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Does Government Spending Spur Economic Growth? Evidence from Nigeria

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Abstract
This paper investigates the impact of government spending on economic growth in Nigeria. Utilizing annual time series data from 1970 to 2010, we applied OLS technique to a modified Ram (1986)'s two-sector production growth model. Overall, our results show that at the aggregate level, government spending in Nigeria is growth promoting, although the impact is very small and less than unity (0.16%). At the disaggregated level, only recurrent spending is significantly and positively related to growth, while the impact of capital spending is negative and insignificant. Since this is contrary to conventional wisdom and economic theory, we posit that the result should cautiously be interpreted as a special case for the Nigerian economy, which is not only characterized by poor institutional quality and corruption but also with a very weak capital infrastructural base. Thus, the paper submits that for a robust growth, recurrent spending may still be necessary but government may also need to re-adjust its spending priorities to accommodate capital spending. Doing this would not only complements and improve the competitiveness of private sector productivity but may also corrects for the observed insignificant and negative impact of the variable on Nigeria's economic growth.
Keywords: Nigeria, economic growth, recurrent and capital spending
JEL Classification: C22, E62, H50

1. Introduction

The relationship between government expenditure and economic growth has continued to generate intense debate among scholars. To date, policymakers are still divided as to whether government expansion helps or hinders economic growth. Proponents of bigger governments are usually of the view that increase in government expenditure, especially on socio-economic and physical infrastructures, encourages economic growth. For example, government expenditure on health and education are presumed to raise the productivity of labour and increase the growth of national output. Similarly, expenditure on infrastructure such as roads, communications, power, etc. are theoretically expected to reduce production costs, increases private sector investment and profitability of firms, thus fostering economic growth. Thus, some scholars concluded that expansion of government expenditure contributes positively to economic growth.

On the other hand, advocates of smaller government argued that higher government spending could undermine economic growth (Mitchell, 2005). For instance, it is argued that in an attempt to finance rising expenditure, government may increase taxes and/or borrowing. Higher income tax discourages individual from working for long hours or even searching for jobs. This in turn reduces income and aggregate demand. In the same vein, higher profit tax tends to increase production costs and reduce investment expenditure as well as profitability of firms. Moreover, if government increases borrowing (especially from the banks) in order to finance its expenditure; this by extension could crowds out private sector and therefore private investment by transferring resources from the productive sector of the economy to government.

Interestingly, economic theory does not automatically generate strong and definitive conclusions about the impact of government expenditure on growth. Although the conclusions appear to be that some level of government expenditure matters for the growth process, there are still much controversy on the optimal size of such government spending. However, on the empirical front, the relationship between government spending and economic growth have received mixed evidence. For instance, Landau (1983), Engen & Skinner (1991) and Folster & Henrekson (2001) obtained negative evidence while Ram (1986) and Kormendi & Meguire (1986), Akpan (2011) and Wu, Tang & Lin (2010), have found positive evidence.

In view of the above, some studies (e.g. Wu, et al, 2010) have attributed the efficacy of government spending on growth on the institutional quality of the country in question. For instance, it argued that low-income countries, which are usually characterized by poor institutions and corruption, would normally cause government expenditures to be irrelevant or destructive to economic growth (Wu, et al, 2010). More so, it is generally agreed that not all government spending is growth enhancing. Thus, distinction has been made between "productive" and "unproductive" government expenditure (e.g. See Devarajan, Swaroop and Zo, 1996; Akpan, 2012).

This paper seeks to examine the impact of government spending on economic growth in Nigeria. There are at least two justifications for the present study. The first is the scanty literature on the subject for Nigeria. Secondly, the growing recurrent spending vis-à-vis capital spending in Nigeria has recently triggered a call by the Governor of Central Bank of Nigeria for a 50% downsizing of the country's labour force. The controversy generated by the call demands that we investigate the relationship between government recurrent spending versus capital spending on economic growth in order to have an informed policy guide on the debate.

Ensuing, instead of relying on ad-hoc model specification, we modified and applied Ram (1986) two-sector production growth model, while controlling for other key growth variables. Using annual time series data from 1970 to 2010, we estimated the model using the OLS technique. Overall, our results show that at the aggregate level, government spending in Nigeria is growth promoting, although the impact is very small. At the disaggregated level, only recurrent spending is significantly and positively related to growth, while the impact of capital spending is negative and insignificant. Since this is contrary to conventional wisdom and economic theory, we cautiously interpret the result as a special case for Nigeria, which is not only characterized by poor institutional quality and corruption but also with a very weak capital infrastructural base.

The remainder of the paper is structured as follows. In the next section, we carry out a review of the existing and related literature on the subject matter. Section 3 presents an overview of government spending trends and economic growth in Nigeria. The methodology and model adopted for the study is presented and discussed in section 4. Section 5 presents and discusses the results. Implications of the results for policy and conclusions are contained in the last section.

2. The Literature

2.1 Theoretical Review

Public expenditure represents one of the key fiscal policy instruments for governments. Theoretically, public expenditure is believed to generate wide range of short-term and long run influences on economic growth. Economic theories have offered some explanations on how government expenditure may either spur or retard economic growth. Prominent among such theories is the traditional Keynesian macroeconomic theorizing. Standard Keynesian analysis suggests that government spending could play a stabilizing role in the economy. It is argued that by increasing its spending, governments can offset a slower pace of economic activities. Proponents of this school of thought often anchored their argument on the presumed positive multiplier effect of government spending on aggregate demand. In this connection, government spending is viewed as a powerful stabilizing policy instrument that can be used to mitigate short-run fluctuations in output and employments (Zagler and Durnecker, 2003).

However, the time lag through which government spending could positively contribute to growth has been a subject of theoretical debate. While some believe that government spending could play an effective role in the short-run, others believe that this may not be the case because it takes time for the expected effect on growth to materialize, if at all it would. The key argument here is that by the time a change that affects spending is decided and implemented, conditions in the economy may have changed drastically (Perotti, 2002). The fallout of this could cause government spending to generate a different (and sometimes negative) outcome in the economy. This raises much skepticism about the efficacy to which government spending could be positively linked to growth (especially long-term growth).

Another key issue in the presumed government spending-growth connection relates to the effectiveness of government spending in stabilizing aggregate demand and thus growth. The argument here is that the effectiveness of government spending on growth depends on whether or not it distorts or crowds out private spending in the economy. For instance, an increased in government spending that is not matched by a corresponding increase in revenue naturally leads to budget deficit financing. As put forward by Kandil (2006), if such deficit is financed by issuing domestic debt, it would have serious growth implications for the economy. For instance, such policy action can have a negative consequence for domestic interest rates, which eventually leads to a crowding out of private (consumption and investment) spending. On the other hand, if the spending is financed by an easy monetary policy, it may lead to a build-up in inflationary expectations due to credit and liquidity expansion, which in turn, results in higher nominal interest rates, thereby hurting private spending (Wahab, 2011). This has the effect of dampening economic activities in the short-run and reduces capital accumulation in the long-term.

Theoretically, following the Keynesian postulation, while fiscal contraction should naturally lead to a lower aggregate demand, and therefore a slower pace of economic activities, Wahab (2011) opined that it could also have opposite and stimulating effects by lowering domestic expectations of either higher taxes or debt-issuance that are no longer needed to fund the expansion of government spending. This is the so called "expansionary fiscal contraction" hypothesis. On the reverse, a higher government spending which traditionally should have increase aggregate demand and a higher level of economic activities, could instead, lead to a lower economic

growth. This is because a higher tax could be required (now or in the future) to finance the higher spending. This in turn could induce some negative spillover effects to other sectors of the economy due to either: (a) lowered after-tax returns on investments and lowered incentives to invest due to higher taxes, (b) a crowding-out effect as government substitutes debt issuance for higher taxes which raises the cost of borrowing for other sectors due to increased demands on a fixed pool of savings (Wahab, 2011). The main argument here is that higher government spending may be growth distortionary by crowding out the private sector of the limited resources that would otherwise be available to fund capital accumulation.

On the other hand, the classical economists, also strongly viewed government spending as an ineffective policy tool that could be used to enhance economic growth. The economic growth models of the 1960s accord greater significance to private investments in physical capital. Long-run growth in these classical models was entirely attributed to growth in technological progress, which was exogenous to the model. Specifically, the neoclassical growth model of Solow (1956) or its re-formulated version as espoused by Cass (1965) and Koopmans (1965) leaves very little room for public spending in economic growth process. The general consensus from the neoclassical growth model seems to be that long-run growth are exogenously generated, thus government expenditure are ineffective, especially in the long-term. At best, government spending is believed to leave the short-run growth rate or equilibrium levels of different macroeconomic aggregates unchanged and without any possibility for positive effects.

The debate on the role of government spending on growth was re-opened in 1980 following the work of Romer (1986) who generates long run growth endogenously from the actions of individuals in the economy. However, his results and conclusions were not radically different from those in the exogenous growth models, since government actions were still regarded as detrimental or neutral to long-run economic growth. Perhaps, Barro (1990)'s seminal paper, without any doubt, represents a breaking point in the ensuing debate. By allowing for productive spending (i.e. public spending that increases private capital marginal productivity, such as spending on infrastructure), Barro identifies the existence of a positive correlation between government spending and economic growth. He introduces government spending as a public good into the production function of individual firms. In this way, the rate of return to private capital increases which in turn, stimulates private investments and growth. Most recently, Irmen and Kuehnel (2008) have developed and clarified this connection.

The above theoretical exposition points, at least, to one fact. Government expenditure could exert both positive or negative growth effects depending on (a) how the spending is financed and (b) the composition of the spending (whether productive or unproductive). The strong consensus that seemed to have emerged in contemporary literature is that government spending may still be required, especially in the less developed economies (LDCs) in order to stimulate economic growth. Indeed, strong arguments have increasingly been made for active government intervention in the working of the economy of the LDCs given the pervasiveness of market imperfections in most of these economies. Nevertheless, given the divergent theoretical conclusions above, the crucial policy question, begging for empirical scrutiny, remains: does government expenditure spur economic growth in Nigeria?

2.2 Empirical Review

The literature is awash with so many studies that have been carried out to examine the relationship between government spending and economic growth. However, there is no unique consensus on the precise nature of the relationship. Hence, to date, the evidence remains mixed and sometimes controversial and inconclusive.

For instance, Wu, *et al.* (1998), in a panel data study that includes 182 countries for the period 1950-2004 examined the relationship between government spending and economic growth by conducting a panel Granger causality test. Their result shows that government spending has a positive effect on economic growth. However, when they disaggregated the countries by income levels and the degree of corruption, their results further confirm the bi-directional causality between government spending and economic growth, except for the low-income countries. The contrary result for the low-income country was attributed to the inferior institutions and inefficient governments that often characterized these economies. This suggests that the positive impact of government spending on growth may hold in more developed countries and less likely in less developed countries.

In another study, Deverajan, *et al* (1996) focused on the composition of government expenditure and economic growth for a panel of 43 developing countries from 1970 to 1990. Using OLS method, they found that increase in the share of current expenditure has a positive and statistically significant growth effects. By contrast, capital expenditure was found to have a negative effect on per capita growth. This finding looks surprising and somewhat controversial, given that capital expenditure is often presumed to be more productive and thus more growth enhancing than current expenditure. It shows that the distinction between "productive" and "unproductive" expenditure is not clear-cut: there could be productive current expenditure that is growth enhancing (e.g. efficiency wage rate for workers that acts as a motivation and thus raises their productivity) just as there could be unproductive capital expenditure, which may not contributes to growth (e.g. construction and

beautification of a city gate). More so, as noted by Deverajan, *et al* (1996), seemingly productive expenditures, when used in excess, could become unproductive. The conclusion of the authors was that developing countries have been misallocating public expenditures in favour of capital expenditures at the expense of current expenditure.

Gong and Zou (2002) obtained a similar result to that of Deverajan, *et al* (1996) for a panel of over 90 countries. Using OLS estimation method, they found that growth in capital expenditure has no association with output growth whereas growth in government current spending stimulates growth.

Using a model that accommodates asymmetric adjustments of output growth to changes of government spending, Wahab (2011) examined the effect of aggregate and disaggregated government spending variables on output growth for a sample of 97 countries as well as sub-samples of developed (OECD) and developing (non-OECD) countries. The key findings from the study indicates that while aggregate government spending appears to have positive output growth effects, government consumption spending has no significant output growth effects. However, government investment spending was found to have positive output growth effects particularly when its growth falls below its trend-growth level; this favourable effects was observed to turn negative when government investment spending growth exceeds its trend-growth.

On the other hand, Ram (1986), using data for 115 countries found that government spending had a positive effect on growth, particularly in the developing countries sub-sample. In contrast, a few other panel studies like Dar and Amirkhalkhali (2002) and Folster and Henrekson (2001) obtained negative results between government expenditure and economic growth.

Apart from cross-sectional studies, other studies that employ time-series analysis also abound but also with mixed results. In a study for Switzerland, Singh and Weber (1997), regress economic growth on six functional categories of public spending namely health, education, transport, social welfare, justice and national defense. Employing data from 1950 to 1994 and using OLS estimation method, they found that out of the six categories of government spending, only two (education and health) have permanent growth effects in Switzerland. However, the effect of education was positive while that of health was (surprisingly again) found to be negative.

Kweka and Morrissey (2000) investigate the impact of public expenditure on economic growth using time series data on Tanzania for 32 years (1965-1996). They formulate a simple growth accounting model in which total government expenditure was disaggregated into expenditures on (physical) investment, consumption spending and human capital investment. Their results were very conflicting with the prediction of traditional economic theory. Increased productive expenditure (physical investment), instead of having a positive growth effect, was found to have a negative impact on economic growth. In addition, they found that government consumption expenditure relates positively to growth contrary to the widely held view that government consumption spending is growth reducing.

Mudaki and Masaviru (2012) investigate the composition of public spending on Kenya's economic growth using annual time series data from 1972 to 2008. Government spending was disaggregated into education, health, economic affairs, defense, agriculture, transport and communication. Their results showed that only expenditure on education was highly significant on growth, while those on economic affairs, transport and communication were weakly significant. In contrast, expenditure on agriculture was found to have a significant negative impact on growth, while outlays on health and defense were all found to be insignificant determinants of economic growth in Kenya. As could be observed, some of these findings contradict sharply with the predictions of economic theory.

Halicioglu (2003) using granger causality method on Turkish data from 1960 to 2000, finds neither co-integration nor causal relationship between government spending shares and GDP per capita. This result tends to suggest that government spending does not granger cause economic growth in Turkey.

Following a large degree of inconsistent results in the empirical literature, other studies like Veldder and Gallaway (1998), Sheehey (1993) and Chen and Lee (2005), all argued that the relationship between government size and economic growth is non-linear rather than linear, as most studies on the subject often assumed. The main argument here is that the relationship between the two variables is asymmetric in nature, which follows the inverted U-shape. One argument for the possibility of such a relationship is that a smaller government size has the function to protect private property, provides public goods, and thus fast-track economic growth. However, as government size (proxied by the size of its expenditure per GDP) over-expands, it would crowd out private investment and leads to an overweight on taxes and liability interest which would be damaging to the economy. The conclusion from this segment of the literature is that a very large government size is injurious to economic growth.

The fallout of the above has been to search for the optimal threshold spending that is conducive for economic growth. Pursuing this line of research, Chen and Lee (2005) carried out a threshold regression analysis for Taiwan. Their results confirm that government size has a threshold effects in Taiwan. The threshold regime for government spending (percentage of GDP) was found at 22.839%, indicating that when government size is

smaller than this regime, economic growth in Taiwan is promoted under expanding government spending, but if larger than the regime, then growth decreases.

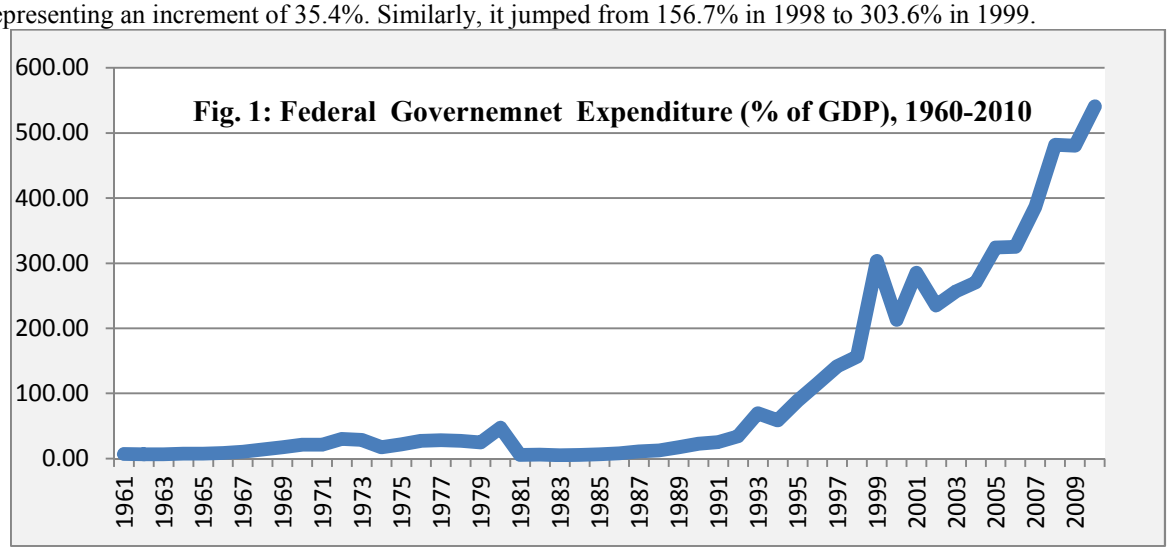
Coming back to Nigeria, few studies have also been carried on this topical issue. For instance, Nasiru (2012) investigated the relationship between government spending (disaggregated into capital and recurrent) and economic growth in Nigeria over the period 1961-2010. The author employs a simple Pairwise Granger causality analysis, and found that only government capital spending granger cause economic growth. In another study, Usman, *et al,* (2011) decomposed Nigeria's public expenditure into three steams namely expenditure on human capital (education and health), building infrastructure (transport and communication and other services) and expenditure on administration. Their overall results indicate that government expenditure in Nigeria does not contribute to the country's economic growth. They attribute this to missing expenditure between release and execution of projects in Nigeria. A brief summary of some empirics on government spending and growth is presented in Table 1.

Table 1: Summary of Selected Empirical Studies on Government Spending and Economic Growth

Author	**Sample**	**Methodology**	**Main Results**
Wu, *et al* (2010)	182 countries (1950-2004)	Panel Granger Causality Test	Government spending is helpful to economic growth. Causality runs from government spending to growth.
Halicioglu (2003)	Turkey (1960-2000)	Granger Causality Test	No relationship between government spending shares and GDP per capita
Ram (1986)	115 countries (1960-80)	OLS	Government spending has a positive impact on growth
Singh and Weber (1997)	Switzerland (1950-1994)	OLS	Effect of education spending on growth is positive while that of health is negative
Gwartney, *et al* (1998)	60 LDCs (1980-1995), OECD (1960-1996)	OLS	Excessive government spending reduces growth
Chen and Lee (2005)	Taiwan (Quarterly data, 1979:1-2003:3)	Threshold Regression Model	There is a non-linear relationship between government size and economic growth. Government size has a threshold effects in Taiwan
Hsieh and Lai (1994)	G-7 countries	VAR	Uncertainty
Usman, *et al* (2011)	Nigeria (1970-2008)	OLS	Public expenditure on administration, education, and transport and communications do not matter for economic growth in Nigeria. Only expenditure on health and other services have positive growth effects
Gong and Zou (2002)	Over 90 countries (1970-94)	OLS	Controversial: Growth in capital expenditure has no association with output growth whereas growth in current spending stimulates output growth.
Folster and Henrekson(2001)	23 OECD countries and 7 developing countries	OLS	There is a negative relationship between government spending and growth
Deverajan, *et al* (1996)	43 developing countries (1970-1990)	OLS	Current expenditure has a positive growth effects while capital expenditure has a negative effects
Dar and Amirkhalkhali (2002)	19 OECD countries	Random coefficient model	There is a negative relationship between government size and growth
Nasiru (2012)	Nigeria (1961-2010)	Pairwise Granger causality test	Only capital expenditure granger cause economic growth
Kweka and Morrissey (2000)	Tanzania (1965-1996)	OLS and Granger causality	Controversial and Ambiguous

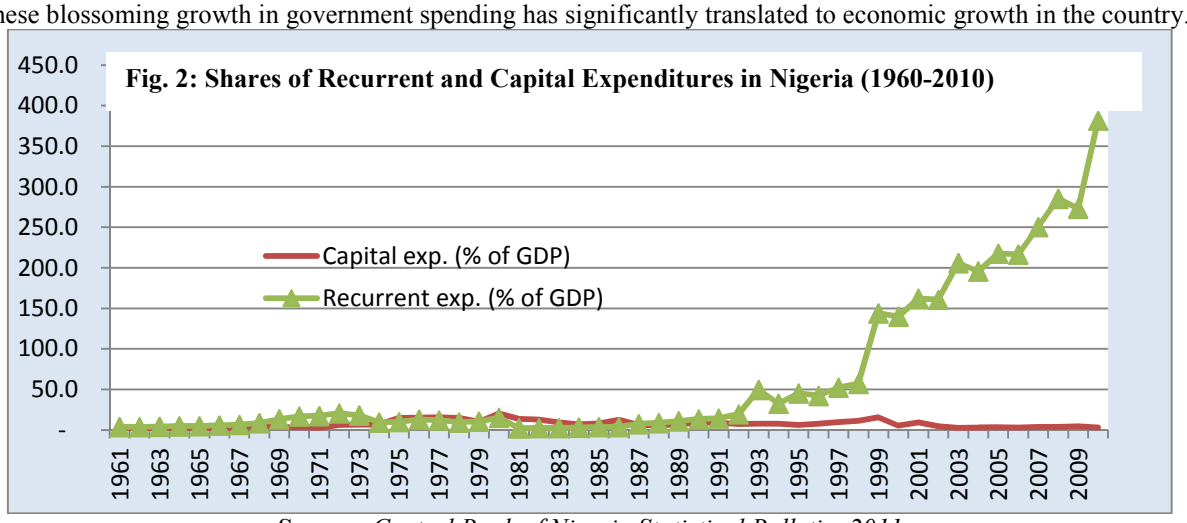
3. Government Expenditure and Economic Growth in Nigeria: An Overview

Figure 1 presents the trend of Federal government expenditure as a percentage of Gross Domestic Product (GDP) from 1960 to 2010. It provides a crude measure of the size of government in the Nigerian economy over the period. The Figure shows that between 1960 and 1998, the percentage share of Federal government expenditure in the economy has increased significantly (with some moderate fluctuations) from its value (6.6%) in 1961 to over 500% in 2010. Perhaps due to the 1970s oil windfall and the post civil war reconstruction programmes, the share of Federal government expenditure in GDP rose significantly from about 21% in 1970 to 47% in 1980. Curiously, the periods of general elections, especially 1993 and 1999, witnessed a sharp rise in government spending relative to the preceding periods. For instance, the figure rose from 34.2% in 1992 to 69.6% in 1993 – representing an increment of 35.4%. Similarly, it jumped from 156.7% in 1998 to 303.6% in 1999.



Source: *Central Bank of Nigeria Statistical Bulletin, 2011*

Figure 2 reveals that most of the growth of public spending in Nigeria is fuelled by recurrent expenditure, especially in recent times (from 1991 to 2010). While the shares of capital expenditure maintained a very sluggish trend almost throughout the entire period, the share of current spending from 1991 to 2010 was consistently higher than the former. It must be noted that 1990s corresponds to the period of the exit of the military and the commencement of civilian administration in 1999. Our interest and focus, remains how and if these blossoming growth in government spending has significantly translated to economic growth in the country.



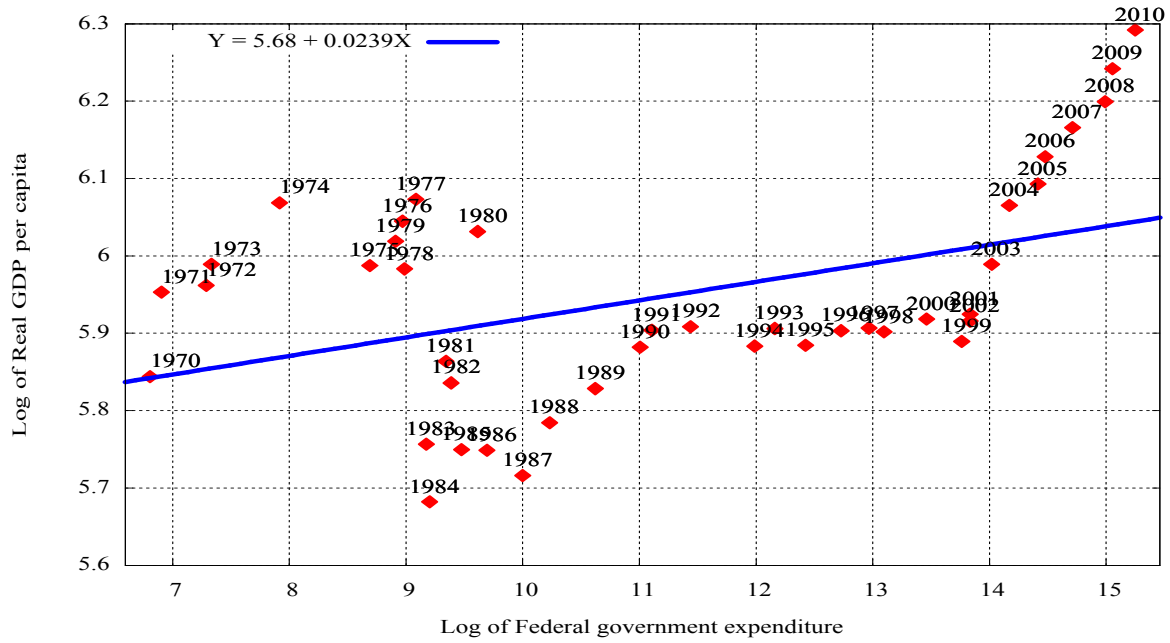
Source: *Central Bank of Nigeria Statistical Bulletin, 2011*

Thus turning to economic growth, Figure 3 is very illuminating. It shows clearly that in real term, Nigeria's gross domestic product, which has been sluggish before, has shown an impressive trend starting from 1980. This is not surprising given the size of Nigeria and her resources as well as a number of economic reforms initiated and implemented in the country since independence in 1960.

Source: *Central Bank of Nigeria Statistical Bulletin, 2011*

What is less clear is the role of government spending in the country's growth process. As a preliminary exercise, we plot the log of government spending versus the log of real GDP in Figure 4. This scatter plot gives us a crude picture of some seemingly correlation between the two variables. As shown in the figure, both variables appear to be moving positively in the same direction. However, it is very pertinent to point out here that such casual observation could be highly misleading, hence re-enforcing the need for proper empirical analysis.

Fig. 4: Government expenditure Versus Real GDP in Nigeria (with least squares fit)



4. Model Specification

To analyze the relationship between government expenditure and economic growth in Nigeria, we utilized Ram (1986)'s two sector production model as our analytical framework. Ram's model has been extended and applied by a number of studies including Chen and Lee (2005). Suppose output in the economy (Y) is produced by two sectors of the economy: the government sector (G) and the non-government sector (N). The output in the government sector (government spending) is assumed to have an externality effect on output in the non-government sector. Assume further that output from each sector depends only on labour (L) and capital (K) inputs, such that the production function for both sectors could be described as follows:

$$N = n(L_n, K_n, G) \quad (1)$$

$$G = g(L_g, K_g) \quad (2)$$

$$Y = N + G \quad (3a)$$

$$L = L_n + L_g \quad (3b)$$

$$K = K_n + K_g \quad (3c)$$

$$\frac{G_l}{N_l} = \frac{G_k}{N_k} = 1 + \delta \quad (4)$$

Where $G_l = \partial G/\partial L$ is the marginal productivity of labour input in the government sector, $N_l = \partial N/\partial L$ is the marginal productivity of labour in the non-government sector, $G_k = \partial G/\partial K$ is the marginal productivity of capital input in the government sector, and $N_k = \partial N/\partial K$ is the marginal productivity of capital input in the non-government sector. Eqs. (1) and (2) indicate the production function of the non-government and government sectors respectively. The subscripts indicate sectoral inputs. Eq. (1) says that the government sector output (G) will create an externality effect to non-government sector output (N). Eq. (3a) provides that the total output (Y) is the sum of N and G. Eqs. (3b) and (3c) are the total labour and capital inputs, where the total labour (capital) stock is the sum of labour (capital) input in the non-government and government sectors. Eq. (4) is the relative factor productivity in the two sectors where δ indicates the difference of marginal productivity between the factor inputs in the two sectors. For instance, if $\delta > 0$, it would imply that the marginal productivity of the government sector is higher than that of the non-government sector. And if $\delta < 0$, then the opposite would be the case.

By total differentiation of Eqs. (1) and (2), we obtain the following:

$$dN = \frac{\partial N}{\partial L_n} dL_n + \frac{\partial N}{\partial K_n} dK_n + \frac{\partial N}{\partial G} dG$$
$$= N_l dL_n + N_k dK_n + N_g dG \quad (1^*)$$
$$dG = \frac{\partial G}{\partial L_g} dL_g + \frac{\partial G}{\partial K_g} dK_n$$
$$= G_l dL_g + G_k dK_g \quad (2^*)$$

In a similar manner, we can transform Eqs. (3a)-(3c) into total differentials as follows:

$$dY = dN + dG \quad (3a^*)$$
$$dL = dL_n + dL_g \quad (3b^*)$$
$$dK = dK_n + dK_g \quad (3c^*)$$

By simply substituting Eqs. (4), (1*), and (2*) into (3a*), we obtained the following:

$$dY = N_l dL_n + N_k dK_n + N_g dG + (1+\delta) N_l dL_g + (1+\delta) N_k dK_g$$
$$= N_l(dL_n + dL_g) + N_k(dK_n + dK_g) + N_g dG + \delta(N_l dL_g + N_k dK_g) \quad (5)$$

From our Eqs (3b*), (3c*) and (4), Eq. (5) could simply be re-written as:

$$dY = N_l dL + N_k dK + N_g dG + \frac{\delta}{1+\delta} dG \quad (6)$$

Dividing Eq. (6) by Y and multiplying the last term by $\frac{G}{G}$, we obtained Eq.(7) as:

$$\frac{dY}{Y} = N_l \frac{dL}{Y} + N_k \frac{dK}{Y} + \left(N_g + \frac{\delta}{1+\delta}\right) \frac{dG}{G} \frac{G}{Y} \quad (7)$$

Setting $\alpha = N_k$ and $\beta = N_l \left(\frac{L}{Y}\right)$, where α means the marginal production of the capital in the non-government sector and β means the production elasticity of the labour in the non-government sector, Eq. (7) reduces to:

$$\dot{Y} = \alpha \frac{I}{Y} + \beta \dot{L} + \left(N_g + \frac{\delta}{1+\delta}\right) \dot{G} \frac{G}{Y} \quad (8)$$

Where the dot (.) indicates that the variables are growth rates. In the above equation, N_g denotes the marginal externality effect, which comes from the production of the government sector imposed on the production of the non-government sector. Eq. (8) is our basic framework from which we can derive the empirical equation to be estimated as follows:

$$\dot{Y}_t = \beta_0 + \beta_1 \left(\frac{I_t}{Y_t}\right) + \beta_2 \dot{L}_t + \beta_3 \dot{G}_t \frac{G_t}{Y_t} + \xi_t \quad (9)$$

Where $\dot{Y}_t$ is real GDP growth rates at time *t*, $\frac{I_t}{Y_t}$ is private gross fixed capital formation (GFCF) as a share of GDP at time *t*, $\dot{L}_t$ is the labour force growth rates at time *t*, $\dot{G}_t$ is the growth rates of government spending at time *t*, $\frac{G_t}{Y_t}$ is government expenditure as a share of GDP at time *t*, and ξ_t is the error term which is assumed to be independent and identically distributed (iid) with zero mean and constant variance σ^2. The sign of β_3 indicates that the government sector has a reciprocal effect on economic growth through two channels: the direct channel through the government sector (factor productivity differentials) and the indirect channel through the non-government sector (externality effect).

Eq. (9) is the traditional economic growth model, which shows how government expenditure could affect growth. However, to avoid omitted variable bias, we extend the equation to incorporate other key variables as follows:

$$\dot{Y}_t = \beta_0 + \beta_1 \left(\frac{I_t}{Y_t}\right) + \beta_2 \dot{L}_t + \beta_3 \dot{G}_t \frac{G_t}{Y_t} + \beta_4 O_t + \beta_5 F_t + \beta_6 D_t + \xi_t \quad (10)$$
$$\beta_0 \lessgtr 0, \beta_1 > 0, \beta_2 > 0, \beta_3 \lessgtr 0, \beta_4 > 0, \beta_5 > 0, \beta_6 < 0$$

Where O_t is the degree of openness of the Nigerian economy at time *t* (measured as trade as a ratio of GDP), F_t is foreign direct investment at time *t*, D_t is the external debt burden at time *t*. All other variables are as earlier

defined. Government expenditure is classified into three: total government expenditure, capital expenditure and recurrent expenditure.

4.2 A Priori Expectations

Our a priori expectations concerning the signs of the included variables are the following. Gross private investment, $\frac{I_t}{Y_t}$, is expected to have a positive impact on economic growth, hence we expect the sign of its coefficient to be positive. The growth rate of labour force, $\dot{L}$, is expected to impacts positively on growth. This closely follows the prediction of the neoclassical growth theory that long-run economic growth depends on the population and labour productivity. Hence, we expect the coefficient of this variable to be positive. The sign of β_3 is ambiguous. First, it depends on whether government spending crowds out private spending through the indirect channel and if this dominates its direct impact on growth. If this is the case, then the coefficient is expected to be negative and positive otherwise. Also by further classification of this variable into recurrent and capital spending, we expect the former to have a negative growth effect while the impact of the latter should be positive. Both openness and foreign direct investment are expected to exert a positive influence on economic growth. This is because openness is expected to stimulate trade and exports while FDI is viewed as a complement to domestic investment necessary for accelerating economic growth. Thus, we expect their coefficients to be positive. Lastly, external debt is a constrain variable and it is expected to be inversely related to economic growth.

4.3 Data Measurement and Sources

All the variables are measured in their natural logarithms. This is to enable us easily interpret the estimated coefficients as elasticities. All data on government expenditure were sourced from CBN Statistical Bulletin, 2011. These data were measured in millions of naira and were transformed into their natural logarithms. The data on investment (proxied by gross fixed capital formation) were extracted from IMF International Financial Statistics (IFS) CD-ROM, 2010. This series were only available from the said source up to 2005. Data for the remaining years were gotten from CBN Statistical Bulletin, 2011. Labour force growth rate, *L* (proxied by population growth rate) came from WDI-GDF, 2012. Since this is a growth rate, no additional transformation was required. Our dependent variable, GDP growth rate (measured by log GDP per capita) was also gotten from WDI-GDF, 2012. The openness variable, *O,* (measured as the sum of exports and imports divided by GDP) was extracted from Penn World Table prepared by Alen, *et al* (2010). This variable was measured in 2005 constant dollars and was transformed into its natural logarithms. External debt, *D*, measured as percentage of GNI and Foreign direct investment (% of GDP) came from WDI-GDF, 2012.

5. Results And Discussion

5.1 Unit Root and Cointegration Results

Since our data are time series, we follow the conventional practice in time series econometrics by first examining the integration properties of the variables employed. These include the unit root and cointegration tests. For the unit root test, the traditional ADF and the PP statistics were used and the results are shown in Table 2. The two test statistic employed in the study- the Augmented Dickey-Fuller (ADF) test and the Phillip-Perron (PP) test - clearly show that the variables have different order of integration.

Table 2: Unit Root Results

Variable	ADF		PP		Decision
	Level	Ist Diff.	Level	Ist Diff	
Real GDP per capita(Y)	-0.214(4)	-2.181(3)***	-0.238(5)	-5.905(5)***	*I*(I)
Investment per GDP (I/Y)	3.412(9)**	1.121(2)	8.679(4)***	-4.647(5)***	*I*(0)
Labour force growth (L)	-0.117 (3)	-1.889(0)	-0.929(4)	-2.359(2)	*I*(2)
Total govt. exp. (G)	6.528(2)***	4.302(9)***	16.951(6)***	-4.349(4)***	*I*(0)
Capital exp. (*Cexp*)	2.246(9)	1.174(7)	-0.039(0)	-5.767(0)***	*I*(1)
Recurrent exp. (*Rexp*)	9.005(1)***	2.122(2)	9.301(3)***	-3.301(4)**	*I*(0)
Openness (O)	-2.671(0)	-6.408(0)***	-2.671(0)	-6.476(4)***	*I*(I)
FDI (F)	-3.699(0)***	-10.073(0)***	-3.587(1)**	-23.216(34)***	*I*(0)
External Debt (D)	-1.101(0)	-5.898(0)***	-1.170(2)	-5.898(1)***	*I*(1)

***Notes**: ***,**,and * indicates significance at the 1%, 5% and 10% levels respectively. The values in bracket for*

the ADF test indicates optimal lag length automatically selected by the SIC within a maximum lag of 9.. The values in bracket for the PP test are the Newey-West Bandwidth selection using the Bartlet Kernel criterion. Both the ADF and PP tests assume a constant and intercept term

While real GDP per capita, degree of openness, external debt and government capital expenditure were found to be stationary at their first differences, investment per GDP, total federal government spending, recurrent expenditure and foreign direct investment were shown to be stationary at their levels. However, only the growth rate of labour force was found to be stationary at its second difference, i.e. *I*(2).

Having ascertained the stationarity properties of the variables, we proceed to test for their long-run cointegration relationship, using the Johansen Maximum Likelihood framework. The essence is to avoid generating any spurious results if these variables (with different levels of stationarity) are used together. The results of the exercise are reported in Table 3. Both the Trace and Max-Eigen statistic as reported in the table confirm that our variables are cointegrated. In specific term, while the trace statistic confirmed that there are at least seven (7) co-integrating equations, the max-Eigen statistic indicates that at least five (5) of such relationship exists among the variables. This high level of long-run evidence of cointegration shows that the linear combination of the variables would not give us spurious results.

Table 3: Summary of Johansen Co-integration Results

Null Hypothesis	Eingenvalue	Test Statistic	Critical Value (5%)	Prob.**
Trace Statistic				
None*	0.8227	235.94	125.62	0.000
At most 1*	0.7925	168.45	95.75	0.000
At most 2*	0.6740	107.11	69.82	0.000
At most 3*	0.4602	63.39	47.86	0.001
At most 4*	0.4375	39.35	29.80	0.003
At most 5*	0.2201	16.91	15.49	0.030
At most 6*	0.1689	7.22	3.84	0.007
Max-Eigen Statistic				
None*	0.8227	67.49	46.23	0.000
At most 1*	0.7925	61.34	40.08	0.000
At most 2*	0.6740	43.72	33.88	0.003
At most 3	0.4602	24.05	27.58	0.133
At most 4*	0.4375	22.44	21.13	0.033
At most 5	0.2201	9.69	14.26	0.233
At most 6*	0.1689	7.22	3.84	0.007

Note: ** denotes rejection of the hypothesis at the 5% level, ** MacKinnon-Haug-Michelis (1999) P-values. The test assumes a linear deterministic trend.*

5.3 Government Spending and Economic Growth in Nigeria: Empirical Results

Table 4 contains the empirical results on the relationship between government expenditure and economic growth in Nigeria, estimated using the OLS technique. The second column contains the results of aggregate federal spending on economic growth while the third and fourth columns show the corresponding impact of capital and recurrent spending respectively.

Focusing on the second column, we found that the results largely conform to our a priori expectations on the signs of the variables' coefficients. In other words, apart from the degree of openness (*O*), all other variables are correctly signed. Our results show that investment (*I/Y*) has a positive and significant impact on economic growth in Nigeria. One percentage point increase in investment per GDP leads to an increase in economic growth by 5.95%. Our key variable of interest, government expenditure, is also positively and significantly related to economic growth. However, its impact on growth is relatively small. A percentage increase in government spending raises economic growth (through its direct and indirect channels) by only 0.16%. This tends to confirm that government spending is necessary for economic growth in Nigeria.

Table 4.3: Government Expenditure and Economic Growth in Nigeria

Dependent Variable: Log Real GDP per capita (*Y*)

(1) Variable	(2) Model I	(3) Model II	(4) Model III
Constant	5.733455*** (0.0000)	5.860175*** (0.0000)	5.673589*** (0.0000)
Log(*I/Y*)	0.059510*** (0.0001)	0.082119*** (0.0000)	0.055603*** (0.0001)
Log(*G*)*G/Y*	0.001629* (0.0512)	-	-
Log(*Cexp*)*Cexp/Y*	-	-0.000629 (0.7749)	-
Log(*Rexp*)*Rexp/Y*	-	-	0.003219** (0.0101)
L	0.228431*** (0.0005)	0.153565*** (0.0083)	0.254103*** (0.0001)
Log(*O*)	-0.033882 (0.4826)	-0.007008 (0.8889)	-0.037756 (0.4122)
Log(*F*)	0.025948 (0.1166)	0.020734 (0.2286)	0.029402* (0.0677)
Log(*E*)	-0.074009*** (0.0000)	-0.067432*** (0.0000)	-0.075393*** (0.0000)
R-squared	0.910160	0.899608	0.917416
Adjusted R-squared	0.894306	0.881892	0.902842
F-statistic	57.40848 (0.0000)	50.77874 (0.0000)	62.94992 (0.0000)
Durbin-Watson stat	1.379335	1.253347	1.495287
Other Diagnostic Tests			
Specification Error: *Ramsey RESET Test*	0.4379 (0.5127)	3.6559 (0.065)	2.12e-05 (0.9964)
Autocorrelation test: *Breusch-Godfrey LM Test*	2.1472 (0.1523)	1.2956 (0.2877)	0.8228 (0.4483)
Heteroskedasticity: *White Heteroskedasticity Test*	1.2833 (0.2817)	1.0880 (0.4063)	1.2491 (0.2822)

Note: ****, **, * denotes significance at 1%, 5% and 10% respectively; Values in brackets are the P-values*

In line with the neoclassical models proposition, the growth rate of labour force (*L*) positively and significantly influences economic growth in Nigeria. A percentage increase in this variable raises economic growth by as much as 22.8%. This shows that output is a positive function of labour force growth. The logic for this is quite simple to grasps. The more this variable grows, the more likely a nation is blessed with engineers, doctors, teachers, etc that contributes to growth. A declining economy would tend to exhibit the opposite effect. However, it is important to emphasize that the quality of the labour force may also be a key factor in the labour force – growth equation.

On the other hand, the degree of openness (*O*), although not correctly signed, is not significant in the model. This

indicates that liberalization of the Nigerian economy, which is characterized by a very weak export base, may not ginger economic growth in the country. Foreign direct investment (*F*) has a positive impact on economic growth, as expected. It should be noted that foreign direct investment constitutes one major source external finance that could complement domestic savings mobilization. However, even though its impact is positive, our results show that the variable is an insignificant source of Nigeria's economic growth.

Lastly, the external debt burden also bears the correct negative sign. An increase in external indebtedness has the potential of reducing economic growth in Nigeria. One percentage point increase in external debt stock reduces economic growth by 7.4%. This negative influence, which is highly significant at the 1% level, is quite plausible. A higher debt stock could constrain economic growth through an expenditure reduction in other key sectors of the economy in order to service the debt. This has the effect of limiting the long-run capacity of the country to meet other economic needs. Moreover, if the "fungability hypothesis" holds, whereby the debt was not utilized on its intended projects, but diverted, the much expected impact would be diminished. Future generations would be made to divert the economy's scare resources to service the debt stock, thus constraining the long-run growth process.

Turing to model II, column 3, where we replaced federal government expenditure with capital expenditure, all other variables, which are maintained in the model, retained their respective signs as in our previous model. However, our result for capital spending is contradictory to our expectation. Instead of increasing economic growth, government capital spending is negatively related to economic growth in Nigeria. This result is consistent with the findings of Gong and Zou (2002) as well as Deverajan, *et al* (1996) for a panel of 43 developing countries. However, the relationship is not significant in our model. That the relationship is insignificant and negative in Nigeria may not be very surprising. This result could also be a reflection of misallocation of capital spending in the Nigerian case. Usually, there is always a lag between capital spending budgeting and disbursement. Most often, the actual capital amount disbursed relative to recurrent expenditure is very small and may not have been enough to have a significant and expected positive effect on growth (Fig. 2 refers). This can casually be gleaned from the poor state of infrastructural facilities and other national capital projects in Nigeria. Such a weak infrastructural base or capital investments could have accounted for the insignificant and negative relationship between capital spending and Nigeria's economic growth.

Turning to the impact of recurrent expenditure on Nigeria's economic growth, a similar exercise was performed and the empirical results are shown in column 4. Unlike the case of capital expenditure, the impact of recurrent expenditure on economic growth is significant and positive. The impact is however, very small. One percentage point increase in recurrent spending would cause an increase in GDP by 0.32%. Again, our result is consistent with the findings of Gong and Zou (2002) and Deveranjan, *et al* (1996). This result largely confirms the fact that there could be productive recurrent expenditure as there could be unproductive capital expenditure. Going by our results, we could assert that recurrent expenditure is not necessarily bad to economic growth as conventional theory may first suggest. Recurrent expenditure on education and health, for instance, has the probability of motivating and increasing workers' productivity and thus growth. Besides, since labour is a key component of the production function, an efficiency wage payments is an incentive to increasing their efforts and achieve higher productivity than lower wages reflected by a low current spending.

Generally, the overall results prove robust for policy. This is shown by the various model diagnostic tests reported at the bottom of the table. As shown by the adjusted R-squared, about 90 % of the variations in economic growth are explained by the included variables. The F-statistics with very low probability (0.00) also confirms that the overall equations are significant. This is further confirmed by the non-rejection of model adequacy by the RESET test as well as the absence of serial correlation as indicated by Breusch-Godfrey test. The White's heteroskedasticity test also shows that such an econometric problem is not present in the estimation. In terms of stability of the parameter estimates, the CUSUM and CUSUM-SQUARE plots as shown in Fig. A1-3 (at appendix) rules out any instability. The plots of both statistics for all the estimations are well within the 5% critical confidence bound (represented by the two straight lines). Movement outside the critical lines could have suggested instability of the estimated parameters.

6. Policy and Conclusion

Government expenditure is a veritable fiscal instrument that could be manipulated to stimulate economic growth. This study has shown that government spending in Nigeria has a marginal positive and significant impact on economic growth in the country. However, the empirical evidence contained in this study has shown that, apart from recurrent spending, government capital expenditure does not have any significant impact on growth.

This result should be cautiously interpreted as a special case for Nigeria. This reasoning is practically reinforced by the low attention which capital expenditure has been accorded in the country's budgetary provisioning. Such an insignificant share relative to recurrent expenditure may not have been enough to generate the expected positive effect on economic growth. Nigeria is largely characterized by a very high deficit of capital infrastructure. More so, as noted by Wu, *et al* (2010) the efficacy of government spending on growth depends on

the institutional quality of the country in question. For instance, it argued that low-income countries, which are usually characterized by poor institutions and corruption, would normally cause government expenditures to be irrelevant or destructive to economic growth. This could partly explain the insignificant relationship between capital spending and growth in the Nigerian case. If capital expenditure is to contribute to economic growth in Nigeria, then this insignificant trend and institutional problem must be urgently addressed. It is implausible to assume that capital spending is insignificant for growth and thus should be de-emphasized, especially for a developing economy like Nigeria. Even though recurrent expenditure currently consumes over 80% of government budget, by our results, it should be noted that its positive contribution to growth is very negligible. It is likely that the multiplier effect of capital spending could outweigh that of recurrent spending. Thus for a robust growth, recurrent spending may still be necessary but government may also need to re-adjust its spending priorities to accommodate capital spending. Doing this would not only complements and improve the competitiveness of private sector productivity but may also corrects for the observed insignificant and negative impact of the variable on Nigeria's economic growth.

Policy conclusions on the other included variables are quite straightforward. Government should desist from incurring further external debt to finance its fiscal responsibilities. To strengthen its internal revenue base, the country needs to diversify from crude oil into other untapped and abandoned sectors like solid minerals, agriculture and commerce. The level of investment in the country should be significantly increased. For this to be sustainable, improvements in the level of infrastructural facilities could go a long way to boost the investment climate. Lastly, policies that attract foreign direct investment (FDI) must be vigorously pursued and implemented.

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Appendix

Fig. A1: Stability (CUSUM and CUSUM-SQUARE) plots for Model 1 with 95% confidence band

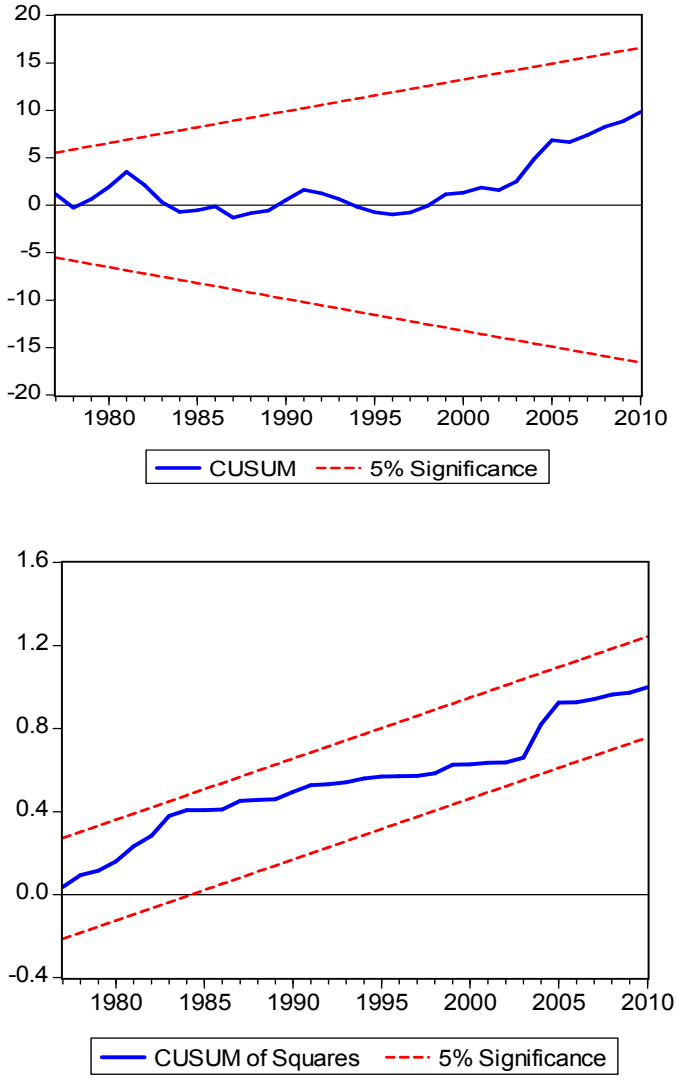

Fig. A2: Stability (CUSUM and CUSUM-SQUARE) plots for Model II with 95% confidence band

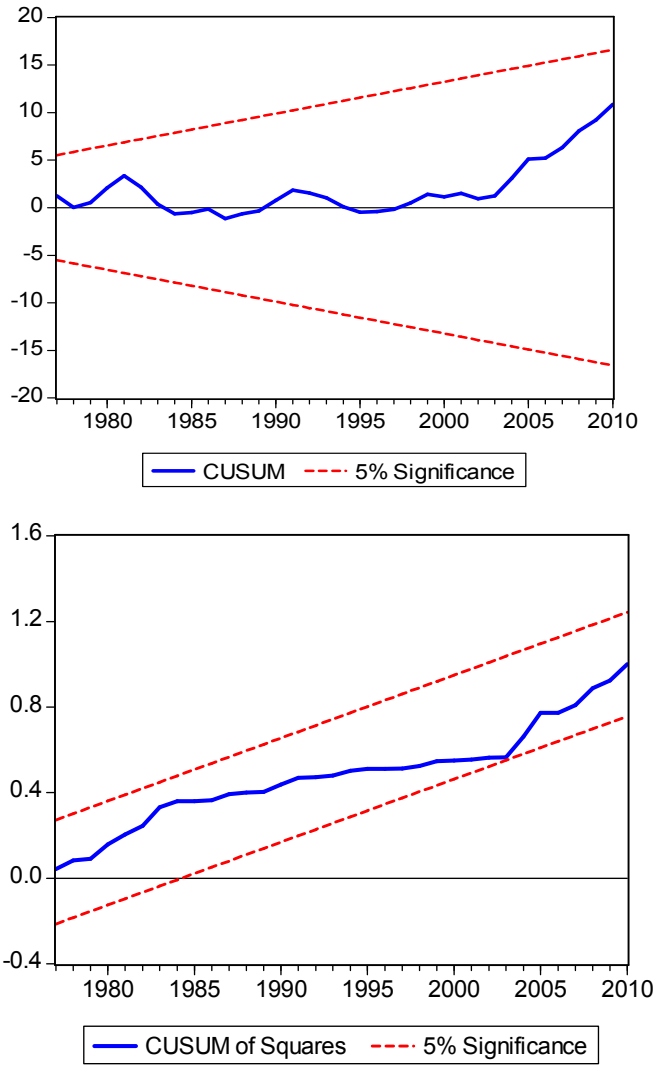

Fig. A3: Stability (CUSUM and CUSUM-SQUARE) plots for Model III with 95% confidence band