Journal of World Economic Research
2014; 3(6): 95-108
Published online November 25, 2014 (http://www.sciencepublishinggroup.com/j/jwer)
doi: 10.11648/j.jwer.20140306.14
ISSN: 2328-773X (Print); ISSN: 2328-7748 (Online)

Monetary and fiscal policy shocks and economic growth in Kenya: VAR econometric approach

Mutuku Cyrus[1, 2, 3], koech Elias[3]

[1] Kenya Institute for Public Policy research and Analysis, Nairobi, Kenya
[2]School of Economics, University of Nairobi, Nairobi, Kenya
[3]School of Business and Economics, Mount Kenya University , Nairobi, Kenya

Email address:
mutukucmm@gmail.com (M. Cyrus), Koelias@yahoo.com (K. Elias)

To cite this article:
Mutuku Cyrus, koech Elias. Monetary and Fiscal Policy Shocks and Economic Growth in Kenya: VAR Econometric Approach. *Journal of World Economic Research.* Vol. 3, No. 6, 2014, pp. 95-108. doi: 10.11648/j.jwer.20140306.14

Abstract: In macroeconomic policy design and management, monetary and fiscal policies are of great essence. However, the relative effectiveness of these policies has been subject to debate in both theoretical and practical realms for a long period of time. This paper investigated the relative potency of the policies in altering real output in Kenya using a recursive vector autoregressive (VAR) framework. The analysis of variance decomposition and impulse response functions reveled that fiscal policy has a significant positive impact on real output growth in Kenya while monetary policy shocks are completely insignificant with fiscal policy shock significantly alters the real output for a period of almost eight quarters.

Keywords: Monetary Policy, Fiscal Policy, Vector Autoregressive Model, Real Output, Policy Design

1. Introduction

Macroeconomics stability is a key concern for policy institutions, policymaker sand the government in both developed and developing countries. Sustainable economic growth with relatively stable price level and substantial improvement of the welfare of the society has been the drive of policy institutions, policy makers and the government in both developed and developing countries. In this respect both monetary and fiscal policies are used as major tools for macroeconomic stabilization, economic growth and management. However, in the last five decades, the effectiveness of the two policies has been a major concern of economist and policy makers with advocacy ranging from monetarists, fiscalists and both policy coordination. Monetarists are those economists who believe that monetary policy is a more powerful tool when used for macroeconomic stabilization. They include (Friedman and Meiselman, 1963: Elliot, 1975; Rahman, 2005 and Senbet, 2011)

On the other hand are the fiscalists/Keynesians whose policy faith is much in government expenditure and tax changes than in monetary policy. This group is lead by Keynes. These policy stands have motivated extensive research on the relative effectiveness of fiscal and monetary policy (Ajisafe and Folorunso,. 2002 and Adefeso, and Mobolaji,. 2010, Ajisafe and Folorunso,. 2002, Chowdhury,1986, Mohammad, et al., , 2009).

However the bulk of empirical research has not reached a conclusion concerning both the relative and sole effectiveness of the two policies with some specific country studies concluding that monetary policy has a negative effect on economic growth. The findings give contradicting results hence limiting generalization of the results across other countries. Interestingly, the controversy on results is much attributed to variable choice and methodology approach employed in analysis (Senbet, 2011). Another strand of literature argues that both monetary and fiscal policies impact significantly on output thus they should be accorded prominent roles in pursuit of macroeconomic stabilization in both developing and developed countries (Adefeso, and Mobolaji,. 2010).The debate on their relative importance still goes on between the monetarists and the Keynesians (Ajisafe and Folorunso,. 2002). This debate has occasioned research mostly in developed countries but the empirical findings vary from one country to another (Senbet, 2011, , Bruce and Tricia, 2004).Similarly, researchers in the developing countries have also taken a step in contributing to the debate and enriching the existing literature with empirical findings on the relative effectiveness of the two policies (Rahman, 2005, Adefeso, and Mobolaji,. 2010, Olaloye and Ikhide, 1995, Jayaraman,

2002). The results are still controversial hence a generalization on the effectiveness of the two policies cannot be established. The question remains, which of the two policies is more effective? Are the policies really effective? Hence, a specific country study is necessary. In the view of the controversy, this study contributes to the debate by conducting a study on Kenya covering the period from 1997 to 2010

Although monetary and fiscal policies use different policy instruments, they are closely related in terms of achieving certain objectives by affecting the levels of output in the economy. Conventionally, monetary policy under financial programming framework is pro-cyclical meaning that when the economy is in a boom, money supply increases and when the economy is on a down swing, money supply decreases, (Nyamongo at al., 2008).This paper to investigate the relative effectiveness of fiscal and monetary policy in Kenya based on vector autoregressive approach. It analyses impulse responses and variance decomposition in an attempt to explain the relative effectiveness of monetary and fiscal policy in Kenya.

1.1. Monetary Policy in Kenya

Governments design macroeconomic policies to promote growth, economic stability, high employment, low inflation rates, stability in the financial markets, and favorable conditions in the external balance. In Kenya the role of monetary policy design and management is assigned to the central bank according to the Central Bank Act (CAP 491).The act stipulates that the principal objective of the CBK shall be to formulate and implement monetary policy directed to achieving and maintaining stability in the general price level. Of late, this act has been emended to include the objective of growth and employment. Since post impendence to around 1980 monetary policy in Kenya was generally passive with major focus being the protection of the country's foreign exchange and reserves and supporting the import substitution policy aimed at strengthening the balance of payment (BOP) position (mwega 1991).Since 1980 monetary policy in Kenya has been implemented in conjunction with IMF programmes like the structural Adjustment facility (SAF) and Enhanced Adjustment Facility.

The central bank influences the level of economic activity by controlling money supply through instruments of monetary policy such as reserve requirements, discount rate and open market operations .Economic theory indicates that an increase in money supply leads eventually to an increase in aggregate demand and thus, through different channels, raises total output. Those channels are the interest rate channels, the credit channel, the exchange rate channel, and the asset price channel. Monetary policy framework in Kenya is inflation targeting. Central Bank of Kenya adjusts interest rate to steer inflation towards the targeted rate.

Notably, Cheng (2006) examined the impact of a monetary policy shock on output and prices and the nominal effective exchange rate for Kenya using a VAR framework. The empirical findings revealed that a shock in repo rate, used as the proxy for monetary policy has no effect on the real output . The results were backed up by the fact that Kenya financial system has structural rigidities which hinders monetary policy transmission. This study used recent data to address the relative potency of the two policies on output unlike the previous study that sought to explain the relative potency of the monetary policy transmission channels.

Since post independence Economic history of Africa, Kenya has earned a reputation as one of the best performing and most stable economies. The price rise has never spilled to hyper-inflation while substantial balances of payment (BOP) difficulties have never completely halted the economy. This is attributed to sound fiscal and monetary policies Kallick and Mwega (1991).However the question on the comparative potency of the policies on real output remains unresolved.

1.1.1. Fiscal Policy in Kenya

Fiscal policy refers to the discretionary act of the government to influence the direction of the economy by altering the level and composition of public expenditure and funding. Generally it entails altering size of government expenditure and tax rates. Fiscal policy contributes to the economy by delivering on the three principal functions of government namely, efficient allocation of resources, fair distribution of incomes and stabilization of economic activity. Fiscal policy affects aggregate demand, the distribution of wealth, and the economy's capacity to produce goods and services. In the short run, changes in spending or taxing can alter both the magnitude and the pattern of demand for goods and services. After some time lag, this aggregate demand affects the allocation of resources and the productive capacity of an economy through its influence on the returns to factors of production, the development of human capital, the allocation of capital spending, and investment in technological innovations. Tax rates impacts on the net returns to labor, saving, and investment thus influencing both the magnitude and the allocation of productive capacity.

Fiscal policy in Kenya has been conducted based on the Long-term National Development plans which have been acting as the guidance on investment and development. For instance from 2003 the government adopted the economic recovery strategy which is currently the vision 2030.Other initiatives which constitute fiscal policy have been implemented in Kenya for instance The Medium Term Expenditure Frame work (MTEF), Poverty reduction Strategy Paper and poverty Reduction Growth Facility (PRGF).

1.2. Literature Review

The sole and relative efficiency of the two tools of macroeconomic stabilization has been an issue that has attracted the interests of economists for a long period of time(Friedman and Meiselman, 1963 Darrat, 1984: Garrison and Lee, 1995: Gramlich, 1971, Adefeso, and Mobolaji,. 2010) and Uhlig, 2005).The empirical investigations reveal differing results for different countries hence it's impossible to give a generalization from a study done in a single country.

Friedman and Meiselman (1963) conducted an empirical study to test the validity of the Keynesian and monetarist theories using, in simplified single equation models. The results support the stability of the monetary model compared to the Keynesian multiplier model. However, their results have been challenged and criticized by many economists on the ground of modeling oversimplification and misinterpretation of econometric results. The simplified single equation models do not recognize the problem of endogeneity associated with macroeconomic variables.

In similar vein, Jordan and Anderson (1968) used a dynamic econometric model and concluded that monetary policy was more effective and faster in influencing the economy than fiscal policy. Contrary, econometric models constructed by the Federal Reserve System identified multiple channels through which monetary policy works thus indicating a relatively more effective fiscal policy than monetary policy. Waud (1974) used an econometric model similar to the one used in the Anderson and Jordan (1968), and found both fiscal and monetary policies to be important in influencing the real economic output (real GDP). Similar studies have also been conducted in the developing countries.

Ajayi (1974) emphasized that in developing economy the emphasis is always on fiscal policy rather than monetary policy. In his work, he estimated the variables of monetary and fiscal policies using ordinary least square (OLS) technique and found out that monetary policy influences are much larger and more predictable than fiscal influences. These results were confirmed with the use of beta coefficients that changes in monetary action were greater than that of fiscal action. In essence, greater reliance should be placed on monetary actions.

However, Andersen and Jordan (1986) obtained contradicting results. They tested empirically the relationships between the measures of fiscal and monetary actions and total spending for United States. These relationships were developed by regressing quarter to quarter changes in Gross National Product (GNP) on quarter to quarter changes in the money stock (MS) and the various measures of fiscal actions namely; high employment budget surplus (R-E), high employment expenditure (E) and high employment receipt (R). They concluded that fiscal policy impacts more and faster on economic output than monetary policy.

Chowdhury (1986) used the ordinary least square (OLS) technique in his empirical investigation on the relative effectiveness of the two policies in Bangladesh. He adopted a modified St. Louis equation in estimating the monetary and fiscal variables. From the analysis he concluded that fiscal actions exert greater impact on economic activity in Bangladesh than monetary actions. This result was confirmed with the t-statistics of the summed coefficients, which is significantly larger than the corresponding value for the monetary summed coefficients.

Abbas (1991) examine the relationship between lagged monetary aggregates and economic growth in Asian countries .Bidirectional causality was established between the two variables.

Olaloye and Ikhide (1995) using monthly data for 1986-1991 in Nigeria estimated a slightly modified form of the basic St. Louis equation. The analysis of their results showed that fiscal policy exerts more influence on the economy than monetary policy. However most of the studies seem to overlook the properties of time series data variables, direction of causality and endogeneity of variables. Most macroeconomic variables exhibit difference stationarity in the sense that for these variables to be stationary they must be differenced. Any regression based on variables at levels is likely to be none sense regression especially if the equation is non cointegrating, Engle and Granger (1987).

Economists criticize the validity of using the St Louis equation on the grounds that it's a reduced form of an equation, the policy variables included in the equation such as money and government expenditure are not statistically exogenous and on the grounds that the equation has specification error since it omits other relevant variables (interest rate, exchange rate and prices).This renders the results based on st Louis equation unreliable and inconsistent Raham (2005).Bruce and Snyder (2004) using US data found that fiscal policy is very influential on output. Ansari [1996] found that a shock to government spending explained close to a fourth of the movement in India's GDP.

Hassan (2006) uses structural Vector autoregressive model to study the effectiveness of fiscal policy in stabilizing the real GDP in Egypt using annual data covering 1981 to 2005.The study concluded that the relationship between the fiscal policy and economic activity is really weak. The study also established that fiscal policy impacts on monetary policy strongly calling for policy coordination. In conclusion the paper revealed evidence against using fiscal policy to stabilize fluctuations. Adefeso and mobolaji (2010) re-examined the relative effectiveness of fiscal and monetary policy on economic growth in Nigeria using annual data from 1970-2007.They employed the error correction mechanism and cointegration technique to draw policy inference .Their findings suggested that monetary policy impact on real Output (real GDP) is much more stronger than fiscal policy and the inclusion of trade openness did not alter the results. They concluded that in case of macro-economic stabilization, monetary policy is relatively more effective than fiscal policy

Suleiman (2009) investigated the long-run relationship between money supply (M2), public expenditure and economic growth in Pakistan using annual data for the period between 1977-2007.The study employed Johnson cointegration test to determine whether there exists a long-run relationship between the study variables. The granger causality test was employed to determine whether the direction of causality was bilateral or unidirectional. Surprisingly the results of the study revealed that there exists a negative relationship between public expenditure and growth in the long-run while money supply (M2) impacts positively on economic growth in the long-run. The results suggest that monetary policy has unlimited impact on economic growth.

Koimain (2007) used Thailand data for the year 1993 to 2004 to find out the causal association between economic output (real GDP) and government expenditure (fiscal policy proxy). His findings shows that no cointegration among public expenditure, economic growth and money supply (M2). However unidirectional causality was established among the variables with both policies impacting significantly on real GDP. Supporting this findings are the results obtained by Patterson and Sjoberj (2003) using data for Sweden from 1961 to 2003 to determine the relationship between government expenditure and economic growth. They divided public spending in three broad categories which are private consumption, Gross fixed capital formation and interest payment. They found that all the variables significantly effect on economic output hence concluding that fiscal policy significantly impacts on economic output.

Jordan, Roland and Carter (1999) investigated the potency of monetary and fiscal policies in Caribbean countries which include Trinidad, Barbados and Guyani using annual data. In this study, government expenditure was used as fiscal policy variable and net domestic assets as the monetary policy variable and GDP as economic output measure. The results based on a VAR estimation revealed that both policies have significant influence on GDP but the coefficient of monetary policy was negative indicating that an expansion in the monetary policy makes the real output to contract in the long-run.

It is clear that the relative potency of the two policies remain a puzzle in economic literature. The contradictions in the existing empirical findings have been attributed to variable choice, treatment and methodological approach.

Senbet (2011) investigated the relative impact of fiscal verses the monetary action on output in USA using the VARs approach. He points out that most of the studies neglect policy–price relationship. The studies that use nominal GDP as the depended variable could not address the question of how policy induced change is split between a change in real output and change in price. For instance if prices are sensitive to changes in monetary policy and fiscal policy it could be directly reflected in nominal GDP and may lead to the conclusion that the policy is effective. Thus effectiveness should be measured in terms of impact on real variables and not nominal variables. To filter out the effect of price real GDP should be used as the proxy for economic activity while real money stock and real actual government expenditure should be used as the proxies for monetary and fiscal policies respectively. To address the issue of endogeneity the VARs approach should be adopted. Senbet finds that monetary policy is relatively better than fiscal policy in affecting real output.

To date there have not been any formal empirical analysis of the relative effect of monetary and fiscal policies as stabilization tools in the small open economy of Kenya. This study employed time series data for Kenya to address the issue. The study used the VARs approach in analysis. Unrestricted VAR models, unlike large scale macroeconomic modes allow for rich feedback mechanism within the variables. The unrestricted VARs model assumes that each and every variable in the system is endogenous and does not impose any a priori causality restrictions among the variables. This approach solves the endogeneity problem associated with the St. Louis equation by assuming that all the variables in the system are potentially endogenous so each variable is explained by its own lags and the lagged values of the other variables. To address the problem of omitted variables evident in various previous studies, real interest rate and real exchange rate were added in the VAR model along with the three other variables namely, real government expenditure as proxy for fiscal policy, real money supply (M3) as proxy for monetary policy, and real GDP as a proxy for real output.

It is evident that each of the above variables is a potential endogenous variable. In such a case a structural model explicitly specifying the relationship is unreliable Sims (1980). A VAR model allows the variables to interact with each other and themselves too without imposing a theoretical structure on the estimates. Variance decompositions (VDCs) and impulse response functions (IRFs) derived from a recursive vector auto regressions (VARs) approach were used to examine the relative impact of monetary and fiscal policy on real output growth.

The VDCs reflects the portion of the variance in the forecast error for each variable due to innovations to all variables in the system while IRFs show the response of each variable in the system to shock from system variables. Rahman, 2005 used Sims (1980) vector auto regressions (VAR's) to address the St Louis model approach criticism. VARs model addresses the problems of omitted variables and variable endogeneity. He employed unrestricted VARs approach to compute Variance decompositions (VDS) and impulse responses functions (IRFs).The results obtained imply that monetary policy alone has significant positive impact on real output in Bangladesh. Bruce and Tricia, 2004 using US data find that fiscal policy is very influential on output.

Other research papers on similar issue have been done by (Hsing and Hsieh, 2004 Dungey and Fry, 2007 and Arestis, 2009) but the conclusions are contradicting limiting generalization. Hence a country specific study is necessary.

1.3. Theoretical Overview

IS-LM model is widely used in gauging monetary and fiscal policy effectiveness. This model was invented by Hicks in 1937. The model assumes that prices and wages are fixed or predetermined in the short run. In summary the model consists of two schedules that reflect the equilibrium in the money and goods market. The LM (liquidity preference money supply model) is an equation that represents asset market equilibrium. LM model can be expressed mathematically as:

$$m/p = l(r, y) \tag{1}$$

Where, $\partial l/\partial r < 0,\ \partial l/\partial y > 0$

Where r is nominal interest rate, y is output, l is demand for money and m/p is real money stock. dl/dr is the measure of the response of money demand to a unit change in nominal interest rate while dl/dy is the rate of change in money demand in response to a change in national income. Nominal interest rate is the market cost of lending without factoring out inflationary effect while out put is the nominal value of national output. The IS represents the goods market equilibrium equation and can be represented as:

$$Y = A(r, y, g) \tag{2}$$

Where $\partial A/\partial r < 0, \quad I > \partial A/\partial y > 0, \partial A/\partial g > 0$. Where r is real interest rate, g is proxy for fiscal policy in this context, government expenditure. The above denoted derivatives imply that the demand for goods is a decreasing function of real interest rate, both because a high interest rate reduces investment demand and increases savings. The demand for goods increases with income through its effect on consumption and investment. This model is used to analyze the effect of changes in the money stock and fiscal policy on the level of output with multipliers giving the derivatives of output with respect to policy variable. Based on this model and assuming liquidity trap is nonexistent, expansionary monetary policy reduces the interest rate and increases output in the short run. On the other hand, an expansionary fiscal policy (a sudden shock in government expenditure) increases the interest rate and output (Oliver and Fisher, 1989). Fiscal and monetary multipliers can be computed from the IS/LM equations to reveal the expected impact of the policies on output. The IS equation representing the product market equilibrium can be explicitly expressed as:

$$y = c(y - t(y)) + i(r) + g \tag{3}$$

Where y is income, c is consumption, r is interest rate, t is tax rate while g is government expenditure .Assuming the price level p_0 is constant; the money market equation is given as:

$$\overline{M}/p_0 \equiv m = l(r) + k(y) \tag{4}$$

The differentials for both IS and LM equations can be expressed as,

$$\overline{m}/p_0 = dm = l'dr + k'(y) \tag{5}$$

Where k is a constant representing the responsiveness of money demand to changes in income while l is a constant gauging the responsiveness of money demand to changes in interest rate r .

Equation 5 can be rewritten as,

$$dr = dm/l' - k'/l' dy \tag{6}$$

Obtaining the total derivative of equation 3 and substituting equation 6 in it,

$dy = c'(1-t')dy + i(dm/l' - k'/l' dy)$, which can be resolved to: $dy(1 + i'k'/l' - c'(1-t')) = idm/l'$

The monetary policy multiplier can be expressed as, $dy/dm = \frac{i/l'}{1 + ik'/l' + c'(1-t)}$

Where dm/l' is the drop in interest rate induced by monetary policy shock, while idm/l' is the monetary policy induced change in investments i' being the responsiveness of investment to interest rate changes. $dy/dm > 0$, implying that a monetary policy shock has a positive impact on output.

To derive fiscal policy multiplier, the total derivative of equation 3 and 4 holding money stock constant can be expressed as:

$dy = c'(1-t')dy + i'dr + dg$, Where $0 < c', t' < 1, k' > 0$ (7)

$$0 = l'dr + k'dy \tag{8}$$

From equation 8, $dr = -k'/l' dy$, which tells how much interest rate must rise along the LM curve to maintain equilibrium with a given rise in income. Substituting dr in equation 7 and resolving; $dy/dg = \frac{1}{1 - c'(1-t') + i'k'/l'} > 0$. This implies that a positive fiscal policy shock will impact positively on output. However $i'k'/l'$ is the decline in investment (crowding out effect) that results from interest rate increase as y and r rise along the LM curve.

2. Econometric Method , Data Description and Model Set Up

2.1. Data

Time series data on real GDP, real interest, nominal effective exchange rate and Government total expenditure from 1997 to 2010 were collected from Economic Survey and Statistical abstracts both published by the Kenya National Bureau of Statistics (KNBS) while money supply data was collected from Central Bank of Kenya (CBK) quarterly bulletins. Real GDP is normally computed by KNBS using expenditure approach while Money supply M2 is computed by CBK through aggregation of cash balances held by the public, current account and time deposits held in commercial banks. The nominal effective exchange rate is the weighted average value of Kenya shilling currency relative to all major currencies being traded while real interest rate is nominal interest rate deflated.

2.2. The Model Set Up

The study employed a vector autoregressive (VAR) approach to model monetary policy and fiscal policy shocks in the Kenyan economy. The monetary policy VAR model

has four variables which include the logarithm of real money supply (m2), real interest rate, logarithm of real GDP and the logarithm of nominal effective exchange rate. On the other hand, the Fiscal policy VAR model consists of log of real government expenditure, log of real GDP, log of nominal effective exchange rate and the real interest rate. Following (Senbet, 2011) structural VAR model for monetary policy shock can be presented in the following system of equations:

$$\begin{aligned} y_t &= b_{10} - b_{12}m_t - b_{13}R_t - b_{14}\chi_t + B_{11}y_{t-1} + B_{12}m_{t-1} + B_{13}R_{t-1} + B_{14}\chi_{t-1} + \varepsilon_{yt} \\ m_t &= b_{20} - b_{21}y_t - b_{23}R_t - b_{24}\chi_t + B_{21}y_{t-1} + B_{22}m_{t-1} + B_{23}R_{t-1} + B_{24}\chi_{t-1} + \varepsilon_{mt} \\ R_t &= b_{30} - b_{31}y_t - b_{32}m_t - b_{34}\chi_t + B_{31}y_{t-1} + B_{32}m_{t-1} + B_{33}R_{t-1} + B_{34}\chi_{t-1} + \varepsilon_{Rt} \\ \chi_t &= b_{40} - b_{41}y_t - b_{42}m_t - b_{43}R_t + B_{41}y_{t-1} + B_{42}m_{t-1} + B_{43}R_{t-1} + B_{44}\chi_{t-1} + \varepsilon_{\chi t} \end{aligned} \tag{9}$$

Where $\varepsilon_{Yt,}$ $\varepsilon_{Mt,}$ ε_{Rt} and $\varepsilon\chi_t$ are uncorrelated white noise disturbances. *Y* is real *GDP, M* is real money stock, *R* is real interest rate and χ is nominal effective exchange rate. The above set of equations are in structural form and not reduced form since contemporaneous effects represented by the negative coefficients on the right hand side are included in the equations. VAR models are estimated in standard form or the reduced form hence it is necessary to transform the structural equations into reduced form. This can be done by rewriting the above set of equations in the following form.

$$\begin{aligned} y_t + b_{12}m_t + b_{13}R_t + b_{14}\chi_t &= b_{10} + B_{11}y_{t-1} + B_{12}m_{t-1} + B_{13}R_{t-1} + B_{14}\chi_{t-1} + \varepsilon_{yt} \\ m_t + b_{21}y_t + b_{23}R_t + b_{24}\chi_t &= b_{20} + B_{21}y_{t-1} + B_{22}m_{t-1} + B_{23}R_{t-1} + B_{24}\chi_{t-1} + \varepsilon_{mt} \\ R_t + b_{31}y_t + b_{32}m_t + b_{34}\chi_t &= b_{30} + B_{31}y_{t-1} + B_{32}m_{t-1} + B_{33}R_{t-1} + B_{34}\chi_{t-1} + \varepsilon_{Rt} \\ \chi_t + b_{41}y_t + b_{42}m_t + b_{43}R_t &= b_{40} + B_{41}y_{t-1} + B_{42}m_{t-1} + R_{43}R_{t-1} + \chi_{44}\chi_{t-1} + \varepsilon_{\chi t} \end{aligned} \tag{10}$$

The above set of equations can be summarized in matrix notation as follows:

$$\begin{bmatrix} 1 & b_{12} & b_{13} & b_{14} \\ b_{21} & 1 & b_{23} & b_{24} \\ b_{31} & b_{32} & 1 & b_{34} \\ b_{41} & b_{42} & b_{43} & 1 \end{bmatrix} \begin{bmatrix} y_t \\ m_t \\ R_t \\ \chi_t \end{bmatrix} = \begin{bmatrix} b_{10} \\ b_{20} \\ b_{30} \\ b_{40} \end{bmatrix} + \begin{bmatrix} B_{11} & B_{12} & B_{13} & B_{14} \\ B_{21} & B_{22} & B_{23} & B_{24} \\ B_{31} & B_{32} & B_{33} & B_{34} \\ B_{41} & B_{42} & B_{43} & B_{44} \end{bmatrix} \begin{bmatrix} y_{t-1} \\ m_{t-1} \\ R_{t-1} \\ \chi_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{mt} \\ \varepsilon_{Rt} \\ \varepsilon_{\chi t} \end{bmatrix} \tag{11}$$

In simple compact notation the above set of matrices can be expressed as:

$$B\,X_t = \Gamma_0 + \Gamma_1 X_{t-1} + \varepsilon_t \tag{12}$$

Assuming that the inverse of matrix B exists then matrix equation 12 can be rewritten as

$$X_t = B^{-1}\Gamma_0 + B^{-1}\Gamma_1 X_{t-1} + B^{-1}\varepsilon_t \tag{13}$$

Simplifying equation 13 one obtains a matrix equation 14

$$X_t = \alpha_0 + A_1 X_{t-1} + e_t \tag{14}$$

Where: $\alpha_0 = B^{-1}\Gamma_0, A_1 = B^{-1}\Gamma_1, e_t = B^{-1}\varepsilon_t$ *and* $B^{-1}B = I$

Equation 14 is a representation of a reduced form VAR model of order 1. The error terms in the column vector e_t in the reduced form VAR are composition of the structural shocks. It can be stated as $e_t \equiv e_t^y, e_t^m, e_t^R, e_t^x$ *with* the following properties, $E(e_t) = 0$, $E = (e_t e_t^{'}) = \Sigma_e$, $E = (e_t e_s^{'}) = 0$, *for* $t \neq s$ *i.e* mean of zero, constant variance and zero auto-covariance. However the reduced form disturbances are generally known to be correlated hence it is necessary to transform the reduced form model into a structural form model. This is accomplished by premultiplying it by a non-singular k x k matrix A_0 to yield

$$A_0 X_t = A_0\alpha_0 + A_0 A_1 X_{t-1} + A_0 B^{-1} e_t \tag{15}$$

Where $Be_t = A_0\varepsilon_t$ describes the relation between the structural disturbances e_t and reduced form disturbances ε_t. It is assumed that the structural disturbances e_t are uncorrelated with each other, i.e., the variance-covariance matrix of the structural disturbances (*S*e) is diagonal. The matrix A_0 describes the contemporaneous relation among the variables in the vector X_t. In the literature this representation of the structural form is often called the *AB* model (Lutkepohl, 2005).

Without restrictions on the parameters in A_0 and *Bt* this structural model is not identified. Empirical literature suggests various approaches to identifying a structural VAR so as to analyze monetary and fiscal policy effects on macro-economic variables. Among these approaches is the recursive VAR approach introduced by Sims (1980). The second approach is known as the structural VAR approach introduced by Blanchard and Perotti, 2002. Uhlig, 2005 developed the third approach known as the sign restriction approach while the event study approach was developed by Ramsey and Shapiro 1998. This study employs the recursive approach to analyze monetary and fiscal policy shocks on macro-economic variables. According to Misati and Nyamongo, (2012), this approach restricts matrix *B* to a *k*-

dimensional identity matrix and A_0 to a lower triangular matrix with unit diagonal, which implies the decomposition of the variance-covariance matrix $\Sigma_\varepsilon = A_0 \Sigma_e (A_0^{-1})'$ .This decomposition is obtained from the Cholesky decomposition $S_\varepsilon = pp'$ by defining a diagonal matrix D which has the same main diagonal as P and by specifying $A_o^1 = PD^{-1}$ and $\Sigma_e = DD'$ meaning that the elements on the main diagonal of D and P are equal to the standard deviation of the respective structural shock. The recursive approach implies a causal ordering of the variables in the model based on contemporaneous effect or on the behavior of variables in the economy also known as recursive orthogonolization. This study follows the following causal ordering scheme in analyzing monetary policy shocks: real output is ordered first, real money stock ordered second; real short-term interest is ordered third while nominal effective exchange rate is ordered fourth. Thus the relation between the reduced form disturbances ε_t and the structural disturbances e_t takes the following form.

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ b_{21} & 1 & 0 & 0 \\ b_{31} & b_{32} & 1 & 0 \\ b_{41} & b_{42} & b_{43} & 1 \end{bmatrix} \begin{bmatrix} \varepsilon^y \\ \varepsilon^m \\ \varepsilon^R \\ \varepsilon^\chi \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} e^y \\ e^m \\ e^R \\ e^\chi \end{bmatrix} \quad (16)$$

Following a similar approach, the relationship between reduced form disturbances and ε_t and the structural disturbances e_t for the fiscal policy model can be denoted as:

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ b_{21} & 1 & 0 & 0 \\ b_{31} & b_{32} & 1 & 0 \\ b_{41} & b_{42} & b_{43} & 1 \end{bmatrix} \begin{bmatrix} \varepsilon^y \\ \varepsilon^g \\ \varepsilon^R \\ \varepsilon^\chi \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} e^y \\ e^g \\ e^R \\ e^\chi \end{bmatrix} \quad (17)$$

The causal ordering scheme here starts with real GDP(y), real government expenditure (g), real interest rate (R) and nominal effective exchange rate (χ).

It is also crucial to investigate whether there exists interrelationship between the two policies. This entails identifying monetary and fiscal policies shocks in a single model and then analyzing the impulse responses of the two policies to each other's shock. To effect this, a single VAR model consisting of the two policy proxies was used as shown below. The matrix below shows the relationship between the reduced form disturbances and the structural disturbances for combined policy VAR model.

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ b_{21} & 1 & 0 & 0 & 0 \\ b_{31} & b_{32} & 1 & 0 & 0 \\ b_{41} & b_{42} & b_{43} & 1 & 0 \\ b_{51} & b_{52} & b_{53} & b_{54} & 1 \end{bmatrix} \begin{bmatrix} \varepsilon^y \\ \varepsilon^g \\ \varepsilon^m \\ \varepsilon^R \\ \varepsilon^\chi \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} e^y \\ e^g \\ e^m \\ e^R \\ e^\chi \end{bmatrix} \quad (18)$$

The variables were ordered as follows, real GDP(y) was ordered first, followed by fiscal policy proxy (g), monetary policy proxy (M2), real interest rate and nominal effective exchange rate took the last position. This ordering has its specific implications: (i) Real GDP do not react contemporaneously to shocks from other variables in the system. (ii) Government expenditure (g) reacts contemporaneously to real GDP but not to any other variable in the system. (iii) Money stock doesn't react contemporaneously to real interest rate and nominal effective exchange rate but reacts contemporaneously to the other variables in the system. (iv) Real interest rate reacts contemporaneously to all the other variables in the system except nominal effective exchange rate. (v)Nominal effective exchange rate is affected contemporaneously by all the shocks in the system.

2.3. Preliminary Analysis

The basic macroeconomic properties of the data variables were investigated using the JB test for normality and ADF test for stationarity.

2.4. Stationarity Test

In testing for stationarity, this study employed the Augmented Dickey-Fuller (ADF) test which involves estimating a regressions of the following form.

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \sum_{i-1}^{p} \delta i \Delta y_{t-1} + \varepsilon_t \text{ (for levels).}$$

$$\Delta\Delta y_t = \alpha + \beta t + \gamma \Delta y_{t-1} + \sum_{i-1}^{p} \delta i \Delta\Delta y_{t-1} + \varepsilon_t \text{ (for first difference).}$$

ADF test was employed with intercept and trend with the lag length selected based on the SIC information criterion to ensure that the residuals are white noise. The decision criterion involves comparing the computed tau values with the Mackinnon critical values for rejection of a hypothesis of unit root.

3. Results and Discussion

The standard practice in VAR analysis is to report results from impulse responses and forecast error variance decomposition (see Stock and Watson, 2001). In preliminary analysis the study computed descriptive statistics including normality and stationarity test using JB and ADF test respectively. It is evident that the variables are normally distributed stationary in first difference at five percent significance level. The Impulse response functions were used to trace out the response of current and future values of the set of variable to a one unit increase in each of the VAR errors. One standard deviation fiscal policy shock raise real output significantly for a period of 36 months. There is no evidence in support of the conventional notion that loose monetary policy stance translates into increase in real output.

Table 1. *Descriptive statistics*

STATISTIC	LN-G	LN-GDP	LN-M3	LN-NEER	R
Mean	6.4923	12.5821	8.3536	4.6561	3.8800
Median	6.4535	12.5456	8.2872	4.6418	0.0083
Maximum	7.2854	12.8536	8.7351	4.7777	0.1058
Minimum	5.9757	12.3476	8.1772	4.5040	-0.1621
Std. Dev.	0.2499	0.1500	0.1540	0.0583	0.0636
Skewness	0.9195	0.1903	0.9796	0.0486	-0.4049
Kurtosis	4.2274	1.7057	3.0057	2.7858	2.4766
Jarque-Bera	9.7784	3.6398	7.6781	0.1106	1.8593
Probability	0.07527*	0.1620*	0.2151*	0.9461*	0.3946*
Observations	48	48	48	48	48

*Statistically insignificant at 5% level of significance, Where LN-is naturallogarithm, G-government expenditure, GDP is the gross domestic product, M3 is money stock and LN-NEER is the nomina effective exchange rate

3.1. Preliminary Analysis

Table 1 shows various measures of central tendency, dispersion and a normality measure. Among the variables of interest the variable with greater magnitude is GDP. The Jarque - Bera statistic is insignificant at 5% level which implies that all the time series variables in the set are normally distributed after logarithm transformation. The standard deviation shows that government expenditure was erratic for the variables under investigation since it registered 0.25 level of standard deviation.

3.2. Stationarity Test

Table 2 below shows the results for ADF stationarity test both at level and first difference.

Table 2. *ADF unit root test in levels and first difference with intercept and trend*

Variable	Calculated value	P values	Decision
LNM2	-0.5746]	0.9763	I(1)
DLNM2	-7.88596	0.0000	I(0)
LNNEER	-1.9410	0.6186	I(1)
DLNNER	-6.5225	0.0000	I(0)
LN GDP	-2.0826	0.5417	I(1)
DLNGDP	-3.5085	0.0405	I(0)
Real R	-0.7863	0.9597	I(1)
DReal R	-5.5155	0.0002	I(0)
LNG	-1.8692	06548	I(1)
LNG	-10.8342	0.0000	I(0)

D-Differencedvariable,LN-Naturallogarithm,I(0)-Integratedoforderzero and I(1)- Integrated of order one.

This test shows that all the variables are non- stationary in levels at 5% and 10% significance level. This means that the individual time series has a stochastic trend and it does not revert to average or long run values after a shock strikes and the distributions has no constant mean and variance. The non-stationary variables exhibit difference stationarity since they are integrated of order one I(1) implying that they should be differenced once to attain stationarity. However, since the study is not focusing on estimating a long run relationship, the issue of cointegration is not important. Following stock and Watson, (2001) the impulse responses were generated at levels.

3.3. Impulse Response Analysis

Figure 1 illustrates a set of the impulse response functions (IRFs) of the Fiscal policy VAR model for a period of 15 quarters forecast horizon. Vertical axis shows the set of standard errors plotted against time in quarters .It is evident that real government expenditure (figure 1d), real interest rate (figure 2f) and nominal effective exchange rate(figure 1i) responds positively to their own positive shocks but the impact becomes insignificant or totally decays in quarter eight for fiscal policy shock and quarter five for both nominal effective exchange rate and real interest rate. Contrary, GDP(figure 1a) has a positive, permanent significant effect on itself for almost 10 quarters over the forecast horizon. This is similar to the findings of Rozina and Tuner (2008). An expansionary fiscal policy(figure 1b) marked by a positive shock in government expenditure has a positive impact on real GDP. However, its significant innovative effect on real output dies out in 10 quarters time after the shock is initiated in the system suggesting that the output multipliers of government expenditure decay over time. This results which are consistent with the findings of (Senbet, 2011, Mountford and Uhlig, 2005, Kutter and Posen, 2001, Corsetti and Meier, 2011) imply that fiscal policy inform of government expenditure stimulus is reliable for stimulating economic activity in Kenya. Other similar studies showing the potency of fiscal policy in altering real GDP include,(Mallinck 2010, Kofi 2009, Cheng 2006, Francisco and Pablo 2006, Dungey and Fry, 2007). Kutter and Posen,. 2002 studied the fiscal policy effectiveness in Japan within VAR framework and they established that this policy has positive effect on real output. Jacop and Sebastian, 2011.

used the structural VAR model to the effect of government spending shocks have a positive effect on real output.

On the other hand, a shock in GDP impacts positively on government expenditure (see figure 1c) and the shock remain persistently significant for eight quarters in forecast horizon which suggests that as the economy grows government has to spend more to meet its allocation, stabilization and redistribution functions. Similarly economic growth may be accompanied by external dis-economies like congestion, pollution and environmental degradation.

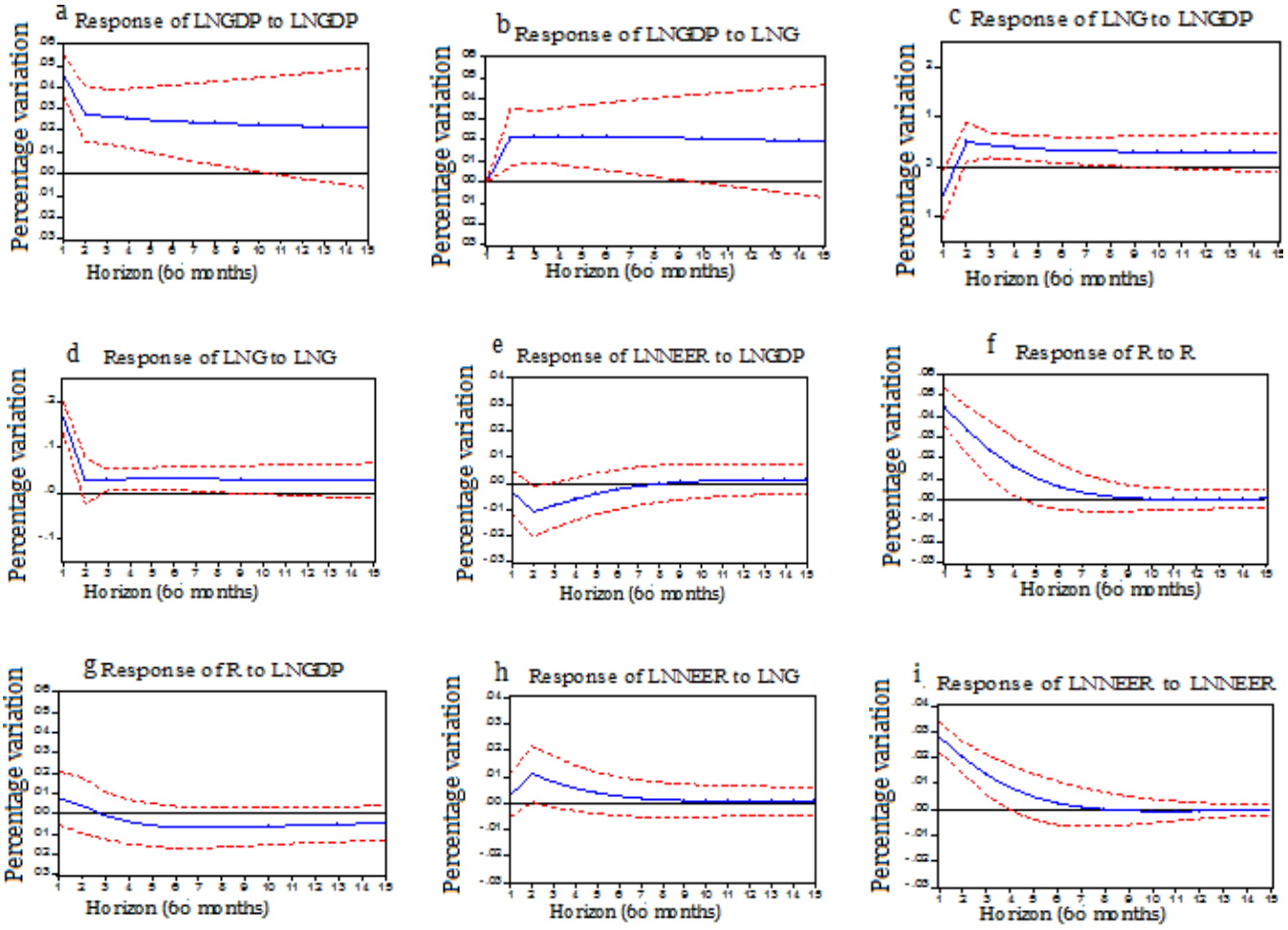

Figure 1. *impulse responses in the Fiscal VAR model*

Since such externalities cannot be resolved through the market forces mechanism the problem of market failure sets in. This calls in for the intervention of the public sector to address the issue through legislation and creation of regulatory institutions suggesting that GDP occasions growth in government expenditure. It is worth noting that the exchange rate appreciates significantly at quarter 2 and 3 after a shock in real GDP (figure 1e). Kenya being an agro-based economy where substantial export volume consists of agricultural products, it is expected that as the economy grows, agricultural export increases, the inflow of foreign currency increases strengthening the shilling against other foreign currencies that is appreciation.

3.4. Impulse Responses in Monetary Policy VAR Model

An expansionary monetary policy which is equivalent to a 0.3% shock in money supply has an insignificant positive impact on economic output as shown by figure 2. Specifically, the impact is not statistically distinguishable from zero, given that the horizontal axis is broadly within the 95 percent confidence band over the entire forecast horizon revealing that monetary policy shocks do not influence real output growth. This is in consonance with the findings of (Nyamongo et al., 2008) that lending rates are sticky to monetary policy signals rendering investment, aggregate demand and therefore real output rigid to monetary policy actions. It is also concurrent with the findings of (Cheng 2006) where the study concludes that monetary policy has little impact on the real output in Kenya due to the structural weaknesses in the financial sector, which hamper the transmission mechanism of monetary policy. Main structural weaknesses, as identified by the Fund's Financial Sector Stability Assessment Report, include weak legal framework, poor governance, and insufficient infrastructure, which have contributed to high interest rate spreads, inadequate financial intermediation and heightened risks.

The nominal effective exchange rate responds to the monetary policy shock positively which implies that a loose monetary policy stance leads to depreciation of the shilling. Similarly, a tight monetary policy marked by a positive shock in short-term interest rate appreciates the domestic currency. This finding is consistent with the uncovered interest parity principle where a decrease in domestic interest rate relative to the rest of the world induced by a loose monetary policy stance is associated with capital outflows, which exerts pressure on the exchange rate i.e depreciation. On the other hand a shock in real interest rate induces an increase in the par value of the shilling by inducing capital inflows. Similar observation was noted by (Misati and Nyamongo, 2011 and Cheng 2006).

The response of Money stock to real GDP shock is positive and significant for 48 months period which is consistent with conventional economic knowledge that as the economy grows more money is required to cater for the increased volume of transactions. A similarly observation is expected for pro-cyclical monetary policy in the economy as confirmed in figure 1 where some patterns of pro-cyclical monetary policy can be traced. On the other hand short-term interest rate shock marked by an increase in interest rate as noted by Cheng 2006 has no significant impact on economic output which implies that short-term interest rate changes does not stimulate economic performance.

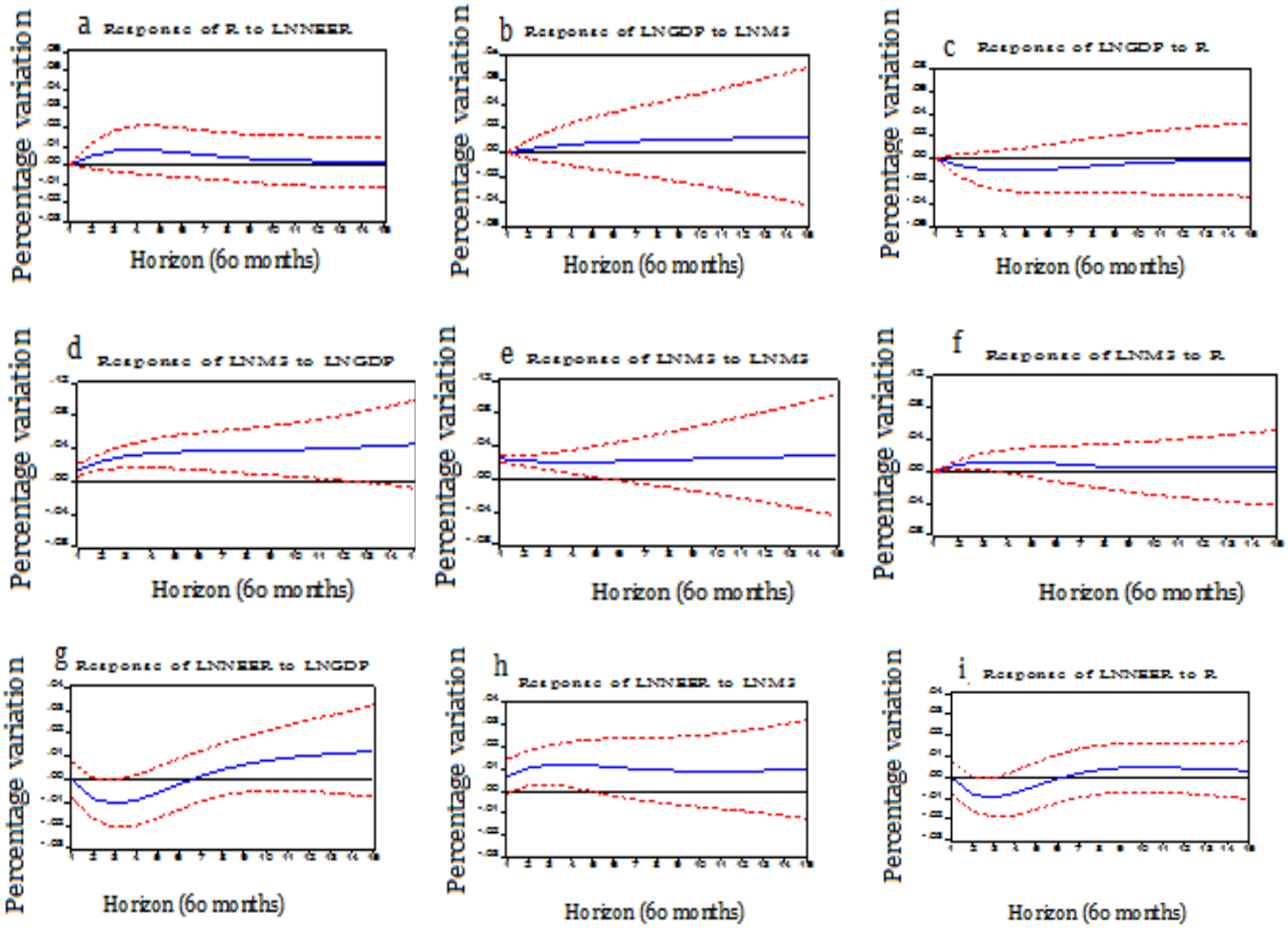

Figure 2. *Impulse responses in monetary policy VAR model*

3.5. Impulse Responses for Combined Monetary and Fiscal Policy VAR Model

To capture the interplay between the two policies the study relied on a VAR model with both monetary and fiscal policy proxies included in the single model. The impulse responses obtained from the combined model are consistent with the response functions obtained from individual policy VAR model implying that the results of the study are robust. Secondly, by reversing the ordering of the two policy proxies in the causal ordering chain the results do not change which emphasizes the robustness of the results from the three VAR models.

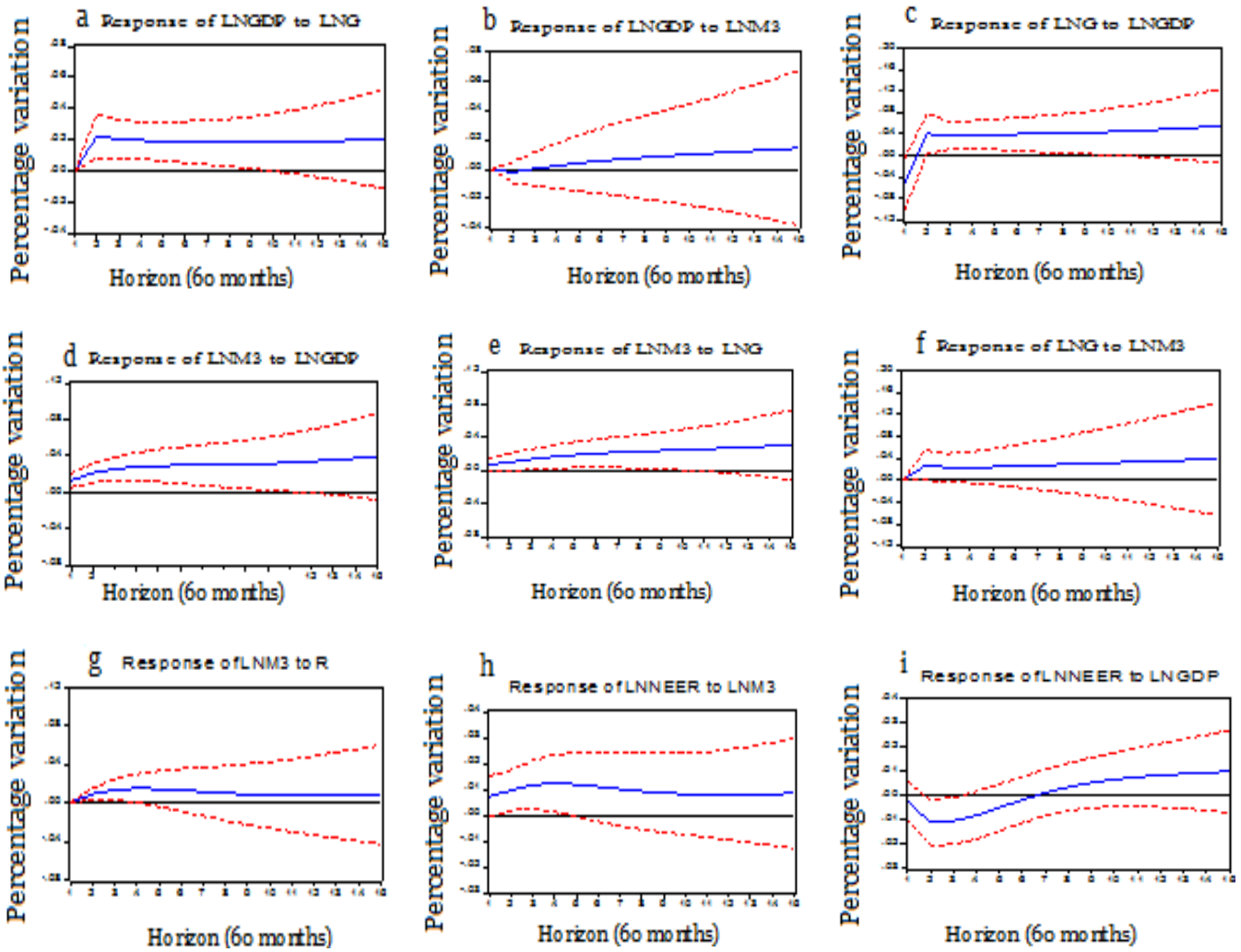

Figure 3. *Impulse responses to monetary and fiscal policy shocks*

In the aspect of policy interrelationship figure 3 reveals that monetary policy responds significantly to a fiscal policy shock for a period of approximately 12 months. On the other hand there is no significant response of fiscal policy to monetary policy shock. This finding suggests that there is some degree of interrelationship between the two policies implying the existence of fiscal dominance. Fiscal dominance is a situation where fiscal deficit is financed in domestic capital markets by selling government treasury bills and bonds in the local currency which in turn affects money supply in the economy.

3.6. Variance Decomposition of the GDP

The variance decomposition of GDP as reported in table 3 reveals that most of the forecast error variance of output growth is explained by its own shock in the entire forecast horizon. This is in tally with the IRF results where it is observed that real GDP responds permanently to its own shock however the shock effect seems to be decaying as the quarter progresses. Fiscal policy shock explains over 14% of real GDP in quarter 2 with its innovative power increasing to about 28% after 15 quarters. Similarly this is observed in the impulse response function where government expenditure shock on real GDP is positive and significant for about 36 months after a shock is induced.

Monetary policy shock explains about 0.1% of the variance in real GDP in the initial period and its proportionate explanation power increases insignificantly as the quarter progresses to only 6% at 15th quarter. This is concurrent with findings of (Misati et al., 2011) that it takes approximately 12 quarters for lending rates to adjust to policy signals and therefore for monetary policy potency to be realized. Notably, the explanatory power of innovation in real interest rate and the nominal effective exchange rate increases over the entire forecast horizon explaining over 1% and 3% of the variations in real GDP respectively by quarter 15.

Table 3. *Variance Decomposition of GDP.*

Period	S.E.	LN_GDP	LN_G	LN_M3	R	LN_NEER
1	0.045633	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.059133	84.84736	14.48137	0.128859	0.435304	0.107112
3	0.068709	79.34515	19.29633	0.099022	0.904266	0.355229
4	0.076356	75.60021	22.20523	0.179395	1.364285	0.650870
5	0.082854	72.82111	24.09955	0.407227	1.721543	0.950566
.						
.						
.						
13	0.124250	61.82028	28.49253	5.060520	1.348212	3.278460
14	0.129572	60.82539	28.56815	5.745308	1.251587	3.609571
15	0.135056	59.84694	28.60359	6.427685	1.174551	3.947231

This study reveals evidence that monetary policy are insignificant in altering GDP while fiscal policy really potency in stimulating real economic activity. However several studies support the centrally notion. Maroney et al (2004) constructed a macroeconomic model for Bangladesh economy revealing that monetary policy is more important than fiscal policy in changing GDP. In the same country Chowdry and Walid, 1995 did a study on the dynamic relationship between output, inflation and monetary policy revealing monetary policy multipliers are positive. Other studies with similar results include (Khamfula, 2008, Saibu and Oladeji, 2008)

4. Conclusion

In this study, an empirical investigation of the relative potency of monetary versus fiscal policies using the recursive VAR methodology was done. The method adopted in this study differs from other similar studies, which are mainly based on single reduced form equations. The VAR methodology captures the dynamics of the policies. It also solves the endogenously problems of most similar studies in this area. The results from the empirical analysis show that, fiscal policy is relatively better than monetary policy in affecting the real output. Specifically, the fiscal policy shock is significantly impacting .However, this study doesn't rule out the reliability of monetary policy as a tool for economic management but emphasizes that the two policies should be used with proper coordination to foster growth and economic stability. It is worth noting that there exists some degree of interrelationship between the two policies suggesting that there should be proper coordination in policy design and implementation.

Owing to the loose link between monetary stance and real output which is probably due to structural weaknesses including regulatory overlaps, poor regulatory framework regarding lending rates charged by commercial banks and other institutional factors in form of corruption in Kenyan financial system, Central Bank of Kenya, Ministry of finance and other financial regulatory authorities should carry out structural reforms. These reforms should entail improving institutional governance and strengthening regulatory and legal framework in the financial system.

Acknowledgements

The authors acknowledge the comments received from peer reviewers.

References

[1] Abbas, K. 1991. Causality test between money and income: a case study of selected developing Asian countries (1960-1988). *Pakistan Development Review*, 30(4), 1919-

[2] Ansari, M.I. Monetary vs. Fiscal Policy: Some Evidence from Vector Auto regressions for India *Journal of Asian Economics*, (winter), 1996, 677-687.

[3] Adefeso, H.A. and H.I. Mobolaji,. 2010. The fiscal-monetary policy and economic growth in Nigeria: Further evidence .*Pakistan journals of social sciences*,7(2):137- 142

[4] Ajayi, F. 1974. Monetary policy and Bank performance in Nigeria. A two steps co integration approach.

[5] Ajisafe, R.A. and B.A. Folorunso, 2002. The relative effectiveness of fiscal and monetary policy in macroeconomic management in Nigeria. *Africa Economic and Business review*, Vol. 3: 23-40.

[6] Arestis. P., 2009. Fiscal policy within the new consensus macroeconomics framework. Cambridge Centre for economic and Public Policy, http://www.scribd.com/doc/84653582/Fiscal-Policy-Within-the-New-Consensus-Macroeconomics-Framework.

[7] Blanchard, O. and R. Perotti, 2002. An empirical characterisation of the dynamic effects of change in government spending and taxes on output. Q. *J. Economics.,* 117: 1329-1368

[8] Bruce, D. and C.S. Tricia, 2004. Empirical comparison of the effectiveness of fiscal and monetary policy. *Centre for Business and Economic Research,*

[9] Cheng, K.C., 2006. A VAR analysis of Kenya's monetary policy transmission mechanism: How does Central Bank repo rate affect the economy. *IMF Working Paper*

[10] Chowdry, R. and Walid, 1995. Monetary policy, output and inflation in Bangladesh. A dynamic analysis: *Applied Economics Letters,* 2: 51-55

[11] Chowdhury, A.R. 1986. Monetary and Fiscal Impacts on Economic Activities in Bangladesh A Note. *The Bangladesh Development Studies*, 14(.2):101-106.

[12] Corsetti, G. and A. Meier, 2011. Fiscal policy transmission with spending reversals. *IMF working paper 09106,* CEPR DP 7302, http://www.eui.eu/Personal/Researchers/meier/reversals_feb2011.pdf.

[13] Darrat, A.F., 1984. The Dominant Influence on Fiscal Actions in Developing Countries. *Eastern Economic Journal*, 10(3):271-284.

[14] Dungey, M. and Fry, R. 2007. The identification of fiscal and monetary policy in a structural VAR. *Cambridge University Paper,*

[15] Elliot, J.W., 1975. The influence of monetary and fiscal actions on total spending: the st. Louis total spending equation revisited. J. Money Credit Banking, 7: 181-192.

[16] Engle, R. F. and Granger, C. W .J. 1987. Co-integration and Error Correction: Representation, Estimation and Testing. *Econometrica,* Vol*., (*55).

[17] Francisco, C and Pablo, H. 2006.The economic effects of fiscal policy shocks in Spain. A structural VAR approach. *European central Bank Working paper series*, No 647

[18] Friedman, M. and D. Meiselman,1963. The Relative Stability of Monetary Velocity and the Investment Multiplier in the United States, 1897-1958, Stabilization Policies: A Series of Research Studies Prepared for the Commission on Money and Credit, Brown, E.C. and Commission on Money and Credit, (Eds.).. 1963, pp. 165 -268

[19] Garrison, C.B. and F.Y. Lee, 1995. The Effect of macroeconomic variables on economic growth rates: A cross-country study. J. Macroeconomics, 17: 303-317.

[20] Gramlich, E.M., 1971. The usefulness of monetary and fiscal policy as discretionary stabilization tools. *J. Money Credit Banking,*3: 506-532.

[21] Hussain, M. 1982.The Relative Effectiveness of Monetary and Fiscal Policy: An Econometric Case Study of Pakistan. *Pakistan Economic and Social Review*. 20: 159-181

[22] Hicks, J.R., 1937. Mr. Keynes and the classics: A suggested interpretation. *Econometrica,* 5: 147-159

[23] Hsing, Y. and W.J. Hsieh, 2004. Impact of monetary, fiscal and exchange rate policies on output in China:VAR *approach. Econ. Planning,* 37: 125-139.

[24] Jacop, C. and H. Sebastian, 2011. Identifying the effects of government spending shocks with and without expected reversal. *European central Bank.*

[25] Jordan, Roland and Carter (1999). The potency of monetary and fiscal policies in Caribbean countries: A co integrating VAR approach. Research department Central Bank of Barbados.

[26] Jayaraman, T.K., 2002. Efficacy of fiscal and monetary policies in the South pacific Island Countries: some empirical evidence. *Ind. Economic. J.,* 49: 63-72.

[27] Khamfula, Y. 2008. Output growth and monetary policy interaction in monetary area, Forecasting with VECM in Namibia, Lesotho, South Africa and Swaziland, 1981-2004. *Journal of Applied Econometrics and international Development.* Vol 6, No 9.

[28] Kofi, M.2009. Fiscal policy and economic growth in south Africa. Oxford University.

[29] Kutter, K.N. and A.S. Posen, 2001. Passive savers and fiscal policy effectiveness in Japan. Research Department, http://www.iie.com/publications/wp/02-2.pdf.

[30] Kutter, N.K. and A.S. Posen,. 2002. Fiscal policy effectiveness in japan. Journal of the Japanese and international economics, 4: 536-558.

[31] Lutkepohl, H., 2005. New Introduction to Multiple Time Series Analysis. 2nd Edn., *Springer-Verlag,* London,ISBN-10:764..

[32] Mallinck, S., 2010. Macroeconomic shocks, monetary policy and implicit exchange rate targeting in India. Queen Mary university of India

[33] Maroney, N.C., M.K. Hassan, S.A. Basher and I. Isik,. 2004. A macroeconomic model for Bangladesh economy and its policy implications. *Journal of Developing Areas*. 38: 135 - 149.

[34] Misati, R.N. and Nyamongo, E.M 2011. Asset price and monetary policy in Kenya. Research Department Central Bank of Kenya.

[35] Misati, R.N. E.M. Nyamongo and W.A. Kamau, 2011. Interest rate pass-through in Kenya. *Int. J. Develop. Issues*, 10: 170-182.

[36] Mohammad, S.D., S.K.A. Wasti, I. Lal and A. Hussain, 2009. An empirical investigation between money supply government expenditure, output & prices: The Pakistan evidence. Eur. J. Econ. Fin. Admin. Sci., 17: 60-

[37] Mountford, A. and H. Uhlig, 2005. What are the effects of fiscal policy shocks. Discussion paper 2005-039, http://sfb649.wiwi.hu-berlin.de/papers/pdf/SFB649DP2005-039.pdf.

[38] Kallick, T. and Mwega, F.M.1990.Monetary policy in Kenya. *Working paper*

[39] Nyamongo, E.M., M.M. Sichei and N.K. Mutai, 2008. The monetary and fiscal policy interaction in Kenya. Research Department, Central Bank of Kenya.

[40] Olaloye, A.O. and S.I. Ikhide, 1995. Economic Sustainability and the Role of Fiscal and Monetary Policies in A Depressed Economy: The Case Study of Nigeria. Sustainable Development, 3:89-100.

[41] Oliver, B. and S. Fisher, 1989. Lecture on Macroeconomics. The MIT press. London.

[42] Olaloye, A. O. and Ikhide, S. I. 1995.Economic Sustainability and the Role of Fiscal and Monetary Policies in A Depressed Economy: The Case Study of Nigeria. Sustainable Development, Vol. ,3:89-100

[43] Rahman, H., 2005. Relative effectiveness of monetary and fiscal policies and output growth in Bangladesh VAR approach. Research Department Bangladesh Bank.

[44] Ramsey, V.A. and M.D. Shapiro, 1998. Costly capital reallocation and the effects of government spending. *Carnegie-Rochester Conf. Ser. Public Policy,* 48: 145-194.

[45] Rozina, S. and P. Tuner, 2008. Measuring the Dynamic effects of Fiscal policy Shocks in Pakistan. Loughborough University, UK,

[46] Saibu, M.O. and S.I. Oladeji, 2008. Openness and the Effects of Fiscal and Monetary Policy Shocks on Real Output in Nigeria (1960–2003). *Africa Development Review.* 30: 529 - 548

[47] Senbet, D., 2011. The relative impact of Fiscal verses monetary actions on output: VAR approach. *Bus. Econ. J.,* 2011: 1-11

[48] Sims, C. 1980. Macroeconomics and reality. *Econometrica,* 48(1):1-48

[49] Stock, J.H. and M.W. Watson,2001. Vector auto regressions. *J. Econ. Perspect.,* 4: 101-115

[50] Suleiman, D. Wasti, S. Lal, I and Adnan, H 2009.An empirical investigation between Money supply, Government expenditure, output and prices .*European Journal of Economics Finance and Administrative science*, ISSN 1450-2275.

[51] Uhlig, H., 2005.What are the effects of monetary policy on output? Results from an agnostic identification procedure. *J. Monetary Econo.* 52: 381-419.

[52] Waud, R. 1974. Monetary and Fiscal Effects on Economic Activity: Reduced Form Examination of Their Relative Importance," *Review of Economics and Statistics*, (May), 177-87