Assessment of the Impact of Government Expenditures on Economic Growth in Nigeria: The ARDL Dynamic

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Abstract

This study examines the impact of government expenditure and inflation on economic growth in Nigeria from 1980 to 2023. Using an Autoregressive Distributed Lag (ARDL) model, the research investigates the short-run and long-run relationships between these economic variables. The study utilizes annual time series data on Gross Domestic Product (GDP), total government expenditure, government recurrent expenditure, government capital expenditure, and inflation rates. The findings reveal a positive and statistically significant relationship between government expenditure and economic growth in both the short and long run. Where in the long run, a 1% increase in total government expenditure is associated with a 0.16% increase in GDP, while in the short run, a 1% increase in government expenditure growth leads to a 0.39% increase in GDP growth. The study recommends Nigeria's Federal Government should prioritize capital expenditure, strengthen inflation-targeting policies, adopt an integrated economic management approach, and develop inflation-adjusted budgeting mechanisms.

KEYWORDS*: Inflation, Government expenditure, Economic Growth, Gross Domestic Product, ARDL.*

1. Introduction

The lack of consensus among financial economist and the interplay between inflation, government expenditure, and economic growth has long been a complex and a focal point of macroeconomic analysis. Within this realm, the management of inflation is seen as a crucial tool for maintaining economic stability and fostering sustainable development. Consequently, fluctuations in inflation rates significantly influence consumer behavior, investment decisions, and financial flows within an economy, thereby impacting overall economic performance. Thus, a well-conceived monetary policy aimed at managing inflation is not only vital for price stability but also for overall domestic economic growth and government fiscal planning (Joshua et al., 2022). In today's era of global economic integration, characterized by heightened cross-border economic activities, understanding and managing inflation is indispensable for macroeconomic policy formulation (2018). Extensive on the economic repercussions of both high and low inflation rates. Maintaining an optimal level of inflation is deemed crucial for macroeconomic stabilization aimed at achieving sustainable output growth and employment levels (Ramos-Herrera, 2022). Scholars like Ramos-Herrera (2022) and Edwards (2018)

highlight the detrimental impact of both excessive inflation and deflation on government finances and economic growth. When a country experiences high inflation, the real value of government revenue may decrease if tax brackets and other fiscal measures are not adjusted accordingly. This can lead to a decrease in the government's purchasing power, potentially reducing its ability to maintain the same level of public services and investments

The impact of inflation on various aspects of a nation's economy, including government expenditure, cannot be overstated. As prices rise, the purchasing power of government funds can significantly change, affecting the government's ability to finance its operations and initiatives (Okoye et al., 2021). This phenomenon has garnered substantial attention from policymakers, economists, and researchers, who have investigated the complex relationship between inflationary pressures and government spending patterns. Governments are responsible for providing essential public goods and services, such as education, healthcare, infrastructure, and national defense. These expenditures require substantial financial resources, which are often obtained through taxation, borrowing, and other means. However, when a nation experiences significant inflationary pressures, it can impact the government's ability to fund these critical areas effectively (Karahan, 2020).

The impact of inflation on government expenditure in Nigeria is multifaceted. On one hand, inflationary pressures can erode the purchasing power of government funds, potentially limiting the state's ability to finance crucial development projects and public services. Conversely, in periods of high inflation, the nominal value of government revenue may increase, particularly from oil exports denominated in US dollars, potentially providing more funds for expenditure. However, this advantage may be offset by the increased cost of imported goods and services required for government operations, as well as the higher burden of servicing foreign debt (Umar & Yakubu, 2020). Moreover, the effectiveness of Nigeria's monetary and fiscal policies in influencing aggregate productivity within its market-oriented economy warrants thorough evaluation. The challenge lies in balancing the need for government expenditure to stimulate economic growth with the imperative of maintaining price stability. High levels of government spending, while potentially beneficial for short-term economic stimulus, can contribute to inflationary pressures if not carefully managed (Oluwatoyin & Olu, 2019).

Given the critical nature of these interrelationships, it is imperative for Nigerian policymakers to develop a nuanced understanding of how inflation, government expenditure, and economic growth interact. This understanding is crucial for formulating effective strategies that can mitigate adverse effects and promote sustainable economic development. Against this backdrop, this study aims to scrutinize the short- and long-term effects and economic growth in Nigeria, with the goal of providing insights that can inform more effective macroeconomic policies. By analyzing these complex dynamics, this research seeks to contribute to the ongoing discourse on economic policy in Nigeria and offer valuable perspectives for policymakers striving to navigate the challenges of inflation management, optimal government expenditure, and sustainable economic growth in a developing economy context.

2. Statement of Problems

The Nigerian economy has faced significant challenges in recent years, particularly during the 2020-2023 periods. The COVID-19 pandemic and subsequent economic slowdown led to a

sharp decline in government revenue, resulting in rising fiscal deficits (Ewubare & Umoh, 2021). In response, the Nigerian government resorted to borrowing to finance its expenditures, leading to a rapid accumulation of debt. The government's debt stock increased from ₦33.11 trillion in 2020 to ₦44.06 trillion in 2022, representing a 33% increase in just two years (Debt Management Office, 2022). This growing debt burden has raised concerns about the sustainability of Nigeria's fiscal policies and the potential impact on future economic growth (Onyekwena & Oloko, 2022). However, the relationship between inflation, government expenditure, and economic growth in Nigeria is complex and intertwined. Inflation has increased the cost of goods and services, contributing to higher government spending and eroding the purchasing power of public expenditures (Onyekwena & Oloko, 2022). Conversely, the government's growing debt burden and inefficient spending patterns have undermined investor confidence, potentially exacerbating inflationary pressures and limiting economic growth prospects (Kanu, 2022).

This vicious cycle has negative implications for Nigeria's economic stability and growth prospects. Continued high inflation discourages foreign direct investment, dampens exports, and further fuels inflationary pressures (Kanu, 2022). At the same time, unsustainable government spending and mounting debt levels could lead to fiscal crises, crowding out private investment and impeding economic growth (Ewubare & Umoh, 2021). Given the importance of inflation and its potential implications for government expenditure and economic growth, it is crucial to understand the nature and extent of this relationship in the Nigerian context. This understanding can inform policymakers in developing appropriate strategies to mitigate any adverse effects of inflation on government spending and economic growth, ensuring the effective delivery of essential public goods and services to the Nigerian people.

Several studies have examined the relationship between inflation, government expenditure, and economic growth across countries. In Nigeria, researchers have mainly focused on the effects of these variables on economic growth (Otekunrin et al, 2022; Feizi, Joshua, Jide & Chika, 2022; Ahamed, 2020; Ofori, 2021; Okoro & Charles, 2019). However, there is a need for more comprehensive analysis of the interplay between inflation, government expenditure, and economic growth in the Nigerian context.

3. Research Questions

Following research questions is drawn from the specific objective.

How has the impact of government expenditure impacts economic growth of Nigeria?

4. Research objectives

The specific objective of the study is to

Determine the impact of government expenditures on economic growth in Nigeria.

5. Conceptual clarification

Inflation: Inflation is a fundamental concept in economics, representing the sustained increase in the general price level of goods and services over time. This phenomenon results in the reduction of the purchasing power of a currency, meaning that a unit of money can buy fewer goods and services than it could in the past.

***Economic Growth*:** Economic growth is an indication of society's welfare. It reflects the changes in its ability to attain any socially agreed upon set of goals, whether consumption, capital formation and improvement in general well-being of individuals in the society.

***Government spending*:** also known as public expenditure or government expenditure, is a crucial aspect of a nation's economic and social landscape. It represents the funds allocated and spent by the government on various goods, services, and investments to fulfill its responsibilities and achieve its policy objectives

6. Keynesian Theory

The relationship between government spending and economic growth in Keynesian Theory is often described through the concept of the fiscal multiplier. This multiplier effect suggests that an increase in government spending leads to a more than proportional increase in national income. As the government injects money into the economy through spending, it creates a ripple effect, stimulating further economic activity as the initial expenditure circulates through various sectors (Mankiw, 2020). This theoretical framework aligns well with empirical studies such as Okunlola et al. (2024) and Emeru (2023), which found positive relationships between government expenditure and economic growth in various contexts. However, the Keynesian perspective also acknowledges potential limitations and complexities in this relationship. For instance, the theory recognizes the possibility of crowding out, where increased government spending might lead to reduced private investment due to higher interest rates or reduced confidence in the private sector. This nuanced view allows for a more comprehensive analysis of the government spending-growth relationship, accounting for both positive and potentially negative effects (Blanchard, 2017). Regarding inflation, Keynesian Theory offers insights that are particularly relevant to our study.

7. Empirical review

Literatures were reviewed to give insight to other studies which were in line to the current study.

Okunlola et al. (2024) examined the impact of government spending on economic growth and assessed how corruption control and conflict incidence influence the relationship. Methodologically, the research employed panel cointegration techniques to analyzed data from 15 ECOWAS nations over the period 1999-2021. They utilized POLS, FMOLS, and DOLS estimation methods across four models. The findings revealed a positive relationship between government expenditure and real economic growth in ECOWAS countries. Emeru (2023) examined the short-term and long-term correlations between public spending and economic growth. The research utilized time series data, Johansen integration tests and vector error correction models (VECM) was used. The findings shows education and health expenditures had significant positive impacts on economic growth in both short and long terms. Likewise, Agricultural spending showed negative effects, while investment spending had mixed results and defense spending had positive but insignificant effects.

Haoyu (2023) explored the economic growth effects of government health expenditure in China within the context of the "Healthy China" initiative. The study's analyzed the impact of government health spending on economic growth across different regions. The research employed a two-way fixed effects model using panel data from 30 Chinese provinces from 2011 to 2020, based on the Cobb-Douglas production function. The findings revealed a significant positive effect of government health expenditure on economic growth, primarily realized through increased residential consumption. Regional differences were noted, with stronger impacts in more economically developed areas.

Shaukat et al. (2023) examined the impact of government expenditure on Pakistan's economic growth. The study's objective was to analyze the relationship between government spending

and GDP growth. Methodologically, the research used annual time series data from 1980 to 2020, employing the ADF Unit-Root Test for data stationarity and Ordinary Least Squares (OLS) for estimation. The findings indicated a positive and significant impact of government expenditure and GDP per capita on GDP growth, while inflation showed a significantly negative influence.

Okonkwo et al. (2023) investigated the effects of disaggregated government capital expenditure on Nigeria's economic growth rate. The study's objectives were to examine the impacts of various categories of government spending on economic growth and to evaluate post-pandemic government expenditure performance. The research used secondary data and employed an autoregressive distributed lag model due to mixed order integration of variables. The findings revealed a long-run association between the studied variables, with administrative and economic services expenditure showing strong positive relationships with economic growth.

Kaur (2023) analyzed the impact of government expenditure on economic growth and development in India. The study's objectives were to assess the relationship between government spending and economic growth, and to examine its effects on GDP, FDI, and income distribution. The study used both short-run and long-run analyses. The findings suggested a significant positive relationship between government spending and economic growth, particularly in the short run, with positive impacts on GDP and FDI in both short and long terms. The study also highlighted the role of government spending in income redistribution.

8. Methodology

The general model for this study is formulated using a multiple linear regression model to assess the relationship among inflation, government expenditure and economic growth. The functional form of this model is specified as follows: Gross Domestic Product = *f* (Government Recurrent Expenditure, Government Capital Expenditure, and Inflation).

$$GDP_t = f\left(GEX_t,\ CEX_t,\ RGX_t, CPI_t\right) \quad (3.1)$$

The mathematical form for the first model can be expressed as;

$$GDP_t = \beta_o + \beta_1 GEX_t + \beta_2 CEX_t + \beta_3 RGX_t + \beta_4 CPI_t \quad (3.2)$$

But equations above are exact or deterministic in nature. In order to allow for the inexact relationship among the variables as in the case of most economic variables, the stochastic error term "μ_t" is added to the equations. Thus, the study expresses the econometric form of the models as:

$$GDP_t = \beta_o + \beta_1 GEX_t + \beta_2 CEX_t + \beta_3 RGX_t + \beta_4 CPI_t + \mu_t \quad (3.3)$$

In order to properly estimate the parameters of the postulated models, we rescale some of the variables by logging them, as follow;

$$Log\left(GDP_t\right) = \beta_o + \beta_1 log\left(GEX_t\right) + \beta_2 log\left(CEX_t\right) + \beta_3 log\left(RGX_t\right) + \beta_4 CPI_t + \mu_t \quad (3.4)$$

Where, GDP_t = Gross domestic product , RGX_t = government recurrent expenditure CEX_t = government capital expenditure, INF_t = inflation Log = logarithm, β_o = the intercept or

autonomous parameter estimate, $\beta_1 - \beta_4$ = Parameter estimate representing the coefficient of independent variables respectively, and μ = Error term (or stochastic term).

9. Empirical Results and Discussion

The run outcomes of the autoregressive distributed lag (ARDL) procedure generated dependable assessments of the long-run coefficient that are asymptotically standard irrespective of whether the underlying regressors are I(0) or I(1) (Pesaran &Shin,1998, Paseran et al 2001). The inert status of the time series data was first examined to ensure that the variables satisfied the ARDL underlying condition of I(0) and I(1) or of not otherwise. The estimates were conducted via Augmented Dickey-fuller (ADF) unit roots estimates. The ARDL model for the relationship among inflation, government expenditure, and economic growth in this study is theoretically presented as

$$\Delta\left[logGDP_t\right] = \alpha_0 + \gamma_1 l\,\mathrm{og}\left(GDP_{t-1}\right) + \gamma_2 log\left(GEX_{t-1}\right) + \gamma_3 log\left(CEX_{t-1}\right) + \gamma_4 log\left(RGX_{t-1}\right) + \gamma_5 log\left(CPI_{t-1}\right) + \sum_{i=1}^{k} \lambda_1 \Delta log\left(GDP_{t-1}\right) + \sum_{j=0}^{M} \psi_j \Delta log\left(GEX_{t-j}\right) + \sum_{r=0}^{N} \phi_r \Delta log\left(CEX_{t-r}\right) + \sum_{v=0}^{P} \theta_v \Delta log\left(RGX_{t-v}\right) + \sum_{w=0}^{Q} \eta_w \Delta log\left(CPI_{t-w}\right) + \mu_t$$

(3.5). $\gamma_1 - \gamma_5$ are the long run parameters, while $\lambda_1, \psi_j, \phi_r, \theta_v,\ and\ \eta_w$ are the short

The lag length of the underlying ARDL model was selected automatically using Akaike information criterion (AIC). The Error Correction Model (ECM) to obtain the short-run dynamic parameters is specified below:

$$\Delta\left[logGDP_t\right] = \alpha_0 + \sum_{i=1}^{k} \lambda_1 \Delta log\left(GDP_{t-1}\right) + \sum_{j=0}^{M} \psi_j \Delta log\left(GEX_{t-j}\right) + \sum_{r=0}^{N} \phi_r \Delta log\left(CEX_{t-r}\right) + \sum_{v=0}^{P} \theta_v \Delta log\left(RGX_{t-v}\right) + \sum_{w=0}^{Q} \eta_w \Delta log\left(CPI_{t-w}\right) + \delta ECT_{t-1} + \mu_t$$

3.6)

Where:

ECM_{t-1} is the error correction mechanism lagged for one period δ = the coefficients of the error term that measures the speed of adjustment back to equilibrium after a short run disturbance.

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The run results of the autoregressive distributed lag (ARDL) procedure yielded consistent estimates of the long-run coefficient that are asymptotically normal irrespective of whether the underlying regressors are I(0) or I(1) (Pesaran &Shin,1998, Paseran et al 2001). The inert status of the time series data was first examined to ensure that the variables satisfied the ARDL underlying condition of I (0) and I(1) or of not otherwise. The estimates were conducted via Augmented Dickey-fuller (ADF) unit roots estimates

Unit Root Tests

Variables	ADF	5% level Test critical values	P-Values	Remakes	Order of Integration
			@LEVELS		
LOGGDP	-0.601233	-2.935001	0.8593	Not Stationary	Unknown
LOGCEX	-0.761976	-2.931404	0.8196	Not Stationary	Unknown
LOGRGX	-1.654691	-2.933158	0.4464	Not Stationary	Unknown
INF	-6.066574	-2.931404	0.0000	Stationary	I(0)
			@FIRST DIFFERENCE		
D(LOGGDP)	-6.543072	-2.933158	0.0000	Stationary	I(1)
D(LOGCEX)	-6.383063	-2.933158	0.0000	Stationary	I(1)
D(LOGRGX)	-8.372238	-2.933158	0.0000	Stationary	I(1)

Note: figures in parenthesis are P-values

Source: computed by the author using E-views. Version 10 (2024)

ARDL Bounds Testing for Co-integration

The run result of the long-run co-integrating relationship among the indicated variables is based on the Nayaran (2004) bound test. Pesaran et al (2001) bounds test could not be in this test because of our sample size is too small (n=43). The table shows, the computed F-statistics values of (5.281173) exceeds the upper bound critical values at both 5 per cent. This, therefore, implies a strong rejection of the null hypothesis of no level relationship at the 5 per cent confidence level. The test results suggest that there exists a long-run co-integrating relationship among the study variables.

ARDL Long-run Regression Analysis

The ARDL Long-Run Estimates table provides crucial insights into the relationships between various forms of government expenditure, inflation, and economic growth in Nigeria from 1980 to 2023. This analysis reveals the long-term impacts of these factors on Nigeria's Gross Domestic Product (GDP).

ARDL Long-Run Estimates

Dependent Variable:LOGGDP				
Variables	**Coefficient**	**S.E**	**t-values**	**P-Value**
LOGRGX	0.277960	0.078745	3.529884	0.0026
LOGCEX	0.310988	0.073435	4.234876	0.0006
INF	-0.005962	0.001653	-3.606932	0.0022
C	10.98198	0.160478	68.43309	0.0000
Model Fit	**Statistic**			
R-squared	0.888618			
Adjusted R-squared	0.802550			
Durbin-Watson stat	2.177158			

F-statistic	1050.926	
Prob(F-statistic)	0.000000	

Source: computed by the author using E-views. Version 10 (2024)
Note: *** Statistical significance at the 1 per cent levels, **Statistical significance at the 5 percent levels.*Statistical significance at the 10 per cent levels,

The model's overall fit is strong, as indicated by the R-squared value of 0.888618, suggesting that approximately 88.86% of the variation in GDP is explained by the included variables. The adjusted R-squared of 0.802550 confirms the model's good fit even when accounting for the number of predictors. The Durbin-Watson statistic of 2.177158 is close to 2, indicating that there is likely no significant autocorrelation in the residuals, which is a positive sign for the model's validity. The F-statistic of 1050.926 with a probability of 0.000000 confirms that the model as a whole is statistically significant.

Starting with government expenditure, the study shows a positive and statistically significant relationships between all forms of government spending and GDP. Total government expenditure has a coefficient of 0.001632, indicating that a 1% increase in total government spending is associated with a 0.0016% increase in GDP. This relationship is statistically significant with a p-value of 0.0020, well below the 0.05 threshold.

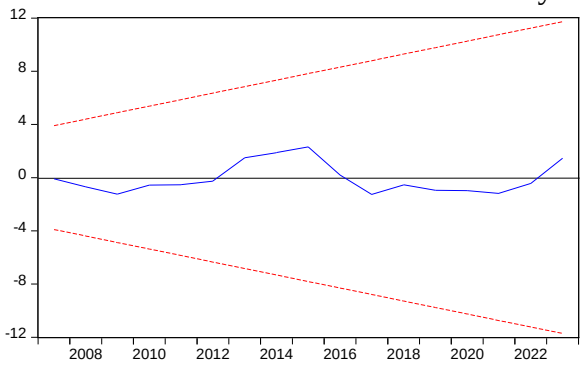
Recurrent government expenditure shows a stronger positive relationship with GDP, having a coefficient of 0.277960. This suggests that a 1% increase in recurrent expenditure is associated with a 0.28% increase in GDP, a substantial effect that is statistically significant (p-value 0.0026). Capital expenditure demonstrates the strongest positive relationship with GDP among the expenditure variables, with a coefficient of 0.310988. This implies that a 1% increase in capital expenditure is linked to a 0.31% increase in GDP, and this relationship is highly significant (p-value 0.0006). Interestingly, inflation (INF) shows a negative relationship with GDP, with a coefficient of -0.005962. This suggests that a one percentage point increase in inflation is associated with a 0.5962% decrease in GDP. This relationship is statistically significant (p-value 0.0022), highlighting the detrimental effects of inflation on economic growth.

These results provide valuable insights into Nigeria's economic dynamics. The positive relationships between government expenditures and GDP suggest that fiscal policy has been an effective tool for promoting economic growth. The stronger coefficients for recurrent and capital expenditures compared to total expenditure imply that the composition of government spending matters, with investments in capital projects potentially yielding higher returns in terms of economic growth. However, the negative relationship between inflation and GDP underscores the importance of price stability for economic growth. This finding suggests that monetary policy aimed at controlling inflation could play a crucial role in fostering economic development.

This ARDL model reveals complex interrelationships among government expenditure, inflation, and economic growth in Nigeria from 1980 to 2023. It highlights the potential benefits of strategic government spending, particularly in capital projects, while also emphasizing the need for effective inflation management to support sustainable economic growth. These insights could inform policy decisions aimed at optimizing the balance between government expenditure and price stability to promote long-term economic development in Nigeria.

Stability Test

The stability test is a crucial test to deterthemine whether the predicted ARDL models are stable. The cumulative sum of recursive residuals test and the cumulative sum of squares were used to determine the coefficient's stability.



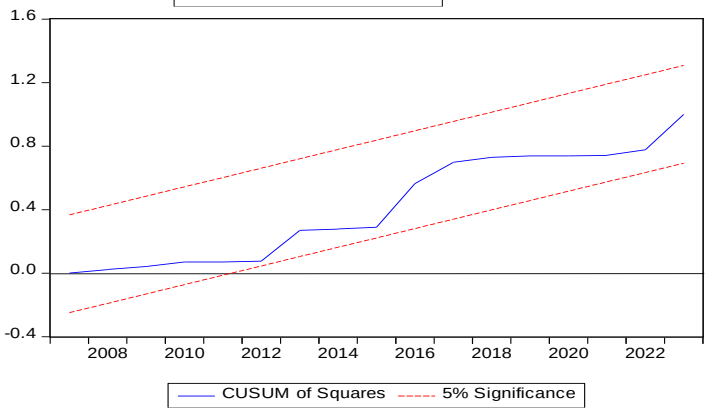


Figure CUSUM Squares Figure 4.3 CUSUM Sum of squares

Source: Generated by the Author using E-views version 10.0 (2024)

The stability of the linear (symmetric) ARDL bounds testing estimates was examined using the CUSUM and CUSUM sq. tests, and the outcomes are displayed in the Figures. In the CUSUM statistics plots, the data points remained comfortably within the 5% critical bounds. Similarly, the CUSUM of squares statistics plots indicated that the data points were slightly within the 5% critical bounds. These results confirm the accuracy and consistency of the ARDL estimates. The tests reveal that the coefficients were stable, as evidenced by the fact that the cumulative sum (represented by the blue lines) did not surpass the region between the two critical bounds (represented by the red lines).

Conclusion

Based on the study's findings, the following conclusions can be drawn: Government expenditure has a positive impact on economic growth in Nigeria, both in the short and long run. The study found statistically significant positive relationships between various forms of government spending and GDP growth. The composition of government expenditure matters for economic growth. Capital expenditure showed the strongest positive relationship with GDP in the long run, followed by recurrent expenditure. This suggests that investments in infrastructure and long-term projects, as well as ongoing government operations, contribute significantly to economic development. Inflation has a negative impact on economic growth in

Nigeria. The study consistently found a negative relationship between inflation and GDP growth in both short-run and long-run analyses. This negative impact was further corroborated by the Granger causality tests, which showed that inflation Granger-causes GDP.

Recommendations

Based on the conclusions drawn from the study, the following recommendations are proposed to enhance economic growth and stability in Nigeria: Given the positive impact of government expenditure on economic growth, the Federal Government of Nigeria should maintain a consistent and strategic approach to public spending. This can be implemented through the development of comprehensive, long-term fiscal plans that align with national development goals. The Ministry of Finance, Budget, and National Planning should lead this effort, collaborating with other relevant ministries and agencies. Implementation should involve regular reviews and adjustments of spending patterns based on economic indicators and outcomes. This approach may achieve sustained economic growth and improved public service delivery.

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