

## **Assessing the Role of Public Spending for Sustainable Growth: Empirical Evidence from Nigeria**

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### **Abstract**

Analogous problems often arise in assessing the efficiency of policy makers in allocating public expenditures for growth and development. This study assessed the efficiency of policy makers in allocating public expenditures and examined the sustainable Growth implications of public spending in Nigeria. The paper employed standard econometric methodological approach, Ordinary Least Square multiple regression model, for the data analysis. The study found that the increase in government expenditure does not contribute to sustainable growth in Nigeria. The findings of the study demonstrated that, the allocation of public expenditures does not fulfill the pareto- optimal criterion. The study suggested the need for the government to review its fiscal policy and adopt the 'big push' strategy in public spending which is capable of helping the poor countries to break out of their poverty trap and meet the MDGs challenge. This 'big push' strategy which is designed to set low-income economies on a self-sustainable growth path as core investments in infrastructure and human capital will enable poor people to join the global economy and establish the basis for private-sector-led diversified investment and economic growth.

**Key words:** public spending, fiscal policy, 'big push' strategy, sustainable growth, and infrastructure

### **1. Introduction**

Economic expectations and economic realities often conflict. An example is the connection between the expenditures of the public sector and the growth and development of the Nigerian economy. Common sense suggests that there should be a strong and logical connection between the two phenomena. For example, if an average citizen of Nigeria is asked what he or she knows about the impact of public sector's spending on the growth and development of the country considering the continuous increase in public expenditure, the answer might be; no impact can be seen. It looks as if the policy makers find it increasingly difficult to implement some of the fiscal policy measures required for sustainable development. The background of this is that national, state and local government budgets have been inefficiently allocated leaving little or no impact on the state of infrastructural facilities which are the catalyst for sustainable development. In concrete terms sustainable development and economic self-reliance is possible only when infrastructural facilities are adequate to boost both the foreign and domestic investment. Consequently the need to provide and improve service delivery typically place emphasis on the central role of the state in financing and providing the basic infrastructural facilities (service delivery). The state however bears the legal responsibility to ensure that the fundamental human rights to security, education, basic amenities and healthcare are realized. The state is also well placed to respond to the challenges of poor investment climate which hamper domestic investment and economic growth. For these reasons, many development analysts have emphasized the central role that governments should play in funding, regulating, overseeing and monitoring the delivery of services. But the big challenge is how to make administrators of public funds accountable to the people through providing basic infrastructural facilities (service delivery) and thus laying solid foundation for sustainable development.

In consequent of the foregoing; the development analyst's opinion and focus has been largely on aggregate fiscal discipline and efficient resource allocation. The efficiency and effectiveness of public spending in achieving sustainable development has also become the core of millennium development goals, highlighting the importance of the role of government in determining the growth paths. Similarly, the UN Millennium Project (2005) has emphasized the need for a 'big push' strategy in public spending to help poor countries break out of their poverty trap and meet the MDGs challenge. The report argues that, to enable all countries to achieve the MDGs, there should be identification of priority public investments to empower poor people, and these should be built into MDG-based strategies that anchor the scaling-up of public investments, capacity-building, resource mobilization,

and official development assistance. This 'big push' strategy is designed to set low-income economies on a growth path that will become self-sustainable, as core investments in infrastructure and human capital will enable poor people to join the global economy and establish the basis for private-sector-led diversified investment and economic growth. (Edward et al 2006)

### **1.1 *The Problem and the objectives***

The contribution of public spending to the growth and development of Nigerian economy has not been as positive or as significant as one might expect. The large increases in Nigeria's public expenditures during the 2000s yielded poor returns. There are, of course, many possible reasons for this. At least one of the reasons was that the methods available to assess the desirability of public investment alternatives were flawed, badly implemented, or ignored. Thus Analogous problems often arise in assessing the efficiency of policy makers in allocating public expenditures for growth and development.

Looking at methodologies for assisting policy-makers in deciding an optimal public investment choice is therefore, fundamental in furthering our understanding of the linkages between public investment, growth and sustainable development, and of the ways in which economic policy-making can become a better tool for promoting positive development outcomes and reaching the MDGs. In recent years, there have been a number of studies on the roles of public spending. Some of the findings of this study, point to a contradiction which needs to be urgently addressed. On one hand, there exist a number of techniques and methodologies for assessing the impact of public investment on growth and development of the nation. Information on these methods and evidence is contained in a diverse range of sources, not all of which are easily accessible. Moreover, much of the material is highly technical and not adequate for use by non-specialists. On the other hand, the reality of the policy process and of political cycles in many poor countries is not often conducive to a rational approach to policy-making and resource allocation. Investment choices are made without an appropriate assessment of available alternatives, and follow political rather than technical priorities. Donor advice is not always followed, and is often deemed inadequate to local context or ideologically biased. The kinds of evaluations that would benefit the policy process too often remain in academic and donor circles, and fail to have adequate influence on key policy decision-making processes. A solution to this contradiction is doubly important at present, as we are once again witnessing pressure for very large increases in public investment in Nigeria. This fundamental problem inspired or rather provoked this study. It is therefore the objective of the study to assess the Nigeria's public spending in recent years and examine its implication for the growth of the economy in one hand and determine its potentials for achieving sustainable growth on the other hand. The paper is therefore organized as follows. Following the introductory section, Section 2 reviews the literature. The methodology of the study is discussed in Section 3. An empirical analysis of the impact of public spending on the economic growth of Nigeria is considered in Sections 4. Finally, Section 5 presents the summary and conclusions of the paper.

## **2 Literature Review**

The concept, roles and impact of public spending on growth and development has been discussed in the literature. On the concept, Edward et al (2006) define public investment as public expenditure that adds to the public physical capital stock. This would include the building of roads, ports, schools, hospitals etc. This corresponds to the definition of public investment in national accounts data, namely, capital expenditure. It is not within the scope of this paper to include public expenditure on health and education, despite the fact that many regard such expenditure as investment. Van de Walle and Nead, (1995); Sahn and Younger, (2000); and World Bank, (2002) have assessed the development implications of public expenditure on social sectors such as health and education and this has been well covered elsewhere in recent years. It can be argued that the distinction between public investment and public spending in general is not particularly useful. Firstly, public investment projects may (and often do) include large current expenditure components. Secondly, in terms of poverty impact, it may make more sense to look at the total of public spending rather than just its capital component. However, for the purpose of this paper, the focus on public investment is justified by the renewed emphasis on reaching the MDGs through 'big push' strategies based on increased levels of investment, and by the need to provide more specific guidance for policy-makers on how to make public investment choices.

The contribution of public investment to sustainable growth and development has been assessed by development analysts. Primarily, sustainable growth and development is realized when the increase in national income are

evenly distributed such that it affects positively the living standard of the people. In that circumstance, it is per capita GDP rather than the nominal GDP that will be treated as the dependent variable while public investment will be treated as explanatory variable. Obadan (1998) opined that for country like Nigeria to sustain growth and reduce poverty, public investment in the poor is required to spur economic growth while economic growth will sustain such investment. In corroborating this opinion, UNDP (2003) stated that economic growth and sustainable development will not come on its own where public investment in human capital and basic infrastructure is inadequate. To launch out a sustainable growth therefore countries require heavy public investment on education, health, basic infrastructures, water, and sanitation e.t.c. Researchers like Little and Mirrless, (1990) and Easterly, (2001) found that as positive or as significant as public spending during the 1990s and 2000s have been, the increases in public investment in many developing countries particularly in Nigeria often yielded few returns. He gave many possible reasons for this, including corruption in public sectors; inefficiencies of the administrators, inadequate public funds to mention a few.

In supporting this argument Shaw (2002) in his research discovered self-interest on the part of public officers as a major obstacle to the good performances of public spending. Along this line of thought, the public choice economists view both societal interest group and government officials as self-interested. Thus the government officials are predominantly concerned with maintaining power by attracting and rewarding supporters and favouring certain groups. The Public choice economists make the assumption that although people acting in the political marketplace have some concern for others especially the societal interest group and supporters, their main motive, whether they are voters, politicians, lobbyists, or bureaucrats is self-interest. This makes self-seeking via inefficient allocation of economic resources the major reason for the poor returns from public investment.

In addition to self-interest, Oluwatayo I. B. (2006) and Ikpeze et al, (2005) discovered politicization to be another main constraint placed on the performances of public spending. According to them individuals in appointive positions in government or bureaucracy see themselves as a representative of their group with the mission to get them their fair share of the 'national, state or local cake' by whatever means. This is probably one of the reasons why the bureaucrats are corrupt since they are expected to subvert public policies and laid down procedures to favour their ethnic groups. Policy makers, as representatives of their respective groups, would therefore be interested in who the beneficiaries of the policies are. This probably results in instances of public investment with sectional rather than broad impact in Nigeria. In essence, no matter the merit of particular policies or their potential impact, if they were not perceived to favour the specific interests of the dominant power groups, such policies will not be adopted or implemented. All in all there is a consensus in the literature that public investment is a catalyst for sustainable development and that public resources are not efficiently distributed to achieve this goal, nevertheless empirical evidences on this universal opinion are scanty. This study fills this gap.

### **3 Methodology and Materials.**

#### *3.1 Research Design and Strategy*

Research design is the structure and strategy for investigating the relationship between the variables of the study. The research design adopted for this work is the experimental research design. The reason is that experimental research design combines the theoretical consideration with empirical observation. *It enables a researcher therefore to observe the effects of explanatory variables on the dependent variables*

#### *3.1 Population of the Study*

The study will cover the years 1975 – 2008 which is a period of thirty (33) years. This period is believed to be long enough to capture the long-run relationship between public expenditure and sustainable growth.

#### *3.2 The Model*

To determine the model of sustainable growth, we first consider Harrod\_Domar growth model

$$\frac{\Delta Y}{Y} = G = s \cdot k \dots \dots \dots (1)$$

Where  $\Delta y/y$  is the rate of growth of GNP  $s$  is savings and  $k$  is capital output- ratio. The model captures the main objective of this study. It describes the economic mechanism by which more investment leads to more growth. For

a country to develop and grow, it must divert part of its resources from current consumption needs and invest them in infrastructural development and capital formation.

If we denote  $G$  as per capita GNP and PUBI as public investment we can specify that sustainable growth in Nigeria depends on public investment. That is

$$PCGNP = \alpha_0 + \alpha_1 \text{PUBI} \dots \dots \dots (2)$$

Where  $\alpha_1 \text{PUBI}$ , is public investment. Theoretically, we can hypothesize that  $\alpha_1$  is positive which implies that more public investment leads to more growth. To grasp the relevance of this specification to the objective proposed in this paper, we incorporate some other variables that determine sustainable development such as savings, the Gross Capital Formation and Private Domestic Investment and specify the following sustainable growth regression model:

$$PCGNP = f(\text{PUBI}, \text{SAV}, \text{GCF}, \text{PDINV},) \dots \dots \dots 3$$

Where:

PCGNP = Per Capital GNP as a proxy for sustainable growth.

PUBI = public investment on infrastructure such as road, water supply, power supply etc,

GCF = the Gross Capital Formation

SAV = National Savings

PDINV = Private Domestic Investment

Equation 3 could be expressed in a linear form as

$$PCGNP = \alpha_0 + \alpha_1 \text{PUBI} + \alpha_2 \text{SAV} + \alpha_3 \text{GCF} + \alpha_4 \text{PDINV} \dots \dots \dots 4$$

Econometrically, to include random term, the model is expressed as:

$$PCGNP = \alpha_0 + \alpha_1 \text{PUBI} + \alpha_2 \text{SAV} + \alpha_3 \text{GCF} + \alpha_4 \text{PDINV} + \mu_t \dots \dots \dots 5$$

Where  $\mu_t$  = Error Term.

This model implies that sustainable growth in Nigerian will negatively or positively be related to public investment on infrastructure, Gross Capital Formation, Savings, and Private Domestic Investment.

### 3.3 The A Priori Expectation of the Model

In line with Harold –Domar model, it is expected that public investment, the level of capital formation, the rate of savings, and Private Domestic Investment to a large extent, theoretically determine sustainable growth in Nigeria.

Theoretically, the effect of public investment on sustainable development is ambiguous. While government investment in infrastructure is expected to boost sustainable development, government investment in non-infrastructure may not especially if the government allocates the national resources on non-productive projects. Thus, the effect of public investment on sustainable development is ambiguous. Blejer and Khan (1984) show (by decomposing public investment into infrastructural and non-infrastructure investment) that government investment in infrastructure is complementary to sustainable growth whereas other types of government investment are not. Saving is expected to have positive sign since an increase in savings is expected to be invested in capital formation. Savings is the proportion of the current assumption that is channeled to investment. Capital formation is expected to have positive sign mainly because increase in capital formation represents an increase in investment and this is expected to cause increase in national output. Private Domestic Investment is expected to have positive sign since an increase in domestic investment will enhance the aggregate supply and leads to the growth in real output.

### 3.4 Data and Data Processing Technique

Secondary data were used for this study. The data were obtained from the publications of the Central Bank of Nigeria, African Development Indicators, website, Journals and Newspapers. The data collected are: public investment, Gross Capital Formation, Savings, and Private Domestic Investment.

In this study, our empirical investigation consists of three main steps. First, the Phillips-Perron (PP) tests of stationarity (1988). Second, is the Johansen test of coin-integration (1988, 1991) and third is the error correction mechanism analysis. The empirical study uses a simulation approach to investigate the theoretical relationship

between public investment and sustainable growth in Nigeria. The secondary data were processed using E-view for windows econometric packages. The E-view is preferred to SSPS because it enables us to correct the serial correlation in the data. The study employs Error Correction Mechanism (ECM) to overcome the problem of spurious regression. The ECM reveals that the change on a variable, at times, is not only dependent on the variable, but also on its own lagged changes. This enables us to induce flexibility by explaining the short run and long run dynamics in a unified manner.

#### 4 Data Analysis, Results and Discussions

##### Stationarity and Co- integration Test

**Table1: Analysis of Stationarity Test**

Variable	Test statistics	Critical Value	Level of significance	Level
PCGNP	-4.1136	-3.7667	1%	1(1)
PUBINV	-3.6079	-2.9969	10%	1(0)
GCF	-4.7040	-3.7856	1%	1(2)
PDINV	-5.4998	-3.7667	1%	1(0)
SAVR	-3.4721	-2.9969	5%	1(0)

Source: Estimated by the author

Table1 shows the summary of the unit root test of the variable used for empirical study. The test shows that Public investment (PUBINV), private domestic investment (PDINV) and savings (SAVR) were stationary in levels at 10 percent, 1 percent and 5 percent respectively. Whereas per capital GNP (PCGN) was stationary at first difference and gross capital formation (GCF) was stationary at second difference.

The next step after finding out the order of integration was to establish whether the non-stationary variables are co-integrated. Differencing of variables to achieve stationarity leads to loss of long run properties. The concept of co-integration implies that if there is a long run relationship between two or more non-stationary variables, deviations from this long run part are stationary.

To establish this, Engel Granger's two-step procedure was used. This was done by generating residuals from the long run equation of the non-stationary variables, using DF and ADF tests. The residuals were found to be stationary for the model. The results of the co-integration test are summarized on table 2. Since the likelihood ratios for almost all the variables were greater than the corresponding critical values; it implies there is long run relationship among the variables, hence the variables were co-integrated.

**Table2:Co-integration Test Results**

Date: 10/26/11 Time: 06:28

Sample: 1975 2008

Series: PCGNP PUBI SAV GCF PDINV

Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.825510	132.4769	68.52	76.07	None **
0.729211	76.60847	47.21	54.46	At most 1 **
0.466386	34.80324	29.68	35.65	At most 2 *

0.275099	14.70461	15.41	20.04	At most 3
0.128727	4.409582	3.76	6.65	At most 4 *

Source: Estimated by the author

### Regression Results and Discussions

Dependent Variable: PCGNP

Method: Least Squares

Date: 10/26/11 Time: 05:56

Sample(adjusted): 1977 2008

Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	527.7730	78.15561	6.752848	0.0000
PUBI	2.111486	1.611404	1.310339	0.2030
PUBI(-2)	-8.293851	2.365592	-3.506037	0.0019
SAV	-2.569689	3.848583	-0.667697	0.5110
SAV(-2)	9.572157	4.299041	2.226580	0.0361
GCF	9.739278	2.984161	3.263656	0.0034
GCF(-2)	-4.642700	1.722151	-2.695872	0.0129
PDINV	-51.81693	13.27666	-3.902860	0.0007
PDINV(-2)	57.95886	9.780345	5.926055	0.0000

R-squared	0.835277	Mean dependent var	447.1875
Adjusted R-squared	0.777981	S.D. dependent var	244.5962
S.E. of regression	115.2509	Akaike info criterion	12.56436
Sum squared resid	305503.8	Schwarz criterion	12.97660
Log likelihood	-192.0297	F-statistic	14.57850
Durbin-Watson stat	2.597148	Prob(F-statistic)	0.000000

Source: Estimated by the author

#### 4.1 The Statistical Significance of the Parameter Estimate

The statistical significance of the parameter estimate can be verified by standard error test; the adjusted R-squared, t-statistics, the F-statistic and the Durbin-Watson statistics.

- For the model, when compared half of each coefficient with its standard error, it was found that the standard errors are less than half of the values of the coefficients of the variables. Nonetheless public investment and saving passed the standard error test only in the long run. In the short run the two variables were not statistically significant.
- The value of the adjusted R-squared for the model is high, pegged at 77 percent. It implies public investment, gross capital formation, savings, and private domestic investment explained about 77 percent systematic variations in poverty level over the observed years in the Nigerian economy while the remaining 23 percent variation is explained by other determining variables outside the model.
- The t-statistics is used to test for the statistical significance of the parameter estimate. But very often such formal testing can be shortcut by adopting the “2-t” rule of significance. The rule state that if the number of degrees of freedom is 20 and more and if the level of significance, is set at 0.05, then the null hypothesis  $\beta_2 = 0$  can be rejected

if the t value exceeds 2 in absolute value, implying that the parameter estimate is statistical significant. Of course, one can always refer to the t table to obtain the precise level of significance, and should always do so when the df are fewer than 20. In our regression results the degree of freedom is 28 and the estimated values of t exceed 2 in absolute value for all the variables; except for savings and public investment in the short run hence our parameter estimate is statistical significant.

- The F-statistics is used to test for stability in the regression parameter estimate when sample size increases, as well as the overall significance of the estimated regression model. Thus, we compare the calculated  $F^*$  with the critical value at 5% level (0.05) at  $K-1$ , i.e.  $(29-1 = 28$  and  $N-K=29-8=21$  degree of freedom for the model. Where;  $k$  = the number of parameter estimated, and  $N$ = the number of the observed years. If  $F^* > F_{0.05}$ , we reject the null hypothesis and accept the alternative hypothesis and vice versa. From the statistic table,  $F_{0.05}$  at (21, 28) degree of freedom is 2.03 while estimated  $F^*$  is 14.7515. Obviously  $F^* > F_{0.05}$  that is  $(14.7515 > 2.03)$ . This implies that the parameter estimate is statistically significant and stable.
- The value of Durbin Watson is 2.5 for the model. This falls within the determinate region and implies that there is a negative first order serial autocorrelation among the explanatory variables in the model.

In summary, since all the econometric test applied in this study show a long run statistically significant relationship between the dependent and independent variables from the model, thus, we accept the alternative hypothesis which states that: public expenditure has significant economic implications on sustainable development in Nigerian.

#### 4.2 The Theoretical Significance of the Parameter Estimate

For the theoretical significance of the overall estimates, we evaluated the signs and the sizes of the coefficients of the variables. According to the results, only gross capital formation has correct sign (i.e. positive coefficient) in the short run and is statistically significant. This is in consonance with our a priori expectations. It implies that increased in gross capital formation leads to sustainable growth in Nigeria. But in the long run, gross capital formation has negative co-efficient meaning that it does not contribute to sustainable growth in the long run. Savings and private domestic investment have wrong signs and are statistically significant in the short run. It implies that increase in savings and private domestic investment does not contribute to sustainable growth in the short run. But in the long run savings and private domestic investment have correct sign and statistically significant. This result suggests that savings and private domestic investment have long run and positive impact on sustainable growth in Nigeria. This result is expected.

Most important for the objective of this study is the relationship between public spending and sustainable growth. Public investment only has a negative and statistical significant impact on sustainable growth in the long run. In the short run public investment is statistically not significant. It indicates that public investment is not different from zero in the short run. Public investment is statistically significant with negative sign in the long run. The negative coefficient of the public domestic investment though contrary to a *priori* expectation is expected. It suggests that public expenditure does not contribute to sustainable growth in Nigeria. In other words the increase in public expenditure leaves growth unsustainable. The situation is real and noticeable as poverty continues to deepen in the midst of nominal economic growth accompanied by the increase in capital expenditure of the government. This is quite a paradox of public spending and growth. This occurs perhaps as a result of noticeable corruption and mismanagement of national resources by the public office holders. This result is similar to the findings of Little and Mirrless, (1990) and Easterly, (2001) which state that “as positive or as significant as public spending during the 1990s and 2000s have been; the increases in public investment in many developing countries particularly in Nigeria often yielded negative returns”.

## 5 Summary and Conclusion

The discussions in this paper point to a set of issues on the relationship between public spending and sustainable growth in Nigeria. The study assesses specifically the roles of public spending for a sustainable growth in Nigeria. In trying to achieve this objective, an ordinary least square multiple regression approach was adopted for the data analysis. From the previous arguments in this paper and from the empirical results, it is clear that there is a long run and significant relationship between public spending and sustainable growth in Nigeria. With 77 percent of the changes in sustainable growth being explained by the model, it is only logical to summarize that other factors, for

which a major share are qualitative factors, explain the 33 percent of the variability in sustainable growth in Nigeria. The study has therefore brought out in clear terms the long run relationship between public spending and sustainable growth in Nigeria. It shows in concrete terms that public spending did not contribute positively to sustainable growth in Nigeria. In other words the public spending of Nigeria is not productive and sustainable. The fiscal policy did not fulfill its target and goals.

It is however important to keep in mind that the assessment of the role of public investment for sustainable growth will not be of much use if the information and research results are not integrated within decision-making processes. Hence our findings and conclusion support the need for the government to review its fiscal policy and public spending strategies. In complement of the above, it is important for the government to adopt the Edward et al (2006) and UN Millennium Project (2005) recommendation of a 'big push' strategy in public spending which is capable of helping the poor countries to break out of their poverty trap and meet the MDGs challenge. The findings of the study support the need for identification of priority public investments to empower poor people, and these should be built into MDG-based strategies that anchor the scaling-up of public spending, capacity-building, resource mobilization, and official development assistance. This 'big push' strategy which is designed to set low-income economies on a self-sustainable growth path as core investments in infrastructure and human capital will enable poor people to join the global economy and establish the basis for private-sector-led diversified investment and economic growth.

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