Dynamic Impacts of Changes in Government Spending on Economic Growth in Kenya: A Structural VAR Analysis

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Abstract

Relationship between government spending and economic growth is still indecisive in both theory and empirical studies. Since its independence in 1963, the Kenyan government has been expanding its expenditure to achieve high levels of economic growth and development. However, this goal has witnessed many upward and downward trends. This paper aims at examining the dynamic effects of government expenditure on economic activity (GDP) in Kenya. The paper applies a Structural Vector Auto Regression (SVAR) model and uses quarterly data set between 1991 and 2012 to estimate the Kenyan government expenditure multiplier. Results have shown that the effect of government spending on output in Kenya appears to be weak and nonpersistent. These results are justified by high government debt to GDP ratio, high debt servicing, and high marginal propensity to import in Kenya.

Key words: Government Spending, Economic Growth, SVAR Model.

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1. Introduction

Relationship between government spending and economic growth has been debatable both in theory and practice. Economic theory suggests that on some occasions lower levels of government spending will enhance economic growth while on other occasions higher levels of government spending will be more effective (Alexiou 2009).

According to the Keynesian view, an increase in government spending, especially during downturns and recessions, leads to a rise in employment, profits and investment, through its multiplier effects on aggregate demand. Thus, government expenditure can stimulate aggregate demand, incite private sector and contribute positively to economic growth (Yergin and Stanislaw 2002).

On the contrary to Keynes' theory, the classical economic theory assures that too much government spending will take away valuable economic resources from businesses (private sector) and by turn decreases economic growth (Yergin and Stanislaw 2002). Also, according to Solow's neoclassical growth model in 1956, productive government expenditure may stimulate investments in human or physical capital but doesn't affect the long-run growth rate (Solow 1956). In addition, the endogenous growth models, such as Barro's model in 1990, predict that only those productive government expenditures will positively affect the long-run growth rate (Barro 1990).

Some empirical studies have found out that when government expenditures constantly grow, the law of diminishing returns begins to apply and beyond some point further increase in government expenditures contributes to economic stagnation and decline (Vedder & Gallaway 1998). Others have showed that an increase in government expenditures doesn't have its intended stimulating effect in developing countries; given the high and often unstable levels of public debt, government consumption crowds out private investments, dampens economic promoting effects in the short run and reduces capital accumulation in the long run (Guseh 1997).

To understand how this relationship works in Sub-Saharan African countries, Kenya is chosen to be a case study. Since its independence in 1963, the government has been expanding its expenditure to achieve high levels of economic growth and development. However, this goal has witnessed many upward and downward trends. Thus, this paper investigates the dynamic effects of government expenditure on economic activity in Kenya, over the

period (1991-2012), by applying a Structural Vector Auto Regression (SVAR) model.

The remainder of the paper is organized as follows. Section 2 reviews the literature on the relationship between government expenditure and economic growth. Section 3 illustrates the trends of government expenditure and economic growth in Kenya respectively. Section 4 demonstrates the methodology and data sources while section 5 presents the diagnostic tests used. Section 6 reports the empirical results. Finally, section 7 provides the conclusion.

2. Literature Review

Since the appearance of Keynesian growth theory in 1936, the relationship between government spending and economic growth has been under investigation in vast number of empirical studies. Different methodologies have been used and results are still inconclusive (Bergh & Henrekson 2011). As a matter of simplification, these empirical studies can be classified into three groups according to their results.

The first group has asserted the negative impact of government spending on GDP growth rate. For example, Landau (1983) carried a cross sectional study of 104 countries and found out that an increase in the ratio of government expenditure to real GDP reduces the growth rate of per capita real GDP. Likewise, by applying a cross-section study of 98 countries, Barro (1990) found a significant negative relationship between government consumption share and the growth of real per capita GDP. Also, Kweka & Morrissey (2000) investigated the impact of government spending on economic growth in Tanzania, by using used time series data, and found that increased productive expenditure (physical investment) has a negative effect on growth.

The second group has assured the positive relationship between government expenditure and economic growth. For example, Albala-Bertrand & Mamatzakis (2001) investigated the long-run impacts of infrastructure investment on economic growth rates in Chile and found positive growth impacts. Also, Bose et al (2007) examined growth effects of government expenditure for a group of 30 developing countries and found that the share of government capital expenditure in GDP is positively and significantly correlated with economic growth. In addition, Chude & Chude (2013) investigated the effects of public expenditure in education on economic

growth in Nigeria, using Error Correction Model (ECM), and found that total expenditure on education is highly and statistically significant and have positive relationship with economic growth in the long run.

The third group has shown that the relationship between government spending and economic growth is affected according to the type of the public expenditure. For example, Baum and Lin (1993) tested the impact of three different types of government expenditures (defense, welfare, and education) on per capita GDP growth rate in developed and developing countries. They found that the growth rate of both education and defense expenditures has positive effects on growth rate while the growth of welfare expenditures has an insignificant effect on economic growth. Also, Devarajan et al (1993), by using a sample of 14 OECD countries, found a positive impact for each of government expenditure on health care, transportation, and communication on economic growth.

Concerning the relationship between government expenditure and economic growth in Kenya, some empirical studies have reached mixed results. For example, M'Amanja and Morrissey (2005) examined the effect of government investment in infrastructure on long-run economic growth rate over the period (1964-2002) and found a positive relationship between the two variables. On the other hand, Muthui et al (2013) examined the impact of public expenditure composition on economic growth from 1964 to 2011. The results showed that government expenditure on health doesn't spur any significant change to growth.

3. Trends of Government Expenditure and Economic Growth in Kenya

The government expenditure in Kenya has two categories: recurrent and development expenditures. With respect to **recurrent expenditures**, they are of repeated nature, less discretionary, spent on ongoing programs, and mostly domestically funded. While **development expenditures** are one-time expenditures, more discretionary, spent on new programs, and largely externally funded (World Bank 2005).

Since Kenya's independence, the government expenditure has witnessed huge expansion. This was the result of two factors. The first factor was the adoption of African Socialism, after independence, which obliged the government to spend more on the reduction of: poverty, ignorance, and disease. The second factor was the prevalence of inefficiency, corruption, and tremendous increase in salaries of government officials, during 1970s and

early 1980s. Thus, pressure increased from politicians, the civil society, and development partners on the Kenyan government to reduce its non-productive expenditures. As a result, in 1980s, Structural Adjustment Programs (SAPs) were introduced by the Kenyan government to review its expenditure (Swamy 1994).

In 1993, Civil Service Reform Program (CSRP) emphasized on restructuring government expenditures by focusing more on development expenditures as opposed to recurrent expenditures (Hope 2012). However, in the end of 1990s, there was a persistent increase in recurrent expenditures at the expense of development expenditures (Republic of Kenya 2001).

After 2002, the development expenditures witnessed an upward trend as the National Alliance of Rainbow Coalition (NARC) government started a very big infrastructure development program. From 2008 till 2012, the development expenditures remained high in line with vision 2030, which emphasized on increasing investments in infrastructure to create a suitable environment for business (World Bank 2013).

Concerning output growth rate, the performance of the Kenyan economy was impressive during the first decade of independence; the real GDP growth rate averaged 6.6% per year over the period (1964 –1973). This was the result of consistent economic policies, high domestic demand, and expansion of markets for domestic output within the East African region (Swamy 1994).

During the second decade of independence, the economy was negatively affected by several external shocks and the inconsistent fiscal and monetary management. Consequently, Kenya witnessed a persistent economic decline over that period; average real GDP growth rate fell to about 5.2% (Rono 2002).

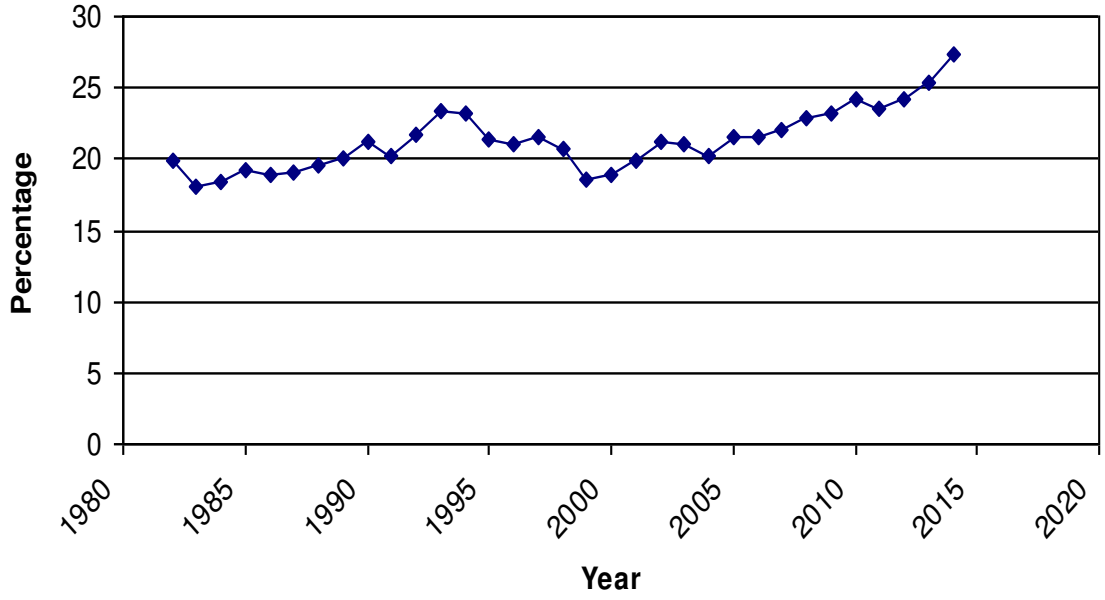
During the third and fourth decades of independence, in spite of introducing SAPs, the economic conditions were worsened by political instability, external and internal shocks. As a result, the average growth rate of real GDP fell to less than 4.2% and 2.2% over the two decades respectively (M'Amanja and Morrissey 2005).

Over the past decade, Kenya's real GDP grew at an average of 3.8%. This was much better than in previous decades, but below its potential and its peers. Excluding South Africa, SSA grew at an average of 6 % since 2002.

East Africa as a whole grew even more, at 6.5%, and without Kenya it would have grown at almost 7%. This was due to a series of exogenous shocks, droughts, skyrocketed oil price, and the recession in the European Union - a major trading partner (World Bank 2013).

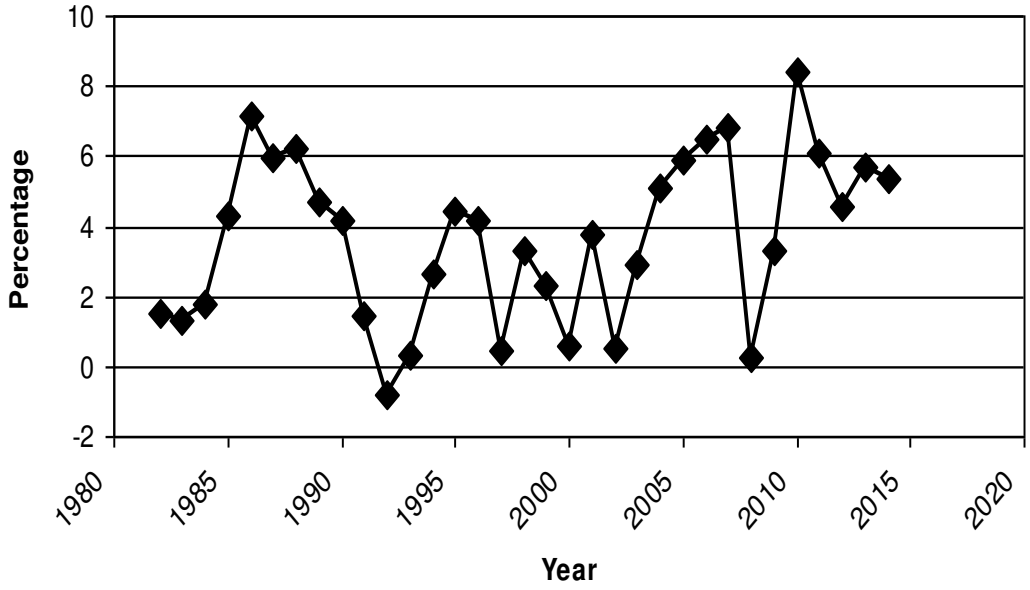
Figure (1) and figure (2) show the upward increase in total government expenditures (including both recurrent and development expenditures) and the severe fluctuations in Kenyan Real GDP growth rate, respectively, over the period (1982 -2014).

Figure (1)
Trend of Kenyan Government Expenditure from 1982 till 2014 (% of GDP)



Source: International Monetary Fund: **World Economic Outlook (WEO) Database April 2016**, at: http://opendataforafrica.org/wiraszf/imf-world-economic-outlook-weo-april-2016, Visited on: 4/1/2016.

Figure (2)
Trend of Kenyan Real GDP Growth Rate from 1982 till 2014



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4. Methodology and Data Sources

VAR framework is used to measure the impact of government spending on economic growth in Kenya. It is recommended by many macroeconometricians to avoid the problem of simultaneity bias that results from potential endogeneity between the variables under consideration; fiscal spending and economic growth [1](Stock & Watson 2001).

This study applies **SVAR model** adopted by Blanchard and Perotti (2002), which includes exogenous variables to control for external influences. The identification procedure of Blanchard and Perotti (2002) model assumes that government expenditure impacts GDP which, in turn, can impact tax

[1] It is often assumed that there is a bidirectional relationship between public spending and GDP growth rate. It comes from government spending influence on economic growth and, in turn, economic growth influence on the government decision making and its ability to undertake fiscal measures.

collections[1]. Thus, contemporaneous impact of government expenditure, if any, on taxes will be reflected through GDP. The model can be written in the following **structural form equation**:

$$G(L)Y_t = C(L)X_t + E_t$$

Where G(L) and C(L) represent matrix polynomials in the lag operator L for vectors of endogenous variables (Y_t) and exogenous variables (X_t) while E_t is a vector of structural disturbances (unobserved). Endogenous variables include government expenditure (GEXP), GDP growth rate (GGDP) and tax revenue (TX) while world GDP growth rate (WGDP) is included as an exogenous variable.

To obtain E_t, we use the **reduced-form VAR**, which can be represented as:

$$AY_t = AC(L)Y_{t-1} + AE_t$$

The previous equation can be rewritten as:

$$AY_t = AC(L)Y_{t-1} + U_t$$

Where $AE_t = U_t$ and U_t is the observed (reduced-form) residuals. Therefore, we can get the structural disturbances E_t by estimating the VAR's innovations U_t as follows:

$$E_t = B\ U_t$$

Where $A^{-1} = B$. It can be written in matrix form as:

$$\begin{bmatrix} e_t^{gexp} \\ e_t^{ggdp} \\ e_t^{tx} \end{bmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ c_{21} & 1 & 0 \\ 0 & c_{32} & 1 \end{pmatrix} \begin{bmatrix} u_t^{gexp} \\ u_t^{ggdp} \\ u_t^{tx} \end{bmatrix}$$

Matrix B is restricted as a lower triangular matrix with ones on the main diagonal. This restriction is a way of identifying its elements to reflect the contemporaneous relationships, previously illustrated, among the endogenous variables.

[1] This identification procedure is consistent with the assumption that both government revenue and expenditure remain unresponsive to current GDP growth.

The model is estimated for the period (1991-2012), covering over two decades of relatively open economy. Data for the variables included in this model have been taken from the IMF World Economic Outlook (WEO) Database (IMF 2016). These data are available as follows: world and Kenya GDP growth rates (WGDP, GGDP) are measured in real terms while government expenditure (GEXP) and tax revenue (TX) are both measured as a percentage of GDP. It is also worth mentioning that small-scale SVAR models have proven to outperform larger ones and that tax revenue as a ratio of GDP is a better measure of the taxes in any country (Blake 2013).

SVAR analysis applied here assumes that governments need at least one period (as long as a quarter) to respond to new economic data (a shock) with discretionary policy. Thus, to be able to track the impact of these responses on the whole economy, it is better to estimate our SVAR model using quarterly not annual data. Unfortunately, quarterly data on the variables included in the model have not been available and we have resorted to interpolating annual data using the **quadratic-match sum method**.

5. Diagnostic Tests

Our SVAR model was estimated by using **Eviews 9**. All the time series of the variables included in the model (exogenous and endogenous) were tested for the existence of unit root using Augmented Dickey-Fuller test. Results revealed that all of them were I (1). Therefore, a SVAR model in first differences of the endogenous variables and the exogenous variable was estimated. The Akaike Information Criterion test (the Lag Criterion test) was used to select the number of lags to be included in the estimated SVAR model and they turned to be 4. Our estimated SVAR model also satisfied normality and absence of autocorrelation tests (see the Appendix for relevant tables).

6. Empirical Results

As figure (3) shows, a shock to government spending tends to have a negative impact on Kenyan output in the first quarter; GEXP initial impact reaches a value of -0.03. As the initial impact of GEXP can be misleading because government spending can only be implemented over time and there may be lags in output responses. Therefore, the accumulated impact of GEXP is computed. Figure (4) shows that the accumulated impact of GEXP on Kenyan output is still so weak but reaches a positive value of 0.01 in the tenth quarter.

With respect to the response of output to taxes shock, figure (3) shows that the initial response is zero in the first quarter. Also, figure (4) indicates that the accumulated impact of TX on output approaches zero in the long run (precisely in the tenth quarter). From figure (3), it shows that there is an increase in the response of taxes to a shock to government spending in the eighth quarter. This could be explained by the fact that the Kenyan government is trying overtime to compensate for its prior increases in spending.

In comparing the effect of government spending and taxes on output in Kenya, it may seem that both have weak and nonpersistent impacts. The small impact of these two variables on output is consistent with the results reached by Mendoza et al (2010), who found that the government spending multipliers tend to be small and even negative in developing countries. Also, World Bank (2010) found that a discretionary fiscal shock has a small impact on Kenyan output and it stays positive for only nine quarters till it changes to a negative value.

These results can be justified by high government debt/GDP ratio in Kenya[1]. In economies with high government debt/GDP ratio, any increase in government spending may act as a signal that fiscal tightening will occur later on. Thus, households and private sector may not spend or invest during the short term in anticipation that they will be required to compensate for these expenditures in the future (Scott et al 2008). Therefore, due to high level of debt that the Government of Kenya has incurred, any expansionary government spending will not have a large impact on output. Also low impact of government spending on GDP in Kenya can be due to high debt servicing. Over the period (2000-2011), the ratio of total debt service to total government revenue, excluding grants, scored an average of 20.6% in Kenya[2]. Thus, the fifth of the government resources are consumed by the repayment of debt rather than by providing schools, roads and bridges (growth inducing infrastructure). In this regard, it can be expected that government spending might not have a major impact on GDP.

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[1] Concerning government debt /GDP ratio in Kenya, it scored an average of 54.6% from 1998 until 2012, with a highest record of 78.3% in 2000 and lowest record of 42.8% in 2008 (Author's calculations from data of IMF 2016).

[2] This average score is calculated by the author from data found in the following source: East African Community (EAC): **EAC Statistics Portal-Statistics Database**, in: http://www.eac.int/statistics/index.php?option=com_content&view=article&id=141&Itemid=111#bop, Visited on 4/20/2016.

Also, the previous results are consistent with the findings of Mendoza et al (2010) that fiscal multipliers in small open economies tend to be small. As a result of a higher marginal propensity to import in these economies, the expansionary fiscal policy would be met by a reduction in net exports rather than an increase in domestic production. This applies to Kenya; as figure (5) shows an increasing trend in its trade deficit over the period (1991- 2012). Also, the figure shows that exports in Kenya have largely decreased over the same period.

Figure (3)
Impulse Response Functions of the Endogenous Variables

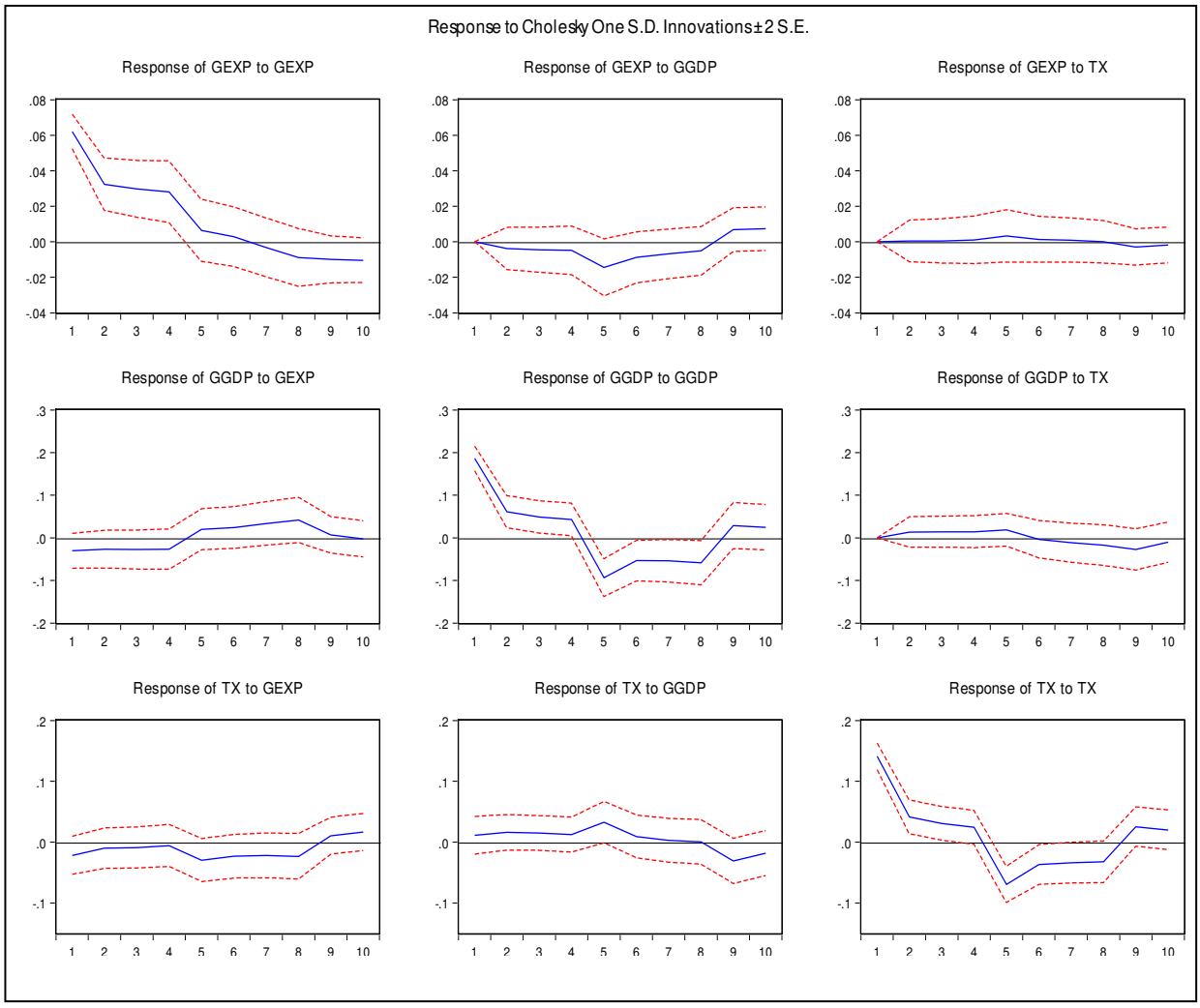


Figure (4)
Accumulated Impulse Response Functions of the Endogenous Variables

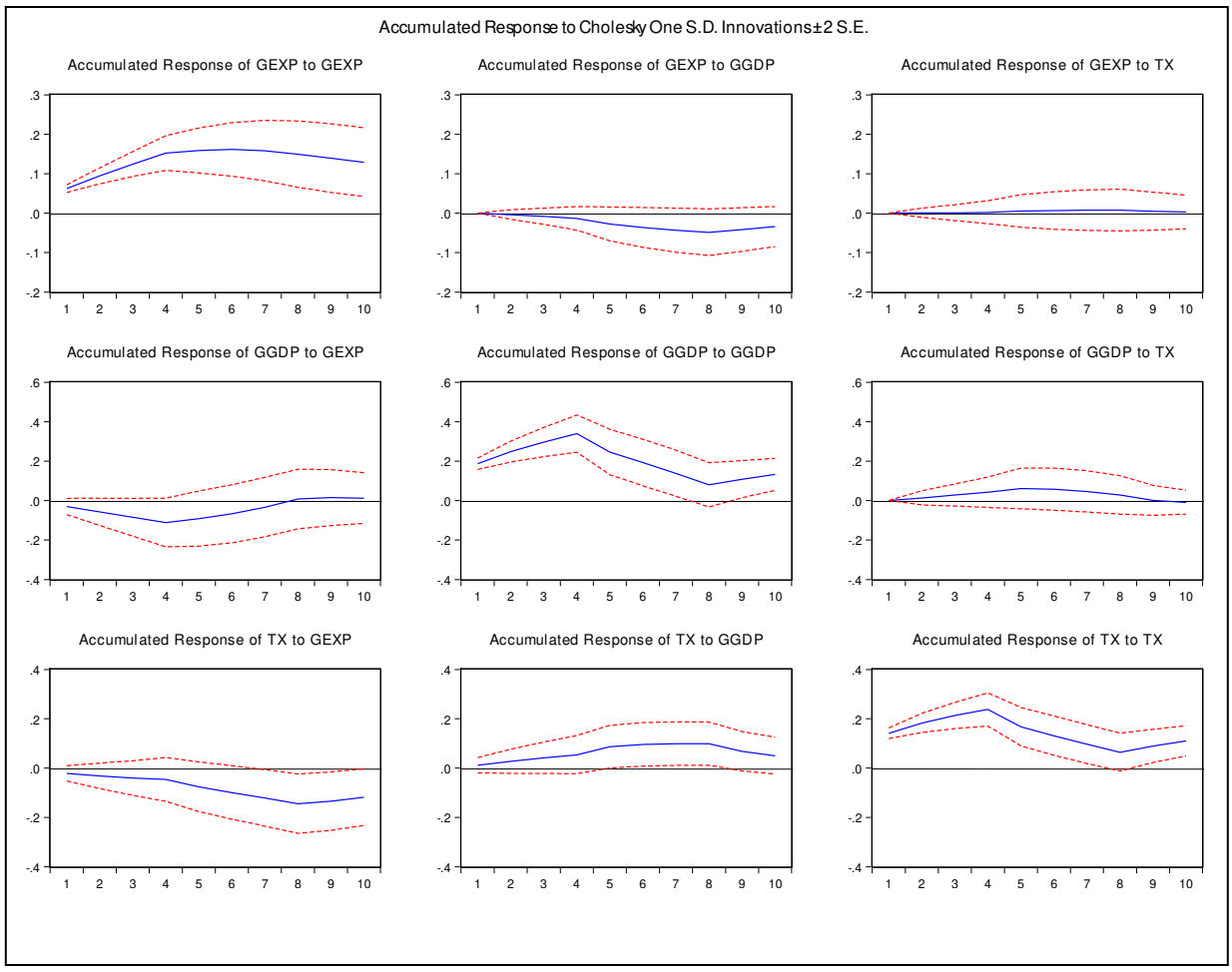
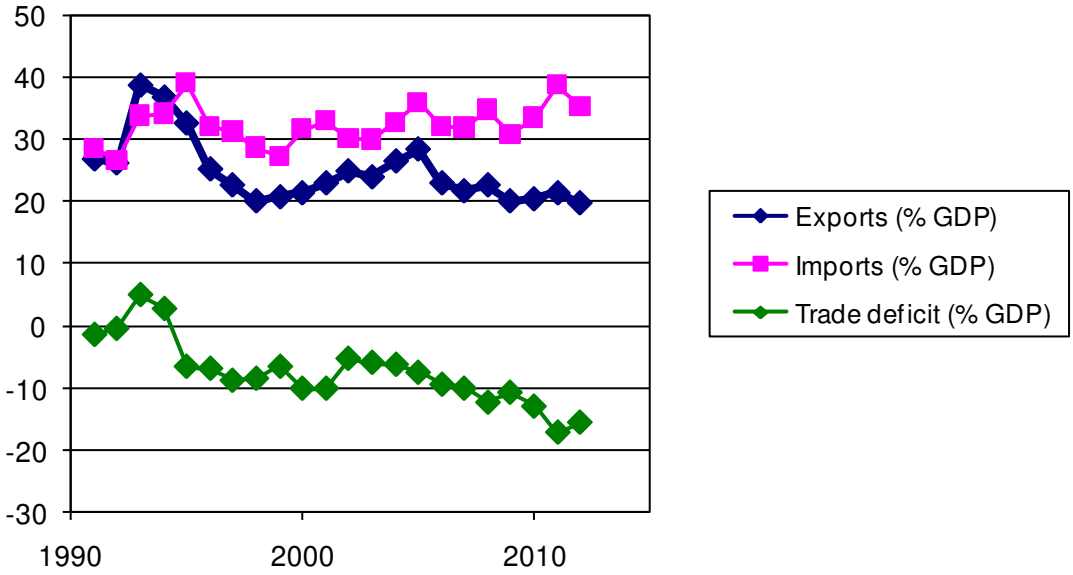


Figure (5)
Trend of Exports, Imports, and Trade Balance from 1991 till 2012
(% of GDP)



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7. Conclusion

Since its independence in 1963, the Kenyan government has been expanding its expenditure to achieve high levels of economic growth and development. However, the findings in this paper indicate that the effects of both government spending and taxes on output in Kenya are weak and nonpersistent. These results are largely consistent with other studies findings in other developing countries. High ratios of both government debt to GDP and debt servicing to government revenue are considered to be the main reasons for these weak fiscal multipliers in Kenya. Thus, it is highly recommended that the government of Kenya should reduce its debt level as it restrains the impact of expansionary fiscal policy.

Finally, for getting better estimation of the Kenyan fiscal multipliers, further research should consider the following **three points**:

1. Investigating the impact of the exchange rate regime and the level of openness on the size of the Kenyan fiscal multipliers.

2. Using quarterly data that are not interpolated from annual figures.

3. Using data on different types of government spending, instead of the total spending figures. As long as government spending directed towards capital expenditure leads to more growth, it consequently affects the relative strength and size of fiscal multipliers.

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Appendix

Table (1): Descriptive Statistics

	GEXP	GGDP	TX	WGDP
Mean	5.411170	0.796500	4.116912	0.674260
Median	5.366328	0.817734	3.992335	0.744068
Maximum	6.184000	2.202023	5.217565	1.192345
Minimum	4.586250	-0.319000	3.518366	-0.632584
Standard Deviation	0.387421	0.637029	0.361780	0.355578
Skewness	-0.076944	0.134759	1.091280	-1.631519
Kurtosis	2.372525	2.197373	3.884580	6.697395
Jarque-Bera	1.530490	2.628449	20.33552	89.16654
Probability	0.465220	0.268683	0.000038	0.000000
Sum	476.1830	70.09200	362.2883	59.33488
Sum Square Deviation	13.05827	35.30510	11.38695	10.99991
Observations	88	88	88	88

Table (2): Unit Root Test

Variable	Augmented Dickey-Fuller test	
	Level	1st Difference
GEXP	-1.489259	-4.750275*
GGDP	-2.335985	-3.618313*
TX	-2.703702	-6.859217*
WGDP	-2.973637	-4.878054*

* The null hypothesis of a unit root is rejected by the Mackinnon critical values at 1%.

Table (3): Lag Selection Criteria for the Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	109.7657	NA	1.65e-05	-2.500378	-2.325522	-2.430131
1	149.9485	75.52428	7.77e-06	-3.251771	-2.814631*	-3.076153
2	150.9933	1.888220	9.43e-06	-3.060080	-2.360656	-2.779090
3	154.6123	6.278773	1.08e-05	-2.930417	-1.968710	-2.544057
4	202.2360	79.18157*	4.27e-06*	-3.861109*	-2.637117	-3.369378*

* 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

Table (4): VAR Residual Normality Tests

Component	Skewness	Chi-square	Degrees of Freedom	Probability
1	-0.324247	1.454384	1	0.2278
2	-0.129706	0.232727	1	0.6295
3	0.672678	6.259527	1	0.0124
Joint		7.946638	3	0.0471
Component	**Kurtosis**	**Chi-square**	**Degrees of Freedom**	**Probability**
1	3.580552	1.165599	1	0.2803
2	4.329481	6.112672	1	0.0134
3	7.997152	86.35987	1	0.0000
Joint		93.63814	3	0.0000
Component	**Jarque-Bera**	**Degrees of Freedom**	**Probability**	
1	2.619983	2	0.2698	
2	6.345399	2	0.0419	
3	92.61940	2	0.0000	
Joint	101.5848	6	0.0000	

Table (5): VAR Residual Serial Correlation LM Tests

Lags	LM-Statistics	Probability*
1	13.04043	0.1608
2	2.265869	0.9865
3	10.51000	0.3108
4	63.63225	0.0000
5	9.348029	0.4058
6	8.196294	0.5145
7	7.889701	0.5453
8	25.73726	0.0023
9	5.573533	0.7817
10	4.082236	0.9059
11	2.858524	0.9696
12	10.18729	0.3355
13	1.259005	0.9986
14	1.408042	0.9978

* Probability from chi-square with 9 degrees of freedom.