FACTA UNIVERSITATIS
Series: **Economics and Organization** Vol. 22, Nº 1, 2025, pp. 63 - 84
https://doi.org/10.22190/FUEO241207005A

Original Scientific Paper

THE NEXUS BETWEEN GOVERNMENT PUBLIC DEBT, INFLATION AND PER CAPITA INCOME IN NIGERIA: A GENERALIZED LINEAR MODEL

UDC 336.27(669)
336.748.12(669)
330.566.2(669)

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Abstract. *This study examines the effects of government public debt and inflation on per capita income in Nigeria, covering the period 1981 to 2023. The study utilizes the variables of government public debt, inflation, per capita, money supply and interest rate. The study deploys the generalized linear model based on the heteroscedasticity problem that is associated with the study data set. The study is designed to seek practical implications for economic policies. In addition to examining the impacts of government public debt and inflation on per capita income, the study specifically examines the moderating effect of government public debt and inflation on per capita income as well as investigates the impact of money supply and interest rate on inflation and per capita income. The findings reveal that government public debt has a negative and significant effect on per capita income. In addition, the impact of inflation on per capita income is mild, positive and not significant. Also, the moderating effect of government public debt and inflation is negative and not significant on per capita income. In contrast, the impact of government public debt on inflation is positive and significant. The study recommends a reduction in government fiscal deficit and government borrowing to reduce inflation. The study also recommends fiscal consolidation and the efficient application and management of borrowed funds.*

Key words: *government public debt, inflation, interest rate, money supply, per capita income*

JEL Classification: H63, E31, O47, E51

Received December 07, 2024 / Revised March 31, 2025 /Accepted April 15, 2025
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1. INTRODUCTION

Most developing countries in Africa face the challenge of poor revenue collection, occasioned by a weak tax revenue base and diminishing support from external donor countries (Ibrahim & Jairo, 2023). In an attempt to close the resulting fiscal gap, the developing country governments often recourse to debt to execute development projects (Hassan & Hassan, 2020). Generally, countries use public debt to bridge tax revenue deficits and fund economic projects, thereby improving citizens' living standards and fostering long-term growth and development. Developing countries like Nigeria have often contracted large amounts of public debt that has led to the mounting of trade debt arrears at highly concessional interest rates.

Government public debt serves to smoothen government expenditure in the face of a temporary shortage of tax revenues. Economic theory provides two broad frameworks for analyzing fiscal deficits. The Neo-classical theory believes that government intervention at the level of economic activity should be minimal as government borrowing will crowd out private investment and dampen the level of economic growth. On the other hand, the Keynesian approach suggests that government intervention is necessary to improve the economy's functioning and encourage private investment to enhance economic growth. The Keynesian theory deeply embeds the analysis of macroeconomic fiscal deficit. Also, the Keynesian theory views public borrowing as a vital means of achieving government development objectives and maintaining a stable level of productivity and employment. The fiscal situation remains manageable when income (GDP) grows faster than government borrowing. However, public debt may become unsustainable when government borrowing overshoots the growth of income, requiring some fiscal adjustments (Dakhlallah, 2020).

Public borrowing by governments in developing countries has been linked to several macroeconomic issues. Accumulating debt service payments may pose numerous challenges for countries, particularly emerging nations. Developing countries' public borrowing is often associated with a debt burden since foreign loans may be serviced for more than the amount they were obtained (Yusuf & Mohd, 2021). In extreme cases, a developing country may end up with a debt overhang resulting from its inability to repay both the interest and principal amounts. When governments borrow persistently from the domestic financial market, there is the risk of increasing the lending rate and crowding out the private sector (Alenoghena et al., 2022). Besides, "government spending and taxes are exogenous. In that case, bond-financed deficits are often non-sustainable, and the Central Bank would eventually monetize the government fiscal deficit and thus increase the money supply for the economy and inflation in the long run" (Onyedibe et al., 2022). Where the government does not monetize the deficit, inflation could remain a necessary consequence due to the crowding-out effect. In addition, some authors have contended that a sustained increase in government public borrowing may increase aggregate demand and raise the level of imports, thereby inducing unfavourable terms of trade and prompting the twin-deficit hypothesis (Mahuni, 2017; Saibu & Alenoghena, 2017).

Nigeria has virtually engaged in a fiscal deficit since the 1960s. The country has witnessed overall deficits in annual budgets, except for a few years during the period from 1970 to 2022. Additionally, the level of fiscal deficit incurred by the Nigerian government has increased significantly over the years despite an increase in the nation's revenue based on earnings from the country's crude oil exports (Adebisi & Oyeleke, 2020). The country's borrowing has soared over the years, and it has remarkably ballooned since the foreign debt

repayment in 2006. "The growth in domestic borrowing has accounted for over 75% of the government's total borrowing between 2006 and 2019 and consumed about 90% of the entire debt service" (CBN, 2022). Total government public debt has more than doubled between 2019 and 2023 from N27.40 billion to N97.34 billion. Additionally, the debt-to-GDP ratio has increased from 29.2% in 2019 to 38.8% in 2023. The Nigerian debt situation warrants concern as the government continues to borrow more. Similarly, inflation has also been a problem in Nigeria, as it has been on a steady rise since 2019. From 11.4% inflation in 2019, it rose to 18.85 in 2022. By December 2023, it has risen to 28.92% (CBN, 2022). By June 2024, inflation had climaxed at 34.19%.

While the issue of debt repayment is a significant headache for the Nigerian government, people and businesses, inflation has had a severe impact on household income and assets over the years. The twin problems of debt and inflation in Nigeria have had a debilitating impact on the economy, creating a multitude of challenges for the government and the monetary authority. Several authors have conducted empirical studies on the relationship between government debt and economic growth (Yusuf & Mohd, 2021; Alenoghena et al., 2023). Additionally, existing studies have explored the relationship between government debt and inflation (Natagwandu et al., 2021; Danladi, 2022; Francesco & Sandri, 2023), as well as the connection between inflation and economic growth (Ezeanyeji, 2019; Muhammad, 2021; Shuaibu et al., 2021). However, the existing literature on the effect of government public debt and inflation on per capita income is relatively scant. This study aims to explore and emphasize the hiatus in the moderating effect of government public debt and inflation on per capita income. Therefore, this article intends to investigate the following objectives: One, examine the impact of government public debt on per capita income; two, determine the effect of inflation on per capita income; three, investigate the impact of government debt on inflation; and four, evaluate the moderating effect of government debt and inflation on per capita income.

Furthermore, the study aims to examine the role of money supply and interest rate in response to the interactive effects of the study variables in the Nigerian economy, covering the period from 1981 to 2023. The remaining sections of this article are structured as follows: Section 2 handles the review of the relevant literature. Section 3 is devoted to the methodology, which encompasses model specification, estimation technique, and data sources. Section 4 presents the empirical findings and discusses the study's results. The final section presents the study's conclusions and policy implications.

2. Literature Review

The literature review conducted in this study is divided into two segments: theoretical review and empirical review.

2.1. Theoretical Review

Several schools of thought have associated public debt and inflation with economic factors that are related to supply and demand in the economy, resulting in lags that appear as higher prices for goods and services for an extended period. Some of these theories are discussed below:

2.1.1. Neo-Classical Growth Theory

This Neo-classical theory dates back to 1956 when Robert Solow advanced a formal model which postulated that a critical variable in growth in the growth process is labour productivity (i.e. output per worker). Accordingly, the model emphasizes that the role of technological change becomes more imperative when synchronized with capital accumulation. Also, the model assumes that total output (Y) is produced by employing labour, physical capital and technology. Symbolically, the model is expressed as:

$$Y = f(A, K, L)$$

Where Y is the total output, A signifies the current state of technology, K represents the stock of capital goods, and L the quantity of labour engaged during that period. Observe that A, K, and L are the factor inputs that are formally included in the model. All the factors expressed are important for the model operation based on the values of the exponents in the Equation, which indicate their productivity and relative contribution. The level of productivity depends on the standard of technological change, in addition to organizational efficiency and practices.

Therefore, the model justifies an increase in government spending to improve the quality of education and health services as a strategy to improve the contribution of human capital to production activities. Against this backdrop, the neoclassical growth theory gained popularity considering the fact that government public borrowing to finance projects on education and health would improve the quality and contribution of labour to the country's development process (Precious, 2013; Eze et al., 2019). The last and important aspect of the neoclassical theory is the advocated minimal role for government intervention in the economic activity of a nation. The theory believes that a government fiscal deficit to fund public projects would crowd out private investment activity. Therefore, the role of government in economic activity should be minimal (Alenoghena, 2023). Based on the relevance of the neoclassical theory to the supply-side management of the economy, this study acknowledges its stronger relevance to the issues being addressed in this study.

2.1.2. Keynesian Theory of Inflation

John Maynard Keynes (1883 - 1946) and his academic supporters opine that an increase in aggregate demand was the source of demand-pull inflation. Demand-pull inflation refers to a situation where the aggregate demand in the economy for goods and services outgrows aggregate supply in terms of the output of goods and services. Hence, aggregate demand, in this instance, comprises government consumption expenditure, firms' investment and household consumption. Accordingly, Totonchi (2011) opines that a policy which causes a decrease in any of the components of aggregate demand "is effective in reducing the pressure on demand and, invariably, inflation". Hence, the policy may involve a reduction in government expenditures, followed by an increase in tax and a contractionary monetary policy.

In Nigeria, the economy can hardly produce output to meet demand and the economy is highly foreign-dependent, hence, may face more inflationary pressures due to excess government spending.

2.1.3. Keynesian Theory of Fiscal Deficit

The Keynesian Theory of fiscal deficit encourages government in public borrowing since the fiscal deficit is undertaken to deliver goods and services of necessity for the citizens. The Keynesian proposition for the budget deficit is based on the multiplier effect principle. The multiplier principle underscores the procedure, which shows how a larger change in national output can result from a smaller initial change in public expenditure. The essence of the Keynesian theory lies in the argument that fiscal deficit increases domestic production, promotes the employment level and crowd-in private sector investment.

2.2. Review of Empirical Literature

A review of empirical studies has been conducted on the effect of government public debt and inflation on economic growth and the relationship among the variables of study. Below are some of the researchers' discussions on public debt, inflation, as well as interest rates in relation to Nigeria's economic growth.

The first discussion on the literature review concerns the relationship between public debt and economic growth. The first set of empirical studies in this relationship argues in favour of a negative impact of public debt on economic growth in line with the neo-classical school of thought (Tung, 2018; Jack Salmon, 2020; Akamobi & Unachukwu, 2021; Abdulkarim & Saidatulakmal, 2021; Kalu & Boniface, 2023). The neo-classical school believes that government borrowing crowds out private investment and negatively impacts economic growth. The second strand of empirical studies suggests that public debt has a positive relationship with economic development aligning with the Keynesian school of thought (Hanadi Taher, 2017; Biplob, 2019; Abdulkarim & Saidatulakmal, 2021; Adewale et al., 2022; Alenoghena et al., 2023). The argument advanced by proponents of this school of thought holds that public debt would stimulate output, increase productivity, and, consequently crowd in private investment to enhance economic growth. The final set of empirical studies on the relationship between public debt and growth posits that the level of economic activity does not respond to the volume of government public borrowing. The empirical studies in this case argue in favour of the application of the Ricardian Equivalence Hypothesis (REH) while maintaining that total output and consumption in the economy, will fail to respond to changes in fiscal policy (Halicioglu & Eren, 2017; Ofori-Abebrese & Pickson, 2018; Ncanywa & Letsoalo, 2019; İkiz, 2020; Frank & Peter, 2020; Isah et al., 2022).

The second set of literature reviews investigates the relationship between public debt and inflation. Several empirical studies on the relationship conclude that public debt has a positive impact on inflation (Ezeanyeji, 2019; Boukraine, 2021; Muhammad, 2021; Mehmeti & Deda, 2022; Saungweme et al., 2023; Sangweni & Ngalawa, 2023). The authors in this section believe that “an increase in public debt becomes inflationary either in the short run or in the long run”. There are a few studies with empirical evidence showing “a negative relationship between public debt and inflation” (Nzirim, 2014; Nguyen, 2015 & Essien, 2016). In support of the negative relationship between debt and inflation, some authors have explained that when the debt level is low with a significant allowance for gearing, an increase in debt may reduce the level of inflation. The final discussion on the relationship between debt and inflation is maintained by authors with empirical studies that

show a neutral relationship between the two variables (Shuaibu et al., 2021; Aimola & Odhiambo, 2021).

The final set of empirical studies to be examined is on the relationship between inflation and economic growth. The first strand of empirical studies in this regard believes that "the relationship between inflation and economic growth is positive" (Idris & Bakar, 2017; Ogu et al., 2020; Boukraine, 2021; Adaramola & Dada, 2020). The proponents of a positive relationship believe that businesses make more profits and thrive better during inflation, hence increasing output and employment. Conversely, most empirical studies on inflation and income argue that the relationship is negative (Osuji et al., 2022; Bawa & Ismaila, 2021; Saungweme & Odhiambo, 2021; Ahmad, 2022). The empirical studies supporting a negative relationship between inflation and income show that inflation reduces the purchasing power of households and lowers the value of fixed salary earners and cash in the bank. The last set of empirical studies on the relationship between inflation and income argues that the relationship is neither positive nor negative. Rather, the authors believe that while the relationship may be negative before a threshold, it becomes positive after the threshold (Švigir & Miloš, 2017; Ndoricimpa, 2017; Runganga, 2020; Law et al., 2021; Azam & Khan, 2022).

A summary of the empirical studies reviewed showed that several authors have focused on government debt and economic growth (Jack Salmon, 2020; Akamobi & Unachukwu, 2021; Yusuf & Mohd, 2021; Alenoghena et al., 2023) without examining the combined effect of inflation; also, there are existing studies on government debt and inflation (Adamu & Mohammed, 2018; Natagwandu et al., 2021; Danladi, 2022; Francesco & Sandri, 2023) without investigating the synergistic effect of the variables on income; there have also been studies that concentrated on inflation and economic growth (Essien, 2016; Ezeanyeji, 2019; Muhammad, 2021; Shuaibu et al., 2021; Saungweme & Odhiambo, 2021; Ahmad, 2022) that lose sight of the effect of debt. However, the existing literature on the synergistic effect of government public debt and inflation on per capita income is relatively scanty. Hence, the novel area of this study is to explore and emphasize the interactive effect of government public debt and inflation on per capita income.

3. METHODOLOGY

3.1. Functional Derivation of the Relationship Between Government Public Debt, Inflation, Money Supply and Income

The proposal developed by Kwon et al. (2009), based on the earlier treatise of Castro et al. (2003), the functional relationship between public debt, price level, money supply and real per capita income of an economy is demonstrated. The illustration exemplifies the utility-maximizing behaviour of a typical household that is endowed with limited resources (Y) for each period and allocates its real wealth among household consumption (C), real money (M/P) and government bonds (B/P) in the process of maximizing the following utility function:

$$\sum_{t=0}^{\infty} \beta^t \left[In(C_t) + YIn\left(\frac{M_t}{P_t}\right)\right] \quad (1)$$

Subject to the resource constraints imposed by

$$C_t + \frac{M_t}{P_t} + \frac{B_t}{P_t} = Y_t - T_t + \frac{M_{t-1}}{P_t} + \frac{i_{t-1}B_{t-1}}{P_t} \quad (2)$$

Where T is the lump-sum tax and i is the return on government financial bond for the periods between t_{-1} and t. Therefore, the household maximization problem evolves into the basic first-order condition for the maximization of consumption spending and real money demand, respectively. Hence,

$$\frac{C_{t+1}}{C_t} = \frac{\beta i_t}{\pi_{t+1}} \; also: \frac{M_t}{P_t} = \frac{YC_t i_t}{i_{t-1}} \quad (3)$$

Where $\pi_t = P_{t+1}/P_t$. The first order condition in two parts constitutes a Cagan-type of demand for money function that relates inversely to inflation expectations in the economy. On the other hand, the government faces an intertemporal budget constraint.

$$G_t + (i_{t-1} - 1)\frac{B_{i-1}}{P_t} = T_t + \frac{(M_t - M_{t-1})}{P_t} + \frac{(B_t - B_{t-1})}{P_t} \quad (4)$$

Equation (4) indicates the path of money supply expressed by the level of debt monetization. It also shows the savings in the view of the future interest payments induced by the present financing of the budget deficit. The equilibrium price conditions may be demonstrated as follows.

$$P_t = \frac{(1-\beta)(M_{t-1} + \delta i_{t-1}B_{t-1})}{YC_t} \quad (5)$$

The nature of equilibrium in the system may be recursive, and there is the assumption of no arbitrage in the relationship between real asset returns ($r_{t+1} = \frac{i_t}{\pi_i}$) and bonds. Hence, the equilibrium price may be presented as follows:

$$P_t = \frac{(1-\beta)(M_t + \delta B_i)}{YC_t} \quad (6)$$

Equation 6 gives a functional relation, which is the result of the price level in relation to real GDP, money and government debt. It indicates the effect of money supply, government debt and per capita income on the price level. However, if real income becomes the dependent variable, the functional relation becomes

$$Y_t = \frac{(1-\beta)(M_t + \delta B_i)}{PC_t} \quad (7)$$

Equation (7) shows the nature of relationship between per capita income and government debt, price level, money supply and household consumption. The structural parameters to be estimated in the equation are $\beta \; and \; \delta$.

3.2. The Model

The model adopted in this study follows Van Bon (2015) and Boukraine (2021). It expresses per GDP per capita (GPC) as the dependent variable and central government borrowing (PDEBT), consumer inflation (INFL), Broad Money Supply (BMS), and interest rate (INTR) as the explanatory variables.

The variables are exhibited in equation (8) as follows:

$$\text{GPC} = (\text{PDEBT, INFL, BMS, INTR}) \tag{8}$$

Equation (1) can be further expressed in a functional form as shown in equation (9)

$$GDP_t = \beta_0 \cdot (PDEBT_{it})^{\beta_1} \cdot (INFL_{2t})^{\beta_2} \cdot (BMS_{3t})^{\beta_3} \cdot (INTR_{4t})^{\beta_4} \tag{9}$$

The next step is to log-linearise Equation (9) for ease of estimation. The process of log-linearization is necessary to effectively streamline the variable scales reduce the data fluctuations. Hence:

$$LogGPC_t = \beta_0 + \beta_1 LogPDEBT_{t1} + \beta_2 LogINFL_{t2} + \beta_3 LogBMS_{t3} + \beta_4 LogINTR_{t4} + \mu_t \tag{10}$$

Equation (10) can assess the effect of Government Public Debt on per capita income. The same equation (3) will be used to investigate the effect of inflation on per capita income. Another equation is designed to assess the impact of government public borrowing on inflation in Nigeria.

$$LogINFL_t = \beta_0 + \beta_1 LogPDEBT_{t1} + \beta_2 LogGPC_{t2} + \beta_3 LogBMS_{t3} + \beta_4 LogINTR_{t4} + \mu_t \tag{11}$$

Equation (11) is designed to assess the effect of government public debt on inflation. The model will also determine the impact of interest rates on inflation in Nigeria.

In addition, equation (12) is designed as follows:

$$LogGPC_t = \beta_0 + \beta_1 LogPDEBT_{t1} + \beta_2 LogINFL_{t2} + \beta_3 LogPDEBT * LogINFL_{t3} + \beta_4 LogBMS_{t4} + \beta_5 LogINTR_{t5} + \mu_t \tag{12}$$

Equation (4) is configured to examine the effect of the interaction between government public debt and inflation on per capita income in Nigeria.

Where $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \& \beta_5$ are the coefficients to be estimated in Equations 3 & 4, and μ_t is the stochastic error term that is associated with the models.

Furthermore, the apriori expected signs of the models are for equations (10 & 11):

$\beta_1 > 0; \beta_2 > 0; \beta_3 > 0; \& \beta_4 < 0.$

The apriori expected signs for equation (5) are

$\beta_1 > 0; \beta_2 > 0; \beta_3 > 0; \& \beta_4 > 0 \& \beta_5 < 0.$

Therefore, the parameter > 0 implies a positive relationship between the dependent and independent variables. Also, < 0 means a negative relationship between the dependent and independent variables.

3.3. Sources of Data

While the data on government public debt is obtained from the Central Bank of Nigeria (CBN) Annual Statistical Bulletin (2023), the rest of the data is obtained from the WDI (World Bank) statistics.

Table 1 Description and Measurement of Variables

Variable	Description and Measurement	Source
GPC	GDP per capita is gross domestic product (at constant prices) divided by midyear population	WDI
PDEBT	Domestic Debt plus External Debt (Taken as a ratio of GDP)	CBN
INFL	"The inflation rate based on the consumer price index specifies the annual percentage change based on the cost of the average consumer items in terms of purchasing a selected basket of goods and services yearly. The Laspeyres formula is used "	WDI
BMS	"Broad money is defined on the basis of the value of currency outside banks plus demand deposits other than those held by the federal government plus the time, savings, and foreign currency deposits of residents in the country other than the federal government. It is a ratio of GDP"	WDI
INTR	"The lending rate is the bank rate that is estimated based on the government's short-term and medium-term financing needs of the private sector (Lending rate/Monetary Policy Rate)"	WDI

Source: Authors Elaboration

3.4. Estimation Strategy

The Generalized Linear Model (GLM) is the estimation model that was adopted for analysis in this research study. The GLM is a statistical regression method that is adopted to estimate the relationship between a dependent variable and one or more explanatory variables. It goes beyond the traditional Ordinary Least Squares (OLS) regression analysis by making allowance for the non-normal distributions of the dependent variable and the nonlinear relationship estimated between the dependent and independent variables. The Generalized Linear Model has three essential components, namely, the linear predictor, a link function, and the probability distribution function. We obtain the linear predictor by multiplying the independent variables by their respective coefficients and summing them together. The probability function is connected with the linear predictor with the aid of the link function in the approach to model the independent variable. The probability function specifies the probability of a particular value of the dependent variable given the values of the independent variables.

Generalized linear regression is generally a potent statistical approach that expounds the traditional least squares regression approach by allowing for nonlinear and non-normal distributions in estimating the relationships between the explanatory and the dependent variables. The generalized linear model has widespread applicability in various professional fields, such as marketing, education, finance, healthcare, and statistics.

There are several types of generalized linear models (GLM). Each GLM possesses its assumptions and features. A clearer understanding of each model is significant for choosing the appropriate one to be adopted for a given dataset and achieving accurate results. The several types of GLM approaches include: First, Logistic Regression: Logistic regression is used when the response variable is binary (e.g., yes or no, 0 or 1). The Logistic Regression approach models the probability of the occurrence of a given event by adapting a logistic function to the given dataset. Second, the Poisson Regression: The Poisson Regression model is adopted when a given response variable is counted (e.g., number of sales, number of accidents). The approach of the Poisson Regression model assumes that

the response variable follows a Poisson distribution pattern involving a discrete probability distribution function that models the specified number of events that may occur in a fixed time, interval or space. Third, the Gamma Regression: The Gamma model is deployed when the response variable assumes a continuous and positive distribution. The Gamma model is not normally distributed with examples such as income and waiting time. The Gamma Regression model assumes that the response variable follows a gamma distribution pattern. The Gamma pattern comprises a continuous probability distribution often deployed to model the waiting time for a designated set of events to occur.

The justification for the choice of methodology (Generalized Linear Model) for this work stems from the inherently heteroscedastic nature of the data for this study. Several other methods, like VECM and ARDL, will not suffice for analysis in view of the non-constant variance attribute in the data for this study. The GLM approach becomes preferable to other methodologies as it emphasizes a linear combination of predictor variables and deploys a function that links the linear predictor to the mean of the response variable. Also, this study observes that some authors have applied the GLM approach in empirical studies concerning fiscal policy, budget deficit and prices (Udeze et al., 2020; Alhendawya et al., 2023).

3.4.1. Theoretical Basis of the Generalized Linear Model

Nelder and Wedderburn (1972) introduced the first canonical derivation of the GLM, expanding on the approach and notation of the methodology. They started by considering the classical linear regression model:

$$Y_i = X_i\beta + \varepsilon_i \tag{13}$$

Where $i = 1, \ldots, N$, Y_i is a dependent variable. X_i is a vector of k explanatory variables or predictors, β is k by one vector with parameters unknown and ε_i are zero mean stochastic error terms. In line with the assumptions of the classical linear regression model, the following features of the generalized linear model are taken into account.

i) A random or stochastic component: The random component specifies the conditional distribution of the response variable. Y_i are the values of the explanatory variables with independent normal distributions of $E(Y_i) = \mu_i$ having the constant variance of σ^2.

ii) A systematic component (linear predictor) declared as the covariate X_i linearly combines with the model's coefficients to form the linear predictors $\theta_i = X_i\beta$. Therefore the regressor's linear function may be declared as:

$$\theta_i = \alpha + \beta_1 X_{i1} + \beta_2 X_{i2} + \cdots + \beta_k X_{ik}$$

iii) Consist of a linear invertible link function $g(.)$ which has the responsibility of transforming the expectations of the response variable $\mu_i \equiv E(Y_i)$ to the linear predictor. It forms the link between the systematic component and random components of the linear predictor $X_i\beta = \theta_i$ and it becomes a function of the mean coefficient through the link function $g(\mu_i)$. Therefore, the normal linear model with the g forms an identity.

$$g(\mu_i) = \theta_i = \alpha + \beta_1 X_{i1} + \beta_2 X_{i2} + \cdots + \beta_k X_{ik} \tag{14}$$

The accompanying density function is derived from the normal distribution template in line with the exponential extension.

$$f(y_i, \mu_i, \sigma^2, w_i) = \left(\frac{2\pi\sigma^2}{w_i}\right)^{\frac{1}{2}} exp\left(\frac{-(y_i - 2y_1\mu_i) + \mu_i^2}{2\sigma^2/w_i}\right) for -\infty < y_i < \infty \quad (15)$$

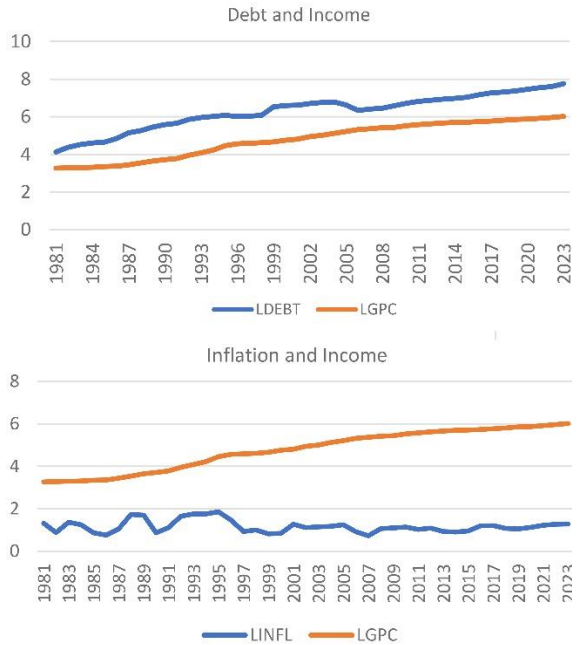
Equation (15) forms the basis for processing the set of data in line with the generalized linear model methodology. Recall that the aim of this study is to investigate the effect of government debt and inflation on the Nigerian economy. Therefore, the feasible estimation procedure to be adopted is the generalized linear model approach as formulated in equation (15).

The estimation strategy for this study involves the stationarity test adopting the ADF – Fisher's Chi-Square and the Phillips-Perron (PP) approaches. The second step is the cointegration test employing the Engle-Granger Single-Equation method. The third step is the impact relationship assessment between the dependent variable and the independent variables over the period 1981 to 2023, utilizing the Generalized Linear Model (GLM), Fisher Scoring method, and Marquardt steps approach. The final test is the Error Specification assessment carried out using the Ramsey Regression Specification Error Test (RESET).

4. Empirical Analysis and Results

4.1. Trend Analysis

In all the trends, per capita income was on the rise. When analysed against government public debt, income and debt were generally on the rise together throughout the data. However, a close observation will reveal that they share a negative relationship. For instance, between 1987 and 1996, the gap between the trend of the two variables diverged and converged. In the second diagram showing inflation and per capita income, there is no clear relationship between the variables. While inflation appears to decline on a general note during the study period, income was on the rise in the same period.



Source: Authors elaboration based on Central Bank of Nigeria Annual Statistics.

4.2. Descriptive Statistics

This sub-section of the study analyzes the statistical features of the variables utilized in the study. The main characteristics of the study variables presented in Table 2 concern the mean, median, maximum values, minimum values, standard deviation, kurtosis, Jarque–

Bera, probability and number of observations. Hence, the means of per capita income, government public debt, inflation, broad money supply and interest rate are 12.48, 32.29, 18.95, 16.80 and 17.32, respectively. The variables' maximum values, when presented in a similar order, are 12.85, 79.71, 72.84, 27.38 and 31.65. Also, the respective minimum values for the variables per capita income, government public debt, inflation, broad money supply and interest rate are 12.20, 7.12, 5.39, 9.06 and 8,92. The period of analysis for all the variables covers from 1981 to 2023, making 43 observations.

Table 2 Descriptive Statistics

	GPC	PDEBT	INFL	MSS	INTR
Mean	12.479	31.288	18.947	16.802	17.324
Median	12.409	22.376	12.942	13.887	16.922
Maximum	12.846	79.713	72.836	27.379	31.650
Minimum	12.203	7.117	5.388	9.063	8.917
Std. Dev.	0.239	22.848	16.455	6.061	4.817
Skewness	0.266	0.798	1.877	0.450	0.357
Kurtosis	1.394	2.257	5.437	1.509	3.601
Jarque-Bera	5.008	5.422	35.058	5.309	1.527
Probability	0.082	0.066	0.000	0.070	0.466
Sum	524.106	1314.09	795.76	705.68	727.62
Sum Sq. Dev.	2.332	21404.03	11101.40	1506.04	951.22
Observations	43	43	43	43	43

Source: Created by Authors

The variables that recorded the highest and lowest standard deviation values (variability) are the government public debt and per capita income with 22.85 and 0.24, respectively. The data skewness shows that it is positively skewed, with inflation and government public debt recording the highest with values of 1.88 and 0.79, respectively. Hence, the distribution is positively skewed (to the right). The kurtosis values of the data measuring the peak of the distribution show that the two variables having scores above 3 are inflation and interest rate, with values of 5.44 and 3.60, respectively and the other variables recording values that are below 3. Therefore, on a general scale, the distribution is platykurtic, indicating a flatter peak with a smaller base. For the Jarque-Bera test, only inflation has a very high value of 35.06 with a probability of 0.00. All the other variables have probabilities that are above 0.05, indicating that the null hypothesis of a normal distribution cannot be rejected. Therefore, the data for the study is normally distributed.

4.3. Correlation Matrix of Regressors

The results of the estimates of correlation values for all the study variables are presented in Table 3. The results show that the correlation values of the study variables are generally low except for income and money supply. The table results indicate that money supply has a positive association with income. However, the general level of correlation estimates among the study variables suggest that they do not suffer from multicollinearity.

Table 3 Correlation Matrix

Correlation	GPC	PDEBT	INFL	MSS	INTR
GPC	1				
PDEBT	-0.5664	1			
INFL	-0.3636	0.4649	1		
MSS	0.8843	-0.5051	-0.2641	1	
INTR	-0.1853	0.6093	0.3694	-0.1276	1

Source: Created by Authors

4.4. Unit Root Test

Table 4 shows the stationarity test performed using the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests. It was conducted involving all the variables adopted in this study. From the ADF and PP tests, all the variables, per capita income, government public debt, inflation, broad money supply and interest rate, have results showing that they are integrated at order one, that is, I(1) or become stationary at first difference.

Table 4 Unit Root Test

Null Hypothesis: Series has a unit root								
Series: GPC, PDEBT, INFL, BMS, INTR								
Method		ADF - Fisher Chi-Square			Phillips-Perron Test			
Series	t-State	Prob	Order of Integration	Maximum Lag	t-Stat	Prob	Order of Integration	Maximum Lag
GPC	-4.1008	0.0026	I(1)	1	-4.0097	0.0034	I(1)	1
PDEBT	-4.3649	0.0013	I(1)	1	-4.3855	0.0012	I(1)	1
INFL	-6.6367	0.0000	I(1)	1	-6.9008	0.0000	I(1)	1
BMS	-5.2266	0.0001	I(1)	1	-5.1907	0.0001	I(1)	1
INTR	-7.0032	0.0000	I(1)	1	-7.0682	0.0000	I(1)	1
	1% level	-3.6105			1% level	-3.6056		
	5% level	-2.9390			5% level	-2.9369		
	10% level	-2.6079			10% level	-2.6069		

Source: Created by Authors

The stationarity position is underscored by the values of the probabilities of the ADF and the PP tests showing the statistical significance at 1%, 5% and 10% critical values in the first difference.

4.5. Engle-Granger Cointegration Test

An observation of the Engle-Granger cointegration test conducted on the variables requires the variables are declared as endogenous to enable the determination of a long-run equilibrium relationship among them. The result of the cointegration test is shown in Table 5. The normalized auto-correlation coefficient (termed the z-statistic) along with the Engle-Granger tau-statistic (t-statistic) in both cases reject the null hypothesis of no cointegration among the variables at the 5% significance level. The accompanying probability values are evaluated from the MacKinnon reaction to the apparent simulation results. Given the sample size and the estimated probabilities of the variables, the critical values stipulate the

existence of five cointegrating equations at the 10% level of significance utilizing the z-statistic and tau-statistic (t-statistic) estimations. Hence, the tests show the presence of long-run equilibrium cointegrating association among the variables: per capita income, government public debt, inflation, money supply and interest rate.

Table 5 Cointegration Test

Series: GPC PDEBT INFL MSS INTR						
Null hypothesis: Series are not cointegrated						
Cointegrating equation deterministics: C						
Dependent	tau-stat	Prob.*	z-stat	Prob.*		
GPC	-3.276	0.481	-15.995	0.551		
PDEBT	-2.557	0.803	-11.938	0.789		
INFL	-3.786	0.263	-21.331	0.260		
MSS	-4.793	0.048	-44.963	0.000		
INTR	-1.258	0.993	-3.941	0.995		
		GDPPC	PDEBT	INFL	MSS	INTR
Rho – 1		-0.390	-0.291	-0.520	-0.634	-0.175
Rho S.E.		0.119	0.114	0.137	0.132	0.139
Residual variance		0.005	77.937	156.661	3.850	5.852
Long-run residual var		0.005	77.937	156.661	12.120	1.962
Number of lags		0	0	0	1	2
Number of observations		42	42	42	41	40
Number of stochastic trends**		5	5	5	5	5
**Number of stochastic trends in asymptotic distribution						

Source: Created by Authors

4.6. Lag Order Selection

The lag order selection process entails choosing the lag that is most recommended by the combination of the various statistical estimates. The result of the test is shown in Table 6. The table indicates that the most recommended lag based on the different statistical assessments (LR, FPE, AIC, SC and HQ) is the first lag. Therefore, this study will adopt the first lag in various test estimation processes.

Table 6 Lag Oder Selection

VAR Lag Order Selection Criteria						
Endogenous variables: GPC PDEBT INFL MSS INTR TRADE						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-655.5325	NA	21802757	33.92474	34.18067	34.01657
1	-488.3029	274.4280*	26671.32*	27.19502*	28.98655*	27.83780*
2	-458.0888	40.28538	41083.28	27.49174	30.81886	28.68548
3	-421.7813	37.23846	59326.7	27.47597	32.33869	29.22067
* indicates lag order selected by the criterion						

Source: Created by Authors

4.7. Test for Heteroscedasticity

This test establishes the level of Heteroscedasticity in the data. The procedure entails estimating the regression model and assessing the degree of Heteroscedasticity through residual diagnostics. The result of the heteroscedasticity test is presented in Table 7.

Table 7 Test for Heteroscedasticity

Heteroskedasticity Test: Harvey			
Series: GPC PDEBT INFL MSS INTR			
F-statistic	6.1324	Prob. F(5,36)	0.0003
Obs*R-squared	19.3184	Prob. Chi-Square(5)	0.0017
Scaled explained SS	14.8144	Prob. Chi-Square(5)	0.0112

Source: Created by Authors

The Breusch-Paga-Godfrey test shows that the observed R-squared and the F-statistic have a probability that is less than 0.05; hence, we reject the null hypothesis, stipulating that the study data is free from heteroscedasticity. Therefore, heteroscedasticity is present in the data. With the presence of heteroscedasticity in the data, any estimation with the normal OLS regression procedures will result in the bias of the regression coefficients as a result of the unreliable variances. Hence, with the presence of heteroscedasticity, the regular regression estimators will not be BLUE. The presence of heteroscedasticity in the data justifies the application of the Generalized Least Squares Estimator. The GLS method will correct the heteroscedasticity in the data and produce estimates that are BLUE.

4.8. The Results of Generalized Linear Model Regression Analysis

4.8.1. Assessing the Effect of Government Public Borrowing, Inflation and Money Supply on Per Capita Income.

The result of the generalized linear model regression analysis on the effect of government public borrowing, inflation and money supply on income is shown in Table 8. While the impact of government public debt, money supply and interest rate are significant in affecting income, the effect of inflation is mildly negative and not significant in affecting per capita income in Nigeria. The effect of government public debt is negative and significant in affecting income. More specifically, a 1% change in government public debt will stimulate a 0.40% change in per capita income in the reverse direction. On the other hand, the effect of money supply on income is positive and significant. Therefore, a 1% change in money supply is accompanied by a 0.27% change in income in the same direction. Although the change in inflation is negative on per capita income, the effect is not significant. Additionally, interest rate has a negative and significant impact on income for the period under study such that a 1% change in interest rate elicits a 0.79% change in income in the opposite direction.

Table 8 GLM Coefficient Impact Analysis

Dependent Variable: GPC				
Method: Generalized Linear Model (Fisher scoring / Marquardt steps)				
Dispersion computed using Pearson Chi-Square				
Variable	Coeff	Std. Error	z-Stat	Prob.
PDEBT	-0.402	0.098	-4.089	0.000
INFL	-0.088	0.101	-0.868	0.385
MSS	0.273	0.029	9.466	0.000
INTR	-0.794	0.398	-1.997	0.046
C	1.202	0.073	16.417	0.000
Mean dependent var	12.479	S.D. dependent var		0.239
Sum squared resid	0.320	Log likelihood		42.670
Deviance statistic	0.009	Restr. Deviance		2.332
LR statistic	232.799	Prob(LR statistic)		0.000
Pearson SSR	0.320	Pearson statistic		0.009
Dispersion	0.009			

Source: Created by Authors

4.8.2. Investigating the Impact of Government Public Borrowing, Money Supply and Interest Rate on Inflation.

Table 9 shows the impact of government public borrowing and interest rate on per capita income. The impact of government public borrowing on inflation is positive and significant. A 1% increase in government public borrowing stimulates a 1.143% increase in inflation. Also, the effect of money supply on inflation in Nigeria for the period of study is positive but insignificant. In addition, the impact of interest rate on inflation is negative but not significant.

Table 9 The Impact of Government Public Borrowing on Inflation

Dependent Variable: INFL				
Method: Generalized Linear Model (Newton-Raphson / Marquardt steps)				
Dispersion computed using Pearson Chi-Square				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
PDEBT	1.1429	0.5531	2.0663	0.0388
GPC	0.6955	0.2379	2.9234	0.0035
MSS	0.4732	0.7101	0.6664	0.5051
INTR	-1.0393	0.7545	-1.3774	0.1684
C	1.2820	2.3313	0.5499	0.5824
Mean dependent var	18.947	S.D. dependent var		16.455
Sum squared resid	8353.813	Log likelihood		-170.906
Deviance statistic	225.779	Restr. Deviance		11101.400
LR statistic	12.169	Prob(LR statistic)		0.016
Pearson SSR	8353.813	Pearson statistic		225.779
Dispersion	225.779			

Source: Created by Authors

4.8.3. Assessing the Effect of Interacted Government Public Borrowing and Inflation on Per Capita Income.

The analysis in this section of the study concerns the interactive effects of the two variables on per capita income in Nigeria. The interactive effects of the two variables on income in Nigeria are shown in Table 10. The table shows that the interactive effect of government public borrowing and inflation in Nigeria is negative but not significant. This means that there is no meaningful effect of the synergy between government public debt and inflation on income in Nigeria.

Table 10 Interacted Effect of Government Public Borrowing and Inflation on Per Capita Income

Dependent Variable: GPC				
Method: Generalized Linear Model (Fisher scoring / Marquardt steps)				
Dispersion computed using Pearson Chi-Square				
Variable	Coeff.	Std. Error	z-Stat	Prob.
PDEBT	-0.045	0.014	-3.236	0.001
INFL	-0.022	0.030	-0.732	0.464
PDEBT*INFL	-0.027	0.027	-0.996	0.326
MSS	0.027	0.003	9.061	0.000
INTR	0.077	0.041	1.890	0.059
C	1.205	0.097	12.463	0.000
Mean dependent var	12.479	S.D. dependent var		0.239
Sum squared resid	0.318	Log likelihood		42.722
Deviance statistic	0.009	Restr. Deviance		2.332
LR statistic	228.107	Prob(LR statistic)		0.000
Pearson SSR	0.318	Pearson statistic		0.009
Dispersion	0.009			

Source: Created by Authors

4.9. The Regression Specification Error Test

This research study adopts Ramsey's (1969) Regression Specification Error Test (RESET) to assess for the functional misspecification that may be associated with the models that were assessed in Table 11 of this study. The table shows the RESET assessments designed to detect the existence of any neglected nonlinearities in the estimated model. More specifically, RESET will decide whether a nonlinear combination of the independent variables will explain the variation in the independent variable and, hence, whether the model is mis-specified.

The RESET test concerns the models that utilized per capita income (model 3) and inflation (model 4) as the dependent variables. The test outcome with model 3 shows values of F-statistic and accompanying probability of F-statistic as 0.6835 and 0.4138, respectively. Since the associated probability value is more significant than 0.05 level of significance, the null hypothesis emphasizing the non-existence of omitted variables cannot be rejected. Similarly, the test outcome with model 4 shows values of F-statistic and accompanying probability of F-statistic as 1.3216 and 0.2579, respectively. Also, with probability values greater than 0.05, the null hypothesis emphasizing the non-existence of omitted variables cannot be rejected. Therefore, the models are well-specified.

Table 11 The RESET Test for Per Capita Income as Dependent Variable

Ramsey RESET Test				Ramsey RESET Test			
Specification: GPC PDEBT INFL MSS INTR C				Specification: INFL PDEBT GDPPC MSS INTR C			
Omitted Variables: Squares of fitted values				Omitted Variables: Squares of fitted values			
	Value	df	Prob.		Value	Df	Probability
t-statistic	0.8267	36	0.4138	t-statistic	1.1496	36	0.2579
F-statistic	0.6835	(1, 36)	0.4138	F-statistic	1.3216	(1, 36)	0.2579
Likelihood ratio	0.6835	1	0.4084	Likelihood ratio	1.3216	1	0.2503

Source: Created by Authors

4.10. Discussion of Findings

The effect of government public borrowing on per capita income is negative and significant. The specific results of government borrowing in income show that an increase in borrowing by 1% will stimulate a negative response on income by 0.4%. The position of the negative impact of government debt on income is maintained by Yusuf et al. (2021), Sani and Nwite (2021) and Kalu and Boniface (2023). The negative effect of government public borrowing on income indicates the application of the Neo-Classical theory of crowding–out hypotheses in Nigeria. In addition to the crowding-out of private sector investment, a negative relationship between government debt and income could also indicate a growing debt crisis, an increase in tax burden for the repayment of the debt, inflationary pressures and a decline in the growth of the economy. The second finding shows that inflation has a mild and non-significant negative effect on per capita income. The result implies that inflation does not dramatically affect per capita income and the purchasing power in the country during the period under review. Also, no significant policy intervention has been implemented to manage inflation in the country during the period under review.

The third major finding shows that the effect of government public borrowing on inflation is positive and significant. A 1% increase in government public borrowing stimulates a 1.143% increase in inflation. Several empirical studies support the positive effect of government public debt on inflation (Romero & Marín, 2017; Aimola & Odhiambo, 2020; Saungweme & Odhiambo, 2021). This finding implies that the sustained government public borrowing in Nigeria is one of the major causes of the persistent and high inflation in the country. Persistent high inflation causes an erosion of the purchasing power of economic agents, increasing the interest rates and making debt servicing more expensive for households, firms and the government. A high inflation level could have a negative effect on the country's currency and erode the value of savings.

The fourth major finding in this study is from the analysis of the synergistic effect of government public debt and inflation on per capita income. The result of the interactive effect of government public borrowing and inflation in Nigeria shows that it is negative but not significant. Thus, the synergy between government public debt and inflation has a negative influence on per capita income in Nigeria. The economic implications of the combined effect of the duo of government debt and inflation in Nigeria indicate a declining purchasing power, a rising cost of doing business, an increased tax burden and a magnified potential for stagflation in the country.

The fifth finding is on the effect of money supply on per capita income in Nigeria. Money supply demonstrated a positive and significant effect on income, such that when

the money supply increases by 1%, income also increases by 0.2%. The positive relationship between money supply and income is corroborated by some empirical studies (Ugwuanyi, 2018; Oseni & Oyelade, 2023). The positive relationship between money supply and income suggests that the economy benefitted from the money growth during the period to enhance the level of productivity that improved the GDP level of the country during the period. However, a persistent increase in money supply could result in inflationary pressures and lower interest rates during the period. The final outcome of this study shows that interest rate demonstrated a negative and significant relationship with income such that a 1% change in interest rate elicits a 0.79% change in per capita income in the reverse direction (Utile et al., 2018; Lehrer & Light, 2018). Thus, a negative relationship between interest rate and income falls in line with economic theory, suggesting that a lower lending rate reduces production costs and improves the output of goods and services in the economy.

5. Conclusions and Policy Recommendations

This study examines the impact of government public debt and inflation on per capita income in Nigeria, spanning the period from 1981 to 2023. The study also attempts to examine the role of money supply and interest rate in the debt, inflation and growth nexus. The study is timely and vital, as the most significant economic evils facing the country at this point are increasing government borrowing, which reached 46.6% in the second quarter of 2024, and inflation, which soared to 33.4% in recent times in the Nigerian economy. For analysis, the study employed the Generalized Least Squares approach, which is an improvement over the basic Ordinary Least Squares model, as the study variables do not require any transformation to achieve a normal distribution status. The choice of the GLS approach is contingent on the heteroscedasticity status of the data for the study. The study was able to establish specific conclusions based on the empirical findings of the analysis.

The key findings of this research study include the following: First, a negative relationship exists between government public borrowing and income, indicating an application of the neoclassical theory of fiscal deficit in Nigeria. Additionally, government borrowing has contributed to the persistent and rising inflationary trend in the country. While the money supply has a positive influence on income, the trend in interest rates has a negative impact on the level of income.

Based on the findings mentioned in this study, the following recommendations are proffered. First, the Nigerian government must reduce its borrowing volume from domestic financial markets to mitigate the pressure on interest rates. Second, there should be a more effective strategy to manage the government's public borrowing and spending on the economy. The debt management office should follow up to ensure that the government reduces the level of borrowing. Another assignment for the Nigerian Debt Management Office is to ensure the effective and efficient management of funds disbursed from borrowed sources. Another recommendation is for the government to practice fiscal consolidation and reduce excessive spending and persistent budget deficits. The Nigerian government should maintain fiscal discipline by keeping within the limits of budgetary appropriations. Also, the effort to curtail inflation would entail the timely issuance of central bank financial instruments made sustainable when accompanied by fiscal discipline and structural reforms that emphasize the independence of monetary authority and issuance of monetary policy.

The strategy of raising interest rates to mitigate inflation should stop, as inflation in Nigeria has a structural origin. Experience has shown that inflation does not respond to changes in interest rates. High interest rates discourage investment as they increase the cost of funds. A high cost of funds discourages investment, reduces output and welfare and does not minimize inflation in Nigeria. The government should make a conscious effort to reduce interest rates through improvements in managing the increased depth of the domestic financial markets.

5.1. Study Limitation

The Nigerian economy has been affected by frequent economic changes and shocks during the period of analysis in this research study. The economy during this period was affected by currency depreciation, oil price fluctuations, and policy changes, which made it difficult to establish long-term trends reliably. This work may be more robust when a different methodology is adopted to capture the volatility that is inherent in the variables used in the study.

REFERENCES

Adaramola, A. O., & Dada, O. (2020). Impact of inflation on economic growth: Evidence from Nigeria. *Investment Management & Financial Innovations, 17*(2), 1-13. http://dx.doi.org/10.21511/imfi.17(2).2020.01

Adebisi, D. G., & Oyeleke, O. J. (2020). Fiscal Deficit Episode in Nigeria: What Is the Percentage of Error Correction between Public Revenue and Expenditure?. *Modern Economy, 11*(2), 533-540. https://doi.org/10.4236/me.2020.112039

Ahmad, T. (2022). A case of Pakistan investigating the relationship between inflation and economic growth: a case of Pakistan. *Acta Pedagogia Asiana, 1*(1), 1-8. https://doi.org/10.53623/apga.v1i1.64

Aimola, A. U., & Odhiambo, N. M. (2020). Public debt and inflation: a review of international literature. *Folia Oeconomica Stetinensia, 20*(1), 9-24. https://doi.org/10.2478/foli-2020-0001

Aimola, A. U., & Odhiambo, N. M. (2021). Public debt and inflation nexus in Nigeria: An ARDL bounds test approach. *Cogent Economics & Finance, 9*(1), 1921905. https://doi.org/10.1080/23322039.2021.1921905

Alenoghena, R. O., Aghughu, A. A., & Odior, E. S. (2023). Domestic Borrowing and the Nigerian Economy: A Bayesian VAR Analysis. *The Journal of Developing Areas, 57*(3), 65-77. https://doi.org/10.1353/jda.2023.a907735

Alenoghena, R. O., Amase J., & Aghughu, A. A. (2022). The Threshold Effect of Domestic Public Borrowing on the Nigerian Economy. *International Journal of Research and Innovation in Social Science (IJRISS), 6*(5), 824-833. https://dx.doi.org/10.47772/IJRISS.2022.6544

Alhendawya, H. A. A., Mostafa, M. G. A., Elkananib, S. G., Zakic, N. M. A., & Selmeya, M. G. (2023). Using generalized linear model to determine the impact of oil price fluctuations on the Egyptian public budget. *International Journal of Energy Economics and Policy, 13*(2), 92-99. https://doi.org/10.32479/ijeep.14029

Amos, A. S., Ekperiware, M. E., Oyetade, J. A., & Adewusi, A. A. (2022). Effect of Budget Finance on Economic Growth in Nigeria. *International Journal of Economic Policy, 2*(2), 31–50. https://doi.org/10.47941/ijecop.1020

Azam, M., & Khan, S. (2022). Threshold effects in the relationship between inflation and economic growth: Further empirical evidence from the developed and developing world. *International Journal of Finance & Economics, 27*(4), 4224-4243. https://doi.org/10.1002/ijfe.2368

Bawa, S., & Ismaila, A. S. (2021). Threshold Effect of Inflation on Economic Growth in Nigeria. *CBN Journal of Applied Statistics (JAS), 3*(1), 43-63.

Boukraine, W. (2021). Debt, Economic Growth and Inflation in Tunisia. *Journal of Smart Economic Growth, 6*(1), 75-82.

Dakhlallah, K. M. (2020). Public debt and fiscal sustainability: the cyclically adjusted balance in the case of Lebanon. *Middle East Development Journal, 12*(2), 340-359. https://doi.org/10.1080/17938120.2020.1773076

Essien, S. N., Agboegbulem, N. T. I., Mba, M. K., & Onumonu, O. G. (2016). An Empirical Analysis of the Macroeconomic Impact of Public Debt in Nigeria. *CBN Journal of Applied Statistics, 7*(1a), 125–145.

Ezeanyeji, C. I., Imoagwu, C. P., & Ejefobihi, U. F. (2019). Public debt and inflation in Nigeria: An econometric analysis. *International Journal of Applied Research, 5*(3), 219-224.

Ezirim, C.B., Amuzie, A.E., & Mojekwu, K. (2014). Domestic Debt Overhang and Inflationary Pressures: An Autoregressive Distributed Lag Investigation of the Nigeria Experience. In *Paper Accepted for Presentation at the Spring Conference of IABPAD at Double Tree Hotel, Dallas, USA*.

Fasanya, I. O., & Adekoya, O. B. (2017). Modelling inflation rate volatility in Nigeria with structural breaks. *CBN Journal of Applied Statistics, 8*(1), 175-193.

Fijoh K., & Iheaturu I. B. (2023). Empirical Analysis of the Effect of Public Debt on the Economic Growth of Nigeria. *Economics and Business Quarterly Reviews, l6*(1), 1-18. https://doi.org/10.31014/aior.1992.06.01.482

Halicioglu, F., & Eren, K. (2017). Testing Twin Deficits and Saving-Investment nexus in Turkey. *YILDIZ Social Science Review, 3*(1), 35-46.

Hasan, Z. (2020). Deficit financing in developing countries: Applications and consequences. In: *Leading Issues in Islamic Economics and Finance: Critical Evaluations*, 173-191. http://dx.doi.org/10.1007/978-981-15-6515-1_7

Ibrahim, A. J., & Jairo, I. J. (2023). Determinants of tax Revenue Performance in the East African Countries. *African Journal of Economic Review, 11*(2), 55-73.

Idris, M., & Bakar, R. (2017). The relationship between inflation and economic growth in Nigeria: A conceptual approach. *Asian Research Journal of Arts & Social Sciences, 3*(1), 1-15. https://doi.org/10.9734/ARJASS/2017/33365

Kwon, G., McFarlane, L., & Robinson, W. (2009). Public debt, money supply, and inflation: a cross-country study. *IMF Staff Papers, 56*(3), 476-515.

Law, S. H., Ng, C. H., Kutan, A. M., & Law, Z. K. (2021). Public debt and economic growth in developing countries: Nonlinearity and threshold analysis. *Economic Modelling, 98*, 26-40. https://doi.org/10.1016/j.econmod.2021.02.004

Lehrer, E., & Light, B. (2018). The effect of interest rates on consumption in an income fluctuation problem. *Journal of Economic Dynamics and Control, 94*, 63-71. https://doi.org/10.1016/j.jedc.2018.07.004

Mehmeti, I., & Deda, G. (2022). Econometric evaluation of public debt on inflation: evidence from Kosovo and North Macedonia. *Journal of Liberty and International Affairs, 8*(3), 171-187. https://doi.org/10.47305/JLIA2283171m

Muhammad, N. I., Olaolu, D., Abu, A. S., & Umar, H. U. (2021). Effect of Public Debt on Inflation Rate in Nigeria. *Lafia Journal of Economics and Management Sciences, 6*(1), 171-186.

Ncanywa, T., & Letsoalo, T. E. (2019). Which among twin deficits hypothesis, twin divergence, and Ricardian's equivalence hold in a developing country?. *Journal of Public Affairs, 19*(2). https://doi.org/10.1002/pa.1904

Ndoricimpa, A. (2017). Threshold effects of inflation on economic growth: is Africa different?. *International Economic Journal, 31*(4), 599-620. https://doi.org/10.1080/10168737.2017.1380679

Nelder, J. A., & Wedderburn, R. W. (1972). Generalized linear models. *Journal of the Royal Statistical Society Series A: Statistics in Society, 135*(3), 370-384. https://doi.org/10.2307/2344614

Nguyen, V.B. (2015). The Relationship between Public Debt and Inflation in Developing Countries: Empirical Evidence Based on Difference Panel GMM. *Asian Journal of Empirical Research, 5*(9), 128–142.

Odonye, O. J., Odeniran, S. O., Oduyemi, A. O., Olaoye, O. J., & Ajayi, K. J. (2014). An examination of the structural inflation dynamics in Nigeria. *Economic and Financial Review, 52*(1), 65-86.

Ogu, M. A., Adagiri, I. H., & Abdusalam, A. U. (2020). Impact of inflation on economic growth in Nigeria 1999-2017. *UMYU Journal of Counselling and Educational Foundations, 1*(1).

Onyedibe, F. C., Uzonwanne, M. C., & Chidinma, M. C. (2022). Impact of Budget Deficit Financing on Money Supply in Nigeria. *Growth, 9*(1), 20-30. https://doi.org/10.20448/growth.v9i1.3931

Oseni, I. O., & Oyelade, A. O. (2023). The effects of monetary policies on economic growth in Nigeria. *African Journal of Economic Review, 11*(3), 13-28.

Osuji, O., Alugbuo, J., & Eze, E. (2022). Inflation and Economic Growth Nexus in Nigeria. *Lafia Journal of Economics and Management Sciences, 7*, 143-158.

Romero, J. P. B., & Marín, K. L. (2017). Inflation and public debt. *Monetaria, 5*(1), 39-94.

Runganga, R. (2020). Inflation and economic growth in Zimbabwe is there any inflation threshold level. *International Journal of Applied Economics, Finance and Accounting, 8*(1), 1-10. https://doi.org/10.33094/8.2017.2020.81.1.10

Saibu, O. M. & Alenoghena, R. O. (2017). Fiscal Deficit Financing and Financial Market Development Nexus in Nigeria. *Journal of Economics and Policy Analysis, 2*(1), 113-139.

Sangweni, S. D., & Ngalawa, H. (2023). Inflation dynamics in South Africa: The role of public debt. *Journal of Economic and Financial Sciences, 16*(1), a750. https://doi.org/10.4102/jef.v16i1.750

Sani, A.I., & Nwite, S. (2021). Public debt burden and issues of economic growth in Nigeria: Are there solutions?. *Accounting and Taxation Review, 5*(2), 1-14.

Saungweme, T., & M Odhiambo, N. (2021). Public debt and inflation dynamics: Empirical evidence from Zimbabwe. *Croatian Review of Economic, Business and Social Statistics, 7*(2), 14-30. https://doi.org/10.2478/crebss-2021-0007

Saungweme, T., Maluleke, G., & Odhiambo, N. M. (2023). Non-Linear Impact of Public Debt on Inflation in Rwanda. *Review of Economics, 74*(2), 79-98. https://doi.org/10.1515/roe-2023-0049

Shuaibu, M., Muhammad, H. M., Abdullahi, S. I., & Gwazawa, U. G. (2021). Impact of public debt on inflation and unemployment in Nigeria: An ARDL vector error correction model. *Noble International Journal of Economics and Financial Research, 6*(5), 91-98.

Švigir, M., & Miloš, J. (2017). Relationship between inflation and economic growth; comparative experience of Italy and Austria. *FIP-Financije i pravo, 5*(2), 91-101.

Udeze, C. R., Obi, K. O., Ezenekwe, U. R., & Ukeje, C. D. (2020). Impact of fiscal policy on urban unemployment in Nigeria. *International Journal of Economics, Commerce & Management, 8*(3), 202-217.

Ugwuanyi, C. U. (2018). Money supply, inflation, and economic growth in Nigeria: Error Correction Model (ECM) approach. *Lafia Journal of Economics and Management Sciences, 3*(1), 237-237.

Utile, B. J., Okwori, A. O., & Ikpambese, M. D. (2018). Effect of interest rate on economic growth in Nigeria. *International Journal of Advanced Academic Research, 4*(1), 66-76.

Yusuf, A., & Mohd, S. (2021). The impact of government debt on economic growth in Nigeria. *Cogent Economics & Finance, 9*(1), 1946249. https://doi.org/10.1080/23322039.2021.1946249

VEZA IZMEĐU DRŽAVNOG JAVNOG DUGA, INFLACIJE I PER CAPITA PRIHODA U NIGERIJI: GENERALIZOVANI LINEARNI MODEL

Ova studija ispituje efekte državnog javnog duga i inflacije na prihod po glavi stanovnika u Nigeriji, obuhvatajući period od 1981. do 2023. godine. Studija koristi varijable državnog javnog duga, inflacije, prihoda po glavi stanovnika, ponude novca i kamatne stope. Studija primenjuje generalizovani linearni model zasnovan na problemu heteroskedastičnosti koji je povezan sa skupom podataka studije. Studija je osmišljena da pronađe praktične implikacije za ekonomske politike. Pored ispitivanja uticaja državnog javnog duga i inflacije na prihod po glavi stanovnika, studija posebno ispituje moderatorski efekat državnog javnog duga i inflacije na prihod po glavi stanovnika, kao i istražuje uticaj ponude novca i kamatne stope na inflaciju i prihod po glavi stanovnika. Rezultati pokazuju da državni javni dug ima negativan i značajan uticaj na prihod po glavi stanovnika. Pored toga, uticaj inflacije na prihod po glavi stanovnika je blag, pozitivan i nije značajan. Takođe, moderatorski efekat državnog javnog duga i inflacije je negativan i nije značajan na prihod po glavi stanovnika. Nasuprot tome, uticaj državnog javnog duga na inflaciju je pozitivan i značajan. Studija preporučuje smanjenje državnog fiskalnog deficita i državnog zaduživanja kako bi se smanjila inflacija. Studija takođe preporučuje fiskalnu konsolidaciju i efikasnu primenu i upravljanje pozajmljenim sredstvima.

Ključne reči: *državni dug, inflacija, kamatna stopa, novčana masa, prihod po glavi stanovnika*