Public Debt and Standard of Living in Nigeria

Chukwujekwu Kingsley Onyenwife
Department of Economics,
Chukwuemeka Odumegwu Ojukwu University, Igbariam, Nigeria
konyenwife@yahoo.com

Chukwunonso Ekesiobi
Department of Economics,
Chukwuemeka Odumegwu Ojukwu University, Igbariam, Nigeria
cs.ekesiobi@coou.edu.ng

Chike Kingsley Okoli
Department of Economics,
Nnamdi Azikiwe University, Awka, Nigeria
kch.okoli@unizik.edu.ng

Abstract
Over the years, the debate regarding the relationship between public debt and standard of living has continued to subsist unabatedly. While debt desirability proponents argue that public debt is purely welfare-enhancing, others argue that public debt does more harm than good to the welfare outcomes. In recent times, the increase in public debt in Nigeria has continued to raise increased concern regarding its desirability. Although several studies have been carried out in this regard, there is hardly any study that examines public debt-living standards using both per capita income (PCI) and the environmentally adjusted per capita income (EAPCI) to capture the standard of living. Thus, the study aimed to investigate the impact of public debt on the standard of living in Nigeria between 1981 and 2020. Using the canonical cointegrating regression (CCR), the following conclusions are made: domestic debt does not have a significant impact on PCI in Nigeria, domestic debt has a significant negative impact on EAPCI in Nigeria, and external debt has a significant positive impact on both PCI and EAPCI in Nigeria and debt servicing has a significant negative on PCI and EAPCI in Nigeria. The study recommends among other things that given the negative effect of domestic debt on both PCI and EAPCI in Nigeria, the government should refocus its borrowing on external sources. Nigeria is a capital-scarce economy and crowding out investment or inducing high-interest rates through domestic borrowing has a high opportunity cost to the economy
Keywords*: Public debt, Standard of living, PCI, EAPCI, CCR, Nigeria*

Introduction

The criticality of an improved living standard in any country cannot be overemphasized (Dimnwobi, Ekesiobi, Madichie & Asongu, 2021; Azolibe, Dimnwobi & Uzochukwu-Obi, 2022). However, the living standard indicators of Nigeria are startling. For instance, the poverty rate in Nigeria has been varying, and most times, it has been on the increasing trend. Statistics from the National Bureau of Statistics (NBS, 2006) indicated that poverty in Nigeria was around 15 percent of the population in 1960, and by 1980, it grew to 28.1 percent. The figure surged to 46.3 percent by 1985, before dropping to 42.7 percent by 1992. Similarly, the poverty figure surged further in 1996 to 65.6 percent in a total population of about 102.3 million, but the figure declined to 54.4 percent in 2004 before increasing to around 69 percent in 2010 and 70 percent in 2018 (NBS, 2012, 2018). This showed that poverty in the country fluctuates, and most recently, it has enormously increased. Also, the inability of a large proportion of the nation's population to have access to health care or demand for better healthcare services is another indicator of poor living standards (Gafar & Raji, 2005). The status of health care in the country has put a high cost on the quality of life of the people, including the areas of life expectancy and mortality rate. This sector over years has been given very minimal attention (Obi, Ekesiobi, Dimnwobi, & Mgbemena, 2016; Nwokoye, Igbanugo & Dimnwobi, 2020; Orji *et al.*, 2020). Women and children from low-income households have narrow access to most healthcare services for want of funds (Orji *et al.*, 2020).

The foregoing highlights the prevalence of poor living standards in Nigeria. One of the critical ways of stimulating a nation's welfare outcomes is through the development of its critical infrastructure (Dimnwobi, Ekesiobi & Mgbemena, 2016; Dimnwobi, Madichie, Ekesiobi & Asongu, 2022; Dimnwobi, Onuoha, Uzoechina, Ekesiobi & Nwokoye, 2022). When government revenues fall short of their expenditure, governments borrow. Public debt is thus a critical tool for governments to fund public spending, particularly when it is difficult to raise taxes and reduce public expenditure. The justification for government borrowing has its foundation in the neoclassical growth models, which prescribe the need for capital-scarce countries to borrow to increase their capital accumulation and steady-state level of output per capita (Madow *et al.*, 2021). The occurrence of global economic crises has provided further impetus for countries (especially the developing ones) to borrow as they are often confronted with the need for increased expenditure levels and declining capital inflows (Ogbonna *et al.*, 2019). The conventional view suggests that public debt has a positive effect on development outcomes in the short run by stimulating aggregate demand and output. However, theoretical literature

continues to point to a negative debt-growth relation in the long run by crowding out private investment.

Public debt can crowd out private investment and threaten economic growth through higher long-term interest rates, higher inflation, and higher future distortionary taxation (Mhlaba et al., 2019). The extensive use of domestic borrowing can have severe repercussions on the economy. Domestic debt service can consume a significant part of government revenues, especially given that domestic interest rates are higher than foreign ones. The interest cost of domestic borrowing can rise quickly along with increases in the outstanding stock of debt, especially in shallow financial markets. In the long run, a higher interest rate would discourage investment and thus crowd out private investment. The lower investment eventually leads to lower steady-state capital stock and a lower level of output. Therefore, the overall long-term impact of debt would be smaller total output and eventually lower consumption and reduced economic welfare. This is also referred to as the burden of public debt, as each generation burdens the next, by leaving behind a smaller aggregate stock of capital (Àkos & Istvàn, 2019).

Nigeria has currently ranked among Sub-Saharan Africa's heavily indebted countries with a stunted GDP growth rate, retarded export growth rate, a fast dwindling income per capita and an increasing poverty level (Yusuf & Mohd, 2021). Nigeria has been trapped by hasty and distressed borrowing which they are often unable to service. For instance, available records show that at the end of 2018, the country's total debt was ₦24.387 trillion or $79.4 billion with domestic debt representing 68.18% of the overall debt stock while external debt accounted for 31.82% (DMO, 2018). Similarly, as of March 31, 2021, total public debt increased to ₦33.107 trillion or USD87.239 billion with domestic debt representing 62.33% of the overall debt stock while external debt accounted for 37.67%. Worse still, they need to borrow more because of the deteriorating world prices of their primary exports (Ogunjimi, 2019). Nigeria's 2005 debt relief provided by the Paris Club of creditors motivated largely by the need to free-up resources for investment and faster economic growth led to a significant decline in the country's debt burden in 2006. Unfortunately, 17 years after, the country is back in a bigger debt crisis. Successive governments have been accumulating debt at an alarming rate while debt servicing cost has again increased astronomically to become a sour point in Nigeria's budgetary process in the last decade. The economy is, therefore, over-burdened with massive government debt and debt service costs that consume more than half of government scarce revenue, narrowing down the fiscal space for the government to invest in critical infrastructure that supports private investment, sustains growth and

development (Nwokoye, Dimnwobi, Ekesiobi & Obegolu, 2017; Dimnwobi, Nwokoye, Ekesiobi, & Igbanugo, 2017).

This study is different from previous studies in several respects. First, as far as we know, studies on the implication of public debt and standard of living are sparse in the literature. This study presents new evidence on the nexus between public debt and the standard of living in the Nigerian context by utilizing recent data sets. Second, we departed from previous studies by using per capita income and environmentally adjusted per capita income to capture the living standard. The choice of using these variables to capture the living standard is because of the recent argument that the GDP is misstated when environmental impact is not accounted for. Third, most studies on the nexus between debt and living standards have majorly focused on external debt and living standards (Oyedele, Emerah & Ogege, 2013; Zaghdoudi & Hakimi, 2017 among others) thereby ignoring domestic debt. It is pertinent to note that in a developing economy like Nigeria, domestic debt is a significant portion of Nigeria's total indebtedness (DMO, 2021). To address this, this study disaggregated public debt into external and domestic debts while focusing on their impacts on the standard of living. Lastly, the survey of the literature showed that previous studies on the subject matter particularly those in Nigeria have utilized the Ordinary Least Square (OLS) technique. However, for this study, we used the canonical cointegrating regression (CCR) framework of Park (1992) based on its appealing attributes in empirical estimations. CCR is considered efficient in estimating a long-term cointegrated function. It produces consistent, unbiased, and efficient estimates even when the data are multicollinear or serially correlated.

Literature Review

Public debt or government debt occurs when a government borrows to offset its deficits or for the development of its economy (Okoro, 2013). It is commonly described as the aggregate of borrowings acquired by the nation's government bodies which encompassed funds owned by public entities, public or private institutions, foreign governments, and private organizations among others (Ajayi & Edewusi, 2020). On the other hand, the standard of living is the level of income, comforts and services available, generally applied to society or location, rather than to an individual (Adebayo et al., 2021). Standard of living is relevant because it is considered to contribute to an individual's quality of life. Standard of living is generally concerned with objective metrics outside an individual's control, such as economic, societal, political and environmental matters – such things that an individual might consider when evaluating where to live in the world, or when assessing the success of the economic policy.

The relationship between debt accumulation and standard of living has been examined in only a few studies as over the last three decades, numerous studies have been conducted on the debt-economic growth nexuses. For instance, Oyedele, Emerah and Ogege (2013) utilized the cointegration and regression analysis to investigate the impact of external debt and debt servicing on poverty reduction in Nigeria using data for the period 1980 to 2010. The study found among other things that both external debt and debt servicing cause poverty in Nigeria. Likewise, Tamunonimim (2014) investigated the relationship between domestic debt and the poverty of Nigeria (1986-2012), using the ordinary least square technique, vector autoregression (VAR), cointegration and Granger causality approach. Using the Johansen Cointegration technique, the estimated results revealed that there is a long-run relationship between poverty (measured by real gross domestic product, per capita gross domestic product, and basic secondary school enrolment) and domestic debt in Nigeria. The study concludes that domestic debt significantly impacts poverty.

Akram (2016) examined the consequences of public debt on economic growth and poverty in selected South Asian countries namely Bangladesh, India, Pakistan and Sri Lanka, for the period 1975-2010. The study developed an empirical model that incorporates the role of public debt into growth equations and the model is extended to incorporate the effects of debt on poverty. The model is estimated by using standard panel data estimation methodologies. The results showed that although public debt hurts economic growth, neither public external debt nor external debt servicing has a significant relationship with income inequality, suggesting that public external debt is as good/bad for the poor as it is for the rich. However, domestic debt has a positive relationship with economic growth and a negative relationship with the GINI coefficient, indicating that domestic debt is pro-poor. Zaghdoudi and Hakimi (2017) investigated the impact of external debt on poverty for a panel of 25 developing countries over the period 2000 to 2015. By performing a panel cointegration model, they found strong evidence of a positive and significant long-run relationship between poverty, external debt, GDP per capita, gross domestic and fixed investment. The study indicated the existence of a negative and significant association between poverty, infrastructure, health condition and openness. The Granger-causality results indicate bidirectional causality between external debt and poverty in both the short- and long-run. The study concludes that external debt increase poverty in developing countries.

Ozigbu (2018) examined the implications of public debt sustainability on poverty incidence in Nigeria. Specifically, the impacts of the external debt stock and interest payment on external debt, a proxy for

external debt servicing on poverty headcount was estimated using Stock-Watson Dynamic Least Squares (DOLS). Data were extracted from the National Bureau of Statistics (NBS) and World Bank World Development Indicators. The estimated cointegrating regression model shows that external debt stock as a share of GNI has a significant positive relationship with poverty headcount as a 10 percent increase in external debt stock induces a 7.59 percent increase in poverty headcount. On the other hand, it was found that interest payments on external debt as a proportion of GNI is negatively related to poverty headcount. Similarly, Whajah, Bokpin and Kuttu (2019) employed the fixed effect regression model to examine the relationship between government size, public debt and inclusive growth for a panel of 54 African countries over the period 2000 to 2016. The authors used various variables to capture inclusive growth namely access to electricity, adequacy of social safety net programs, adequacy of social protection and labour programs, total child labour, compulsory education duration, total contributing family workers, CPIA social protection rating, CPIA transparency, accountability and corruption in public sector rating, total government education expenditure, total government expenditure on public health, improved sanitation facilities, improved water source, female labour force participation rate, mobile cellular subscriptions (per 1000 people), under five years mortality rate, nurses and midwives (per 1000 people), physicians (per 1000 people), poverty headcount ratio at $1.90 a day, poverty headcount ratio at national poverty lines, proportion of seats held by women in national parliament, primary school pupil-teacher ratio, gross school enrolment, gender parity index GDP growth rate and total unemployment. The findings from the study suggest that the size of government has a positive effect on inclusive growth, and the extent of public indebtedness has a negative effect on inclusive growth, as well. The study further observed that improvements in inclusive growth work to promote levels of inequality-reducing growth.

Omodero (2020) assessed the influence of public debt on the condition of living in Nigeria using per capita income (PCI) which signifies the income per person in the country. Since public debt is deemed to be suppressing an economy, the standard of living becomes the target of the estimated suppression. This study employed secondary data from 2000 to 2018 and multiple regression techniques is used to establish the impact of public debt on PCI. The study found that foreign debt has a substantial harmful effect on PCI while domestic debt has a weighty favourable impact on PCI. These findings lead to a conclusion that the country is better off with local borrowing instead of external fund sourcing.

Efanga, Etim and Jeremiah (2020) ascertained the impact of public debt on economic development in Nigeria from 1981 to 2018. Gross fixed capital formation was employed to capture economic development, while foreign debt and domestic debt were utilized as a proxy for public debt and the exchange rate was employed as a control variable. This study employed the autoregressive distributed lag (ARDL) model and the study conclude that public debt had a positive and significant impact on economic development in Nigeria. Sani and Yahaya (2021) investigated the role of institutional quality in public debt, and the incidence of poverty relationship. Using the Generalized Method of Moment (GMM) approach on a sample of 42 SSA countries, the link between public debt and incidence of poverty was examined over the period 2011 to 2019. The findings of this study revealed that the relationship between the public debt and household final consumption expenditure per capita is negative, and this showed that public debt accumulation is one of the leading causes of poverty in SSA. However, the result of the interaction term of public debt and the institutional quality confirmed that this negative relationship can be averted or even reversed if the quality of the institutions improves in the region.

Methodology

Theoretical Framework

The study adopts the neoclassical growth theory proposed by Solow (1956) and Swan (1956). The first attempt to employ neoclassical growth in the public debt framework was attributed to Phelps and Shell (1969) and further utilized by Ahlborn and Schweickert (2015). The neoclassical growth model is considered appropriate since it presents us with an economy-wide production function that primarily explains the role of capital (both government and private) and labour supply (determined by population growth which is an exogenous factor to the model) in the economy. With the assumption of inelastic labour supply and constant return to scale, the neoclassical growth model is a convenient framework that allows for the application of Newton's first law of debt.

Suppose the economy is perfectly competitive such that numerous identical firms produce a homogenous commodity, Y_j (with the assumption of a single-product economy, the aggregate output is indicated as Y). In other words, j^{th} firm produces Y using capital, K_j and labour L_j. Following Barro and Sala-i-Martin (1995) and Arčabić, Tica, Lee and Sonora (2018), the aggregate production function will be specified as follows:

$$Y = AK^{\alpha}(ZL)^{\beta} \qquad 3.1$$

Where $Z = \frac{K}{L}$ = labour efficiency

$A, \alpha, \beta > 0$ but $\alpha + \beta = 1$ and A is a scale parameter

Now suppose the government finances public expenditure, *E*, through taxes, *T* and debts, *D*. It also pays interest, *r*, on the debt. Also, suppose public spending and debts are fixed proportion of the national income or aggregate output, then

$$E = \Psi Y \; ; \; dE/d\Psi = 0 \qquad 3.2$$

and

$$D = \Phi Y \; ; \; dD/d\Phi = 0 \qquad 3.3$$

Where Ψ and Φ refer to purchase ratio and public debt ratio respectively.

Naturally, the government pays *rD* as interest on *D*. On the other hand, with a flat tax rate, τ, the government imposes a tax on factor income and debt income such that:

$$T = \tau(Y + rD) \qquad 3.4$$

Given that budget deficit, $\ddot{D}$, equals public debt, D, (this is based on the assumption that there is no existing debt or interest obligation), government budget constraint could be written as:

$$D + T = E + rD \qquad 3.5$$

Plugging (3.3) to (3.5) into (3.6) yields:

$$\Phi Y + \tau(Y + rD) = \Psi y + rD \qquad 3.6$$

$$Y = \frac{1}{\Phi + \tau + \Psi}(1 - \tau)rD \qquad 3.7$$

Suppose we further assume that Ricardian Equivalence does not hold such that public debt dynamics affect the real sector, then Equation 3.7 reveals that changes in public debt ratio (Φ), public debts (D) and debt interest obligation (r) would have a non-zero effect on national output, Y and by extension and the living standard of the citizens.

3.2. Model Specification

Based on the research objective, we specify the debt-living standard empirical model as follows. From Equation 3.7, it is clear that public debt and debt servicing could have a function related to economic outcomes. Suppose we disaggregate public debt into domestic and external debt. Suppose we also approximate the indicator of economic outcome with the living standard of the citizens indicated by per capita income. The economic relation would be written as:

$$PCI = f(DD, EXD, DES, X) \qquad 3.8$$

Where PCI refers to income per citizen (or per capita income), DD refers to domestic debt, EXD stands for external debt, DES refers to debt servicing while X refers to other control variables. In an econometric sense, the inclusion of control variables is critical to escape the omitted variable trap. Following Sala-i-Martin (1995) and Arčabić, Tica, Lee and Sonora (2018), inflation rate (INF) and government expenditure (GOEX) were included as control variables. All random effects are captured using the

usual stochastic error term. Using a canonical cointegrating regression framework, Equation 3.8 is specified as:

$$PCI_t = \alpha_0 + \alpha_1 t + \alpha_2 t^2 + \Pi_1 DD_t + \Pi_2 EXD_t + \Pi_3 DES_t + \Pi_4 INF_t + \Pi_5 GOEX_t + \varepsilon_t \quad 3.9$$

Where $\alpha_0, \alpha_1, \alpha_2$ are the parameter estimates for intercept, linear and quadratic trend respectively; Π_i is the parameter estimate for the i^{th} explanatory variables, and ε is the white noise with zero mean and constant covariance (i.e $\varepsilon \sim i.i.i[0, \Phi]$).

To enable us to estimate environmentally adjusted estimates of living standards, we further utilized adjusted per capita income as a dependent variable in another model estimation.

From the theoretical framework, we established that public debt is expected to have nontrivial implications for the economic outcome. One economic outcome of interest in this study is the living standard of the citizens. Based on popular literature, we utilized PCI as a measure of living standard. However, following the recent argument that the GDP is misstated when environmental impact is not accounted for, we further re-estimated the model using an environmentally adjusted estimate of citizens' welfare called environmentally adjusted PCI. Further, we included inflation rate and government expenditure as critical variables in living standard models.

Table 3.1: Measurement, Description and Sources of Data

S/N	Variable	Description	Source
1	PCI	This is described as income per head. The PCI represents the income of each citizen in the economy. It is used to measure the living standard.	WDI (2020)
2	EAS	Environmentally Adjusted PCI (EAPCI) per capita measures the true PCI after adjusting for the depletion of natural resources and damages caused by pollution.	WDI (2020)
3	INF	Inflation (INF) is a persistent increase in the general price level. It is measured by the proportional changes over time in some appropriate price index, commonly a consumer price index or a GDP deflator.	WDI (2020)
4	GOEX	Government Expenditure (GOEX) is the aggregate government spending on public consumption, public investment and transfer payments consisting of income transfers and	CBN (2020)

S/N	Variable	Description	Source
		capital transfers.	
5	DD	Domestic debt (DD) refers to the total debt stock owed to domestic firms and households	CBN (2020)
6	EXD	External debt (EXD) refers to the sum of government debt obligations to external creditors, including Paris clubs, London clubs, multinationals, and multilateral organizations.	CBN (2020)

Source: Researchers' Compilation

Estimation Techniques

The main estimation techniques are the canonical cointegrating regression (CCR) framework. Canonical Cointegrating Regression (CCR) was introduced by Park (1992). The CCR procedure involves data transformation that uses only the stationary component of a cointegrating model. A cointegrating relationship supported by the cointegrating model would remain unchanged after such data transformation. The CCR transformation makes the error term in a cointegrating model uncorrelated at the zero frequency with regressors. Therefore, the CCR procedure yields asymptotically efficient estimators and provides asymptotic chi-square tests that are free from nuisance parameters (Park,1992). According to Park (1992), the CCR transformations asymptotically eliminate the endogeneity caused by the long-run correlation of the cointegrating equation errors and the stochastic regressors innovations, and simultaneously correct for asymptotic bias resulting from the contemporaneous correlation between the regression and stochastic regressor errors. In other words, CCR generates efficient estimates in the face of multicollinearity. Estimates based on the CCR are therefore fully efficient and have the same unbiased, mixture of normal asymptotic (Nkoro & Uko, 2019). However, before estimating both models, the time-series properties of the data were investigated using the unit root test and cointegration test.

Empirical Results

Summary of Descriptive Statistics

The results shown in Table 4.1 shows that the mean external debt stock over the sample period (1981 to 2020) is ₦1,927.205 billion. The median, maximum, and minimum external debt stock are ₦640.975 billion, ₦10,871.474 billion, and ₦2.330 billion respectively.

Table 4.1: Summary of Descriptive Statistics

	Debt Servicing (DES)	External Debt stock (EXD)	Government Expenditure (GOEX)	Inflation Rate (INF)	Domestic Debt	Per capita income	Environmentally adjusted PCI
Unit of Measurement	Billions of Naira	Billions of Naira	Billions of Naira	Percentage	Billions of Naira	US$	US$
Mean	487.350	1,927.205	2,262.329	19.035	3,203	1706.85	681.15
Median	143.232	640.975	982.843	12.547	957.61	1483.04	374.70
Maximum	3,987.920	10,871.474	10,897.780	72.836	16,023.89	2563.09	2630.35
Minimum	1.007	2.330	9.637	5.382	11.19	1151.13	68.54
Std. Dev.	830.674	2,608.040	2,875.611	16.863	4,571.07	471.99	725.20
Observations	40	40	40	40	40	40	40

Source: Authors Computation

Similarly, the mean annual debt servicing is ₦487.35 billion. However, the maximum and minimum debt servicing of ₦3, 987.92 billion and ₦1.007 billion respectively were recorded in 2020 and 1983 respectively. In the same vein, domestic debt, PCI and environmentally adjusted PCI average ₦3,203.63 billion, US$1,706.85 and US$ 681.15 respectively for the sample period.

Analysis of Results

The time-series properties of the data are evaluated using the unit root test and cointegration test. The results are discussed below.

(a) Unit Root Test

Unit root tests are tests for stationarity in a time series. To ascertain the presence of unit root, we utilize both the augmented Dicker-Fuller (ADF) test and Philip-Perron (PP) test. The null hypothesis is generally defined as the presence of a unit root and the alternative hypothesis is stationarity, trend stationary or explosive root depending on the test used.

Table 4.2: Summary of Results of Unit Root Test

	ADF Test		Philip-Perron Test	
Variable	ADF statistics	Order of Integration	PP statistics	Order of Integration
Inflation (INF)	-4.929***	I(1)	-4.929***	I(1)
Government expenditure (GOEX)	-4.278***	I(1)	-16.479***	I(1)
Debt Servicing (DES)	-4.599***	I(1)	-5.139***	I(1)
External debt (EXD)	-4.548***	I(1)	-4.380***	I(1)
Domestic Debt (DD)	-5.436***	I(0)	-4.373***	I(0)
PCI	-4.159***	I(0)	15.256***	I(0)
EAPCI	-4.959***	I(0)	-4.953***	I(0)

Source: Authors Computation

***, **, * indicate significant at 1%, 5% and 10% significance level

The result shown in Table 4.2 indicates that inflation (INF), government expenditure (GOEX), external debt (EXD) and debt servicing (DES) are integrated of order one (I(1)) while domestic debt (DD), PCI (PCI), and environmentally adjusted PCI (EAPCI) are integrated of order zero (I(0)). This result suggests that time series are the realization of stochastic processes.

(b) Cointegration Test

Given that most of the time series are not integrated at levels (I(0)), we proceed to implement a cointegration test. According to Woodridge (2011), a cointegration test is used to establish if there is a correlation between the time series in the long term. We employed Philp-Qualiaris (PQ) technique in the test of cointegration. The null hypothesis of no cointegration is rejected if at least one cointegrating equation exists. Given that about four (4) cointegration equations exist, the null hypothesis of no cointegration is rejected. This implies that there is an existence of a long-run relationship among the variables.

Table 4.3: Summary of PQ Cointegration Results

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
DD	-4.896036	0.2243	-30.16030	0.1928
EAPCI	-14.68564	0.0000	-29.05299	0.0000
EXD	-4.747591	0.2710	-30.88064	0.1668
DES	-6.968996	0.0061	-41.74003	0.0073
INF	-6.128375	0.0313	-45.39225	0.0016
GOEX	-5.286606	0.1290	-18.48306	0.8013
PCI	-16.005409	0.0000	-92.66024	0.0000

Source: Authors Computation

(c) Impact of Public Debt on Living Standard

As earlier discussed, we represented the living standard using two measures, namely, per capita income growth and environmentally adjusted PCI. The environmentally adjusted PCI adjusts to account for environmental damages through emission and other pollutants.

Table 4.4: Summary of Estimates for the Impact of Public Debt on Living Standard

Variables	PCI		EAPCI	
	Coefficients	Standard error	Coefficients	Standard error
DD	0.063	0.820	-0.593**	0.266
EXD	0.014***	0.004	0.145***	0.046
DES	-0.270***	0.053	-0.365***	0.048
INF	-0.319***	0.064	-0.577***	0.109
GOEX	0.023***	0.006	0.222***	0.037

C	-0.047***	0.010	0.247***	0.091
TREND	0.049***	0.012	0.124	0.163
R2	86.92		89.03	
F-stat	223.01		329.99	
Obs	40		40	

Source: Authors Computation

***, **, * indicate significant at 1%, 5% and 10% significance level

The results presented in Table 4.4 shows that the coefficient of domestic debt (DD), government expenditure (GOEX) and external debt are 0.063, 0.023 and 0.014 respectively for the PCI model. This suggests that government expenditure and external debt may increase PCI by 2.3% and 6.3% respectively. In the same vein, the coefficients of debt servicing (DES) and inflations (INF) are -0.270 and -0.319 respectively for the PCI model. This again suggests that increasing debt servicing and inflation by 1 unit may lead to a 27% and 31.9% decrease in PCI. Notice that the coefficient for DD is not statistically significant in the PCI model. For the environmentally adjusted PCI (EAPCI) model, the coefficient for DD is statistically significant at 5%. Unlike the PCI model, it turned negative. The result shows that EAPCI may decline by 26.6% following a one-unit increase in DD. However, EXD and GOEX entered the EAPCI model with positive coefficients, namely, 0.145 and 0.222 respectively. In the EAPCI model, DES and INF yielded negative coefficients, namely, -0.365 and -0.577 respectively. Notice that the magnitude of the negative impact of DES on PCI and EAPCI is greater than the positive impacts of EXD on PCI and EAPCI by 1829% and 152% respectively.

Discussion of Findings

The main thrust of this study is to ascertain the impact of public debt on living standards in Nigeria. We used PCI and environmentally adjusted per capita income (EAPCI) to capture living standards. The result obtained shows that while domestic debt does not have a significant impact on PCI, it exerts a negative significant impact on environmentally adjusted PCI. First, this may suggest that measuring living standards using GDP measure may overestimate the status of living of the citizens. This is because environmental factors are not considered. Since domestic debt includes debt from banks, this result could suggest the prevalence of the crowding-out effect. A monetarist argument is that high levels of government borrowing cause 'crowding out'. This theory argues that an increase in the federal budget deficit means that the government increases its demand for "loanable" funds from the private sector, looking to borrow money from its citizens as well as from international investors. In

a healthy economy, this means that the government begins competing with private borrowers for a fixed supply of savings, and thus drives up interest rates. This increase in interest rates may reduce ("crowd out") private-sector investments in plants and equipment. This decline in investment means limited capabilities for citizens, thereby dampening the living standard (Bivens, 2010).

The result, however, shows that external debt exerts a positive impact on the living standard. In the case of external debt, Adepoju et al, (2007) noted that external debt represents an injection into the economy. As a fiscal lever, external debt is a medium used by countries to bridge their deficits and carry out economic projects that can increase the standard of living of the citizenry and promote sustainable growth and development. Hameed, Ashraf and Chaudary (2008) argue that external borrowing ought to accelerate the living conditions of the citizens especially when domestic financing is inadequate.

On the other hand, the results show that debt servicing exerts a negative effect on living standards. Several theoretical contributions have focused on the adverse impact of debt servicing on the economy and the circumstances under which such impact arises. In this line of research, Krugman (1988) coins the term "debt overhang" as a situation in which a country's expected repayment ability on external debt falls below the contractual value of debt. Debt servicing represents a burden of previous debts on the current generation. If it is paid on external loans, it represents foregone domestic expenditure. In other words, the opportunity cost of debt servicing on external debt is the foregone critical domestic spending, a condition that could worsen the livability condition of the citizens.

Conclusion

Over the years, the debate regarding the relationship between living standards and public debt has continued to subsist unabatedly. While debt desirability proponents argue that public debt is purely growth-enhancing, others argue that public debt does more harm than good to the economy. Although several studies have been carried out in this regard, there is hardly any study that examines this nexus using both per capita income and environmentally adjusted per capita income to capture living standards. Thus, this study aims at extending the frontier of knowledge along these identified lines. Using CCR, the study established that while domestic debt does not have a significant impact on PCI, it exerts a negative significant impact on environmentally adjusted PCI. The result, however, shows that external debt exerts a positive impact on the living standard. On the other hand, the results show that debt servicing exerts a negative effect on living standards.

Following these outcomes, the study recommends the following:

First, public debts should be utilized in economically viable and productive ventures to avoid the problem of debt overhang. The debt burden is worsened by the inability to spend the borrowed fund on productive ventures that could guarantee its payback. Given the huge and obvious social and macroeconomic costs associated with debt financing, the Federal government should therefore ensure that it does not engage in a frivolous spending spree. It must ensure that borrowed funds are spent on priority productive ventures that are welfare enhancing. In addition, it must ensure that every proposed expenditure passes through the Value for Money (VfM) test. In the same vein, fiscal spending should target development capital and labour as well as create enabling environment for industrial productivity. Specifically, the government should prioritize developmental projects such as the provision of infrastructural facilities via good roads, electricity etc. This will in turn create an enabling environment for the home-based industries and equally attract foreign investors into the country which has the ripple effect of boosting the economy as well as welfare outcomes. Second, given the negative effect of domestic debt, the government should refocus its borrowing on external sources. Nigeria is a capital-scarce economy and crowding out investment or inducing a high-interest rate through domestic borrowing has a high opportunity cost to the economy. Within acceptable thresholds, government debt should endeavour to raise its debt fund through issuing of debt securities rather than through the bank lending window, which is the most common loanable fund market to small and medium-scale firms.

References

Adebayo, O., Salman, K.K., Omotayo, A.O., & Oluseyi, O.K. (2021). Welfare impact of remittances in south-west Nigeria: Rural and urban households compared. *The Journal of Developing Areas*, 55 (2), 92-113

Ajayi, I.E., & Edewusi, D.G. (2020). Effect of public debt on economic growth of Nigeria: An empirical investigation. *International Journal of Business and Management Review*, 8(1), 18-38

Àkos, D., & Istvàn, D. (2019). Public debt and economic growth: What do neoclassical growth models teach us? *Applied Economics*, 51(29), 104-121.

Akram, N. (2016). Public debt and pro-poor economic growth evidence from South Asian countries. *Economic Research-Ekonomska Istraživanja*, 29(1), 746-757.

Azolibe, C.B., Dimnwobi, S.K. & Uzochukwu-Obi, C.P. (2022). The determinants of unemployment rate in developing economies: Does banking system credit matter? AGDI Working Paper 044

Debt Management Office (2018). Annual report and statement of accounts. Retrieved from https://www.dmo.gov.ng/publications/reports/dmo-annual-report-statement-of-accounts/3060-2018-annual-report/file. Accessed 15 September, 2020

Debt Management Office (2020). Nigeria's total public debt portfolio as at March 31, 2021. Retrieved from https://www.dmo.gov.ng/debt-profile/total-public-debt/3591-nigeria-s-total-public-debt-stock-as-at-march-31-2021/file. Accessed 15 July, 2021

Dimnwobi, S.K., Ekesiobi, S.C., & Mgbemena, E.M. (2016). Creativity, innovation and competitiveness in Nigeria: An economic exploration. *International Journal of Academic Research in Economics and Management Sciences*, 5(3), 29-52

Dimnwobi,S.K., Nwokoye, E.S., Ekesiobi, C.S., & Igbanugo, C.I. (2017). Transportation infrastructure and diversification of Nigeria's economy: Implications for the developmental state. *Nigerian Journal of Economics and Social Studies*, 57 (3), 309-331

Dimnwobi, S. K., Ekesiobi, C., Madichie, C. V., & Asongu, S. A. (2021). Population dynamics and environmental quality in Africa. *Science of The Total Environment*, 797, 149172. Retrieved from doi:10.1016/j.scitotenv.2021.1491. Accessed 11 October, 2021

Dimnwobi, S.K., Madichie, C.V., Ekesiobi, C.S, & Asongu, S.A. (2022). Financial development and renewable energy consumption in Nigeria. *Renewable Energy*, 192, 668-677

Dimnwobi, S.K., Onuoha, F.C., Uzoechina, B.I., Ekesiobi, C.S., & Nwokoye, E.S. (2022). Does public capital expenditure reduce energy poverty? Evidence from Nigeria. *International Journal of Energy Sector Management*. Retrieved from https://doi.org/10.1108/IJESM-03-2022-0008. Accessed 15 June, 2022

Efanga, U.O., Etim, R.S., & Jeremiah, M.S. (2020). Public debt and economic development in Nigeria. *IIARD International Journal of Banking and Finance Research*, 6(12), 18-31

Gafar, T. I., & Raji, A.B. (2005). Demand for modern health care services and the incidence of poverty in Nigeria: A case study of Ilorin Metropolis. *IFRA Special Research Issue*, 1, 113-129.

Idenyi, O.S., Igberi, C.O., & Anoke, C.I. (2016). Public debt and public expenditure in Nigeria: A causality analysis. *Research Journal of Finance and Accounting*, 7(10), 27-38.

Johnny, N., & Johnnywalker, W. (2018). The Relationship between external reserves and economic growth in Nigeria (1980-2016). *International Journal of Economics, Commerce and Management*, 6(50), 213-241.

Joy, J., & Panda, P.K. (2020). An empirical analysis of sustainability of public debt among BRICS nations. *Journal of Public Affairs*. Retrieved from doi:10.1002/pa.2170. Accessed 11 October, 2021

Karazijiene, Ž. (2015). Critical analysis of public debt and tendencies of its management. *Public Policy and Administration*, 14(2), 194-208.

Madow, N., Nimonka, B., Brigitte, K. K., & Camarero, M. (2021). On the robust drivers of public debt in Africa: Fresh evidence from Bayesian model averaging approach. *Cogent Economics & Finance*, 9(1), 1-15

Mhlaba, N., Phiri, A., & Nsiah, C. (2019). Is public debt harmful towards economic growth? New evidence from South Africa. *Cogent Economics & Finance*, 7(1), 1-16.

Ogbonna, K. S., Ibenta, S. N., Chris-Ejiogu, U.G., & Atsanan, A. N. (2019). Public debt services and Nigerian economic growth: 1970-2017. *European Academic Research*, 6(10), 22-34.

Ogunjimi, J. A. (2019). The impact of public debt on investment: Evidence from Nigeria. *Development Bank of Nigeria Journal of Economic and Sustainable Growth*, 3(2), 1–28.

National Bureau of Statistics (NBS). (2006). *Poverty in Nigeria (current evidence). National policy dissemination workshop on poverty and inequality in Nigeria*. Abuja: NBS

National Bureau of Statistics (NBS). (2012). *Nigeria poverty profile 2010. Harmonized version of the Nigeria living standard survey 2012*. Abuja: NBS

National Bureau of Statistics (NBS). (2018). *Country profile*. Abuja: NBS

Nwokoye, E.S., Dimnwobi, S.K., Ekesiobi, C.S., & Obegolu, C.C. (2017). Power infrastructure and electricity in Nigeria: Policy considerations for economic welfare. *KIU Journal of Humanities*, 2(1), 5-17

Nwokoye, E.S., Igbanugo, C.I., Mgbemena, E.M., & Dimnwobi, S.K. (2019). Joblessness in the midst of plenty: What factors reinforce the resource-curse syndrome in Nigeria? International Journal of Social Science and Economic Research, 4 (3), 1787-1805

Nwokoye, E.S., Igbanugo, C.I., & Dimnwobi, S.K. (2020). International migrant remittances and labour force participation in Nigeria. *African Development Review*, 32 (2), 125-137

Obi, C.U., Ekesiobi, S.C., Dimnwobi, S.K., & Mgbemena, E.M. (2016). Government education spending and education outcome in Nigeria. *International Journal of Economics, Finance and Management Sciences*, 4(4), 223-234

Organisation for Economic Co-operation and Development (2012). Debt and macroeconomic stability. Organisation for Economic Co-operation and Development, Economics Department Policy Notes No. 16.

Orji, A., Ogbuabor, J. E., Nwosu, E., Anthony-Orji, O. I., & Amoji, N. (2020). Analysis of poverty correlates and multi-dimensionality in south east Nigeria: New empirical evidence from survey data. *Poverty & Public Policy*, 12(3), 255-270.

Okoro, A.S. (2013). Understanding monetary policy series, No 36: Public debt. Abuja: CBN

Omodero, C.O. (2020). Public debt and the living condition of people in Nigeria. *Business Administration and Business Economics*, 39(1), 35-46

Onafowora, O., & Owoye, O. (2017). Impact of external debt shocks on economic growth in Nigeria: A SVAR analysis. *Economic Change and Restructuring*. Retrieved from doi:10.1007/s10644-017-9222-5

Onafowora, O., & Owoye, O. (2019). Public debt, foreign direct investment and economic growth dynamics. International Journal of Emerging Markets. Retrieved from doi:10.1108/ijoem-01-2018-0050. Accessed 11 October, 2021

Oyedele, S.O., Emerah, A.A., & Ogege, S. (2013). External debt, debt servicing and poverty reduction in Nigeria: An empirical analysis. *Journal of Economics and Sustainable Development*, 4(19), 174-179

Ozigbu, J.C. (2018). Public debt sustainability and incidences of poverty: Empirical evidence from Nigeria. *International Journal of Development and Economic Sustainability*, 6(3), 12-26

Sani, A., & Yahaya, A. (2021). Public debt and incidence of poverty in sub-Saharan Africa: The role of institutional quality. *Global Scientific Journals*, 9(2), 1076-1103

Saungweme, T., Odhiambo, N. M., & Camarero, M. (2019). Government debt, government debt service and economic growth nexus in Zambia: A multivariate analysis. *Cogent Economics & Finance*, 7(1), 1-15

Tamunonimim, A.N. (2014). Domestic debt and poverty in Nigeria: An empirical time series investigation. *European Journal of Accounting Auditing and Finance Research*, 2(5), 33-47

Whajah, J., Bokpin, G. A., & Kuttu, S. (2019). Government size, public

debt and inclusive growth in Africa. *Research in International Business and Finance*, 49, 225-240.

Yusuf, A., & Mohd, S. (2021) The impact of government debt on economic growth in Nigeria. *Cogent Economics & Finance*, 9(1), 1-15

Zaghdoudi, T., & Hakimi, A. (2017). Does external debt- poverty relationship confirm the debt overhang hypothesis for developing counties? *Economics Bulletin*, 37(2), 653-665