Debt-Revenue Dynamics and Per Capita Consumption in Nigeria and Ghana: A Comparative Analysis

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Abstract: - By representing debts-revenue dynamics by debt-GDP ratio (DGR); debt-export ratio (DER); debt-service ratio (DSR); revenue-GDP ratio (RGR); and debt-revenue gap (DRG), the study examined the impact of debt-revenue dynamics on per capita consumption in Nigeria and Ghana from 1981 to 2022; and per capita consumption (PCC) was used as the dependent variable. Utilizing secondary data on the above variables, Keynesian theoretical propositions were adopted as a framework to model the subject matter. Trendy analysis and Auto-regression Distributive Lag (ARDL) to conduct differential short run and bound tests as well as residual diagnostic test. From the analysis, it is revealed that in the short run with respect to debt-GDP, debt-export, revenue-GDP ratios and debt-revenue gap impact more on PCC in Ghana than Nigeria. However, Nigeria outperformed Ghana in terms how debt-service ratio impacted on per capita consumption. The therefore concluded that per capita consumption is more significantly impacted in by debt-revenue dynamics in Ghana than Nigeria. Hence, the study recommended that the Nigerian government should use its debt for more worthwhile endeavors to enable per capita consumption and access to economic opportunities increase in the country.

Key-Words: - Debt, Revenue, GDP, Per Capita Consumption, ARDL

Received: March 7, 2025. Revised: April 18, 2025. Accepted: May 9, 2025. Published: July 15, 2025.

1 Introduction

The first step towards measuring the effect of government borrowing and revenue on the economy is to understand the mechanism through which it can affect key macroeconomic variables. Governments use fiscal policy to influence the level of aggregate demand in the economy with a focus to achieve economic objectives of price stability, full employment, economic growth and balance of payments equilibrium; and ultimately address economic development questions. The Keynesian model advocates that deficit spending on labor-intensive infrastructure projects serves as a means to stimulate employment and stabilize wages for better per capita consumption (PCC), [1], [2]. This suggests that the dynamics of public debts and revenue nexus is such that borrowed monies should serve as instrument of economic prosperity for revenue generation through decrease in unemployment rates, increase in economic growth and increase in government-funded programmes, [3], [4]. This explains why public debts are often incurred to finance deficit budget through various needs of the public as well as raise revenue for the purpose of furthering the future of the economy and eventually repay the debts. The foregoing economic models proposes that debts are incurred to stimulate economic activities that would in turn increase revenue space that accommodates expenditure towards addressing low per capita consumption that has characterized Nigerian and Ghanaian States.

Debt-revenue dynamics refer to the relationship between a debt levels and revenue, which plays critical roles in assessing a country's fiscal health challenge and debt sustainability issues, [5], [6]. Governments borrow money (debt) when revenues (primarily from taxes) are insufficient to cover their expenditures. This informs why a theoretical proposition that expects public debts, if properly utilized, should serve as a catalyst for increase in revenue - which provides the means of addressing economic development issue like low per capita consumption. In this context therefore, debt-to-revenue ratios serve as useful metrics (debt-GDP ratio, debt-export ratio, debt-service ratio for debt dynamics; revenue-GDP ratio and debt-revenue gap for revenue dynamics) for addressing per capita income challenges. Thus, borrowing is expected to bring about positive changes in economic landscape in Africa; especially, Nigeria and Ghana that have high debt profiles, and relatively low per capita consumption.

While public debt and revenue have risen in the last two decades in both Nigeria and Ghana, the return that they offer to citizens of both countries have fallen, especially relative to the return on per capita consumption. In Nigeria, the debt profile had risen from about ₦794 billion in 1999 to N49.85 trillion ($108.30 billion) as at December 21, 2022. This had accounted for 20.5% of the country's nominal GDP in December 2022, compared with the ratio of 20.2% in the previous quarter. This excludes the estimated ₦27.55 trillion 'Ways and Means' loans from the Central Bank and additional debt envisaged in the 2023 annual budgets of States and the Federal Government (Debt Management Office of Nigeria, 2023). Similarly, in Ghana, the national debt has been forecast to continuously increase between 2023 and 2024 by a total of 62.5 billion U.S. dollars (81.74 percent) projection, which is currently estimated at GH₵575.7 billion at the end of November 2022 (Bank of Ghana, 2022). This brings Ghana's debt to Gross Domestic Product (GDP) ratio to 93.5% from 75.9% suggesting a high debt-to-GDP ratio and debt burden.

The foregoing explains why the Nigerian government expects to generate about ₦8.19 trillion (78%) of the total budgeted 2023 revenue of ₦10.49 trillion from non-oil sources. However, this decreased to ₦1502.52 billion in the fourth quarter of 2022 from ₦1837.52 billion in the third quarter of 2022 (CBN, 2023). In Ghana, the total revenue averaged 2671.32 GHS Million from 2012 to 2019, reaching an all-time high of 6619.58 GHS million in December of 2018. The revenue had made tremendous increase to the values of 886 GHS million in 2021, and recorded a sharp increase, the year after, to the value of 956 GHS billion in 2022, [7].

It is evident from the foregoing that public debts and revenue dynamics have maintained a steady rise 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. The case of Africa is quite different, especially Nigeria and Ghana, where

per capita consumption appears to be a problem that does not bother them. With the rising profile of public debts and revenue, one would expect per capita consumption to rise astronomically, but the reverse is the case. In fact, within the five decades, PCC was ₦218.8, ₦284.1, ₦829.6, ₦2504.5 and ₦2065.6 - 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 sets out to provide empirical answers to what has been the role of public debt-revenue dynamics in increasing per capita consumption in Nigeria and Ghana. Addressing these, forms the crux of this study.

2 Reviews on Theoretical and Empirical Literature

2.1 Keynesian Theory of Public Debt

The traditional view that constant unbalanced budgets and rapidly rising public debt imperils the financial stability of the nation's gradually gives way to the conception that a huge public debt is a national asset, [8]. This theory argues that increase in public debt through multiple sources 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 and intends so that effective demand in the economy is increased resulting in increased employment and output. In justifying the validity of the theory, [9], 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. This justifies the inclusion of this theory into the present study.

2.2 Keynesian Consumption Theory (Absolute Income Hypothesis)

This theory as propounded by Keynes focuses on explaining how individuals and households consume goods and services, as well as the factors that influence their consumption behaviour relative to their income and wealth. It contends that consumption depends on his total expected income of his entire life. It further argues that the more income in a period one has, the more is likely to be his consumption expenditure in that period; though consumption expenditure does not have a proportional relationship with income. [10], show that consumption is not entirely dependent on current income, suggesting that other factors like expectations of future income also play a role. This could be attributed to the fact that short-term data generally align more closely with Keynesian predictions, showing that consumption moves with income, [11]. It is argued that households attempt to smooth consumption over time, which conflicts with the simple Keynesian view that consumption is driven solely by current income, [12]. This smoothing behaviour suggests that consumers are forward-looking and base their consumption not just on current but also on expected future income. The presence of uncertainty about future income; that may lead to budget deficit and borrowing, leads to precautionary saving, which reduces the sensitivity of consumption to current income.

2.3 Theoretical Framework

This study anchors on the two theories which argue that financing deficit budget through borrowing is done for the purpose of accumulating funds for capital projects. This would engender more economic activities that would enable people engage in so many employment activities for the purposes of earning income and increasing per capita consumption.

2.4 Review of Empirical Literature

[13], report the relationship between external debt and economic growth in Nigeria by saying that external debt is found to be a driver of economic growth if properly managed but it's servicing rather than repayment is an inhibiting factor to economic growth. [14], in his study on the effect of external debt service payment practices on sustainable economic growth and development in Nigeria from 1981 to 2004

argued that debt payment to Nigerian creditors affect the economic growth both positively and negatively. But, [15], found that Nigeria is indebted to several creditors which do not augur well for the country. Similarly, [16], 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 while external debt contributes positively to growth up to a point after which its contribution becomes negative in Nigeria.

[17], applied the OLS technique on real GDP, total external debt stock and debt service ratio. The results of their study revealed that foreign capital inflow was positive as expected while debt service/export ratio was negative as expected. The extent of public debt-revenue crisis and its consequences on economic development using data on the Nigerian economy for the period 1970 to 2010 was looked into, reference is made to, [3], [5]. To validate the belief that public sector borrowing spurs growth, [18], 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 result showed 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.

Furthermore, a study on determining the optimal public debt threshold for Nigeria. Generally, the study finds an inverted U-shape relationship between public debt types and economic growth, referencing, [10]. For total public debt as percentage of GDP, model results identified a threshold level of 73.70 per cent, while the estimated inflexion points for external and domestic debts were 49.4 and 30.9 per cent, respectively. Wright and Grenade (2014) 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.

[19], tried to establish what roles institutional quality play in the relationship between financial inclusion, economic growth, and environmental quality in the MENA region. The study utilized a sample of 12 Middle East and North Africa (MENA) countries from 2004 to 2021 and performed the seemingly unrelated regression (SUR) model. The findings indicate that financial inclusion (FI) significantly increases the level of CO2 emissions. Hence, a more inclusive financial system deteriorates the quality of the environment in the MENA region. However, FI does not exert any significant effect on the level of growth. Furthermore, and the interaction between FI and IQ increases growth and improves the quality of the environment. This interactional effect is more apparent when the dependent variable is environment quality rather than growth. The results of their study have substantial implications that border on improvement of IQ to mitigate the negative effects of FI and to spur growth and preserve the environment. When FI is aligned with environmentally conscious policies and practices, it can promote economic development while also contributing to a healthier planet and a more equitable society.

[20], examines the consequence of public debt for economic growth and investment in Pakistan. The study found a 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. [21], observes similar results for SSA countries. It is evident from the breadth and width of the empirical literature reviewed that those numerous studies in the fields of economics have focused on the subject of public debts and economic growth in both Nigeria and abroad. Little or no studies have been carried out with the aim of comparing the impact of public debts-revenue dynamics per capita consumption in Nigeria and Ghana. This study seeks to fill this gap by looking at the impact of debt-revenue dynamics on per capita consumption in Nigeria and Ghana from 1981 to 2022.

3 Methodology

Ex-post facto research design is used in this study following quasi experimental research orientation. This is done in order to examine how

a particular characteristic, trait, or past occurrence in debt-revenue dynamics affects the per capita consumption in Nigeria and Ghana. The data used is secondary in nature, collected from 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. The independent variables are debts-revenue dynamics captured as debt-GDP ratio, debt-export ratio, debt-service ratio, revenue-GDP ratio, and debt-revenue gap. On the other hand, the dependent variable is per capita consumption inferred through dividing real GDP by population of the two countries within the time frame of the study.

Two models, each for Nigeria and Ghana, are specified in this study. following relevant theoretical framework that debts are incurred for the purpose of providing necessary capital needed to drive economic activities, which in turn enables people to gain employment, earn income and are able to take up their financial obligations; and by so doing increase their consumption. Following this therefore, the functional relationship looks at how public debts-revenue dynamics impact per capita consumption from 1981 to 2022, by inferring that

$$PDRD = f(PCC). \quad (1)$$

Where, PDRD is Public Debts-Revenue Dynamics, f is a sign for the functional relationship between PDRD and PCC, while PCC is Per Capita Consumption. Expanding Equation (1) and separating for Nigeria and Ghana, specifies as follows,

$$PCC_N = f(DGR_N, DER_N, DSR_N, RGR_N, DRG_N), \quad (2)$$
$$PCC_G = f(DGR_G, DER_G, DSR_G, RGR_G, DRG_G), \quad (3)$$

where, Indices for Debts-Revenue Dynamics (DRD) are; Debt-GDP Ratio (DGR), Debt-Export Ratio (DER), Debt-Service Ratio (DSR), Revenue-GDP Ratio (RGR), and Debt-Revenue Gap (DRG).

The specification of the above model relies on existing empirical literature carried out by, [22] who argued that public debts can lead to economic development in Nigeria; hence they used $PUD = f(EOG)$, where PUD is public debts, and EOG is Economic growth. [23], specified that revenue generated by government is used to address economic growth issues in Japan such that, $REV = f(EOG)$, with REV as Revenue. These models were adopted with considerable modifications. This is because they used debts as a single variable and economic growth but left out its dynamics in relation to revenue, and how that impact on per capita consumption; hence causing a lacuna in the body of existing literature.

From the expanded functional relationships in Equations (2) and (3), the econometric models are specified in order to achieve the specific objective, that is,

$$PCC_{tN} = \varphi_0 + \varphi_1 DGR_{tN} + \varphi_2 DER_{tN} + \varphi_3 DSR_{tN} + \varphi_4 RGR_{tN} + \varphi_5 DRG_{tN} + \mu_{tN} \quad (4)$$
$$PCC_{tG} = b_0 + b_1 DGR_{tG} + b_2 DER_{tG} + b_3 DSR_{tG} + b_4 RGR_{tG} + b_5 DRG_{tG} + \mu_{tG} \quad (5)$$

Where, φ_0 and b_0 are constants of the regression lines for Equations (4) and (5), φ_1 and b_1 are Regression slopes or coefficient of DGR for Nigeria and Ghana, φ_2 and b_2 are Regression slopes or coefficient of DER for Nigeria and Ghana, φ_3 and b_3 are Regression slopes or coefficient of DSR for Nigeria and Ghana, φ_4 and b_4 are Regression slopes or coefficient of RGR for Nigeria and Ghana, φ_5 and b_5 are Regression slopes or coefficient of DRG for Nigeria and Ghana for Equations (4) and (5) respectively while, all the variables retained their definitions and descriptions as earlier stated with t as time series trend, μ_t as Stochastic error term, and N is Nigeria, G is Ghana.

The study proceeds to estimate Autoregressive Distributed Lag (ARDL) bound cointegration equation from Equations (4) and (5), given as

$$\Delta In(PCC'_N)_1=\varphi_0+\varphi_1 In(PCC'_N)_{t-1}+\varphi_2 ln(D'GR_N)_{t-1}+\varphi_3 In(DER'_N)_{t-1}+\varphi_4 In(DSR'_N)_{t-1}+\varphi_5 In(RGR'_N)_{t-1}+\varphi_6 In(DRG'_N)_{t-1}+\sum_{i=1}^{p}\theta_{0i}\Delta(PCC_N)_{t-i}+\sum_{i=1}^{r}\theta_{1i}\Delta(DGR_N)_{t-0}+\sum_{i=1}^{s}\theta_{2i}\Delta(DER_N)_{t-0}+\sum_{i=1}^{s}\theta_{3i}\Delta(DSR_N)_{t-0}+\sum_{i=1}^{s}\theta_{4i}\Delta(RGR_N)_{t-0}+\sum_{i=1}^{s}\theta_{5i}\Delta(DRG_N) \quad (6)$$

$$\Delta In(PCC'_G)_1=b_0+b_1 In(PCC'_G)_{t-1}+b_2 ln(DGR'_G)_{t-1}+b_3 In(DER'_G)_{t-1}+b_4 In(DSR'_G)_{t-1}+b_5 In(RGR'_G)_{t-1}+b_6 In(DRG'_G)_{t-1}+\sum_{i=1}^{p}\theta_{0i}\Delta(PCC_G)_{t-i}+\sum_{i=1}^{r}\theta_{1i}\Delta(DGR_G)_{t-0}+\sum_{i=1}^{s}\theta_{2i}\Delta(DER_G)_{t-0}+\sum_{i=1}^{s}\theta_{3i}\Delta(DSR_G)_{t-0}+\sum_{i=1}^{s}\theta_{4i}\Delta(RGR_G)_{t-0}+\sum_{i=1}^{s}\theta_{5i}\Delta(DRG_G)_{t-0}+\mu_{tG} \quad (7)$$

Where, φ_0 = Constant of the ARDL regression line for Nigeria; b_0 = Constant of the ARDL regression line for Ghana; φ_1 = ARDL regression slope of DGR for Nigeria; b_1 = ARDL regression slope of DGR for Ghana; φ_2 = ARDL regression slope of DER for Nigeria; b_2 = ARDL regression slope of DER for Ghana; φ_3 = ARDL regression slope of DSR for Nigeria; b_3 = ARDL regression slope of DSR for Ghana; φ_4 = ARDL regression slope of RGR for Nigeria; b_4 = ARDL regression slope of RGR for Ghana; φ_5 = ARDL regression slope of DRG for Nigeria; b_5 = ARDL regression slope of DRG for Ghana; Δ = denotes the first difference operator; PCC'_{t-1}, DGR'_{t-1} , DER'_{t-1} , DSR'_{t-1} , RGR'_{t-1} , DRG'_{t-1} are vectors of the equations allowed to be purely 1(0), 1(I) or cointegrated; p, r, and s are maximum lags associated with the exogenous variables; ln = natural log; t – I = the lagged values; μ_t = vector of the uncorrelated random error term with zero mean and constant variance. 't'= time series trend, and μ_t= Stochastic error term, N = Nigeria; G = Ghana.

The theoretical expectation of this study goes in the direction that increases in public debts and revenue would increase per capita consumption from 1981 to 2022. Therefore, the expectations of the theories are specified as follows:

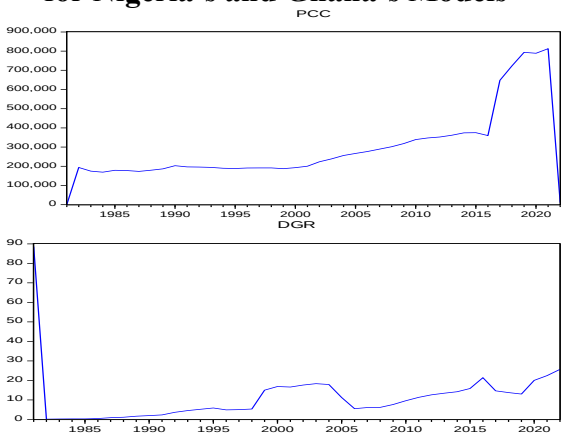
$$\text{PCC Model for Nigeria: } \frac{\partial DGR}{\partial PCC}>0;\ \frac{\partial DER}{\partial PCC}>0;\ \frac{\partial DSR}{\partial PCC}>0;\ \frac{\partial RGR}{\partial PCC}>0;\ \frac{\partial DRG}{\partial PCC}>0$$

$$\text{PCC Model for Ghana: } \frac{\partial DGR}{\partial PCC}>0;\ \frac{\partial DER}{\partial PCC}>0;\ \frac{\partial DSR}{\partial PCC}>0;\ \frac{\partial RGR}{\partial PCC}>0;\ \frac{\partial DRG}{\partial PCC}>0$$

In additional to the conventional methods of data analysis, the study goes ahead to conduct t-statistical, chi-square and ANOVA tests in order to gain more insights. The t-stat test was conducted to measure how far the sample statistic (usually a regression coefficient or mean) is from the null hypothesis value, in units of standard error. It is used to determine if an estimated parameter (like a mean difference or regression coefficient) is statistically significantly different from zero (or some other value). The Chi-square (χ^2) test is a non-parametric statistical test widely used to analyze the relationships between PCC and DGR, DER, DSR, RGR and DRG variables. Its importance lies in its ability to test hypotheses about frequency distributions, making it a cornerstone in social sciences, healthcare, education, market research, and more. And the Analysis of Variance (ANOVA) is a crucial statistical method in research, especially when comparing more than two groups. It helps determine whether observed differences in sample means reflect true differences in the population or are simply due to chance.

4 Result and Discussion

4.1 Trend Analysis on Study Variables for Nigeria's and Ghana's Models



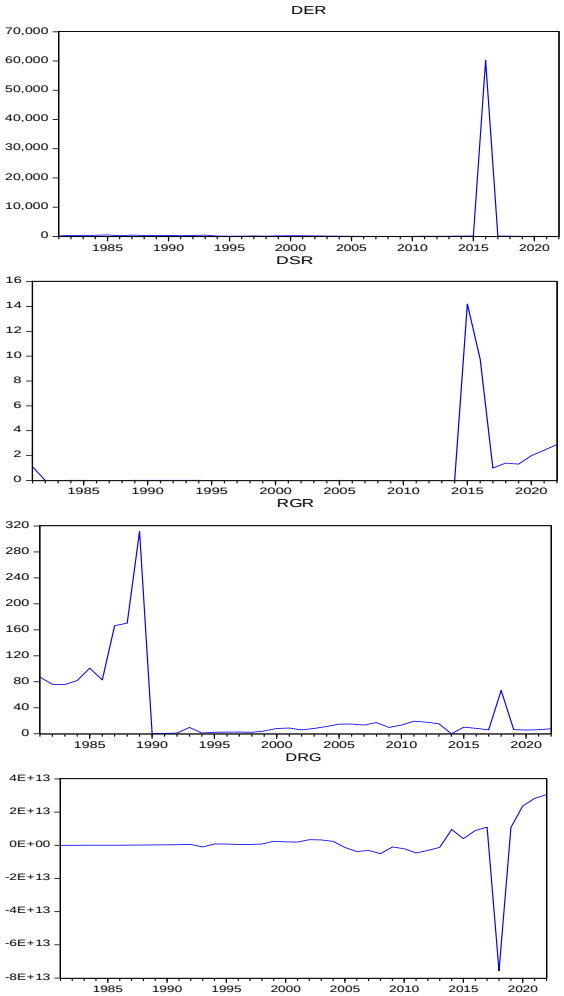
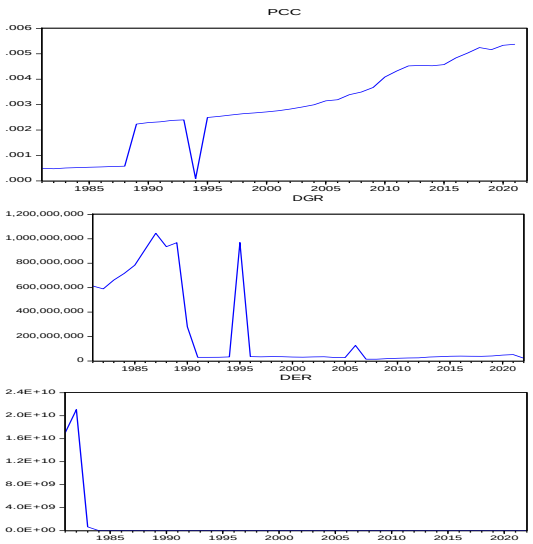


Fig. 1. Trend Analysis of Study Variables for Nigeria's Models
(Source: Authors' Design, 2024)



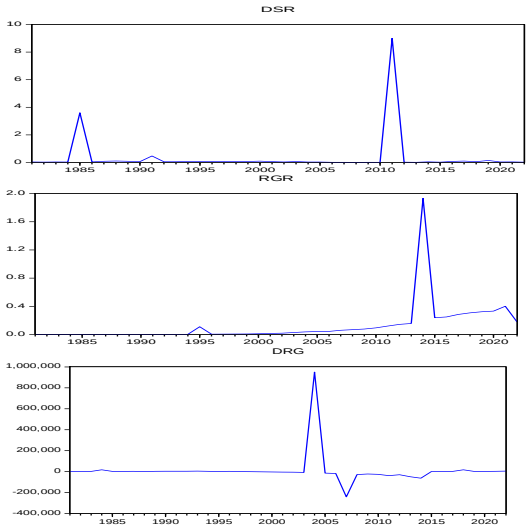


Fig. 2. Trend Analysis of Study Variables for Ghana's Models
(Source: Authors' Design, 2024)

The study variables – Per Capita Consumption (PCC), Debt-GDP Ratio (DGR), Debt-Export Ratio (DER), Debt-Service Ratio (DSR), Revenue-real GDP Ratio (RGR) and Debt-Revenue Gap (DRG) - are shown in Fig. 1 and Fig. 2, to demonstrate a general direction of change based on the trend analysis that was presented. The predictions clearly show that the research variables for both models have an innate upward or falling tendency. This implies that the data for the study variables do not match to a common linear streak at every point in the series, as shown by the trend analysis plot. This is because the underlying trend in the models continuously changes when each study variable fit begins to move away from the data near the conclusion of the series. In light of this, one is persuaded to suspect the existence of unit root problems in each of the study variables based on the fashionable nature of their behaviours. For this reason, unit roots tests are conducted using both the Augmented Dickey-Fuller (ADF) estimator as shown in the following tables; followed by the presentations of the results of the descriptive and correlation tests.

Table 1. 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
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: Authors' Computation, 2024.

The results of the Augmented Dickey-Fuller (ADF) unit root test on the variables used in the Nigerian models are shown in Table 1. Per Capita Consumption (PPC), the dependent variable, is stationary when it is differentiated for the second time and integrated of order two [*I*(2)]. 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. Debt-service ratio, revenue-real GDP ratio, and debt-revenue gap, on the other hand, the third, fourth, and fifth independent variables are integrated of order one and stationary at the initial difference [*I*(1)]. Based on statistical evidence, utilization of autoregressive distributed lag (ARDL) as the major method of data analysis is justified. It is important to note that 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.

Table 2. 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
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	0.000 0	-6.209862	-2.945842	0.000 0	[*I*(0)]	Stationary at Level
DRG	-6.289531	-2.935001	0.0000	-10.63809	-2.936942	0.000 0	-6.362931	-2.945842	0.000 0	[*I*(0)]	Stationary at Level

Source**:** Authors' Computation, 2024.

The ADF unit root test on the variables used to investigate the effects of public debt-revenue dynamics on per capita consumption is presented in Table 2. The analysis reveal that per capita consumption (PCC) is integrated of order one and stationary at level [*I*(1)]. 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)]. This result provides more evidence for the existence of a mixed order of integration in the distribution series. On this basis, the use of the Autoregressive distributed lad estimator to examine the effects of public debt-revenue dynamics on per capita consumption in Nigeria and Ghana is supported by the evident existence of mixed order integration.

Table 3. Result of Lag Length Selection Criteria Test for Nigeria's and Ghana's Models

Nigeria							Ghana						
PCC DGR DER DSR RGR DRG							PCC DGR DER DSR RGR DRG						
Lag	LogL	LR	FPE	AIC	SC	HQ	Lag	LogL	LR	FPE	AIC	SC	HQ

0	-2470.182	NA	5.43e+50	133.8477	134.1089	133.9398	0	-1496.416	NA	7.50e+27	81.21166	81.47289	81.30376
1	-2305.971	266.2892	5.45e+47	126.9173	128.7459	127.5620	1	-1422.938	119.1537	1.02e+27	79.18582	81.01443	79.83049
2	-2135.430	221.2415	4.44e+44	119.6449	123.0409	120.8421	2	-1376.295	60.50941	6.71e+26	78.61054	82.00653	79.80778
		144.3475											
3	-1987.073	*	1.62e+42	113.5715	118.5349	115.3213	3	-1301.709	72.57024	1.32e+26	76.52480	81.48817	78.27462
									54.28553		**73.94696**		**76.24935**
4	-1916.117	46.02546	**7.35e+41***	**111.6820***	**118.2128***	**113.9844***	4	-1218.019	*	**3.01e+25***	*	**80.47770***	*

Indicates lad order selected by the criterion. LR: Sequential modified LR test statistic (each test at 5% level). FPE: Final prediction error. AIC: Akaike information criterion. SC: Schawrz information criterion. HQ: Hannan-Quinn information criterion.

Source: Authors' Computation, 2024.

The results of the lag length selection criterion test on the variables pertaining to Nigeria and Ghana are displayed in Table 3. From the table, it is evident that both Ghana and Nigeria ARDL models have a maximum of four lags, following all lag length selection criteria. The maximum point on the lag structure for choosing the duration of lag for the models of both countries is 4. The four lag lengths that were selected are valid because all the variables, with the exception of LR in the case of Nigeria, are indicated under the criteria of LogL, FPE, AIC, SC, and HQ, as shown by the askerized values. However, in Ghana, every eligible point is selected at lag four (4) based the selection criterion, which includes LogL, LR, FPE, AIC, SC, and HQ, in that order. Since all of the variables are clearly visible in the askerized numbers, the four lag lengths that were selected are valid. This justifies the continuation of ARDL since the lag order selection procedure increases the lag length iteratively to around four (4) and beyond which confirms an improvement in the lag length selection.

Table 4. Result of Short Run ARDL Test for Nigeria's and Ghana's Models

Dependent Variable: PCC. Dynamic regressors (4 lags, automatic): DGR DER DSR RGR DRG.Method: ARDL. Selected Method: ARDL (4,4,4,4,3,4for Nigeria's model; 2, 1, 4, 4, 2, 2 for Ghana's model). Included Observation: 37 after adjustment. Maximum Dependent Lag: 4 (Automatic Selection). Model Selection Method: Akaike Infor Criterion (AIC)

Nigeria					Ghana				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***	**Variable**	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
PCC(-1)	1.984613	0.770418	2.576021	0.0328	PCC(-1)	1.649389	0.328649	5.018698	0.0001
PCC(-2)	-0.070292	0.587463	-0.119653	0.9077	PCC(-2)	-0.611475	0.278456	-2.195948	0.0432
PCC(-3)	-0.923654	0.447582	-2.063654	0.0729	DGR	2.82E-12	5.49E-13	5.129753	0.0001
PCC(-4)	-0.316370	0.287344	-1.101017	0.3029	DGR(-1)	-1.30E-12	7.06E-13	-1.841128	0.0842
DGR	-388.4487	788.9543	-0.492359	0.6357	DER	-1.27E-07	7.62E-09	-16.63066	0.0000
DGR(-1)	1828.291	1253.134	1.458975	0.1827	DER(-1)	5.93E-08	2.26E-08	2.626669	0.0183
DGR(-2)	843.3741	1255.637	0.671670	0.5207	DER(-2)	-1.42E-09	4.22E-10	-3.358772	0.0040
DGR(-3)	555.9937	1582.155	0.351416	0.7344	DER(-3)	4.58E-11	1.36E-11	3.365609	0.0039
DGR(-4)	-2913.100	1467.596	-1.984947	0.0824	DER(-4)	-1.50E-12	4.34E-13	-3.457981	0.0032
DER	6.226832	18.03280	0.345306	0.7388	DSR	-1.40E-05	2.01E-05	-0.699203	0.4945
DER(-1)	0.439648	26.06699	0.016866	0.9870	DSR(-1)	-3.39E-06	1.74E-05	-0.194275	0.8484
DER(-2)	-43.67998	25.53513	-1.710583	0.1255	DSR(-2)	-2.17E-05	1.75E-05	-1.236975	0.2339
DER(-3)	13.93143	15.25363	0.913319	0.3878	DSR(-3)	-0.000179	8.57E-05	-2.084688	0.0535
DER(-4)	20.73590	13.24170	1.565954	0.1560	DSR(-4)	0.000272	7.05E-05	3.858240	0.0014
DSR	5074.553	2372.765	2.138666	0.0649	RGR	0.000845	0.000452	1.871203	0.0797
DSR(-1)	-22978.38	76315.71	-0.301096	0.7710	RGR(-1)	-0.001438	0.000361	-3.989326	0.0011
DSR(-2)	42375.34	108050.3	0.392182	0.7052	RGR(-2)	9.97E-05	8.43E-05	1.182510	0.2543
DSR(-3)	159714.1	93169.36	1.714234	0.1248	DRG	-6.18E-11	1.38E-10	-0.447059	0.6608
DSR(-4)	-203638.3	107450.6	-1.895180	0.0947	DRG(-1)	5.01E-11	1.37E-10	0.364319	0.7204
RGR	20.28832	33.99715	0.596765	0.5672	DRG(-2)	-2.21E-10	1.57E-10	-1.411955	0.1771
RGR(-1)	71.36542	25.70664	2.776148	0.0241	C	-6.79E-05	0.000265	-0.255902	0.8013
RGR(-2)	-96.74548	62.41171	-1.550117	0.1597					
RGR(-3)	-51.78794	36.08222	-1.435276	0.1891					
DRG	1.67E-09	1.57E-09	1.060442	0.3199					
DRG(-1)	-4.12E-09	2.02E-09	-2.038564	0.0758					
DRG(-2)	-6.10E-09	1.54E-09	-3.954607	0.0042					
DRG(-3)	-1.65E-09	3.10E-09	-0.530845	0.6099					
DRG(-4)	5.35E-09	3.39E-09	1.578610	0.1531					
C	62912.53	26044.81	2.415550	0.0421					
R^2 = 0.759739. Adj R^2 = 0.758824. F-Statistics = 1092.968. Prob. (F-Statistic) = 0.0000. Mean dependent var = 310738.5. AIC = 20.48319. SC = 21.74580. HQ = 20.92832. Durbin-Watson Stat = 2.319769					R^2 = 0.776311. Adj R^2 = 0.761700. F-Statistics = 216.0571. Prob. (F-Statistic) = 0.0000. Mean dependent var = 0.003122. AIC = -14.71519. SC = -13.80088. HQ = -14.39285. Durbin-Watson Stat = 2.933518				

Source: Authors' Computation, 2024.

This analysis looked at how debt-revenue dynamics impacted per capita consumption in Nigeria and Ghana. The study was carried out in accordance with Equations (6) and (7), which estimated the ARDL short run equations for the impact of debt-real GDP ratio (DGR), debt-export service ratio (DER), debt-service ration (DSR), revenue-real GDP ratio (RGR), and debt-revenue gap (DRG) on per capita consumption (PCC) in Nigeria and Ghana. It is clear that PCC is significantly impacted (0.0328) at the first lag in the Nigerian model. However, the probability values indicate that PCC is not significantly impacted (0.9077 and 0.0729) at the second,

third, or fourth lags. In the first lag, the variable PCC is positive; but negative in the second, third, and fourth lags. However, the same variable, PCC, gains significance at the first (0.0001) and second (0.0432) lags with respect to Ghana's model. In the first and second lags, the variable records a positive sign and a negative sign. This implies that Ghana outperforms Nigeria in the short term for PCC.

It is demonstrated that the first independent variable (DGR) is not found to be significant in the lags of the first, second, third, and fourth. This is due to the fact that every value in the series of interest - 0.6357, 0.1827, 0.5207, and 0.0824 - is higher than the selected alpha level. Additionally, the coefficient values remain positive with the exception of the fourth lag and current period. However, in Ghana's situation, the DGR is only lagging once, and at that first lag of 0.0842, it did not reach a significant level. Its coefficient maintains a positive sign in the present period but a negative one in the first lag; however, it is significant in the current period at the value of 0.0001. This implies that DGR acted more appropriately in the near term in Nigeria than in Ghana.

In Nigeria, the debt-export ratio (DER) indicates that there is no substantial lag over the four periods and that the variable is not important at this time. The numbers (0.07388, 0.9870, 0.1255, 0.3878, and 0.1560) are all greater than the significance level of 0.05, which establishes this. The variable maintains positive values for the coefficients in the current, first, third, and fourth periods, but a negative value in the second period. However, the Ghana model shows that DER is significant at 0.0000, 0.0183, 0.0040, 0.0039, and 0.0032, respectively, throughout the current and lag periods. In the present, second, and fourth lag periods, the variable has negative values; nevertheless, it maintains positive values in the second and third lag periods. This implies that, in the short term, DER acted better in Ghana than in Nigeria.

In the first to fourth lag periods, the debt-service ratio (DSR) is not significant at values of 0.0649, 0.7710, 0.7052, 0.1248, and 0.0947, respectively. Additionally, its coefficient values assume negative values in the first and fourth periods, at -203638.3 and -22978.38, respectively, but are positive in the current, second, and third periods, at 5074.553, 42375.34, and 159714.1, respectively. However, DSR in the Ghana's model is adjudged to be meaningful at a value of 0.0014 in the fourth lag. The current period, the first, second, and third lag periods - at values of 0.4945, 0.8484, 0.2339, and 0.0535, respectively - fail to retain the same status, with negative coefficient values in the same periods, but a positive sign in the fourth. This implies that DSR's short-term behaviour is better in Nigeria than in Ghana.

The examination of Nigeria's and Ghana's revenue-real GDP ratios (RGR) is also shown in the table. The variable in Nigeria maintains a significant status at the first lag, with a value of 0.0241, but at the second and third values in the current period, which are 0.5672, 0.1597, and 0.1891, respectively, it is not significant. Additionally, its coefficient values are considered to be negative at the second and third periods, although they are positive at the current period and the first lag. The variable RGR in Ghana's model is found to be significant at the first lag, or 0.0011, but not able to attain significance at the current period and lag period at 0.0797 and 0.2543, respectively. In both the present and second lag periods, its coefficient values - 0.000845 and 9.97E-05, respectively - are positive. This implies that RGR performed better in the near term in Ghana and Nigeria.

The result also includes an examination of the debt-revenue discrepancy. According to the analysis, DRG is only significant at the second lag period (value of 0.0042). It did not sustain its significance at the first, third, or fourth lag periods (values of 0.3199, 0.0758, 0.6099, and 0.1531, respectively). Its coefficients are negative in the first (-4.12E-09), second (-6.10E-09), and third (-1.65E-09) lag periods, respectively, but they are positive in the current period (1.67E-09) and fourth lag (5.35E-09). The table also provides analysis on Ghana's model, demonstrating that DGR is not significant at any point during the lag period, with respective values of 0.6608, 0.7204, and 0.8013. In both the current period (-6.18E-11) and the second lag period (-2.21E-10), the variable's coefficient is negative. This implies that Ghana outperforms Nigeria in the short term, i.e., during the study period, there is a greater disparity between public debt and revenue in Nigeria than in Ghana. The Nigerian short-term

model achieves a significant status at 0.0421, with a coefficient value of (62912.53) for its constant in the regression. On the other hand, the Ghana's model has a non-significant constant for the regression line, with a negative value of -6.79E-05. The result also displays the adjusted R^2 of 0.758824 and the coefficient of determination of R^2 at 0.759739. This means that in Nigeria, the explanatory variables (DGR, DER, DSR, RGR, and DRG) can account for approximately 0.76 (76%) of the changes in per capita consumption (PCC). The remaining 0.24 (24%) of the changes in PCC could not be accounted for, but could instead be explained by other factors affecting PCC besides those included in the model. Additionally, the F-statistic result at 1092.968 with a probability of 0.0000 is presented.

The probability value of prob(F-stat) indicates that DGR, DER, DSR, RGR, and DRG have a strong short-term impact on PCC. The outcome also suggests that the revenue-real GDP ratio [RGR (-1)] is significant at 0.0241 with a coefficient value of 71.36542 at the first lag. The study also shows that, at its second lag, debt-revenue gap (DRG) has a considerable impact on PCC, with values of 0.0042 and a coefficient value of -6.10. This indicates that whereas [DRG (-2)] has a negative influence on PCC in Nigeria, RGR has a favorable impact on PCC in the first lag. The table further presents the result of the coefficient of determinant of R^2 at the value of 0.776311 and adjusted R^2 of 0.761700. This means that the variables in the Ghana's model, as specified, can explain about 0.78 (78%) changes that occurred in the per capita consumption (PCC), while the remaining 0.22 (22%) changes in the PCC could not be accounted for, but could be explained by other factors that affect PCC other than the ones captured in the model. It also presents the result of F-stat at 216.0571 with its probability of 0.0000. This means that DGR, DER, DSR, RGR and DRG jointly impact PCC in the short run as evident in the probability value of prob(F-stat). Specifically, the result further reveals that DRG at the current period is significant at 0.0001 with a coefficient value of 2.82. This means that within the current period one unit change in DGR would result in 2.82 increases in PCC.

On the other hand, DER has a major influence on PCC in the current time lag in which one unit change in DER would also result in a 1.27 reduction in PCC. The same variable can affect PCC at first lag [DER (-1)], second lag [DER (-2)], third lag [DER (-3)], and fourth lag [DER (-4)], in that order. Additionally, it is shown that one unit change in DER would result in a 5.93 and 4.58 unit rise in PCC during the first and third lag periods, but a 1.42 and 1.50 unit decrease during the second and fourth lag periods. Additionally, it is revealed that DSR and RGR have a major effect on PCC. The results are particularly intriguing because, during the study period, a unit change in RGR decreased PCC by 0.00 while a unit change in DSR raised PCC by 0.00.

Table 5. Result of ARDL Bound Test

Significant Level	Nigeria				Ghana				
	[*I*(0)] Bound (Lower Bound)	[*I*(1)] Bound (Upper Bound)	F-Stat	Decision	Significant Level	[I(0)] Bound (Lower Bound)	[*I*(1)] Bound (Upper Bound)	F-Stat	Decision
10%	2.26	3.35	2.530409	Retain	10%	2.26	3.35	17.32987	Drop Ho
5%	2.62	3.79		Ho	5%	2.62	3.79		
2.5%	2.96	4.18			2.5%	2.96	4.18		
1%	3.41	4.68			1%	3.41	4.68		

Source: Authors' Computation, 2024.

The results reveal that 5% (2.62), 2.5% (2.96), and 1% (3.41) of the lower bounds are where the F-stat value (2.530409) of the result falls between the *I*(0) Bounds (lower bound) and *I*(1) Bounds (upper bound); while the upper bounds have the values of 3.35, 3.79, 4.18, and 4.68 for 10%, 5%, 2.5%, and 1%, respectively. It is clear from the result that the F-stat value (2.53049) is smaller than the critical values of 2.62, 2.96, and 3.41 as well as the lower bounds of 5%, 2.5%, and 1%. It follows that the null hypothesis is upheld – suggesting that the dynamics of debt-revenue

have no long-term effects on Nigeria's per capita consumption. However, using the same dimension, the Ghana's model result shows that the F-stat value of 17.32987 is more than all critical values of 10%, 5%, 2.5%, and 1% at the lower bound's respective values of 2.26, 2.62, 2.96, and 3.41. The F-statistic values, which are 3.35, 3.79, 4.18, and 4.68 respectively, are all smaller than the upper bounds' critical values. Therefore, the alternative is accepted and the null hypothesis is dropped. This suggests that Ghana's per capita consumption has been significantly impacted over the long term by debt-revenue dynamics. It follows that, in Ghana, not in Nigeria, the dynamics of debt-revenue have long-term and significant effects on per capita consumption.

Table 6. Result of Chi-Square, T-Stat and ANOVA for Nigeria Model

	PCC	**DGR**	**DER**	**DSR**	**RGR**	**DRG**
Chi-Square (p-value)	.000[a]	.000[a]	.000[a]	128.000[b]	.000[a]	73.810[c]
df	41	41	41	9	41	31
Asymp. Sig	1.000	1.000	1.000	.000	1.000	.000
Exact Sig	1.000	1.000	1.000	.000	1.000	.000
Point Probability	.000	.000	.000	.000	.000	.000
	T-Stat			**ANOVA**		
Statistic	15.5245		F-Stat	81.791		
Sig	0.000		Sig	0.000		

Source: Authors' Computation, 2024.

Table 6 presents the result of chi-square, t-stat and analysis of variance (ANOVA) for the purpose of giving more statistical insights to the preceding analyses with respect to Nigeria's model. The value of 0.000 for PCC, DGR, DER and RGR means that there is very strong evidence against the null hypothesis of no significant relationship between PCC and DGR, DER and RGR in Nigeria. On the other hand, PCC and, DSR and DRG are not significantly related. From the result, a t-statistic of 15.5245 is very large, which means that the estimated coefficient is far from zero (in standard error units) – indicating that the study variables are highly statistically significant as revealed by the significant value of 0.000. In practical sense this result means that the independent variables of the study have a strong effect on the dependent variable (per capita consumption). The ANOVA result of 81.791 (F-statistic) means the Nigeria's model is highly statistically significant, indicating that at least one of the independent variables meaningfully contributes to explaining the variance in the dependent variable as seen in the result of 0.000. This reflects a strong overall model fit.

Table 7. Result of Chi-Square, T-Stat and ANOVA for Ghana Model

	PCC	**DGR**	**DER**	**DSR**	**RGR**	**DRG**
Chi-Square	.000[a]	.000[a]	.000[a]	6.000[b]	.000[a]	113.143[c]
df	41	41	41	35	41	17
Asymp. Sig	1.000	1.000	1.000	1.000	1.000	.000
Exact Sig	1.000	1.000	1.000	1.000	1.000	.000
Point Probability	.000	.000	.000	.000	.000	.000
	T-Stat			**ANOVA**		
Statistic	3.219		F-Stat	30.659		
Sig	0.000		Sig	0.000		

Source: Authors' Computation, 2024.

Table 7 presents the result of chi-square, t-stat and analysis of variance for the purpose of giving more statistical insights to the preceding analyses with respect to Ghana's model. The value of 0.000 for PCC, DGR, DER and RGR means that there is very strong evidence against the null hypothesis of no significant relationship between PCC and DGR, DER and RGR in Ghana. On the other hand, PCC and, DSR and DRG are not significantly related. From the result, a t-statistic of 3.219 is considered moderately to strongly significant relationship - which means that the estimated coefficient is far from zero (in standard error units). This indicates that the study variables are highly statistically significant as revealed by the significant value of 0.000. In practical sense, this result means that the independent variables of the study have a strong effect on the dependent variable (per capita consumption). The ANOVA result of 36.659 (F-statistic) means the Ghana's model is highly statistically significant, indicating that at least one of the independent variables meaningfully contributes to explaining the variance in the dependent variable as seen in the result of 0.000. This reflects a strong overall model fit.

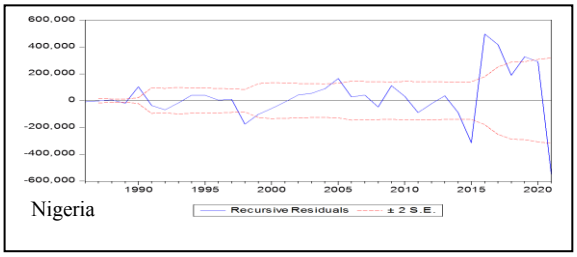
From Table 6 and Table 7, it is evident that independent variables (DGR, DER, and RGR) have the same influence on PCC in both countries, but DSR and DRG have different influence on the dependent variables in the both countries. DSR performed better in Ghana than Nigeria, but Nigeria performed better than Ghana in terms of DRG. The t-stat result indicate that the Nigeria's model performed better than the Ghana's model. This is supported by the result of ANOVA.

Table 8: Result of Residual Diagnostic Tests

Nigeria						Ghana					
Histogram Normality Test		Breusch-Godfrey Serial Correlation LM Test:		Heteroskedasticity Test: Breusch-Pagan-Godfrey		Histogram Normality Test		Breusch-Godfrey Serial Correlation LM Test:		Heteroskedasticity Test: Breusch-Pagan-Godfrey	
Mean	Population	F-Stat	Prob. F(2,34)	F-Stat	Prob. F(2,34)	Mean	Population	F-Stat	Prob. F(2,34)	F-Stat	Prob. F(2,34)
33464.12	0.090702	3.201355	0.0532	8.229186	0.0000	-6.32E-18	0.061985	7.654494	0.0057	1.031923	0.4810

Source: Authors' Computation, 2024.

The results robustness of the model as evident in Breusch-Godfrey serial correlation and Breusch-Pagan-Godfrey heteroskedasticity tests with respect to the Nigeria's models; while only is Breusch-Godfrey serial correlation is confirmed significant in the Ghana's models.



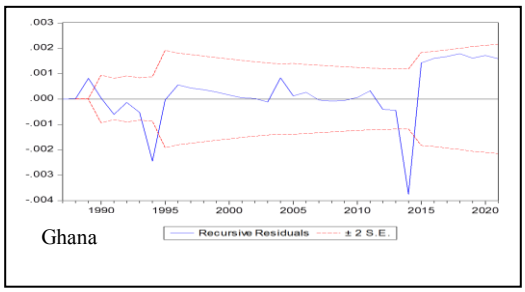


Fig. 3. Recursive Residual for PCC Models for Nigeria and Ghana
Source: Author's Design, 2024.

The recursive residuals' output is shown as standardized one-step-ahead prediction errors in Fig. 3. They are (asymptotically) normal according to the standard assumptions of the linear regression model. According to the test, the larger portion of the blue line in both Nigeria's and Ghana's models is contained within the boundaries of the red lines, suggesting that there is evidence in favour of equal variance in the distribution series. This suggests that the linear analysis findings of the study are more reliable in terms of their applicability to policy, negating the need to take into account any other approaches rather than the ARDL employed in this investigation.

4.2Discussion of the Impact of Debt-Revenue Dynamics on Per Capita Consumption

Comparing the effects of debt-revenue dynamics (DGR, DER, DSR, RGR, and DRG) on per capita consumption (PCC) in Nigeria and Ghana was the study's intention. According to the analysis, DGR generally has a negative influence on PCC in Nigeria, but it has a good impact in Ghana. In both countries, on the other hand, PCC is negatively impacted by DER and DSR. While DRG has a negative effect on PCC in Nigeria and Ghana, RGR has a negative impact on PCC in Nigeria but a good influence on PCC in Ghana. The hypothesis test result showed that, not only in Nigeria but also in Ghana, debt-revenue dynamics had long-term, major effects on per capita spending. In this context, [8] argue that there is an empirical relationship between public debt and economic development in Nigeria, according to [9], there is a positive correlation between state debt and the manufacturing subsector's performance in Nigeria. In a study on the impact of external debt service payment practices on Ghana's sustainable economic growth and development from 1981 to 2004, [14], made the case that paying debts owed to Nigerian creditors might have both beneficial and negative effects on the country's economic growth.

According to [17], the debt service/export ratio was negative as anticipated, while the inflow of foreign capital was positive. This is so because borrowed capital promotes capital development and has a favourable effect on economic expansion. Conversely, the debt-service ratio is a measure of capital flight, which lowers real GDP by undermining a nation's performance. Additionally, it supports the hypothesis that the debt service to export ratio takes resources out of the debtor nation. They argue further that total debt stock, less debt service, still leaves a robust positive balance to enhance capital accumulation that positively impacts economic growth. This is because the results show a positive relationship rather than a negative relationship and are statistically significant at all levels. [24], argue that all things being equal, per capita GDP correlates with other macroeconomic variables such as foreign reserve, debt stock, investment, and debt service payment in developed countries. [25] presents, however, that the relationship between domestic debt and revenue had a detrimental effect on economic growth.

Having a significant association between per capita consumption and the debt-GDP, debt-export and revenue-GDP ratios means that there is a statistically meaningful relationship between the two variables. It further indicates how much a Nigeria's average income per person (per capita income) is linked to the ratio of its external debt to its exports. This result points to the fact that the observed relationship is unlikely to be due to chance alone. For example, a p-value less than 0.05 is typically considered statistically significant. Therefore, as per capita consumption increases, the debt-export ratio also increases. This might suggest that richer countries are more capable of borrowing more in relation to their exports and can afford higher levels of debt compared to their exports, possibly because they are more creditworthy or have more diversified economy. In a related study, [26], who applied logistic regression analysis to household debt of Bangkok and metropolitan area of Thailand argued that key determinants identified include household size, number of wage earners, receipt of remittances, and emergency loans and the model achieved a 67.7% accuracy rate in classifying household debt status. [27], in favour, that while external and domestic debts can positively influence growth, excessive debt servicing and unfavorable exchange rates negatively impact economic performance.

A significant association between per capita consumption and the revenue-GDP ratio means there is a statistically meaningful relationship between a country's average income per person and the proportion of its government revenue relative to the size of its economy (GDP). Since the chi-square, t-text and ANOVA statistical tests of the Nigeria's model performed better, it could imply that Nigeria is more capable of collecting a larger share of their GDP as revenue (due to more effective tax systems, broader tax bases, better compliance, and more formal economic activity) and a government's ability to fund public goods and services that could increase as national wealth rises. The results in Tables 6 and 7 indicate that per capita consumption and the debt-GDP ratio in Nigerian debt burden (relative to GDP) are statistically associated with changes in its average income per person - and this association is unlikely due to chance. This further suggests that Nigeria, to an extent, uses her debt

productively to invest in infrastructure, education, or industry, which boosts income, and her borrowing is financing growth-enhancing activities, [24]. It is further indicated that debt-service ratio and debt-revenue gap do not appear to influence per capita consumption in Nigeria. Then, it could be instructive to submit that changes in per capita consumption do not consistently correlate with changes in the debt-service ratio. Debt-service pressures might be driven more by external factors (e.g., international interest rates, exchange rates, export performance) than by how wealthy a Nigeria's population is; and fiscal or debt management policies might not be directly tied to income levels.

Also, per capita consumption does not show a strong or predictable link with the size of the debt-revenue gap. A country with high income per person may still have a large gap if it collects little revenue or has high debt; likewise, a low-income country might manage its gap well. This implies that the effectiveness of revenue collection, fiscal discipline, and debt accumulation may be more crucial factors than income levels, [28]. Consequently, an increasing income per person will automatically solve debt sustainability issues and a non-significant relationship between per capita consumption and the debt-service ratio or debt-revenue gap is not necessarily attributed to income level alone; because it is not a good predictor of how well a country handles its debt obligations or fiscal balance. [29], emphasizes the need for effective debt management strategies to mitigate the adverse effects of rising public debt levels is to increase per capita consumption through increase in personal income in what so ever means.

The failure of DSR and DRG to attain significant status could be attributed to challenges of weak institutions and policy implications in developing countries. That the coefficient is 3.219 standard errors away from zero – is a sign that this variable likely has a real and non-random effect on the outcome. This is strong in evidence, that the independent variables have real effect on per capita consumption, and the relationship is meaningful. In a similar manner, [30], content that debt dynamics exerts reasonable effect on a country's standard of living. [31], advances an opinion that both public external debt and debt servicing negatively affected economic growth and investment, indicating the presence of "debt overhang" and "crowding out" effects. Notably, interest rates were identified as a direct channel, while savings did not emerge as a transmission channel in their analysis, [32]. By drawing insights from the results in relation to revenue dynamics, [33], provides insights into the economic behaviors of rural households and their implications for living standards. [34], say that government revenue if well collected and utilized ought to have economic relationship with economic indicators like per capita consumption.

5 Concluding Remarks

The study was undertaken because of the observed rise in public debt and the apparent decline in economic growth profile of Africa, with a focus on Nigeria and Ghana. In response, this study sets out to compare the effects of debt-revenue dynamics on economic development in Nigeria and Ghana between 1981 and 2022, paying particular attention to per capita consumption. According to the findings, debt-revenue dynamics have historically had a significant impact on per capita consumption in Ghana but not in Nigeria. This implies that Ghana's per capita spending significantly impacted more by debt-revenue dynamics than Nigeria. This indicates that, in terms of debt-revenue dynamics, PCC did better in Ghana but worse in Nigeria. It also implies that Ghana's real GDP is contributing more positively to debt than Nigeria's is by increasing per capita consumption (PCC). Thus, it can be concluded from the findings that, during the study period, Ghana experienced a greater influence from debt-revenue dynamics than Nigeria. Hence, the study recommended that the Nigerian government should use its debt for more worthwhile endeavours to enable per capita consumption and access to economic opportunities increase in the country.

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