A Fiscal Reaction Function for Kenya

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Abstract

This study sought to determine whether Kenya's fiscal policy is on a sustainable path by estimating a fiscal reaction function. A fiscal reaction function is a rule derived from an inter-temporal government budget constraint, which reveals the response of government to accumulating public debt. It also sought to establish whether fiscal policy responds to business cycles by determining its cyclical nature. The study used annual time series data spanning 1970 to 2013, and multivariate analysis based on VAR and VECM model. The empirical analysis reveals that, first, fiscal behaviour is incoherent with inter-temporal budget constraint, and the moderation is low. This implies that if fiscal adjustment is not done, debt is likely to accumulate. Second, expenditures during election cycles threaten Kenya's long run fiscal sustainability. Finally, fiscal policy is a-cyclical, meaning that the stabilization objective is not considered when developing and implementing fiscal policy. The study recommends that comprehensive fiscal rules and regulations be enacted by an independent fiscal committee to correct these biases.

Abbreviations and Acronyms

GDP	Gross Domestic Product
ERS	Economic Recovery Strategy
GoK	Government of Kenya
HP	Hodrick Prescott
IBC	Inter-temporal Budget Constraint
KRA	Kenya Revenue Authority
MTEF	Medium Term Expenditure Framework
OLS	Ordinary Least Squares
OECD	Organization for Economic Cooperation and Development
PRSP	Poverty Reduction Strategy Paper
PRGF	Poverty Reduction Growth Facility
TMP	Tax Modernization Programme
TR	Tax Revenue
TAR	Threshold Autoregressive
VAR	Vector Autoregressive
VAT	Value Added Tax
VECM	Vector Error Correction Model

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1.   Introduction

1.1   Background Information

Fiscal policy entails the deliberate measures by a government to influence the direction and the performance of the economy in order to attain specific set objectives, such as fostering macroeconomic stability, efficient allocation of resources, and fair distribution of income. Fiscal policy adjustments are normally effected through alterations in the composition and level of government expenditure, changes in tax revenue, or changes in tax structure. The effects are either realized through automatic stabilization or discretionary changes through the fiscal budget. Automatic stabilizers are those elements of fiscal policy that reduce tax burden and increase public spending without discretionary government action.

Kenya's fiscal policy stance is mainly geared towards macroeconomic stability, sustainable growth and a conducive environment for investment and innovation. As articulated in the budget strategy paper 2012/2013 and 2013/2014 financial years, a sound fiscal policy should not only be sustainable but should also create fiscal space for counter cyclicality in case the economy is exposed to destabilizing shocks. Some of the key indicators of the soundness of fiscal policy are debt to GDP ratio, and fiscal deficit as a percentage of GDP. To ensure fiscal sustainability, Kenya targets a fiscal deficit of 3.6 per cent by 2016 while the East Africa Community target is 6.0 per cent. On the other hand, as a percentage of GDP, public debt increased from 44.5 per cent in the previous financial year to 49.8 per cent in 2013/2014 financial year, with the projected trend being expected to hit 53.3 per cent in 2014/2015, far above the debt target of 40.0 per cent of overall GDP.

This rising debt and fiscal deficit is attributed to increasing government expenditure, and a slower growth in revenue. The rising deficit is not only a threat to fiscal consolidation efforts but also poses a great challenge to macroeconomic stability. In addition, it does not only constrain fiscal space required to design and implement a countercyclical fiscal policy, but also raises concerns on sustainability of such a policy.

Fiscal policy is sustainable if it satisfies the inter-temporal budget constraint. This means that the present value of future primary surpluses should be equal or more than the current level of debt (Alesina and Filipe, 2008; Bohn, 1998). As debt accumulates, the government should run sufficient future surpluses if debt is to remain non-explosive. It implies that the government can run the current fiscal policy over time without altering taxation or leading to excessive debt accumulation. Fiscal sustainability implies good management of public resources.

Unsustainable fiscal policy has adverse consequences on the economy and the welfare of its citizens. Specifically, it results into a non-stable macroeconomic environment, which manifests in financial crisis, weak currency, explosive debt, financial sector failure, and volatile interest rates. In addition, non-sustainable fiscal policy exposes economies to external shocks, harms the welfare of the state through large fiscal deficits and excessive debt stocks, and generates an inefficient allocation of resources. Excessive public debt does not only affect future generations but also leads to inflation volatility (Anca, 2011).

Secondly, it also has implications on financial markets and monetary policy stance. For instance, high public debt and fiscal deficit levels create expectations in financial markets that government is likely to default on debt, hence investors demand a higher interest rate on government debt to compensate for the apparent risk that the government may not be able to repay its loans, causing a sudden and sharp increase in the government's financing costs. The ultimate effect is to crowd out private borrowing due to rising cost of credit. High debt levels may also force the government to monetize the debt or create a surprise inflation, which in turn jeopardizes monetary policy stance (Renee and Weinberg, 2007).

As earlier cited, macroeconomic stabilization is one of the key fiscal policy objectives in Kenya. An automatically stabilizing fiscal policy is crucial in cushioning the economy against macroeconomic shocks. For Kenya, the Vision 2030 is based on the assumption that fiscal policy remains sustainable and stabilizing. A stabilizing fiscal policy should not lean on the wind; the government should spend more during economic downswing and spend less during upswing. Such a policy is said to be countercyclical. Countercyclical policies as attributed to strong automatic fiscal stabilizers should mitigate both short run and long run business cycles, rather than amplifying them. However, empirical evidence has it that in most developing economies, fiscal policies are procyclical, meaning that they lean on the wind, hence accelerating instabilities especially after shocks (Halland and Bleaney, 2009; Alesina and Filipe, 2008; Ilzetzki and Vegh, 2008; Mcmanus and Ozkan, 2012).

It is therefore essential to understand the fiscal sustainability prospects for Kenya and from a wide perspective that assesses not only fiscal sustainability, but also automatic stabilizers property of the fiscal tools. One way of assessing fiscal sustainability is through an assessment of how a government reacts to changes in its debt position. For a country such as Kenya that has seen considerable increases in total debt levels, an understanding of how the country changes its fiscal policy stance in relation to changing debt positions is important. Fiscal sustainability will be achieved if the increases in expenditure are matched with increases in revenue (World Bank, 1990). Further, a stabilizing fiscal policy should be sustainable,

which implies that it should not lead to excessive debt accumulation. It should also be countercyclical, implying that fiscal position should not accommodate business cycles but rather counter them.

Assessment of the government reaction to debt is done through estimation of a fiscal reaction function. A fiscal reaction function is a rule that reveals how sound a fiscal policy is in terms of sustainability, transmission and cyclicality (Khalid, 2007; Mello, 2005; Baldi and Karstein, 2012. Having the right fiscal reaction function makes fiscal policy and public finance sound and stable (Nguyen, 2013).

It is against this background that this study seeks to assess the response of the Kenyan government to changes in debt position through estimation of a fiscal reaction function. This would also give insights into the sustainability of fiscal policy in Kenya, and also whether fiscal policy stabilizes business cycles in the economy. The specific objectives of the study are to:

(i)   Estimate a fiscal reaction function for Kenya;

(ii)   Assess fiscal sustainability in Kenya; and

(iii)   Assess the cyclicality of fiscal policy in Kenya

1.2   Fiscal Policy in Kenya

Fiscal policy seeks to address macroeconomic instability; fostering higher economic growth; reducing poverty rate; and addressing substantial income, asset, and regional inequalities. In Kenya, these objectives are pursued in government policy documents such as Sessional Paper No. 10 of 1965 on African Socialism and its Application to Kenya, Sessional Paper No. 1 of 1986 on Economic Management for Renewed Growth; Economic Recovery Strategy (ERS) of 2003; Vision 2030, Medium Term Expenditure Framework (MTEF) of 2007; Poverty Reduction Strategy Paper (PRSP); and the Poverty Reduction Growth Facility (PRGF).

From a historical perspective, persistent rise in government expenditure on infrastructure, free primary education, military operations, power plants and on other social amenities, coupled with persistently rising recurrent expenditure, raised total government expenditure to GDP from 29.0 per cent in 1970 t0 40.0 per cent in 2013. Tax revenue has grown in tandem with the increasing public expenditure, for instance from 9.0 per cent of GDP in 1970 to 24.0 per cent in 2013, which is within the expected target. However, it hardly suffices the expenditure, leading to persistent fiscal deficit.

Notably, fiscal deficit has worsened from 7.0 per cent of GDP in 2004 to 12.0 per cent in 2012 and 14.0 per cent in 2013. Kenya is in a worse fiscal position compared to East African economies such as Uganda, Burundi and Tanzania. For instance, in 2008/09, 2009/010, and 2010/11 financial years, fiscal deficit in Uganda was 4.6 per cent, 7.2 per cent and 6.2 per cent, respectively. In Tanzania, fiscal deficit remained stable, registering 8.6 percent, 9.3 per cent and 11.0 per cent, respectively. In Burundi, the deficit was relatively low, showing a drastic decline from 13.6 per cent to 4.0 per cent in 2009/10 financial year. This is one of the challenges leading to delay in achieving the East Africa Monetary Union, since the expected deficit benchmark should be 6.0 per cent. To bridge the gap between revenue and expenditure, tax reforms have been used severally. Firstly, in the wake of the 1970s oil crisis, minor tax reforms were undertaken. Sales taxes were introduced as a means of generating extra revenue, and trade taxes were used to address the then widening balance of payments deficit.

During the period 1974 through 1985, tax rates on both personal and corporate income were high, with marginal personal income tax rates ranging from 10 per cent on the first shilling to a top rate of 65 per cent. The tax rate applied to income of domestic corporations was 45 per cent in 1974, while foreign corporations faced a rate of 52 per cent. However, this did not yield much as expected due to low labour productivity (Wanjala and Karingi, 2005).

In 1986, the Tax Modernization Programme (TMP) was approved, aimed at broadening the tax base to 28 per cent of GDP in 1992. Subsequently, the Budget Rationalization Programme intended to place controls on public spending was put in place in 1987. In 1991, as part of TMP, several tax rates were converted into *ad valorem* tax partially to maximize tax revenue. Other reforms included changes in VAT in line with the East Africa Community protocol, more reliance on indirect tax than direct tax, and centralization of tax collection purposely to raise tax revenue, with zero fiscal deficit being in consideration. Although tax revenue has grown over time, the zero deficit target has remained elusive (Nada and William, 2009).

Consequently, public debt is used to bridge the gap, with the current external debt increasing by 28.7 per cent from Ksh 843.6 billion in June 2013 to Ksh 1,085.9 billion in June 2014, largely as a result of the issuance of the International Sovereign Bond and depreciation of the Kenya shilling against the Euro, Dollar, Sterling Pound and other major world currencies (Government of Kenya, 2009).

This persistent fiscal deficit and a rising public debt raise questions on whether fiscal policy is sustainable in Kenya. On the other hand, it suggests that fiscal policy in Kenya leans on the wind; that is, fiscal policy is run with no consideration on business cycles. Such fiscal policies tend to amplify business cycles or remain

non-responsive to short run business cycles at all. In addition, macroeconomic stability remains at stake (Halland and Bleaney, 2009, Alesina et al, 2008; Ilzetzki and Vegh, 2008; Mcmanus and Ozkan, 2012). A sustainable fiscal policy must meet the inter-temporal constraint (Ostry et al., 2010).

1.3 Revenue and Expenditure Trends

Figure 1.1 shows a consistent gap between tax revenue and government expenditure measured in GDP, especially in the period between 1980 to 2004 as government expenditure proportion of GDP rises to 56 per cent, far above the 18 per cent TR/GDP in 1993. However, TR/GDP has also grown over time courtesy of various tax reforms. Although 1970 was characterized by financial crisis originating from oil shocks, the declining revenue was countered by 1972/73 tax reforms, where sales tax replaced consumption tax and corporate tax was increased by 5 per cent. The introduction of Tax Modernization Programme in 1986 led to a gradual increase in tax revenue as a proportion of GDP, reaching 18 per cent of GDP in 1993. There is also a slight decline in government expenditure during the period 1987 to 1991, which is attributed to the Budget Rationalization Programme enacted in 1987, intended to place controls on public spending.

However, the effect was short-lived as government expenditure proportion to GDP took a drastic upswing immediately after 1991 to 56 per cent of GDP, attributed to multi-party politics and structural reforms during the same period. From 1994, revenue takes a down-turn, partially due to the declining yield of VAT (Wanjala

Figure 1.1: Revenue and expenditure as a percentage of GDP
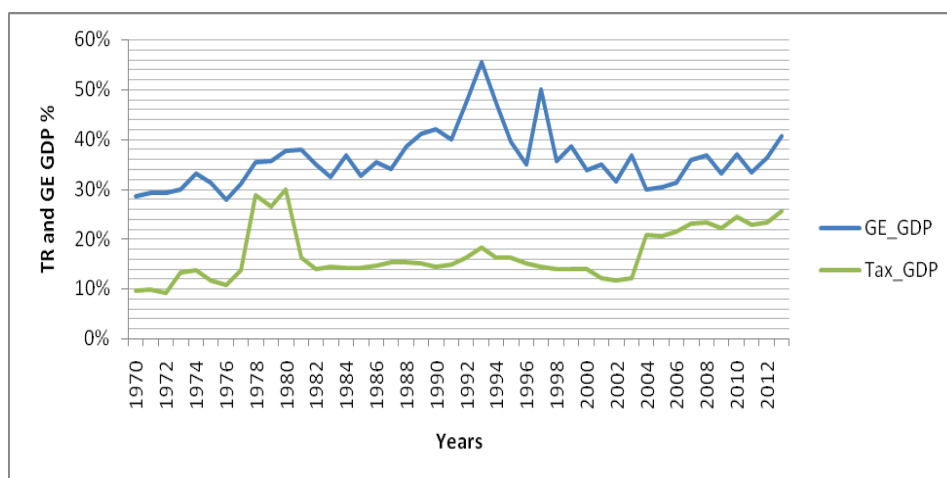
Source: KNBS (2012, 2013, 2014), Economic Survey

and Karingi, 2005). Another substantial change in revenue to GDP proportion is experienced from 2004 to 2013 as revenue to GDP percentage ratio rises from 12 per cent to 21 per cent in 2004, stabilizing at 26 per cent in 2013. Overly, this growth in tax revenue is attributed to the success of TMP (Wanjala and Karingi, 2005) among other tax reforms and institutional measures.

In regard to government expenditure, Medium Term Plan for (2008-2012) of Vision 2030 provides the expenditure priorities for the Government for 2011/12-2012/13. In 2012/13, overall expenditures were projected at 29.8 per cent. However, the target was far much surpassed by expenditure, which hit 41.0 per cent of GDP in 2013. The substantial growth in government expenditure is attributed to increasing recurrent and investment expenditure by the government and the fiscal stimulus undertaken between 2008/09 and 2010/11 (Government of Kenya, 2012). However, the effectiveness of fiscal restrain is expected if implementation of the Integrated Financial Management Information System (IFMIS) across Ministries and Departments and subsequently at the county level following devolution is fully put in place.

A look at Figure 1.2 shows that tax revenue (TR) has increased over time from a total tax revenue amounting to Ksh 371,989.1 million in 2006/07 to Ksh 1,006,862 million in 2013/14. The increase in tax revenue is attributed to significant increase in income revenue, trade tax revenue, VAT and excise tax revenue over the same period. Substantial growth in excise duty growth is in the wake of tax amnesty and a waiver of interest on all tax arrears in 2004. However, government expenditure (GE) is consistently higher than tax revenue, generating a persistent deficit in the economy. Figure 1.3 shows tax efforts and government expenditure to rebased GDP in percentage. The trend reveals a steady tax effort ranging between 19 per

Figure 1.2: Nominal total revenue and government expenditure (Ksh million)
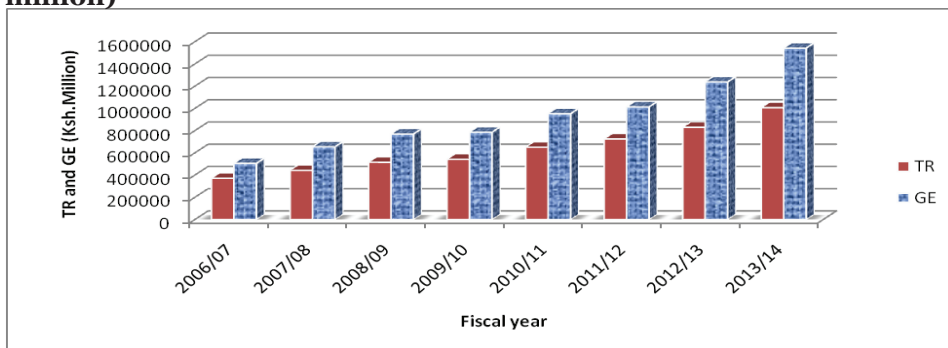
Source: KNBS (2012, 2013, 2014), Economic Survey

Figure 1.3: Total revenue and government expenditure as percent of rebased GDP
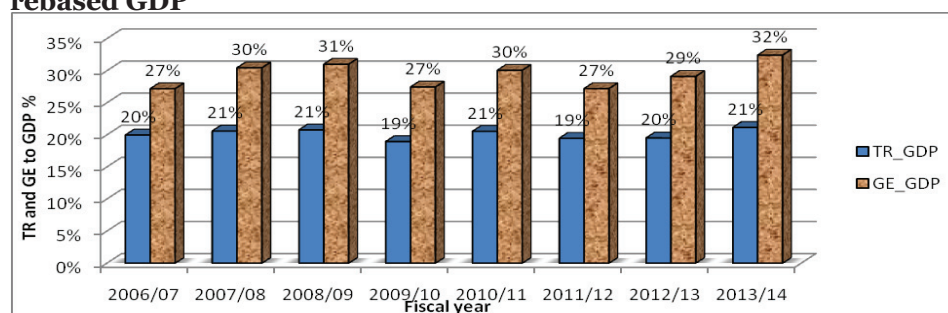
Source: Authors computation using data from KNBS (Various), Economic Survey

cent and 21 per cent of GDP. Similarly, the proportion of government expenditure to GDP has risen to 32 per cent in 2013/14.

1.4   Fiscal Balance and Public Debt GDP Ratio

Public debt is composed of both domestic and external borrowing by the government. Debt is often used to finance government deficit in Kenya. For instance, the fiscal stimulus of 2009 to 2011 led to growth of public debt to 45 per cent of GDP.

Debt to GDP ratio remains high at 52 per cent of GDP in 2013, rising from 42 per cent in 2010 as shown Figure 1.4. The projected ratio is to increase to 53 per cent of GDP. However, looking at debt trends after GDP rebasing, the ratio is still high at 40 per cent in 2013. Looking at Figure 1.4, high debt ratios are observed especially between the period 1993 to 1994, 2000 and 2004, 2008 and 2012. Such periods are associated with high deficit ratios, implying that deficits are funded by increased debt. The declining debt trend over time can be attributed to continued fiscal consolidation efforts that started in the 2010/11 budget, as well as efficiency in spending and improved tax performance following reforms in expenditure management and tax legislations.

The government envisages in the 2012 Budget Strategy Paper that the sustained easing of debt to GDP ratio will provide a room to conduct countercyclical fiscal policy should the economic situation worsen in the future. However, the debt burden is increasing , as the cost of servicing debt increased, amounting to Ksh 250 billion in 2013. The increase in debt around 2008 reveals that the fiscal stimulus package was funded by debt. It also suggests that there may be limited fiscal space to run countercyclical policy in Kenya. However, this is subject

Figure 1.4: Fiscal deficit and debt GDP ratio
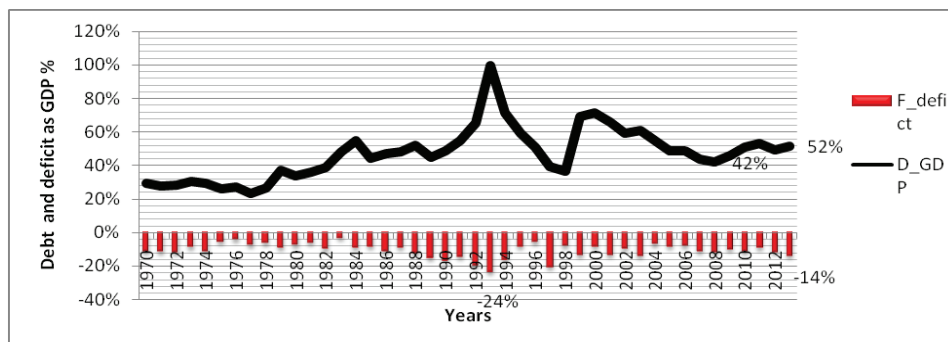
Source: KNBS (1975 to 2014), Economic Surveys

to empirical confirmation in this study. It also implies that it is most likely that the existing fiscal stance is purely non-countercyclical, putting macroeconomic stability at stake especially in case of unexpected shocks. In the absence of any deficit bias, we would observe budgets to be alternatively in deficit and in surplus depending on economic and/or political conditions. These fluctuations would be mainly driven by business cycles when fiscal policy is run countercyclically, as should be (Wyploz 2012).

1.5   Fiscal Stance and Business Cycles

One of the key roles of fiscal policy both in the long run and the short run, as earlier cited, is to ensure macroeconomic stability. Majorly, it should stabilize overall economic performance by ensuring that output gap both in the long run and the short run is minimized (Halland and Bleaney, 2009). We assess how fiscal policy responds to economic swings by examining the relationship between primary fiscal balance (as the measure of fiscal stance) and output gap (as measure of business cycles). Primary balance is the difference between tax revenue and government expenditure, excluding debt servicing cost. Output gap is the deviation of the actual output from potential in a given year. It is computed using the Hodrick-Prescott (HP) filter Method.

The HP filter is a two-sided linear filter that computes the smoothed series y_t^* of y_t by minimizing the variance of y_t around y_t^* subject to a penalty that constrains the second difference of y_t^* and is formally stated as:

$$Min \sum_{t=0}^{T}\left(y_t - y_t^*\right)^2 + \lambda \sum_{t=2}^{t=1}\left(y_{t+1} - y_t^*\right) - \left(y_t^* - y_{t-1}^*\right)^2$$

Where λ is a parameter that controls the smoothness of the series.

When output gap is positive, it means the economy is operating above the potential and the aggregate demand is likely to cause macroeconomic instability. Similarly, a negative output gap suggests that the economy is operating below its potential. A countercyclical policy should be expansionary (primary deficit) when output gap is negative and tight when the gap is positive (primary surplus). From Figure 1.5, the economy experienced noticeable downswings in 1972 during the financial crisis as a result of oil crises that occurred in the same period. Similar downswings tend to persist from 1988 to 1992 and 2002 to 2004, consistent with economic history in Kenya. The two variables tend to co-move, as noted clearly in 1972 to 1975, 1998 to 1993, 1996 to 2000 and 2002 to 2005; a strong indication that the government has not been pursuing fiscal policy in a manner consistent with the business cycle movements.

The rest of the paper is organized as follows. Section two provides the theoretical and empirical literature review while section three provides the methodology for the study. Section four provides the findings of the study while section five concludes and provides policy recommendations.

Figure 1.5: Fiscal stance and business cycles in Kenya
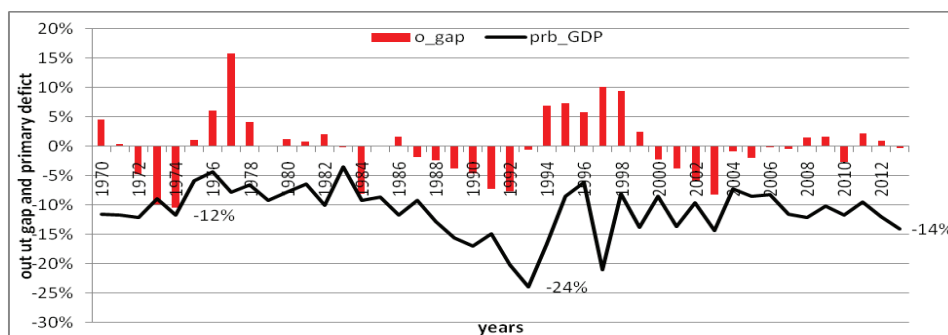
Source: Authors' computation using data from KNBS (Various), Statistical Abstract

2.   Literature Review

This chapter provides both theoretical and empirical review of literature on fiscal reaction function, fiscal sustainability, effectiveness and cyclicality.

2.1   Theoretical Overview

Keynesian theory postulates that with sticky prices and wages, the economy does not respond immediately to demand fluctuations, hence fiscal policy should be countercyclical. A countercyclical fiscal policy helps the economy to adjust more completely, and more rapidly to such fluctuations. Fiscal policy should therefore actively smooth the business cycle by lowering taxes and increasing expenditure in bad times, thereby increasing aggregate demand while reducing expenditure and increasing savings in good times (Halland and Bleaney, 2009). Neoclassical theoretical perspective stipulates that fiscal policy should aim to minimize distortions. Barro's (1979) tax smoothing hypothesis shows that tax rates should be held constant over the business cycle as long as spending shocks or shocks to the tax base are temporary. This implies a positive correlation between the budget balance with output (Fatás and Mihov, 2009). A pro-cyclical fiscal policy is sub-optimal both by Keynesian and by neoclassical standards (Ilzetzki and Vegh, 2008).

2.2   Empirical Review

2.2.1   Fiscal reaction function and fiscal sustainability

Fiscal sustainability has received the attention of economic researchers in the recent past following the global financial meltdown in 2008 and the subsequent debt crisis in Greece in 2009. According to Anca (2011), running unsustainable fiscal policies is not only a recipe for macroeconomic instability but also exposes economies to exogenous shocks. An unsustainable fiscal policy characterized by large fiscal deficits and excessive public debt stocks has harmful consequences as typified by the Greece crisis in 2009. Ensuring fiscal sustainability is crucial.

Gauging fiscal sustainability has taken various analytical angles categorized into stationarity tests where the debt/GDP ratio is tested for unit root. The presence of unit root shows that fiscal policy is unsustainable (Trehan, 1991; Corsetti and Roubini, 1991; Caporale, 1995 ; Uctum, 2000). The second category is cointegration tests, which test for cointegration between tax revenue and government expenditure. If the two fiscal variables are not co-integrated, fiscal policy is unsustainable. This approach used by Haug (1995), Payne (1997) and Stoian (2008). The third category is the fiscal reaction function, where the responsiveness of fiscal primary balance to debt accumulation is tested, if positive

and significant, at conventional levels, an internal debt correction mechanism is said to be in existence and fiscal policy is sustainable (Bohn, 1998; De Mello, 2005; Stoian, 2008; Ostry, 2007 and Mendoza et al., 2011).

The three categories are based on the inter-temporal budget constraint (IBC). However, Bohn (2007) shows that IBC imposes a very weak econometric restriction on the series of debt or revenue and expenditure. The study shows how a broader class of stochastic processes may comply with an IBC and yet violate stationarity and cointegration conditions for sustainability, hence invalidating the usefulness of the first two approaches. Instead, fiscal reaction approach, which represents an error-correction type policy reaction function, is more promising in understanding fiscal imbalances (Bohn, 2007). A fiscal reaction function checks whether government behaviour has been sufficiently responsive to increment in debt (Stoian, 2006 and de Mello, 2005).

Researchers can iterate the government inter-temporal budget constraint to produce different fiscal reaction functions (Nguyen, 2013). There are two possible approaches used in iteration process. In the first approach, the fiscal reaction functions are model-based, as in the case of (Penalver and Thwaites, 2006) while in the second approach, which is commonly used, researchers use econometric approach to measure the relationship between fiscal balance and the debt/GDP ratio, plus other macroeconomic variables. This approach is applied by Bohn (1998), de Mello (2005), Khalid et al. (2007), and Burger et al. (2011).

The estimation technique also varies across studies. Bohn (1998) uses simple ordinary least squires (OLS) model to show that US debt is sustainable. Khalid et al. (2007)uses vector autoregressive approach (VAR) to gauge fiscal sustainability in Pakistan. The VAR model includes fiscal deficit, output gap, and inflation. The advantage of VAR model is that it does not only show variable relationship in linear models, but also provides rich dynamic relationship between variables. Within VAR models, transmission, responsiveness and effectiveness of fiscal policy shocks is easily captured. Burger et al. (2011) find consistent results using OLS, threshold autoregressive (TAR), VAR, general methods of moments - GMM, vector error correction mechanism (VECM), and State-Space methods is South Africa. This study uses a VAR method to estimate a fiscal reaction function for Kenya.

2.2.2 Fiscal cyclicality and fiscal stabilization

There is a rich literature showing evidence of fiscal procyclicality and explaining why fiscal policy in developing economies is rarely countercyclical. Gavin and Perotti (1997) show evidence of fiscal cyclicality differences between regions (Kaminsky et al., 2004; Talvi and Végh, 2005; Ilzetzki and Végh, 2008), show

similar differences in rich and poor countries or across time for the same group of countries (Fatás and Mihov, 2009). Gavin and Perotti (1997) observe that while fiscal policy in the OECD is countercyclical or acyclical, it is procyclical in Latin-America. Kaminsky et al. (2004), using various measures of cyclicality in a study of 104 countries for the period 1960-2003, confirm the countercyclicality or acyclicality of the OECD economies, while finding fiscal procyclicality in developing countries. Similarly, Talvi and Végh (2005) observe that fiscal procyclicality is predominant in Latin American feature and in 36 developing countries of their sample. Thornton (2008), in a study of 37 African countries over the period 1960-2004 finds real government consumption in 32 of these countries to be extremely procyclical, with half of the countries having a government spending response to output fluctuations even above proportionality.

Woo (2006) using econometric analysis shows that fiscal procyclicality bias is largely explained by social polarization of preferences arising from inequalities. In addition, the study shows that procyclical fiscal policy is negatively and strongly associated with long run economic growth. Manasse (2006) shows that the severe difference in policy cyclicality between developed and developing countries is due to the higher severity of the shocks that hit developing countries.

Other hypothesis that explain fiscal cyclicality are restrictions on access to domestic credit (Caballero and Khrisnamurthy, 2004), international credit markets (Gavin and Perotti, 1997; Calderón and Schmidt-Hebbel, 2008), institutions or political structures (Lane 2003; Talvi and Végh, 2005; and Alesina et al., 2008).

According to Gavin and Perotti (1997), developing countries are less able to smooth the business cycle because limited access to international credit markets prevents them from borrowing during bad times. A similar argument is supported by (Calderon and Schmidt-Hebbel, 2008). Using the ratio of foreign liabilities to GDP as their measure for financial openness, they find that wider access to domestic and foreign capital markets enables countries to run countercyclical policies. Riascos and Végh (2004) confirm that limited financial depth proxied by domestic credit to the private sector is a major constraint to the implementation of countercyclical fiscal policy.

On the other hand, Thornton (2008) contrary to Alesina et al. (2008), in a sample of 37 African countries, concludes that less corruption leads to more procyclicality. His explanation is that if corruption leads to lower levels of tax collection, generating lower government expenditure, then better governance may be positively correlated with fiscal pro-cyclicality if it increases the tax revenues available for fiscal expenditure. This study sought to establish whether fiscal policy is pro-cyclical, countercyclical or acyclical in Kenya.

3.   Methodology

3.1   Analytical Framework

Fiscal reaction function is useful in gauging fiscal sustainability, cyclicality and effectiveness of a fiscal policy. The arithmetic's of fiscal sustainability start with government budgetary constraint, Burger et al, (2011), where the constraint is represented as:

$$D_t = D_{t-1} + (1 + i_t)D_{t-1} - pB_t \quad \text{...1}$$

Where D is public debt stock, i is nominal interest rate on government bonds, and pB is primary balance, which can be a surplus or a deficit position. Equation 1 is also known as the law of motion for debt. Applying forward substitution, $t=1, t=2,..,t=n,$ and generalizing, we obtain the intertemporal budget constraint and solvency condition as equation 2:

$$D_N = (1+i)^N D_0 - \sum_{j=1}^{N}(1+i)^{N-j} pB_j \quad \text{..2}$$

Rearranging equation 2 and discounting by interest rate i results into equation 3.

$$D_0 = \sum_{j=1}^{N}\frac{1}{(1+i)^N} pB_j + \frac{1}{(1+i)^N} \cdot D_N \quad \text{..3}$$

Equation 3 implies that initial debt stock is related to the intervening primary balance and terminal period debt. Imposing the transversality (no Ponzi game) condition, that is

$$\lim it_{N-\infty}\left(\frac{1}{1+i}\right)^N D_N = 0$$

which prohibits the government from issuing more and more debt without repaying principle and accumulated interest of previous debt stock, we obtain equation 4.

$$D_0 = \sum_{j=1}^{N}\frac{1}{(1+i)^N} pB_j \quad \text{..4}$$

This is known as the solvency condition. It implies that if the initial debt is positive, the government needs to run a positive surplus in future. The relationship between nominal GDP and its past and real interest rate and its past can be expressed as equation 5 and 6, respectively, that is:

$$p_t y_t = (1 + \prod_t)(1 + g_t)(p_{t-1} y_{t-1}) \quad \text{..5}$$

$$(1 + i_t) = (1 + \textstyle\prod_t)(1 + r_t)$$ 6

Using equation 5 and 6, equation 1 can be transformed into debt to GDP ratio time evolution as equation 7 below:

$$d_t = \frac{(1 - r_t)}{(1 + g^t)} d_{t-1} - pb_t$$ 7

Where $d_t = D/Y$ ratio of public debt to GDP at time t, g: real economic growth rate, $b_t = B/Y$ is primary balance and Y is nominal GDP. Equation 7 implies that high primary balance and high economic growth rate leads to a lower debt to GDP ratio. By rearranging equation 7 we obtain an equation of primary balance below:

$$b_t = \frac{r - g}{1 + g} \cdot d_{t-1}$$ 8

In empirical estimation following Bohn (1998), a fiscal reaction function is represented as:

$$b_t = \alpha + \beta d_t + \Phi z_t + \varepsilon_t$$ 9

where β is approximately $\dfrac{r - g}{1 + g}$ which measures the presence of internal debt

correction mechanism by the government. This is the relationship we sought to establish in regard to fiscal sustainability. Z is a vector of other variables that are targeted by fiscal policy. In this study, Z constitutes output gap-measure of fiscal cyclicality, interest rate, exchange rate and inflation rate. It also includes a political dummy to capture electoral effect and lagged revenue to GDP ratio to capture fiscal authority's ability to generate fiscal surplus effect on fiscal position.

3.2 Model Specification

The study used a vector autoregressive (VAR) model. According to Sims (1980), macroeconomic variables are potentially endogenous, hence structural models explicitly dictating causality are mis-specified. Alternatively, A VAR model allows the variables to interact without imposing a theoretical structure on the estimates. In addition, VAR models allow for rich dynamics relationship among a vector of macroeconomic variables. Similar approach has been used by Khalid et al. (2007) and Burger et al. (2011).

The VAR model is specified as:

$$X_t = [Z, d\_GDP, pr\_bal] \ ....10$$

Where X_t is a vector of fiscal primary balance as a ratio of GDP(pr_bal), debt to GDP ratio(d_GDP), while Z is a set of economic variables that have influence on fiscal policy behaviour. Particularly, vector Z includes output gap (y_gap) proxied as the trend obtained with the Hodrick-Prescott filter to capture the influence of business cycles (Bohn, 1998; de Mello, 2005); commodity prices (CPI) capture the effects of price movement on the fiscal position; and real effective exchange rate (reer) to capture the effect of persistent depreciation on fiscal position regarding external debt services and the pass through effect on inflation. Following Asiama et al. (2014), fiscal stance in developing countries is highly influenced by national elections, which tend to be accompanied by excessive budget overruns. Therefore, Z also includes a dummy variable, p_dummy to capture possible electoral effects. According to Asiama et al. (2014) and Abiad et al. (2005), the key factor distinguishing fiscal structures between developing countries and developed economies is the relatively lower revenue-to-GDP base of the former. A lagged total revenue-to-GDP ratio (TR_GDP) was used as a proxy for the capacity of the fiscal institution to deliver a primary surplus. Following Khalid et al. (2007), a structural VAR model is represented as:

$$\beta \ \chi_t = \beta_0 + \sum_{j=1}^{p} Z^i \chi_{t-1} + \varepsilon_t \quad ....11$$

Where ε_t is a vector of error terms, and β is a matrix of coefficients capturing the contemporaneous effects of variables on each other. β_o is a vector of constant terms. Z_t are the matrices of coefficients measuring the lagged effects of variables on each other. ε_t is a vector of error terms that contain zero mean, constant variance and serially as well as cross uncorrelated innovations, i.e. these elements represent pure structural shocks. Through mathematical manipulation, the Standard reduced form VAR with lagged variables on the right hand side can be expressed as:

$$\chi_t = A_0 + \sum_{j=1}^{p} A_i \chi_{t-1} + \ell_t \quad ....12$$

Where $\ A_o = B^{-1}B_o, \ A_i = B^{-1}Z^i \ and \ \ell_t = B^t\varepsilon_t$

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 (Mutuku and Koech, 2014). This is known as VAR identification in econometrics jargon. This study used recursive identification approach, which implies a causal ordering of the variables in the model based on contemporaneous

effect or on the behaviour of variables in the economy also known as recursive orthogonolization.

3.3 Data Sources and Definition of Variables

The study used annual time series data spanning the period 1996Q1 -2014Q4. These were obtained from Central Bank of Kenya, International Financial Statistics, and Kenya National Bureau of Statistics.

Table 3.1: Variable definition and description

Variable	Type of Variable	Measurement	A prior expectation
Debt to GDP ratio	Continuous	Ratio	-ve or +ve
Output gap	Continuous	Ratio	-ve or +ve
Consumer Price Index	Continuous	Index	-ve
Real effective exchange rate	continuous	Index	+ve
Primary balance as a ratio of GDP	Continuous	Ratio	+ve
Interest rate	Continuous	Percentage	+ve
Political dummy	Binary	I or 0 if national elections take place	-ve
Lagged total revenue to GDP ratio	Continuous	Ratio	+ve

4.   Findings

4.1   Diagnostic Tests

This section outlines some preliminary tests to gauge the fitness of the model run.

4.1.1   Test for unit roots

Macroeconomic time series variables mostly exhibit time variant moments. This can be confirmed through stationarity tests. In testing for stationarity, this study used the Augmented Dickey-Fuller (ADF) and Phillips Perron. ADF test was used with intercept and 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 a unit root.

Table 4.1: Test for stationarity results

Unit root test with trend and intercept					
Variable	ADF		PP		Conclusion
	Level	1st Difference	Level	1st Difference	
D_GDP	-2.5650***	-5.0894	-2.3738***	-6.2196	I(1)
OUTPUT GAP	-3.8074*	-4.8878	-3.3385*	-5.7474	I(1)
LN_CPI	-1.03173**	-3.7709	-0.6084**	-3.9612	I(1)
LN_NEER	-1.03171**	-3.7709	-0.6084**	-3.9612	I(1)
PR_BAL	-2.5582**	-5.9111	-4.3278	-13.0578	I(1)
LN_R	-2.6742**	-6.3865	-2.4196**	-8.9137	I(1)
TR_GDP	-3.8042*	-4.8878	-3.5162*	-5.7474	I(1)

***10%,**5% and *1% significance levels. I(1) integrated of order one

This test shows that all the variables are non-stationary in levels at 1 per cent, 5 per cent and 10 per cent significance level. This means that the individual time series have a stochastic trend and do not revert to average or long run values after a shock strikes, and the distribution has no constant mean and variance. The fact that debt to GDP ratio is non-stationary is an indication of non-sustainability of debt or fiscal indiscipline (Wyplosz, 2012). However, as earlier cited, the test is weak.

4.1.2   Test for co-integration

Since variables have unit root at level, we tested for long run relationship using the Johansen and Juselius (1990) approach to establish the co-integrating vectors. Two test statistics are used to test the number of co-integrating vectors, based on the characteristic roots. For both trace and Eigen statistics, the null is at most r co-integrating vectors. The trace statistics:

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{k} \ln(1 - \hat{\lambda}_i) \quad \text{...13}$$

The alternative is at most k co-integrating vectors. The maximum Eigen statistics:

$$\lambda_{max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1}) \quad \text{...14}$$

The alternative is at most r+1 CI vectors. It tests rank r+1 by testing if is zero.

Table 4.2: Cointegration test results

Trace statistic				
Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.958212	342.6391	169.5991	0.0000
At most 1 *	0.887197	221.9833	134.6780	0.0000
At most 2 *	0.786180	139.0629	103.8473	0.0000
At most 3 *	0.595858	80.44328	76.97277	0.0265
At most 4	0.424781	46.01567	54.07904	0.2143
At most 5	0.302195	25.00148	35.19275	0.4001
At most 6	0.164440	11.32850	20.26184	0.5108
At most 7	0.111718	4.501698	9.164546	0.3425
Trace test indicates 4 co-integrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Eigen statistic				
Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.958212	120.6557	53.18784	0.0000
At most 1 *	0.887197	82.92041	47.07897	0.0000
At most 2 *	0.786180	58.61966	40.95680	0.0002
At most 3	0.595858	34.42761	34.80587	0.0554

At most 4	0.424781	21.01419	28.58808	0.3385
At most 5	0.302195	13.67298	22.29962	0.4923
At most 6	0.164440	6.826806	15.89210	0.6906
At most 7	0.111718	4.501698	9.164546	0.3425
Max-eigen value test indicates 3 co integrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Author's computation

Both the Eigen and Trace statistic reject the one cointegration hypothesis at 5 per cent significance level for at 3 and 4 cointegrating relationships, respectively. This reveals that there is enough statistical evidence for existence of a unique cointegrating vector for the set of variables in the VAR model. Cointegration results are shown in Table 4.3. Since the set of variables are I(1) and cointegration has been established in Table 4.3, then it justifies the estimation of a vector error correction model - VECM -to capture the short run dynamism as in Granger representation theorem without losing the long run data properties. Similarly, a non-spurious cointegrating equation of the variables at level can be estimated as shown in Table 4.4.

4.1.3 Optimal lag length selection for the VAR model

The optimal lag length was selected based on comparison of the following information criteria, which include Akaike information criterion (AIC), Schwarz information criterion (SC), Hannan–Quinn information (HQ) criterion, Final prediction error (FPE), and Sequential modified LR test statistic. Majority of the criteria as shown in Table 4.2 indicate that the optimal lag length should be 3.

Table 4.3: Lag selection criteria

VAR Lag Order Selection Criteria						
Lag	Log L	LR	FPE	AIC	SC	HQ
0	357.9841	NA	1.38e-18	-18.42021	-18.07546	-18.29755
1	569.1364	322.2852	6.44e-22	-26.16508	-23.06228*	-25.06112
2	649.7278	89.07470	4.31e-22	-27.03831	-21.17747	-24.95307
3	773.2210	84.49537*	8.90e-23*	-30.16953*	-21.55065	-27.10300*
* 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						

Source: Author's calculations

4.2 Estimation of VECM and Cointegrating Model

This part estimates the long run and the short run model using the VAR and VECM approach.

4.2.1 Long run model results

The cointegrating model in Table 4.4 above shows that long run coefficient of public debt is negative but statistically insignificant, hence the government inter-temporal budget constraint is violated. The results reveal that fiscal authorities' reaction to accumulating debt is non-systematic, and the current fiscal policy is unsustainable. Unsustainable fiscal policy means that the expected path for debt is much larger than the likely path of future primary surpluses. This implies that public debt is likely to accumulate in the long run if the government does not generate substantial primary surpluses to deal with public debt.

Political dummy representing election cycles has negative significant effect in the long run behaviour of primary balance.

Table 4.4: Cointegrating model

Dependent Variable: PR_BAL				
Variable	**Coefficient**	**Std. Error**	**t-statistic**	**Prob.**
P_DUMMY	-0.041314	0.018265	-2.261995	0.0302
TR_GDP	0.049288	0.116502	0.423069	0.6749
Y_GAP	0.088832	0.113340	0.783765	0.4386
LNR	-0.002566	0.010624	-0.241528	0.8106
LNCPI	-0.014881	0.008689	-1.712693	0.0959
LN_NEER	-0.001186	0.008258	-0.143626	0.8866
D_GDP	-0.089707	0.061681	-1.454364	0.1550
C	-0.009043	0.031767	-0.284656	0.7776
PR_BAL(-1)	0.175866	0.148241	1.186352	0.2437
R-squared 0.453168	Akaike info criterion -3.667579			
F-statistic 3.522037	Schwarz criterion -3.298956			
Prob(F-statistic) 0.004555	Hannan-Quinn criter. -3.531642			
	Durbin-Watson stat 2.179206			

Standard errors in ( ) & t-statistics in [ ] **significance at 5%; *significant at 1% .

This implies that fiscal position significantly deteriorates during election years, probably due to expenditure overruns associated with national elections. This implies that elections-associated expenditure threaten the long term fiscal sustainability of Kenya's public finance.

In regard to revenue collection capability, proxied by revenue to GDP ratio, there is a weak surplus generating capacity of the fiscal institution in the long run as the coefficient was positive and statistically insignificant. This suggests that fiscal institutions have improved substantially in efficiency and ability to collect tax revenue, although more reforms should be encouraged to ensure overall fiscal sustainability. The coefficient of the output gap is positive but statistically insignificant at 5 per cent level, implying fiscal policy is acyclical in Kenya. Acyclical fiscal policy implies that the policy lacks automatic stabilization effect, and in case of destabilizing shocks, the effect is likely to be relatively distortive to macroeconomic stability. The coefficient of output gap is positive but insignificant at 5 per cent statistical level. This implies that fiscal policy in Kenya is not acyclical; that is, it does not counter debt accumulation.

4.3   Short Run Results - Vector Error Correction Model

The error correction coefficient is -0.1260 as shown in the error correction model in Table 4.5. This suggests that 13 per cent of any disequilibrium is corrected in every quarter. In addition, as Asiama et al. (2014) reveal, it implies that the explanatory variables Granger-cause primary balance in the long run.

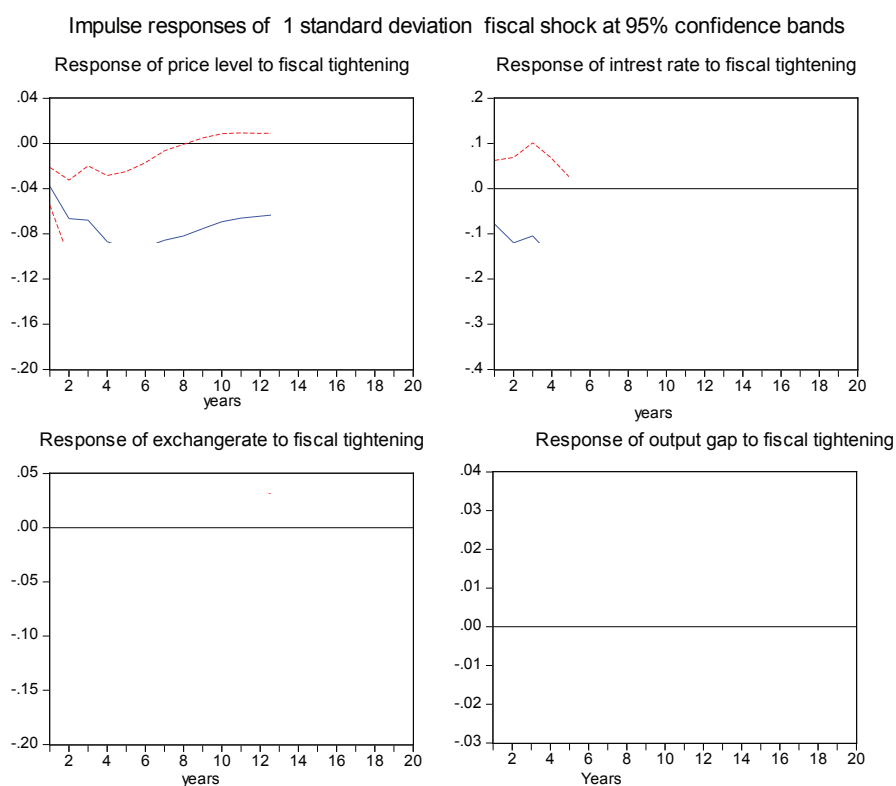**Table 4.5: Vector error correction model**

Vector Error Correction Estimates	
Error Correction term: ECMt-1	
	-0.126025
D(PR_BAL(-1))	-0.845929*
D(PR_BAL(-2))	-0.165028
D(P_DUMMY(-1))	-0.065271**
D(P_DUMMY(-2))	-0.023981
D(TR_GDP(-1))	-0.156002
D(TR_GDP(-2))	-0.491801**
D(Y_GAP(-1))	0.040525
D(Y_GAP(-2))	-0.130498
D(LNR(-1))	0.029399
D(LNR(-2))	0.001372
D(LNINFL(-1))	-0.026396
D(LNINFL(-2))	-0.001555
D(LN_NEER(-1))	-0.133071
D(LN_NEER(-2))	-0.189955**
D(D_GDP(-1))	-0.027053
D(D_GDP(-2))	0.105700
D(LNCPI(-1))	0.032817
D(LNCPI(-2))	0.163872
C	-0.001762
R-squared	0.695255
F-statistic	2.521585*

**significance at 5%; *significant at 1%

Source: Author's computation

Figure 4.1 shows the response of macroeconomic variables to fiscal tightening. One standard deviation tightening in fiscal policy significantly reduces price level for a period of 8 years. A similar effect is realized on exchange rate, but with a lag of 3 years. However, the effect decays completely after one year. On the other hand, fiscal shocks have no effect on output gap or interest rate, implying that fiscal policy effect is not transmitted to these variables. It also emphasizes the acyclical nature of fiscal policy in Kenya.

Figure 4.1: Impulse response functions

Impulse responses of 1 standard deviation fiscal shock at 95% confidence bands

Response of price level to fiscal tightening

Response of intrest rate to fiscal tightening

Response of exchangerate to fiscal tightening

Response of output gap to fiscal tightening

5. Conclusion and Policy Recommendations

5.1 Conclusion

This study focused on estimating a fiscal reaction function and gauging the long run sustainability of fiscal policy in Kenya. It also sought to establish the cyclical nature of the policy. It specifically sought to ascertain whether the authorities pursued appropriate policies to avert excessive debt accumulation

The empirical analysis reveals that, firstly, fiscal behaviour is incoherent with inter-temporal budget constraint, and the moderation is low. This implies that fiscal authorities react non-systematically to increasing debt, thus threatening fiscal sustainability in the long run. It also suggests that if there is no fiscal adjustment, debt is likely to accumulate. Secondly, election cycles expenditure threatens Kenya's long run fiscal sustainability. Thirdly, fiscal policy is acyclical, meaning that the stabilization objective is not considered while conducting the policy. Similar results were obtained by Khalid et al. (2007) and Halland and Bleaney (2009). Thirdly, fiscal shocks have no effect on output gap, meaning that the policy is not countercyclical to business cycles.

5.2 Policy Recommendations

To revert fiscal policy to a sustainable path, address cyclicality and depoliticize macroeconomic policy, the following should be done:

1. ***Formulate a fiscal rule***: Kenya needs an explicit fiscal rule that specifies: (a) long term debt (debt/GDP) ratio; (b) primary fiscal balance (zero, surplus or deficit) depending on macroeconomic environment; (c) fiscal convergence rate (average rate at which the debt ratio and fiscal balance targets are to be approached incase of deviation; and (d) degree of fiscal counter-cyclicality (amount of stimulus needed in case of recession or a boom). The motivation for fiscal rules is that they correct government's short sightedness resulting from electoral prospects. They also contain the size of the government and improve fiscal performance. However, rules may constrain discretionary action when needed, hence may accentuate fiscal pro-cyclicality. Therefore, rules should be accompanied by escape clauses to give leeway for discretionary action only when necessary. Further reason for explicit and flexible fiscal rules is that they promote macroeconomic stability through countercyclical policies, enhance credibility of government's fiscal policy, and aid in deficit elimination. They definitely contribute to long term fiscal sustainability.

Conclusion and policy recommendations

2. ***Independent fiscal committee/authority:*** To depoliticize fiscal policy and implement clear fiscal targets, there is need for an independent Fiscal Policy Committee (IFC) to mimic the approach adopted in the case of monetary policy. IFC can shield the budgetary process from pressure connected with the electoral cycles. IFC should have mandate to set debt targets and primary surplus required to stabilize debt over a given horizon consistent with business cycles. In addition, IFC should have the authority to decide on budget balance on the basis of explicit GDP forecast so as to break out the vicious cycles of fiscal pro-cyclicality/acyclicality by setting counter-cyclical budget targets and building surpluses during booms to be tapped during recessions.

3. ***Estimating business cycles***: Counter cyclicality requires estimation of business cycles. IFC should comprise of technical experts to estimate business cycles and determine the appropriate fiscal balance consistent with the fiscal rule. It should also have the ability to monitor and ensure that the rule is followed. The business cycles estimates should be published regularly (quarterly, as in South Africa) to guide macroeconomic policy.

4. ***Fiscal responsibility laws***: A more comprehensive approach would be to provide well designed fiscal responsibility laws (FRLs) covering all levels of government (including counties) and with strict transparency requirements. Effective FRLs should not be easy to change and suspend, but should however be accompanied by quantitative targets.

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