



Public Sector Financial Sustainability and External Shocks: The Mediating Role of Monetary Policy in Nigeria's Fiscal Stability

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Abstract. Nigeria's dependence on crude oil and exposure to exchange rate and commodity price shocks continue to pose challenges to public sector financial sustainability and fiscal stability. This study examines the mediating role of monetary policy in the relationship between external shocks and public sector financial sustainability in Nigeria. Using annual data covering 2006–2023, the study examines inflation rate (IFR), exchange rate (EXR), crude oil price (COP), and Monetary Policy Rate (MPR). The study employs the Autoregressive Distributed Lag (ARDL) model, with mediation analysis used to assess the role of MPR in the transmission of external shocks to fiscal stress, proxied by inflation. The findings indicate that EXR significantly influences inflation in both the short and long run, while COP is statistically insignificant in both periods. With MPR included, EXR remains significant in the short and long run, while MPR exhibits a delayed short-run effect but remains statistically insignificant in the long run. The study also finds no evidence of a stable long-run cointegrating relationship among the variables. These findings suggest that exchange rate instability represents a more immediate and persistent source of fiscal stress, while monetary policy provides only a limited and delayed stabilising effect. The study recommends adopting a transparent, market-driven exchange rate regime, diversifying the economy beyond oil, and strengthening monetary policy effectiveness through improved forecasting and proactive interventions.

Keywords: Public sector financial sustainability; External shocks; Monetary Policy Rate; Exchange rate volatility; Fiscal stability.

1. Introduction

1.1 Background to the Study

The Nigerian economy remains highly dependent on crude oil, making developments in the global oil market an important determinant of domestic fiscal and macroeconomic conditions. Oil revenues influence government finances and foreign exchange availability, while Oil market shocks can transmit through government spending, exchange rate movements, production costs, and domestic prices. Recent evidence confirms the interconnected nature of these channels. Evans (2021), for instance, finds that oil prices have significant effects on inflation in Nigeria and identifies a petro-monetary transmission mechanism through which oil price, exchange rate, interest rate, and credit shocks influence consumer prices. Similarly, Oladunni (2020) demonstrates that positive oil price shocks can generate Dutch-disease effects in Nigeria, underscoring the vulnerability of oil-dependent economies to fluctuations in crude oil prices.

The transmission of external shocks to domestic economic stability is particularly evident through the interaction between oil prices, exchange rates, and inflation. Oil price movements can affect foreign exchange earnings and, consequently, the value of the domestic currency, while exchange rate depreciation can increase the domestic cost of imported goods and production inputs. Evidence from Nigeria shows that oil prices, inflation, interest rates, budget balance, and other macroeconomic variables significantly influence exchange rate fluctuations (Evans, 2021). More broadly, López-Villavicencio and Pourroy (2019) establish that oil price changes have asymmetric effects on domestic inflation and that monetary policy regimes can influence the extent of oil price pass-

through to consumer prices. Bala and Chin (2018) similarly document asymmetric oil price effects on inflation among African OPEC member countries, while George and Ogede (2020) find that oil price effects on inflation can differ between positive and negative shocks in African net oil exporting economies.

Monetary policy therefore assumes an important role in managing the inflationary and macroeconomic consequences of external shocks. In Nigeria, the Monetary Policy Rate (MPR) constitutes a key instrument through which the Central Bank of Nigeria seeks to influence interest rates, liquidity conditions, credit, inflation expectations, and broader economic activity. However, the effectiveness of monetary policy depends partly on the strength of the transmission mechanism through which policy decisions affect the wider economy. Recent Nigerian evidence suggests that the monetary policy response itself is influenced by Oil market conditions. Ogiji et al. (2022), for example, find that the Central Bank of Nigeria exhibits an asymmetric monetary policy reaction to oil price shocks, while Evans (2021) establishes that interest rate shocks, alongside oil price and exchange rate shocks, generate significant movements in consumer prices. These findings suggest that monetary policy cannot be examined independently of the external shocks that characterize Nigeria's oil dependent economic structure.

The relevance of this relationship has become even more pronounced following recent changes in Nigeria's exchange rate and monetary policy environment. The International Monetary Fund's recent assessment of Nigeria shows that the exchange rate pass-through to domestic prices is highly dependent on the nature of the underlying shock, while interest rate transmission has strengthened following the shift toward a more market-determined exchange rate regime. The evidence further indicates that oil-related shocks affect inflation through multiple channels, including exchange rate movements, government spending, and domestic energy costs, highlighting the close interaction between external shocks, fiscal conditions, exchange rates, inflation, and monetary policy.

Against this background, this study examines public sector financial sustainability and external shocks, with particular emphasis on the mediating role of monetary policy in Nigeria's fiscal stability.

1.2 Statement of the Research Problem

Historically, oil price instability has also contributed to fiscal crises and erosion of public financial capacity (Adelman, 2000). Although rising oil prices may temporarily increase government revenue, they can encourage procyclical spending and inflationary pressures, thereby generating fiscal stress (Huseynov et al., 2014); conversely, declining prices can result in revenue shortfalls, reduced capital expenditure, and increased deficit financing.

Inflation further compounds fiscal pressures by reducing the real value of tax revenues through collection lags (Tanzi, IMF), while exchange rate depreciation increases the local currency cost of foreign-denominated debt servicing and imported capital goods (Reisen, 1989). Empirical studies have similarly established significant effects of oil price fluctuations on macroeconomic and public sector financial sustainability (López-Villavicencio & Pourroy, 2019; Mahdi, 2018; Sunday, 2020; Evans, 2021), with evidence that negative oil price shocks may exert stronger fiscal effects than positive shocks (George & Ogede, 2020; Sharma et al., 2019; Bala & Chin, 2018; Osy et al., 2020).

Despite this substantial body of literature, limited attention has been paid to the Monetary Policy Rate (MPR) as a mediating mechanism through which crude oil price and exchange rate movements influence fiscal stress in Nigeria. Sargent and Wallace (1981) argue that under fiscal dominance, monetary policy may become constrained by government deficit financing requirements, while IMF evidence (2021) indicates that central bank financing of government in Sub-Saharan Africa can contribute to exchange rate depreciation and inflationary fiscal erosion. Thus, an important empirical gap remains concerning how changes in MPR may transmit or modify the effects of oil price volatility and exchange rate depreciation on fiscal stress. This study therefore investigates the mediating role of MPR in the relationship between crude oil prices, exchange rates, and public sector financial sustainability, proxied by consumer price inflation, in Nigeria, with the main objective of determining the extent to which MPR mediates these relationships.

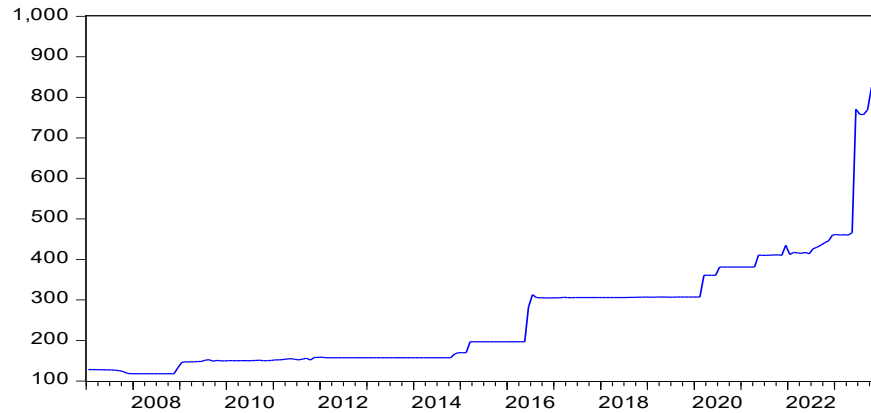
2. Literature Review

2.1 Exchange Rate Fluctuation and Public Sector Financial Sustainability

Exchange rate fluctuations constitute an important channel through which external vulnerabilities are

transmitted into public sector finances, particularly in resource-dependent and heavily indebted economies. In Nigeria, where public debt includes substantial foreign currency obligations and government projects

EXR



The exchange rate remained relatively stable between 2006 and 2014 but experienced substantial depreciation from 2015, with notable pressures following the 2016 oil price shock and from 2020 onward amid the COVID-19 pandemic and domestic economic challenges. This persistent depreciation has consequently increased fiscal pressures associated with foreign debt service and imported public sector inputs. Evidence further indicates that currency devaluation can significantly worsen government debt dynamics, highlighting exchange rate risk as an important dimension of public sector financial sustainability.

In Nigeria, the fiscal implications of exchange rate instability are closely linked to its transmission to domestic prices. Exchange rate stability remains central to macroeconomic management (Mordi, 2014), while recent evidence indicates intensified inflationary effects following exchange rate unification (Garba et al., 2024). Bada et al. (2016) found significant but incomplete exchange rate pass-through to consumer prices, while Gidigbi, Babarinde and Lawan (2018) established long-run causal relationships between exchange rate volatility and inflation. Similarly, Nuhu (2021) found that both money supply and nominal exchange rates increase CPI, while Oriavwote and Eshenake (2012) reported persistent exchange rate volatility associated with domestic and imported inflation. Further evidence from Nkoro and Uko (2016) and Obiekwe and Osabunhien (2016) confirms significant exchange rate effects on inflation, whereas Yakub et al. (2019) found that although exchange rate volatility disrupts trade in the short run, its long-run effects are insignificant. Collectively, these findings

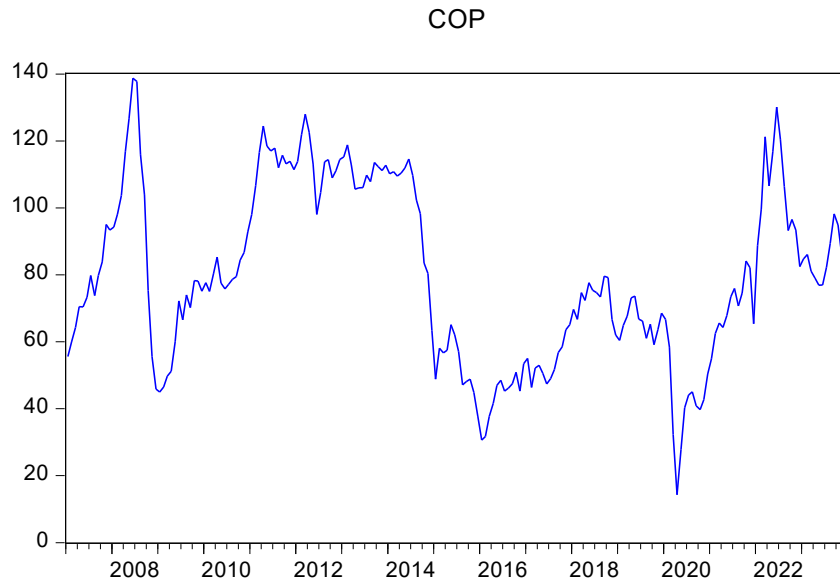
rely considerably on imported capital goods, naira depreciation increases the domestic currency cost of debt servicing and public investment.

suggest that currency instability can complicate fiscal forecasting, increase procurement and debt service costs, and undermine budgetary planning.

Despite the extensive literature on exchange rate pass-through and inflation, limited attention has been given to how exchange rate volatility specifically affects public sector financial sustainability through fiscal stress channels, particularly in relation to budget credibility, debt sustainability, and capital project implementation. Moreover, the role of monetary policy instruments, especially the Monetary Policy Rate (MPR), in mediating this transmission remains insufficiently explored within Nigeria's fiscally dominant, resource-dependent economy. Thus, while existing studies provide substantial evidence of exchange rate and inflation linkages, the mechanism through which exchange rate fluctuations translate into broader public sector financial pressures, and the extent to which monetary policy mediates this relationship, remains an important empirical gap.

2.2 Crude Oil Price Volatility and Public Sector Financial Sustainability

Crude oil price volatility is a major source of public sector financial instability in oil-dependent economies because it directly affects government revenue and the credibility of budget planning. Oil revenues are particularly destabilising because of their large contribution to public finances, non-tax nature, exposure to production and price fluctuations, and opacity, making medium-term fiscal planning difficult. The IMF similarly identifies oil revenue as structurally uncertain because it is exhaustible, volatile, and largely externally determined.



The historical volatility of crude oil prices, including the sharp declines during 2014–2016 and 2020, therefore represents a significant challenge to fiscal sustainability. Sachs and Warner (2001) further associate resource dependence with rent seeking, weaker institutions, and reduced fiscal resilience, while evidence of a “fiscal presource curse” indicates that anticipated resource wealth can encourage excessive borrowing and debt accumulation. Nigeria's experience with the Excess Crude Account similarly demonstrates the difficulty of insulating public finances from oil shocks where institutional and governance constraints persist.

Empirical evidence confirms that oil price volatility affects fiscal outcomes through revenue uncertainty, procyclical expenditure, and inflationary pressures. Evidence from GCC countries shows that oil price shocks significantly influence budget performance, with expenditure implementation improving during booms but deteriorating during downturns. In Nigeria, Lawrence and Okon (2024) found that oil revenue volatility significantly reduces capital expenditure performance, indicating that development projects are particularly vulnerable during revenue shortfalls. Oil price shocks also generate inflationary pressures through petro-monetary transmission (Sunday, 2020; Evans, 2021), while Bawa et al. (2021), Ben Salem et al. (2024), and Agu and Nyatanga (2021) establish both short- and long-run inflationary effects. Earlier studies by Oriakhi (2013), Wilson et al. (2014), and Akpan (2009) similarly identify transmission through government spending, exchange rates, and money supply, thereby linking oil price movements to broader fiscal pressures.

The fiscal consequences of oil price shocks may also be asymmetric. George and Ogede (2020), Sharma et al. (2019), Bala and Chin (2018), and Osy et al. (2020) show that negative oil price shocks can generate stronger macroeconomic effects than positive shocks, while Bello et al. (2023), Nnadozie et al. (2022), and Otoakhia (2020) provide evidence of asymmetric and persistent effects in Nigeria. Awujola et al. (2020) and Omojolaibi (2013), however, suggest that domestic shocks and macroeconomic conditions may sometimes outweigh direct oil price effects on inflation, highlighting the importance of institutional and domestic factors in determining the ultimate fiscal impact of external shocks. Despite this extensive literature, limited attention has been given to integrating oil price volatility into a unified public sector financial sustainability framework, particularly by examining inflation as a proxy for fiscal stress and the MPR as a mediating mechanism. This study therefore examines whether monetary policy can buffer or amplify the fiscal consequences of crude oil price volatility in Nigeria.

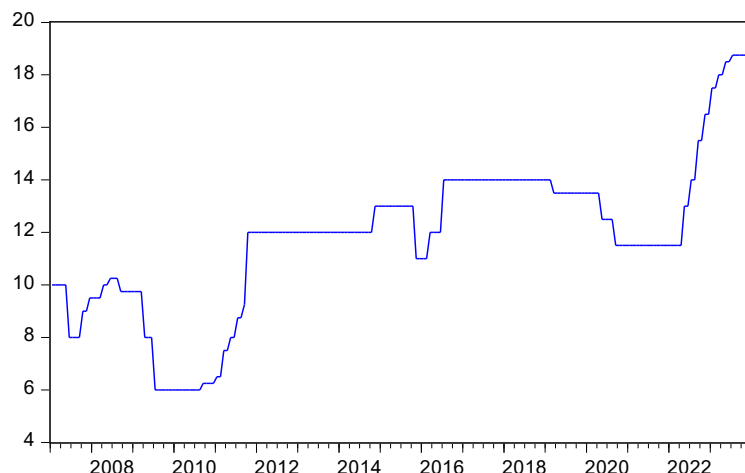
2.3 Monetary Policy Rate, Fiscal Dominance, and Public Sector Financial Sustainability

Monetary policy is traditionally viewed as a macroeconomic stabilisation instrument for controlling inflation and supporting sustainable economic activity. However, under fiscal dominance, persistent government borrowing requirements can constrain monetary policy independence, causing the Monetary Policy Rate (MPR) to function partly as a debt management instrument. Sargent and Wallace (1981) provide the foundational theoretical explanation, arguing that when fiscal deficits remain

large and non-monetary financing is constrained, monetary policy can become subordinated to government financing requirements, potentially generating inflationary pressures.

Recent evidence from Sub-Saharan Africa supports this concern. Hooley et al. (2021), examining 41 SSA countries, found that increased central bank lending to government significantly affects exchange rates and inflation, with a one percentage point increase in central bank credit to government associated with

MPR



The fiscal implications of monetary policy tightening are particularly important where public debt and interest obligations are substantial. Changes in the MPR influence domestic borrowing costs and consequently affect debt service requirements and available fiscal space. Nigeria's MPR has undergone substantial adjustments over time, including sharp increases during periods of elevated inflation and exchange rate pressure. Brookings Institution data indicate that approximately 96% of federal government revenue was devoted to interest payments in 2022, while the 2023 budget allocated 29% to debt servicing compared with 8% for education, 5% for health, and 6% for infrastructure. Against this background, monetary tightening may simultaneously address inflationary pressures while increasing the cost of domestic borrowing and refinancing. The IMF's evidence from 40 emerging market and developing economies further shows that interest rate increases reduce inflation and output, with exchange rate amplification playing an important role in monetary transmission. The effectiveness of this process depends significantly on the quality of the monetary policy framework, including central bank independence and policy credibility.

Nigerian empirical studies provide further evidence of the monetary policy, macroeconomic nexus. Andabai,

contemporaneous exchange rate depreciation and a lagged rise in inflation. Although legal restrictions on central bank lending can constrain fiscal dominance, they do not eliminate it. In Nigeria, where fiscal deficits have historically been financed partly through Ways and Means advances and other central bank lending, MPR decisions therefore cannot be considered independently of government financing requirements.

Ikeora, and Anah (2019) found that Treasury Bills, liquidity ratio, and MPR significantly affect GDP, while Henry and Sabo (2020) reported negative effects of MPR and exchange rates on inflation but a positive effect of broad money supply. Ayenajeyi (2021) found that MPR and liquidity ratio significantly influence inflation, although monetary policy effectiveness remained limited, while Elisha, Musa, Balogun, and Diemsan (2024) confirmed significant roles for money supply, MPR, and CRR in explaining inflation. Otoakhia (2020) similarly argues that monetary policy is more effective in highly integrated and monetised economies with robust financial networks, conditions that remain constrained in Nigeria. Despite these findings, limited research has examined the mediating role of MPR in the crude oil price–exchange rate and fiscal stress nexus. This study therefore addresses this gap by investigating how MPR mediates the relationship between crude oil prices, exchange rates, and public sector financial sustainability, proxied by consumer price inflation, in Nigeria.

3. Methodology

3.1 Population and Sample

The research adopts a quantitative research design, covering sixteen years from 2007 to 2023. Secondary

data on crude oil prices, inflation rate, exchange rate and Monetary Policy Rate for Nigeria were collected from reputable sources including the Central Bank of Nigeria, the International Monetary Fund and the World Bank databases. The estimation is performed with EViews (version 9.5).

Given the absence of a direct, high frequency public sector financial sustainability index for Nigeria, this study follows the public finance literature (Tanzi, IMF; Reisen, 1989) in employing consumer price inflation (IFR) as a proxy for fiscal stress. Inflation erodes the real value of budget appropriations, tax revenue, and public debt capacity, making it a theoretically valid and empirically tractable indicator of public sector

financial sustainability in a resource-dependent economy.

3.2 The Models

The study adopts a mediating effect analysis framework within a vector autoregressive ARDL model.

Model 1: Baseline ARDL MODEL (External Shocks and Fiscal Stress without Monetary Policy Mediation)
The baseline ARDL model examines the direct short and long-run effects of exchange rate movements and crude oil price volatility on public sector financial sustainability, proxied by the inflation rate. The model is specified as:

$$\ln IFR_t = \alpha + \sum_{i=1}^p \beta_i \ln INF_{t-i} + \sum_{j=0}^q \beta_j \ln EXR_{t-j} + \sum_{k=0}^r \beta_k \ln COP_{t-k} + \epsilon_t$$

Where:

INFL = Inflation rate (Consumer Price Index) employed as a proxy for public sector financial sustainability and fiscal stress

COP = Crude oil prices (USD per barrel)

EXR = Exchange rate (NGN/USD)

ϵ = Error term

BOUNDS TEST FOR COINTEGRATION

$$\Delta \ln IFR_t = \alpha + \phi \ln INF_{t-1} + \lambda_1 \ln EXR_{t-1} + \lambda_2 \ln COP_{t-1} + \sum_{i=1}^{p-1} \beta_i \Delta \ln INF_{t-i} + \sum_{j=0}^{q-1} \beta_j \Delta \ln EXR_{t-j} + \sum_{k=0}^{r-1} \beta_k \Delta \ln COP_{t-k} + \epsilon_t \quad (ii)$$

ERROR CORRECTION MODEL

$$\Delta \ln IFR_t = \alpha + \sum_{i=1}^{p-1} \beta_i \Delta \ln INF_{t-i} + \sum_{j=0}^{q-1} \beta_j \Delta \ln EXR_{t-j} + \sum_{k=0}^{r-1} \beta_k \Delta \ln COP_{t-k} + \lambda ECM_{t-1} + \epsilon_t \quad (iii)$$

2. Baseline ARDL Model (With Monetary Policy Intervention)

To test for a stable long-run equilibrium relationship among the fiscal stress proxy and the external shock variables, the following bounds testing equation is specified:

$$\ln IFR_t = \alpha + \sum_{i=1}^p \beta_i \ln INF_{t-i} + \sum_{j=0}^q \beta_j \ln EXR_{t-j} + \sum_{k=0}^r \beta_k \ln COP_{t-k} + \sum_{l=0}^s \beta_l \ln MPR_{t-l} + \epsilon_t \quad (iv)$$

$MPR = \gamma_0 + \gamma_1 COP + \gamma_2 EXR + \epsilon$

$INFL = \alpha_0 + \alpha_1 COP + \alpha_2 EXR + \alpha_3 MPR + \epsilon$

Where:

MPR = Monetary Policy Rate

BOUNDS TEST FOR COINTEGRATION

$$\Delta \ln IFR_t = \alpha + \phi \ln INF_{t-1} + \lambda_1 \ln EXR_{t-1} + \lambda_2 \ln COP_{t-1} + \lambda_3 \ln MPR_{t-1} + \sum_{i=1}^{p-1} \beta_i \Delta \ln INF_{t-i} + \sum_{j=0}^{q-1} \beta_j \Delta \ln EXR_{t-j} + \sum_{k=0}^{r-1} \beta_k \Delta \ln COP_{t-k} + \sum_{l=0}^{s-1} \beta_l \Delta \ln MPR_{t-l} + \epsilon_t \quad (v)$$

ERROR CORRECTION MODEL

$$\begin{aligned} \Delta \ln IFR_t = & \alpha + \sum_{i=1}^{p-1} \beta_i \Delta \ln INF_{t-i} + \sum_{j=0}^{q-1} \beta_j \Delta \ln EXR_{t-j} \\ & + \sum_{k=0}^{r-1} \beta_k \Delta \ln COP_{t-k} + \sum_{l=0}^{s-1} \beta_l \Delta \ln MPR_{t-l} + \lambda ECM_{t-1} + \varepsilon_t \end{aligned} \quad (vi)$$

4. Result and Discussion

4.1 Descriptive Statistics

	IFR	EXR	COP	MPR
Mean	13.00769	258.4389	79.40387	11.80515
Median	12.33077	197.0000	76.42000	12.00000
Maximum	28.92179	899.3930	138.7400	18.75000
Minimum	4.111929	117.7300	14.28000	6.000000
Std. Dev.	4.678144	147.3638	26.26913	2.948400
Skewness	0.818828	1.781243	0.138060	-0.085853
Kurtosis	3.934876	7.122699	2.098881	3.265021
Jarque-Bera	30.22523	252.3476	7.550183	0.847610
Probability	0.000000	0.000000	0.022935	0.654552
Sum	2653.569	52721.53	16198.39	2408.250
Sum Sq. Dev.	4442.661	4408365.	140083.7	1764.692
Observations	204	204	204	204

The average inflation rate was 13.01%, with a standard deviation of 4.68%, ranging from 4.11% to 28.92%, indicating moderate variability and periods of significant economic instability. The mean exchange rate was 258.44, with a standard deviation of 147.36, ranging from 117.73 to 899.39, reflecting substantial exchange rate volatility. Crude oil prices averaged \$79.40 per barrel, with a standard deviation of 26.27, and ranged from \$14.28 to \$138.74, reflecting global Oil market fluctuations. The MPR averaged 11.81%, with a standard deviation of 2.95%, ranging from 6% to 18.75%, indicating periods of monetary tightening. The exchange rate recorded skewness of 1.78 and kurtosis of 7.12, indicating a highly skewed and leptokurtic distribution characterized by extreme movements.

4.2 Stationarity Tests

Table 1: Stationarity Test

Variables	Augmented Dickey-Fuller (ADF) Test	Stationarity
	Test Statistic	
Inflation Rate (INF)	-7.300827***	First Difference
Exchange Rate (EXR)	-14.11237***	First Difference
Crude Oil Price (COP)	-10.42223***	First Difference
Monetary Policy Rate (MPR)	-8.109613***	First Difference

Note: *** denotes significance level at 1% (which is the strongest confidence level). The variables are all stationary at first difference; we rejected the null hypothesis that the variables have no unit root.

The Augmented Dickey-Fuller (ADF) test confirms that all variables—inflation rate (IFR), exchange rate (EXR), crude oil price (COP), and monetary policy rate (MPR)—are stationary at the first difference, with ADF statistics of -7.30, -14.11, -10.42, and -8.11, respectively, all significant at the 1% level; these results confirm the absence of unit roots after differencing and validate the use of the ARDL modelling approach, which accommodates variables integrated at I(0) and I(1), for the study's short- and long-run analysis.

4.3 ARDL Model Results

4.3.1 Without Monetary Policy Intervention

The ARDL model without monetary policy intervention analyzes the short- and long-term effects of exchange rates and crude oil prices on inflation.

SHORT-RUN DYNAMICS

Dependent Variable: LOG(IFR)

Method: ARDL

Date: 01/08/25 Time: 23:46

Sample (adjusted): 2007M03 2023M12

Included observations: 202 after adjustments

Maximum dependent lags: 4 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (4 lags, automatic): LOG(EXR) LOG(COP)

Fixed regressors: C

Number of models evaluated: 100

Selected Model: ARDL(2, 0, 0)

Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(IFR(-1))	1.158732	0.069284	16.72430	0.0000
LOG(IFR(-2))	-0.209878	0.069905	-3.002330	0.0030
LOG(EXR)	0.030553	0.016465	1.855621	0.0650
LOG(COP)	0.000902	0.015321	0.058873	0.9531
C	-0.036350	0.103361	-0.351684	0.7255
R-squared	0.957954	Mean dependent var	2.505567	
Adjusted R-squared	0.957100	S.D. dependent var	0.366807	
S.E. of regression	0.075974	Akaike info criterion	-2.292402	
Sum squared resid	1.137103	Schwarz criterion	-2.210514	
Log likelihood	236.5326	Hannan-Quinn criter.	-2.259270	
F-statistic	1122.074	Durbin-Watson stat	2.016261	
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

In the short run, EXR had a marginal positive effect on inflation (coefficient = 0.0306; p-value = 0.065), implying that a 1% increase in EXR increases inflation by 0.03%, although the effect is borderline significant; COP had no significant effect (coefficient = 0.0009; p-value = 0.953), suggesting no immediate inflationary impact, while the ECT coefficient of -0.0511 indicates that approximately 5.11% of deviations from long-run equilibrium are corrected each period.

LONG-RUN FORM AND BOUNDS TEST FOR COINTEGRATION

ARDL Long Run Form and Bounds Test

Dependent Variable: DLOG(IFR)

Selected Model: ARDL (2, 0, 0)

Case 2: Restricted Constant and No Trend

Date: 01/08/25 Time: 23:55

Sample: 2007M01 2023M12

Included observations: 202

Levels Equation

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EXR)	0.597374	0.223060	2.678090	0.0080
LOG(COP)	0.017635	0.299015	0.058978	0.9530
C	-0.710720	1.997448	-0.355814	0.7224
EC = LOG(IFR) - (0.5974*LOG(EXR) + 0.0176*LOG(COP) -0.7107)				

F-Bounds Test Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	1.688629	10%	2.63	3.35
K	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5
Finite Sample: n=80				
Actual Sample Size	202	10%	2.713	3.453
		5%	3.235	4.053
		1%	4.358	5.393

*Note: p-values and any subsequent tests do not account for model selection.

In the long run, EXR significantly influenced inflation (coefficient = 0.5974; p-value = 0.008), indicating that persistent exchange rate depreciation generates sustained inflationary pressures, while COP remained statistically insignificant (p-value = 0.953), suggesting that crude oil price fluctuations have no meaningful long-run effect on inflation within the study period.

4.3.2 With Monetary Policy Intervention

Including MPR as a mediating variable substantially improves the model's explanatory power, increasing the R-squared to 0.963 and indicating that a greater proportion of inflation variation is explained by EXR, COP, and MPR, thereby highlighting the role of monetary policy in mediating their effects on inflation.

Short-Run Dynamics

Dependent Variable: LOG(IFR)

Method: ARDL

Date: 01/09/25 Time: 00:12

Sample (adjusted): 2007M04 2023M12

Included observations: 201 after adjustments

Maximum dependent lags: 4 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (4 lags, automatic): LOG(EXR) LOG(COP)

LOG (MPR)

Fixed regressors: C

Number of models evaluated: 500

Selected Model: ARDL(2, 0, 0, 3)

Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
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LOG(IFR(-1))	1.093764	0.066129	16.53977	0.0000
LOG(IFR(-2))	-0.161747	0.066608	-2.428347	0.0161
LOG(EXR)	0.042371	0.020889	2.028381	0.0439
LOG(COP)	-0.017737	0.015306	-1.158878	0.2479
LOG(MPR)	0.004561	0.114661	0.039779	0.9683
LOG(MPR(-1))	0.192418	0.158657	1.212792	0.2267
LOG(MPR(-2))	0.155603	0.158752	0.980163	0.3282
LOG(MPR(-3))	-0.386697	0.115697	-3.342332	0.0010
C	0.104831	0.102666	1.021092	0.3085
R-squared	0.963020	Mean dependent var	2.509793	
Adjusted R-squared	0.961479	S.D. dependent var	0.362760	
S.E. of regression	0.071198	Akaike info criterion	-2.402958	
Sum squared resid	0.973281	Schwarz criterion	-2.255049	
Log likelihood	250.4973	Hannan-Quinn criter.	-2.343108	
F-statistic	624.9946	Durbin-Watson stat	2.120960	
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

In the short run, EXR had a significant positive effect on inflation (coefficient = 0.0424; p-value = 0.0439), indicating that a 1% increase in EXR raises inflation by 0.042%. COP remained statistically insignificant (p-value = 0.2479), suggesting no meaningful short-run effect on inflation. MPR also had no immediate effect (p-value = 0.9683); however, its third lag, MPR (-3), had a significant negative effect (coefficient = -0.3867; p-value = 0.0010), indicating that monetary policy influences inflation with a delayed response.

Long-Run Effects:

ARDL Long Run Form and Bounds Test

Dependent Variable: DLOG(IFR)

Selected Model: ARDL(2, 0, 0, 3)

Case 2: Restricted Constant and No Trend

Date: 01/09/25 Time: 00:14

Sample: 2007M01 2023M12

Included observations: 201

Levels Equation

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EXR)	0.623261	0.213511	2.919102	0.0039
LOG(COP)	-0.260908	0.244911	-1.065317	0.2881
LOG(MPR)	-0.501805	0.374692	-1.339246	0.1821
C	1.542020	1.633744	0.943857	0.3464

EC = LOG(IFR) - (0.6233*LOG(EXR) -0.2609*LOG(COP) -0.5018
*LOG(MPR) + 1.5420)

F-Bounds Test

Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	2.628030	10%	2.37	3.2
K	3	5%	2.79	3.67

		2.5%	3.15	4.08
		1%	3.65	4.66
Actual Sample Size	201		Finite n=80	Sample:
		10%	2.474	3.312
		5%	2.92	3.838
		1%	3.908	5.044

In the long run, EXR significantly affected inflation (coefficient = 0.6233; p-value = 0.0039), indicating that persistent exchange rate depreciation generates significant and sustained inflationary pressures. In contrast, COP and MPR remained statistically insignificant, with p-values of 0.2881 and 0.1821, respectively, suggesting that neither variable has a meaningful long-run effect on inflation within the model.

4. Discussion

The findings provide important insights into the relationship among exchange rate movements, crude oil price volatility, monetary policy, and public sector financial sustainability in Nigeria. The ARDL model without monetary policy intervention shows that EXR affects fiscal stress, proxied by inflation, in both the short and long run, while COP remains statistically insignificant across both horizons. This suggests that fiscal stress is more strongly associated with exchange rate volatility than oil price fluctuations, despite Nigeria's petroleum dependence. The finding aligns with Reisen (1989) on the fiscal effects of depreciation through foreign denominated debt service and imported capital goods, and corroborates Garba et al. (2024) and Bada et al. (2016) on exchange rate pass-through and macroeconomic instability.

The insignificance of COP in both horizons suggests that oil price volatility does not primarily transmit fiscal instability through sustained inflationary erosion of real tax revenue and budget appropriations, as identified by Tanzi (IMF). Rather, consistent with Budina and van Wijnbergen (2008) and the IMF (2022) fiscal resource curse literature, oil shocks may operate through direct revenue shortfalls that trigger emergency borrowing or expenditure compression. Thus, fiscal protection against oil volatility requires revenue diversification and institutional savings mechanisms alongside demand management policies. The inclusion of MPR significantly improves model explanatory power, although its stabilising effect is delayed, appearing only at the third lag, consistent with Otoakhia (2020) on structural and financial constraints to monetary policy effectiveness in Nigeria.

The long-run insignificance of MPR suggests limited effectiveness as a sustained debt management and fiscal stabilisation instrument, consistent with the fiscal dominance hypothesis of Sargent and Wallace (1981) and IMF (2021) evidence linking central bank deficit financing to exchange rate depreciation and inflationary fiscal erosion. This also accords with Ayenajeyi (2021) and Henry and Sabo (2020) regarding weak monetary policy transmission in Nigeria. Furthermore, the absence of cointegration indicates no stable long-run equilibrium among EXR, COP, MPR, and fiscal stress, reflecting Nigeria's structural vulnerabilities. As Sachs and Warner (2001) argue, resource dependence can weaken institutional foundations, while the IMF (2022) notes the limited effectiveness of stabilisation mechanisms such as the Excess Crude Account. These findings therefore underscore the need for revenue diversification, stronger debt management, fiscal monetary coordination, and greater central bank operational autonomy to achieve durable public sector financial sustainability.

5. Conclusion & Recommendations

This study concludes that exchange rate fluctuations play a dominant role in driving public sector financial sustainability in Nigeria, both in the short and long term, making exchange rate stability an essential pillar of fiscal management. The influence of crude oil prices on fiscal stress appears largely indirect, emphasizing the need for public revenue diversification beyond oil dependence to reduce vulnerability to external shocks and budget volatility. Furthermore, while monetary policy interventions through the Monetary Policy Rate (MPR) can significantly influence fiscal stability, their effects often manifest with delays, underscoring the importance of strengthening fiscal monetary coordination and adopting proactive debt management strategies. Taken together, the findings highlight that ensuring a stable exchange rate regime, diversifying the public revenue base, and improving the effectiveness of monetary policy as a debt management instrument remain the most critical steps

toward achieving sustainable public finances and long-term fiscal stability in Nigeria.

The study recommends:

- i. Adopt a transparent, market-driven exchange rate regime to strengthen fiscal stability.
- ii. Diversify the economy into agriculture, manufacturing, and technology to reduce oil dependence.
- iii. Strengthen monetary policy effectiveness through improved forecasting and proactive interventions.

References

- Adelman, I. (2000). *Fifty years of economic development: What have we learned?* Semantic Scholar. <https://www.semanticscholar.org/paper/Fifty-Years-of-Economic-Development-%3A-What-Have-we-Adelman/5113a0bbe92a804cee2364819ee308f1ec307a45>
- Agbo, E. I. (2020). Effect of oil price fluctuations on Nigeria's monthly inflation rate. *Scholars Journal of Economics, Business and Management*, 7(11), 142–149. <https://doi.org/10.36347/sjebm.2020.v07i11.05>
- Agu, O. C., & Nyatanga, P. (2021). Does the expected crude oil price influence inflation in Nigeria? *African Journal of Business & Economic Research*, 16(4), 117. <https://doi.org/10.31920/1750-4562/2021/v16n4a6>
- Akpan, E. (2009). Oil price shocks and Nigeria's Macro Economy. *Journal of Economics*, 4, 12–19.
- Andabai, P. W., Ikeora, J. J. E., & Anah, S. A. (2019). Impact of monetary policy on economic growth in Nigeria (1990–2017). *International Journal of Developing and Emerging Economies*, 7(3), 14–21.
- Awujola, A., Dyaji, A., Iyakwari, B., Lecturer, A., & Bot, R. E. (2020). Examination of the relationship between oil price shock and macroeconomic variables in Nigeria. *SocioEconomic Challenges*, 4(1), 102–110.
- Ayenajeyi, J. E. (2021). *Impact of exchange rate fluctuations on inflation in Nigeria* [Master's thesis, Nasarawa State University Keffi]. Nasarawa State University Keffi.
- Ayenajeyi Elisha, J., Musa, M. J., Balogun, A. E., & Attah Diemsan, A. (2024). [Title of the article]. *KASU Journal of Economics and Development Studies*, 10(2).
- Bada, A. S., Olufemi, A. I., Tata, I. A., Peters, I., Bawa, S., Onwubiko, A. J., & Onyowo, U. C. (2016). Exchange rate pass-through to inflation in Nigeria. *CBN Journal of Applied Statistics*, 7(1a), 49.
- Bala, U., & Chin, L. (2018). Asymmetric impacts of oil price on inflation: An empirical study of African OPEC. *Energies*, 11(11), Article 3017. <https://doi.org/10.3390/en11113017>
- Bawa, S., Abdullahi, I. S., Tukur, D., Barda, S. I., & Yusuf, J. (2021). Asymmetric impact of oil price on inflation in Nigeria. *CBN Journal of Applied Statistics*, 11(2), 85–113.
- Bello, M. A., Shuaibu, M. S., Alam, M. J., & Lawan, N. (2023). The asymmetric impact of oil price volatility on Nigeria's inflation. *Annals of "Dunărea de Jos" University of Galați, Fascicle I: Economics and Applied Informatics*, 29(3), 22–34.
- Ben Salem, L., Nouira, R., & Rault, C. (2024). On the impact of oil prices on sectoral inflation: Evidence from the world's top oil exporters and importers (IZA Discussion Paper No. 16706). IZA – Institute of Labor Economics.
- Budina, N., & van Wijnbergen, S. (2008). *Fiscal sustainability, volatility and oil wealth* (Tinbergen Institute Discussion Paper No. 08-054/2). Tinbergen Institute. <https://papers.tinbergen.nl/08054.pdf>
- Ekeruche, M. A., Folarin, O., Ihezue, E., Okon, A., & Olasode, T. (2023, September 28). Fiscal policy options for growing out of debt: Evidence from Nigeria. *Brookings Institution*. <https://www.brookings.edu/articles/fiscal-policy-options-for-growing-out-of-debt-evidence-from-nigeria/>
- Evans, O. (2021). The curious case of petro-monetary transmission mechanism in oil-producing countries: An analysis of the effect of oil price on inflation in Nigeria. *Iranian Economic Review*, 25(1), 107–120. <https://doi.org/10.22059/ier.2019.70884>
- Garba, Z., Garba, I., Gambo, K. A., & Oladapo, J. (2024). Exchange rate-inflation nexus in Nigeria: Some stylized facts. *SSRN*. <https://doi.org/10.2139/ssrn.4854163>
- George, E. O., & Ogede, J. S. (2020). Asymmetric oil price and inflation: Evidence from net oil exporting countries in Africa. *Izvestiya Journal of Varna University of Economics*, 64(2), 168–179.
- Gidigbi, M., Babarinde, G., & Lawan, M. (2018). Inflation and exchange rate volatility pass-through in Nigeria. *Journal of Management, Economics, and Industrial Organization*, 18–40. <https://doi.org/10.31039/jomeino.2018.2.3.2>

- Henry, E. A., & Sabo, A. M. (2020). Impact of monetary policy on inflation rate in Nigeria: Vector autoregressive analysis. *Bullion*, 44(4), Article 6. <https://dc.cbn.gov.ng/bullion/vol44/iss4/6>
- Hooley, J., Nguyen, L., Saito, M., & Towfighian, S. N. (2021). *Fiscal dominance in Sub-Saharan Africa revisited* (IMF Working Paper No. 2021/017). International Monetary Fund. <https://doi.org/10.5089/9781513592604.001>
- Huseynov, S., Ahmadov, V., & Adigozalov, S. (2014). Beating a random walk: "Hard times" for forecasting inflation in post-oil boom years? (MPRA Paper No. 63515). Munich Personal RePEc Archive. <https://mpra.ub.uni-muenchen.de/63515/>
- Lawrence, E. O., & Okon, B. I. (2024). Oil revenue fluctuations and capital expenditure performance in Nigeria. *Nigerian Journal of Infrastructure and Development*, 11(3), 101–123.
- López-Villavicencio, A., & Pourroy, M. (2019). Inflation target and (a)symmetries in the oil price pass-through to inflation. *Energy Economics*, 80, 860–875. <https://doi.org/10.1016/j.eneco.2019.01.025>
- Mahdi, A. E. A. (2018). *Relationship between crude oil price fluctuations and inflation in Oman (1990–2017)*. Neelain University.
- Mordi, C. N. O. (2014). Exchange rate and inflation: Is there a relationship in Nigeria? *CBN Economic and Financial Review*, 52(4), 105–123.
- Nkoro, E., & Uko, A. K. (2016). Autoregressive distributed lag (ARDL) cointegration technique: Application and interpretation. *Journal of Statistical and Econometric Methods*, 5(4), 63–91.
- Nnadozie, O., Emediegwu, L. E., & Raifu, I. A. (2022). Examining the response of inflation to the boom-bust cycle of oil price: Evidence from Nigeria. <https://doi.org/10.2139/ssrn.4152273>
- Noer, A. A., Arie, J. F. A., & Piter, A. (2010). The relationship between inflation and real exchange rate: Comparative study between ASEAN+3, the EU and North America. *European Journal of Economics, Finance and Administrative Sciences*, 18. <http://www.eurojournals.com>
- Nuhu, M. (2021). Impact of exchange rate volatility on inflation in Nigeria. *Journal of Contemporary Research in Business, Economics and Finance*, 3(1), 26–38. <https://doi.org/10.33094/26410265.2021.31.26.38>
- Obiekwe, E., & Osabunhien, E. (2016). Exchange rate pass-through, exchange rate volatility and inflation rate in Nigeria [Paper presentation]. Proceedings of the 3rd International Conference on African Development Issues, Covenant University, Nigeria.
- Omojolaibi, J. A. (2013). Does volatility in crude oil price precipitate macroeconomic performance in Nigeria? *International Journal of Energy Economics and Policy*, 3(2), 143–152.
- Oriakhi, D. E. (2013). Oil price volatility and its consequences on the growth of the Nigerian economy: An examination (1970–2010). *Asian Economic and Financial Review*, 3(5), 683–702.
- Oriavwote, V. E., & Eshenake, S. J. (2012). Real exchange rate and inflation: An empirical assessment of the Nigerian experience. *Mediterranean Journal of Social Sciences*, 3(3), 145. <https://doi.org/10.5901/mjss.2012.v3n3p145>
- Osy, J., Callistus, I., & Ojimadu, P. K. (2020). Impact of oil price fluctuation on economic growth in Nigeria. *IOSR Journal of Economics and Finance*, 11(6), 43–54. <https://doi.org/10.9790/5933-1106034354>
- Otoakhia, E. I. (2020). Pass-through of crude-oil price shocks to consumer prices in Nigeria: Pre and post 2008 global financial crisis. *CBN Journal of Applied Statistics*, 12(1), Article 4. <https://dc.cbn.gov.ng/jas/vol12/iss1/4>
- Reisen, H. (1989). Interaction between the exchange rate and the public budget in major debtor developing countries. In *Macroeconomic adjustment and growth* (pp. 129–155). International Monetary Fund. <https://www.elibrary.imf.org/display/book/9781557751713/ch007.xml>
- Ruzzante, M., & Sobrinho, N. (2022). *The 'fiscal presource curse': Giant discoveries and debt sustainability* (IMF Working Paper No. 2022/010). International Monetary Fund. <https://doi.org/10.5089/9781616358990.001>
- Sachs, J. D., & Warner, A. M. (2001). The curse of natural resources. *European Economic Review*, 45(4–6), 827–838. [https://doi.org/10.1016/S0014-2921\(01\)00125-8](https://doi.org/10.1016/S0014-2921(01)00125-8)
- Sargent, T. J., & Wallace, N. (1981). Some unpleasant monetarist arithmetic. *Federal Reserve Bank of Minneapolis Quarterly Review*, 5(3), 1–17. <https://doi.org/10.21034/qv.531>
- Sharma, A., Rishad, A., & Gupta, S. (2019). Measuring the impact of oil prices and exchange rate shocks on inflation: Evidence

- from India. *Eurasian Journal of Business and Economics*, 12(24), 45–64.
- Sunday, T. (2020). Dynamic relationship between oil price and inflation in oil exporting economy: Empirical evidence from wavelet coherence technique. *Energy Economics Letters*, 7(1), 12–22.
<https://doi.org/10.18488/journal.82.2020.71.12.22>
- Tanzi, V. (1977). Inflation, lags in collection, and the real value of tax revenue. *IMF Staff Papers*, 24(1), 154–167.
<https://doi.org/10.2307/3866566>
- Wilson, A., David, U., Inyama, O., & Beatrice, E. (2014). Oil price volatility and economic development: Stylized evidence in Nigeria. *Journal of Economics and International Finance*, 6(6), 125–133.
<https://doi.org/10.5897/JEIF2014.0572>
- Yakub, M. U., Sani, Z., Obiezue, T. O., & Aliyu, V. O. (2019). Empirical investigation of exchange rate volatility and trade flows in Nigeria. *Central Bank of Nigeria Economic and Financial Review*, 57(1), 25–46.