International Journal of Economics, Business and Management Research

Vol. 2, No. 06; 2018

ISSN: 2456-7760

EFFECT OF INCREASING INFRASTRUCTURAL EXPENDITURE ON ECONOMIC GROWTH IN NIGERIA

Udo Emmanuel Samuel (corresponding Author)
Department of Banking and Finance, Faculty of Business Administration,
University of Nigeria, Enugu, Nigeria
Abner Ishaku Prince
Department of Management, Faculty of Business Administration,
University of Nigeria, Enugu Campus, Enugu, Nigeria.
Idogen Kingsley Imolemen
Department of Accountancy, College of Management Science,
Veritas University, Abuja, Nigeria

Abstract
The effect of increasing infrastructural development expenditure on economic growth in Nigeria is examine from 1989-2017.This study was motivated on the basics of the increasing public expenditure on infrastructure in Nigeria without a proportional increase in infrastructural development. The Johansen co-integration, Error Correction Model (ECM) and the Ganger Causality Test serves as the prime techniques of analysis. Public expenditure and economic growth variables were found to be non-stationary and co-integrated, thus substantiating a long-run equilibrium condition. The ECM result show that, the disequilibrium cause by infrastructural degeneration in the previous year is adjusted back to equilibrium at the speed of 20% annually. The Granger causality test revealed a unidirectional causality, running from gross domestic product to variables of infrastructure. Therefore, Wagner's law and Fiscial Illusion theory were found to be valid in Nigeria's case for the period of study. The recommendation is to improve government expenditure on health, and transport and communication infrastructures to checkmate the increasing cases of infant and maternal mortality rates, and outbreak of virus in Nigeria. A business-like approach to infrastructural expenditure and controls on infrastructural should be embrace by the government.

Keywords: public expenditures; infrastructural development; economic growth; autoregressive distributed; ganger causality test

Introduction

The nexus between infrastructural development and economic growth in recent times have again prominent in economic and financial arguments. Owing to its significant role as catalyst for human capital development and economic industrialization in emerging and developed economies. Theories of economic and financial development maintained that, infrastructural development is a cardinal strategy for poverty mitigation.

Thus, investment in social, physical, economic and financial infrastructures of (education, health, transport and communication, agriculture, road construction, other economic services, other social and community services and internal securities) arouse employment generation, economic and trade openness, poverty mitigation and sustained peace and development.

Vol. 2, No. 06; 2018

ISSN: 2456-7760

Consequently, infrastructural development expenditures aregiganticowing to its capital-intensive nature to stimulate development via production, construction, procurement and technology.

The gigantic infrastructural development expenditures without proportional economic development and growth in Nigeria remains a topic of argument as a result of the crumbling social, physical, economic and financial infrastructures in Nigeria.

Babatunde, (2018), Raheem, Ayana, and Fashedemi, (2014) sustained that, the gigantic infrastructural development expenditures in Nigeria is a technical displace of limited resources to the detriment of the taxpayers. As such there is no proportional development in relation to the gigantic sum spend on infrastructural development. Where poverty rate is on the increase, with infant mortality rate, increase in virus outbreak, illiteracy, lawlessness, inadequate economic industrialization and maternal mortality.

In the bid to scrutinize the effect and directional causality between increasing infrastructural development expenditures and economic growth in Nigeria. Chan, Ramly and AbdKarim (2017) sustained that, Value Added Tax (VAT) boosts the effectiveness and efficiency of public infrastructural development expenditures on economic growth in East Asia. Babalola (2015) further maintained that, there is a positive and statistically significant correlation flanked by infrastructural development expenditures on economic growth in Nigeria with the study period.

Similarly, Edame*et al.* (2010) posit that, infrastructural development crowds in private investment, and checkmate transaction cost to cause profits and employment.

Denis Goulet, noted that, the prime indices of development are the quality of livelihood measured by accessibility and availability of key infrastructural necessities of life (Fasoranti, 2012).

On the contrarily empirical findings from the studies conducted by Connollyand Li (2016), Fasoranti, (2012), Iheanacho (2016), Ifarajimi, and Ola (2017) revealed that,infrastructural development negatively and statistically affects growth economically. The factors driving the negative relationship consist of; naira depreciation, inadequate economic diversification plan and lack of sustainable project monitoring and evaluation in Nigeria. Mitchell (2005) further argue that, public expenditures by whatever forms are economically destructive.

The increasing infrastructural development expenditure and economic growth in Nigeria as trigger somber worry and inquiries giving birth to question bothering on application of the huge budgetary allocation for infrastructural development and the economic implication of such on the nation's economy?

Statement of the Problem

The increasing public expenditures on infrastructural development without proportional growth and development as trigger somber worry and inquiries. The 2016 Trading Economics report in Nigeria revealed between 2015-2016 Nigeria witness a decline in GDP trend of -2.06% and -1.5% respectively. The 2015-2016 dwindling oil price negatively affected the economy with proportional impact on infrastructural development expenditure. The 2010 World Bank report revealed that the degenerating infrastructure in Nigeria specifically in the educational sector hampers the realization of Nigeria's projected knowledge-based economy (World Bank, 2010).

Vol. 2, No. 06; 2018

ISSN: 2456-7760

The 2004-2005 Federal Ministry of Health report revealed that 72% of death rate in Nigeria is traceable to communicable diseases, 21% death rate non-communicable diseases. Thus about 38% children the age of 0-10 are stunted, 29% are underweight, infant mortality rate is 100 deaths per 1000, while under-5 mortality rate is 201 per 1000 (Federal Ministry of Health, 2005). The World Health Organisation report in Nigeria indicates that, shortage of skilled medical workers contributes to the preponderance of health-related problems in Nigeria. Hence, only 41.9% of primary health care facilities provide antenatal and delivery services, while 57.73% of these health facilities operates without any midwife and 18.03% operate without midwives or senior community health extension workers (SCHEWs) (WHO, 2001).

Objective of the Study

The central objective of the study is to scrutinize the effect ofincreasing public expenditure on infrastructural development in Nigeria from 1989- 2017 a period covering the after the civil war and post-millennium era of power transition from the military to the civilian in Nigeria.

Review of Related Literature

Theoretical Framework

a. Musgrave and Rostow Model of Public Expenditure Growth

The Musgrave and Rostow model of public expenditure growth states that increase inpublic expenditure on infrastructural development increases economic growth and development. At the developmental stage of an economy, capital projects of (hospital, educational facilities, transport and communication and roads) are the prerequisite for growth and development acceleration.
Expenditure on infrastructural development is a direct function of the developmental stage of an economy as express in equation (I) below.
GOEX = f (POPUL, REVEN, GDP, PRCR, BUAL…….X_n) ……(I).
Where:
GOEX = Government Expenditure;
POPU = Population;
REVE = Revenue;
GDP = Gross Domestic product;
PRCR = Price of Crude Oil; and BUAL = Budget Allocation;
X_n = other indices such as hospital, educational facilities, transport and communication and internal security) etc.
According to Rostow (1961), five stages of development, there is a significant and positive long run relationship between public sector investment as a proportion of total investment on economic growth and development in the early stages of national development. Expenditure on capital projects are crucial in projecting the economy into the take-off stage as express below in equation(II) below;
$^{G}\Sigma^{K}1/Ps$ ……(II)
Where: G Σ = Government expenditure;

Vol. 2, No. 06; 2018

ISSN: 2456-7760

K = Constant maturity stage (in years);
Ps = Private Sector
Musgrave's theory of public expenditure growth relates the demand for public services to the stage of economic development of a country. According to the Rostow's five stages of development, the first three stages are relevant to emerging economies with the take-off stage central in the model.
The plausible arguments are increase in economic development increases productive investment rate from 5% or less to over 10% of national income (Nyong, 2005; BECAO, 1992; Khan and Reinhart, 1990).

b. The Wagner's Law of Public Expenditure

The Wagner's law of increasing state activity as promulgated by Adolph Wagner (1835–1917) states that increase in per capita income in an economy increases the relative size of the public sector. Infrastructural expenditures are sub-divided into, administration and defense, cultural and welfare, and direct services by government in relation to market failure.
According to Meier, (1984); Swanson and Terferra, (1989); World Bank, (1981), and Nyong, (2005) increase in public expenditure on infrastructural development is explained in terms of income-elastic (Edame&Fonta, 2014). Thus, increase real income increases public expenditure on infrastructure. This explains the rising ratio of government expenditure to gross national product GNP) according to Nyong (2005) in his public policy assessment of Nigeria expenditure situation.
Similarly, Wu, Shih-Ying et al. (2010) argue that, Wagner's law operates perfectly in developed economies in direct comparison to emerging economies. However, a few subdivisions of the studies sustained that government expenditure drives influences economic growth positively (if they are directed to promote public infrastructure) and negatively (if they are consumed by government in the form investment in growth retarding projects).
The apriori expectation of this study is that, infrastructure expenditure ought to match economic growth; however, in reality the case is different in economies like Nigeria owing to elements of fiscal illusion in government activities.

c .Fiscal Illusion Theory

The theory of fiscal illusion is traceable to the study conducted Puviani (1903) along with its additional impetus from the study conducted by Buchanan (1967) as cited in (Babatunde, 2018). Fiscal illusion theory explains the misperception of fiscal parameters.
According to Oates (1985), fiscal illusion implies persistent interpretations and biases on public budgetary decisions of government based on imperfect information. Afonso (2014) argues that the benefits of government programmes appear to be remote and unrecognised by the citizenry. Thus, the citizens feel more directly the impact of budget financing through taxation.
This theory is relevant to this study because the real benefits of infrastructure spending may not necessarily translate into infrastructural development and economic growth because of the

Vol. 2, No. 06; 2018

ISSN: 2456-7760

element of illusion in government developmental system plans. Hence, government programmes are concealed to accommodate unnecessary expenditures.
Oates (1985) argues that the misconception of fiscal parameters could considerably distort economic choices. This study explains the findings based on this theory as an opportunity to show the direction of fiscal illusion in the cost and benefits analysis of government spending on infrastructure towards the ideology of economic growth.
Foot Note: *The authentication of Wagner's law and Keynes's hypothesis is through testing whether or not increasing infrastructural development expenditure and GDP possess a long-run equilibrium relationship, and whether or not GDP Granger causes infrastructural development and vice versa*

Economic Growth Theory

a **.Solo-Swan Modern-Day Theory**

This study employs the Solo-Swan modern-day theory. The Solo-Swan modern-day theory emphases on the impact of labour, capital and technology, with particular focus on technology regarding infrastructural development and economic growth in relation to GDP. As factors that affecting economic growth and development.
According to the Solo-Swan theory technological advancement spur development and growth through labour and capital.
The study argues that when government spending is zero, there is little economic growth because enforcing contracts, protecting life and property and infrastructure development would be complicated. Hence, government spending is necessary as supported by Keynesian theory.

b. *Keynesian Theory*

Keynesian theory presupposes that government intervention stabilise economic imbalances and stimulate growth and development in period of economic and financial recession.
The Keynesian school of thought further sustained that government technological intervention, increases employment rate, economic diversification and trade (Jahan, Mahmud,&Papageorgiou, 2014). On the other hand, Aregbeyeni and Kolawole (2015) and Mitchell (2005), argue that Keynesian theory fails to recognized that lower tax rates boost economic growth.

Empirical Framework

a. Public Expenditure on Infrastructural development and Economic Growth

According to the general consensus established by the United Nations Development Programme (UNDP) (2015) for a nation (developed or emerging) to progress in its sustainable development goals. Robust growth in national income, quality infrastructural development and economic growth are the fundamental prerequisite. Aregbeyeni and Kolawole, (2015); Babalola, (2015)

Vol. 2, No. 06; 2018

ISSN: 2456-7760

maintained that government expenditure improves production and stimulate economic growth and development.

Edame and Fonta (2014) examined the impact of government expenditure on infrastructure in Nigeria based on a co-integration and error correction specification. The study analysed the results but failed to give an interpretation of the implication of the results, which is necessary for policy formulation and decision-making.

Mitchell (2005) investigated the impact of government spending on economic growth in the United States. The study covers only United States and does not cover developing economies like Nigeria, where there is a dearth of such studies. Mitchell, argue that government expenditure hampers economic growth as a result of the bulky nature of the public sectors plummeting economic activities.

Ekpung (2014) examined the trends of public expenditure on infrastructure, and economic growth in Nigeria between 1970 to 2010. The VEC technique was employed. The VEC result revealed that public expenditure on transport/telecommunication, water supply, housing/environment, road construction and electricity supply is very low especially in the short-run and long-run; equilibrium is static and showed weak adjustment.

Siyan and Adegoriola (2016) investigates the nexus between infrastructural development and economic growth in Nigeria. Employing annualized data from 1981 to 2014 along with the co-integration, and Vector Error Correction Model (VECM) as the prime method of analysis.

Findings show that, there is long run relationship between infrastructure development and economic growth in Nigeria. VECM have the expected negative sign, and is between the accepted region of less than unity. It also shows a low speed adjustment towards equilibrium. Infrastructural development on road and communication show a positive relationship with economic growth, while private investment, degree of openness and education produced negative relationship with economic growth.

The study recommended that, government ought to beef commitment on infrastructural development, in the manufacturing sector to harness the advantages of trade openness, improve and monitor budgetary allocation to education and encourage the private sector with series of incentives to increase their participation in investment to drive economic growth.

Fasoranti, (2012) examined government expenditures on infrastructure on economic growth in Nigeria. Embracing the co-integration and vector error correction estimation model as the major method of analysis. Results showed a longrun relationship between economic growth and government expenditures in education, environment and housing, health services, water resources, inflation rate, agriculture, security, transport and communication.

Government expenditures on health services, transport and communication imparted negatively on growth while expenditures in agriculture and security show a non-significant relationship with economic growth. The study recommendations are that to increase economic growth stringent controls measures must be adopted on expenditures on infrastructure to checkmate fraud, fund diversion and mismanagement.

Edame, and Fonta (2014) investigate government expenditure on infrastructure in Nigeria, by means of co integration and error correction Specifications. The error correction mechanism

Vol. 2, No. 06; 2018

ISSN: 2456-7760

(ECM) indicates a feedback of about 99. 38 percent of previous year's disequilibrium from long-run elasticity of rate of urbanization, openness, government revenue, external reserves, population density and type of government. The results of the Chow test revealed that public expenditure on infrastructure were stable and did not change over time as evidenced by F* value of 1.8214 against F-critical value of 2.580 at the 5% level during the period.

Gap in Literature

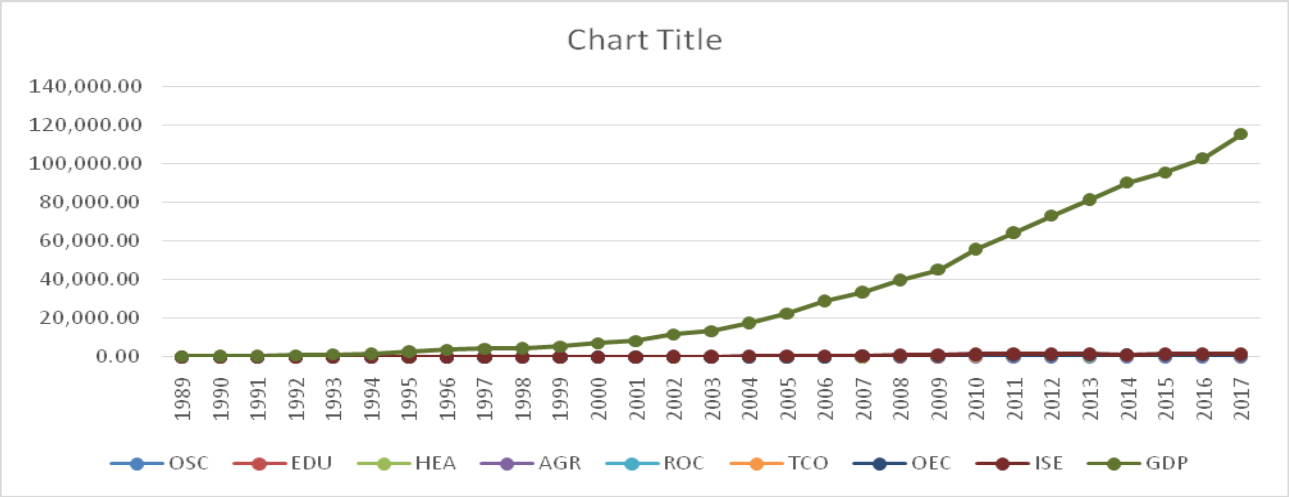
Empirical studies on public expenditure concentrated squarely on the growth trend of public expenditure (Phillp, 1971; and Lambo, 1987). While others concentrated on the effect of public expenditure on infrastructure in totality (specifically) on economic growth. Employing the Ordinary Least Squares (OLS) technique for estimations.

The application of the OLS technique is inadequate specifically where the datasets are non-stationary. Hence, the study results are spurious as such the long-run economic growth effect could not be ascertained (Odedokun, 1997; Odedokun, 2001).

The contemporary study investigates pre and post-millennium periods from 1989-2017. The Johansen co-integration, Error Correction Model (ECM) and the Ganger Causality Test are the prime techniques of analysis. The Johansen co-integration test for the long run relationship. The Error Correction Model (ECM)test for the speed of adjustment from disequilibrium caused by infrastructural degeneration after the civil war in 1970and power transition from the military to civilian back to equilibrium in the current year. The Ganger Causality test for the directional causality as an innovation to contribute to the existing body of knowledge.

The study further disaggregate infrastructure into component sectors to analysis the rate of development with core Keynesian economic theories, the Wegner law of public expenditure theory and fiscal illusion theories. The findings are argued based on the underlying theories.

Figure 1. Trend Analysis of Infrastructural Expenditure and Economic Growth Relationships in Nigeria Between 1989 - 2017.



Source. Authors' computations from Central Bank of Nigeria Statistical Bulletins 2017.

Vol. 2, No. 06; 2018

ISSN: 2456-7760

Trend Analysis

A cursory look at the infrastructural development on economic growth from 1989-1999 after the civil war and from 2000-2017 after the power transition from the military to the civilian in Nigeria.

Figure 1 reveals that economic growth measured by Gross Domestic Product, descriptively, does not have a significant influence on the pace of infrastructural development as indicators for economic development. Thus, from 1989-1998 revealed the slow pace of economic growth and infrastructural development after the civil war. Hence, from 1999-2017 the economy witness momentous increase without a proportional increase in infrastructural development, with Nigeria rank one of the fasters growing economies in the World after China in 2014.

Thus, Babatunde, (2018), Raheem, Ayana, and Fashedemi, (2014) argue that, the gigantic infrastructural development expenditures in Nigeria is a technical displace of limited resources to the detriment of the taxpayers.

As such there is no proportional and significant relationship between economic growth and infrastructural development. Where poverty rate is on the increase, with infant mortality rate, increase in virus outbreak, illiteracy, lawlessness, inadequate economic industrialization and maternal mortality.

Afonso (2014) argues that the benefits of government programmes appear to be remote and unrecognised by the citizenry. Thus, the citizens feel more directly the impact of budget financing through taxation than benefitting from the infrastructural development.

The 2010 World Bank report revealed that the degenerating infrastructure in Nigeria specifically in the educational sector has hampers the realization of Nigeria's knowledge-based economy. The report acknowledged, key challenges restraining the realization of Nigeria's knowledge-based economy to include; stumpy tertiary enrolment level, obsolete teaching and lecturing aids and methods, strikes and administrative hiccups, corruption, lack of ICT infrastructure and above all poor educational sector fund (World Bank, 2010).

The 2004-2005 Federal Ministry of Health report revealed that 72% of death rate in Nigeria is traceable to communicable diseases, 21% death rate non-communicable diseases. Thus about 38% children the age of 0-10 are stunted, 29% are underweight, infant mortality rate is 100 deaths per 1000, while under-5 mortality rate is 201 per 1000 (Federal Ministry of Health, 2005).

The World Health Organisation report in Nigeria indicates that, shortage of skilled medical workers contributes to the preponderance of health-related problems in Nigeria.

Hence, only 41.9% of primary health care facilities provide antenatal and delivery services, while 57.73% of these health facilities operates without any midwife and 18.03% operate without midwives or senior community health extension workers (SCHEWs) (WHO, 2001).

The reports revealed a disintegrating health infrastructure, limiting the chances of the citizenry and impeding their capability to effectively and efficiently contribute and benefit from the taxes paid.

According to NISER, (2004) as cited in Fasoranti, (2012) the plausible argument for the wide gap between increasing expenditure and the level of infrastructural development is that such funds are diverted for purpose without impact on infrastructural development.

Vol. 2, No. 06; 2018

ISSN: 2456-7760

Edame and Fonta (2014) argue that, the deficiencies in infrastructural development along with inefficient delivery of social services hampers the competitive value of Nigeria's export goods in the international market.

The fiscal illusion maintained that the real benefits of infrastructure spending may not necessarily translate into infrastructural development and economic growth because of the element of illusion in government developmental system plans. Hence, government programmes are concealed to accommodate unnecessary expenditures.

Methodology

Data and Method

The study adopts the *ex post facto*, research design herein referred to as comparative research design. Is applicable for studies geared toward ascertaining the cause–effect association between the independent and dependent variables (Onwumere, Onodugo, & Ibe, 2014). The justification for the adaptation of the research design is based on the fact that the events understudy occurred in the past.

Evaluating the cause–effect relationships among the selected study variables serves as the major aim of this study. The data are of secondary nature, collated from the Central Bank of Nigeria (CBN) Statistical bulletins for various years, from 1989- 2017.

The justification for 1989 is to examine the rate of infrastructural development nineteen years after the civil war in 1970.

The annualized time series data will be analyzed using the Johansen co-integration, model, to test for the long-run relationship and the Ganger Causality to test for the directional causality among the series. The underlying assumption is that all variables are integrated of Order 1 or I(1).

The speed of adjustment will be ascertained based on the ECM and will be able to tell us the rate at which the previous period disequilibrium in infrastructural development is adjusted toward equilibrium path on an annual basis in the current year.

Model Specification

The prime objective is to derive the output effect of increasing public infrastructural development expenditure on economic growth. To achieve this, we estimate for the infrastructural sectors the Classical Linear Regression equation:

$Y_t^o = \delta_0 + \delta_1 EDU + \delta_2 HEA + \delta_3 OSC + \delta_4 TCO + \delta_5 AGR + \delta_6 ROC + \mu_t$…….(1)

Where;

Y is the real output (measured as annualized percentage contribution infrastructural development expenditure to Gross Domestic Product GDP),

EDU = Educational sector contribution Expenditure

HEA = Health sector contribution Expenditure

OSC = Other Social and Community Services Expenditure

TCO = Transport and Communication Sectors Expenditure

Vol. 2, No. 06; 2018

ISSN: 2456-7760

AGR = Agricultural Expenditure and ROC = Road Construction Expenditure
μ_t = Stochastic white noise error term with zero mean and constant variance
δ_0 = Parameters to be estimated
Equation (1) is our baseline long-run model for determining the public infrastructural expenditure effects on economic growth in Nigeria.
It has been vastly buttressed in recent literature of financial econometrics that upon the establishment of a long-run relationship, there is need to integrate a model which accommodates for short-run dynamic adjustment process, which is the speed of adjustment from short-run disequilibrium to long-run equilibrium. Based on this, we developed ECM by modifying Equation (1) as follows:

$$\Delta Y_{t,j} = \delta_0 + \sum_{i=0}^{n1} \delta_{1i,j} \Delta GDP_{t-1,j} + \sum_{i=0}^{n2} \delta_{2i,j} \Delta EDU_{t-1,j} + \sum_{i=0}^{n3} \delta_{3i,j} HEA_{t-1,j} + \sum_{i=0}^{n4} \delta_{4i,j} \Delta OSC_{t-1,j} + \sum_{i=0}^{n5} \delta_{5i,j} \Delta TCO_{t-1,j} + \sum_{i=0}^{n6} \delta_{6i,j} \Delta AGR_{t-1,j} + \sum_{i=0}^{n7} \delta_{7i,j} \Delta ROC_{t-1,j} \ldots\ldots\ldots (II)$$

Where; Δ denotes change; *i* and *j* are lag lengths; *n* is number of lags; δ *t*−1 is the error correction term (ECT) (and speed of adjustment), which is integrated at Order 0, 1(0); δ_0 is the constant term; $\delta_1 – \delta_6$ are coefficients; and $\mu t$is the error term.
The Johansen co integration will be employed to test for the co integrating relationship among the variables understudy. The justification all our series are stationary after first differencing (Order 1).
Thus, where some variables have unit root, the Autoregressive Distributed Lag (ARDL) or Bound Test model for co-integration will be developed embracing the two steps suggested by Engel and Granger (1987) into a one-step function.
The ARDL model is specified in Equation III:

$$\Delta \text{ Log } GDP_t = \alpha_0 + \sum_{I=1}^{n} \alpha_{1i} \Delta LogGDP_{t-1} + \sum_{I=0}^{n} \alpha_{2i} \Delta LogEDU_{t-1} + \sum_{I=0}^{n} \alpha_{3i} \Delta LogHEA_{t-1} + \sum_{I=0}^{n} \alpha_{4i} \Delta OSC_{t-1} + \sum_{I=0}^{n} \alpha_{5i} \Delta TCO_{-1} + \sum_{I=0}^{n} \alpha_{6i} \Delta AGR_{t-1} + \sum_{I=0}^{n} \alpha_{7i} \Delta ROC_{t-1} + \delta_1 LogGDP_{t-1} + \delta_2 LogEDU_{t-1} + \delta_3 LogHEA_{t-1} + \delta_4 OSC_{t-1} + \delta_5 TCO_{t-1} + \delta_6 AGR_{t-1} + \delta_7 ROC_{t-1} \mu_t \ldots\ldots (III)$$

Where; Δ = first difference operator
The model parameters α_1 - α_7 = short-run dynamics of the model.
The model parameters $\delta_1 – \delta_7$ = long-run relationship
All other variables are defined as above;
This is denoted as:H_0:$\delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = 0$
i.e there is no co integration among these variables.
Ha: $\delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq \delta_6 \neq \delta_7 \neq 0$ i.e there is co integration among these variables.
The bound test is based on the (F-statistic). The critical values are given by Pesaran, Shin and Smith (2001) for the co integration test.
The lower critical bound assumes all the variables are 1(0) meaning that there is no co integration. The upper bound assumes that all variables are 1(1) meaning that there is co integration.

Decision Rule

Vol. 2, No. 06; 2018

ISSN: 2456-7760

i. Where the computed F-statistic is greater than the upper bound critical value, then the H_0 is rejected (the variables are cointegrated).
ii. Where the computed F-statistic is below the lower bound critical value, then the H_0 cannot be rejected (the variables are not cointegrated).
iii. Where the computed F-statistic falls between the lower and upper bounds, the results are (inconclusive).

Apriori expectation: δ_1, δ_2, δ_3, δ_4, δ_5, and $\delta_6 > 0$.

Presentation and Analyses of Data

Data Description

a. Unit Root Test

To verify the stationary of the datasets employed the variables were subjected to a unit root in following the Augmented Dickey Fuller Statistics. The results are reported in table 1 below:

Table 1: Summary of ADF Unit Root Tests

S/No	Variables	ADF Stat	Critical Values @ 5%	Prob*	Order of Integration	Inference
1.	LOGAGR	-5.953581	-3.595026	0.0003	I (1)	Stationary
2.	LOGEDU	-6.989327	-3.587527	0.0000	I (1)	Stationary
3.	LOGGDP	-4.162950	-3.587527	0.0148	I (1)	Stationary
4.	LOGHEA	-5.808807	-3.622033	0.0005	I (1)	Stationary
5.	LOGOSC	-7.700651	-3.587527	0.0000	I (1)	Stationary
6.	LOGROC	-5.056591	-3.603202	0.0022	I (1)	Stationary
7.	LOGTCO	-5.208799	-3.622033	0.0018	I (1)	Stationary

** ***Suggests Stationarity at the given level of Significance***
Source: Researchers Computation, 2018

The result in Table above indicates that the variables attained stationarity at first difference order I (1) of integration. LOGGDP, LOGHEA, LOGAGR, LOGOSC, LOGROC, LOGEDU and LOGTCO are stationary at first difference, I (1).

Vol. 2, No. 06; 2018

ISSN: 2456-7760

The Johansen co integration test is adopted as the appropriate technique for cointegration testing since the study variables are co-integrated of in Order I or I (1); otherwise, the ARDL would apply. Thus the approach is adopted to ascertain a long-run relationship among our variables. Thus, the approach is employ to ascertain a long-run relationship among our variables.The unit root test is vital to assure that the regression result would not be spurious.

Model Estimation

Table 2: Result of Johansen Co integration Test for a Long-Run Relationship

Series: EDU, HEA, OSC, TCO, AGR, ROC

Unrestricted Co integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.951035	236.1699	125.6154	0.0000
At most 1 *	0.893088	154.7202	95.75366	0.0000
At most 2 *	0.670694	94.35502	69.81889	0.0002
At most 3 *	0.616049	64.36430	47.85613	0.0007
At most 4 *	0.531602	38.51882	29.79707	0.0039
At most 5 *	0.306210	18.04105	15.49471	0.0202
At most 6 *	0.261106	8.170212	3.841466	0.0043

Trace test indicates 7 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.951035	81.44970	46.23142	0.0000
At most 1 *	0.893088	60.36515	40.07757	0.0001
At most 2	0.670694	29.99072	33.87687	0.1358
At most 3	0.616049	25.84548	27.58434	0.0821
At most 4	0.531602	20.47777	21.13162	0.0615
At most 5	0.306210	9.870835	14.26460	0.2205
At most 6 *	0.261106	8.170212	3.841466	0.0043

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

Vol. 2, No. 06; 2018

ISSN: 2456-7760

* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Researchers Computation, 2018

The Trace and Max-Eigenvalue test indicate seven and two co-integrating equation at 0.5% level. There is a stable long run relationship between infrastructural development expenditure and economic growth in Nigeria.
GDP =Goss Domestic Product, EDU = Education, HEA= Health, OSC= Other Social and Community Services, ROC= Road Construction, and TCO = Transport and Communication.

Table 3. Estimate of Long-Run Effect Based on Baseline Model.

Selected Model: ARDL(1, 2, 1, 2, 0, 0, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGGDP(-1)	0.794378	0.077382	10.26570	0.0000
LOGAGR	0.043214	0.036712	1.177118	0.2588
LOGAGR(-1)	0.023621	0.030067	0.785605	0.4452
LOGAGR(-2)	0.074750	0.031742	2.354947	0.0336
LOGEDU	0.013224	0.085710	0.154290	0.8796
LOGEDU(-1)	-0.293702	0.061290	-4.792021	0.0003
LOGHEA	-0.006236	0.082195	-0.075871	0.9406
LOGHEA(-1)	0.285175	0.063451	4.494436	0.0005
LOGHEA(-2)	0.069548	0.031645	2.197725	0.0453
LOGOSC	-0.028857	0.021150	-1.364364	0.1940
LOGTCO	-0.065125	0.026452	-2.462004	0.0274
LOGROC	-0.012253	0.043082	-0.284400	0.7803
C	2.119141	0.522328	4.057107	0.0012

Source: Researchers Computation, 2018

Before analyzing the significance of the long run model estimates. It is obligatory to discuss the validity and stability tests contained in table 4. to attest that there is noviolation of the assumptions of the model. Any of such assumptions casts doubts on the validity and reliability of the model result.

Table 4: Validity and Stability Tests for the Model

R^2	F-Stat	DW	BG-F	x^2(HET)	RESET-F
0.99	1269.51	2.15	0.24	0.98	0.72

Source: Researchers Computation, 2018

Vol. 2, No. 06; 2018

ISSN: 2456-7760

The results as contained in Table 4, show that, the model has a goodness of fit 99% assuggested by the R^2. The $R^2$of 99% explain that, the variation in the dependent variable is accounted for by the independent variables with an unexplained variation of 1%. The F-statistics of 1269.51 and the corresponding probability value of 0.000, shows that the overall result is statistically significant. The Durbin Watson Statistics of 2.15 rules out all possible suspicion of first order positive autocorrelation.

To further certify the Durbin Watson Statistic result. A higher order serial correlation test was conducted. The Breusch Godfrey Lagrange Multiplier Serial Correlation Test was conducted and the result of the F-stat with a p-value of 0.24confirms the non-existence of autocorrelation.

Similarly, a test for heteroskedasticity was carried out on the model to ensure that the assumption of homoskedasticity was not violated. The result obtained, revealed that $the\ x^2$ and F-stat of 0.98indicate that the model is homoscedastic.

The model error specification test (Ramsey RESET Test) clearly shows that there is no inclusion of any irrelevant variable neither does it have an omission of a relevant variable.This result is confirmed in Fig (I) through the Cumulative Sum Control Chart (CUSUM) test.

The results in Table 3 indicate that EDU and AGR positively and statistically influence economic growth. Hence, a unit increase in educational sector development lead to 13% increase in economic growth and increase agricultural sector development lead to 43% increase in economic growth.

The result supports the theoretical foundations of (the Keynesian, Wagner's law and Musgrave and Rostow) in this discourse that is increase in infrastructural expenditure positively and statistically stimulate economic growth. The study result is a confirmation of Iheanacho, (2016); Udoka and Anyingang, (2015); Darma, (2014) research results.

Similarly, Health sector, Transport and Communication sectors, Other Social and Community Services, and Road Construction negatively and statistically affects economic growth. A unit decrease in Health sector, Transport and Communication sectors, Other Social and Community Services, and Road Construction leads to 6%, 65%, 28%, and 12% decrease respectively in economic growth.

This result supports of the theoretical foundations of (Fiscial Illusion) in this discourse that the real benefits of infrastructure spending may not necessarily translate into infrastructural development and economic growth because of the element of illusion in government developmental system plans. Government programmes are concealed to accommodate unnecessary expenditures. Mitchell (2005) argument on the Keynesian theory, on government expenditure on infrastructural development may not result in economic growth, is supported to some extent. Thus, this result suggests an improvement on the Keynesian theory of economics.

Table 5: Estimate of the Baseline Bounds Test Model.

F-Bounds Test	
Selected ARDL Model	(1, 2, 1, 2, 0, 0, 1)

Vol. 2, No. 06; 2018

ISSN: 2456-7760

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	27.31757	10%	1.99	2.94
K	6	5%	2.27**	3.28**
		2.5%	2.55	3.61
		1%	2.88	3.99

** ***Suggests Stationarity at the given level of Significance***

Source: Researchers Computation, 2018

The value of F-statistic is 20.41 and we have (K+1) = 6 variable (HEA, EDU, OSC, ROC, AGR and TCO) in our model. The lower and upper bounds for the F-test statistic at 5% significance levels are 2.27% and 3.28% respectively. As the F- statistic value of 27.31 exceeds the upper bound of 3.28 at the 5% significance level.

The H_0 is rejected (the variables are co integrated). Thus there is a significant long run co-integrating relationship between pubic infrastructural development expenditure on economic growth in Nigeria.

Table 6: Short-Run Estimate Based on Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGAGR)	0.043214	0.015358	2.813880	0.0138
D(LOGAGR(-1))	-0.074750	0.017916	-4.172168	0.0009
D(LOGEDU)	0.013224	0.037174	0.355739	0.7273
D(LOGHEA)	-0.006236	0.040141	-0.155356	0.8788
D(LOGHEA(-1))	-0.069548	0.021121	-3.292827	0.0053
CointEq(-1)*	-0.205622	0.011357	-18.10555	0.0000

R^2= 80, Adjusted R^2=76%, Durbin-Watson stat = 2.15

Source: Researchers Computation, 2018

The coefficient of the error correction term, $Coint_{t-1}$ is negative and statistically significant. The CointEq (-1)* measures the speed of adjustment towards equilibrium. The coefficient of the feedback parameter is -0.205622. By implementation the speed of reversion is relatively slow. The disequilibrium in the previous period, cause by infrastructural degradation after the civil war in Nigeria.

Vol. 2, No. 06; 2018

ISSN: 2456-7760

Is revised to equilibrium at about 20% annually in the current period and is statistically significant. The goodness of fit for the short run ARDL model is 80% and the adjusted R^2 is 79%. The Durbin Watson statistic of 2.82 is indicative of the absence of autocorrelation.

Granger Causality Tests

The standard F-test Granger causality test is applied in this study. A causal test aims at substantiating whether or not the lags of two variables enter into the equation for another variable affect directly and significantly its value (Enders, 2004). According to Engle and Granger, if two variables are I (1) and co integrated, then either unidirectional or bi-directional causality must exist in the I (0) variables (Biswal et al., 1999).

Table 7: Granger Causality Tests

Pair wise Granger Causality Tests
Date: 11/27/18 Time: 23:54
Sample: 1989 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.	Inference
LOGAGR does not Granger Cause LOGGDP	27	0.45407	0.6409	No causality exist KH does not hold
LOGGDP does not Granger Cause LOGAGR		2.76179	0.0851	Causality exist WH holds
FormOne				
LOGEDU does not Granger Cause LOGGDP	27	0.10652	0.8994	No causality exist KH does not hold
LOGGDP does not Granger Cause LOGEDU		9.46025	0.0011	Causality exist WH holds
FormTwo				
LOGHEA does not Granger Cause LOGGDP	27	1.55296	0.2339	No causality exist KH does not hold
LOGGDP does not Granger Cause LOGHEA		5.22256	0.0139	Causality exist WH holds
FormThree				
LOGOSC does not Granger Cause LOGGDP	27	0.84754	0.4420	No causality exist KH does not hold
LOGGDP does not Granger Cause LOGOSC		5.07483	0.0154	Causality exist WH

Vol. 2, No. 06; 2018

ISSN: 2456-7760

			holds
Form Four			
LOGTCO does not Granger Cause LOGGDP	27	0.59050	0.5626 No causality exist KH does not hold
LOGGDP does not Granger Cause LOGTCO		1.34395	0.2814 No causality exist WH does not hold
FormFive			
LOGROC does not Granger Cause LOGGDP	27	1.52695	0.2393 No causality exist KH does not hold
LOGGDP does not Granger Cause LOGROC		5.26918	0.0135 Causality exist WH holds
FormSix			

Note: WH and KH stand for Wagner's and Keynes's hypotheses, respectively

Source: Researchers Computation, 2018

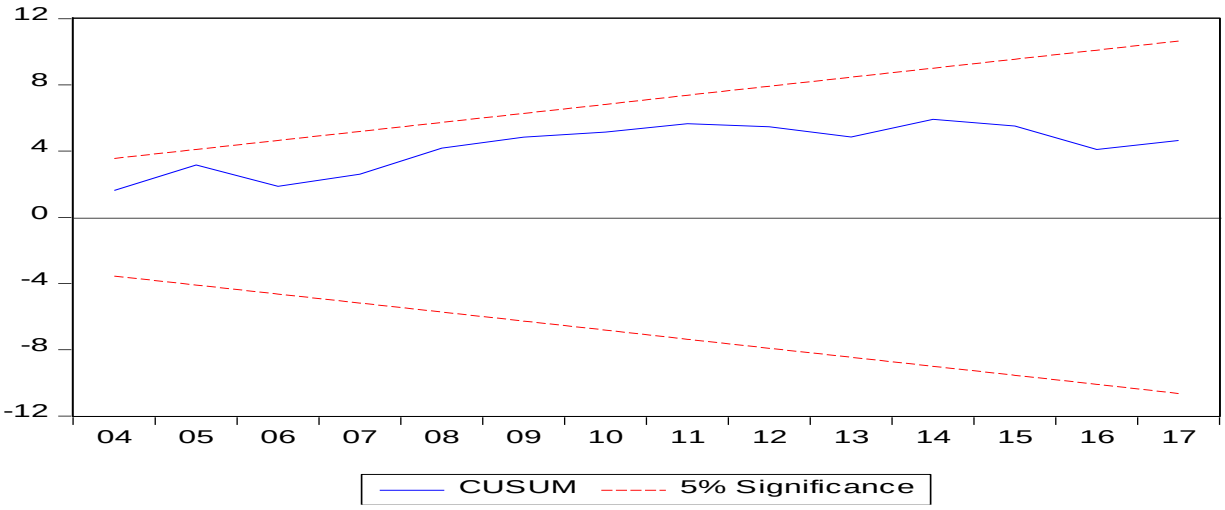
From the Table 7, it can be inferred that there is no bi-directional causality in form five results. Thus there is a directional causality running from economic growth (GDP) to AGR, EDU, HEA, OSC, TCO and ROC which supports Wagner's proposition. The results show that growth in aggregate public expenditure on economic growth is explained in terms of Wagner's law. The result from the version five revealed that there is no bi-directional causality which supports Fiscial Illusion proposition.

The results show that, the real benefits of infrastructure spending may not necessarily translate into infrastructural development and economic growth because of the element of illusion in government developmental system plans. Hence, government programmes are concealed to accommodate unnecessary expenditures. Afonso (2014) noted that, the benefits of government programmes appear to be remote and unrecognised by the citizenry. Thus, the citizens feel more directly the impact of budget financing through taxation.

Vol. 2, No. 06; 2018

ISSN: 2456-7760

Fig. I Cumulative Sum of Squares Stability Test (RECURSIVE ESTIMATES ONLY)



Source: Researchers Computation, 2018

Fig I above contains the cumulative sum of squares graph following the recursive estimates. The cumulative sum of squares graph measure of the stability of the model. Evidently the model is BLUE (Best Linear Unbiased Estimator) and lies intact between the lower and the upper bounds. This clearly points to the stability of the model.

Conclusion and Recommendation

In an attempt to examined the effect of increasing public infrastructural development expenditure on economic growth in Nigeria, and to ascertained whether or not the Fiscial Illusion theory, Keynesian's theory, the Wagner's law and the Musgrave and Rostow theory hold in the Nigerian context. Our baseline bound test of ARDL result reveals that there is a long run relationship between the variables; also unidirectional Granger causality runs from GDP to infrastructural development expenditure.

The ECM estimate validates the above findings. The degree of responsiveness of changes in infrastructural development expenditure was found to be higher (or more significant) in the long-run compared with the short-run dynamics. A unit increase in Agricultural Sector and Educational Sector Developments to lead to 43%, and 13% increase respectively in economic growth. Similarly, a unit decrease in Health sector, Other Social and Community Services, Road Construction, and Transport and Communication sectors development negatively and statistically affects leads to 6%, 28%, 12% and 65% decrease respectively in economic growth.

The Wagner's theory and Fiscial Illusion theory are valid for Nigeria. The study results are directly proportional to the general deterioration and inadequate application of funds meant for infrastructural development. The trend of infrastructural development expenditure within the study period might also be a factor for the non-existence of the Keynesian theory. Thus, huge

Vol. 2, No. 06; 2018

ISSN: 2456-7760

percentage of infrastructural development expenditures and embezzlement of budgeted funds hampers infrastructural development.

The ECM result revealed speed of adjustment of 20% to equilibrium. By implication disequilibrium cause by poor infrastructural development after the civil war is corrected at the rate of 20% annually back to equilibrium in the current year.

Recommendation

Empirical findings and recommendation from previous bears some implications for policy formulation. It's vital to improve government expenditure on health sector infrastructures to checkmate the increasing cases of infant mortality rate, and outbreak of virus etc.

There is an urgent need to diversify and developed economic infrastructure such as roads, social and community services, transport and communication to boost trade openness and economic growth in Nigeria.

Thus, a business-like approach and controls on expenditures on infrastructures must be embrace to ensure efficiency and equity should be incorporated within public governance especially where increasing public infrastructural development expenditure does not translate to infrastructural development.

References

Afonso, W. B. (2014). Fiscal illusion in state and local finance- A hindrance to transparency. *Sage Journals, 46*(3), 219–228. doi:10.1177/0160323X14550103

Aregbeyeni, O., & Kolawole, B. O. (2015). Oil revenue, public spending and economic growth relationships in Nigeria. *Journal of Sustainable Development, 8*(3), 114–123.

Babatunde S, A., (2018). Government spending on infrastructure and economic growth in Nigeria, *Economic Research- Ekonomska Istraživanja,*

Babalola, A. I. (2015). Fiscal policy and economic development in Nigeria. *Journal of Economic and Sustainable Development, 6*(7), 150–160.

Babatunde. (2015). Effects of internal control system deficiency on contractors' infrastructural development capability in the Nigerian public sector. *Chinese Business Review, 14*(12), 573–582. doi:10.17265/1537-1506/2015.12.002

Chingoiro, S., &Mbulawa, S. (2016). Economic growth and infrastructure expenditure in Kenya: AGranger-Causality approach. *International Journal of Social Science Studies, 4*(9), 1–9.

Darma. (2014). Federal capital expenditure and its impact on economic growth in Nigeria; 1980–2010. *Developing Country Studies, 4*(4), 24–33.

Enders, W. (2004), Applied Econometric Time Series. 2nd ed. New Jersey: Wiley.

Edame, G. E., &Fonta, W. M. (2014). The impact of government expenditure on infrastructure in Nigeria: A co- integration & error correction specification. *International Journal of African and Asian Studies, 3*, 50–63.

Vol. 2, No. 06; 2018

ISSN: 2456-7760

Edame, G.E., F.E. Onah and Fonta. W.M., (2010). Macroeconomic impact of public expenditure on infrastructure in third world countries: The Nigerian experience. International Journal of Management Science, 2(2): 30-45.

Engle, R. F., & Granger, C. W. J. (1987). Co integration and error correction: Representation, estimation and testing. *Econometrical*, *55*, 251–276.

Ekpung E, G. (2014). Public Infrastructure Spending and Economic Growth In Nigeria: An Error Correction Mechanism (Ecm) Approach. *Journal of Social Economics Research*, 2014, 1(7): 129-140.

Fasoranti M, M., (2012). The Effect of Government Expenditure on Infrastructure on the Growth of the Nigerian Economy, 1977-2009. *International Journal of Economics and Financial Issues* Vol. 2, No. 4, 2012, pp.513-518 ISSN: 2146-4138 www.econjournals.com

Federal Ministry of Health. (2005). *Health Promotion Policy for Nigeria.* FMOH.

Iheanacho, E. (2016). The contribution of government expenditure on economic growth of Nigeria Disaggregated Approach. *International Journal of Economics & management sciences, 5*(5), 1–9. doi:10.4172/2162-6359.1000369

Jahan, S., Mahmud, A. S., & Papageorgiou, C. (2014, September). What is Keynesian economics? *Finance & Development, 51*(3), 53–54.

Mitchell, D. J. (2005). The impact of government spending on economic growth. *Heritage Foundation, 1831*, 1–18.

Onwumere, J. U. J., Onodugo, V. A., &Ibe, I. G. (2013). Financial structure and economic growth: Evidence from Nigeria. *Global Journal of Management and Business Research*, *13*(5), 1-9.

Pesaran, M.H., Shin, Y., & Smith, R.J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 26,289-326.doi:10.1002/jae.616.

Trading Economics (2016). *GDP growth rate*. Retrieved from http://www.tradingeconomics.com/ Country

Udoka, C., & Anyingang, R. A. (2015). The effect of public expenditure on the growth and development of Nigerian economy (1980–2012). *International Review of Management and Business Research,4*(3), 824–835.

United Nations Development Programme (UNDP). (2015). *Sustainable development goals*. Retrieved from http://www.undp.com

WHO. (2001). *WHO Country Cooperation Strategy: Federal Republic of Nigeria.* Brazzaville: WHO.

Wells, K. (2015). *What is economic growth? - Definition, theory & impact*. Retrieved from http://www. study.com/academy.