Research Article

The Nexus between Tax Revenue and Government Expenditure in Kenya

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Abstract

In lieu of rising budget deficits in many countries across the world, driven by tax revenue insufficiency in financing government expenditure, many governments continue to accumulate public debt due to the financing of budget deficits. In the long run, however, persistent budget deficits as well as debt accumulation are unsustainable and pose several problems to the economy including inflationary spirals, depressed growth, higher associated poverty levels and consequently fiscal crisis. To offer any policy prognosis towards controlling and consequently reducing budget deficit requires an understanding of the nexus between tax revenue and government expenditure. This study examined this nexus in Kenya, for 1960-2011. Data was collected from Kenya economic surveys from 1960-2012. Because data was available in fiscal years, it was converted to calendar years by splicing. Augmented Dickey Fuller and Philips Perron unit root tests were employed to establish the stationary properties of the series while the Johansen and Juselius co-integration techniques were used to determine presence of linear long run economic relationships in the series. The study established that budgetary authorities follow the spend-revenue hypothesis. The study recommends resort to fiscal discipline, especially by cutting down on nonproductive expenditure.

Introduction

Budget deficits have been rising recently and have been associated with rising government expenditures relative to revenue capacity. For example, expenditures on salaries, wages, and even interest on debt have been growing rapidly and can be traced back to the first and second World Wars when the share of spending in GDP rose to over 45 and 60% in that order in Britain and across Nations [1].

Many analysts particularly economists trace almost every economic illness to budget deficits. Specifically, persistent increases in the budget deficit has the potential of causing high inflation, low investment, low consumption and consequently low economic growth, in the long run. Overall, the effect is raising levels of poverty, therefore with low living standards and consequently leading to loss in societal welfare.

In effect, this is not the end of the cycle. Fiscal deficit finance involves debt contracting. Public debt is distributed both as internal and external debt. While internal debt instruments including Treasury bills and bonds are commonly used by governments in financing various operations including development aspects of the economy like supporting huge infrastructure development initiatives which increase capital stock formation, they nonetheless serve as safe and attractive investments available to the public promising some fixed and attractive rates of return.

Review of Literature

Theoretical literature

There is no consensus about the relationship between tax revenue and government expenditure. Four types of relationships have generally been studied: taxes cause spending (revenue-spend hypothesis [2]; spending cause taxes (spend-revenue hypothesis); taxes and spending are concurrent (fiscal synchronization) and; independence/institutional separation.

The revenue-spend hypothesis, also referred to as the revenue dominance hypothesis assumes that governments spend what they get from taxing the public or even more. The amount of revenue raised through taxation will therefore determine the level of government spending. This is usually where budget deficits are not entertained, and the only solution to correcting them would be to reduce revenue so that it imposes changes in government expenditure. However, this argument does not settle well with some scholars. A case in point is Friedman [3], who argued that this was only a temporary measure but not a solution to budget deficits since a reduction in taxes would reduce revenues required to finance government operations. According to the author, a deficit is a hidden tax and to finance it government either prints money or borrows. While printing money has inflation as a hidden cost, borrowing leads to high taxes or interest in future to repay it. Given that government expenditure is the measure of the true cost of government to the public, cutting taxes would lead to a higher deficit and would discourage government expenditure. Therefore, lower deficits need lower taxes. Further, taxes should not be increased to reduce budget deficits. The relationship in such a case is positive.

Unlike the above view, there is another set of scholars who agree that causality runs from revenue to government expenditure but instead believe this relationship is negative. These include Buchanan and Wagner. To these scholars, since public debt and both direct and indirect taxes with inflation are sources of government finance, Buchanan and Wagner argued that decreasing revenues will cause government expenditure to increase. This would occur through fiscal illusion. A cut on taxes leads the public to perceive there is a reduction in the cost of government activities or programs. The public will in turn demand more of government programs which if implemented will lead to higher government expenditure even though the public may

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incur extra costs-including indirect inflation tax due to money printing and high interest rates due to government debt which may crowd out private investments. Therefore, budget deficits increase because of rising expenditure and falling tax revenue. To solve the problem of budget deficits, expenditure should be reduced and taxes increased.

The spend-revenue hypothesis also called the expenditure dominance hypothesis argued that governments should make decisions on expenditure first before adjusting tax policies and revenues to match expenditures. According to Peacock and Wiseman, presence of an emergency, crisis or natural disaster say drought, would increase the demand for some services in that period therefore increasing expenditure and shifting revenue permanently. Presence of crises has the potential of changing public perceptions about the proper level of government expenditure hence displacement of revenue and expenditure when the increases in these variables is accepted resulting from a crisis. In addition, if a political majority increases expenditure, then revenues will also be increased. If it is then considered that bonds are not issued, the government or fiscal authorities will not be worried about the size of the fiscal deficit because revenues would be high when government expenditure is high and vice versa [4]. In this case the solution to budget deficits was to reduce government expenditure.

Similarly, Barro [5] argued that government usually exploited government expenditure since presence of any debt today would be repaid by higher tax in future on what is called Ricardian equivalence hypothesis. The Ricardian equivalence hypothesis originally done by Ricardo [6] is based on two assumptions. First, the government budget constraint is similar to that of the consumer showing that government cannot run a budget deficit forever as expenditures should equal revenue. Any case where expenditure is above revenue in the present time resulting due to a tax cut or an increase in expenditure would be financed through a tax increase or expenditure cut so that revenues are above expenditure. Second, consumers are rational and forward looking so that they do not increase consumption in response to a tax cut financed by debt. Thus, in anticipation of future tax increases, consumers would reduce consumption whenever increasing government expenditure was financed by debt. The implication of this theory is that fiscal policies which worsen the long run position of the budget and require government to issue bonds do not have much stimulating effects on the economy.

Fiscal synchronization hypothesis states that causality may run in either direction from revenue to government expenditure or from expenditure to revenue and assumes rationality. Government, like any other decision maker is rational and compares the marginal benefits and costs of its operations before undertaking any fiscal program. According to Murat and Murat [7] the budget process is determined both by bureaucrats and politicians and most of these items are approved from the preceding year with only very little differences. In this case, governments would decide regarding desirable levels of revenue and expenditure at the same time [8]. When debt has no effect on savings and consumption due to GDP growth exceeding the rates of interest and an almost stable budget deficit, there was flexibility in financing government budget as there were options to either raise revenue or spend first. In this situation, solutions to the budget deficit involve either increasing revenue which would in turn affect expenditure decisions or changing expenditure that would affect revenue decisions.

The independence or institutional separation or fiscal neutrality hypothesis holds that there is no relationship between expenditure and revenues. Growth in government expenditure is never an outcome of change in revenues since decisions on these variables are taken independently. It therefore attributes these variables to economic growth in the long run [9,10]. This hypothesis holds in a federal system of government where different independent institutions hold the responsibilities of raising and spending revenue [11]. However, in any other system, it is attributed to political reasons for example, lack of loyalty that leads to lack of accountability for government operations. This case displays no causality between revenue and expenditure.

Empirical literature

Given that there is no generally agreed relationship between revenue and expenditure, most empirical studies focused to test causality based on existing hypothesis using Granger tests, among others. The revenue-spend hypothesis gained support from findings of: Eita and Mbazima [12] who used a cointegrated VAR over 1977-2007 in Namibia; Ghartey [13]; Raju [14] for India; and Westerlund who used an error correction (ECM) framework.

Al-Khulaifi [15] studied the link between taxes and expenditure for Qatar on annual data over 1980-2011. The author conducted unit root tests using Philips perron as well as Augmented Dickey Fuller unit root tests. Further, the author carried out the two-step Engle Granger cointegration technique to test the order of integration in the series. The author found that these variables were stationary in their first differences and concluded that they were cointegrated. Examining the direction of cause and effect using Granger causality analysis, the author found evidence suggesting that tax caused expenditure. Garcia [16] who used unit root panel tests and Cointegration tests for heterogeneous panels including Pedroni, Kao and Johansen-Fisher in Spain Masenyetse and Motelle [17] also found evidence in support of this view. The revenue-spend hypothesis thus suggests that in financing government expenditure, government raises revenue first before spending which is indeed common in many economies. However, in practice this view may not apply directly since unforeseen events like drought, earthquake or war must be financed through the government budget. Thus, in case of budget deficit problems, increase in revenue (tax) will cause reduction in the budget deficit. In other words, policies aimed at stimulating revenue (or revenue generation capacity) are paramount to reducing the fiscal deficit.

The spend-revenue hypothesis was supported by studies done by Carneiro, Faria and Barry [18] who investigated the link between revenues and expenditures in Guinea Bissau over 1981-2002. They tested for unit roots using Philips Perron and ADF test. Further, to differentiate between pure stationary and near unit root processes, they used the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test. The authors concluded integration of order one (I(1)) among the variables thus presence of a stable long run relationship (cointegration). The authors found evidence lending support to spend-revenue hypothesis using both traditional Granger test as well as in the Error correction framework. The policy advice suggested that government should cut/limit spending to restore fiscal discipline as well as reduce the budget deficit. This meant that the government would have to spend first before raising revenues. Though it may sound unrealistic, to governments it does occur because unlike the private sector it is characterized by multiple revenue sources to choose from. Raju using India data found evidence in support of this hypothesis as well as Wahid [19] and Zapf and Payne [20] who used Engle Granger cointegration test for US data.

On fiscal synchronization, after conducting unit root tests and Engle Granger cointegration tests¸ Al-Qudair used Granger causality

tests with error correction model (ECM) on time series data for 1964-2001 in Saudi Arabia. Ndahiriwe [21] used both annual and quarterly data and found that the former displayed this trend. Nyamongo, Sichei and Schoeman [22] found evidence lending support to this hypothesis in South Africa though only in the long run unlike in the short run where there was no evidence of causality (supporting fiscal separation/independence). The study used seasonal roots and vector error correction on monthly data. Thornton used 1895-2007 data for South Africa.

Murat and Murat investigated the intertemporal relationship between taxes and spending in Turkey over 1950-2007 and in particular; to find out if fiscal synchronization was relevant for Turkey. The authors considered the 2001 financial crisis as an endogenous structural break and divided their sample into two: 1950-2007; and 1950-2000 then transformed both series into logarithms to obtain stationary variance. The authors used the three-step Engle Granger residual based and the Gregory-Hansen cointegration techniques to establish the order of integration while Augmented Dickey Fuller and the Philips Perron integration tests were used to establish whether unit roots were present. And because of structural breaks, they used the Zivot and Andrews (ZA) unit root test involving three regressions to take in account the intercept, slope and both since the conventional unit root tests would produce unreliable results. Finally, they tested for causality using error correction framework. They found that structural breaks were not too strong to change results of both conventional unit root and cointegration tests. The authors also established that data supported bidirectional (feedback effect or fiscal synchronization) relationship between taxes and government expenditure. Moreover, the findings were quite robust and did not depend on the number of lags. In contrast though, the outcome was quite different in comparison to previous empirical studies in Turkey. The findings on fiscal synchronization hence offer support to the view that government expenditure and revenue decisions should be made at the same time. That is, higher government expenditure will lead to higher tax revenues and vice versa. In this case, persistent budget deficit problems will be solved either through affecting expenditure or revenue.

Jalil and Muhammad [23] who used an autoregressive distributive lag concluded a valid long run equilibrium relationship while Aladejare and Ani [24] studied federal government revenue and expenditure in Nigeria over 1961-2010. They used cointegrated VAR. They advise that joint determination of revenues and expenditures is appealing as long as it effectively restrains the budget deficit. Further they recommend that, efforts at enhancing sources of revenue should be accompanied by reductions in government spending for Nigeria. Aregbeyen and Insah [25] studied this relationship in Ghana and Nigeria over 1980-2010. They used ADF, Philips Perron and KPSS unit root tests with and without trends. Further, dynamic ordinary least squares estimation that would allow for better approximation closer to normal distribution, and also error correction framework were used to determine short and long run properties. The authors found that data supported fiscal synchronization in both Nations even though the effect of expenditure on revenue was positive in Ghana while it was negative in Nigeria. And to account for the difference in results where earlier studies had supported revenue-spend hypothesis, these authors stated that it depended on the specification of the ECM equations.

Independence/institutional separation hypothesis gained support from Chang et al. [26], Ghartey who used Jamaican data and Chowdhury who studied the States of the United States and found that 40% of the States supported this hypothesis. These empirical studies largely support the view that institutions raising revenue and those charged with expenditure decisions should be different or rather independent. This may be an argument to discourage political manipulation of these institutions so that government expenditure is not just an outcome of the political process which imposes a tax burden without corresponding benefits to society. Ndoricimpa studied this relationship using Asymmetric Error correction Model over 1997-2013 for Burundi. The findings support this relation in the short run. To reduce budget deficits, the author recommends increasing tax collections system.

Importance of the Study

Understanding this relationship is important in the following ways: First, this relationship links the size of government, level of public deficits and the structure/pattern of taxation and expenditure [27]. In addition, this relationship is passed on to fiscal policy which is significant in the government tax and expenditure structure/patterns and plans and therefore aids in effective fiscal policy design. Second, in analysing the role played by government in the distribution of resources, this relationship *ceteris paribus*, is critical in aiding design and implementation of sound fiscal policy for rapid, sustained social-economic growth and development [28]. Indeed, this relationship is critical in understanding the causes, outcomes and future paths/directions of government budget deficit and hence drawing the optimal strategy/policy framework for both deficit control and deficit reduction. This study examined these relationships over the period 1960-2011.

Statement of the problem

Government fiscal operations saw the budget deficit rise from 4.6 as a percent of GDP in March 2012 to 5.3 as a percent of GDP in the same month of 2013. Huge and persisting budget deficits show genuine underlying economic issues, for example loopholes in the tax system that include tax evasion due to ineffective tax administration. It further indicates that budget deficit finance, often through resort to public debt – may not be channeled into those areas that hold more potential in boosting productivity. Consequently, rising budget deficits to levels that are unsustainable creates the risk of fiscal crisis where the government is unable to raise revenues to finance its expenditures, leading to high growth in debt than in Gross Domestic Product (GDP).

Therefore, to be able to offer any policy prescriptions towards controlling and consequently reducing budget deficit as well as resulting public debt and associated problems, it is necessary to understand the relationship between tax revenues and government expenditure.

Among previous studies that attempted to address the relationship between tax revenue and government expenditure in Kenya is Ghartey [29] and Kanano. Kanano studied the determinants of growth in government expenditure and not the link between tax revenue and government expenditure. This study adds into the contribution of the 1960-2005 used by Ghartey. Further, this study only examines one country.

Objectives

(i) To examine the nexus between tax revenue and government expenditure

(ii) To examine the budget deficit approach followed by budgetary authorities in Kenya

(iii) To identify the optimal budget deficit reduction strategy

Hypothesis

H_0: Tax revenue granger causes government spending

H1: Tax revenue does not granger cause tax revenue

Research Methodology

Granger causality

Series that have an error correction representation point to the existence of causal relationships among variables. This study performed causality analysis in the spirit of Granger to examine the relationship between tax revenue and government expenditure. Granger causality analysis is based on the criteria that past and present information determines the future better. That is, variable y causes variable x if past values of y and x predict x better rather than previous values of x alone. Similarly, x causes y if past values of x and y predict x better rather than previous values of y alone.

Based on the objectives of the study, granger causality was examined between tax revenue and government expenditure. Formulation of Granger causality tests for two variables x and y are written as:

$$x_t = \sum_{i=1}^{n1} a_i x_{t-i} + \sum_{i=1}^{n2} b_i y_{t-i} + \varepsilon_t \qquad (1)$$

$$y_t = \sum_{i=1}^{n3} c_i y_{t-i} + \sum_{i=1}^{n4} d_i x_{t-i} + \mu_t \qquad (2)$$

x and y are the series to be tested, $n_i; i = 1,2,3$, are maximum lag lengths determined using Akaike Information Criteria (AIC) [30] and Schwartz information criteria where the lag length that is minimum in either case is taken. Error terms (ε_t and μ_t) are assumed uncorrelated, that is, the expectation of their means is zero ($E(\varepsilon_t, \mu_t) = 0$).

Hypotheses to be tested in eqn. (1) are H_0: y does not granger cause x against H_1: x granger causes y, while in eqn. (2), hypotheses to be tested are H_0: x does not granger cause y against H_1: y granger causes x.

In effect that the series is integrated of order one, I (1) and hence co-integrated, traditional granger test which is based on the F test does not have a standard distribution and causality is examined within Error correction mechanism (ECM), as shown below;

$$\Delta x_{t-1} = \sum_{i=1}^{n1} a_i x_{t-i} + \sum_{i=1}^{n2} b_i y_{t-i} + \Phi_1 \varepsilon_{1t-1} + v_t \qquad (3)$$

$$\Delta y_{t-1} = \sum_{i=1}^{n3} c_i x_{t-i} + \sum_{i=1}^{n4} d_i y_{t-i} + \Phi_2 \varepsilon_{2t-1} + \mu_t \qquad (4)$$

Where ε_{1t-1} and ε_{2t-1} represent lagged error terms from eqns. (1) and (2) while ϕ_1 and ϕ_2 show adjustment of y and x to long run equilibrium.

Results and Discussion

To determine the underlying orders of integration for public debt, tax revenue and government expenditure series, the Augmented Dickey Fuller (ADF) and Philips Perron (PP) unit root tests were conducted. The results for the ADF and the PP unit root tests are reported in Table 1. For the ADF unit root test, four lags were selected based on the Akaike Information Criterions' minimum value. 1% level of significance was used. All the series under study were non-stationary at

levels when considered with trend. At first difference the series became stationary. This meant that with the trend, government expenditure and tax revenue were integrated order one or, I (1).

It was justified to proceed and test these series for their orders of integration using the PP unit root test. This was in light of Pierre [31] and Sjo who argued that in the presence of unusual circumstances the conventional ADF unit root test would be invalid, for example in the presence of an explosive unit root. Also, the PP unit root test is reported to be particularly robust to any heteroscedasticity in the error term. Moreover, the user does not need to specify the number of lags for this test. The Newey-West selected three lags For the PP unit root test with default lags. With this justification, it was fit to present the results for the PP unit root test reported in Table 1.

For all cases, none of the variables were stationary at levels. They, were however stationary or I (0) at first difference.

As all variables were integrated of order one (I(1)), ordinary estimation techniques were going to be invalid due to the existence of one or more equilibrium relationships among them. To estimate what and how many equilibrium relationships existed, this study adopted the Johansen and Juselius [32,33] cointegration technique. Results for the Johansen cointegration test are presented in Table 2.

Three lags were selected for the test. The AIC lag selection criterion was used as it yielded minimum value (68.77). 1% level of significance was used. Both the trace and the maximum eigenvalue test statistics indicated one cointegrating equation.

Granger causality between tax revenue and government expenditure was justified on account that it would be useful in devising an optimal strategy for budget deficit reduction. Recall that unit root tests indicated each of the series was I (1), pointing to possible long run equilibrium relationships among these series. The Johansen test for cointegration assuming four lags based on the AIC and 1% level of significance indicated 1 cointegrating equation in each of the three hypotheses tested-supporting existence of long run association. Given this outcome, in testing causality the traditional granger causality test based on the F test does not have a standard distribution and causality was examined on an error correction model (ECM). Three lags were used in estimating all ECM equations (except in testing causality between tax revenue and government expenditure where four lags were used). Results for granger causality are presented in Table 3.

Findings

Between tax revenue and government expenditure, there was evidence of unidirectional flow running from government expenditure to tax revenue at 1% level of significance. The results indicated that government expenditure granger causes tax revenue both in the short and long run. This finding is in line with the findings of Carneiro, Faria and Barry [5], Raju [14], Wahd [19] and Zapf and Payne [20]. They

	Level		First difference	
Variable	GR	GE	GR	GE
ADF	13.45	8.02		
ADF (with trend)	5.29	3.27	1.49	-0.37
PP	17.01	7.26	-25.12*	-49.97*
PP (with trend)	7.13	2.92	-40.18*	-59.01*

Note: GR: Tax revenue; GE: Government expenditure; ADF: Augmented Dickey Fuller; PP: Philips Perron.

*Coefficient is statistically significant at 1% level of significance.

Table 1: ADF and PP Unit Root test results.

| Trend: constant | | | | Number of observations=49 | |
| Sample: 1963 -2011 | | | | Lags=3 | |
Max rank	Parms	LL	Eigenvalue	Trace statistic	5% Critical Value
0	6	-171.56		29.35	15.41
1	9	-157.57	0.88	1.39*	3.76
2	10	-156.88	0.1		

AIC=68.77; SBIC=69.89; HQIC=69.19.

*Coefficient is statistically significant at 1 % level of significance.

Table 2: Johansen Cointegration test results.

Hypothesis	Coefficient	ECT Probability	R-squared
Tax revenue does not granger cause government expenditure	1.31	0.17	0.72
Government expenditure does not granger cause tax revenue	-1.62*	0	0.81

ECT denotes the error correction term.

1% level of significance was used. Four lags were chosen by the AIC.

*ECT coefficient is statistically significant at 1% level of significance.

Table 3: Results for Granger causality tests: Tax revenue and government expenditure.

are however in contrast to the findings by Ghartey [29] in favor of the revenue-spend hypothesis. However, and as noted also by Garcia [16], several factors account for divergent results-statistical techniques, method approaches, reporting periods, and the level of aggregation. The optimal strategy for deficit reduction hence is a cut on government expenditure to restore fiscal discipline.

Recommendations

Fiscal authorities should cut government expenditure to restore fiscal discipline and solve budget deficit problems.

Conclusions

The fiscal authorities in Kenya follow spend-revenue hypothesis. This means the government makes expenditure decisions first and pays for this spending later by raising taxes. In this regard the optimal strategy for deficit reduction is fiscal discipline. This can be exercised by cutting on unwanted expenditures and spending on priority activities. This includes those projects within the social safety net for example irrigation, health and education.

Limitations

Data from the Kenya National Bureau of Statistics is available in fiscal years. This study required data for calendar years. To overcome this limitation, data was spliced to avail it for use.

Scope for Further Research

Given the reeling debate among scholars recently on public debt, it is necessary to understand the causal links between public debt and government expenditure. This will be useful in offering an informed decision on the public debt debate.

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