International Journal of Economics and Financial Issues
Vol. 2, No. 4, 2012, pp.513-518
ISSN: 2146-4138
www.econjournals.com

The Effect of Government Expenditure on Infrastructure on the Growth of the Nigerian Economy, 1977-2009

Mary Modupe Fasoranti
Deparment of Economics, Adkunle Ajasin University, Akungba Akoko,
Ondo State, Nigeria. Email: olafasoranti@yahoo.co.uk

ABSTRACT: The paper examined the effects of government expenditures on infrastructure on the growth of the Nigerian economy. The data sourced majorly from the various issues of Central Bank statistical bulletin was analyzed with the aid of econometric methods. Data collected included government expenditures on education, environment and housing, health services, transport and communication, agriculture, security, inflation rate and gross domestic product. Data treatment methods used was the unit root test, co-integration and vector error correction estimation. Simple multiple regression model was used to obtain the results used for the analysis. Results showed a long run relationship between the growth of the economy and government expenditures in education, environment and housing, health services, water resources, inflation rate, agriculture, security, transport and communication. The paper observed that government expenditures on health services, transport and communication imparted negatively on growth while expenditures in agriculture and security were not significant in the growth of the economy. To increase the growth rate of the economy, the government must adopt stringent controls on its expenditures on infrastructure so as to reduce fraud, fund diversion and mismanagement. Moreover, monitoring and evaluation of government spending must be given top priority. This will help to ensure that the targets of government spending are reached.

Keywords: Government expenditures; Infrastructure; Growth; Gross domestic product.
JEL Classifications: EO; H5; O4

1. Introduction

The development of infrastructure is central to a nation's growth and development. Hence the quantity and quality of available infrastructure and their accessibility to the supposed beneficiaries could be regarded as indices of development. Among other things, the availability of such infrastructures (functional ones) has significant effect on the quality of life of people in a given environment. As opined by Denis Goulet, one of the indices of development is the quality of life measured by substance i.e. accessibility to the basic necessities of life which include accessibility to basic infrastructure.

Hence, improvement in such infrastructure will go a long way to aid the growth and development of any community. World Bank (1994) further stressed that provision of infrastructure in their right quantity and quality determines the success or failure of a country in the following areas:

- diversification of production;
- trade expansion;
- coping with population expansion;
- reduction of poverty and
- improvement in environmental conditions.

From the above, one can rightly say that improvement in infrastructure plays a vital role in determining the productivity and development of a nation and consequently the quality of life of the people. No wonder, Rosteimston Rodan argued that the provision of minimum quantum of infrastructure is required for industrial take off.

Generally, investments in infrastructure are characterized by initial huge amount of capital and indivisibility. As a result of this and the attendant externalities, the government is responsible for their

provision most often times at subsidized rates. Hence, the various governments made budgetary provisions for infrastructure from year to year which translated into huge public expenditures. Right from the time of classical economists, the provision of infrastructure has been the sole responsibility of the government. The major reasons are the huge capital requirement, presence of externalities, jointness in consumption of such goods and the principles of non-excludability. All these made the infrastructure sub sector especially the physical/hard infrastructure such as public utilities (energy, gas, and water supply), public works (roads, bridges, dams and canals) and other transport facilities (railways, seaports and airports) unattractive to the profit oriented private sector.

Efforts to develop this sector started from the colonial era. For example, the 10-year plan of Development and Welfare (1946-1956) by the colonial masters laid emphasis on developing Nigeria economically and socially. The major schemes included road development, improved water, communication and building programmes. The subsequent economic programme of the government of the Federal Republic of Nigeria (1955-1962) also laid emphasis on this sector. Major schemes were provision of country wide system of communication networks, funds for educational development and development of public utilities.

In Nigeria, public expenditures on infrastructure have continued to increase over the years. Unfortunately, rising government expenditure has not translated into meaningful growth and development of the infrastructural sector in Nigeria especially in the rural areas. Many areas have continued to suffer from the dearth of necessary infrastructure (physical, social and economic). The worst hits are the transport, energy and health subsectors. Many of the roads are poorly constructed while many are characterized by deep potholes that have claimed the lives of many illustrious sons and daughters of this country. Many rural areas lack basic health facilities either human or physical materials. The questions then are what has become of the huge amount of budgetary allocation to this sector over the years and the rhetoric sweet promises of past leaders and what has been the growth implication of such spending on the nation's economy? This study seeks a compositional analysis of government expenditures as they relate to infrastructure in the country between 1970 and 2009. The study also examined the correlation between government spending on infrastructure and the growth of the nation's economy.

2. Literature Review

This section presents the relevant literatures on the relationship between government spending on infrastructure and the growth of the economy. Infrastructural development is a necessary condition for economic growth as it leads to expansion of macro markets and creates a better quality of life (Samli, 2011). The importance of infrastructure in economic growth cannot be over-emphasized. It has been described as the foundation upon which all economic activities such as satisfying consumers' needs, setting up a factory, moving goods and services from the point of production among others are laid. According to Waters (1999), Muiu (2008) and Friedman (2006), infrastructural development generates growth, facilites trade and creates global trade power respectively. Without mincing words, Nurkse (1953) asserted that economies cannot develop without proper infrastructural base. Lack of proper infrastructural basis is one of the major reasons why the less developed countries are not making much progress. In the words of Samli (2011), the less developed countries will likely not have a chance to become newly industrialized countries.

Considering the contribution of infrastructure to economic growth, empirical literatures have shown divergent views. Some studies testified to the growth-enhancing effects of infrastructure while some others showed evidence of reverse causal relationship between infrastructural spending and growth. For example, Agenor and Moreno-Dodson (2006) and Fourie (2006) showed that infrastructure impacts on economic growth in several ways such as lowering of the costs of production thereby increasing productivity, improvement in the productivity of worker, long-term creation of job opportunities and improvement in the quality of the labour force through expenditures on health and education. They further argued that infrastructure generates economies of scale in that better transport services lower the cost of transportation. Many other studies such as Calderon (2004), Seethepali et al., (2008) and Macdonald (2008) aligned with the fact that infrastructure is an important and significant determinant of growth.

Queiroz and Gautan (1992) in a World Bank study emphasized that infrastructure is a significant factor in economic growth and development. Aigbokhan (1999) corroborated this finding

in his study on "Infrastructure, private investment and Economic growth in Nigeria". According to him, infrastructure variables have positive correlation with growth. Effective public spending on such goods and services will impact positively and strongly on growth. He concluded by saying that there must be adequate funding of infrastructure if the country must experience investment-led growth.

As regards the effectiveness of public expenditures especially on infrastructure, a study conducted by NISER (2004) observed a wide gap between government spending and achievement despite the enormous expenditure announced year-in-year out. The possible reason adduced by the study is that such public expenditure have failed to translate into desired service probably because such expenditure may have been directed at the wrong goods and persons. In most cases such never flow to the end users. According Buhari (2000), the services of this sector have remained generally poor. Moreover, studies such as Landau (1986) and Barro (1991) showed that government spending on infrastructure impacted negatively on gross domestic product. Similarly, a study on Kenya, Ghana and South Africa by Ansari et al., (1997) found no causal relationship between government expenditure on infrastructure and national income. Similar result was obtained from a study on Tunisian economy by Ghali (1998) showing a long run negative relationship between government spending on infrastructure and economic growth.

A close examination of the literatures on the relationship between government spending on infrastructure and economic growth showed that most of the analyses were on aggregate spending on infrastructure. Most of the studies did not decompose government spending on infrastructure. As a departure from previous studies, this study examined the compositional analysis of government expenditure on infrastructure and the causal relationship between spending on each of the components of infrastructure and the growth of the economy. The aim is to identify the effects of each infrastructure on the growth of the economy.

3. Materials and Methods

Data for this study was sourced from secondary sources much include Central Bank publication, relevant textbooks and Journals. The data collected included government expenditures on water resources; health services; transport and communication; education, agriculture, security (defense and internal security) and Gross Domestic Product. The study covered the period between 1977 and 2009. All variables are measured in naira.

Data collected was analyzed with the aid of econometric methods. Data treatment methods used were the unit root test, co-integration text and vector error correction estimation. All these tests are necessary to ascertain the level of stationarity and the order of integration of the variables used. The tests also help to rule out the possibility of spurious regression results. Simple multiple regression analysis was used to analyze the data.

Using the Keynesian definition of aggregate output, a simple multiple regression function was specified as follows:

GDP=f (EDU, EEH, EHS, EWR, IFR, AGR, SEC, TC) ---------- (1)

In a simple linear equation form, model (1) becomes

$GDP=\alpha_o+\alpha_1 EDU+ \alpha_2 EEH+\alpha_3 EHS+\alpha_4 EWR+\alpha_5 IFR+\alpha_6 AGR+\alpha_7 SEC+\alpha_8 TC+E_t$--------- (2)

Taking the natural log of equation (2), the model is as follow:-

$L_N GDP= \alpha_o+\alpha_1 L_N EDU+\alpha_2 L_N EEH +\alpha_3 L_N EHS+\alpha_4 L_N EWR++\alpha_5 L_N IFR+\alpha_6 L_N AGR+\alpha_7 L_N SEC+\alpha_8 L_N TC+E_t$--------- (3)

The general error correction model adopted for the study is specified as follows:

$L_N GDP_t = \alpha_o+\Delta L_N EDU_t+\Delta L_N EEH_t +\Delta L_N EHS_t+\Delta L_N EWR_t+\Delta L_N IFR_t+\Delta L_N AGR+\Delta L_N SEC_t+\Delta L_N TC_t+ECM_{t-1}+\varepsilon_t$---------- (4)

Where:-

GDP	=	Gross Domestic Product
EDU	=	Expenditure on Education
EEH	=	Expenditure on Environment and housing
EHS	=	Expenditure on health services
EWR	=	Expenditure on water resources
IFR	=	Inflation rate
AGR	=	Expenditure on agriculture
SEC	=	Expenditure on Defence and Internal Security

TC = Expenditure on Transport and Communication
ECM = Error Correction Term
ECM_{t-1} = One period lagged error correction term estimated from
ϵ_t = Error or random term at period t.
Δ = First difference operation
L_N = Natural Logarithm

4. Data Presentation and Analysis

The Unit root test showed that all the variables were non-stationary at that level but stationary at first difference as summarized in tables 1 and 2.

Table 1. Unit Root Test at the level

Variable	ADF	Critical Value (1%)	Remarks
LN GDP	0.810121	-3.670170	Non-Stationary
LN EDU	0.265133	-3.670170	Non-Stationary
LN EEH	-2.784627	-3.679322	Non-Stationary
LN EHS	0.743334	-3.679322	Non-Stationary
LN EWR	-2.210615	-3.752946	Non-Stationary
LN IFR	-3.572867	-3.661661	Non-Stationary
LN AGR	-0.298385	-3.679322	Non-Stationary
LN SEC	-2.830716	-3.724070	Non-Stationary
LN TC	0.130065	-3.670170	Non-Stationary

Table 2. Unit Root Test at first Difference

Variable	ADF	Critical Value (1%)	Remarks
LN GDP	-4.339405	-3.679322	Stationary
LN EDU	-6.128748	-3.679322	Stationary
LN EEH	-4.480977	-4.297073	Stationary
LN EHS	-7.087649	-3.679322	Stationary
LN EWR	-5.373348	-3.788030	Stationary
LN IFR	-6.449241	-3.670170	Stationary
LN AGR	-7.161858	-3.679322	Stationary
LN SEC	-7.094560	-3.670170	Stationary
LN TC	-5.633637	-3.679322	Stationary

As a follow-up of the above tests, the long-run co- integration test at 1% level of significance was conducted. The result of the test is as presented in table 3 below.

Table 3. Johansen Co-integration Test, unrestricted co-integration Tests

Hypothesized	Eigen value	Trace statistic	5% critical	1percent critical
None **	0.714164	20.03741	3.76	6.65

(**) denotes the rejection of the hypothesis at the 5% and 1% levels. Trace test indicates one cointegrating equation at both 5% and 1% levels. This implies that there exists a long-run relationship between the dependent (Ln GDP) and the independent variables – L_N EDU, L_NEEH, L_N EHS, L_N EWR, L_N IFR, L_N AGR, L_N SEC and L_N TC.

The test for the static long-run was carried out to derive the residuals which are presented in table 4.The result from the static regression suggests that the variables are not appropriate enough for meaningful conclusion. However, since cointegration is established (Table 3), the error correction model was estimated as shown in table 5. The evidence of cointegration rules out the possibility of spurious estimated relationship between the dependent and independent variables. The regression result is presented in the table below.

Table 4. Result for static Long-run Equation of Growth (GDP)

Variable	Coefficient	Standard Error	T-statistic	probability
C	3.191550	2.053109	1.554497	0.16
L_N EDU	-0.078642	0.510756	-0.153972	0.88
L_NEEH	0.051103	0.096459	0.529792	0.61
L_N EHS	0.052851	0.618549	0.085443	0.93
L_N EWR	0.018516	0.193578	0.095654	0.93
L_N AGR	-0.134409	0.291124	-0.461692	0.66
L_N IFR	0.148935	0.162332	0.917470	0.39
L_N SEC	1.306122	0.632171	2.066088	0.08
L_N TC	-0.140411	0.183662	-0.764510	0.47

R^2 = 0.98, DW = 1.16, F – Statistic = 36.79

Table 5. Result of Error correction of Growth (GDP). (Regression Results)

Variable	Coefficient	Standard Error	T-statistic	probability
C	-0.098283	0.506000	-0.194235	0.86
L_N EDU	0.108160	0.331218	0.326554	0.78
L_NEEH	0.006397	0.039070	0.163731	0.89
L_N EHS	-0.308855	0.602692	-0.512460	0.66
L_N EWR	0.035495	0.126760	0.280022	0.81
L_N AGR	0.089034	0.130244	0.683598	0.56
L_N IFR	0.003490	0.049526	0.070461	0.95
L_N SEC	0.407389	0.537976	0.757264	0.5279
L_N TC	-0.233650	0.266327	-0.877306	0.4728
ECM(-1)	-0.013733	0.026954	0.509506	0.66

R^2= 0.71, DW=2.26 (approx.2), F=0.55

From Table 5, results showed that the error correction model, $ECM_{(-1)}$ is significant and bore negative sign. This conforms to our earlier conclusion that there exists a long-run relationship between growth (GDP) and expenditures on the various components of infrastructure as included in the model.

Using the standard error, all the variables except expenditure on agriculture (AGR) and security (SEC) were statistically significant at 5% level of significance. The in-significance of government expenditure on agriculture on the growth of the economy could be due to the failure of various policies to revamp the sector. The sector has been unable to regain its lost glory despite several efforts on the part of the government to raise the level of productivity of this sector. Such failure could be due to problems inherent in the sector itself, misappropriation of funds, and misconception of government programmes, lack of monitoring and evaluation, poor funding, wrong perception of the sector by the younger generation, inability to reach the target population, poor administration, inadequate modern technology, and lack of continuity of government policies among others. The findings here confirmed with the findings of Abu and Abdullahi (2010), Laudau (1986), Barro (1991).

Result also showed that the expenditures on health services and transport and communication were negatively related to growth. This is contrary to a prior expectation. Good health is expected to enhance efficiency and productivity while transport and communication are expected to improve marketing and distribution. The negative relationship of the two variables with growth could be due misappropriation and diversion of public funds which have left behind uncompleted road projects in many parts of the country and the popular slogan of "out of stock" in most public hospitals and health centers. The implication of this is that growing public spending on health services and transport and communication is capable of slowing down growth in the country. Nevertheless, expenditure on education, environment and housing, water resources, agriculture and security impacted positively on GDP. Result also indicated that an increase in inflation will lead to increase in growth. This confirms the fact that a certain level of inflation is necessary for growth.

The R^2 of 0.71 showed that the variable in the model accounted for about 71% of total variation in GDP. The F-statistics is significant at 5% level while the DW of 2.26 confirm the absence of auto or serial correlation.

5. Conclusion

The study examined the growth effect of government spending on infrastructure on Nigerian economy. The study considered the compositional analysis of government spending on some basic infrastructure. The study established a long-run relationship between growth and government expenditure on education, environment and housing, health services, water resources, inflation rate, agriculture, security, transport and communication. The study also showed that expenditure on health services, transport and communication imparted negatively on growth. Moreover, expenditure on agriculture and security had no statistical significance on the growth of the economy while the other variables were statistically significant. To increase the growth rate of the economy, the government should device control measures on its expenditure on infrastructures. This will go a long away to reduce the spate of fraud, fund diversion and mismanagement. Moreover, monitoring and evaluation of government spending should be emphasized. This will go a long away to ensure that the targets of government expenditures are reached. Generally, the development of the infrastructural sector should be given top priority at all levels Federal, state and local government levels. For any meaningful growth of the economy, there must be a good and solid foundation laid in the infrastructural sector.

References

Abu, N., Abudullahi, U. (2010) Government Expenditure and Economic Growth in Nigeria, 1970-2008: A Diaggregated Analysis, Business and Economics Journal, 4, 1-11.

Agenor, P.R., Moreno-Dodson, B. (2006), Public infrastructure and Growth: New Channels and Policy Implication. World Bank Policy Research working paper 1061

Aigbokhan, B.E. (1999) Evaluating Investment in Basic Infrastructure in Nigeria, in proceedings of the 8th Annual Conference on the Zoirah research Organised by the research Department, CBN at I-lamdala Hotel, Kaduna, 11th-15th June, 1999, pp 208]

Ansari, M.I., Gordon, D.V., Akuamuah, C. (1997) Keynes Vs Wagner Public Expenditure and National Income for the three African Countries. Applied Economics, 29, 543-550

Barro, R.J. (1991) Economic Growth in a Cross-section of Countries. Quarterly Journal of Economics, 106, 407-444.

Buhari, M. (2000) The Role of Infrastructural Development and Rehabilitation in Sustainable Economics Growth in Nigeria". www.anppusa.org

Calderon, C., Serven, L. (2004) The Effects of Infrastructure Development on Growth and Income distribution? The World Bank Policy Research Working Paper 3100.

Fourie, J. (2006) Economic Infrastructure: a review of definition theory and empirics, South African Journal of economics. 74, 530-556.

Friedman, T. (2006) The World is Plat, New York: Farrar, Strous and Giroux.

Ghali, K.H. (1998) Public Investment and Private Capital Formation in a Vector Error Correction Model of Growth, Applied Economics. 30, 837-844.

Landau, D. (1986) Government and Economic Growth in the Less Developed Countries: An Empirical Study for 1960-1980. Economic Development and Cultural Change, (35), 35-75.

Macdonald, R. (2008) An Examination of Public Capital's Role in Production. Economic Analysis (E.A) Research Paper Series.

Muiu, M. (2008) Globalisation from the Botton Up, New York Spinger.

NISER (2004) "Effectiveness of Public Expenditures in Nigeria" An ECEM CAPNSER Study submitted to the Federal Government of Nigeria (EC. Support), Technical Assistance Office, Ministry of Finance, Abuja.

Nurkse, R. (1953) Problems of Capital Formation in Underdeveloped countries, Oxford, Basil Balckwell.

Queiroz, C., Gautmai, S. (1992) Road Infrastructure and Economic Development – some Diagnostic indicators. The World Bank Policy Research Working Paper 9 (21).

Samli, A.C. (2011) Infrastructuring: The key to Achieving Economic Growth, Productivity and Quality of Life. Springer New York Herdelberg, London. Chapter 3, pp 13-22.

Seethepali, K., Bramait, M., Veredas, D. (2008) How Relevant is Infrastructure to Groin East Asia? Research Working paper 4597 Washinton D.C. World Bank.

Waters, C.D.J. (1999) changes to Road transport in Poland during a period of Economic Transition, International Journal of Physical Distribution and Logistics Management, 29, 122-137.