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Government Infrastructure Spending On Growth Of The Nigeria Economy (1981-2019)

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Abstract – This study aims to investigate the impact of government infrastructure spending on the economic growth of Nigeria. The specific objectives were to: investigate the impact of government economic infrastructure spending on economic growth in Nigeria, and determine the impact of government social infrastructure spending economic infrastructure on economic growth in Nigeria. Time series data covering from 1981 to 2019 and sourced from CBN were used for the analysis. The cointegration test using the Bounds approach confirmed the existence of the relationship between economic growth and the trade openness variables. The ARDL technique was employed to estimate the parameters. The major findings indicate that: government economic infrastructure spending has a positive but insignificant impact on economic growth in Nigeria; government social infrastructure spending has a positive significant impact on economic growth in Nigeria. Following these outcomes and the hypothesis evaluated, the study recommends that: there is a need for the government to embark on aggressive expansion programs on economic infrastructures, and there is a need to ensure that infrastructures provided are accompanied by proper maintenance mechanisms to ensure optimal functioning and benefits".

Keywords – Impact, Government Infrastructure, Spending, Growth, Nigeria Economy.

I. INTRODUCTION

In Nigeria, spending has been spent on ineffective transfer payments and questionable budgeting expenses that result in a deficit trap. The key policy issue to economists and policy makers in Nigeria is to ascertain the benefits such as achieving a modest increase in the GDP deriving from undertaking huge infrastructure financing. One of the dominant economic concerns in the current decade is the tenacity and size of the government infrastructural projects (National Planning commission 2015). There has been discussion on the importance of public infrastructure in economic progress (Okolo, Edeme, and Chinanuife 2018). Some argue that a modern country Without enough public infrastructure investment, the full potential will never be realized, and increasing investment spending is a proven method to do so. Much of the discussion on how to improve development, decrease poverty and achieve other SDGs revolves around the need to greatly increase public infrastructure investment (World Economic Forum 2017). The most common reason for increased public infrastructure spending is that it boosts GDP by increasing private input productivity and the rate of return on capital, especially when stocks are low (Barro 1990). The type and volume of investment allocated to economic and social development initiatives largely determine how infrastructure spending aids the economy's growth process (Dickey and Fuller 1979).

The depths, maturity, scale, and sophistication of global capital markets can fund all viable infrastructure investments and projects in developing countries (Global Development Finance 2007). According to Torsten (2014), new sources and methods of funding will be required to meet the expanding demand for infrastructure projects. However, various causes have been attributed to their unwillingness and failure to do so, as well as the fall in the flow of private sector finance to government capital projects. Some of these factors as listed by the Global Development Finance include the impact of global macroeconomic shocks, ongoing transitions in the global power and telecommunications industries, the fragility of most developing countries' local capital markets, and unfinished reforms aimed at putting their infrastructure industries on a commercial footing

Governments growing need for expanded capital projects financing solutions is driven by the nationwide overwhelming demand for adequate and improved infrastructure, this perhaps according to Orimobi (2011) inspires the fact that in contemporary Nigeria many charged with the responsibility of directing state affairs seek for alternative sources of funding to attend to the several developmental and social needs of the people.

The growing need for expansion in government infrastructural projects has seen a correspondingly geometric growth in capital expenditure of the government. The increase in capital expenditure is accompanied by the need for financing solutions. Available data show that the option of bond financing entered government financing strategy in 2003 where the federal government held a bond-debt obligation to the tune of ₦72.56 billion which by the year 2005 had more than tripled to ₦250.83 billion (CBN 2017).

Government capital expenditure comprises those expenditures that provide critical infrastructures that are necessary for sustainable growth and development of the economy. According to the broad classification of capital expenditure of government presented by Oluwatobi (2011), it includes economic or hard infrastructure; and social or soft infrastructures. The hard infrastructures as noted by the source comprise the large physical networks necessary for the functioning of a modern industrial nation including infrastructures such as roads, railway, air and seaports, power plants etc.; while the soft infrastructures contain those institutions saddled with the burden of maintaining economic, health, cultural and social standards such as the financial sector (commercial, mortgage, merchant, development banks and non-bank financial institutions); the education system, the healthcare system, the economic services sector; and the all-important system of government and law enforcement as well as emergency services. Thus, the classification by Wale makes case for easy assessment of how government prioritizes its capital projects. Infrastructure development touches practically every area of the economy since it is concerned with societal well-being and human welfare, including health, education, sport, the environment, tourism, and youth and women's development facilities. Several academics have expressed concern about capital spending's role in infrastructure development. The notion is that wise capital spending may open up enormous opportunities, create jobs, encourage investment, and improve human well-being.

II. Statement of the Problem

Implementation of capital projects by the government is hindered by factors that are financially inclined, notably the absence of a sufficiently large and strong capital market required to pivot the funding weight of capital projects. "Available data indicate that public expenditure so far has not contributed to infrastructure development due to low and inconsistent allocation and in most cases, actual spending is far lower than the budgeted amount. For example, economic services received N400 million in 1980 out of total expenditures of N14.988 billion, while social and community services received N91.4 million. Government spending averaged N696,777 billion between 1996 and 2010, while infrastructure spending averaged N21,817 million. Total expenditure in 2013 was N4,987 trillion, up from N4,649 trillion anticipated in 2012, representing a 5% increase in the overall budget forecasts. Approved capital expenditures totaled N1,621 billion, or 31.3 percent of the total, while recurrent expenditures totaled N2,386 trillion, or 68.7%. Meanwhile, oil revenue has increased, with non-oil revenue accounting for a small part of total revenue. Oil and non-oil revenues were N32 billion and N14 billion in 1995, 2000, 2005, 2010, 2015, and 2016, respectively, N1591 billion and N31 billion, N4762 billion and N79 billion, N5396 billion and N190 billion, and N2994 billion and N299 billion (CBN 2017).

During the 2019 Ministerial screening in the National Assembly, the Minister-designate Babatunde Raji Fashola lamented that paucity of the fund is a major challenge to the infrastructural development of Nigeria". Along the line, he advocated for the introduction of a 10trillion naira bond to address the infrastructure challenge (Fashola 2018). He said that in the last four years, the federal government has been operating a deficit budget due to the paucity of funds which has also affected capital budget implementation. The lack of funding for efficient implementation of infrastructural growth is a key hurdle; it is anticipated that $2.9 trillion will be necessary to close the country's infrastructure deficit by 2043. (Bello 2018). Experts believe that Nigeria has a

significant infrastructure deficit. but minding the gap is constrained by dwindling government revenue. There is the recurring menace of uncompleted and or abandoned projects littered all over the country ranging from roads, bridges, school projects, health facilities, electricity projects and others and the common rhetoric of government in defense is the paucity of funds. It is common knowledge that governments continually have the problem of limited stream of revenue to contend with, perhaps Mailafia (2014) aligns with this in their assertion that funds available to governments at all levels and at any point in time to pursue articulated policies and programs are seemingly perceived insufficient. It is pertinent therefore to look at certain questions that research should provide answers to regarding infrastructure spending and transmission to growth; does government economic infrastructure spending impact on economic growth in Nigeria? What is the size of the impact of government social infrastructure spending on economic growth in Nigeria? The specific objectives for the current study hence are to determine the impact of government infrastructure spending on the economic growth of Nigeria; the specific objectives; investigate the impact of government economic infrastructure spending on economic growth in Nigeria; and determine the impact of government social infrastructure spending economic infrastructure on economic growth in Nigeria. Since capital project financing options is a concern for policymakers", this study will enable them to assess the measured impact of infrastructure spending especially in the planning and implementation of borrowing plans. Secondly, government agencies especially the budget office and the debt management office (DMO) who are saddled with the function of mobilizing revenue through borrowing to fund government activities particularly capital expenditures will find the study outcome indispensable due to the empirical approach. Finally, it will add to the volume of the empirical literature on bond financing and capital expenditure.

III. Review of Related Literature

Theoretical Framework

This study considers two theories of economic growth which share certain similarities in their prescriptions; the solo-swan growth model and the theory of increasing state activities by Wagner.

The Robert Solow–Swan theory

The Swan–Solow theory is a theory proposed by Robert Solow. The neoclassical growth hypothesis was proposed by Robert Solow and Trevor Swan in 1956. Economic growth, according to the theory, is driven by three factors: labor, capital, and technology. Although an economy's capital and labor resources are restricted, technology's contribution to growth is limitless. Economic growth, as measured by GDP, is defined as an increase in the monetary worth of a country's commodities and services over time. The concept of 'decoupling' economic expansion from environmental degradation has gradually overtaken the growth criticism since the 1980s. “In their report Our Common Future, the World Commission on Environment and Development emphasized such a 'decoupling' perspective as a critical strategy for sustainable development (1987). Critics have expressed questions about the viability of such decoupling in recent years, advocating for zero-growth or even de-growth instead. Until recently, proponents of expansion have had the upper hand. The arguments of the opponents have broadened from their initial focus on resource constraints and environmental deterioration to include a broader range of challenges. Economic growth, according to Xue (2019), is the increase in services generated in a country over time. It is measured as an increase in G.D.P. adjusted for inflation, and a country must increase its G.D.P. to be sustainable. regularly According to Kasun (2019), the Solo-Swan theory states that technical innovation helps an economy develop because labor and capital adapt in response to technological advances”. According to the study, when government spending is zero, it is impossible to enforce contracts, safeguard life and property, or create infrastructure, resulting in little economic growth. As a result, government spending is required.

The Theory of Increasing State Activities

Wagner's law is a principle named after German economist Adolph Wagner (1835-1917). Wagner By examining trends in public expenditure growth and the size of the public sector, he enlarged his 'law of rising public expenditures.' According to Wagner's law, the expansion of states' functions increases public expenditure on economic administration and regulation; (ii) the development of modern industrial society results in increased political pressure for social progress and calls for increased allowance for social consideration in the conduct of industry; (iii) the increase in public expenditure exceeds the increase in national income.

Musgrave and Musgrave (1988) argued in favor of Wagner's law, saying that as advanced countries become more industrialized, the public sector's share of the national economy continues to expand. Even Keynesianism has ramifications when it comes to increasing government expenditure to generate GDP. Keynes was one of the most well-known economists who questioned the relationship between government spending and economic growth due to his opposing position. Government expenditure, according to Keynes, is an exogenous factor that can be used as a policy tool to increase economic growth. According to Keynesian theory, government spending can help stimulate economic growth. As a result of the multiplier effects on aggregate demand, an increase in government consumption is projected to lead to an increase in employment, profitability, and investment. Government spending improves aggregate demand as a result of the expenditure multipliers, resulting in increased production.

Conceptual Review

Oshikoya, Jerome, Hussein, and Mlambo (1999) characterize infrastructure as either social (or soft-core) or physical (or hard-core). They stated that soft-core infrastructure encompassed healthcare, governance, education, and accountability, as well as property rights and that hard-core infrastructure included transportation, telecommunications, power, water, and sewage, which they referred to as the wheels of economic activity. Transportation, communication, sewage, water, and power networks are examples of critical physical infrastructure for a firm, area, or country. These systems are typically capital-intensive and costly investments, yet they are necessary for a country's economic growth and success. Government, private sector, and public-private partnerships can all fund infrastructure improvement initiatives.

Infrastructure, in economic terms, often entails the production of public goods, and hence serves as the economic structure's foundation. Government financing, control, oversight, or regulation of infrastructure is widespread since it frequently involves the generation of public goods. This usually manifests itself in the form of more productive direct government production or strictly regulated, legally sanctioned, and frequently subsidized production.

Categorization of Infrastructure

Soft Infrastructure: The institutions that keep the economy operating are made up of this type of infrastructure. These projects, which contribute to the delivery of specific services to the general public, usually necessitate the use of human resources. Healthcare, financial institutions, political systems, law enforcement, and educational systems are all examples.

Hard infrastructure refers to the physical processes that allow a modern, industrialized nation to function. Roads, highways, and bridges, as well as the money and assets required to maintain them (transit buses, cars, and oil rigs/refineries), are examples. Housing and heating facilities, telecommunications, and transportation are examples of key infrastructure assets recognized by a government as being critical to the smooth operation of a society and economy. Agriculture, for example, or public health. The Department of Homeland Security, the Department of Energy, and the Department of Transportation are all in charge of important infrastructure in the United States.

Government Infrastructural Spending and economic growth

This question has spawned a lot of discussions among economists. While some academics believe that government spending has a negative or little impact on economic growth, others disagree., the nature of the impact is inconclusive (Akpan, 2005), others argue that it has a positive and considerable impact (Korman and Bratimasrene, 2007). Researchers are interested in confirming and comprehending the links between fiscal policies and economic growth, thanks to a recent resurgence of interest in growth theory. Over the last decade and a half, "a lot of empirical research has gone into determining whether aspects of government spending have a meaningful link with economic growth. Another essential part of government spending is the provision of services that are not covered by the market economy, such as health economic growth. To put it another way, human capital has a significant impact on economic growth. The provision of services that are not covered by the market economy, such as health economic growth, is another important aspect of government spending. That is, human capital promotes high benefits associated with economic growth, but the financial source for public expenditure, taxation, reduces taxpayer benefits and, as a result, reduces economic growth benefits". What makes government spending desirable for supporting economic growth is how it is spent. Economic growth can occur in several ways. The first is a rise in the volume of circulating physical capital products. It has been proven that increasing capital in the economy increases labor productivity. Workers may be able to produce greater

output every period if they have access to newer, better, and more tools. Technology advancements have the potential to re-ignite economic growth. Workers can generate more by integrating capital items in more productive ways.

Challenges of infrastructure development in Nigeria

Infrastructure development is critical for emerging countries, particularly in Africa (Ogbaro and Omotoso 2017). The absence of modern infrastructure in SSA countries has long been regarded as a key hindrance to economic development and a major roadblock to achieving the Millennium Development Goals (MDGs) (Oluwatobi, 2011).

Furthermore, Ondiege et al. (2013) blamed a lack of infrastructure in most African countries for the rise in commercial transaction costs. Africa's economies are among the world's least competitive, with the lowest production levels of any low-income country. The significance of infrastructure in Nigeria cannot be overstated.

Infrastructure development, according to Olaseni and Alade (2012) and Sanusi (2012), is important to achieving Vision 2020, which aims to make Nigeria one of the top 20 economies in the world by 2020, with a minimum GDP of $900 billion and a per capita income of $4000 per year. The federal government has continued to make concerted efforts to raise financing from local and international debt markets to alleviate Nigeria's infrastructure deficit. As rising markets like Nigeria pursue development, the importance of infrastructure in several aspects of the economy cannot be emphasized. However, a major hurdle to infrastructure development is a lack of financing to complete it. By 2043, it is estimated that a total of $2.9 trillion will be needed in Nigeria to address the country's infrastructure deficit. The current administration has made concerted efforts to acquire funding from local and international debt markets to overcome Nigeria's infrastructure deficit.

2.3 Empirical Literature

Babatunde (2018) used both primary and secondary data to evaluate the influence of government investment on infrastructure and economic growth in Nigeria. According to the conclusions of the study, government expenditure on transportation and communication, education, and health infrastructure have a positive impact on economic growth, "whereas spending on agriculture and natural resource infrastructure has a negative impact.

The impact of infrastructure on Nigeria's industrial sector was researched by Orji, Worika, and Umofia (2017). The researchers used time series data from 1990 to 2015 to do regression analysis with the ordinary least square method. Nigeria's industrial sector performance was measured using the index of electricity consumption, gross capital formation, and federal government spending on transportation and communication, while infrastructural development was measured using the index of electricity consumption, gross capital formation, and federal government spending on transportation and communication. The index of energy consumption had a positive but small impact on industrial value-added, according to the regression results, but gross capital creation and federal government spending had a negative but considerable impact (on a 5 percent confidence level). To ensure a better supply of power, the report recommended that actions to restructure and sustain Nigeria's power industry be addressed seriously. It was also suggested that corruption be reduced and that projects receiving funds be closely monitored to ensure that effective and long-lasting infrastructure is built and maintained to boost industrial output".

Oyinlola and Akinnibosun (2013), Modebe, Okafor, Onwumere and Imo (2012) and Muritala and Taiwo (2011) are some studies related to this subject but have produced mixed findings.

IV. METHODOLOGY

Design and Sources of Data

Since the data used for this study are time series data, the research design adopted is the experimental research design (*ex post facto*). The reason for adopting this type of design is that it combines theoretical consideration with empirical observation (Baghebo and Atima, 2013). "This type of design has proved some more than satisfactory level of accuracy in enabling researchers to observe the effects of the explanatory variables on the explained variable. The study tested and analyzed secondary data on the variables established; the data were sourced from the Central Bank of Nigeria Statistical Bulleting for various years containing values for the representative variables ranging from 1981 to 2019. The statistical analysis will be done with the aid of E-Views statistical analysis package version 10.0

Model Specification

The model for the current study expresses economic growth as a function of some components of economic infrastructure spending and social infrastructure spending. The model is specified as below:

RGDP = f (GSEI, GSSI)

$$\mathbf{RGDP = \beta 0 + \beta_1 GSEI + \beta_2 GSSI + \mu t,}$$

where:

DEPENDENT VARIABLE

RGDP = Gross Domestic Product which represents economic growth

INDEPENDENT VARIABLES

GSEI = government spending on economic infrastructure

GSSI = government spending on social infrastructure

Ut = error term with zero mean and constant variance

$\mathbf{B_0}$ = parameters to be estimated

the specified model implies that economic growth proxied by G.D.P. is influenced by government expenditure in the provision of economic infrastructure (GSEI) and government expenditure on the provision of social infrastructures (GSSI). The μt is a stochastic white noise error term with zero mean and constant variance, while β0 are parameters to be estimated.

V. Presentation And Discussion Of Results

Pre Estimation Tests

The Unit Root Test

Table 1: Unit root test result

Variables	@level	@1st diff	C.V	order	remark
RGDP	5.615336	-	3.53	1(0)	stationary
GSEI	1.402578	5.640419	3.54	1(1)	stationary
GSSI	1.776202	5.907791	3.540	1(1)	stationary

Source: researcher's computation using E-views (version 10)

The test for stationarity conducted using the Augmented Dickey Fuller (ADF) Unit Root approach shows the data on the dependent variable (RGDP) and the independent variables (GSEI, and GSSI) did not all achieve stationarity @ level. While RGDP became stationary @level, others were stationary after being subjected to first differencing. Differencing is done when the data set fails to be stationary @ level; stationarity is concluded if the ADF statistic is greater than the 5% critical value or if the probability value (P-value) is less than (0.05). Hence, stationarity and integration were achieved at order 1(0) and 1(1) respectively.

Bounds Cointegration Approach to long-run relationship

The data were not all stationary and integrated of the same order. As a consequence, and in following the standard econometric estimation procedure the Johansen cointegration test is not suitable. The most suitable long run test is the Bounds test of a long run relationship, the result is presented below:

Table 2.0 cointegration test result

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	109.8313	2

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	3.17	4.14
5%	3.79	4.85
2.5%	4.41	5.52
1%	5.15	6.36

Source: researcher's computation using E-views (version 10)

As seen in Table 2 above, the test statistic of the Bounds test of long-run relationship indicates the presence of a long-run relationship among the variables at 5% level of significance, thereby leading to the rejection of the null hypothesis of no long-run relationship and acceptance of the alternative.

There are three options for the decision criteria when using the Bounds approach to cointegration: if the F-stat is greater than the critical value for the upper bound 1(1) then we can conclude that there is a long-run relationship; if the f-stat falls below the critical value for the lower bound 1(0)", "there is no cointegration, hence no long-run relationship; and the test is considered inconclusive if the f-stat falls between the lower bound 1(0) and the upper bound 1(1). The obtained f-stat of 109.8313 is greater than the critical value for the upper bound 1(1) at 5% level of significance (109.8313 > 4.85), hence it is concluded that the variables show evidence of a long-run relationship.

Estimation Result

Table 3 ARDL Result

Dependent variable: RGDP

Variable	**Coefficient**	**Std. Error**	***T-statistic***	**Prob.**
GSEI	0.839326	3.053738	0.274852	0.7851
GSSI	30.44326	10.15584	2.997611	0.0051
R-squared	0.799185			
F-stat	138.8170			
Prob(F-stat)	0.000000			

Source: researcher's computation using E-views (version 10)

Table 3 above indicates that the infrastructure spending variables (government spending on economic infrastructure) and (government spending on social infrastructure) conformed to their apriori predicted sign (GSEI > 0, and GSSI > 0). An increase in both spending streams increases economic output by (0.839 billion Naira) and (30.44 billion Naira) respectively.

The Coefficient of Determination R^2

The empirical value of the coefficient of determination (R^2 = 0.799185) shows that 79.92% of the additions to the aggregate output of the economy (economic growth) is streamed from concerted efforts in the provision of the necessary infrastructure needed to run businesses and the economy. Economic theories and empirical evidence have supported the notion that infrastructures are the basic foundations upon which the economy is run, these structures support businesses, provide jobs and income and ultimately create growth enabling indices that trigger rapid expansions in the aggregate economy out of the economy. The policy implication of the results is that the need for infrastructure development is indeed crucial for developing countries, especially Nigeria as opined by Ogbaro and Omotoso (2017). The lack of modern infrastructure is regarded as an impediment to economic development and a major constraint not only on poverty reduction but on expansion of incomes and welfare".

VI. Conclusion, Summary Of Findings And Recommendations

This study focused on investigating the impact of government infrastructure spending on the economic growth of Nigeria. The study reviewed relevant conceptual, theoretical and empirical submissions.

The estimation test proceeded from the unit root test intended to ensure model reliability for policy and forecasting purposes; the variables were not all initially stationary at level, but at first, differencing; they were integrated of order 1(0) and 1(1), hence the result of the regression analysis can reliably be employed in forecasting and predictions regarding aggregate economic outcomes. The result of the cointegration test using the ARDL Bounds approach confirms a long-run sustainable relationship between infrastructure spending by the government and economic growth. The entire regression plane is statistically significant as shown by the F-test, indicating a joint influence of the model explanatory variables.

From the regression result, the coefficient of multiple determination (the R^2) shows that 79.92% of the total variations in the aggregate economic output of Nigeria (RGDP) could be streamed by great additions to the stock of both economic and social infrastructures in the economy. The research analysis so far leads to the conclusion that spending activities of the government in the provision of social infrastructure have a positive and significant impact on the economic growth of Nigeria, while government spending on economic infrastructure does not.

VII. Recommendations

Based on the outcome of the various tests carried out and the hypothesis evaluated, this research, therefore, makes the following recommendations:

- There is a need for the government to embark on aggressive expansion programs on economic infrastructures.
- There is need to ensure that infrastructures provided are accompanied by proper maintenance mechanism to ensure optimal functioning and benefits".

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