The Effects of Primary Budget Deficits on Economic Growth: Evidence from Kenya

Patrick Mugendi Mugo¹, Wafula Masai¹ and Kennedy Osoro¹

¹School of Economics, University of Nairobi, Kenya.

Authors’ contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JEMT/2021/v27i530344

Editor(s):
(1) Dr. Kamarulzaman Ab. Aziz, Multimedia University, Malaysia.
(2) Dr. Olusegun Felix Ayadi, Texas Southern University, USA.

Reviewer(s):
(1) Kuswanto, Jambi University, Indonesia.
(2) Francisco Venegas-Martinez, México.

Complete Peer review History: https://www.sdiarticle4.com/review-history/71485

Received 20 May 2021
Accepted 27 July 2021
Published 31 July 2021

ABSTRACT

Aims: The paper attempts to examine the effects of primary budget deficits on economic growth. It reviews the nature and direction of causality between primary budget deficit and economic growth. In the recent years, these have been debated both in developed and developing countries. In contributing to this ongoing debate, the study analyzes the case for Kenya from 1980 to 2016. The evidence is intended to provide policy insights for macroeconomic stability and sustained economic growth for shared prosperity in Kenya.

Study Design: The study employs quantitative time-series research design by utilizing Stata econometrics software.

Place and Duration of Study: Sample: Evidence from Kenya, from 1980 to 2016.

Methodology: The study employs unit root tests, Johansen cointegration analysis, a dynamic vector error correction model and a multivariate Toda-Yamamoto Granger-causality representation.

Results: The findings establish that the primary budget deficit, gross fixed capital formation, real interest rate, terms of trade, inflation growth and financial innovation have significant effects on GDP per capita growth in Kenya. Primary budget deficit has a strong and significant effect on GDP per capita growth both in short-run and long run. In the short-run, the results revealed that the primary budget deficit had a positive effect on economic growth which turned negative in the long-run. There was a unidirectional causality running from primary budget deficit to economic growth.

*Corresponding author: E-mail: pattmugoh@gmail.com;
Conclusion: The study concludes that both in the short run and long run, primary budget deficit has strong and significant causal effects on economic growth in Kenya. The evidence underscores the need for the authorities to reduce high primary budget deficits, interest payments and domestic borrowings and strictly apply the golden rule of public finances to boost long term inclusive growth, in Kenya.

Keywords: Primary budget deficit; economic growth; cointegration; VECM; Toda-Yamamoto granger-causality.

1. INTRODUCTION

Globally, governments design economic strategies by which they attempt to influence their economies. The national budgets reflect the economic policies of governments. It is through the budgets that governments exercise the three primary methods of instituting control: (i) allocative; (ii) stabilization and; (iii) distributive, functions [1]. The achievement of a sustained economic growth is the main focus of every nation. The desire to achieve this key objective has associated the substantial use of fiscal policy that has culminated in sustained budget deficits in many developing nations. However, the debate on the effectiveness of fiscal policy as a device of economic development and macroeconomic stabilization is yet to be resolved [2].

Generally, fiscal policies are formulated in the context of the annual budget to be implemented by the government in question. The budget is normally structured into revenue and expenditure sides. There are three possibilities for the relations between expenditure and revenue sides of the budget. When the proposed government expenditure is exactly equal to its expected revenue, the government has a balanced budget; if the expected revenue exceeds proposed expenditure, there is a surplus budget; and when the government spending is greater than the expected revenue, there is a deficit budget. Each of these budget situations has its own implications for the economy. This study focuses on deficit budget. The question is how effective is the discretionary fiscal policy in attainment of sustainable economic growth for shared prosperity in Kenya?. In reference to [2], monetary policy is generally a superior alternative for the realization of such objectives. However, this assertion is generalized.

On a global perspective, debates on general budget deficits and economic growth connection have yielded great attention since 1980s and have been therefore at the center of macroeconomic adjustments for economic growth and stability [3,4,5,6]. The outcome of the 2008 global financial crisis has also renewed this impetus. This has further necessitated policy debates and research interests on the subject. This has been the case since several developing countries undertake deficit spending as a means of accomplishing certain macroeconomic objectives. In conventional perspectives, overspending by governments is perceived as a policy that is mainly applied to deal with macroeconomic problems [7].

According to [8], a greater number of developing nations priorities including Kenya is controlled by infrastructural development. This has caused governments to rely on deficit financing. However, [9] observed that when expansionary fiscal policy is overemphasized, it strains monetary policy. Eventually, there is tendency to compromise the efficacy of monetary policy and the credibility of the overall policy framework. Moreover, while relying on [8] seminar paper, the unsustainable fiscal system is domineering relative to sustainable regime. The study shows evidence of prudent and active response of monetary policy to unsustainable fiscal policy. This happens sequentially, implying a lagged effect of monetary policy, in Kenya.

Affirming the [10] assertion, developing economies have deliberately sustained high budget deficit gap with intention of promoting economic development. That when government spending is channeled on the growth of real sectors in terms of infrastructural and human capital development, the deficits would be effective in expanding output. However, budget deficits have exacerbated crowding out private investments and in some instance, they have been associated with inflationary pressures and unemployment problems [7]. In a developing economy like Kenya, where government’s fiscal operation is characterized with huge recurrent spending vis-à-vis the great desire to attain country’s developmental needs, deficit financing has overtime translated into prolonged budget
deficits which may have some implications on the macroeconomic aggregates and inclusive growth in particular. The inability of the Government of Kenya to raise sufficient revenue to meet its annual budgetary expenditures has indeed resulted to budget deficits every fiscal year. In reference to [11], development aid has also turned out to be more unpredictable for Kenya. Equally, the effort of raising revenue in the Counties has also been limited [12]. The Government of Kenya has therefore been left to depend more on tax revenue and borrowings to finance the annual budgets.

There has also been volatility in economic performance in Kenya. Intuitively, when economic performance is not impressive, combined with the existing high public debt levels, the impact can result to significant deficits in future budgets. When governments decide to run budget deficits, there is need to provide funds for excess expenditure to bridge the budget financing gaps. Budget deficits are usually financed using internal and external sources. Other means of financing include; (i) printing money; (ii) depleting foreign exchange reserves; and (iii) borrowing from abroad and domestic markets. These sources of financing have varied implications on the macroeconomic variables. Evidence show that the nature in which budget deficits are financed is a critical predictor of its effects on the economy [2].

Moreover, development needs in most developing economies have exerted more pressure due to increase in population growth which has led to more demand to invest in health, education and infrastructure. For this reason many developing countries including Kenya have therefore been addicted to deficit budgeting. The difficulty of timely policy adjustment in public expenditure levels to changes in the government’s resource envelop poses a serious problem and a risk to fiscal policy planning and management in Kenya. The need for adequate public expenditure management has recently become paramount particularly at this period where the national government, the 47 county governments and the private sector are experiencing severe financial constraints. As such, many developing economies including Kenya are currently facing the “fiscal trilemma” in an effort to balance between increased spending, containment of public debt and resistance to tax increments.

As a means to reduce the current level of budget deficit in Kenya, intuitively it implies that the government should impose austerity measures that may hurt current growth of the economy, whereas expanding debt indefinitely implies that a higher proportion of spending in future goes to servicing the debt, which could result to higher future taxes. The question now is should Kenya government continue with deficit budgeting? To date, the debates on the effects of deficit financing on economic growth is unsettled. Even though, deficit financing can precipitate high tax rates, decreasing productivity and crowding out private investment, on the flipside it is inferred to compliment business investment, productivity and economic growth. Do we accept the neoclassical’s view that budget deficit crowds-out private investment via interest rate and other variables which invariably results to negative effect on economic growth or do we accept the Keynesian’s view that budget deficit crowds-in private investment through its effect on macroeconomic variables leading to positive effect on economic growth or do we accept the Ricardian equivalence view that budget deficit has no effect on aggregate demand?

In referenced to [13], budget deficit is a paramount macroeconomic variable. Further, a study by [14] established that budget deficit has negative but insignificant effect on economic growth. The study established that the different classifications of budget deficit contributed to varied short-run causalities. Definitions of deficits change from country to country and even overtime in the same country. Additionally, [15] observed that interest rates can be extremely volatile and are often outside control of many developing economies and argued that developing countries should focus on what they can control. The study advocates the application of primary budget deficit as opposed to conventional deficit in developing economies. Further, [16] argues that considering the primary as opposed to conventional deficit is a better way of gauging how fiscal policy is contributing to the government budget constraint. Primary budget deficit is a non-interest budget deficit. It examines the discretionary budgetary stance by excluding non-interest payments from the budget. It also ascertains how current actions improve or worsen the indebtedness of the government in question. From a macroeconomic perspective, it is instrumental for analyzing the sustainability of government deficits which is key for macroeconomic policy analysis. Due to unavailability of data, scanty evidence exists on the subject. In Kenya, there exists relatively scanty literature that have considered the
application of primary deficit in the analysis [17]. To this end, it is established that sustained inclusive growth is possible only with sound macroeconomic policies and discretionary fiscal policy is one of them. Fig. 1 shows the primary budget deficit and GDP per capita growth in Kenya.

In Fig. 1, there is evidence of fluctuations in GDP per capita growth overtime which may be attributed to political and economic instability in Kenya.

1.1 Statement of the Problem

In several developing nations, fiscal policies are increasingly turning to be unsustainable [18]. This has raised concerns to many policy makers. As it has been argued, the inability of Government of Kenya to raise sufficient revenue to meet its expenditure has resulted to deficit budgeting while seeking the government's financing gap from both internal and external sources. This has triggered sustained budget deficits overtime. The issue is not that the government rarely use deficit spending during times of national emergency or economic recessions but that it does so persistently. In reference to the East Africa Monetary Union Macroeconomic convergence criteria, Kenya’s conventional budget deficits (excluding grants) have persistently exceeded the targeted ceiling of 3% of GDP, and also the gross public debt ceiling of 50% of GDP. Moreover, Kenya faces a risk of external debt distress due to breach of one of the three debt sustainability indicators [19].

As a result of the country’s deteriorating fiscal position and increasing public debt, international rating agencies including Standard and Poor’s; and Moody's Investors Service have in the recent past (2017 to 2021) downgraded Kenya’s credit rating. The implication is that the Government of Kenya will have to pay more for foreign borrowings. Additionally, combined with the existing state of debt levels in the country, the impact can result to significant deficits in future or heavy tax burden to the current and future generations. Further, this could signal a looming increase in debt servicing obligations, including interests and principal payments, whose ultimate effect is to increase recurrent expenditure and squeeze on development spending. Eventually, this could adversely aggravate the adverse effects on macroeconomic performance and economic growth. When a government runs permanent budget deficits, it implies that the stock of debt will always rise. Moreover, budget deficits cannot be sustained indefinitely particularly when they are inconsistent with macroeconomic fundamentals. Moreover, evidence show that when expansionary fiscal policy is overemphasized, in an effort to remedy fiscal imbalances there is burdening of monetary policy. Generally, this compromises the credibility of the overall policy framework and in particular the effectiveness of monetary policy. As pointed out by [9], this has been the case for Kenya. Intuitively, this may have some implications on macroeconomic aggregates and economic growth.

Importantly, whereas an expanding external deficit may not essentially be a source of concern for an advancing economy like Kenya, external deficits combined with rising public debt could further de escalate the country’s sovereign ratings and precipitate a capital flight, nostalgic of the Asian crisis, or the recent turmoil in the euro-area. Moreover, external sources of deficit financing may create a deficit in the current account leading to disequilibrium in the balance of payments, among others. Financing the budget deficit from internal sources can lead to a rise in interest rates and crowding out of private investments. Intuitively, the rise in government spending causes inefficient social allocation of resources. The most efficient private investors are deprived of investment funds. Additionally, persistent financing of budget deficits through Central Banks may result to excess liquidity in banks and could trigger inflationary pressures.

To this end, the question that remains unresolved is whether there could be a relationship between discretionary fiscal policy and inclusive growth, in Kenya?. What is the direction of causality between primary budget deficit and GDP per capita growth in Kenya?.

1.2 Objectives

The objective of the study is to analyze the effects of primary budget deficits on economic growth in Kenya. Specifically, the study seeks;

i) To determine the effects of primary budget deficits on GDP per capita growth in Kenya.

ii) The ascertain the direction of causality between primary budget deficit and GDP per capita growth in Kenya.
1.3 Policy Relevance

The study is aimed at contributing to the ongoing debate on the subject by providing evidence from Kenya. The findings from this study are intended to provide useful economic policy insights that can be used to redirect policy improvement measures for macroeconomic stability and sustained economic growth for shared prosperity. This paper also provides a number of novelties that originate from the application of novel estimation techniques that include cointegration, application of structural breaks and a deeper analysis that appreciates the study objectives more exhaustively in terms of a developing country specific time series variations. The study also takes into account the dynamism of country’s macro-economy and considers changes induced by the recent rebasing of GDP in Kenya in 2014. The estimates establish stable and robust causal relationships that validate the estimates providing the much needed evidence for Kenya. The paper does not only provide evidence on the subject but it also establishes the direction of flow between the variables of interest. The study also contributes to formulation of evidence based and country specific strategies for sustained economic growth and lastly, it builds a crucial research data base for future researchers, academia and policy makers in Kenya. Due to inadequacy of data in many developing countries, scholars have shied away from country specific studies. They have also shied away from the application of primary budget deficit in the analysis. This study was instrumental in filling these research gaps for Kenya.

1.4 Literature Review

This study identifies three main theories on budget deficit and economic growth connections. These are the Neoclassical, Keynesian, and the Ricardian equivalence theories. Neoclassical theory as presented by [20] asserts that budget deficit has an adverse effect on economic growth. The theory posits that a rise in government expenditure and a reduction of taxes increase the interest rates and eventually “crowd out” private investment, impacting negatively on growth of the economy. On the contrary, Keynes [3] theory advocates that in the short-run, budget deficit enhances domestic output and stimulates the economy. It increases total private and public consumption that expands the aggregate demand and positively impact on growth. Keynes theory also posits that the government can inverse economic recessions by borrowing money from the private sector and paying back through various spending. The theory advocates that rapid market intervention through deficit budgeting by the government is the only means for ensuring economic growth and stability. This guarantees regulation of markets, efficiency in allocation of resources, macroeconomic stabilization and harmonizes social conflicts [2]. As it has been pointed out by [20], the equivalence hypothesis implies that budget deficit is simply deferment of taxes and has no effects on economic growth. The fact that the identified theoretical views are mixed-up, several empirical studies have been conducted and various results obtained. This study identifies and summarizes the findings of a few selected empirical studies related to the subject matter.

While examining the multiplier of GDP on government spending, [21] used a panel of OECD countries. The study shows that the multiplier is smaller in expansions than in recessions. The study by [22] reveal that the effect of government spending shocks relies on specific characteristics of a nation. Based a
quarterly data for 44 countries, the study shows that the output effects of a rise in government consumption is greater in industrialized than in developing economies. Equally, the fiscal multiplier is comparably large in economies operating under predetermined exchange rates. However, it was zero in economies operating under flexible exchange rates. The study confirms that multipliers are negative in countries that recorded high stock of debt levels. The multiplier was also smaller in open relative to closed economies.

A study by [23] focused on a panel data for the period 2000Q1 to 2011Q4 for Eurozone countries while [24] applied VAR growth model to analyze the effect of budget deficits between twenty developed and twenty-five developing nations. Their finding reveal that in developing nations, the reaction of output to rise in government consumption is smaller and less persistent than in high income countries. The findings confirmed that budget deficit had positive effect in the short-run.

Further, a study by [26] in Kenya, categorized spending into productive and unproductive. It analyzed several measures of fiscal policy on economic growth from 1964 to 2002. It shows that unproductive spending and non-distortionary taxes had no effect on economic growth. Against the expectations of the study, productive spending were confirmed to have strong adverse effect on growth of the economy. Further, [13] analyzed the relationship on fiscal deficits and economic growth in Kenya. The study applied time series data from 1970 to 2007. Using OLS technique, the study shows a positive effect of fiscal deficits on economic growth. A study by [27] estimated the expenditure multiplier from 1991 to 2012 in Kenya. By employing SVAR approach, it reveals that the effect of public spending on output is weak and non-persistent for Kenya. Lastly, [9] investigated the nature of fiscal and monetary policy coordination and its impact on sustainability in Kenya. They used annual time series data from 1963 to 2014. The findings confirm that in the long run, monetary and fiscal policy reaction functions in Kenya are nonlinear. The results also point out that unsustainable fiscal regime is more dominant confirming that there is a tendency for monetary policy to proactively react to unsustainable fiscal policy, in Kenya.

The above analysis establishes a view that primary budget deficits may be effective in stimulating economic growth in some cases and may prove impotent in others. This may be due to the fact that the effectiveness of budget deficits differs depending on various economic characteristics, including the size of primary budget deficit, among others. This could explain why fiscal policy has both positive, negative and neutral effects in the identified studies. To sum up, literature provides great insights in terms of Keynesian modelling in developing economies. This study notes that there exists very scanty evidence particularly for country specific studies and specifically for Kenya. It is also clear that there exist country heterogeneities across the globe. With the foregoing in mind, and by applying a different analytical model, data, methodology and sample period, the study may yield fresh economic policy insights. To address the lingering questions, we focus on a developing country and aim to conduct a relatively deeper and comprehensive examination of the identified problem and provide evidence from Kenya.

2. METHODOLOGY

We use annual time series data from 1980 to 2016 and employ unit root tests, [28] cointegration analysis with allowance for structural break, dynamic Vector Error Correction Model (VECM) and a multivariate Toda-Yamamoto causality representation. The dynamic VECM technique is justified by the characteristics of data employed (the non-stationary and integrated of order one time series [I (1)] and presence of cointegration. It is also consistent with the study objectives. In reference to [29], the results of the VECM technique are more efficient and provides qualitative parameter estimates. Further, as justified by [30], the multivariate Toda-Yamamoto causality test examines the direction of flow between the variables. The main difference of this analysis from the standard Granger is that there is no requirement that the variables should be stationary.

2.1 Theoretical Framework

The nexus between primary budget deficits and economic growth is derived from the Keynesian
economic growth approach. The paper adopts the extended framework originally developed by [31]. The economic growth model has also been applied by [32] in the analysis of India’s state finances and recently by [33] for the analysis of the finances and growth of USA economy. The model has been extended by [34]. As pointed out by [8], it is not simple to use budget deficit to determine the impact of fiscal policy by using only budget deficit. However, it is shown that it is one of the most assured indicators when jointly analyzed with other macroeconomic variables, and impacts on growth of the economy as illustrated in Fig. 2.

In Fig. 2, the effect of a primary budget deficit in the Keynes case has positive effects but negative effects on economic growth in the Merkel case. In the latter case, a conventional reduction in primary budget stimulus shifts the steady state debt to output ratio downwards. This effect is reversed in the Keynes case. In instances where both interest rate and economic growth cannot be influenced by the government, [33] show that the government should tighten the primary budget balance permanently. If it does not, it implies that to achieve fiscal sustainability, it would have to contain the real burden of her debt.

Economic theory suggests that GDP per capita growth is preferred when making comparisons between economies. This is justified by the fact that it is able to reveal the relative performance of individual economies besides the growth accounting for the population variables. It is mostly used since countries do not have similar aggregate production functions [13]. We summarize the fiscal policy stance by movements in the primary budget deficit expressed as a share of GDP. Further, [35] noted that in order to arrive at appropriate fiscal policy and economic growth responses, the correct measurement of the budget deficit is an essential prerequisite. To this end, we apply the GDP per capita growth as a proxy for inclusive growth variable and primary budget deficit as the main explanatory variable. The growth equation is derived as;

$$ Y = (BD, K, RIR, ToT, CPI, FI) $$

where $Y$ is GDP per capita growth, $BD$ is the primary budget deficit, $K$ is gross fixed capital formation, $RIR$ is real interest rate, $ToT$ is terms of trade, $CPI$ inflation growth and $FI$ represents the financial innovation dummy with a value of 1 for 2007 onwards and zero if otherwise. The study notes that M-Pesa mobile banking has been the leading mobile payment in the world and therefore cannot be overlooked when analyzing economic growth in Kenya. In the event that the unit roots and cointegration are confirmed to exist in the data series, we estimate the VEC model as in equation 2.2;

$$ \Delta X_t = \sum_{i=1}^{k} \Delta A_i X_{t-i} + \alpha D_t + \Pi ECT_{t-i} + \vartheta_t $$

where $X_t$ is a vector of endogenous variables which include GDP per capita growth, primary budget deficit, gross fixed capital formation, real interest rates, terms of trade and inflation growth in time $t$. $\Delta$ is the lag operator, $A_i$ is time-invariant matrix, $D_t$ is the dummy capturing the effects of financial innovation on economic growth in Kenya, $\vartheta$ is a vector of white noise error term, $\alpha$ and $\Pi$ are the financial innovation and error correction term (ECT) matrices, respectively.

3. RESULTS

3.1 Descriptive Statistics

This paper applied annual time series data from 1980 to 2016 for Kenya. The data was sourced from the Government of Kenya and also from [36 and 37]. The period also coincides with the time when many countries in Sub-Saharan Africa, Kenya included experienced chronic budget deficits and volatile economic performance. All the variables in the estimated growth model had full information of observations (frequency) except primary deficit which had 35 out of 37 observations. We applied the Stata econometrics software to analyze the data. GDP per capita growth was found to have a mean of 0.73%. The minimum (MIN) value for GDP per capita growth recorded was below zero by 3.92% with the maximum(MAX) being 5.48%. The primary budget deficit had a mean of 0.7% with the minimum being below zero by 4.47% and a maximum of 5.28%. Further, GDP per capita growth had a standard deviation (STD. DEV.) of 2.34 while other variables had their respective statistics as summarized in Table 1.

3.2 Trend Analysis

The study examined the movement and behavior of the estimated model variables overtime before proceeding to the time series analysis. These
variables are GDP per capita growth, primary budget deficit, gross fixed capital formation, real interest rate, terms of trade and inflation rate as presented in Figs. 3, 4, 5, 6, 7 and 8. We applied Microsoft excel for the trends analysis. The graphical trend for fiscal deficit and real GDP growth are also displayed merely for comparison purposes.

Fig. 2. The effects of primary budget deficit on economic growth
Source: Taylor et al., (2011)

Table 1. Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Mean</th>
<th>STD. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth of GDP Per Capita</td>
<td>37</td>
<td>0.73</td>
<td>2.34</td>
<td>-3.92</td>
<td>5.48</td>
</tr>
<tr>
<td>Primary Budget Deficit</td>
<td>35</td>
<td>0.70</td>
<td>2.50</td>
<td>-4.47</td>
<td>5.28</td>
</tr>
<tr>
<td>Gross Fixed Capital Formation</td>
<td>37</td>
<td>18.59</td>
<td>1.91</td>
<td>15.39</td>
<td>22.88</td>
</tr>
<tr>
<td>Inflation Rate</td>
<td>37</td>
<td>105.20</td>
<td>91.30</td>
<td>7.50</td>
<td>313.74</td>
</tr>
<tr>
<td>Real Interest Rates</td>
<td>37</td>
<td>7.45</td>
<td>6.60</td>
<td>-8.01</td>
<td>21.10</td>
</tr>
<tr>
<td>Terms of Trade</td>
<td>37</td>
<td>105.13</td>
<td>14.70</td>
<td>83.24</td>
<td>139.59</td>
</tr>
<tr>
<td>Financial Innovation</td>
<td>37</td>
<td>0.27</td>
<td>0.45</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Fig. 3. GDP per capita growth and real GDP growth in Kenya
There is close correspondence in the volatility of real GDP and GDP per capita growths as highlighted in Fig. 3. Economic growth in Kenya was at the peak in year 2010, mainly due to macroeconomic stability. During this year, real GDP growth was at 8.4% while GDP per capita growth was 5.5%. During this year, the primary budget deficit was at 2.5%. Minimum values of economic growth was recorded in year 1992 attributed to economic and political shocks whereby real GDP growth was -1.1% while GDP per capita growth was -3.9%. In 1992 the primary budget deficit was at 4.4%.

The gap between the primary and fiscal deficits demonstrates the interest on stock of public debt in Kenya. Fig. 4 shows persistent deficits in all the years under review except 1999/2000 for fiscal deficit and a few years for the primary budget deficit. The primary budget deficit touched it peak point in year 2015 where it recorded 5.28% of GDP. During this year the fiscal deficit was at 8.66% of GDP. Fig. 4 shows the trend of both fiscal and primary deficits in Kenya from 1980 to 2016.

Fig. 5 shows that public investment as highlighted by gross fixed capital formation touched the peak point in 2014 recording 22.9%. The minimum value recorded during the study period was 15.4%. This was in 1997.

In Fig. 6, real interest rate was at the maximum point in 1998 recording 21.1% and the minimum value was 2006 where it was below zero by 8%.

Terms of trade have been volatile in Kenya. In 1980 terms of trade values were at the peak (139.6%) and reached the minimum of 83.2 in 2008 as shown in Fig. 7.

The growth in inflation variable ranges from 1.6% in 1995 being the minimum value to a maximum value of 46% in 1993. Generally, the trend is mainly attributed to macroeconomic and political shocks in Kenya.

![Fig. 4. Fiscal deficit and primary budget deficit in Kenya](image)

![Fig. 5. Gross fixed capital formation (as a share of GDP)](image)
3.3 Unit Root Tests

The motivation underpinning the application of tests for unit roots in the analysis, is to ascertain the non-stationarity of the time-series data. In case the variables are found to be non-stationary, differencing is successfully applied until the bias is eliminated. The first thing we noted from the
trend analysis was that the data series was likely to be I (1) process, and therefore we examined the time series properties of the data using the Augmented Dickey Fuller (ADF) unit root tests. The null hypothesis is that variables are non-stationary. If the test statistic is more than the critical value (at 5%), we rejected the null. We show that the variables are integrated of order one and therefore become stationary after first difference as indicated in Table 2.

However, before concluding on the results of ADF unit roots tests, the study suspected presence of structural breaks in the macroeconomic variables examined as claimed by [38]. Structural breaks are the main issue to consider in a time series data particularly on macroeconomic variables. A study by [39] affirms that when structural policy changes are present in the data generation process but not incorporated in unit root tests specification, results may be biased. The weakness of the ADF tests with I (1) as a null hypothesis is, its potential to confuse structural breaks in the series. This study therefore endogenously analyzed the timing of structural breaks on all the variables employed in the model. We applied Zivot-Andrews’s unit root tests and the results are presented in Table 3.

The result of [40] tests for unit roots in Kenya confirmed existence of structural breaks in annual time series macroeconomic data at different time periods. GDP per capita growth had a structural break in 1998 whereas both gross fixed capital formation and real interest rates experienced structural changes in 1999. Primary budget deficit had structural breaks in 2000 while terms of trade experienced these breaks in 2006. The inflation growth variable had structural breaks in 2008. Considering order of integration, all variables were integrated of order one and therefore confirmed the outcome of Augmented Dickey Fuller tests.

The Zivot-Andrew’s tests for unit roots further complemented the ADF results. We show that all the variables transformed to stationary after first difference. In reference to [38], structural breaks for most of the macroeconomic variables in Kenya coincide with identifiable poor and erratic climatic conditions, trade liberalization, shocks in terms of trade, economic policy changes and political shocks in the economy. Moreover, in the wider literature, these structural breaks may also be attributed to global as well as domestic shocks that includes the Asian financial crisis in 1997 [41], among others.

3.4 Johansen Tests for Cointegration

This study applied Johansen (1995) test for cointegration, whereby the trace and the maximum statistic established that the variables were cointegrated implying that the VECM technique was appropriate for estimation and analysis of results.

3.5 VECM Regression Results

We analyzed the short-run and long-run effects of primary budget deficits on economic growth in Kenya. The dependent variable was GDP per capita growth while independent variables comprised of the primary budget deficit, gross fixed capital formation, real interest rate, terms of trade, inflation growth and financial innovation. The residual LM test for serial correlation predicted no serial correlation in the residuals of the estimates. The model stability test satisfied all the stability conditions and the diagnostic tests suggest the estimated model correctly predicts the effects of primary budget deficits on GDP per capita growth. The short-run and long-run results are shown in Tables 4 and 5, respectively.

The motivation of VECM short-run relationship is to establish the speed of adjustment of the error correction term (ECT). It ascertains the amount of disequilibrium transmitted each year. The negative coefficient of the ECT confirms that the GDP per capita growth and the explanatory variables have indeed a long-run relationship. D. represents the first difference. The results show that the coefficient of ECT is - 0.9500526 which is less than one and significant at 1%. The significance implies that whenever there are deviations in the GDP per capita growth from an equilibrium path, the model corrects at the rate of 95% annually.

We show that in the long run, primary budget deficit, gross fixed capital formation, real interest rate, terms of trade, inflation growth and financial innovation variables have significant effects on GDP per capita growth, in Kenya. The parameter estimates of primary budget deficit, gross fixed capital formation, real interest rate and inflation growth were largely significant at 1% significant level (p<0.01) while that of terms of trade and financial innovation were statistically significant at 10 % significant level.
Table 2. Augmented dickey fuller tests results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Unit Root Tests</th>
<th>Augmented Dickey Fuller Tests</th>
<th>P-Value</th>
<th>Order of integration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP Per Capita Growth</td>
<td>Levels</td>
<td>-3.086 (-6.055)</td>
<td>-3.682 (-3.689)</td>
<td>0.03 (0.00)</td>
</tr>
<tr>
<td>Primary Budget Deficit</td>
<td>Levels</td>
<td>-2.841 (-5.114)</td>
<td>-3.568 (-3.572)</td>
<td>0.11 (0.00)</td>
</tr>
<tr>
<td>Gross Fixed Cap Formation</td>
<td>Levels</td>
<td>-3.188 (-5.148)</td>
<td>-3.560 (-3.564)</td>
<td>0.02 (0.00)</td>
</tr>
<tr>
<td>Real Interest Rates</td>
<td>Levels</td>
<td>-3.057 (-7.308)</td>
<td>-3.682 (-3.689)</td>
<td>0.03 (0.00)</td>
</tr>
<tr>
<td>Terms of Trade</td>
<td>Levels</td>
<td>-1.820 (-4.148)</td>
<td>-3.560 (-3.564)</td>
<td>0.34 (0.00)</td>
</tr>
<tr>
<td>Inflation Rate</td>
<td>Levels</td>
<td>-2.478 (-10.21)</td>
<td>-2.969 (-2.972)</td>
<td>0.03 (0.00)</td>
</tr>
</tbody>
</table>

**Values in parenthesis are the figures obtained after first differencing;*These variables have a unit root. H0: Variable is non-stationary**

Table 3. Zivot and Andrew’s (1992) unit root tests

<table>
<thead>
<tr>
<th>Variables</th>
<th>Year of structural break</th>
<th>Level</th>
<th>First difference</th>
<th>Order of integration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>t-statistics</td>
<td>5% critical value</td>
<td>t-statistics</td>
</tr>
<tr>
<td>GDP per Capita Growth</td>
<td>1998</td>
<td>-4.078</td>
<td>-4.42</td>
<td>-5.914</td>
</tr>
<tr>
<td>Primary Budget Deficit</td>
<td>2000</td>
<td>-3.656</td>
<td>-4.42</td>
<td>-5.146</td>
</tr>
<tr>
<td>Real Interest Rates</td>
<td>1999</td>
<td>-2.433</td>
<td>-4.42</td>
<td>-7.332</td>
</tr>
<tr>
<td>Terms of Trade</td>
<td>2006</td>
<td>-3.647</td>
<td>-4.42</td>
<td>-10.362</td>
</tr>
<tr>
<td>Inflation Rate</td>
<td>2008</td>
<td>-1.792</td>
<td>-4.80</td>
<td>-8.696</td>
</tr>
</tbody>
</table>

Table 4. VECM Short-run Relationship

<table>
<thead>
<tr>
<th>Dependent Variable – GDP per Capita Growth</th>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-statistic</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td></td>
<td>0.5738097***</td>
<td>0.30834</td>
<td>1.86</td>
<td>0.06</td>
</tr>
<tr>
<td>D.Primary Budget Deficit</td>
<td></td>
<td>-0.5732248 **</td>
<td>0.24712</td>
<td>-2.32</td>
<td>0.02</td>
</tr>
<tr>
<td>D.Gross Fixed Capital Formation</td>
<td></td>
<td>-0.02202157</td>
<td>0.23295</td>
<td>0.09</td>
<td>0.93</td>
</tr>
<tr>
<td>D.Real Interest Rate</td>
<td></td>
<td>0.183078 *</td>
<td>0.05284</td>
<td>3.47</td>
<td>0.00</td>
</tr>
<tr>
<td>D.Terms of Trade</td>
<td></td>
<td>0.0449231</td>
<td>0.04239</td>
<td>1.06</td>
<td>0.29</td>
</tr>
<tr>
<td>D.Inflation Growth Rate</td>
<td></td>
<td>0.1505866 *</td>
<td>0.05500</td>
<td>2.74</td>
<td>0.01</td>
</tr>
<tr>
<td>D.Financial Innovation</td>
<td></td>
<td>-9.577926 *</td>
<td>1.88016</td>
<td>-5.09</td>
<td>0.00</td>
</tr>
<tr>
<td>Error Correction Term [U (-1)]</td>
<td></td>
<td>-0.9500526 *</td>
<td>0.26394</td>
<td>-3.60</td>
<td>0.00</td>
</tr>
</tbody>
</table>

* Indicate significance at 1% significance level; ** Indicate significance at 5% significance level; *** Indicate significance at 10% significance level
Table 5. VECM Long-run Relationship

<table>
<thead>
<tr>
<th>Dependent Variable –GDP per Capita Growth</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-statistic</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.52652</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Budget Deficit</td>
<td>0.3009452*</td>
<td>0.1031473</td>
<td>2.92</td>
<td>0.00</td>
</tr>
<tr>
<td>Gross Fixed Capital Formation</td>
<td>-0.6293719*</td>
<td>0.1311379</td>
<td>-4.80</td>
<td>0.00</td>
</tr>
<tr>
<td>Real Interest Rate</td>
<td>0.1939812*</td>
<td>0.0301921</td>
<td>6.42</td>
<td>0.00</td>
</tr>
<tr>
<td>Terms of Trade</td>
<td>0.032698***</td>
<td>0.0179231</td>
<td>1.82</td>
<td>0.07</td>
</tr>
<tr>
<td>Inflation Growth Rate</td>
<td>0.151625*</td>
<td>0.0245427</td>
<td>6.18</td>
<td>0.00</td>
</tr>
<tr>
<td>Financial Innovation</td>
<td>-1.072003***</td>
<td>0.6619184</td>
<td>-1.62</td>
<td>0.10</td>
</tr>
</tbody>
</table>

* Indicate significance at 1% significance level; *** Indicate significance at 10% significance level

The primary budget deficit has negative and significant (p<0.01) effect on economic growth variable. Ceteris paribus, a 1 % increase in the primary budget deficit is associated with 0.29% decline in economic growth. Large and persistent budget deficits can signal general macroeconomic instability and eventually impact negatively on the growth of the economy. Gross fixed capital formation had positive and statistically significant (p<0.01) effect on GDP per capita growth. All other factors held constant, a 1 % rise in gross fixed capital formation is associated with 0.6 % increase in GDP per capita growth. This implies that the authorities should apply the golden rule of public finance, whereby budget deficits should be used for public investment only (and not for recurrent spending).

The real interest rate is negatively and significantly (p<0.01) associated with GDP per capita growth. We show that the adverse effects of budget deficits is transmitted through the crowding-out of private investments fueled by the continued public internal borrowings. All else equal, a 1 % increase in real interest rate is associated with 0.18 % contraction in economic growth. The growth rate of inflation has negative and significant (p<0.01) effects on GDP per capita growth. Ceteris paribus, the estimates suggest that a 1 % rise in inflation growth is associated with 0.14 % decrease in growth of the economy.

Financial innovation had positive and statistically significant effect on GDP per capita growth at 10 % significance level. Ceteris paribus, a 1 % rise in financial innovation is associated with boosting the growth of the economy by 1.02 %. This underscores the need to promote policies that augment technological and financial innovations to drive the long term economic growth in Kenya. Lastly, there is evidence of negative effect of terms of trade on economic growth variable that is statistically significant at 10% significance level. Holding all other factors constant, a 1 % rise in terms of trade is associated with a decline of GDP per capita by 0.031 %. This implies that the authorities should put in place adequate policies for value addition, manufacturing and diversification of the economy in order to promote long run inclusive growth. Policies aimed at reducing the overreliance of primary commodities as the main exports by the Government of Kenya should be promoted. This will minimize economic shocks associated with price volatilities of agricultural commodities that Kenya exports.

3.6 A Multivariate Long-run Toda-Yamamoto Causality

The study specifically determined whether one-time series predicts another. That is whether primary budget deficit causes GDP per capita growth or it was GDP per capita growth that causes primary budget deficit or else if both propelled each other. The Toda-Yamamoto (1995) causality results reveal that primary budget deficit causes GDP per capita growth. We also show that GDP per capita growth does not cause primary budget deficit. The result is highlighted in Table 6.

The first row of Table 6 shows that lagged values of primary budget deficit cause growth of GDP per capita as P-value is equal to 0.0000. However, because of the P value (0.986 > 0.05), lagged values of GDP per capita growth do not cause primary budget deficit and therefore, the null cannot be rejected. The direction of flow is from primary budget deficit to GDP per capita growth. This implies that there exist a unidirectional causality, running from the primary budget deficit to GDP per capita growth.
Table 6. Toda-Yamamoto granger-causality Wald Tests

<table>
<thead>
<tr>
<th>Equation</th>
<th>Excluded</th>
<th>Chi2</th>
<th>Df</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP per Capita Growth</td>
<td>Primary Budget Deficit</td>
<td>101.49</td>
<td>3</td>
<td>0.000</td>
</tr>
<tr>
<td>GDP per Capita Growth</td>
<td>Gross Fixed Capital Formation</td>
<td>4.6881</td>
<td>3</td>
<td>0.196</td>
</tr>
<tr>
<td>GDP per Capita Growth</td>
<td>Real Interest Rate</td>
<td>108.53</td>
<td>3</td>
<td>0.000</td>
</tr>
<tr>
<td>GDP per Capita Growth</td>
<td>Terms of Trade</td>
<td>56.098</td>
<td>3</td>
<td>0.000</td>
</tr>
<tr>
<td>GDP per Capita Growth</td>
<td>Inflation Rate Growth</td>
<td>128.84</td>
<td>3</td>
<td>0.000</td>
</tr>
<tr>
<td>GDP per Capita Growth</td>
<td>Financial Innovation</td>
<td>137.5</td>
<td>3</td>
<td>0.000</td>
</tr>
<tr>
<td>GDP per Capita Growth</td>
<td>ALL</td>
<td>426.45</td>
<td>18</td>
<td>0.000</td>
</tr>
<tr>
<td>Primary Budget Deficit</td>
<td>GDP per Capita Growth</td>
<td>0.14189</td>
<td>3</td>
<td>0.986</td>
</tr>
<tr>
<td>Primary Budget Deficit</td>
<td>Gross Fixed Capital Formation</td>
<td>8.9305</td>
<td>3</td>
<td>0.030</td>
</tr>
<tr>
<td>Primary Budget Deficit</td>
<td>Real Interest Rate</td>
<td>4.0299</td>
<td>3</td>
<td>0.258</td>
</tr>
<tr>
<td>Primary Budget Deficit</td>
<td>Terms of Trade</td>
<td>2.3703</td>
<td>3</td>
<td>0.499</td>
</tr>
<tr>
<td>Primary Budget Deficit</td>
<td>Inflation Rate Growth</td>
<td>0.04098</td>
<td>3</td>
<td>0.998</td>
</tr>
<tr>
<td>Primary Budget Deficit</td>
<td>Financial Innovation</td>
<td>1.194</td>
<td>3</td>
<td>0.754</td>
</tr>
<tr>
<td>Primary Budget Deficit</td>
<td>ALL</td>
<td>41.563</td>
<td>18</td>
<td>0.001</td>
</tr>
</tbody>
</table>

H0: Implies Rejection of Granger non-causality

4. CONCLUSION

The study concludes that both in the short run and long run, primary budget deficit has strong and significant causal effects on economic growth in Kenya. This is in line with the Keynesian theoretical model applied where the effects are positive in short run but negative in long run. There is evidence that primary budget deficit, gross fixed capital formation, real interest rate, inflation growth rate, terms of trade and financial innovation have significant effects on GDP per capita growth. The findings also suggest a unidirectional causality running from primary budget deficit to GDP per capita growth. The evidence underscores the need for the authorities to reduce high primary budget deficits, interest payments and domestic borrowings and strictly apply the golden rule of public finances to boost long term inclusive growth, in Kenya. This evidence reinforces the need for more country specific studies particularly in Sub-Saharan Africa.

ACKNOWLEDGEMENTS

The first author is very grateful to his supervisors (and co-authors) Prof. Wafula Masai and Dr. Kennedy Osoro for their valuable comments towards completion of his PhD Thesis. The Collaborative PhD in Economics Scholarship by the Government of Kenya through the African Economic Research Consortium is highly appreciated. The funding agency, however, played no role in the study design, collection, analysis and interpretation of the data, and writing of the manuscript. I am therefore solely responsible for the views, errors and omissions expressed in this paper.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES


22. Cinar, Mehmet, İlhan E, Baki D. Examining the role of budget deficit policies in economic growth from a Keynesian


