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Do Debts-Revenue Dynamics Granger-Cause Economic Development in West Africa? A Comparative Analysis of Nigeria and Ghana Scenarios

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Abstract

This study unraveled debt-revenue dynamics Granger causality effects on per capita consumption, physical quality of life, and standard of living, as measures of economic development, in Nigeria and Ghana?". Using the debt-GDP ratio, debt-export ratio, debt-service ratio, revenue-GDP ratio, and debt-revenue gap as independent variables. Ex-post facto research design, secondary data, and Granger causality method of data analysis was adopted and utilized. The results revealed that there is a unidirectional causal relationship between per capita consumption (PCC), the debt-export ratio (DER), and the debt-revenue gap (DRG) in Nigeria. Nonetheless, there is a unidirectional causal relationship between per capita consumption (PCC) and revenue-real DGP ratio (RGR) in Ghana. It is concluded that debt-revenue dynamics have historically had a major impact on per capita consumption in Ghana but not so much in Nigeria; hence, the Nigerian government should use its debt for more worthwhile endeavours that would raise economic development.

Keywords: *Debt, Revenue, Economic Development, Africa, Granger*

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Background to the Study

Public debt in itself is not a problem, because it also helps the government to accomplish its social and developmental goals. However, debt problems arise, especially in less developed countries, if debt-servicing capacity does not keep pace with the growth of debt, debt-revenue ratio, as well as economic development – hence it may also be expressed as debt exceeding sustainable levels. Unsustainable levels of debt have an array of repercussions for any given economy (Hamed, 2018), and make it difficult to address economic development issues. In contemporary times, the occurrence of global economic crises has provided persuasions for countries (especially the underdeveloped ones) to borrow so as to be able to meet increased expenditure levels and keep pace with declining capital inflows (Greenidge, Alleyne, Parris & Grant, 2021). This is evident in African countries like Nigeria and Ghana, which have recorded poor debt/revenue ratio (Omotosho, Bawa & Doguwa, 2017).

The justification for government borrowing has its foundation in leading economic theories such as Neoclassical Growth Models and the Keynesian Model. The former prescribes the need for capital-scarce countries to borrow to increase their capital accumulation and encourage a steady growth level of output per capita, per capita consumption, physical quality of life, as well as living standard. The latter addresses the debt-to-revenue ratio about economic development is the Keynesian model by advocating deficit spending on labor-intensive infrastructure projects to stimulate employment and stabilize wages during economic downturns (Oates, 2015). This model further proves that the dynamics of public debts and revenue nexus is such that borrowed monies should serve as an economic prosperity instrument for revenue generation through decrease in unemployment rates, and increase in economic growth and increase in government-funded programs (Kalulumia, 2022; Klimaitiene & Ramanauskaite, 2019).

Following these theoretical propositions, it is expected that public debts, if properly utilized, would serve as a catalyst for economic development. This informs the reason why the public debt-to-revenue ratio is a useful metric for evaluating the relationship between debt and revenue, and the potency of such relationship to address economic development issues. Public debt is seen as a constant factor in economic growth and development of a country because it provides the avenue to raise funds and channel same to economic development for the purposes of raising per capita consumption, physical quality of life and standard of living of people of the country (Uzomba, 2015). However, this has not been the case of African countries, especially Nigeria and Ghana where the dynamics of public debts-revenue relationship fails to address economic development questions; hence making economic recovery and sustainability a concern in the region.

A critical observation of the debt transactions in Nigeria reveals that the situation began to get out of control in 1977 when an outstanding growth rate in the country's debt became manifest. The outstanding debt (in current dollar rates) tripled, reaching US$ 7.5 billion in 1979 and 8.9 billion in 1980, 3.55 billion of which represented short-term debts (National Bureau of Statistics, NBS, 2017; Etim, Nweze, Umoffon & Asogwa, 2018). Since after this time, the country's debt profile has risen from about N794 billion in 1999 to N49.85 trillion ($108.30

billion) as at December 21, 2022, accounting for 20.5 % of the country's Nominal GDP in Dec 2022, compared with the ratio of 20.2 % in the previous quarter; excluding another estimated N27. 55 trillion 'Ways and Means' loans from the Central Bank (NBS, 2024). This upsurge is accompanied by consistent increase in the revenue base of the Nigeria. It is further revealed that within five decades, from 1981 to 2021, the Nigeria public debts were N13.5 billion, N444.6 billion, N4.1 trillion, N6.5 trillion and N39 trillion. This course also led to increase in revenue from N13.3billion in 1981, N101 billion in 1991, N2.2 trillion in 2001, N11.1 trillion in 2011 and N10.7 trillion in 2021, suggesting a high debt-to-revenue ratio in Nigeria (NBS, 2024).

The Nigerian situation is not different from Ghana, as the public debts in the country in the last five decades have also increased. In 1981 it was $1.8 billion, which increased to $4.3 billion in 1991 and became $6.8 billion in 2001. It continued to increase from $10.4 billion to $36.2 billion in 2011 and 2021 representing 138.9%, 52.1%, 52.9% and 248.1% increase within the period of interest respectively (World Bank, 2023). In fact, two to three years before the COVID 19 pandemic, Ghana's external debt component of the total debts for 2021 was $36,181,556,008 representing a 13.52% increase from 2020; in 2020, it was $31,871,093,085 signifying a 17.69% increase from 2019; and it was $27,081,567,334 in 2019 showing 14.87% increase from 2018; and lastly in 2018 it was $23,575,181,469 representing a 4.69% increase from 2017 (Sulaiman, 2018; World Bank, 2023).These pieces of evidence of increase in their total debts reflected in the revenue base of the country. In 1981 Ghana recorded $4.2 billion as total revenue; it increased to $6.6 billion in 1991, but slightly decreased to $5.3 billion in 2001. After this point, it astronomically increased to $39.3 billion in 2011 and $79.2 billion in 2021 (Bank of Ghana, 2023; Pescatori, Sandri & Simon, 2024).

It is evident from the foregoing that public debts and revenue dynamics have maintained steady increase individually and collectively; and as such are expected to address economic development questions as they did in the case of the Asian Tigers: Singapore, Hong Kong, South Korea and Taiwan by growing their economies through public debts (Abula & Ben, 2016; Adepoju, 2017; Adesola, 2019). The case of Africa is quite different, especially Nigeria and Ghana, where the economic development questions appear to be problems that do not bother them. With the rising profile of public debts and revenue, issues of economic development, measured in terms of per capita consumption, physical quality of life and living standard still remain major concern because of their continuous increase.

In Nigeria, for instance, per capita consumption (PCC), measured as a ratio of real gross domestic to population, performed as abysmally as it increased far more slowly than public debts and revenue. In fact, within the five decades, PCC was N218.8, N284.1, N829.6, N2504.5 and N2065.6, representing 29%, 192%, and 201.9% increase, 17.5% decrease respectively. This shows that the percentage increase in public debts and revenue profiles are far more than the PCC. This therefore raises concern about the quality of life and living standard of the people, as low per capita consumption indicates lesser access to essential goods and services like food, clean water, housing, and healthcare. Consequently, this study seeks to find out the nature of Granger causality between debt-revenue dynamics (debt-real

GDP ratio (DGR), debt-export ratio (DER), debt-service ratio (DSR), revenue-real GDP ratio (RDR) and debt-revenue gap (DRG)) and per capita consumption, physical quality of life and standard of living in Nigeria and Ghana. The rest of the paper considers literature review, methodology, results and discussion and concluding remarks in sections 2, 3, 4 and 5.

Review of Theoretical Literature

Keynesian Theory of Public Debt: The economic crisis created by the great depression of 1930's was partly responsible for the development for modern theory of public debt by Keynes. The traditional view that constant unbalanced budgets and rapidly rising public debt imperils the financial stability of the nation's gradually giving way to the conception which states that a huge public debt is a national asset rather than a liability and that continuous deficit spending is essential to the economic property of nations (Elom-Obed, Ozioma, Odo, Idenyi & Anoke, 2017). The Keynesian attack on the classical principles of budgeting and public finance was a logical extension of the Keynesian attack on the view that economy tends to be at equilibrium at full employment.

The theory argues that increase in public debt through multiple effects would raise the national income. This could be made possible by the functional linkage that exists between government borrowing and expenditure. The theory links public borrowing with deficit financing, authorizing government to borrow for all purposes so that effective demand in the economy is increased resulting in increased employment and output. In justifying the validity of the theory, Abula and Ben (2016) observe that borrowing (which constitutes public debts) for consumption was as desirable as borrowing for investment in productive goods because consumption expenditure induces investment to rise.

Ability-to-Pay Theory: Revenue as a critical component of government finances is explained by various theories which have been developed to underscore how governments can raise revenue effectively and use it for the benefit of economic growth and development. One of such theories is ability-to-ay principle. This theory, often associated with the economist Henry Simons and John Stuart Mill, posits that individuals and businesses should contribute to government revenue in proportion to their ability to pay suggesting that those with higher incomes or wealth should bear a larger tax burden; and those individuals and businesses should contribute to government revenue in proportion to their ability to pay. The theory justifies progressive taxation, where higher-income individuals pay a higher percentage of their income in taxes.

This theory provides framework for policymakers to design tax systems and revenue-raising strategies that align with economic principles and societal goals. The choice of revenue theory can have significant implications for tax policy and its impact on individuals, businesses, and the overall economy. The theory (Were, 2021, Wright & Grenade, 2024; Peter, Mba, Yuni, Chukwuedo & Oburota, 2023) argues that revenue is a fundamental principle in tax policy and public finance through which individuals and businesses should contribute to government revenue in proportion to their ability to pay, meaning those with higher incomes or greater wealth should bear a larger tax burden. It is rooted in the concept of equity and fairness in

taxation. It is therefore instructive to argue that the theory can help counteract income inequality and reduce the gap between the rich and the poor through undergoing massive infrastructural development projects that would help address the development issues (Okafor, 2022).

Human Capital Development Theory: This theory was championed by Amartya Sen using capability approach. The theory emphasizes the expansion of human capabilities, including education, healthcare, and political freedoms, as central to economic development. It shifts the focus from GDP growth to broader measures of well-being. It argues that development is a multidimensional process involving improvements in the economic, social, and political well-being of a society. Baum, *Checherita-Westphal and Rother (2022)* observe that various theories and models have been proposed to explain the factors and dynamics of economic development. This argument recognizes the fact that development is influenced by a combination of factors, including economic policies, social conditions, political stability, technological advancements, and global economic dynamics which are made workable through the instrumentality of government activities financed through borrowing and revenue.

The theory of human development underscores the fact that countries moving from primitive and poor economies can evolve into sophisticated and relatively prosperous ones, what is of critical importance to underdeveloped countries; and it is usually in this context that the issues of economic development is examined (Etim *et al.*, 2018). The argument within this context can be extended to economic activities that centre on development issues such as standard of living, which is framework that analyzes the well-being and quality of life of individuals or populations within a particular society or country. This theory considers various economic factors and indicators to assess the material and non-material aspects of people's lives. This theory provides a comprehensive framework for evaluating and improving the economic and social well-being of individuals and societies (Goode & Khan, 2022) recognizing that a high standard of living encompasses not only material wealth but also access to essential services, health, education, and overall quality of life (Robert, 2016; Kumhot & Tanner, 2024).

This theoretical framework follows that government spending and decrease in tax rates are the best ways to stimulate aggregate demand. Keynesians argue that this method can be used in times of recession or low economic activity as an essential tool for building economic growth and working towards full employment in developing countries. The study framework argues that when the government runs a budget deficit, funds would need to come from public borrowing, overseas borrowing, or monetizing the debt. When governments fund a budget deficit with public debts, it is insinuated that government does that for purpose of accumulating funds for capital projects (Frank & Bernanke, 2021). This would engender more economic activities that would enable people to engage in so many employment activities for the purposes of earning income.

When people received incomes, they would be willing to support the government through payment of tax, as prescribed by ability-to-pay theory, which serves as a fiscal stimulus

(Essien, *et. al.,* 2017). In summary, the theories collectively argue that human development is a comprehensive approach targeted towards improving the quality of life for people around the world and should be pursued by the public sector of any economy. It recognizes that development should be people-centered, focusing on expanding choices and opportunities for individuals and communities to lead lives they value and consider meaningful.

Review of Empirical Literature

The issue of public debt and its relationship with macroeconomic variables has brought about an increasing literature regarding the determinants of public debt burden and its impact on the economy as well as the policy implications. Some of the empirical works reviewed in this section borders on analysis carried out between public debt and its impact on economic growth, prices (inflation), crowding out of private sector and interest rates. Ayadi and Ayadi (2019) in their study on the impact of external debt on the economic growth of Nigeria and South Africa using neoclassical growth model found a negative impact of debt (and its servicing requirements) on growth in the two countries. Morris (2020) used life expectancy at age 1, infant mortality, and literacy as indicators of development, describing progress in health, sanitation, education, and women's status. He used Gross National Product (GNP) as the standard measure of progress but did not show how output is distributed. He argues that the Physical Quality of Life Index (PQLI) is a summation of complex social interrelationships on which no theoretical explanation imposes any given weights/biases.

A study by Ekperiware and Oladeji (2022) reported that there is a structural break in the relationship between economic growth and external debt in Nigeria during the period 1975 to 2005. The impact of debt on economic growth was negative and quite significant in the long-run though in the short-run the impact was useful in Nigeria (Obademi, 2022). In the study of Ezike and Mojekwu (2021) it is revealed that foreign capital inflow was positive as expected while debt service/export ratio was negative as expected. In an empirical investigation of the relationship between domestic debt and economic growth in Nigeria, Adofu and Abula (2020) report that domestic debt-revenue nexus affected the growth of the economy negatively. To validate the belief that public sector borrowing spurs growth, Onyeiwu (2022) carried out an investigation on the relationship between domestic debt and economic growth in Nigeria using the error correction modeling approach to regression analysis. The study report that the domestic debt holding of government was far above the healthy threshold of 35 percent of bank deposits, which resulted in a negative effect on economic growth.

Traum and Yang (2020) estimate the crowding out effects of government debt for the U.S. economy using a New Keynesian model which includes the following variables: real aggregate consumption, investment, labor, wages, nominal interest rate, gross inflation rate, and fiscal variables such as capital, labor, consumption tax revenues, real government consumption and investment, and transfers. The result of the estimates revealed that whether private investment is crowded in or out in the short term depends on the fiscal shock that triggers debt accumulation. This implies that higher debt can crowd in investment despite a higher real interest rate for a reduction in capital tax rates or an increase in productive government investment.

On discussing the relevance of using education as an index for measuring physical quality of life and standard of living, Benhabib and Spiegel (2024) report that a minimum level of education is a precondition for the introduction of innovative technologies in the production process in any society that wants to address economic development questions. In supporting this argument, Schultz (1993 cited in Benhabib & Spiegel, 2024) concludes that the growth rate of knowledge is a determining factor for the overall growth rate of enterprises, while Lundvall (2017) states that economic performance depends on the ability to innovate. Blundell (2019) stresses that the presence of trained personnel determines the ability to apply new technologies and contributes to high growth rates and enhanced competitiveness. At the microeconomic level, Youndt (2024), using data from 208 firms, reached the conclusion that investment in human capital is more effective than other forms of investment.

Wright and Grenade (2024) indicate a non-linear relationship between debt and growth in a panel OLS and threshold dynamics in 13 Caribbean countries. The study found a debt/GDP ratio of 61 per cent for the sample countries, with a debt/GDP ratio exceeding that threshold having an adverse impact on investment and growth. The results showed marked divergence between actual debt/GDP ratios and the calibrated optimal ratios at the country levels. The study indicated that the negative debt-growth relationship reinforced the point that government borrowing must be done not only on terms that are consistent with entrenching debt sustainability, but also on terms that yields growth dividends in the long run.

Pescatori, Sandri and Simon, (2024), however, do not find any evidence of a debt threshold above which medium-term growth prospects is undermined. The study indicated that the relation between the level of debt and growth is importantly influenced by the trajectory of debt. In other words, countries with high but declining levels of debt have historically grown just as fast as their peers. In spite of the absence of debt thresholds, the authors showed that higher debt was associated with more volatile output growth, which can be damaging to economic welfare. Calderon and Fuentes (2023) report negative and robust effect of public debt on economic growth. They also indicated that strong institutions, good economic policies and outward-oriented policies mitigate these adverse effects. The authors showed that a sharp reduction in public debts and an improvement in the policy environment induced an increase in the growth rate per capita of 1.7 percentage points for the Caribbean and 2 percentage points for South America. A more conservative scenario, however, yielded lower growth benefits for the 2 regions.

Akram (2021) report negative and significant relationship between public external debt and per capita income growth and investment, confirming the presence debt overhang in the country. Meanwhile, domestic debts tended to crowd out private investments, but do not inhibit per capita income growth. From the breadth and width of the empirical literature review, it is revealed that the argument of whether or not debt-revenue dynamics affects economic development remains inconclusive. More importantly, no study has been carried out to ascertain the Granger causality direction of between debts-revenue and economic development questions in Nigeria and Ghana with emphasis on per capita consumption, physical quality of life and standard of living as measures of economic development, from 1981 to 2022.

Methodology

Ex-post facto research design is used following quasi experimental research orientation. The choice of this design is anchored on the fact that variables of the study cannot be changed, manipulated or altered, enabling a determination of the Granger causality direction between the independent variables exert on the dependent variables. The data used is secondary in nature, collected from different published sources - World Bank databank, Central Bank of Nigeria and Bank of Ghana, Federal Ministry of Finance, Office of the Accountant General of the Federation, and Debt Management Office. Debt-revenue dynamics, debt-to-GDP ratio (DGR), debt-export ratio (DER), debt-service ratio (DSR), revenue-real-GDP ratio (RGR) and debt-revenue gap (DRG) are the independent variable; while economic development measures such as per capita consumption (PCC), physical quality of life (PQL) and standard of living (SOL) serve as dependent variables.

Following the theoretical framework that public debts are incurred for the purposes of providing necessary capital needed to drive economic activities, which in turn enables people to gain employment, earn income and take up their financial obligations. By so doing increase their consumption, quality of life and standard of living. Therefore, this study utilizes Granger causality statistical test to determine whether one time series of debts-revenue dynamics can predict economic development measured in terms of per capita consumption, physical quality of life and standard of living. With considerable modification of existing models, our study adopted Ayadi and Ayadi (2019), Morris (2020), Ekperiware and Oladeji (2022), Obademi (2022), Ezike and Mojekwu (2021) and Adofu and Abula (2020) who argued that there are two ways impacts of debt on economic growth and development.

The tool is a statistical concept of causality that is based on prediction. The theoretical underpinning of the tool suggests that, if a signal X_1 (debt-revenue dynamics) "Granger-causes" a signal X_2 (economic development), then past values of X_1 should contain information that helps predict X_2 above and beyond the information contained in past values of X_2 alone. Its mathematical formulation is based on linear regression modeling of stochastic processes (Granger 1969 cited in Seth 2017). Consider a bivariate linear autoregressive model that captures the relationship between two variables – debt-revenue dynamics and economic development, with respect to their past value and the study model is specified thus:

$$PCC1(t) = \sum_{J=1}^{p}\left(AijDGR1(t-j) + \sum_{J=1}^{p}\left(BijDER2(t-j) + \sum_{IJ=1}^{p}\left(CijDSR3(t-j) + \sum_{J=1}^{p}\left(DijRGR4(t-j) + \sum_{J=1}^{p}(EijDRG5(t-j) + E1(t))\right)\right)\right)\right) \quad 1$$

$$PQL2(t) = \sum_{J=1}^{p}\left(FijDGR1(t-j) + \sum_{J=1}^{p}\left(GijDER2(t-j) + \sum_{IJ=1}^{p}\left(HijDSR3(t-j) + \sum_{J=1}^{p}\left(IijRGR4(t-j) + \sum_{J=1}^{p}(JijDRG5(t-j) + E2(t))\right)\right)\right)\right) \quad 2$$

$$SOL3(t) = \sum_{j=1}^{p}\left(KijDGR1(t-j) + \sum_{j=1}^{p}\left(LijDER2(t-j) + \sum_{j=1}^{p}\left(MijDSR3(t-j) + \sum_{j=1}^{p}\left(NijRGR4(t-j) + \sum_{j=1}^{p}(OijDRG5(t-j) + E3(t))\right)\right)\right)\right) \quad 3$$

Where: *P* is the maximum number of lagged observations included in the model (the model order), the matrix *A to E; F to J and K to O* contain the coefficients of the model, that is, the contributions of each lagged observation; DGR, DER, DSR, RGR and DRG to the predicted values of $PCC_1(t)$, $PQL_2(t)$ and $SOL_3(t)$ respectively; E_1, E_2 and E_3 are residuals (prediction errors) for each time series, *'t –j'* is the lagged element,

Results and Discussion

Table 1: Results of Descriptive Statistic Tests for the Study Variables Used in Nigeria's and Ghana's Models

	Nigeria								Ghana							
	PCC	PQL	SOL	DGR	DER	DSR	RGR	DRG	PCC	PQL	SOL	DGR	DER	DSR	RGR	DRG
Mean	290809.9	70.04762	3476.950	11.42143	1591.976	0.860952	35.09405	1.08E+12	0.002867	61.27293	2256.288	2.33E+08	9.45E+08	0.367268	0.125098	11487.63
Median	201526.6	71.00000	2948.440	8.630000	117.5600	0.000000	9.695000	3.14E+11	0.002759	61.08000	2239.680	35776691	708.8117	0.053000	0.018029	880.6917
Maximum	813022.1	76.00000	5708.180	88.61000	60235.20	14.20000	311.6600	3.06E+13	0.005376	66.48000	3667.980	1.05E+09	2.11E+10	9.000000	1.932740	950661.4
Minimum	202.9700	58.00000	1187.510	0.160000	1.090000	0.000000	0.000000	-7.57E+13	8.74E-05	55.73000	781.3500	14215995	164.5543	0.008000	0.000145	-241565.0
Std. Dev.	191855.0	4.090157	1589.009	14.15400	9270.515	2.658051	60.96476	1.44E+13	0.001593	2.105528	963.8622	3.49E+08	4.18E+09	1.489902	0.310777	155634.5
Skewness	1.582123	-0.919957	-0.014387	3.942858	6.244903	4.033985	2.829766	-3.236742	-0.162333	-0.009455	-0.167516	1.321128	4.265234	5.172694	4.989170	5.445837
Kurtosis	4.925190	3.290827	1.590895	22.23578	40.00774	18.99265	11.83868	20.99292	2.032316	3.157664	1.846453	3.013202	19.44338	29.45190	29.37459	34.16183
Jarque-Bera	24.00793	6.072262	3.476209	756.3499	2669.744	561.4999	192.7671	639.8895	1.779777	0.043077	2.464984	11.92705	586.2205	1378.164	1358.443	1861.551
Probability	0.000006	0.048020	0.175853	0.000000	0.000000	0.000000	0.000000	0.000000	0.410702	0.978692	0.291565	0.002571	0.000000	0.000000	0.000000	0.000000
Sum	12214014	2942.000	146031.9	479.7000	66863.01	36.16000	1473.950	4.52E+13	0.117534	2512.190	92507.79	9.54E+09	3.88E+10	15.05800	5.129032	470992.9
Sum Sq. Dev.	1.51E+12	685.9048	1.04E+08	8213.764	3.52E+09	289.6746	152384.8	8.53E+27	0.000102	177.3298	37161212	4.88E+18	6.98E+20	88.79235	3.863290	9.69E+11
Observations	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42

Source: Author's Computation, 2025.

Table 1 displays the findings of the descriptive statistical test conducted on the descriptive analysis of the influence of the public debt-revenue dynamic on the physical quality of life, standard of living, and per capita consumption in Ghana and Nigeria. Nigeria has a higher mean score (290,809.9) on per capita consumption over the study period than Ghana

(0.002867), according to the results. Nigeria has a higher physical quality of life than Ghana, with respective scores of 70.04762 and 61.27293. Nigeria's mean standard of living scores is 3476.950 and 2256.288, respectively. This demonstrates that Ghana's average level of living is inferior to Nigeria's.

Public debt-real GDP ratios show that Nigeria performs better than Ghana, with figures of 2.33 and 11.42, respectively, and 15.91.97 and 9.45, respectively, for the public debt-export ratios. Ghana has a public debt-service ratio of 0.367268, whilst Nigeria has a mean of 0.860952. Nigeria also has a mean of 35.06405 and 0.125098 in the revenue-real GDP ratio, according to the descriptive statistical value. This indicates that Nigeria did better. On the other hand, Ghana surpassed Nigeria on average over the study period, as indicated by the public debt-revenue gap's mean values of 1.08 and 11487.63.

With the exception of the public deficit-revenue gap (DRG), the median values indicate that Nigeria outperformed Ghana in all study variables (PCC, PQL, SOL, DGR, DER, DSR, and RGR). This is true for standard deviation figures as well as maximum and minimum values. The distributions of PCC, DGR, DER, DSR, and RGR for Nigeria are asymmetrical to the right (or positive) side and are not mirror images, whereas the distributions of PQL, SOL, and DRG are asymmetrical to the left (or negative) side and are not mirror images, with respect to the measure of the asymmetry of a distribution, or skewness. However, all of the dependent variables in Ghana - PCC, PQL, and SOL - have an asymptotic distribution to the left (or negative), whereas DGR, DER, DSR, RGR, and DRG have an asymptotic distribution to the right (or positive).

Kurtosis, a statistical measure of the "*tailedness*" of a real-valued random variable's probability distribution, looks at the frequency of outliers in a series or variable's distribution. It is demonstrated that, when it comes to Nigerian variables, DER (40.00774) frequently contains outliers, indicating that the majority of the variable's points are either located near or far from the distribution's mean. Following this are DSR (18.09265), PCC (4.925190), PQL (3.290895), DRG (20.99292), DGR (22.23578), and SOL at this number, 1.590895. Interestingly, the highest outliers in Ghana are found in DRG (34.16183). This indicates that the variable of interest is largely located outside of the mean value, with the highest values. This is followed by DSR (29.45190), RGR (29.37459), DER (19.44338), PQL (3.157664), DGR (3.013202), PCC (2.032316) and SOL at the value of 1.846453.

With respect to the Jarque–Bera test, which measures the goodness-of-fit test of whether the skewness and kurtosis of sample data are consistent with a normal distribution, it is clear that in Nigeria, the probability values of the relevant variables are below the 0.05 significant levels. With the exception of SOL, this suggests that the null hypothesis should be rejected, indicating that the data do not follow a normal distribution. Nonetheless, the findings indicate that in Ghana, the values of all the dependent variables (PCC, PQL, and SOL) surpass the significance level of 0.05, indicating that they do not conform to a normal distribution. However, as the values of each independent variable (DGR, DER, DSR, RGR, and DRG) are less than 0.05, it is assumed that they all have a normal distribution. This reinforces the idea

that the variables contain outliers that may contribute to a unit root problem; for this reason, the data must be put through a unit root test using the PP and ADF estimators.

Table 2: Result of Correlation Matrix Test for Nigeria's Variables

	Nigeria								Ghana							
	PCC	**PQL**	**SOL**	**DGR**	**DER**	**DSR**	**RGR**	**DRG**	**PCC**	**PQL**	**SOL**	**DGR**	**DER**	**DSR**	**RGR**	**DRG**
PCC	1	-0.1585	0.6712	0.0127	0.0503	0.2208	-0.2196	-0.0520	1	-0.8369	0.9386	-0.6717	-0.3467	0.0463	0.4492	-0.0395
PQL	-0.1585	1	-0.5917	-0.1134	0.0457	-0.0628	0.2687	-0.1456	-0.8369	1	-0.7672	0.5925	0.3006	0.0273	-0.3378	-0.0694
SOL	0.6712	-0.5917	1	0.1995	0.1844	0.3827	-0.5337	0.0608	0.9386	-0.7672	1	-0.7531	-0.3104	0.0320	0.4729	-0.0433
DGR	0.0127	-0.1134	0.1995	1	0.1073	0.2193	-0.1149	0.1293	-0.6717	0.5925	-0.7531	1	0.2451	0.0038	-0.2053	-0.0318
DER	0.0503	0.0457	0.1844	0.1073	1	0.5267	-0.0625	0.0848	-0.3466	0.3006	-0.3104	0.2451	1	-0.0523	-0.0933	-0.0159
DSR	0.2208	-0.0628	0.3827	0.2193	0.5267	1	-0.1189	0.1453	0.0463	0.0273	0.0320	0.0038	-0.0523	1	-0.0292	-0.0528
RGR	-0.2196	0.2687	-0.5337	-0.1149	-0.0625	-0.1189	1	-0.1663	0.4493	-0.3378	0.4729	-0.2053	-0.0933	-0.0292	1	-0.0907
DRG	-0.0520	-0.1456	0.0608	0.1293	0.0848	0.1453	-0.1663	1	-0.0395	-0.0694	-0.0433	-0.0319	-0.0159	-0.0528	-0.0907	1

Source: Author's Computation, 2025.

The findings of correlation matrix tests conducted on the variables in the models for Ghana and Nigeria are shown in Table 2. The findings clearly show that, in Nigeria, PCC has a negative link with RGR and DRG, with values of -0.2196 and -0.0520, respectively, but a positive relationship with DGR, DER, and DSR, with values of 0.0127, 0.0503, and 0.2208. PQL has negative relationships with DGR, DSR, and DRG within the same nation, with respective values of -0.1135, -0.0628, and -0.1456; however, it has positive relationships with DER and RGR, with respective values of -0.1134 and -0.1456. Standard of living (SOL) has a negative relationship with RGR (-0.5337), but a positive relationship with DGR, DER, DSR, and DRG (values of 0.1995, 0.1844, 0.3827, and 0.0608, respectively).

Further, the table shows that PCC has positive relationships with DSR and RGR but negative relationships with DGR, DER, and DRG with the levels of -0.6717, -0.3467, and -0.0395. Physical quality of life (PQL) has a negative relationship with RGR and DRG at -0.3378 and -0.0694, respectively, but a positive relationship with DGR, DER, and DSR at 0.5925, 0.3006, and 0.0273. The standard of life (SOL) has a positive relationship with DSR and RGR at 0.0320 and 0.4729, respectively, but a negative relationship with DGR, DER, and DRG at -0.7531, -0.3104, and -0.0433, respectively.

Table 3: Result of ADF Unit Root Test on Nigeria's Variables

Variables	At Level			1st Difference			2nd Difference			Order Integration	Remarks
	t-stat	5% Value	Prob.	t-stat	5% Value	Prob.	t-stat	5% Value	Prob.		
PCC	-1.159114	-2.945842	0.6812	-1.081951	-2.951125	0.7115	-6.020581	-2.951125	0.0000	*I*(2)	Stationary at 2nd Difference
PQL	-0.522413	-2.935001	0.8763	-3.798177	-2.936942	0.0060	-8.729230	-2.938987	0.0000	*I*(1)	Stationary at 1st Difference
SOL	-0.500348	-2.935001	0.8808	-6.300118	-2.936942	0.0000	-10.71795	-2.938987	0.0000	*I*(1)	Stationary at 1st Difference
DGR	-10.95197	-2.935001	0.0000	-30.46342	-2.936942	0.0001	-24.72505	-2.938987	0.0001	*I*(0)	Stationary at Level
DER	-6.411748	-2.935001	0.0000	-7.231964	-2.941145	0.0000	-5.083730	-2.954021	0.0002	*I*(0)	Stationary at Level
DSR	-3.613173	-2.936942	0.0098	-6.924059	-2.941145	0.0000	-1.635269	-2.963972	0.4528	*I*(1)	Stationary at 1st Difference
RGR	-3.332577	-2.936942	0.0199	-5.183559	-2.941145	0.0001	-7.210906	-2.943427	0.0000	*I*(1)	Stationary at 1st Difference
DRG	-0.698977	-2.960411	0.8326	-4.539014	-2.960411	0.0011	-2.717248	-2.963972	0.0829	*I*(1)	Stationary at 1st Difference

Source: Author's Computation, 2025.

The results of the Augmented Dickey-Fuller (ADF) unit root test on the variables used in the Nigerian models are shown in Table 3 of the study. Per Capita Consumption (PPC), the first dependent variable, is stationary when it is differentiated for the second time, according to the result. It is integrated of order two as a result [I(2)]. Physical Quality of Life (PQL), the second dependent variable, is differentiated three times before becoming stationary at the initial difference, suggesting that it is integrated of order zero [I(0)]. The third dependent variable, the standard of living (SOL), is varied three times before stabilizing at the initial difference. The variable is implicitly integrated of order one [I(1)]. The debt-real GDP ratio (DGR) and the debt-export ratio (DER), which are the first and second independent variables, are integrated of order zero [I(0)] and stationary at level.

The debt-service ratio, revenue-real GDP ratio, and debt-revenue gap, on the other hand, are the third, fourth, and fifth independent variables that are integrated of order one and stationary at the initial difference [I(1)]. Based on statistical evidence, stationarity is established when probability values are significant at the 0.05 selected alpha level and when the t-test value is smaller than the 5% value. Though established by ADF as in the case of Nigeria, Philip-Perron (PP) is also used to confirm the result of ADF unit root test and reported in the table below.

Table 4: Result of ADF Unit Root Test on Ghana's Variables

Variables	At Level			1st Difference			2nd Difference			Order Integration	Remarks
	t-stat	5% Value	Prob.	t-stat	5% Value	Prob.	t-stat	5% Value	Prob.		
PCC	-0.749961	-2.938987	0.8219	-5.278296	-2.948404	0.0001	-5.015828	-2.954021	0.0003	[*I*(1)]	Stationary at 1st Difference
PQL	-0.938279	-2.938987	0.7652	-9.389688	-2.938987	0.0000	-9.206525	-2.943427	0.0000	[*I*(1)]	Stationary at 1st Difference
SOL	-0.648834	-2.935001	0.8482	-5.677978	-2.936942	0.0000	-7.186292	-2.941145	0.0000	[*I*(1)]	Stationary at 1st Difference
DGR	-2.439356	-2.935001	0.1377	-8.469062	-2.936942	0.0000	-4.239969	-2.954021	0.0022	[*I*(1)]	Stationary at 1st Difference
DER	-2.96548	-2.935001	0.5698	-9.346963	-2.936942	0.0000	-6.365489	-2.941145	0.0057	[*I*(1)]	Stationary at 1st Difference
DSR	-6.594014	-2.935001	0.0000	-7.373106	-2.938987	0.0000	-6.163758	-2.945842	0.0000	[*I*(0)]	Stationary at Level
RGR	-5.068431	-2.935001	0.0002	-7.337993	-2.938987	0.0000	-6.209862	-2.945842	0.0000	[*I*(0)]	Stationary at Level
DRG	-6.289531	-2.935001	0.0000	-10.63809	-2.936942	0.0000	-6.362931	-2.945842	0.0000	[*I*(0)]	Stationary at Level

Source: Author's Computation, 2025.

The ADF unit root test on the variables used to investigate the effects of public debt-revenue dynamics on per capita consumption, physical quality of life, and standard of living is presented in Table 4 of the study. The findings indicate that the dependent variables, namely standard of living (SOL), physical quality of life (PQL), and per capita consumption (PCC), are integrated of order one and stationary at level [I(1)]. The decision is made based on the fact that the probability values are significant and their individual t-stat values are less than the 5% threshold. However, of the five independent variables, DRG, RGR, and DSR are stationary at levels, and only DGR and DER are integrated of order zero, [I(0)], and stationary at first difference, [I(1)]. To be sure, this result is also put through an additional unit root test with the Phillips-Perron estimator, which is examined and presented in the table below.

Research Question One: How do debt-revenue dynamics Granger cause per capita consumption in Nigeria and Ghana?

Hypothesis One (H_{01}): Debt-revenue dynamics do not significantly Granger cause per capita consumption in Nigeria and Ghana.

Table 5: Result of Pairwise Granger Causality Test on Research Question One

Null Hypothesis: Variable A dose not Granger cause Variable B. Lags:2									
Nigeria					**Ghana**				
Variables	**Obs**	**F.Stat**	**Prob**	**Decision**	**Variables**	**Obs**	**F.Stat**	**Prob**	**Decision**
PCC→ DGR		0.30386	0.7399	Retain Ho.	PCC→ DGR	39	1.90604	0.1642	Retain Ho.
DGR→ PCC	39	3.01782	0.0622	No Causality	DGR→ PCC		171.082	2.E-18	No Causality
PCC→ DER		4.82512	0.0143	Drop Ho; Accept H_1.	PCC→ DER	39	0.25090	0.7795	Retain Ho.
DER→ PCC	39	0.57107	0.5702	Uni-Causality (PCC → DER)	DER→ PCC		1.61366	0.2140	No Causality
PCC→ DSR		2.43308	0.1029	Retain Ho.	PCC→ DSR	39	0.02343	0.9769	Retain Ho.
DSR→ PCC	39	2.08612	0.1398	No Causality	DSR→ PCC		0.07626	0.9267	No Causality
PCC→ RGR	39	0.05977	0.9421	Retain Ho.	PCC→ RGR	39	0.14815	0.8629	Drop Ho; Accept H_1.
RGR→ PCC		0.17199	0.8427	No Causality	RGR→ PCC		3.43189	0.0439	Uni-Causality (RGR → PCC)
PCC→ DRG	39	5.63354	0.0077	Drop Ho; Accept H_1.	PCC→ DRG	39	0.01685	0.9833	Retain Ho.
DRG→ PCC		0.08729	0.9166	Uni-Causality (PCC → DRG)	DRG→ PCC		0.03153	0.9690	No Causality

Source: Authors' Computation, 2025.

The Granger Causality test results are shown in Table 5 for the research variables included in the models define he effects of debt-revenue dynamics on per capita consumption. The goal of the test was to determine whether or not the following independent variables debt-real GDP ratio (DGR), debt-export (DER), debt-service ratio (DSR), revenue-real GDP ratio (RGR), and debt-revenue gap (DRG) caused the following the dependent variable - per capita consumption (PCC) in Africa by comparing the paradigms of Nigeria and Ghana. Based on the results, it is possible to conclude that in Nigeria, there is no directional Granger causality from PCC to DRG or otherwise in both countries, given their respective values.

However, a unidirectional Granger causality exists from PCC to DER at the value of 0.0143 in the Nigerian paradigm but does niot in Ghana. By considering PCC and DSR, it is evident that neither PCC nor DSR Granger cause each other in both counties. Accordingly, by looking at the revenue side, the null hypothesis postulates that there is no Granger causality between per capita consumption (PCC) and revenue-real GDP ratio (RGR) in Nigeria and Ghana is partially treated. This is because there is a unidirectional Granger causality from RGR to PCC in Ghana. Nevertheless, a unidirectional causality is established from PCC to DRG in Nigeria rather than Ghana.

Research Question Two: How do debts-revenue dynamics Granger cause physical quality of life in Nigeria and Ghana?

Hypothesis Two (H_{02}): Debt-revenue dynamics do not significantly Granger cause physical quality of life in Nigeria and Ghana.

Table 6: Result of Pairwise Granger Causality Test on Research Question Two

Null Hypothesis: Variable A dose not Granger cause Variable B. Lags:2									
Nigeria					**Ghana**				
Variables	**Obs**	**F.Stat**	**Prob**	**Decision**	**Variables**	**Obs**	**F.Stat**	**Prob**	**Decision**
PQL→ DGR	39	1.71013	0.1960	Retain Ho.	PQL→ DGR	39	0.37457	0.6904	Drop Ho; Accept H_1.
DGR→ PQL		1.36956	0.2679	No Causality	DGR→ PQL		7.92130	0.0015	Uni-Causality (DGR → PQL)
PQL→ DER	39	0.22135	0.8026	Retain Ho.	PQL→ DER	39	0.00619	0.9938	Retain Ho.
DER→ PQL		1.85183	0.1724	No Causality	DER→ PQL		0.85547	0.4340	No Causality
PQL→ DSR	39	0.07049	0.9321	Retain Ho.	PQL→ DSR	39	0.06191	0.9401	Retain Ho.
DSR→ PQL		0.45242	0.6399	No Causality	DSR→ PQL		0.06909	0.9334	No Causality
PQL→ RGR	39	0.56132	0.5755	Retain Ho.	PQL→ RGR	39	0.54988	0.5821	Retain Ho.
RGR→ PQL		0.08975	0.9144	No Causality	RGR→ PQL		1.23555	0.3034	No Causality
PQL→ DRG	39	2.28244	0.1170	Retain Ho.	PQL→ DRG	39	0.00734	0.9927	Retain Ho.
DRG→ PQL		0.13699	0.8724	No Causality	DRG→ PQL		0.29938	0.7432	No Causality

Source: Authors' Computation, 2025.

Table 6 reports the result Granger causality analysis between debt-revenue dynamics, measured in terms of debt-real GDP ratio (DGR), debt-export (DER), debt-service ratio (DSR), revenue-real GDP ratio (RGR), and debt-revenue gap (DRG), and physical quality of life in Nigeria and Ghana. From the result, it is evident that in Nigeria there neither PQL nor DGR Granger cause each other; but in Ghana there is a uni-directional causality from DGR to PQL. In consideration of Granger causality between PQL and DER in both countries, it is apparent to point out that neither PQL nor DER Granger cause each other as established by their respective statistical evidence. This is also applicable between PQL and DSR; as no Granger causality is found between them in both countries. On the revenue side, it is revealed that Granger causality sought between physical quality of life and revenue-real GDP ratio (RGR) is not achieved because no of the statistical values is significant in both Nigeria and Ghana. Also, between physical quality of life and debt-revenue gap there is no direction of Granger causality in both countries. This further supports the idea that revenue-real GDP ratio and debt revenue gap cannot be used to forecast PQL.

Research Question Three: How do debt-revenue dynamics Granger cause and standard of living in Nigeria and Ghana?

Hypothesis Three (H_{03}): Debt-revenue dynamics do not significantly Granger cause standard of living in Nigeria and Ghana.

Table 7: Result of Pairwise Granger Causality Test on Research Question Three

Null Hypothesis: Variable A dose not Granger cause Variable B. Lags:2									
Nigeria					**Ghana**				
Variables	**Obs**	**F.Stat**	**Prob**	**Decision**	**Variables**	**Obs**	**F.Stat**	**Prob**	**Decision**
SOL→ DGR	39	0.45934	0.6356	Retain Ho.	SOL→ DGR	39	3.20054	0.0529	Retain Ho
DGR→ SOL		3.00790	0.0627	No Causality	DGR→ SOL		1.35579	0.2709	No Causality
SOL→ DER	39	0.00899	0.9911	Retain Ho.	SOL→ DER	39	1.12904	0.3348	Retain Ho.
DER→ SOL		1.96437	0.1558	No Causality	DER→ SOL		2.00952	0.1492	No Causality
SOL→ DSR	39	0.00992	0.9901	Retain Ho.	SOL → DSR	39	1.66283	0.2042	Retain Ho.
DSR→ SOL		2.90577	0.0684	No Causality	DSR→ SOL		0.04160	0.9593	No Causality
SOL→ RGR	39	11.2168	0.0002	Drop Ho; Accept H_1.	SOL→ RGR	39	0.22250	0.8016	Retain Ho
RGR→ SOL		2.70410	0.0813	Uni-Causality (SOL → RGR)	RGR→ SOL		4.49114	0.0184	No Causality
SOL→ DRG	39	0.00336	0.9966	Retain Ho.	SOL→ DRG	39	0.00796	0.9921	Retain Ho.
DRG→ SOL		0.05817	0.9436	No Causality	DRG→ SOL		0.08244	0.9210	No Causality

Source: Author's Computation, 2025.

The table 7 reports the result of the third research question which sought to found out how debt-revenue dynamics Granger cause standard of living in Nigeria and Ghana. The corresponding null hypothesis postulates that debt-revenue dynamics do not Granger cause standard of living in Nigeria and Ghana. From the result, it is evident that there is no Granger causality between debt-real GDP ratio and standard of living in Nigeria and Ghana. This is so because their respective statistical evidence has values granter than the probability value of 0.05. The table also reports that neither debt-export ratio nor standard of living Granger cause each other; and either debt-service ratio or standard of living Granger each other in Nigeria and Ghana within the period of the study. However, there is a uni-directional causality from standard of living to revenue-real GDP ratio in Nigeria, not in Ghana. Nonetheless, between debt-revenue gap and standard of living none Granger cause each other in both Nigeria and Ghana within the period of this study.

Result Implications and Discussion

The result of the study revealed that in Nigeria, there is a unidirectional causal relationship between per capita consumption (PCC), the debt-export ratio (DER), and the debt-revenue gap (DRG). A unidirectional causal relationship between per capita consumption and the debt-export ratio means that changes in one variable systematically cause changes in the other, but not vice versa; meaning that the relationship is exclusively from per capita consumption to debt-export ratio – meaning the reverse influence is statistically insignificant or non-existent. The Granger relationship from per capita consumption to the debt-export ratio refers to whether past values of per capita consumption can statistically predict future values of the debt-export ratio. This is tested using a Granger causality test, a statistical method used to determine if one time series can help forecast another.

This result implies that changes in per capita consumption occur before and have predictive power over changes in the debt-export ratio – suggesting that increased or decreased consumption may contribute to changes in a country's debt relative to exports. Further, higher

consumption increases imports, more imports reduce net exports, worsening the trade balance, leading to a higher debt-export ratio, and higher consumption could drive higher imports (reducing export competitiveness) or lead to increased borrowing to sustain consumption, raising the debt-export ratio in Nigeria. If in any case that the consumption is fueled by credit expansion or government borrowing, it could increase external debt levels, worsening the debt-export ratio.

Nonetheless, there is a unidirectional causal relationship in Ghana between revenue-real DGP ratio (RGR) and per capita consumption (PCC). This unidirectional causal relationship between the revenue-to-real GDP ratio and per capita consumption means that changes in RGR variable systematically cause changes in per capita consumption in Ghana, but not the reverse. The revenue-to-real GDP ratio represents government revenue (taxes, fees) as a percentage of real GDP – indicating the government's ability to generate income relative to the economy's size. This result also implies that changes in the government revenue-to-GDP ratio influence per capita consumption, but not the other way around; and intuitively, higher government revenue (tax collection) may reduce disposable income, leading to lower per capita consumption.

Uzomba (2015) and Akram (2021) confirmed the existence of the debt overhang in the nation by reporting a negative and substantial association between public external debt and per capita income growth and investment, which is consistent with the findings of this study. Findings of the current study and Akram's indicate that while debt tends to displace private investment, it does not impede the rise of per capita income. Kraay and Nehru (2016) also discovered a substantial trade-off between policy and debt loads. According to data presented by Cordella (2020), debt overhang occurs in nations with sound institutions and policies when the net present value of debt exceeds 20 - 25 percent of GDP. According to the results above, a country's public debt to GDP ratio is the measure used to compare public debt to GDP. The debt-to-GDP ratio, which compares a nation's output to its debt, is a reliable indicator of that nation's capacity to repay its loans.

In Nigeria there neither DGR nor PQL Granger cause each other; but in Ghana there is a uni-directional causality from DGR to PQL. Granger causality between the debt-to-real GDP ratio and physical quality of life (PQL) means that past values of DGR (debt-real-GDP-ratio) can statistically predict future values physical quality of life in Ghana than in Nigeria. The direction of causality determines which variable has a leading influence on the other. This suggests that Ghana's debt burden influences future improvements or deteriorations in living conditions, high debt harms physical quality of life, rising debt may divert resources away from social spending (healthcare, education, infrastructure), reducing PQL.

Debt distress could lead to austerity measures (higher taxes, spending cuts), limiting public welfare programs (Kumar & Woo, 2020). High external debt could result in currency depreciation and inflation, increasing the cost of living and reducing real income. However, if debt is used efficiently for public investment (education, healthcare, infrastructure), it can improve PQL over time and sustainable debt management can finance growth-enhancing

projects, leading to higher real GDP and better living standards (Sichula, 2022). GDP and external debts have a substantial link, as demonstrated by Sichula (2022). GDP rises as external debt falls. Due to the release of funds for economic growth initiatives in the health and education sectors, Nigeria's debt relief in 2005 resulted in a structural disruption in the link between the nation's external debt and growth (Ekperiware & Oladeji, 2022). The burden of external debt does not directly affect Nigeria's national income or its per capita income, as the country's economy was negatively impacted by the devaluation of the Naira, worker layoffs, and industrial strikes (Boboye & Ojo, 2022).

In Nigeria, it was discovered that the standard of living (SOL) Granger causes the revenue-real-GDP-ratio (RGR). However, in Ghana, there is none. It could be inferred from this result that Nigeria, as the standard of living, Granger-causes the revenue-to-real GDP ratio (RGR), which means that past values of the standard of living can statistically predict future values of RGR, but not necessarily the other way around. Intuitively, this result suggests that a broad measure of well-being, including income levels, employment, access to healthcare, education, and quality of life indicators can contribute to the proportion of government revenue (mainly from taxes) to real GDP - indicating the Nigerian government has more ability to generate income relative to economic output than the Ghana's government.

As the standard of living Granger-causes the revenue-to-GDP ratio, then improving living conditions can be a long-term strategy to enhance government revenue collection. This suggests that policies focused on social and economic development will ultimately lead to better fiscal health. By lending support to the foregoing, Olumilua and Afolabi (2023), using annual time series data spanning from 1981 to 2022, reported a long-run relationship among economic development variables used in the Nigerian economy, with foreign reserves (FRES) having positive and significant long-run impacts on GDP, but no significant short-run impacts. Similarly, Uzomba (2015) reported a one-way causal relationship between the standard of living, external debt, and economic expansion. Howbeit, Ayadi and Ayadi (2019) argued that growth in South Africa and Nigeria is negatively impacted by debt (and the costs associated with servicing it). The manageability of the current debt-revenue dynamics has also been evaluated using debt sustainability analyses (DSAs). Long-term development finance is at danger because of the growing vulnerabilities brought on by declining debt-to-revenue ratios, according to IMF and World Bank (2023) DSAs for nations including Ghana, Nigeria, and Sierra Leone. When Adegbite (2020) used a panel ARDL model on West African nations, they discovered that revenue diversification - which goes beyond trade and oil taxes - significantly increases growth and debt sustainability.

Nonetheless, between the debt-revenue gap and standard of living none Granger cause each other in both Nigeria and Ghana within the period of this study. This means that past values of one variable do not statistically predict future values of the other. In other words, changes in the debt-revenue gap do not systematically lead to changes in the standard of living, and vice versa. By implication, it suggests that changes in government borrowing relative to revenue do not predict changes in living standards (Mbah, Agu & Umunna, 2016). According to Fjeldstad and Moore (2009), nations are more responsible and receptive to the demands of their citizens

when they produce their own income rather than relying on help or borrowing, which results in better living conditions. According to Akanbi (2014), West African nations with higher levels of domestic revenue mobilization (i.e., tax-to-GDP ratios above 15%) saw notable advancements in water supply, literacy rates, and health access.

In their study on Ghana, Brafu-Insaidoo and Biekpe (2011) observed that growing debt without corresponding revenue growth limits the amount of money available for investments in the social sector. Using a VECM framework, Chuku et al. (2020) demonstrated that debt servicing pushes out budgets for health and education during times of low revenue performance, which halts gains in PQL indexes. After applying a fiscal reaction function to African nations, Baum et al. (2022) concluded that a robust revenue base is necessary to lessen the negative effects of debt on the provision of public services. Sachs (2005) found that the capacity to reallocate resources toward poverty-reducing spending was associated with better health and education outcomes in debt-relief recipient countries (HIPC). According to Mbah et al. (2020), ECOWAS countries' life expectancy and access to essential services decline as debt-to-revenue ratios rise unless they are counterbalanced by greater mobilization of domestic resources.

The lack of Granger causality suggests that government debt management and public revenue do not automatically translate into better or worse living standards. Similarly, changes in living standards do not necessarily influence how much a government borrows relative to revenue. This could be on the account that in both countries, government debt may not be effectively used for social welfare or economic development, making it irrelevant to standard of living changes (Mansell & Whenis, 2015). Similarly, borrowing may be used for non-productive spending (e.g., debt repayment, military expenses) rather than improving healthcare, education, or infrastructure. This may the economies to be resilient to fiscal imbalances, meaning that the debt-revenue gap does not immediately translate into economic hardship.

Conclusion and Recommendation

Debt-revenue dynamics play a crucial role in shaping a country's economic development by influencing per capita consumption, public investment, physical quality of life, fiscal sustainability, and overall economic stability through standard of living. However, the level of economic progress and development in Africa suggests that the continent has not made good progress in economic development; perhaps the way their governments manage its debt and revenue balance could be responsible for low long-term economic development. In this trajectory, this study sought to determine whether or not debt-revenue dynamics and economic development Granger cause each other.

Debt-revenue dynamics are construed as debt-real-GDP ratio (DGR), debt-export ratio (DER), debt-service ratio (DSR), revenue-real-GDP ratio (RGR) and debt-revenue-gap (DRG), and economic development is captured as per capita consumption, physical quality of life and standard of living. Using Granger causality analytical technique, the result revealed that in Ghana revenue-real-GDP-ratio Granger cause per capita consumption, while in Nigeria, per capita consumption Granger causes debt-revenue gap. Further, debt-real-GDP

ratio, in Ghana Granger cause physical quality of life, but none of the debt-revenue dynamics variables Granger cause physical quality of life, but standard of living Granger cause revenue-real-GDP ratio in Nigeria.

The study therefore concludes that there is bidirectional causality between debt-revenue dynamics and economic development in Africa; with emphasis with Nigeria and Ghana. Accordingly, the study recommends that in Nigeria, there should be structural reforms necessary to shift consumption towards domestically produced goods, while in Ghana where revenue-to-GDP drives consumption, government should balance taxation and spending to support sustainable consumption without overburdening taxpayers. In Nigeria, government should ensure that debt is used for productive investments that enhance long-term well-being. This could be done through effective social spending that can break a cycle of high debt and poor quality of life. Governments of both countries should invest in education, healthcare, and job creation so as to be able to improve living standards in their respective countries.

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