

Effect of Public Debt on Poverty and Economic Growth of Nigeria (1981-2019)

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DOI: <https://dx.doi.org/10.47772/IJRISS.2023.701056>

Received: 12 September 2023; Accepted: 30 September 2023; Published: 01 November 2023

ABSTRACT

The research in focus aimed to investigate the interplay between public debt, poverty, and economic growth in Nigeria during the period spanning from 1981 to 2019. The specific objective was to assess the relationship between these variables within the Nigerian context during this timeframe.

To conduct this analysis, time series data were employed, sourced from the Central Bank of Nigeria's annual statistical bulletin and World Bank development indicators. Initially, unit root tests, such as the Augmented Dickey-Fuller (ADF) and Philip Perron (PP) tests, were executed to establish the stationarity of the variables. These tests indicated that, in model one, all variables exhibited stationarity at order one (1) and order zero (0), whereas in model two, all variables were stationary at order one (1).

Subsequently, the Auto Regressive Distributive Lag Model (ARDL) was employed to conduct short-run analysis and reveal the long-run coefficients in model one. In model two, the Error Correction Model (ECM) was utilized to investigate the data and assess the speed of adjustment from the short run to the long-run equilibrium state. The Granger causality test was also applied to determine causality relationships among the variables and to discern the direction of causality.

The findings of this study indicate that external debt exhibited a negative impact in the short run but a positive impact in the long run on the Nigerian economy during the study period. Additionally, there was evidence of unidirectional causality between external debt and economic growth. Conversely, domestic debt exerted a negative influence on both short and long-term economic performance in Nigeria, with unidirectional causality established between domestic debt and economic growth.

In light of these conclusions, the study recommends the implementation of effective debt management strategies by the government, especially concerning loan repayment. It is also suggested that loans acquired should be promptly channeled into viable investments aimed at enhancing the welfare of the populace and overall economic improvement.

INTRODUCTION

Background

Indebtedness has emerged as a significant challenge for numerous developing nations in the 21st century. The escalating levels of public debt within a country can have detrimental effects on its economic growth if not managed effectively (Obademi, 2012). This issue of rising public debt has gained global attention, particularly following events such as fluctuating oil prices and currency exchange rate variations, which have adversely impacted several developing nations, including Nigeria.

The burden of public debt is a pressing concern faced by both developed and developing nations worldwide

(Balcilar, 2012). Post-World War II, many European countries witnessed a consistent increase in their public debt-to-Gross Domestic Product (GDP) ratio. Similarly, the United States experienced a parallel trend of a high debt-to-GDP ratio. Conversely, in most developing nations, including Nigeria, the debt ratio has surpassed alarming levels, often exceeding established debt ceiling thresholds (Egbetunde, 2012).

This study delves into the multifaceted issue of public indebtedness, exploring its impact on economic growth and stability, with a particular focus on Nigeria. In the following sections, we will dissect the various dimensions of this problem, analyze its underlying causes, and assess its implications for both the domestic and global economic landscape. By doing so, we aim to shed light on potential solutions and policy recommendations to mitigate the adverse effects of rising public debt and pave the way for sustainable economic development.

Public debt can be categorized into various types based on its duration and sources. These classifications are essential in understanding the dynamics and implications of government borrowing.

1. Long-term Debt and Short-term Debt

Public debt can be classified into two primary categories: long-term and short-term debt. Long-term debt is intended to be held for an extended period, often several years. In contrast, short-term debt has a shorter maturity period, typically lasting one or two years. The choice between these types of debt instruments depends on the government's financing needs and overall fiscal strategy.

2. External Debt

External debt, also known as foreign debt, refers to financial resources borrowed by a government from foreign countries or international institutions. This type of debt includes funds obtained through various means, such as loans from foreign banks, investments from private individuals, or capital infusions from international financial institutions. It is essential for governments considering external debt to carefully weigh its advantages and disadvantages before pursuing such financing options.

3. Domestic Debt

Domestic debt is defined as debt that a government borrows within its own country and is denominated in the national currency. It encompasses various financial instruments, including Treasury bills, Treasury certificates, Federal government development stock, Ways and means Advance, and Treasury bonds. Domestic debt allows governments to raise capital from domestic financial markets.

Economic Growth

Economic growth, as defined by many economists, refers to the increase in the total value of all final output produced within a country over a specific period, usually a year. This value is measured at market prices and adjusted for price changes. Economic growth also considers the imputed value of goods and services not traded in the market, subtracting net income from abroad. In essence, economic growth signifies an expansion in a country's productive capacity compared to previous periods.

The Relationship Between Debt and Economic Growth

Economic theory suggests that reasonable levels of borrowing by a developing country can potentially enhance its economic growth (Pattillo, Ricci, and Poirson, 2002). A robust economic growth rate, typically exceeding 5%, can positively impact a nation's poverty situation. Developing countries like Nigeria often resort to borrowing to supplement their limited capital stocks, offering investment opportunities with higher

returns than those in developed economies. This approach can be effective when borrowed funds, combined with internally generated resources, are channeled into productive investments and are not affected by macroeconomic instability or distorted economic policies.

Sustainable growth leads to timely debt repayments and an increase in per capita income, which is essential for poverty reduction. These principles remain valid even when considering the risk of debt denial, as countries must carefully manage their debt portfolios to maintain fiscal stability (Pattillo, Ricci, and Poirson, 2002).

In the subsequent sections of this study, we will explore the empirical evidence and factors influencing the relationship between public debt and economic growth in developing countries, with a particular focus on Nigeria.

Defining Poverty

Poverty encompasses more than just a lack of basic necessities such as food, shelter, clothing, healthcare, and education. According to the World Bank's Report (2000), it extends beyond material deprivation. Poverty also involves the unjust treatment of individuals by both state and societal institutions, along with their exclusion from meaningful participation and influence within these institutions. It represents an unacceptable state of deprivation that impacts both psychological and social aspects of well-being.

Psychological Deprivation

Psychological deprivation involves the failure to fulfill fundamental human needs, including access to adequate food, healthcare, education, and housing. It signifies the absence of essential elements necessary for a dignified and healthy life.

Social Deprivation

Social deprivation includes feelings of helplessness, a lack of independence, and diminished self-respect (World Bank, 2000). People in poverty often find themselves excluded from decision-making processes and denied the power to shape their own destinies.

Diverse Definitions of Poverty

Defining poverty succinctly and universally is challenging because it touches upon various aspects of the human condition—physical, moral, and psychological. Different criteria and perspectives have been used to conceptualize poverty. Many analyses follow the conventional view of poverty as a consequence of insufficient income to secure basic goods and services. Others consider poverty as a multifaceted issue influenced by factors such as education, health, life expectancy, and child mortality (Kareem, 2015).

Dimensions of Poverty

Blackwood and Lynch (1994) identified poverty based on consumption and expenditure levels. Poverty can also be viewed as entitlements, which encompass the bundles of goods and services an individual can access, taking into account the means of acquisition (e.g., money, coupons) and the availability of necessary goods (Sen, 1983).

The World Bank's Perspective

The World Bank (1996) provides a broad definition of poverty, considering it as the inability to meet basic

needs—both physical (food, healthcare, education, shelter) and non-physical (participation, identity) required for a meaningful life.

Impact of Economic Factors on Poverty

Studies have shown that economic factors, such as changes in oil prices and inflation, can significantly affect poverty rates. For instance, a 10 percent increase in oil prices can lead to a 4.1 percent increase in poverty, particularly in the short term (Aye, 2012). Inflation, however, has a more lasting impact on poverty, as it is a long-term phenomenon that erodes the purchasing power of low-income individuals. The poor, who often hold a significant portion of their financial assets in cash rather than interest-earning assets, bear a heavier burden when prices rise.

Understanding the multidimensional nature of poverty and its relationship with economic factors is essential for policymakers and stakeholders seeking to address this complex issue effectively. In the subsequent sections of this study, we will explore the dynamics between public debt, economic growth, and poverty reduction, offering insights into potential strategies for mitigating poverty's adverse effects.

Statement of the Problem

The issue of escalating government indebtedness is not unique to Nigeria, but it is particularly pronounced when compared to other sub-Saharan African nations (Asaogwa, 2005). Nigeria's reliance on borrowing from the domestic economy to finance its expenditure has grown significantly, especially in response to fluctuations in oil prices (Gbosi, 1998).

Public debt has long been a matter of concern for both fiscal and monetary policymakers in Nigeria. Since gaining independence, Nigeria has pursued economic planning with a focus on using public debt for planned investments to drive rapid economic growth.

However, the reality has been challenging. Sub-Saharan Africa (SSA), including Nigeria, continues to grapple with heavy external debt burdens, compounded by widespread poverty and structural economic weaknesses (Were, 2001). Despite the cancellation of Nigeria's membership in the Paris and London Clubs in 2006, the country continued to resort to deficit financing in 2009 and 2010, issuing debt instruments totaling ₦524 billion and ₦867 billion, respectively, which contributed to an increased interest rate payment to the Paris Club (Nwankwo, 2010).

This raises concerns about the effective utilization of borrowed funds, whether domestically or internationally, for productive purposes. It is against this backdrop that this study seeks to explore the impact of public debt on poverty and economic growth in Nigeria.

The Scale of Poverty

Poverty is a pressing issue in Nigeria. According to the Federal Office of Statistics (FOS) in 1999, two out of three Nigerians were classified as poor, with 70% living on less than one dollar per day, and 90.8% surviving on less than two dollars per day. More recent data from the National Bureau of Statistics in May 2020 indicated that 40% of the population lived below the national poverty line of 137,430 naira (\$381.75) per year, accounting for approximately 82.9 million people.

Research Gap

While numerous studies have examined the effects of public debt on economic growth, a significant gap exists in the literature concerning empirical evidence in both developed and developing countries, including

Nigeria (Saifuddin, 2016; Naeem, 2017; Muhammad, 2017; Mousa and Shawawreh, 2017; Ndieupa, 2018). This research aims to address this gap by providing a disaggregated analysis of the impact of public debt on poverty and economic growth in Nigeria.

Extension of Previous Studies

This empirical study builds upon previous research on the topic of public debt and economic growth conducted worldwide, including Nigeria. Previous studies have revealed geographical gaps, methodological inconsistencies, and variations in timeframes. Some studies indicate a negative impact of public debt on economic growth, while others suggest a positive effect (Saifuddin, 2016; Egbetunde, 2012; Elom-Obed, 2017; Eze, 2019). This study aims to contribute to the existing body of knowledge by providing a comprehensive and context-specific analysis of the relationship between public debt, poverty, and economic growth in Nigeria.

Regional Disparities

Notably, there are significant regional disparities in poverty and socioeconomic indicators within Nigeria. The Northern region, comprising 19 of the country's 36 states, faces particularly acute challenges, including high rates of school dropouts, adult illiteracy, maternal and infant mortality, low income per capita, high divorce rates, and more. These issues are of great concern, as they surpass the challenges faced by some countries experiencing prolonged conflicts. This study recognizes the need to address these disparities and explore their underlying causes.

In the subsequent sections of this research, we will delve into a detailed analysis of the impact of public debt on poverty and economic growth in Nigeria, with a focus on both the national and regional contexts. This research aims to provide valuable insights for policymakers and stakeholders in Nigeria's ongoing efforts to address poverty and promote sustainable economic development.

Research Questions

This study aims to address the following research questions:

What is the impact of public debt on poverty and economic growth in Nigeria?

Is there a causal relationship among public debt, poverty, and economic growth in Nigeria?

Objectives of the Study

The overarching objective of this research is to empirically analyze the complex relationship among public debt, poverty, and economic growth in Nigeria during the specified study period. To achieve this, the study has the following specific objectives:

To investigate the impact of public debt on poverty and economic growth in Nigeria.

To determine the causal relationship among public debt, poverty, and economic growth in Nigeria.

Research Hypotheses

The following null hypotheses will be tested in this study:

H₀1: There is no significant relationship among public debt, poverty, and economic growth in Nigeria.

H₀2: There is no causal relationship among public debt, poverty, and economic growth in Nigeria.

Justification of the Study

This research holds significant practical and theoretical importance. On a practical level, various stakeholders stand to benefit from the findings of this study. Specifically:

Government: As the major borrower and regulator of monetary and fiscal policies, the government can use the research findings to address the challenges associated with high debt servicing, which affects both government finances and the general public. It can help in devising more effective public debt management strategies.

Financial Sector: Financial institutions can benefit from this research as it sheds light on the risks associated with public debt management. It can aid financial institutions in making informed decisions regarding lending to the government.

Foreign Interest Groups: Prospective foreign investors and international financial organizations can gain insights into the economic impact of public debt on Nigeria's growth prospects, helping them make informed investment decisions.

Academic and Research Community: This research can serve as a valuable source of literature for researchers, students, economists, accountants, bankers, government agencies, and related fields interested in understanding the concepts of public debt, poverty, and economic growth in Nigeria.

Scope of the Study

This study focuses on the effects of public debt on poverty and economic growth in Nigeria. It incorporates various macroeconomic variables, including Real Gross Domestic Product, External Debt, Domestic Debt, Government Expenditure, National Savings, Inflation Rate, Interest Rate, Population Growth Rate, and Per Capita Income of Nigeria. The study's scope is limited to the period from 1981 to 2019, spanning 39 years, to provide a comprehensive analysis of the relationship between these variables during this time frame.

METHODOLOGY

Theoretical Framework

To analyze the relationship among public debt, poverty, and economic growth, this study adopts a

$$Y=F(L,K,T) \dots \dots \dots 2.1$$

Where: Y = Output; K = Capital; L = Labour; and T = Technical Progress.

This equation indicates that output growth can be improved by increasing physical and human capital. External debt is considered instrumental in financing both physical and human capital development, which ultimately contributes to economic growth.

Therefore, a modified neoclassical production function, accounting for debt, is expressed as:

$$Y=F(L,K,T,E,D,\check{K}) \dots \dots \dots 2.2$$

Where: E = External debt; D = Domestic debt and \check{K} = Variables that determines growth

Type and Source of Data

To analyze the impact of public debt on poverty and economic growth in Nigeria from 1981 to 2019, this study utilizes annual data collected from secondary sources. The data sources include the Annual Reports and Statement of Accounts, Statistical Bulletin, and The Bullion of the Central Bank of Nigeria (CBN) for variables such as Real Gross Domestic Product (RGDP), External Debt (EXD), Domestic Debt (DD), Government Expenditure (GEX), National Savings (NS), Inflation Rate (INFR), Interest Rate (INR), Population Growth Rate (PGR), and Per Capita Income (PCI). Additionally, data on Inflation Rate, Interest Rate, Population Growth Rate, and Per Capita Income are obtained from the World Bank Development Indicator Index (WDI).

Model Specification

The research employs a model specification aligned with the neoclassical growth theory. The models used in this study are similar to those in previous research by James (2003) and Oyedele, Emerah, and Ogege (2013). Two main models are considered:

Model 1: Determining the impact of public debt on economic growth.

$$RGDP_t = f(EXD_t, DD_t, GEX_t, NS_t, CPI_t, INR_t, PGR_t) \dots \dots \dots 2.3$$

Where;

RGDP = Real Gross domestic product (₦ `billion)

EXD = External debt (₦`billion)

DD = Domestic debt (₦`billion)

GEX = Government expenditure (₦`billion)

NS = National savings (₦`billion)

INFR = Inflation Rate (%) INR = Interest rate (%)

PGR = Population growth rate (%)

The linear function of the model is a modified form of equation 3.3 and it is explicitly expressed as thus;

$$RGDP_t = \alpha_0 + \alpha_1 EXD_t + \alpha_2 DD_t + \alpha_3 GEX_t + \alpha_4 NS_t + \alpha_5 INFR_t + \alpha_6 INR_t + \alpha_7 PGR_t + U_t \dots \dots \dots 2.4$$

In Natural logarithmic function, it is expressed as;

$$\ln RGDP_t = \alpha_0 + \alpha_1 \ln EXD_t + \alpha_2 \ln DD_t + \alpha_3 \ln GEX_t + \alpha_4 \ln NS_t + \alpha_5 \ln INFR_t + \alpha_6 \ln INR_t + \alpha_7 \ln PGR_t + U_t \dots 2.5$$

Where;

ln = Natural logarithm

U_t = Error term

α₀ = Constant term

t = 1981- 2020 (40 years)

Model 2: Determining the impact of public debt on poverty.

$$PCI = f(TPD) \dots\dots\dots 2.6$$

Where;

PCI = Per capita income (₦'million)

TPD = Total public debt (₦'billion)

This can be expressed in a disaggregated model since;

$$TPD = EXD+DD$$

Therefore, the equation 3.4 is implicitly expressed as thus;

$$PCI = f(EXD,DD) \dots\dots\dots 2.7$$

In linear function, it is explicitly expressed as thus;

$$PCI_t = \beta_0 + \beta_1 EXD_t + \beta_2 DD_t + U_t \dots\dots\dots 2.8$$

In Natural logarithmic function, it is expressed as;

$$\ln PCI_t = \beta_0 + \beta_1 \ln EXD_t + \beta_2 \ln DD_t + U_t \dots\dots\dots 2.9$$

Where;

ln = Natural logarithm

Ut = Error term

β_0 = Constant term

t = 1981-2019 (39 years)

Both models are estimated using natural logarithmic functions to account for percentage changes and are subject to error terms.

Estimation Procedure

The estimation procedure encompasses descriptive and inferential techniques:

Inferential Analysis: Inferential techniques include regression analysis to explore the relationships among public debt, poverty, and economic growth. Additionally, Granger causality tests are employed to determine the direction of causal relationships.

3.4.1 Autoregressive Distributive Lag (ARDL) with Bound's Test Model

$$\ln rgdpt = \alpha_0 + \alpha_1 \ln rgdpt_{-1} + \alpha_2 \ln exdt_{-1} + \alpha_3 \ln ddt_{-1} + \alpha_4 \ln gext_{-1} + \alpha_5 \ln nst_{-1} + \alpha_6 \ln frt_{-1} + \alpha_7 \ln rgrt_{-1} + \alpha_8 \ln pgrt_{-1} + U_t \dots\dots\dots 2.10$$

$$\Delta \ln rgdpt_t = \lambda ECM_{t-1} \sum_{i=1}^l \omega_i \Delta \ln rgdpt_{t-i} + \sum_{i=1}^m \mu_i \Delta \ln exd_{t-i} + \sum_{i=0}^n \Omega_i \Delta \ln ddt_{t-i} + \sum_{i=1}^o \rho_i \Delta \ln gext_{t-i} + \sum_{i=0}^p \theta_i \Delta \ln nst_{t-i} + \sum_{i=1}^q \pi_i \Delta \ln frt_{t-i} + \sum_{i=0}^r \sigma_i \Delta \ln rgrt_{t-i} + \sum_{i=0}^s \Psi_i \Delta \ln pgrt_{t-i} + \lambda ECM_{t-1} + \varepsilon_t \dots\dots\dots 2.11$$

The ARDL technique is applied to Model 1, which involves a mix of first-order and zero-order integration for the variables. Both short-run and long-run models are estimated. Lag lengths are determined using the Schwarz Bayesian information criterion.

Engel-Granger Cointegration Test

The variables in Model 2 are first-differenced and subjected to the Engel-Granger cointegration test to determine the presence of a long-run relationship among them.

Error Correction Model (ECM)

$$\Delta \ln pci_t = \alpha_0 + \sum_{t=1}^n \alpha_2 \Delta \ln pci_{t-1} + \sum_{t=1}^n \alpha_3 \Delta \ln exd_{t-1} + \sum_{t=1}^n \alpha_4 \Delta \ln ddt_{t-1} + \lambda ECM_{t-1} + \varepsilon_t \dots\dots 2.12$$

An error correction model (ECM) is applied to the variables in Model 1 to analyze how they adjust to deviations from equilibrium.

Granger Causality

Granger causality models are estimated to assess the causal relationships among the variables in both Model 1 and Model 2.

Granger Causality Models Specification for model one

$$\ln rgdp_t = \alpha_1 + \sum_{i=1}^p \gamma_i \ln rgdp_{t-i} + \sum_{i=1}^p \delta_i \ln exd_{t-i} + \varepsilon_{1t} \dots\dots\dots 2.13$$

$$\ln exd_t = \alpha_2 + \sum_{i=1}^p \delta_i \ln exd_{t-i} + \sum_{i=1}^p \gamma_i \ln rgdp_{t-i} + \varepsilon_{2t} \dots\dots\dots 2.14$$

Granger Causality Models Specification for model two

$$\ln pci_t = \alpha_1 + \sum_{i=1}^p \gamma_i \ln pci_{t-i} + \sum_{i=1}^p \delta_i \ln exd_{t-i} + \varepsilon_{1t} \dots\dots\dots 2.15$$

$$\ln exd_t = \alpha_2 + \sum_{i=1}^p \theta_i \ln exd_{t-i} + \sum_{i=1}^p \pi_i \ln pci_{t-i} + \varepsilon_{2t} \dots\dots\dots 2.16$$

A Priori Expectations

The study anticipates that external debt, domestic debt, government expenditure, national savings, and population growth rate will have positive relationships with Real Gross Domestic Product (RGDP). Conversely, inflation rate and interest rate are expected to have negative relationships with RGDP.

For Per Capita Income (PCI), external debt and domestic debt are expected to have positive effects. These expectations will guide the interpretation of the results and the formulation of conclusions.

RESULT PRESENTATION AND INTERPRETATION

Unit Root Test Results

In order to achieve the first objective of this study, it became necessary to establish the order of integration of the variables involved. Determining the order of integration of variables is important for two reasons. One, it is a key determinant of the estimation techniques used in achieving set objectives. Secondly, it helps to determine the transformations that may be necessary to ensure the series are well suited to certain objectives. The Augmented Dickey Fuller (ADF) was deployed to determine the time series properties of

the variables in this study. Going by the ADF, we reject the null hypothesis that the variable(s) has a unit root, if the probability of the t-statistic is less than the critical value at the chosen level of significance, which is 5% in this case.

Table 3.1. Unit root results

Series	Order (ADF)	Exogenous	ADF Test (t-statistic) (Prob. Value)	PP Test (t-statistics) (Prob. Value)	Order (PP)
RGDP	2nd difference	Intercept	-6.566572 (0.0000)	-9.604787 (0.0000)	2nd difference
EXD	2nd difference	Intercept	-6.132027 (0.0000)	-11.13631 (0.0000)	2nd difference
DD	—	Intercept	—	-11.52970 (0.0000)	2nd difference
GEX	2nd difference	Intercept	-4.483580 (0.0014)	-9.260646 (0.000)	2nd difference
NS	Level	Intercept	-3.462399 (0.0167)	-5.219996 (0.0012)	1st difference
INFR	1st difference	Intercept	-5.672794 (0.0000)	-9.670148 (0.0000)	1st difference
INR	Level	Intercept	-7.253216 (0.0000)	-7.031616 (0.0000)	Level
PGR	1st difference	Intercept	-5.172918 (0.0001)	-4.620578 (0.0007)	1st difference
PCI	2nd difference	Intercept	-5.990591 (0.0001)	-30.84152 (0.0001)	2nd difference
LNRGDP	1st difference	Intercept	-3.434088 (0.0160)	-3.312652 (0.0214)	1st difference

LNEXD	1st difference	Intercept	-4.726483 (0.0005)	-4.726483 (0.0005)	1st difference
LNDD	1st difference	Intercept	-4.566132 (0.0008)	-4.566132 (0.0008)	1st difference
LNGEX	2nd difference	Intercept	-6.853639 (0.0000)	-7.219555 (0.0000)	1st difference
LNNS	1st difference	Intercept	-4.490256 (0.0010)	-4.490256 (0.0010)	1st difference
LNPCI	1st difference	Intercept	-5.118991 (0.0002)	-6.854885 (0.000)	1st difference

Source: Researcher’s computation (2023)

Table 3.1 above reports the respective levels of stationarity of the variables after the Unit root test. All variables examined are statistically significant at either 1% or 5%, therefore we reject the null hypothesis that there is unit root problem in the series. However, for model 1, while natural logarithm of Real gross domestic product, natural logarithm of external debt, natural logarithm of domestic debt, natural logarithm of government expenditure, natural logarithm of national savings and population growth rate are stationary at first difference that is I(1), Inflation rate and interest rate are stationary at level, that is I(0).

On the other hand, for model two, Natural logarithm of per capita income, natural logarithm of external debt and natural logarithm of domestic debt are all stationary at first difference, that is I(1).

Since there is combination of both I (1) and I (0) variables in model 1, model one is then subjected to Autoregressive redistributive Lag model analysis (ARDL), while for the model 2, there is existence of only I(1), the model is also subjected to the Error Correction Model (ECM) to achieve the second objective of the study.

ARDL Bound Test Output for Model One

Table 3.2: ARDL Bound test result

Test Statistic	Value	K
F-statistic	6.275071	7
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.03	3.13
5%	2.32	3.5
2.5%	2.6	3.84
1%	2.96	4.26

Source: Researcher’s computation (2023)

Table 3.2 shows the bound cointegration test for the model 1, From the table, the bound co-integration test shows that H0 is quickly rejected as against H1. F-Statistic value of 6.275071 being greater than both the lower and upper bounds of all critical value bounds at 1%, 2.5%, 5%, 10% respectively, thereby pointing to a situation of consistent long run relationship among the variables in the study.

ARDL Long Run Result Result For Model one

The table below presents the Autoregressive Distributed Lag model results carried out to examine the effects of each of the independent variables on economic growth. Optimum lag was automatically selected for the estimated ARDL system using the Akaike Informaton Criterion.

Table 3.3: ARDL long run result

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEXD	0.086770	0.036624	2.369228	0.0255
LNDD	-0.164120	0.159853	-1.026690	0.3140
LNGEX	0.008980	0.087242	0.102935	0.9188
LNNS	0.280303	0.117529	2.384975	0.0247
INFR	0.001090	0.001899	0.574276	0.5707
INR	0.002335	0.003271	0.713892	0.4817
PGR	1.864811	0.770929	2.418912	0.0229
C	4.367814	2.093350	2.086519	0.0469
R-squared	0.998519	Mean dependent var		10.30954
Adjusted R-squared	0.997892	S.D. dependent var		0.569680
S.E. of regression	0.026154	Akaike info criterion		-4.197564
Sum squared resid	0.017784	Schwarz criterion		-3.680432
Log likelihood	91.75372	Hannan-Quinn criter.		-4.013572
F-statistic	1593.533	Durbin-Watson stat		2.013212
Prob(F-statistic)	0.000000			

Source: Researcher’s computation (2023)

Table 3.3 above shows the ARDL long run result for model one. The coefficient value of LNEXD which is 0.086770 with probability value of 0.0255, shows a positive relationship between the variable and economic growth and it is statistically significant and it implies that a percentage increase in EXD in the long run will bring about 9% increase in RGDP. The coefficient value of LNDD which is -0.164120 with probability value of 0.3140, shows a negative relationship between the variable and economic growth and it is not statistically significant and it implies that a percentage increase in DD in the long run, will bring about 16% decrease in RGDP. The coefficient value of LNGEX which is 0.008980 with probability value of 0.9188, shows a positive relationship between the variable and economic growth but not statistically significant and it implies that a percentage increase in GEX in the long run will bring about 0.9% increase in RGDP. The coefficient value of LNNS which is 0.280303 with probability value of 0.0247, shows a positive relationship between the variable and economic growth and it is statistically significant and it implies that a percentage increase in NS in the long run, will bring about 28% increase in RGDP. The coefficient value of INFR which is 0.001899 with probability value of 0.5707, shows a positive relationship between the variable and economic growth and it is not statistically significant and it implies that a percentage increase in INFR in the

long run, will bring about 0.2% increase in RGDP. The coefficient value of INR which is 0.002335 with probability value of 0.4817, shows a positive relationship between the variable and economic growth but not statistically significant and it implies that a percentage increase in INR in the long run will bring about 0.2% increase in RGDP. The coefficient value of PGR which is 1.864811 with probability value of 0.0229, shows a positive relationship between the variable and economic growth and it is statistically significant and it implies that a percentage increase in PGR in the long run, will bring about 186% increase in RGDP. The R-Squared value of 0.998519 shows that 99.85% of total variation in the RGDP is being explained by the explanatory variables (LNEXD, LNDD, LNGEX, LNNS, INFR, INR, PGR).

The F-Statistic value of 1593.533 with the probability value of 0.000000 shows the fitness of the model and this is statistically significant at 1% ($p < 0.01$).

The Durbin Watson Statistic always has a value between 0 and 4.0. A value of 2.0 means that there is no autocorrelation detected in the model. Values from 0 to 2.0 indicate positive autocorrelation and values from 2.0 to 4.0 indicate negative autocorrelation. In the above table, the value of Durbin Watson is 2.013212 which indicates that there was a negative autocorrelation in the model because the value lies between 2.0 and 4.0.

3.4 Diagnostic Test Results for Model One

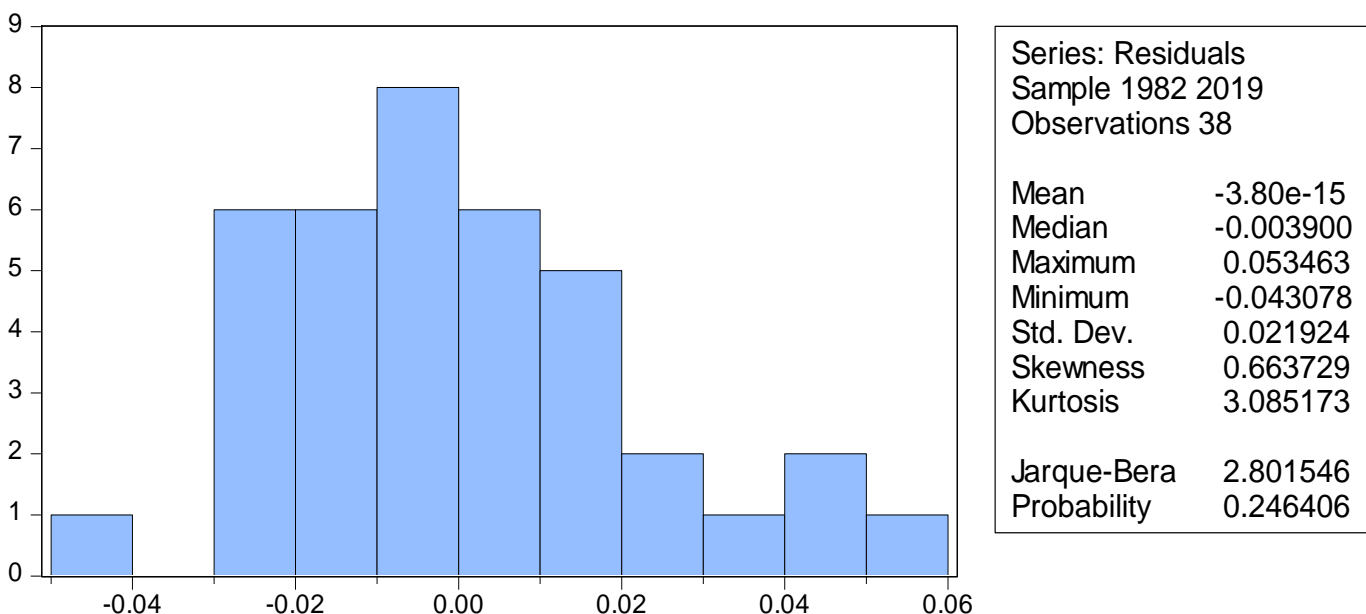
Table 3.4: Diagnostic test outputs for model one

TEST	F-STATISTICS	PROBABILITY	REMARKS
Heteroskedasticity	1.323359	0.2671	There is no heteroskedasticity
Serial correlation LM	0.006267	0.9375	Series are not serially correlated

Source: Researcher’s computation (2023)

3.5: Normality Test Result for Model One

Figure 3.1: Normality Test for Model one



Source: Researcher’s computation (2023)

H0: Residuals are normally distributed

H1: Residuals are not normally distributed

From figure 4.1, the Jarque-Bera value of 2.801546 has a probability of 0.246406 (24.6%) which implies that the probability value of 0.246406 (24.6%) is greater than 0.05 (5%) and this is not statistically significant at 5% level of significance. Hence, we accept the null hypothesis and conclude that Residuals are normally distributed.

Granger causality test for Model one

Table 3.5: Granger causality test result for model one

Null Hypothesis:	Obs	F-Statistic	Prob.	Remark
LNEXD does not Granger Cause LNRGDP	38	6.66156	0.0142	
LNRGDP does not Granger Cause LNEXD		0.61524	0.4381	Uni-directional
LNDD does not Granger Cause LNRGDP	38	4.73065	0.0365	
LNRGDP does not Granger Cause LNDD		1.47686	0.2324	Uni-directional

Source: Researcher’s computation (2023)

Table 3.5 above shows the granger causality relationship among the variables involved in model 1. LNEXD granger cause LNRGDP with F. statistics value of 6.66156 with probability of 0.0142 which is significant at 5% while LNRGDP does not granger cause LNEXD with F. statistics value of 0.61524 with probability value of 0.4381, which is not significant and this implies that there is a uni-directional causality between LNEXD and LNRGDP. This go along with the work of Festus Victor Bekun and Andrew AdewaleAlola (2015) whom investigated public debt and economic growth in Nigeria.

LNDD granger cause LNRGDP with F. statistics value of 4.73065 with probability of 0.0365 which is significant at 5% while LNRGDP does not granger cause LNDD with F. statistics value of 1.47686 with probability value of 0.2324, which is not significant and this implies that there is a uni-directional causality between LNDD and LNRGDP.

Lag length selection criteria for model two

Table 3.6: Lag length selection criteria result for model two

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-34.44523	NA	0.497715	2.139727	2.273043	2.185748
1	-19.87974	25.80172	0.229393	1.364557	1.542311*	1.425917
2	-19.64286	0.406075	0.239849	1.408164	1.630356	1.484864
3	-18.99432	1.074727	0.245070	1.428247	1.694878	1.520288
4	-15.40298	5.746142*	0.211773*	1.280170*	1.591240	1.387552*
* indicates lag 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: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source: Researcher’s computation (2023)

The lag selection criteria is based on the least selected lag length by different criterions (that is Akaike Information Criterion (AIC), Schwartz Information Criterion (SC) and Hannan-Quinn Information Criterion (HQ)). Base on this, the appropriate lag length is Lag 1 which happened to be the least as selected by Schwartz Information Criterion (SC).

Johansen Co-Integration test for Model two

Table 3.7: Johansen co-integration test result for model two

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.476456	34.32618	29.79707	0.0141
At most 1	0.175153	10.38220	15.49471	0.2525
At most 2	0.084278	3.257566	3.841466	0.0711
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.476456	23.94397	21.13162	0.0195
At most 1	0.175153	7.124635	14.26460	0.4745
At most 2	0.084278	3.257566	3.841466	0.0711
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegrating Coefficients (normalized by b'S11*b=I):				

Source: Researcher’s computation (2023)

Table 3.7 above revealed the Johansen Co-integration test. The result shows that the null hypothesis of no co-integration is rejected. The Trace statistics and Maximum Eigen value further shows that the null hypothesis of no co-integration, among the variables was rejected. Both the Maximum Eigen value and Trace statistics indicate that there is one co-integrating equations respectively. This means that there is a long run relationship among the variables. That is, the linear combination of these variables do not cancel out the stochastic trend in the series.

Error Correction Model for Model two

Table 3.8: Error correction model result for model two

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.029883	0.175445	-0.170327	0.8658
D (LNPCI (-1))	1.420733	0.305949	4.643688	0.0001
D (LNEXD (-1))	-0.315520	0.192091	-1.642554	0.1103
D (LNDD (-1))	0.235017	0.675709	0.347808	0.7303

ECT (-1)	-1.523693	0.338656	-4.499236	0.0001
R-squared	0.470574	Mean dependent var		0.170634
Adjusted R-squared	0.404396	S.D. dependent var		0.695372
S.E. of regression	0.536656	Akaike info criterion		1.718170
Sum squared resid	9.215999	Schwarz criterion		1.935862
Log likelihood	-26.78615	Hannan-Quinn criter.		1.794917
F-statistic	7.110699	Durbin-Watson stat		1.772828
Prob(F-statistic)	0.000325			

Source: Researcher’s computation (2023)

Table 3.8 above shows the ECM result of Model two. The coefficient value D (LNPCI (-1)) which is 1.420733 with probability value of 0.0001 shows a positive relationship between the variable and per capita income which is used as a proxy for poverty and it is statistically significant at 5 % and it implies that a percentage increase in previous year PCI would lead to 142.07% increase in PCI of the current year. The coefficient value of D (LNEXD (-1)) which is -0.315520 with probability value of 0.1103, shows a negative relationship between the variable and per capita income and not statistically significant at 5% and it implies that a percentage increase in EXD will bring about 31.55% decrease in PCI. The coefficient value of D (LNDD (-1)) which is 0.235017 with probability value of 0.7303, shows a positive relationship between the variable and per capita income but not statistically significant at 5% and it implies that a percentage increase in DD will bring about 23.50% increase in PCI.

The result of the ECT (-1) which is -1.523693 with probability value of 0.0001, shows that about 152.37% of disequilibrium between short run and long run dynamics would be corrected each year in the variables of interest (LNEXD, LNDD) and it is significant at 1%.

The R-Squared value 0.470574 shows that 47.06% of total variation in the PCI is being explained by the explanatory variables (LNEXD, LNDD).

The F-Statistic value of 7.110699 with the probability value of 0.000325 shows the fitness of the model and this is statistically significant at 1% ($p < 0.01$).

The Durbin Watson Statistic always has a value between 0 and 4.0. A value of 2.0 means that there is no autocorrelation detected in the model. Values from 0 to 2.0 indicate positive autocorrelation and values from 2.0 to 4.0 indicate negative autocorrelation. In the above table, the value of Durbin Watson is 1.772828 which indicates that there was a positive autocorrelation in the model because the value lies between 0 and 2.0.

Diagnostic test for model two

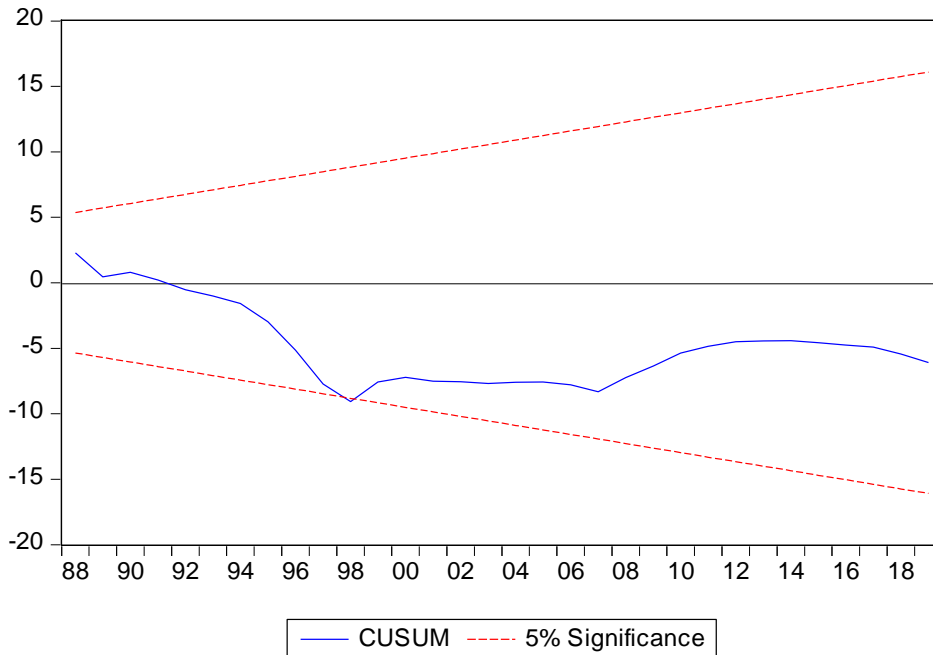
Table 3.9: Diagnostic test outputs for model two

Test	F-statistics	Probability	Remark
Heteroskedasticity	0.913301	0.4681	There is no heteroskedasticity
Serial correlation LM	0.096620	0.7580	Series are not serially correlated

Source: Researcher’s computation (2023)

Cusum Test for model two

Figure 3.2: Cusum Test for Model two

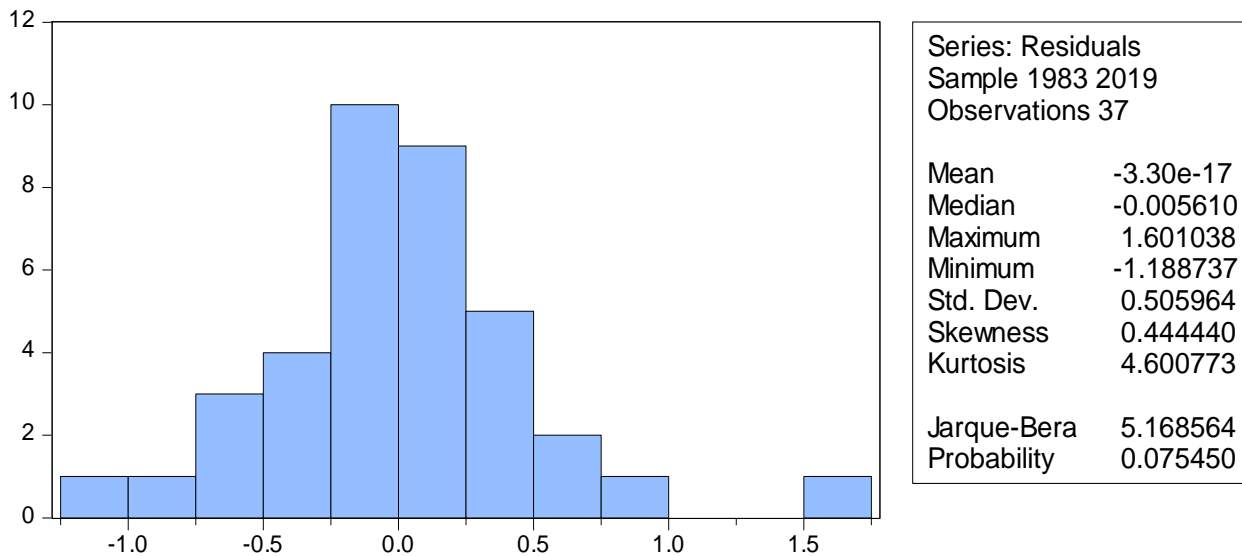


Source: Researcher’s computation (2023)

Figure 3.2 shows that the Cumulative Sum of Recursive Residuals (CUSUM) Lies below the 5% level of significance which depicts that the variables are not stable.

Normality Test for Model two

Figure 3.3: Normality Test for Model two



Source: Researcher’s computation (2023)

H0 : Residuals are normally distributed

H1 : Residuals are not normally distributed

From figure 3.3, the Jarque-Bera value of 5.168564 has a probability of 0.075450 (7.55%) which implies that the probability value Of 0.075450 (7.55%) is greater than 0.005 (5%) and this is statistically not significant at 5% level of significance. Hence, we accept the null hypothesis and conclude that Residuals are normally distributed.

Granger causality Results for Model 2

Table 3.10: Granger causality test result for model two

Null Hypothesis:	Obs	F-Statistic	Prob.	Remark
LNEXD does not Granger Cause LNPCI	38	3.53162	0.0686	
LNPCI does not Granger Cause LNEXD		0.27676	0.6022	No Causality
LNDD does not Granger Cause LNPCI	38	7.20102	0.0111	
LNPCI does not Granger Cause LNDD		6.97934	0.0122	Bi-directional

Source: Researcher’s computation (2023)

Table 3.10 above shows the granger causality relationship among the variables involved in model LNEXD does not granger cause LNPCI with F. statistics value of 3.53162 with probability of 0.0686 which is not significant at 5%, Also, LNPCI does not granger cause LNEXD with F. statistics value of 0.27676 with probability value of 0.6022, which is not significant and this implies that there is no causality between LNEXD and LNPCI.

LNDD granger cause LNPCI with F. statistics value of 7.20102 with probability of 0.0111 which is significant at 5%, Also, LNPCI granger cause LNDD with F. statistics value of 6.97934 with probability value of 0.0122, which is significant at 5% and this implies that there is a bi-directional causality between LNDD and LNPCI.

SUMMARY OF FINDINGS, CONCLUSION AND POLICY RECOMMENDATIONS

Summary of findings

The study investigated the effect of public debt on poverty and economic growth in Nigeria for the period 1981 to 2019. The data used was sourced from the Central Bank of Nigeria (CBN) statistical bulletin and World bank Development Indicator (WDI).

The results of unit root test indicates that real gross domestic product, external debt, domestic debt, government expenditure, national savings, population growth rate and per capita income were all integrated at order one, that is they are all stationary at first difference which implies that they are all I(1) variables while inflation rate and interest rate were both integrated at order zero (0), that is they are both stationary at level which implies that they are both I(0) variables.

The correlation result for model 1 indicated that there was existence of both positive and negative linear association among the variables as well as strong and weak association. Model one is a mixture of both I(1) and I(0) variables which made ARDL the appropriate analysis technique for the model. For the Autoregressive regressive redistributive lag model (ARDL) for model one, Optimum lag was automatically selected for the estimated ARDL system using the Akaike Informaton Criterion. The ARDL result revealed that PGR is the only significant variable that contributed to economic growth of Nigeria in the short run within the period under review and about 24% of disequilibrium between short run and long run dynamics would be corrected each year in the variables of interest (LNEXD, LNDD, LNGEX, LNNS, INFR, INR, PGR) and it is significant at 1%.

The long run form shows that EXD and PGR are the variables that contributed to the Economic growth in the long run. The R-squared shows 99.85% of total variation in RGDP is being explained by the explained by the explanatory variables (LNEXD, LNDD, LNGEX, LNNS, INFR, INR, PGR). The ARDL bound test output revealed that there is existence of long run relationship among the variables (LNRGDP, LNEXD, LNDD, LNGEX, LNNS, INFR, INR, PGR) and this is in the line with the findings of Eze, Nweke and Atuma (2019) on the topic of Public debt and Nigeria's economic growth. The optimal lag selection criteria suggested by Schwartz Information criterion (SIC) was period of one which happened to be the least selected.

The Breusch heteroskedasticity test for model one revealed that the model is free from heteroskedasticity.

The serial correlation test for model one revealed that the series are not serially correlated and the Normality test for model one also revealed that Residuals are not normally distributed.

Based on result of Granger causality test for Model one, Economic growth in Nigeria could not be used to forecast LNEXD and LND. The result also revealed that there is existence of Uni-directional relationship among LNRGDP, LN EXD and LNDD.

Model two consists of I(1) variables which make the Error correction model an appropriate estimation method for model 2. The optimal lag selection criteria suggested by Schwartz Information criterion (SIC) was period of one which happened to be the least selected.

Johansen's rank co-integration showed the existence of a long run relationship among the variables.

The Error correction model of model two shows that about 152.37% of disequilibrium between short run and long run dynamics would be corrected each year in the variables of interest (LNEXD, LNDD) and it is significant at 1%. The R-squared shows that 47.06% of total variation in the PCI is being explained by the explanatory variables (LNEXD, LNDD).

The Breusch heteroskedasticity test for model two revealed that the model is free from heteroskedasticity. Both the Cusum test tests for model two revealed that there was no stability among the variables in the model.

The serial correlation test for model two revealed that the series are not serially correlated and the Normality test for model two also revealed that Residuals are normally distributed.

Based on result of Granger causality test for Model two, Per capita income in Nigeria could not be used to forecast LNEXD but could be used to forecast LNDD. The result also revealed that there is existence Bi-directional relationship between LNPCI and LNDD and there is no causality between LNEXD and LNPCI.

The Bi-directional causality that exist between the dependent variable LNPCI and LNDD is an indication of the role of the explanatory variable LNDD in stimulating Per capita income in Nigeria in the long-run.

Conclusion

The study's conclusions indicate that within the reviewed period, external debt had a detrimental short-term effect and a beneficial long-term effect on the Nigerian economy. Additionally, there was a one-way causal relationship between external debt and economic growth. In contrast, domestic debt had adverse effects on both short and long-term economic conditions in Nigeria, and there was a unidirectional causal link between external debt and economic growth, contrary to the initial expectations of this study. Lastly, external debt had an unexpected negative impact on poverty, contradicting the anticipated outcomes of this research, while domestic debt's influence on Nigeria's poverty situation was found to be insignificant.

Recommendations

1. **External Debt Management:** Given the negative short-term impact of external debt on the Nigerian economy, it is advisable for policymakers to exercise caution when accumulating external debt. There should be a focus on ensuring that external borrowing is directed towards projects and investments that yield long-term benefits to the country.
2. **Long-Term Economic Planning:** Recognizing the positive long-term impact of external debt, it is essential for the government to develop long-term economic plans that consider the implications of external borrowing. This may involve creating mechanisms to effectively manage and service external debt over time.
3. **Domestic Debt Restructuring:** In light of the adverse effects of domestic debt on both short and long-term economic conditions, policymakers should consider strategies to restructure and manage domestic debt more efficiently. This might involve refinancing options, interest rate management, and prudent borrowing practices.
4. **Economic Growth Policies:** The identified unidirectional causality between external debt and economic growth underscores the importance of implementing policies that foster sustainable economic growth. These policies should encompass areas such as infrastructure development, investment in human capital, and support for small and medium-sized enterprises (SMEs).
5. **Poverty Alleviation Programs:** The negative impact of external debt on poverty suggests a need for comprehensive poverty alleviation programs that address the specific challenges faced by vulnerable populations. These programs should aim to enhance income opportunities, access to education, healthcare, and basic services.
6. **Monitoring and Evaluation:** Establish robust monitoring and evaluation mechanisms to continually assess the impact of debt on the economy, poverty levels, and economic growth. This will provide policymakers with timely data to make informed decisions and adjust strategies as needed.
7. **Diversification of Revenue Sources:** Reducing the reliance on debt, both external and domestic, requires diversifying revenue sources. Policymakers should explore opportunities to expand revenue through non-debt means such as improving tax collection, attracting foreign investments, and promoting export-oriented industries.
8. **Transparency and Accountability:** Enhance transparency and accountability in the management of debt. Ensure that borrowing and debt servicing processes are transparent, and that funds borrowed are utilized efficiently and effectively for the benefit of the nation.
9. **Capacity Building:** Invest in the capacity building of government institutions responsible for debt management, economic planning, and poverty reduction. Well-trained and knowledgeable personnel are critical for making informed decisions in these areas.
10. **Stakeholder Engagement:** Engage with relevant stakeholders, including civil society organizations, academia, and international financial institutions, to solicit input and expertise in the development and implementation of policies related to debt management, economic growth, and poverty reduction.

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