

Econometric Modelling of Symmetric and Threshold Effects of Fiscal Operations on Inflation in Nigeria

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Abstract

This study examines the symmetric and threshold effects of fiscal operations on inflation in Nigeria using annual data for the period 1981–2024. Specifically, it evaluates the effects of government revenue, public expenditure, fiscal balance, and public debt on inflation. Secondary data were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin and the World Bank database. The analysis employs the Autoregressive Distributed Lag (ARDL) model and threshold regression analysis to estimate both short- and long-run relationships.

The findings indicate that government revenue, fiscal balance, and public debt exert significant inflationary effects in both the short and long run, whereas public expenditure has no significant short-run effect but reduces inflation in the long run. Threshold analysis further reveals that public expenditure becomes inflationary when it exceeds 14.56% of GDP, suggesting the existence of a fiscal threshold beyond which additional spending contributes to inflationary pressures.

The results demonstrate that fiscal operations in Nigeria have heterogeneous rather than uniformly beneficial effects on inflation, emphasizing the importance of balancing revenue generation, public expenditure, and debt management. The study concludes that maintaining fiscal variables within sustainable thresholds is essential for preserving macroeconomic stability and supporting long-term economic growth. These findings provide useful evidence for policymakers seeking to improve fiscal management and strengthen inflation control in Nigeria.

Keywords: fiscal operations; inflation; threshold regression; ARDL model; nonlinear effects; fiscal policy.

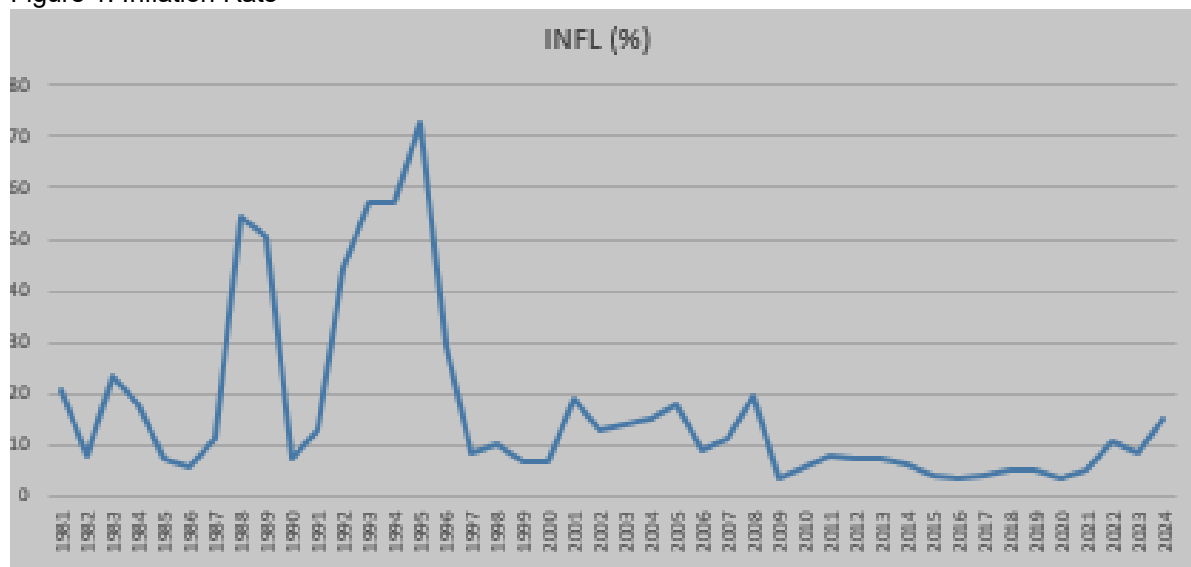
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Introduction

Over the last few decades, one critical question that policy makers, economists, and financial analysts in emerging countries such as Nigeria has been grappling with is: do fiscal operations drive inflation in Nigeria, and if they do, at what point do they cause inflation to become unsustainable? This question is particularly critical for resource-dependent economies characterized by structural inefficiencies such as inefficient institutional frameworks, high-level of public debt accumulation, and high reliance on volatile oil revenue (Abdullahi et al., 2025; Ighosewe et al., 2021).

Over the years, fiscal dominance has continued to undermine the effectiveness of monetary policy tools despite a series of policy reforms to consolidate fiscal operations (Adeyemi-Tijani, 2025; Abdolmaleki & Haghverdi, 2024; & Ali et al., 2023). Even when the Central Bank of Nigeria (CBN) attempt to finance such deficits through ways and means advances, the increase in the volume of broad money supply (M3) heightens inflationary pressure (Abdolmaleki & Haghverdi, 2024). As a result, Nigeria’s headline inflation, as presented in Figure 1 clearly revealed that, the country’s inflation rate averaged 16.66% between the periods of 1981 and 2024, raising concerns about the effectiveness of fiscal operations in achieving an optimal inflationary level (CBN Statistical Bulletin, 2024).

Figure 1: Inflation Rate



Source: CBN Statistical Bulletin (2026)

Recent evidence also suggests that major fiscal policy interventions, particularly the removal of fuel subsidies, have generated significant macroeconomic and financial market adjustments in Nigeria, reinforcing the importance of understanding how fiscal operations influence inflation dynamics (Emudainohwo & Agbogun, 2025). This issue has attracted increasing scholarly attention, as recent evidence indicates that the effectiveness of fiscal policy depends not only on its size but also on its composition and implementation, with important implications for both macroeconomic stability and long-term economic growth (Ike et al., 2025).

Critical evaluation into the country's federal government financing, recurrent expenditure dominates capital expenditure from 2000 to 2024, suggesting that Nigeria's fiscal operations have contributed to sustained inflationary pressure in Nigeria as it stimulates consumption-oriented spending over productivity-enhancing investments needed to expand growth and stabilize general price level (CBN Statistical Bulletin, 2024). Even with the institutions of various fiscal operations policies over the years such as the Medium-Term Expenditure Framework (MTEF), the Fiscal Responsibility Act (FRA) 2007, the Debt Sustainability Framework (DSF), the Excess Crude Account (ECA), and the Sovereign Wealth Fund (SWF), Nigeria economy is still highly inflationary.

Although vast body of earlier fiscal operations and inflation rate studies predominantly adopt a linear framework (symmetric model), they still did not cover the four (4) dimensions of fiscal operations instead focused on the individual measures of fiscal operations. For example, Zoumenou (2025) focused on the effect of fiscal rules on inflation rate, Abdolmaleki & Haghverdi (2024) focused on the effect of taxation and government expenditure on inflation rate, while Sumba (2023), Adeyemi-Tijani (2025), and Aimola & Odhiambo (2021) concentrated on public debt and deficit financing effects on inflation. Similarly, Abdullahi et al. (2025) and Olanrewaju (2021) examined the effect of budget deficits and monetary interactions on inflation. Even the few nonlinear studies such as Oyadeyi et al. (2025) and Yuliati et al. (2025); Albahouth (2025); Checherita-Westphal & Pessoa (2024); Dana & Musaiyaroh (2024), Oyeleke (2021); and Slimani (2016) examined the effect of public debt/budget deficit thresholds, still did not specify the optimal threshold wherein government expenditure sustains inflation rate.

In contrast, the present study departs from this narrow focus by integrating symmetric and threshold effects of fiscal operations on inflation rate within a unified framework. By further identifying a specific fiscal expenditure threshold (14.56% of GDP), the study offers a clearer and more policy-relevant benchmark for Nigeria. This integrated approach enhances methodological robustness, improves analytical depth, and provides stronger policy relevance compared to existing studies. It is the regards to the above identified gaps and the need to address the persistent inflationary pressure that this research is motivated to evaluate both linear and nonlinear relationships between fiscal operations and inflation in Nigeria from 1981 to 2024. Specifically, the study seeks to:

- To examine the symmetric effect of public revenue on inflation rate;
- To evaluate the symmetric effect of public expenditure on inflation rate;
- To ascertain the symmetric effect of fiscal balance on inflation rate;
- To examine the symmetric effect of public debt on inflation rate;
- To determine the threshold level at which fiscal operations sustain inflation rate.

The following pertinent questions were raised in order to address the specific objectives of the study:

- Does public revenue have a symmetric effect on the inflation rate?
- Does public expenditure have a symmetric effect on the inflation rate?
- Does fiscal balance have a symmetric effect on the inflation rate?
- Does public debt have a symmetric effect on the inflation rate?
- What is the threshold level at which fiscal operations sustain the inflation rate?

The following hypotheses guided the research:

H₀₁: Public revenue has no significant symmetric effect on the inflation rate.

H₀₂: Public expenditure has no significant symmetric effect on the inflation rate.

H₀₃: Fiscal balance has no significant symmetric effect on the inflation rate.

H₀₄: Public debt has no significant symmetric effect on the inflation rate.

H₀₅: Fiscal operations threshold has no significant threshold inflation rate

This study made meaningful contribution to fiscal operations-inflation rate research in three (3) ways. First, the study provides a significant non-linear policy evidence for addressing inflation in Nigeria by evidencing that the public expenditure-to-GDP ratio should not exceed 14.56% threshold to stabilize inflationary pressures.

The study further evidenced that if more emphasis is placed on capital expenditure, inflation rate will be reduced. Hence, the study will served as a fiscal policy rule both the CBN and the Federal Ministry of Finance (FMF) will use in determining whether developing fiscal preconditions for effective inflation targeting. Secondly, the study extends earlier theoretical understanding on the relationship between fiscal operations and inflation rate by evidencing that, at lower levels of fiscal operations, its impacts on inflation is linear (symmetric) but become nonlinear (asymmetric) once it exceed 14.56% of GDP. Hence, the study was able to provide a unified framework that explains both linear and nonlinear effects of fiscal operations on inflation as predicted by the Keynesian fiscal theory and the Laffer-curve hypothesis. Thirdly, the study advanced fiscal operations-inflation rate literature by addressing the limited empirical evidence on nonlinear fiscal–inflation dynamics in Africa and, to the best of the researchers' knowledge, is among the few studies to estimate both the symmetric and asymmetric effect of fiscal operations on inflation rate.

1 Research Methodology

Research Design and Method of Data Collection

This study adopted the ex-post facto research design. The major reason why this research design was choosing in this paper is that fiscal operations and inflation in Nigeria are secondary data that have existed in retrospect and that such data are readily available in public domain and cannot be manipulated. The four measures of fiscal operations (public revenue, public expenditure, fiscal balance, and public debts) were sourced from the CBN Statistical Bulletin (financial, real and public sector) while inflation rate was sourced from the National Bureau of Statistics (2024). The annual data spanned from 1981 to 2024 (Table 1).

Table 1: Variables: Description, Unit of Measurement

S/N	Variables	Denotation	Description
1	Public Revenue	PREV	Ratio of public revenue to Nominal GDP
2	Public Expenditure	PEXP	Ratio of public expenditure to Nominal GDP
3	Fiscal Balance	FBAL	Public revenue less expenditure divided by Nominal GDP
4	Public Debts	PDET	Proportion foreign debt to Nominal GDP
6	Inflation	INFL	Consumer price Index

Note: PREV = Public Revenue (% of GDP); PEXP = Public Expenditure (% of GDP); FBAL = Fiscal Balance (% of GDP); PDET = Public Debt (% of GDP); INFL = Annual inflation rate measured by the Consumer Price Index (CPI).

Source: Authors' compilation based on data from the CBN Annual Statistical Bulletin (2024), the National Bureau of Statistics (NBS, 2024), and the World Bank World Development Indicators (2024).

The fiscal-operations-inflation rate linear ARDL model served as the baseline model. This model was considered appropriate for this study because it provides a robust, flexible, and theoretically consistent framework for examining the dynamic and long-term effects. Compared to conventional estimation techniques, such as the OLS estimation, Vector Autoregressive (VAR) Model, and Vector Error Correction Model (VECM), ARDL can handle a mixture of stationary I(0) and first-difference I(1) variables, provided none are integrated of order two, I(2). This characteristic is particularly valuable in macroeconomic studies, where variables often exhibit differing degrees of integration. Again, it facilitates the estimation of the error correction term (ECT), which measures the speed of adjustment of short-run deviations toward long-run equilibrium. This is essential in understanding how quickly the economy responds to fiscal shocks and returns to a stable path.

Econometrically, our baseline model was adapted from the models of Abdullahi et al. (2025). The implicit form of the adapted model is expressed as:

$$INFL = f(PREV, PEXP, FBAL, PDET) \tag{1}$$

The explicit form of the model was expressed as:

$$INFL_t = \beta_0 + \beta_1PREV_t + \beta_2PEXP_t + \beta_3FBAL_t + \beta_4PDET_t + U_t \tag{2}$$

From equation (3), β_0 =Constant/Intercept; β_1 - β_4 = Coefficients of Fiscal Operations' Measures. The dependent variable is inflation rate (INFL) while the independent variable is fiscal operations measured by public revenue (PREV), public expenditure (PEXP), fiscal balance (FBAL) and public debts (PDET). However, the linear ARDL model is expressed as:

$$\Delta INFL_t = \alpha + \sum_{i=1}^p \Delta INFL_{t-i} + \sum_{j=0}^{q1} \delta_j \Delta PREV_{t-j} + \sum_{k=0}^{q2} \gamma_k \Delta PEXP_{t-k} + \sum_{l=0}^{q3} \phi_l \Delta FBAL_{t-l} + \sum_{m=0}^{q4} \psi_m \Delta PDET_{t-m} + \epsilon_t \tag{3}$$

where: Δ denotes the first difference operator, capturing short-run dynamics. β_i , δ_j , γ_k , ϕ_l , ψ_m are the short-run coefficients of INFL and the fiscal operation variables; λ is the coefficient of the ECT, indicating the speed of adjustment from short-run deviations back to the long-run equilibrium; θ_1 to θ_4 are the long-run coefficients of the fiscal operation variables; ϵ_t is the stochastic error term.

This specification captures both immediate effects (short run) changes in fiscal operation variables on inflation rate on the long-run, providing a comprehensive framework to analyse the dynamic and equilibrium impacts of fiscal operations on inflation rate.

The fiscal-operations-inflation rate threshold model served as the complementary model. The threshold regression was preferred for this study over linear models such as OLS, VAR, and VECM Autoregressive (VAR) Model, and linear ARDL because it addresses the nonlinear effect of fiscal operations on macroeconomic variables, which the aforementioned linear models cannot capture adequately. Econometrically, the general form of the threshold regression model was specified as:

$$INFL_t = \alpha + \begin{cases} \beta_1 PREV + \beta_2 PEXP + \beta_3 FBAL + \beta_4 PDET + \varepsilon_t, & \text{if } PEXP \leq \gamma \\ \theta_1 PREV + \theta_2 PEXP + \theta_3 FBAL + \theta_4 PDET + \varepsilon_t, & \text{if } PEXP > \gamma \end{cases} \quad (4)$$

where: Y_t is indicator of Inflation rate; X_t = Vector of fiscal operations: PREV, PEXP, FBAL, and PDET); qt = Threshold variable (PEXP); γ = Unknown threshold value to be estimated; β_1, β_2 = Slope coefficients below and above the threshold α_1, α_2 = Intercepts for each regime; ε_t = Error term.

1.3. Preliminary Analysis

Prior to estimating the two models used for the analysis, various preliminary tests were done to ensure that the modelling strategy was both theoretically justified and econometrically sound. These pre-estimation procedures were necessary to understand the time-series properties of the data, test key econometric assumptions, and confirm the suitability both models. The first preliminary tests conducted is descriptive statistics with a view to summarize the distributional characteristics of the fiscal operations measure (public revenue, expenditure, fiscal balance, and debts) using their mean, standard deviation, maximum and minimum values. In addition, Jarque–Bera test was employed to assess the normality of the variables as expressed as:

$$JB = \left(\frac{n}{6} S^2 + \frac{(K-3)^2}{4} \right) \quad (5)$$

where: n = sample size; S = Skewness coefficient; K = kurtosis coefficient.

The null hypothesis of the normality test is to accept that data is normally distributed if their p-values are below 5%, implying that the variables exhibit skewness and excess kurtosis due to structural breaks, shocks, and volatility clustering. The lack of normality further justifies the use of non-parametric correlation measures (such as Spearman rank correlation).

Having confirmed that the series are not normally distributed, the next preliminary test conducted was the Spearman rank correlation. This non-parametric measure is appropriate for macroeconomic data that may not satisfy the normality assumption and may contain extreme values. The Spearman rank correlation coefficient is given by:

$$\rho_s = 1 - \frac{6 \sum d_i^2}{n(n^2-1)} \quad (6)$$

where: ρ_s = Spearman rank correlation coefficient; d_i = difference between the ranks of paired observations; n = number of observations.

The coefficient ranges from -1 to $+1$, indicating perfect negative to perfect positive monotonic association. This step is relevant because it provides preliminary insight into interrelationships among fiscal and macroeconomic variables while minimizing distortions from non-linearity and outliers, it helps to screen for multicollinearity prior to regression estimation.

The other preliminary tests follow through two approaches since the study used two models. First, to determine the optimal linear ARDL model, the first step is to determine the order of integration of each variable and ensure that none were integrated of order two, $I(2)$, since ARDL can only accommodate variables integrated of order zero, $I(0)$, or order one, $I(1)$. This was done using the Augmented Dickey-Fuller test. This is econometrically expressed as:

$$\Delta Y_t = \alpha + \beta t + \gamma Y_{t-1} + \sum_{i=1}^p \delta_i \Delta Y_{t-1} + \varepsilon_t \quad (7)$$

where: $\Delta Y_t = Y_t - Y_{t-1}$; α = constant, β = deterministic trend (if included), γ = coefficient testing for unit root, (p) = lag length, ε_t = white-noise error.

The null hypothesis ($H_0: \gamma = 0$) indicates a unit root (non-stationarity), while ($H_1: \gamma < 0$) indicates stationarity. Establishing the order of integration ensures appropriate model specification and valid inference in the subsequent regression.

Having confirmed that the model report mixed integration, the next step is to specify the ARDL model by selecting each macroeconomic variables against the selected fiscal operation variables. The third step is to determine the optimal lag length for each variable using the Akaike Information Criterion (AIC). The fourth step is to test for the existence of a long-run relationship using the ARDL bounds testing approach. The calculated F-statistic was compared with the critical bounds to determine whether a stable long-run equilibrium relationship exists among the variables. If the F-statistic exceeds the upper bound, the null hypothesis of no long-run relationship is rejected, indicating the presence of cointegration. Conversely, if it falls below the lower bound, the null cannot be rejected, suggesting no long-run relationship. Values between the bounds are inconclusive. The econometric form of the ARDL bounds test was expressed as:

$$\Delta Y_t = \alpha + \sum_{i=1}^p \beta_i \Delta Y_{t-1} + \sum_{j=0}^q \beta_j \Delta X_{t-j} + \phi Y_{t-1} + \theta X_{t-1} + \varepsilon_t \quad (8)$$

where: Δ = first difference operator, Y_t = inflation rate, X_t = fiscal operation variables, ϕ and θ = Long-run relationships, and ε_t = error term.

Having confirmed that the model exhibits a long-run relationship, the next step is to estimate the long-run coefficients of the fiscal operation variables, with emphasis on the speed at which short-run deviations from the long-run equilibrium were corrected through the ECT. The ECT, which measures the rate of adjustment back to equilibrium after a shock, was expressed as:

$$\Delta Y_t = \alpha + \sum_{i=1}^p \beta_i \Delta Y_{t-1} + \sum_{j=0}^q \beta_j \Delta X_{t-j} + \lambda ECT_{t-1} + \varepsilon_t \quad (9)$$

where: Δ denotes the first difference operator, Y_t = Inflation rate, X_t = Selected fiscal operation variables, λ = Speed of adjustment, and ε_t = Error term.

2. Results and Discussion

2.1. Preliminary Analysis

This section began with descriptive statistics followed by normality test and then Spearman rank correlation technique to examine the direction and strength of relationships among the variables. The next step conducted is unit root tests to determine the stationarity properties of the data. Other preliminary analysis conducted include model Selection Criteria Table and ARDL Bounds Test. They are presented and discussed thus:

Table 2: Descriptive Statistics (Fiscal Operations & Inflation Rate) from 1981–2024

Variables	Mean	Std. Dev.	Maximum	Minimum	OBS
PREV	8.6888	9.5481	49.8678	0.0619	44
PEXP	5.5576	6.1714	25.4162	0.0577	44
FBAL	3.1312	5.3190	24.4516	-11.9453	44
PDET	8.1837	15.1774	87.2267	0.0118	44
GDPR	3.0653	5.1966	15.3292	-13.1279	44
INFL	16.6580	17.1773	72.8400	3.5232	44

Source: Researcher's Computation (2026)

Table 2 reported that public revenue (PREV) has a mean value of 8.69% of GDP from 1981 to 2024, suggesting that, on average, public revenue contributed to GDP by 8.96%. However, it deviated by 9.55%, suggesting considerable volatility in revenue generation over time. This fluctuation is further evidenced by the wide gap between the minimum value of 0.06% and the maximum value of 49.87%, implying that the economy experienced periods of both extremely weak and exceptionally strong revenue performance. Such variability may reflect instability in revenue sources, dependence on cyclical sectors, or inefficiencies in tax administration.

Similarly, public expenditure (PEXP) records an average of 5.56% of GDP, which is lower than the average revenue, suggesting a relatively conservative spending pattern on average. Nevertheless, the standard deviation of 6.17% indicates that expenditure levels have not been stable over time. The minimum value of 0.06% and maximum value of 25.4162% reveal substantial fluctuations in government spending relative to GDP. These variations may be attributed to changing fiscal priorities, policy shifts, or responses to economic shocks, which can significantly influence the scale and direction of public expenditure.

The fiscal balance, which captures the difference between PREV and PEXP, shows a mean value of 3.1312% of GDP, suggesting that, on average, the government maintained a surplus position. However, the standard deviation of 5.3190 reflects moderate variability in fiscal outcomes. The presence of a negative minimum value of -11.9453% indicates that fiscal deficits were recorded in certain periods, while the maximum value of 24.4516% highlights episodes of substantial surplus. This mixed pattern points to inconsistencies in fiscal discipline and suggests that fiscal policy may have been influenced by external shocks or cyclical economic conditions.

Public debt (PDET) presents a particularly striking picture, with an average value of 8.1837% of GDP but an exceptionally high standard deviation of 15.1774. This indicates that external debt levels relative to GDP have been highly volatile over time. The wide range between the minimum value of 0.0118% and the maximum value of 87.2267% underscores the extent of this variability, suggesting periods of both minimal borrowing and significant debt accumulation. Such fluctuations may raise concerns about debt sustainability and fiscal vulnerability, especially if increases in debt are not matched by corresponding growth in economic output.

Inflation emerges as one of the most volatile macroeconomic variables in the descriptive statistics, with a high average rate of 16.6580% and a standard deviation of 17.1773. The substantial difference between the minimum value of 3.5232% and the maximum value of 72.8400% indicates episodes of both moderate and extremely high inflation. This level of

volatility suggests persistent macroeconomic instability, which can erode purchasing power, discourage investment, and complicate economic planning and policy implementation.

Table 3: Normality Test Estimates

Variables	Jarque-Bera	Probability	Conclusion
PREV	91.42883	0.000000	Deviated from Normality
PEXP	19.50080	0.000058	Deviated from Normality
FBAL	58.42681	0.000000	Deviated from Normality
PDET	564.7766	0.000000	Deviated from Normality
INFL	35.30844	0.000000	Deviated from Normality

Source: Researcher's Computation (2026)

The results indicate that all the fiscal operations measure (public revenue, public expenditure, fiscal balance, and public debt) and inflation rate, all exhibit relatively high Jarque-Bera values. The associated probability values provide further basis for assessing the normality assumption for each series. Given that the series did not satisfy the normality assumption, the Spearman rank correlation analysis was conducted, as shown in Table 4:

Table 4: Spearman Rank Correlation Analysis

Correlation	INFL	PREV	PEXP	FBAL	PDET
INFL	1.000000				
PREV	-0.502326	1.000000			
PEXP	-0.542354	0.061804	1.000000		
FBAL	-0.187597	0.015856	0.145173	1.000000	
PDET	-0.359549	0.083087	0.152431	0.368992	1.000000

Note: Sample: 1981–2024; Included observations: 44.

Source: Researcher's Computation (2026)

The Spearman rank-order correlation analysis for inflation rate (INFL) and fiscal operations from 1981–2024 is presented in Table 4, based on 44 observations. The results reveal that INFL is negatively correlated with all the fiscal variables, with the strongest negative associations observed with public expenditure (PEXP) at -0.542 and public revenue (PREV) at -0.502 , suggesting that higher fiscal revenue and spending are associated with lower inflation levels. Public debt (PDET) also exhibits a moderate negative correlation with INFL at -0.360 , while fiscal balance (FBAL) shows a weaker negative correlation of -0.188 . Among the fiscal variables themselves, correlations are generally low, with slight positive associations between PEXP and FBAL (0.145) and between PDET and FBAL (0.369). These findings imply that prudent fiscal operations, particularly revenue mobilization and government spending, may play a significant role in moderating inflationary pressures in Nigeria during study period.

Further preliminary analysis based on the multicollinearity diagnostics indicates that the estimated models are statistically reliable. The multicollinearity test results presented in Table 5 was evaluated using the VIF and TOV statistics across the three estimated models. These measures help to assess the degree of linear association among the explanatory variables, with VIF values exceeding 10 (and TOV < 0.10) typically indicating severe multicollinearity.

Table 5: Multi-collinearity Tests for Fiscal Operations

Variables	VIF	TOV
INFL(-1)	3.7521	0.2665
PREV	2.7483	0.3639
PEXP	4.7073	0.2124
FBAL	1.9284	0.5186
PDET	4.7921	0.2087
Average	3.5856	0.3140

Note: Variance Inflation Factor (VIF) and Tolerance (TOV)

Source: Researcher’s Computation (2026)

Table 5 reported VIF values are slightly higher, ranging between 1.9284 and 4.7921, while tolerance values fall between 0.2087 and 0.5186. The average VIF (3.5856) is lower than 10, suggesting relatively stronger inter-correlations among the explanatory variables. Notably, PDET and PEXP show comparatively high VIF values; however, these still fall within acceptable limits, confirming the absence of harmful multi-collinearity. Following the confirmation of the absence of multi-collinearity, the next step in the preliminary analysis involves examining the stationarity properties of the variables using the ADF (Table 6).

Table 6: Augmented Dickey-Fuller (ADF) Test

Variables	ADF Test Statistics	Test critical values @ 5%	p-value	Order of integration	Decision
PREV	-7.8569	-2.9332	0.0000	1(1)	Stationary
PEXP	-7.7983	-2.9332	0.0000	1(1)	Stationary
FBAL	-8.6281	-2.9332	0.0000	1(1)	Stationary
PDET	-4.9288	-2.9332	0.0002	1(1)	Stationary
INFL	-3.7318	-2.9332	0.0070	I(0)	Stationary

Note: 1(0) denotes at Stationary at level while 1(1) denotes at Stationary at first difference

Source: Researcher’s Computation (2026)

Table 6 reported that, inflation rate is stationary at 1(0) while public revenue, public expenditure, fiscal balance, and public debt are stationary at 1(1), with ADF test statistics ranging from -4.9288 to -7.8569, critical values at 5% approximately -2.933, and p-values effectively zero ($p < .001$). This indicates that these variables are stationary both order zero 1(0) and one (I(1)). This justify that the model exhibits mixed integration.

Table 7: Model Selection Criteria Table

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
2	-200.728261	9.615268	9.861017	9.705893	0.793004	ARDL(1, 0, 0, 0, 0)

Note: Dependent Variable: INFL

Source: Researcher’s Computation (2026)

The model reported the optimal specification of ARDL (1, 0, 0, 0, 0). The model achieves a LogL of -200.73, AIC of 9.615, and a high adjusted R-squared of 0.793, indicating strong explanatory power. This suggests that the selected ARDL model captures most of the variation in inflation dynamics.

Table 8: ARDL Bounds Test

Model 1: Fiscal Operations and Inflation Rate			Critical Value Bounds		
Test Statistic	Value	k	Significance	I0 Bound	I1 Bound
F-statistic	5.698831	4	5%	2.86	4.01

Source: Researcher's Computation (2026)

Table 8 shows an F-statistic of 5.699 is above the upper bound, confirming that fiscal operations are cointegrated with inflation and exert a sustained impact on price levels. The findings underscore that fiscal operations are instrumental policy tools government uses to curb inflation, over the long run.

2.2. Symmetric Effect of Fiscal Operations on Inflation in Nigeria

The ARDL results in Table 9 showed that fiscal operations significantly affect inflation in Nigeria. The linear ARDL estimate reported that, public revenue ($\beta = 0.2850$, p-value = 0.0033), fiscal balance ($\beta = 0.2860$, p-value = 0.0006), and public debt ($\beta = 0.3639$, p-value = 0.0004) have positive and statistically significant impacts on inflation in Nigeria on the short run. This means that fiscal policy shocks that occur due to revenue raising, fiscal imbalances, and debt creation are responsible for creating inflationary effects. The positive impact of public revenue implies that changes in public revenue, especially in case of expansionary fiscal policies, are capable of influencing aggregate demand and hence leading to inflation. In the same way, the positive impact of fiscal balance is an indication that fiscal imbalances are very critical with respect to price level stability, whereas the positive impact of public debt indicates the contribution of debt-financed fiscal policies to inflation.

These findings confirm the Monetarist and Fiscal Dominance theories. The Monetarist Theory explains that the issue of inflation is purely an economic factor that can be exacerbated by the process of fiscal policies causing excessive liquidity and aggregate demand creation. The present findings are also consistent with Oyasor (2025), who demonstrated that fiscal policy interacts with monetary policy in shaping inflation dynamics in Nigeria. This reinforces the view that inflation control requires coordinated fiscal and monetary policy actions rather than reliance on a single policy instrument. In addition, the theory of Fiscal Dominance stipulates that continued fiscal deficits and increasing public debt may force the monetary authority to fund the budget deficit thus compromising the inflation control mechanisms. This result aligns with the findings of Aimola and Odhiambo (2021) who evidenced public debt causes inflationary pressure, particularly in emerging countries. Again, Ezeabasili et al. (2012) reported that fiscal deficits is the major factor, which causes inflationary pressure in Nigeria. Similarly, Abdullahi et al. (2025) reported that methods of financing the deficits have impacts on inflation in Nigeria. Lastly, Albahouth (2025) reported that fiscal policies are significant causes of inflation in Nigeria.

Nevertheless, public expenditure - PEXP ($\beta = 0.0442$, p-value = 0.9426) positively impacts the short run model, although statistically insignificantly, meaning that there is no short-run effect PEXP on the rate of inflation. The reason behind the positive coefficient is that there is a likelihood of inflation. However, the lack of statistical significance makes its effect insignificant statistically. Such insignificance could result from the delay in the process of implementation, inefficiencies in spending, ineffective expenditure, or the reason that a considerable percentage of public expenditure is on capital/production, where the price effect occurs in the long run.

The minimal short-run impact of public expenditures is negates the Keynesian theory that suggests an increase in PEXP will boost aggregate demand and create demand-pull inflation. The results of this paper differ from those of Checherita-Westphal & Pessa (2024) that prove that the fiscal stimulus has a substantial impact on inflation especially when combined with sizable fiscal deficits. Furthermore, they also deviate from Zoumenou (2025), who discovered that fiscal policy measures have a substantial impact on inflation. In addition, according to the results of Yuliati et al. (2025), fiscal policy plays a key role in driving inflation changes in Indonesia.

The ECT is negative and significant (ECT = -0.7949, and p-value= 0.0001), confirming a stable long-run relationship with a fast adjustment speed of about 79.5%. Theoretically, the results support Keynesian, monetarist, and fiscal dominance perspectives, while also highlighting the stabilising role of productive public expenditure.

In the long run, public revenue ($\beta = 0.3568$, and p-value 0.0056), fiscal balance ($\beta = 0.1909$, $p = 0.0375$), and public debt ($\beta = 0.2911$, and p-value= 0.0015) exert positive and significant effects on inflation, indicating that fiscal expansion is inflationary. In contrast, public expenditure ($\beta = -0.3001$, and p-value= 0.0041) has a significant negative effect, suggesting a stabilising role through productive spending that alleviates supply constraints.

Table 9: ARDL Short and Long Run Form

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PREV)	0.285039	0.090656	3.144182	0.0033
D(PEXP)	0.044175	0.613140	0.072047	0.9426
D(FBAL)	0.286046	0.075655	3.780927	0.0006
D(PDET)	0.363863	0.094379	3.855339	0.0004
CointEq(-1)	-0.794949	0.174286	-4.561165	0.0001
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
PREV	0.356830	0.119830	2.977802	0.0056
PEXP	-0.300126	0.096856	-3.098683	0.0041
FBAL	0.190944	0.087863	2.173201	0.0375
PDET	0.291120	0.082261	3.538980	0.0015
Constant (C)	0.393603	0.083403	4.719291	0.0000

Note: Dependent Variable: INFL Selected Model: ARDL (1, 0, 0, 0, 0). Source: Author's Computation

2.3. Threshold Effect of Fiscal Operations on Inflation in Nigeria

The threshold regression result in Table 10 revealed that public expenditure (PEXP) exerts a significant threshold effect on inflation in Nigeria, with an estimated threshold value of 0.1456 (14.56% of GDP). The findings confirmed that, public expenditure served as the threshold variable and that, public expenditure is non-inflationary if it is at optimal threshold of 14.56% of GDP. However, it generates excess aggregate demand pressures once it is above 14.56% of GDP. The justification is that, at this point, public expenditure surpasses the economy's productive capacity, thereby weakening household purchasing power, increasing production and business costs, and constraining long-term investment.

This result further implies that the effectiveness of fiscal policy depends on the composition, size (magnitude), efficiency, and sectoral allocation of public expenditure. It therefore underscores the need to channel public spending toward productive and supply-enhancing sectors that can mitigate inflationary pressures. This conforms to Keynesian theory, the Mundell-Fleming framework, and the Twin Deficits hypothesis, which collectively suggest that excessive fiscal expansion in an open economy may generate inflationary pressures through demand-side transmission channel. Empirically, it aligns with Yuliati et al. (2025), who document threshold-dependent fiscal effects. Although public revenue, fiscal balance, and public debt are individually insignificant in the nonlinear specification, the joint significance of the model indicates that fiscal operations collectively drive inflation dynamics in Nigeria.

Table 10: Threshold Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PEXP < 0.14559999 -- 7 obs				
C	13.44056	4.112572	3.268163	0.0023
0.14559999 <= PEXP -- 37 obs				
C	10.44806	3.852578	2.711966	0.0100
Non-Threshold Variables				
PREV	-0.771869	0.556010	-1.388227	0.1732
FBAL	1.147691	0.817031	1.404710	0.1682
PDET	0.275038	0.188006	1.462924	0.1517

Note: Dependent Variable: INFL; Threshold variable: PEXP Sample: 1981 2024 (44 Observations); $R^2=0.645422$ (64.54%), $Adj. R^2= 0.598768$ (59.88%); F-statistic= 13.83396; and Prob (F-statistic) = 0.000000

Conclusion

This study evaluated the symmetric and threshold effect of fiscal operations on inflation rate. The study employed the ARDL model for both short-run and long-run estimation and complemented it with threshold regression analysis to identify optimal fiscal limits. The study covered a period of 44 years (1981 to 2024), with data sourced from the CBN Statistical Bulletin (2024). Prior to the application of both estimation techniques, the study conducted pre-estimation tests including Augmented Dicker Fuller (ADF) and multicollinearity test to ascertain the basic characteristics of the data, in addition to ARDL Bound tests and rank correlation test based on Spearman's approach.

The ARDL analysis reported that public revenue (0.2850, $p = 0.0033$), fiscal balance (0.2860, $p = 0.0006$), and public debt (0.3639, $p = 0.0004$) significantly increased inflation, while public expenditure (0.0442, $p = 0.9426$) was not significant statistically in the short run. In the long run, public revenue (0.3568, $p = 0.0056$), fiscal balance (0.1909, $p = 0.0375$), and public debt (0.2911, $p = 0.0015$) exerted positive and significant inflationary effects, whereas public expenditure (-0.3001, $p = 0.0041$) turned negative and significant.

Moreover, public expenditure became inflationary above the optimal threshold of 14.56% of GDP. The study concludes that, fiscal operations in Nigeria were not uniformly beneficial, but instead exhibited mixed symmetric and threshold effects on inflation rate in Nigeria. To reduce inflation in Nigeria, government should focus on productive sectors like food production, infrastructure, and energy, while the Central Bank maintains tight monetary policy to control excess liquidity.

Similarly, government should also enforce fiscal discipline by ensuring that total public expenditure does not exceed 14.56% of GDP, to limit demand-side inflationary pressures. To maximize the policy impact, the Federal Ministry of Finance should create a Digital Fiscal Dashboard to help track how the government spends its money with respect to the estimated fiscal threshold and avoid inflationary pressure.

Although the research contributed meaningfully to fiscal operations researches, the study is faced with some limitations. First, the analysis focused mainly on fiscal operations and inflation, which may not fully capture the effect of fiscal operations on other relevant macroeconomic variables such as unemployment, exchange rate, and lending rate. Consequently, future studies should evaluate the effect of fiscal operations on these macroeconomic variables. Secondly, the research still could not consider other advanced nonlinear techniques such as the Nonlinear ARDL and Markov-switching models, which could capture structural breaks, regime shifts, and dynamic asymmetries in the fiscal–inflation relationship more effectively. Consequently, future studies should consider using other advanced non-linear model. Lastly, the study was confined to Nigeria data. To cover a wider scope, future research should cover selected countries in Sub-Saharan Africa.

Credit Authorship Contribution Statement

Oghenekparobo, E. A. & Ejubekpokpo, S.A. contributed to the conceptualization of the study. The methodology was developed by Oghenekparobo, E. A. & Ejubekpokpo, S.A. and Ezeabasili, V.N. Formal analysis and data curation were carried out by Oghenekparobo, E. A. The investigation was conducted by Oghenekparobo, E. A., Ajuniyi-Boyo, W. O., and Charles-Anyago, N. Validation of the results was performed by Ejubekpokpo, S.A., Ajuniyi-Boyo, W. O., and Charles-Anyago, N. The original draft of the manuscript was written by Oghenekparobo, E. A., while all authors contributed to reviewing and editing the manuscript. Supervision was provided by Ejubekpokpo, S.A., Charles-Anyago, N. and Ezeabasili, V.N. All authors have read and approved the final version of the manuscript.

Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability Statement

The data supporting the findings of this study were obtained from publicly available sources, including the Central Bank of Nigeria (CBN) Statistical Bulletin, the National Bureau of Statistics (NBS), and the World Bank World Development Indicators database. The dataset used in the analysis is also provided in Appendix A of this article. Additional information is available from the corresponding author upon reasonable request.

Use of Generative AI

AI-assisted tools were used solely for language and grammar improvement. The authors retain full responsibility for the scientific content and conclusions.

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Ethics Approval Statement

This study is based exclusively on secondary macroeconomic data obtained from publicly available official databases. It does not involve human participants, animals, clinical data, surveys, interviews, or experiments. Consequently, ethical approval and informed consent were not required in accordance with applicable institutional and international research ethics guidelines.

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APPENDIX A:

Data On Fiscal Operations and Inflation Rate From 1981 to 2024

Year	PREV (% of GDP)	PEXP (% of GDP)	FBAL (% of GDP)	PDET (% of GDP)	INFL (%)
1981	0.0673	0.0577	0.0095	0.0118	20.81
1982	0.0619	0.0647	-0.0027	0.0479	7.70
1983	0.0640	0.0586	0.0053	0.0645	23.21
1984	0.0697	0.0611	0.0082	0.0914	17.82
1985	0.0879	0.0757	0.0117	0.1008	7.44
1986	0.0733	0.0943	-0.0211	0.2413	5.72
1987	0.1433	0.1241	0.0190	0.5685	11.29
1988	0.1450	0.1456	-0.0008	0.7039	54.51
1989	0.2779	0.2114	0.0662	1.2394	50.47
1990	0.4525	0.2781	0.1745	1.3773	7.36
1991	0.4642	0.3061	0.1581	1.5096	13.01
1992	0.8368	0.4076	0.4290	2.3907	44.59
1993	0.8645	0.8573	0.0069	2.8389	57.17
1994	0.9220	0.7348	0.1873	2.9629	57.03
1995	2.1022	1.1370	0.9653	3.2761	72.84
1996	2.2965	1.4790	0.8175	2.7076	29.27
1997	2.4832	1.8245	0.6587	2.5392	8.53
1998	1.9256	2.0232	-0.0976	2.6294	10.00
1999	3.7216	3.7157	0.0059	10.1053	6.62
2000	7.4957	2.7569	4.7389	12.1798	6.93
2001	8.2850	3.7794	4.5056	11.7923	18.87
2002	5.5749	3.2777	2.2974	12.6605	12.88
2003	7.7222	3.6765	4.0457	13.4296	14.03
2004	10.7613	4.1289	6.6325	13.4232	15.00
2005	14.3062	4.9506	9.3555	6.9502	17.86
2006	14.5042	4.9554	9.5488	1.0977	9.1402
2007	13.0653	5.5909	7.4745	1.0012	11.1269
2008	16.8080	6.9244	9.8836	1.1180	19.8262
2009	9.5811	6.8289	2.7521	1.1677	3.6870
2010	13.1671	7.5620	5.6051	1.2436	5.4551
2011	19.1075	8.0991	11.0085	1.5415	8.0823
2012	17.5617	7.5907	9.9711	1.6926	7.1935
2013	15.2633	8.1093	7.1540	2.1696	7.1354
2014	14.8121	6.7484	8.0637	2.4001	6.0359
2015	9.9060	7.1494	2.7567	3.0259	3.9973
2016	8.1809	8.5337	-0.3527	5.0674	3.5231

Year	PREV (% of GDP)	PEXP (% of GDP)	FBAL (% of GDP)	PDET (% of GDP)	INFL (%)
2017	10.7575	9.3297	1.4278	8.3628	3.8506
2018	11.4342	11.0776	0.3567	11.0003	4.9472
2019	12.9405	13.4716	-0.5311	12.5148	5.3762
2020	18.4524	14.4523	4.0001	17.9457	3.6818
2021	22.1529	16.5762	5.5766	21.6062	4.9284
2022	25.5887	19.9943	5.5944	25.0189	10.467
2023	49.8678	25.4162	24.4516	49.0400	8.3876
2024	7.9529	19.8981	-11.9453	87.2267	15.15

Sources: CBN Statistical Bulletin External Sector (2024); CBN Statistical Bulletin Financial Sector (2024); CBN Statistical Bulletin Real Sector (2024); National Bureau of Statistics (2024); and the World Development Indicator (2024)