	48.28281	4.250483	41.31071	2.062021	3.982088	0.111892
3	4.425696	44.44591	10.19801	31.12978	1.638457	12.24645	0.341386
4	4.739902	43.96553	9.574503	28.90959	2.600137	14.65179	0.298457
5	4.853743	44.3652	9.130675	27.57928	4.45758	14.04825	0.419023
6	5.050617	46.81078	8.43383	25.54256	4.640595	14.14405	0.428187
7	5.147222	47.55594	8.683166	24.77421	4.489984	13.98711	0.509589
8	5.211917	47.25616	8.674569	25.27228	4.380212	13.64494	0.771841
9	5.224442	47.05739	8.640764	25.3843	4.389118	13.66496	0.86348
10	5.256337	46.5904	8.808933	25.18544	4.720337	13.83773	0.857156

Variance Decomposition of M3:

Period	S.E.	REPORATE	SAVINS	NEER	M3	CPI	GDP
1	23635.7	2.428872	9.595813	0.700611	87.2747	0	0
2	29255.02	10.53978	11.93331	1.912362	75.58175	0.01658	0.016223
3	35677.88	10.93599	18.46204	6.746725	63.47875	0.365564	0.010929
4	40451.31	11.40914	17.12066	9.654611	61.43881	0.312468	0.064318
5	43761.69	11.7181	15.34119	8.918422	62.88632	0.847309	0.288667
6	46592.81	14.03397	13.96926	8.029444	62.04492	1.410286	0.512121
7	48820.32	15.00575	13.55676	7.911561	61.51125	1.375376	0.639302
8	51033.85	15.02091	12.68558	8.390628	61.81361	1.258672	0.830597
9	53175.01	14.49687	11.689	8.294356	63.03579	1.20492	1.279064
10	55422	14.27781	10.79526	7.830605	63.86414	1.27055	1.961628

Variance Decomposition of CPI:

Period	S.E.	REPORATE	SAVINS	NEER	M3	CPI	GDP
1	1.026292	10.44725	3.141218	2.522252	0.019641	83.86964	0
2	1.686773	4.270158	22.91065	8.701875	3.580756	54.134	6.402556
3	2.169787	4.851661	23.09791	14.41619	6.109189	35.39654	16.1285
4	2.564185	9.158202	19.65518	10.84754	13.18684	26.17041	20.98184
5	2.984577	7.946314	15.59177	9.184982	28.15647	19.53849	19.58197
6	3.489841	6.863908	12.56615	9.493521	41.28118	14.29425	15.50099
7	3.865547	6.822237	10.55755	10.36341	47.61052	11.8401	12.80618
8	4.11718	8.220997	9.313025	12.07884	48.5062	10.59229	11.28865
9	4.263163	9.295459	8.698055	13.73324	47.6946	10.03778	10.54086
10	4.337365	10.19845	8.455247	14.2801	46.81268	10.06549	10.18803

Variance Decomposition of GDP:

Period	S.E.	REPORATE	SAVINS	NEER	M3	CPI	GDP
1	2350.012	0.981653	0.013604	0.793259	2.087864	9.122203	87.00142
2	5066.129	4.758289	2.403898	1.402317	19.70002	6.727831	65.00765
3	8610.626	4.518584	5.165516	1.236521	43.7473	4.089591	41.24249
4	12026.34	3.095044	4.430636	0.634379	61.21836	2.254265	28.36732
5	15223.28	1.936693	2.866593	1.891462	71.47991	1.628119	20.19722
6	18423.27	1.513403	2.012834	5.111818	75.07396	1.598215	14.68977
7	21252.36	1.991711	1.613622	7.543955	76.05671	1.302095	11.4919
8	23474.82	3.479993	1.436	8.593626	75.69452	1.10174	9.694122
9	25180.7	5.56754	1.407519	9.115939	74.18063	1.151422	8.576955
10	26460.5	7.359894	1.421585	9.575237	72.52116	1.262676	7.859446

The results of the variance decomposition in fig 4.5 suggests that in the short run, shock to repo rate account for 100% variations of fluctuations in repo rate (own shock) and 0% from other variables in that quarter. In the short run, i.e. quarter two, shock to repo rate account for 21.1% variation of fluctuations in savings and 19.2% in the long run that is 10th quarter. 86.4% of variation in fluctuations in savings are as a result of own shock in the first quarter

Also, in quarter two, a shock in repo rate account for 48.3% variations in fluctuation in NEER, while in the long run, account for 14.2% with 67.8% shock as a result of own shock in the first quarter. Repo rate shock account for 2.4% variation of fluctuations in M3 in the short run, and 14.2% in the long run, with 87.3% being accounted for from own shock in the first quarter. It also account for 0.98% variation in fluctuations in GDP in the short run and 7.4% in the long run

CHAPTER FIVE

CONCLUSIONS, SUMMARY AND POLICYRECOMMENDATIONS

5.1 Introduction

This chapter consists of the conclusions, the summary of the major findings and policy recommendations.

5.2 Summary of findings

The study was designed to analyze the interest rate channel of monetary transmission mechanism in Kenya. The findings from variance decomposition depicts that there is a long run relationship between the Nominal Effective Exchange rate (NEER) and GDP although savings, M3 and CPI are not as strong as NEER and GDP, still there exists a pass through effect from a shock in the interest rate channel. From the study, CPI has the weakest response to repo rate shock but generally, findings suggest that the interest rate channel was effective in the long run analysis.

5.3 Conclusions

The general objective of the study was to give an analysis of the interest rate channel of monetary transmission mechanism in Kenya. This objective was translated in to three specific objectives.

The first specific objective was to determine the dynamic effect of interest rate channel on the exchange rate in Kenya through a shock in repo rate. The findings suggests 48.3% variations in fluctuations in NEER in the second quarter are a attributed to a standard deviation shock in Repo rate, which maintains almost the same rate in the long run depicting 46.6% with the IRF suggesting that the impact is felt after the ninth quarter.

The second specific objective was to establish the relative importance of the interest rate channel on inflation whereby the study suggests that 83.9%% variations in fluctuations of CPI are as result of shock to itself and 10.5% as a result of shock from the repo rate. In the long run (10th quarter) 10.2% variations in fluctuation were as a result of one standard deviation repo rate shock. The shock is positively felt in the first quarter after which it neutralizes

Findings based on the third specific objective suggest that, financial innovation variable peroxide by M3 was in the first quarter 87.3%. According to VAR, it had a significant influence of positive nature in both the first and second quarter.

It was also observed that interest rate channel explains 13.6% variation in fluctuations in savings and 0.98% fluctuations in Gdp in the first quarter while in the 10th quarter; it explains 19.3% and 7.4% variations in fluctuations in savings and Gdp respectively. These results especially on Gdp to a smaller extent does not tally with Cheng's (2006), whose results suggested insignificant influence of a monetary transmission shock to Gdp of Kenya. Further, results from this study suggests that the repo rate influence on Gdp and CPI was significant although weak which to some extent also differ with findings suggested

by Misati and Nyamongo (2012) found that the effect of monetary policy in influencing prices and output is quite shallow; they found that a shock in interest rate has no impact on output and inflation.

5.4 Recommendations

There is need for constant revision of policy and instruments targeting framework and operating procedure to enhance monetary policy effectiveness particularly in stabilizing the exchange rate and keeping inflation levels at the generally recommended rate.

There is need for CBK to harmonize and combine the functionality of all channels to achieve optimum output goals of monetary transmission mechanism. This could be complemented with adoption of one policy rate used to signal the market and by so doing will reduce on duplication of activities by different rates and lead to optimum outcomes of monetary policy goals.

Other factors could be used to control inflation other than monetary tools among them being diversification of energy sources large scale mechanized agriculture, engaging in hedging activities so as to prevent the economy from price shocks occasioned by fluctuation of the dollar when importing crude oil this could assisting maintaining inflationary levels at a rate below the government recommended rate of 5%.

In advent of financial innovation, it's advisable that the CBK combines other transmission channels of monetary policy to achieve optimum policy outcome as opposed to concentrating on single channel. By so doing, financial innovation may dampen the interest rate channel but through other channels it might be responsive

5.5 Suggestions for Further Research.

The study sought to analyze the interest rate channel of monetary transmission mechanism on exchange rate, inflation levels and financial innovation. The study suggests further research on analysis on interest rate channel when interacted with financial innovation variable on asset prices. With increased access to world financial markets by local firms as a result of the Euro bond, the Kenyan financial markets is projected to improve pass through effects on asset prices.
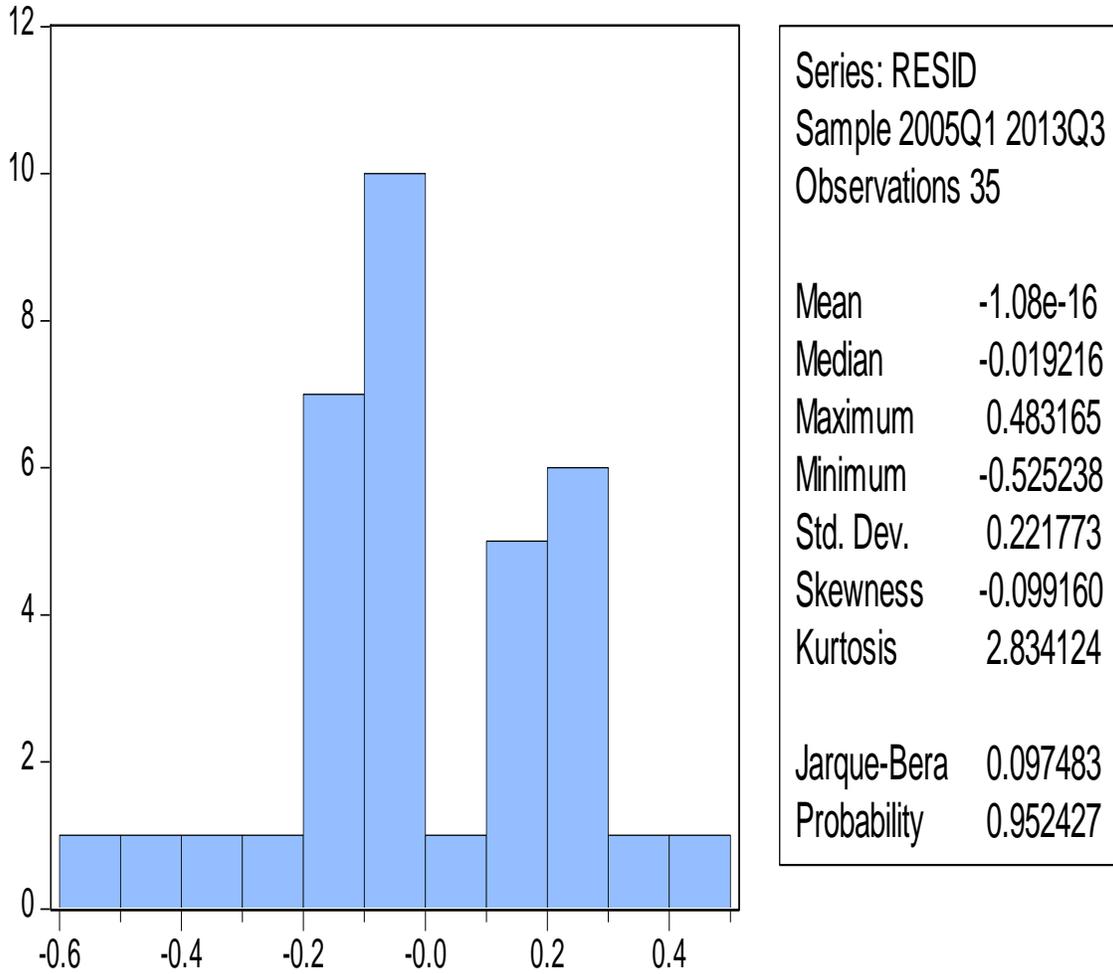
The study could also be further developed by including more variables to the regression model like the 90 days Tb rates and the recently formulated Kenya Banks Reference Rate as policy rates. In addition, one can incorporate the bank lending channels interacted with financial innovation.
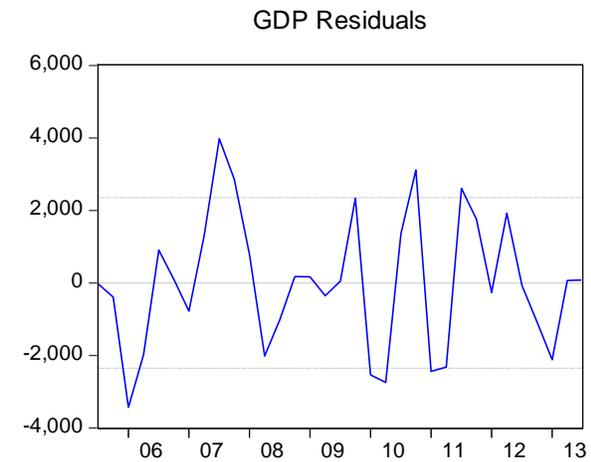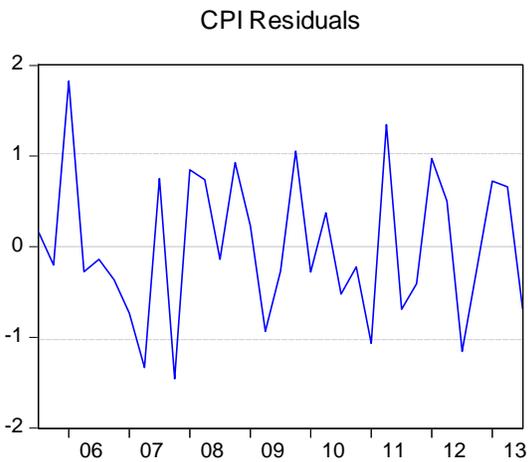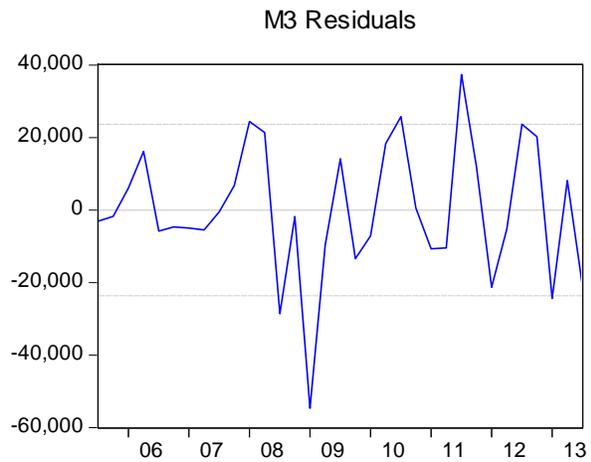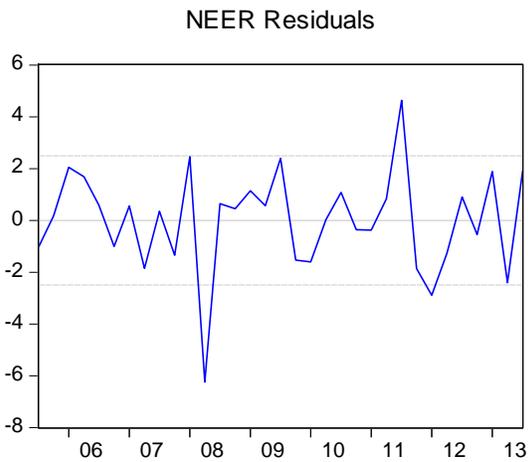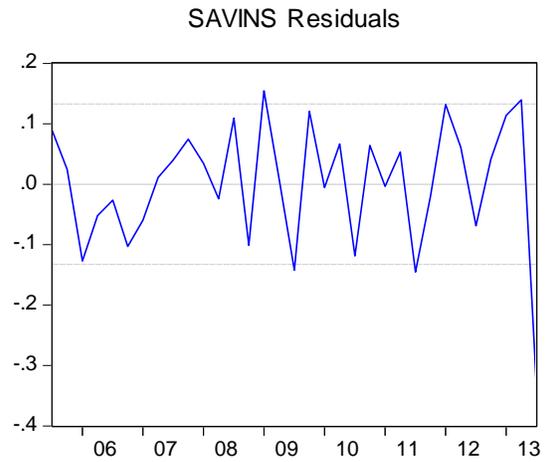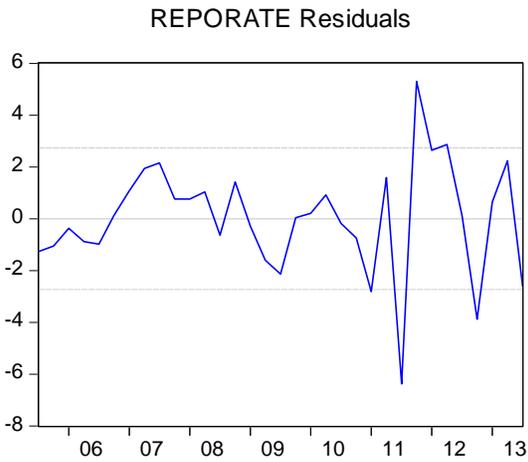
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Appendix 1: Histogram of Residuals

Series: RESID	
Sample 2005Q1 2013Q3	
Observations 35	
Mean	-1.08e-16
Median	-0.019216
Maximum	0.483165
Minimum	-0.525238
Std. Dev.	0.221773
Skewness	-0.099160
Kurtosis	2.834124
Jarque-Bera	0.097483
Probability	0.952427

Appendix 2: Residuals Stationarity Graphs

REPORATE Residuals

SAVINS Residuals

NEER Residuals

M3 Residuals

CPI Residuals

GDP Residuals

Appendix 3: Impulse Response Function all Varaibles Included

Response to Cholesky One S.D. Innovations ± 2 S.E.