



## PUBLIC DEBT AND THE NIGERIAN ECONOMIC DEVELOPMENT (1990 – 2019)

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**ABSTRACT:** *The huge infrastructure deficit in Nigeria underscores the need for capital mobilization required to finance activities and ensure sustainable growth and development. This study examined the effect of public debt on the economic development of Nigeria covering the period 1990-2019. Domestic public debt, External public debt, Total public debt, and public debt servicing represented independent variables. Per capita income was the dependent variable. Ex post facto research design was adopted for the study. Data was sourced from the Central Bank of Nigeria Statistical Bulletin and [Globeconomy.com](http://Globeconomy.com). The study used Augmented Dickey-Fuller (ADF) unit root test to test for the stationarity of the variables while the Johansen cointegration test was used to establish that a long-run relationship exists among the variables. Ordinary Least squares (OLS) and Error Correction Model (ECM) were the tools used for analysis. Results showed that domestic debt and external debts each has a negative and statistically significant effect on per capita income while total public debt and public debt servicing showed a positive and statistically significant effect on per capita income respectively. Based on the findings, the study concluded that neither external debt nor domestic debt has been able to singly spur economic development while total public debt which is the combination of domestic and external public debt positively drive economic growth, thereby, improving the per capita income of the citizens in Nigeria.*

**KEYWORDS:** Domestic Public debt, External Public Debt, Total Public Debt, Public debt Servicing, Per capita income.



## INTRODUCTION

In the course of the economic history of a country, possibly due to the quest to develop its economy, improve standards of living of its citizens, and faced with the challenge of the inadequacy of capital stock, the government incurs debt through borrowing in the domestic and international markets. The essence is to finance productive domestic projects with the view that proceeds will contribute to the growth of the economy and the development of the nation. This type of debt is referred to in economics and finance parlance as public debt. Also called government debt, public debt is a legal obligation on the part of a government to make interest and/or amortization payments to holders of designated claims in accordance with a defined temporal schedule. Public debt is created through government borrowing from individuals, corporations, institutions, and other governments. In simple balance-sheet terms, public debt is a liability item on the government's account and an asset on the combined accounts of the holders of the debt instruments. It constitutes all claims to the government, less any claims held by the government against the private sector and foreigners. This all encompassing definition is credited to Semertzaki, Konstantinidou and Gavrioli (2011), Udoka and Ogege, (2012). From the definition, it suffices to note that public debt constitutes not only external debt but also domestic debt.

Rais and Anwar, (2012) posit that almost all governments face budget deficits due to high expenditure and less revenue. As such, governments can get revenue by increasing taxes, printing money, indulging in domestic or external borrowing and using previous budget surplus. When the government decides to borrow instead of introducing additional tax measures to finance the budget deficit, it creates a liability on itself known as public debt as aforementioned. External obligations and liabilities of some known maturity and outstanding at a particular point in time and payable in form of any commodity is known as public external debt or simply external debt. On the contrary, when the debt is owed to residents in the country, it is known as domestic public debt.

A government may choose to borrow from the many available options for the purpose of financing the fiscal deficit. A readily available option is borrowing from the Central Bank. Going for this is tantamount to the printing of money. Borrowing from domestic commercial banks, from the domestic non-bank sector and external sources are other choices open to the government. Each method has its own ramification for various aspects of the economy. The government usually adopts a mixed strategy and utilizes a number of options at the same time that has more benefits for the prevailing situation of the country.

There are varied opinions on the possible effect of public debt on economic growth and development, and quite a handful of studies in Nigeria have highlighted this. Some studies are quite alarmed with the continued mounting of public debt stressing that this can only exacerbate the economic burden already faced by most developing countries. These studies contend that the enormous debts which at present oppress, and will in the long run probably ruin the economy continue to accumulate in a colossal proportion. This, they consider as a calamity for macroeconomic stability in many countries, especially the ones that have experienced debt crisis (Švaljek, 1997). It causes fear of great disturbances and the breakdown of the state and the welfare of the people. Among the studies, credence is given to the work of Matthew and Mordecai (2016) who reported that the gross increase in the total debt stock has exposed Nigeria to a high debt burden and has resulted in the poor growth of the nation's output. The study also pointed out that Nigeria's high debt burden has had grave consequences for the



economy and has severely encroached on resources available for socio-economic development and poverty alteration. Furthermore, according to Obadan and Ujah (2004) what various statistics showed was the increasingly large debt service requirement which subjected the Nigerian economy to undue pressure and constrained it even when the improved resource inflow was factored into the country's cash flows. Despite the government's conscious effort in managing the nation's debt, the issue of debt has still been a burden to the Nigerian economy. Large debt service payment obligations and the debt burden has depressed investment and hence, economic growth and development through depleting liquidity and also through disincentive effects. Udo and Antai (2014) are of the view that this precarious situation results in the country experiencing resource under-utilization, high incidents of poverty and decay of infrastructures. All three vices impede economic development.

Growing public debt is not a phenomenon peculiar only to Nigeria. It is a trend and experience faced by many countries especially developing countries. This notwithstanding, generally, economists do not consider public debt a major problem. According to Egbetunde (2012), economic theory suggests that reasonable levels of borrowing by a developing country are likely to enhance its economic growth which if well-tailored, translates to economic development. Therefore, to encourage growth, it is proper for countries especially those at the early stage of growth to borrow funds to supplement the stock of funds which is most often inadequate for meaningful investment. Good management of borrowed funds in addition to internally generated funds presupposes that there will be enough returns to cover both the capital and the interest on the debt. This, however, is possible provided there is no macroeconomic instability due to policies that distort economic incentives or sizable adverse shocks, and if the acquired funds are used for the desired purpose. Izedonmi and Ilaboya (2012) are of the view that among other reasons, it is the inability to channel the loan to developing long term infrastructural projects and the problem of corruption that is the issue with debt acquisition. They further argued that the standard growth with debt hypothesis allow poor nations to acquire long term debt, provided the cost of foreign borrowing is less than the expected return from the debt. The long term implication is that the proceeds of the funds so invested will lead to increased output which is growth, and this could further be used to improve economic development. Problems usually emanate rather from the mismanagement and unsustainability of the public debt.

From the afore-discussion and due to a number of advantages over taxes, countries reluctantly contract debt as a source of financing, especially in periods of extremely high, although short-term demand for public expenditures (wars, natural disasters, economic crises).

Throughout the years, especially after the collapse of the oil boom in 1978 which ushered in an oil glut, Nigeria has actively employed the use of public debt as a fiscal policy instrument engaging in both domestic and external borrowing. The management or mismanagement thereof led Rahman, Adeola, Abiodun, and Tolulope (2010) to opine that a major obstacle for Nigeria's economic development over the last decades has been its crippling debt overhang and in April 2006, Nigeria ordered a final debt repayment to rich lending nations, completing Africa's biggest debt relief deal. The debt overhang phenomenon is where substantial resources are used for debt servicing such that it stifles economic growth. It becomes a tax on domestic production such that the amount spent hampers meaningful economic growth activities as it reduces resources available for the government to implement growth-oriented economic policies (Nwannebuike, Ike, & Onuka, 2016).



In as much as there has been much interest, and a lot of studies have focused on the effect of public debt, whether domestic, external, or combined effect on economic development, the methodology, the variables used, and most importantly, the empirical results have been varied. The objective of this study is twofold. Firstly, analyze the trend and patterns in public debt, and its relationship with economic development in Nigeria. Secondly, observe the direct relationship between public debt and economic development. This will undoubtedly fill some gaps in the literature. The study covers a period of 1989 to 2018. The work is divided into five sections. Section I is the introduction, section II is the review of the conceptual, theoretical and empirical literature, section III is the methodology, section IV is the presentation and analysis of data, and section V is a summary of the findings, conclusion and recommendations.

## CONCEPTUAL LITERATURE

According to Matthew and Mordecai (2016), economic development is the increase in the standard of living in a nation's population with sustained growth from a simple, low-income economy to a modern high-income economy. It also involves achieving a balance in all sectors of the economy in the process of production of goods and services be it agriculture, finance, manufacturing, health, education, and a host of others. Adejumo and Adejumo (2014) outlined some of the inherent challenges in the Nigeria Economy including social vices such as poverty, low per capita income, inequitable distribution of income, low capital formation, inefficiency in the mobilization of resources, a monoculture economy - depending so much on a singular commodity – oil as a major source of income, unemployment, inflation among others.

Every government aspires to attain sustainable economic growth and development as it carries out various macroeconomic activities. The prerequisite to achieving this aspiration demands a considerable amount of capital in the form of investment expenditure on infrastructure and other productive capacity development. The shortfalls in capital adequacy usually faced by economies, especially the developing economies make it difficult for the afore-mentioned investments to take place. This results in retardation in the growth of the GDP and limits the development of the economy. To circumvent this malaise, countries resort to the borrowing of funds to augment the inadequate stock of funds and use it for productive investments and boost the growth of the GDP, which, if well executed, will translate to the development of the country, thereby, boosting the standard of living of citizens (Ada, Chigozie, & Godwin, 2016).

Simply put, public debt is debt incurred by the government through borrowing in the domestic and international markets. Concurring with Alison; Obademi (2012) argued that the growth of government debt arises first from financing budget deficits. Secondly, it arises from the implementation of monetary policy - achieved through sales and purchase of treasury bills within the framework of open market operations.

Additionally, governments incur debt to develop the financial sector through the supply of tradable financial instruments in their quest to deepen the financial markets. Obademi also suggested other reasons that may prompt the government to incur debt. Some of these include financing emergencies such as natural disasters and economic depression, financing important capital projects, and financing current expenditure while revenue collection is awaited.

Egbetunde (2012) in his own opinion stated that countries borrow for macroeconomic reasons. For instance, for higher investment, higher consumption such as in education and health, or to



finance the transitory balance of payments deficits with the view of lowering nominal interest rates abroad, or to circumvent hard budget constraints. Egbetunde further stressed that lack of domestic long-term credit is another motivating factor for a country to opt for external debt. The implication is that a country indulges in debt to boost economic development and reduce poverty. The level of debt will remain acceptable provided the returns on investment projects are high enough to redeem the credit and interest. It becomes a problem if the initial stock of debt grows to a certain threshold where servicing them becomes a burden, and countries find themselves on the wrong side of the debt-laffer curve, with debt crowding out investment and growth. This was the situation Nigeria found herself in the 1980s, 1990s and up to 2006 when through the debt relief program, she offset one of the highest debt payments in African history by paying \$12 billion to the Paris Club (Polgreen, 2006). According to Polgreen, this was to pay off about \$30 billion in accumulated debt as of December 2004 to the Paris Club made up of the United States, Germany, France and other wealthy nations. This implied that about 60% of the debt amounting to about \$18 billion was written off as debt relief.

Ada, Chigozie, and Godwin (2016) argued that countries borrow to promote economic growth and development, by creating a conducive environment for people to invest in various sectors of their economies. They further argued that other specific reasons why countries may borrow include: to be able to finance their recurrent budget deficit, as a means of deepening their financial markets, to enable them to fund the increasing government expenditures, to enhance their narrow revenue sources and low output productivity which results in poor economic growth and less development. In a nutshell, governments borrow to augment their limited resources so as to bridge the savings-investment gap which is consistent with the dual-gap theory (Chenery & Stout, 1996).

## **THEORETICAL LITERATURE**

### **The Keynesian theory**

This study is anchored on two theories: The Keynesian theory and the Debt overhang theory.

### **The Keynesian theory**

The hallmark in the Keynesian theory is the paradigm that increases in aggregate demand will invariably spur economic growth, thereby enhancing economic development. Keynes argues that economic stagnation may be attributable to a lot of idle funds in citizens' pockets. In this perspective, Keynes view fiscal policy as the best policy that brings about growth in any economy since it acts in the interest of the general public. Keynes made this assertion in the general theory of employment, interest, and money in 1936 in which he stated that the solution to the problem of economic stagnation rested on the expansion of aggregate demand through a massive increase in government expenditure. Accordingly, when the government embarks on public borrowing to finance investment and other expenditures, the idle funds are withdrawn from the private pockets, and since the funds were lying fallow, the consumption level of private individuals remains unaltered. These funds, when injected back into the economy by the government, lead to multiple increase in aggregate demand causing an increase in output and employment and justifying the Keynesian macroeconomic theory which as earlier stated, generally assumes that increased government expenditure tends to lead to high aggregate demand and in turn rapid economic growth opening opportunities for economic development.





Accordingly, Matthew and Mordecai (2016) posited that public borrowing can be used to influence the macroeconomic performance of the economy.

On the other hand, the indirect effect of public borrowing is its effect on investment. The transmission mechanism through which debts affect growth is its reduction in the resources available for investment by debt servicing. Also, public debt can act as an implicit tax on the resources generated by a country and create a burden on future generations which come in the form of a reduced flow of income from a lower stock of private capital. This, in turn, may lead to an increase in long-term interest rates, a crowding out of private investments necessary for productivity growth, and a reduction in capital.

### **Debt Overhang Theory**

Debt overhang was initially analyzed by Myers (1977). Myers pointed out that “outstanding debt could negatively distort the firm’s investment incentives. This is because there is a reduced incentive to undertake profitable investments when decision-makers seek to maximize equity value. This phenomenon is referred to as a problem of “debt overhang,” since a portion of the return from a current new investment goes to make the existing debt more valuable. The problem of debt overhang could be solved by granting short term debts as submitted by Myers. This was viewed from the perspective that if all debt matures before the investment opportunity, then the firm without debt in place can make the investment decision as if an all-equity firm. It is, therefore, logical to state that, debt that matures soon—although after relevant investment decisions, as opposed to before—should have reduced overhang.

In Borensztein’s (1989) perspective, “Debt overhang occurs where countries are unable to service their debt in full and so actual payments are determined by some negotiation process between the debtor country and its creditors”(p.17). In situations like these, debt payment amounts commonly become linked to the economic performance of the debtor country and not by the contractual terms of the debt.

It implies that: should the economic performance of the debtor country improve, a portion of the return to any investment will be overshadowed by higher debt repayments - accruing to creditors as debt services instead of to the country itself. This invariably would not increase the total consumption of the debtor country with the past accumulated debt acting as a foreign “tax” on current and future production. This weakens the incentive to invest and encourages capital flight even when finance is available. This disincentive effect of debt overhang shall most probably discourage any government efforts to initiate adjustment policies and might equally adversely affect private sector incentives to hold domestic assets.

From the foregoing, the Debt overhang theory is based on the premise that if the debt will exceed the country’s payment ability with some probability in the future, expected debt service is likely to be an increasing function of the country’s output level. Thus, some of the returns from investing in the domestic economy are effectively taxed away by existing foreign creditors and investment by domestic and new foreign investors is discouraged.



## Empirical Literature Review

Uma, Eboh and Obidike (2013) examined the effect of total domestic debt, total external debt, and servicing of external debt on the economic development of Nigeria within the period 1970-2010. After testing the unit root properties of the data with the Augmented Dickey-Fuller unit root test, the study proceeded to conduct the Johansen test for co-integration in order to ascertain the long-run relationship of the variables in the model. Ordinary Least Squares was employed to analyse the data. Findings showed that total domestic and total external debts were inversely related to the real gross domestic product, which was used to proxy economic development although this was not statistically significant. Contrary to the expectations of the researchers, interest in total external debt related positively to real gross domestic product, although at an insignificant level. Based on the findings, they recommended among others that the government must be sincere and focus more on internally generated revenue to finance development projects until all the debts and its interests are finally settled.

Sulaiman and Azeez (2012) examined the effect of external debt on the economic growth of Nigeria within the period 1970 to 2010 with economic growth proxied by the GDP as the endogenous variable and external debt the exogenous variable. Using Augmented Dickey-Fuller (ADF), unit root properties of the time series data were checked. To test for a long-run relationship between the variables, the Johansen cointegration technique was employed. The ordinary least squares and the error correction model were used for data analysis. Findings of the study showed that external debt has contributed positively to the Nigerian economy.

Saifuddin (2016) investigated the influence of public debt and economic growth in Bangladesh, using investment and growth models (indirect and direct effects). The researcher employed the use of Augmented Dickey-Fuller Test to test for unit root and the TSLS regression technique was used to estimate the models. The estimates showed public debt was positively related to investment and growth.

Erhieyovwe and Onovwoakpoma (2013) examined the impact of external debt burden on economic growth by assessing various macroeconomic variables using econometric cointegrating techniques. The result showed the existence of a long run and positive relationship between external debt burden Foreign direct investment, inflation, export and growth.

Udoka and Ogege (2012) examined the extent of the public debt crisis and its consequences on economic growth in Nigeria from 1970 to 2010 using an error correction framework and co-integrating techniques. They found out that a long-run relationship exists between external debt crisis and economic growth. According to these researchers, to avoid a crisis of economic development, public debt should be reduced to a level judged as minimal.

Emmanuel, (2012) employed an augmented Cobb Douglas model to analyse the impact of public debt on economic growth in Nigeria using impact and proportional impact values. Domestic debt, external debt and total debts were the impact values while the ratios of the impact variables to the Gross Domestic Product were used as the proportional impact values. The Co-integration technique was used to estimate the long-run relationship between the explanatory variables and economic growth captured as the GDP. The result showed that a joint impact on public debt on economic growth in Nigeria is negative and quite significant in the long run. The implication is that: though in the short run, the impact of borrowed funds on



the Nigerian economy is positive, in the long run, economic growth is depressed by the impact of debt.

Using the multi-regression technique, Anayochukwu and Ikechi (2014) examined the impact of different types of Domestic Debts and Economic growth in Nigeria (1980-2011). The result showed FGN bonds had a positive relationship with economic growth while development stocks showed a negative relationship.

Ada, Chigozie, and Godwin (2016) investigated the impact of external debt on economic growth in Nigeria 1970 – 2013 using an ARDL Bound testing approach to integration and error correction model. The Granger causality test was used to ascertain the direction of causality. The result established a long-run relationship and that external debt has a significant negative impact on output in Nigeria. The result also showed a unidirectional causality between external debt and economic growth.

Employing the Ordinary Least squares, error correction and parsimonious models, Onyeiwu, (2012) analyzed quarterly data between 1994 and 2008 and the result showed that level of domestic debt showed a negative relationship with economic growth in Nigeria within the stipulated period. Also, considering that the average over the period of study of debt holding of government was 114.98 percent, far above a healthy threshold of 35 percent of bank deposit, there was evidence of crowding out of the private investment.

Investigating the average impact of government debt on per capita GDP growth in 12 European countries 1970 to 2010, and using an empirical growth model based on a conditional convergence equation relating GDP per capita growth rate to the initial level of income per capita, the investment/saving-to-GDP rate and the population growth rate Checherita and Rother (2010), augmented the model to include the level of gross government debt (as a share of GDP). They found a non-linear impact of debt on growth with a turning point at about 90-100% of GDP. Beyond this point, the government debt-to-GDP ratio has a detrimental impact on long-term growth. Also found that the negative growth effect of high debt may start already from levels of around 70-80% of GDP. Lastly, evidence also showed an annual change in the public debt ratio and the budget deficit-to-GDP ratio are negatively and linearly associated with per-capita GDP growth.

Izedonmi and Ilaboya (2012) examined the debt-growth dynamics in Nigeria in the period 1980-2010 using co-integration and error correction tests. Results showed evidence of a significant negative relationship between public debt burden and economic growth. Secondly, the ratio of debt service to export was found to have a negative and significant effect on economic growth.

Matthew and Mordecai, (2016), examined the impact of public debt on the economic development of Nigeria spanning from 1986 to 2014, employing the Augmented Dickey-Fuller test, Johansen co-integration test, Error Correction Method (ECM) and the Granger Causality test. The result showed a long-run relationship among the variables viz; external debt stock, domestic debt stock, external debt servicing, domestic debt servicing and economic development (proxied with GDP per capita). They also found that while the external debt stock and external debt servicing have an insignificant negative relationship with economic development in Nigeria, domestic debt stock has a direct and significant relationship with





economic development, and domestic debt service payment was significant but inversely related to economic development in Nigeria.

Blake, (2015), carried out studies on the impact of public debt on economic growth in Jamaica using quarterly data from 1990 to 2014 and employing an autoregressive distributed lag model. The results of the models indicated that the public debt has a non-linear impact on economic growth and that total public and external debts negatively affect economic growth in excess of 100 percent and 55 percent of GDP, respectively. This implied that the composition of the debt matters.

Okechukwu and Anele (2014) examined whether the external debt is a tool or a threat to the economic growth of Nigeria within the period, 1980 to 2008. They employed multiple regression techniques to analyse the data. The result showed that there is a minimal positive relationship between external debt stock and GDP where external debt stock is a proxy for the explanatory variable and the GDP is the proxy for economic growth.

Egungwu (2018) examined the impact of the increase in external debt stock and its servicing on human capital development in Nigeria by adopting an ex post facto research design and using time series data spanning from 1986 to 2015. Ordinary Least Square (OLS) regression technique was used to test four hypotheses that were formulated for the study. Findings of the study showed that external debt stock and external debt servicing both had significant negative effects on human capital development; external debt stock borrowed from the Paris club and multilateral creditors had insignificant negative effects; those borrowed from the London club had insignificant positive effects while those borrowed from bilateral creditors had significant positive effects. However, on debt servicing, all the creditors showed insignificant positive effects except the London club which had significant positive effects. The study concluded that nations could finance their budget deficits with external funds but should ensure that such funds are applied on priority projects that have the capacity to deepen the economy and improve the well fair of their citizens

## METHODOLOGY

### Data Sources and methodology

The study used an ex post facto research design. The necessary data for the paper was collected from the Central Bank of Nigeria Annual Statistical Bulletin, 2019 edition. The required data for the study is the country's domestic debt, external debt, total public debt, and public debt service from 1990 to 2019.

The study employed the Ordinary Least squares (OLS) analytical tool since it is known for being a Best Linear Unbiased Estimator of a linear relationship like the one employed in this study. The data used are time series and met the requirements of quantitative data and therefore suitable for the study. An augmented Dickey-Fuller Unit root test was conducted on the time-series data to affirm the stationarity of each variable. A unit root exists in most macroeconomic time series data as posited by Nelson & Plosser, Chowdhury in Ugbaje & Ugbaje (2014). Accordingly, for the results of data analysis to be reliable, the data should be stationary, otherwise, it will produce spurious results and this may lead to inconsistency in parameter estimates. All the variables were stationary at the first difference,  $I(1)$ . Secondly, a co-



integration test was performed on the variables to ascertain their long-run relationship. This was achieved with the aid of Johanssen's co-integration tests. The result showed that the trace test indicated one co-integrating equation at the 0.05 level. This statement signified cointegration. This implied that a long-run equilibrium relationship exists between the variables in the series. The fact that all the series are integrated of the order I(1) shows that in the short run, there is an error, and the error correction model was conducted to determine the speed of adjustment of the error in order to attain equilibrium in the long run. Having performed all these preliminary tests, and being that the variables were cointegrated, a fresh regression analysis was run with level values to establish the long-run relationship and type of relationship that binds each of the explanatory variables to the explained variable. The null hypotheses were tested using the t-statistic, the F-statistic and the P-values of the econometric software, Eviews 10.0.

### The Model Specification

After an in-depth review of previous studies and improving upon the model of Matthew and Mordecai, (2016), which state thus

$$GDP_{pc} = f(EDS, DDS, ESP, DSP)$$

Where  $GDP_{PC}$  = Gross Domestic Product per capita,  $EDS$  = External Debt Stock,  $DDS$  = Domestic Debt Stock,  $ESP$  = External debt service payment,  $DSP$  = Domestic debt service payment. The equation is modified by including the joint effect of total public debt (TPDB) and combining external debt servicing with domestic debt servicing to have the effect of public debt servicing (PDS). The model for this study becomes

$$PCI = f(DDB, EDB, TPDB, PDS) \text{ -----1}$$

The natural log of the variables was taken and used throughout the analysis. Usually, Log is used for scale invariance in self-similarity cases. In this case, the log was taken to reduce the size of the variables which are all large similar values.

The econometric model can be expressed as

$$\ln PCI_t = \beta_0 + \beta_1 \ln DDB + \beta_2 \ln EDB + \beta_3 \ln TPDB + \beta_4 \ln PDS + \mu \text{ -----2}$$

Where,

$\ln PCI$  is the natural logarithm of Per Capita income used as a proxy for economic development,  $\ln DDB$ , the natural logarithm of domestic debt,  $\ln EDB$  natural logarithm of external debt,  $\ln TPDB$  natural logarithm of total public debt, and  $\ln PDS$  - natural logarithm of public debt servicing.  $\beta_s$  are elasticity and  $\mu$  is the white error term.

Wooldridge (2013) pointed out that when  $y > 0$ , models using  $\log(y)$  as the dependent variable often satisfy the Classical Linear Model (CLM) assumptions more closely than models using the level of  $y$ . He added that this also mitigates, and most often, eliminates heteroskedastic or skewed problems usually suffered by strictly positive variables. Wooldridge also intimated that taking the log of a variable often narrows its range especially true for large monetary values and that while this usually applies to the dependent variable we occasionally have problems with the residuals, (e.g. heteroscedasticity) caused by an independent variable which can be sometimes corrected also by taking the logarithm of that variable.



Benoit (2011), in concordant with Wooldridge (2013), also stated that logarithmic transformations are also a convenient means of transforming a highly skewed variable into one that is more approximately normal. He went on to state that there are four ways a simple bivariate model could be transformed. The first is level-Level, second, Log-Level transformation, third, Level-Log, and lastly Log-Log transformation. This simple model could be generalised to include multivariate models. This justifies the transformation of the level-level model in equation 1 into a log-log model in equation 2 restated thus:

$$\text{LnPCI}_t = \beta_0 + \beta_1 \text{LnDDB} + \beta_2 \text{LnEDB} + \beta_3 \text{LnTPDB} + \beta_4 \text{LnPDS} + \mu$$

## DATA PRESENTATION AND ANALYSIS OF RESULTS

It is common for time-series data to reveal a component trend- a nonlinear component that varies every time. Table 1 presents public debt figures relative to Per capita income (PCI) growth (N' billion) in Nigeria from 1990 to 2019 while Figures 1-4 are graphical presentations of the annual trend of the various variables under study.

**Table 1: Public Debt Relative to Per Capita Income (PCI) Growth (N'Billion)**

Year	PCI	PCI Growth Rate	Domestic Debt	Domestic Debt Growth Rate	External Debt	External Debt Growth Rate	Total public Debt	Total Debt Growth Rate	Public debt servicing	Public debt servicing Growth Rate
1989	474.23	-13.66	47.05	0.04	240.39	79.46	287.44	58.82	13.27	43.67
1990	567.53	19.67	84.09	78.73	298.61	24.22	382.71	33.14	23.82	79.47
1991	502.91	-11.39	116.2	38.18	328.45	9.99	444.65	16.19	26.41	10.88
1992	477.18	-5.12	177.96	53.15	544.26	65.7	722.23	62.42	19.4	-26.55
1993	270.22	-43.37	273.84	53.87	633.14	16.33	906.98	25.58	81.08	317.94
1994	321.32	18.91	407.58	48.84	648.81	2.47	1,056.40	16.47	49.4	-39.07
1995	408.18	27.03	477.73	17.21	716.87	10.49	1,194.60	13.08	51.06	3.36
1996	461.52	13.07	419.98	-12.09	617.32	-13.89	1,037.30	-13.17	53.05	3.9
1997	479.98	4	501.75	19.47	595.93	-3.46	1,097.68	5.82	68.54	29.2
1998	469.43	-2.2	560.83	11.77	633.02	6.22	1,193.85	8.76	64.39	-6.05
1999	497.84	6.05	794.81	41.72	2,577.37	307.16	3,372.18	182.46	30.84	-52.1
2000	567.93	14.08	898.25	13.02	3,097.38	20.18	3,995.64	18.49	131.05	324.88
2001	590.38	3.95	1,016.97	13.22	3,176.29	2.55	4,193.27	4.95	155.42	18.59
2002	741.75	25.64	1,166.00	14.65	3,932.88	23.82	5,098.89	21.6	163.81	5.4
2003	795.39	7.23	1,329.68	14.04	4,478.33	13.87	5,808.01	13.91	363.51	121.91
2004	1007.87	26.71	1,370.33	3.06	4,890.27	9.2	6,260.59	7.79	382.5	5.22
2005	1268.38	25.85	1,525.91	11.35	2,695.07	-44.89	4,220.98	-32.58	393.96	3
2006	1656.42	30.59	1,753.26	14.9	451.46	-83.25	2,204.72	-47.77	249.33	-36.71
2007	1883.46	13.71	2,169.64	23.75	438.89	-2.78	2,608.53	18.32	213.73	-14.28
2008	2242.87	19.08	2,320.31	6.94	523.25	19.22	2,843.56	9.01	381.2	78.36
2009	1891.34	-15.67	3,228.03	39.12	590.44	12.84	3,818.47	34.28	51.79	-33.95
2010	2292.45	21.21	4,551.82	41.01	689.84	16.84	5,241.66	37.27	15.66	65.08




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2011	2520.4	9.94	5,622.84	23.53	896.85	30.01	6,519.69	24.38	27.18	26.83
2012	2746.99	8.99	6,537.54	16.27	1,026.90	14.5	7,564.44	16.02	679.3	28.85
2013	2998.07	9.14	7,118.98	8.89	1,373.58	33.76	8,492.56	12.27	828.1	21.91
2014	3222.69	7.49	7,904.02	11.03	1,631.52	18.78	9,535.54	12.28	941.7	13.72
2015	2730.43	-15.27	8,837.00	11.8	2,111.53	29.42	10,948.53	14.82	1,060.38	12.6
2016	2176	-20.31	11,058.20	25.14	3478.91	64.76	14,537.11	32.78	1426	34.48
2017	1968.56	-9.53	12 589.49	13.85	5787.51	66.36	18,377	26.41	1823.89	27.9
2018	2028.18	3.03	12 774.40	1.47	7 759.20	34.07	20,533.60	11.74	2161.37	18.5
2019	2386.9	17.69	<b>14,272.63</b>	11.73	<b>9,022.42</b>	16.28	23,295.05	13.45	2,454.07	13.54



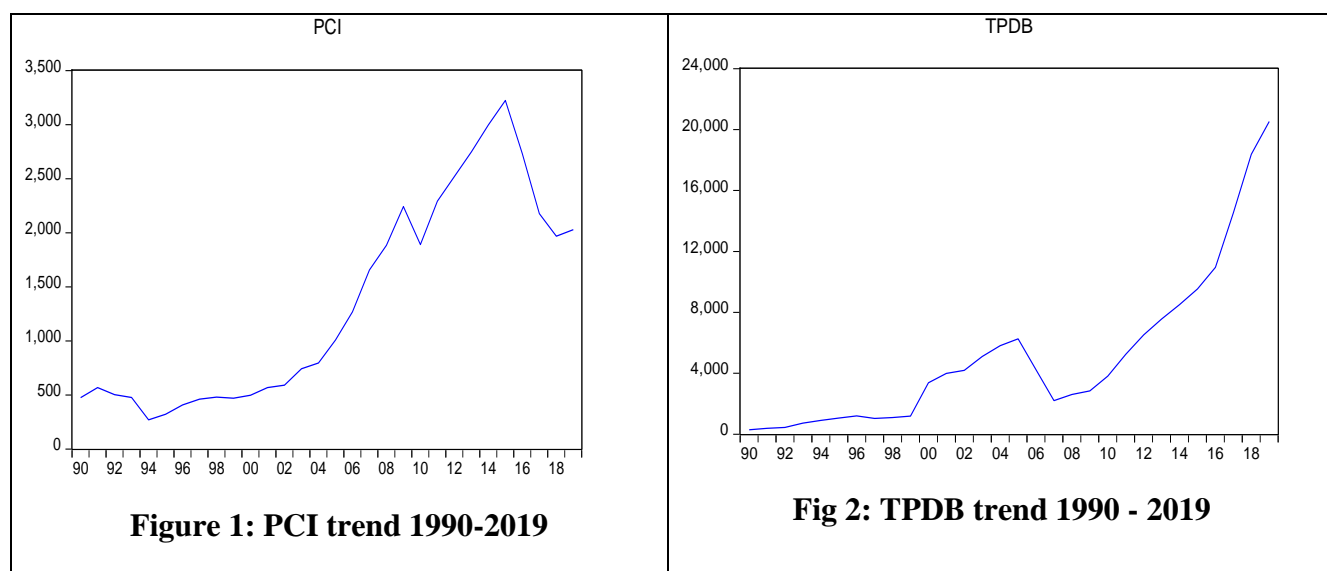


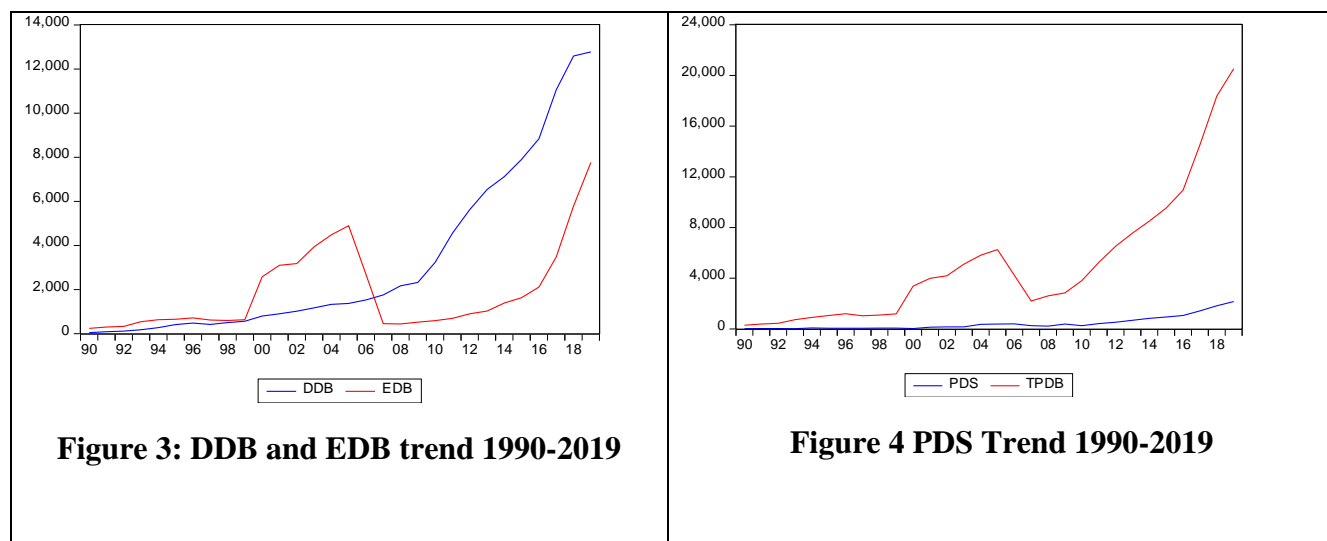
## Analysis of the trend in growth rate of public debt in Nigeria

In order to visualize the relationship of public debt with economic development, trend analysis in the growth rate of PCI, public debt, and debt servicing was done.

Table-1 presents the data on per capita income (PCI), disaggregated public debt, public debt servicing, and capital expenditure for the period 1990 to 2019. The total outstanding public debt of Nigeria increased more than 16 times between 1990-2004, that is from NGN382.71 billion to N6.261 trillion before dropping by 32.58% to NGN4.221trillion in 2005. This further dropped by 47.77% to NGN2.205 trillion in 2006 after Nigeria ordered a final debt repayment to rich lending nations, completing Africa's biggest debt relief deal in 2006. It grew by 18.32% to NGN2.609 trillion in 2007 before growing at an average annual rate of 20.23% to close at NGN23,295.05 trillion in 2019. From 2006 onward, the bulk of the public debt was made up of domestic public debt. For instance, in 2006, domestic debt was 79.5% of total public debt, and in 2015, it was 80,71% leaving external debt to only 20.5% and 19.29% in 2006 and 2015 respectively. Domestic debt, however, dropped from 80.71% in 2015, to 61.23% of total public debt in 2019 signifying that the present administration has doubled down the proportion of external debt from 19.29% in 2015 to 38.77% in 2019.

Total public debt grew sharply from 33.14 percent in 1990 to the maximum during the period under the study of 182.46 percent in 1999 then slipped to its lowest of -47.77 percent in 2006, and rising to 16.15 percent in 2019. Figures 1-4 is a graphical presentation of the trend of the various variables under study.





Source: Authors computation using Eviews 10.0

It shows that though there are few perturbations, in general, there has been a gradual increase in the per capita income of Nigeria, implying that there is improvement in the standard of living of the citizens depicting that there is improvement in economic development.

It can be inferred from Figure 2 that the overall public debt position has somehow influenced economic development in Nigeria. The average growth of public debt and PCI during the years 1990 to 2019 was about 21.52 and 5.96 percent per annum respectively with maximum values of 182.46% for public debt in 1999, and 30.5% for PCI in 2006. The minimum growth rate registered for public debt was -47.77 % in 2006 when Nigeria made the biggest debt payment in the history of Africa, and -43.37% for PCI in 1993.

### Unit Root Tests

A unit root exists in most macroeconomic time series data (UgbajeandUgbaje, 2014). Accordingly, for the results of data analysis to be reliable, the data should be stationary (has no unit root), otherwise, it will produce spurious results and this may lead to inconsistency in parameter estimates. Data is stationary if it is well behaved (has a constant mean wave} therefore, predictable. Stationarity was determined by employing Augmented Dickey-Fuller (ADF) unit root test. The summary of the Augmented Dickey-Fuller unit root test results for all the variables under study is presented in table 4.1.

**Table 4.1 Summary of Unit root test results of the data and the order of integration**

Variable	TEST CONDUCTED	Mackinnon Critical Value at 5% probability level	Level ADF Test Stat	Mackinnon Critical Value at 5% probability level	1 <sup>st</sup> Difference ADF Test Stat	Order of Integration
<b>LnPCI</b>	ADF	-2.967767	-0.658680	-2.971853	-4.143075	I(1)
<b>LnDDB</b>	ADF	-2.967767	-2.502094	-2.971853	-3.376548	I(1)
<b>LnEDB</b>	ADF	-2.971853	-1.755724	-2.971853	-3.696142	I(1)
<b>LnTPD</b>	ADF	-2.967767	-1.931254	-2.971853	-5.684329	I(1)
<b>LnPDS</b>	ADF	-2.998064	0.244184	-2.998064	-5.317793	I(1)

Source: Author's Summary Computation extracted from Eviews 10.0 output

The results indicate that all the series has the same order of integration I(1) implying that the simple Engel granger, as well as Johansen cointegration techniques, could be used in the cointegration tests as these tests require that all the series must have the same order of integration.

## COINTEGRATION TEST

All the variables were subjected to the Engel-Granger Cointegration test and to further confirm the validity of the test, the variables were also subjected to the Johanson Cointegration test. In the Engel Granger test, regression was carried out on the variables and the residuals subjected to the unit root test as the procedure demands. The result of the unit root test, table 4.2 below showed that the residuals were integrated at level, I(0), thereby, signifying cointegration. We confirmed this by carrying out the Johanson cointegration test (table 4.2) and the statement that the Max-eigen value test indicates 1 cointegrating equation at the 0.05 level denotes rejection of the hypothesis at 0.05 level implies there is cointegration. The meaning of all these is that some sort of a long-run relationship exists between the explained variable and the explanatory variables or that equilibrium is attained in the long run.



### Table 4.2 Engel-Granger Cointegration Test

Null Hypothesis: RESID01 has a unit root

Exogenous: Constant

Lag Length: 3 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.251910	0.0282
Test critical values:		
1% level	-3.711457	
5% level	-2.981038	
10% level	-2.629906	

Source: Output from Eviews 10.0

### Table 4.3 Johansen Cointegration

Date: 08/27/20 Time: 16:29

Sample (adjusted): 1992 2019

Included observations: 28 after adjustments

Trend assumption: Linear deterministic trend

Series: LNPCI LNDDDB LNEDB LNTPD LNPDS

Lags interval (in first differences): 1 to 1

#### Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.726366	75.44817	69.81889	0.0166
At most 1	0.514128	39.16123	47.85613	0.2539
At most 2	0.375973	18.95055	29.79707	0.4965
At most 3	0.137033	5.746819	15.49471	0.7252
At most 4	0.056222	1.620204	3.841466	0.2031

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values



The existence of cointegration between the dependent and the independent variables implied that a long-run relationship exists between Nigerian economic development represented by Per Capita Income (PCI) and the explanatory variables, viz; Domestic Debt (DDB), External debt (EDB), Total public debt (TPDB), and Public debt Servicing (PDS).

### The Error Correction Model (ECM)

Next in the series of tests carried out was the Error correction model. The fact that all the series are integrated of the order  $I(1)$  shows that there is no short-run equilibrium relationship between them. The error correction model was conducted to determine the short-run relationship between the dependent and the independent variables, and the speed of adjustment to attain equilibrium in the long run. The argument is that though there is a long-run relationship between the variables, in a short term, there is an error, meaning there are short-run fluctuations and the essence is to know the speed of adjustment for the variables to attain equilibrium or normalcy in a long run. Therefore, the whole idea of ECM is to tie the short-run dynamics of the co-integrating equations to their long-run statics. The coefficient of the ECM in the ECM model gives the speed at which the short term fluctuations are absolved for equilibrium to be attained in the long run. A necessary condition is for the ECM coefficient to be negative and significant. The result (table 4.4) shows that the coefficient of the ECM is negative and significant, thereby satisfying the condition and showing that the model is good. The value of the ECM coefficient of -0.415936 shows that the speed of adjustment is about 42% within a period of one year. This implies that it will take a medium time of a little over 2 years for the variables to attain equilibrium.

**Table 4.4 Error Correction Model (ECM)**

Dependent Variable: D(LNPCI)

Method: Least Squares

Date: 08/27/20 Time: 16:26

Sample (adjusted): 1991 2019

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNDDDB)	-0.961613	0.296056	-3.248072	0.0035
D(LNEDDB)	-0.571992	0.200105	-2.858456	0.0089
D(LNTPD)	0.930261	0.393096	2.366497	0.0268
D(LNPDS)	-0.033638	0.056693	-0.593344	0.5587
ECM(-1)	-0.415936	0.123780	-3.360282	0.0027
C	0.156239	0.042352	3.689064	0.0012
R-squared	0.589713	Mean dependent var	0.047241	
Adjusted R-squared	0.500521	S.D. dependent var	0.177057	
S.E. of regression	0.125133	Akaike info criterion	-1.136885	
Sum squared resid	0.360141	Schwarz criterion	-0.853997	
Log-likelihood	22.48484	Hannan-Quinn criter.	-1.048288	
F-statistic	6.611677	Durbin-Watson stat	2.377439	
Prob(F-statistic)	0.000598			

Source: output from Eviews 10.0





## Regression Analysis

Next, we ran an OLS regression on the level values of the variables to enable us to ascertain the long-run relationship between the explained variable and each of the explanatory variables. Table 4.5 shows the details of the regression test.

**Table 4.5 Regression Analysis**

Dependent Variable: LNPCI

Method: Least Squares

Date: 08/27/20 Time: 16:19

Sample: 1990 2019

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNDDDB	-0.683322	0.273044	-2.502610	0.0192
LNEDB	-1.098250	0.200608	-5.474604	0.0000
LNTPD	1.792913	0.444814	4.030702	0.0005
LNPDS	0.313792	0.106722	2.940265	0.0070
C	3.610875	0.557242	6.479902	0.0000

R-squared	0.927874	Mean dependent var	6.972333
Adjusted R-squared	0.916334	S.D. dependent var	0.791104
S.E. of regression	0.228827	Akaike info criterion	0.039313
Sum squared resid	1.309048	Schwarz criterion	0.272846
Log-likelihood	4.410300	Hannan-Quinn criter.	0.114023
F-statistic	80.40426	Durbin-Watson stat	1.375294
Prob(F-statistic)	0.000000		

Source: Output from Eviews 10.0

-0.683322

From the table values, the model becomes;

$$\text{LNPCI} = 5.008464 - 0.683322\text{LnDDB} - 1.098250\text{LnEDB} + 1.792913\text{LnTPD} + 0.313792\text{LnPDS}$$

If this were to be plotted in a graph, 5.008464 will be the intercept on the LnPCI axis and connotes the value of Ln PCI not influenced by the independent variables in the model.



## DISCUSSION

As seen from the OLS regression, Table 4.5, the values of  $R^2$ , adjusted  $R^2$ , and the F-statistic of 0.927874, 0.916334, and 80.40426 respectively. Generally, the coefficient of determination  $R^2$  measures the explanatory power of the multiple regression model. The high coefficient of determination  $R^2 = 0.93$  and adjusted  $R^2 = 0.92$  implies that the variables in the equation are useful and can explain up to 92% of the effects of the explanatory variables on the explained variable and just about 8% of the relationship is explained by factors other than the explanatory variables imputed in the model. The F-statistic value of 80.4 and significant at 5% level shows a good fit and that the explanatory variables are important determinants of the GDP growth rate in Nigeria. The overall P-value (F-probability) is less than 0.05 signalling statistical significance for the overall model.

The OLS regression in Table 4.5 also shows that Domestic debt (DDB), external debt (EDB) each has an inverse and significant effect on PCI while total public debt (TPD) and public debt servicing (PDS) each has a positive and significant effect on per capita income (PCI) on the long run.

Findings of the long-run effect showed that the coefficient of LnDDB is -0.683322, while the P-value is 0.0192. This shows a negative and statistically significant effect on economic development represented by PCI in the long run. It has been shown statistically that in a log-log model as is the case with this study, the relationship between y and x can be predicted as a percentage change in y is equal to a percentage change in x represented mathematically as;

$$\% \Delta y = \beta \% \Delta x$$

Where  $\beta$  is the coefficient of the independent variable involved. Following the above expression, it implies from Table 4.5 that in the long run, an increase in domestic debt of 1% will lead to a decrease of 0.68% of PCI. The result is in line with Onyeiwu, (2012; Uma, Eboh and Obidike (2013) which stated an inverse effect of domestic debt on economic growth, and invariably, economic development. The result contrasts that of Matthew and Mordecai, (2016) who stated that domestic debt stock has a direct and significant relationship with economic development. However, Anayochukwu and Ikechi (2014) showed that the different types of domestic debt exhibited different effects on growth and development. The study showed that while the FGN bonds had a positive relationship with economic growth, development stocks showed a negative relationship.

On a different note, the coefficient and p-value of LnEDB are -1.098250 and 0.0000 respectively. These depict an inverse effect of external debt on economic development in Nigeria in the long run. An increase of external debt of 1% will result in a decline in per capita income of 1.1%. The result is contrary to Sulaiman and Azeez (2012) in which findings showed that external debt has contributed positively to the Nigerian economic development and Okechukwu, and Anele (2014) which showed that there is a minimal positive relationship between external debt stock and GDP. Conversely, the result of this study is consistent with Blake, (2015); Ada, Chigozie, and Godwin (2016) who found a negative effect of external debt burden on economic growth and invariably, on economic development. In another study, Egungwu (2018) showed a negative effect of external debt stock on economic development represented by the human capital index. This is contrary to prior expectations and Keynes's theory that external debt will lead to increased government spending and investment that will



in turn spur growth and economic development. This could imply that the external debt alone is not sufficient to produce the desired results as postulated by Keynes. However, Erhieyovwe and Onovwoakpoma (2013) showed a positive effect of external debt while Adegbite, Ayadi, and Felix (2008); showed that external debt contributes positively to growing up to a point after which its contributions become negative reflecting the presence of nonlinearity in effects. To buttress this and based on a sample of 114 developing countries, Presbitero (2012) showed that public debt has a negative impact on economic growth when the debt is more than 90% of the GDP.

Contrary to the results above, the coefficient of the natural log of total public debt (LnTPDB) is 1.792913 and the P-value is 0.0005. These show that in the long run, total public debt has a positive and significant effect on per capita income. In essence, a 1% rise in total public debt will lead to a rise in per capita income of 1.8% unit and vice versa. The result contradicts the result of Izedonmi and Ilaboya (2012); Uma, Emmanuel (2012); Eboh and Obidike (2013); Blake (2015), which stated that total public debt has a negative and significant relationship with economic growth and development. However, this result is consistent with Saifuddin, (2016) who found that public debt has a significant positive effect on growth in Bangladesh. It is equally consistent with Keynes's macroeconomic theory which presupposes that increased government expenditure tends to lead to high aggregate demand and in turn, rapid economic growth. Increased total public debt which is the joined effect of domestic debt and external debt invariably implies increased government spending/investment. Going by Keynes theory, this spurs growth, and if the proceeds of growth are well managed, will translate to economic development viz; reduction in unemployment, increased standard of living, increased household consumption, along with infrastructural development.

Similarly, the coefficient of LnPDS is 0.313792 and the p-value is 0.0070. This means that public debt servicing has a positive and statistically significant effect on the per capita income. This implies that a 1% increase in public debt servicing will lead to a 0.31% increase in per capita income in Nigeria. This finding is consistent with Uma, Eboh and Obidike (2013) which found a positive although insignificant effect of public debt servicing on economic development. The work is, however, inconsistent with Adegbite, Ayadi, and Felix (2008); Matthew and Mordecai (2016) who found an inverse relationship between public debt servicing and economic development

## CONCLUSION

Findings have shown that in Nigeria, public domestic debt, as well as public external debt has a negative effect on economic development. On the other hand, total public debt and public debt servicing each has a positive and statistically significant effect on economic development. The study, therefore, concludes that neither public domestic debt nor public external debt can singly positively drive growth and development in Nigeria and that the management of debt servicing throughout the period studied was fairly done so as not to erode the benefits of total public debt which showed a positive and significant effect on economic development.



## RECOMMENDATIONS

1. The study recommends that each public domestic/external debt incurred by the government should be tied to a specific project with specific key performance indicators (KPIs) be it a social project or otherwise and the project supervised, monitored, and the multiplier effect estimated. This will ameliorate the execution of both types of public debts and hopefully lead to the enhancement of economic development.
2. Government should increase the volume of total public debt which will invariably have a multiplier effect on economic development.
3. The government should improve on public debt servicing. It is only by doing this that it could easily attract more debt which if put into judicious use, will attract more proceeds to service the debts.

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