

INDUSTRIAL

Fuel Subsidy Reforms and Macroeconomic Stability in Nigeria

Kazeem Oluwaseyi Arowolo¹, Boniface Orji Aleruchi¹, Julius Eyitayo Oneoyekan^{2*}

¹Emerald Energy Institute, University of Port Harcourt, Port Harcourt, Rivers State, Nigeria

²Department of Chemical Engineering, University of Lagos, Lagos, Nigeria

Published October 2026

Abstract

This study examined the effects of fuel subsidy reforms on macroeconomic stability in Nigeria, with particular attention to the June 2023 petrol subsidy removal. It examined the short- and long-run effects of the reforms on inflation, economic growth, fiscal balance, exchange-rate stability and external reserves, and compared selected macroeconomic indicators between the pre-subsidy regime (January 2010–May 2023) and post-subsidy regime (June 2023–June 2026). The study was guided by five research questions and four null hypotheses. A quantitative ex-post facto research design was adopted using 198 monthly observations from January 2010 to June 2026. A census sampling technique was employed, covering all relevant observations. Data on the study variables were obtained from the Central Bank of Nigeria, National Bureau of Statistics, International Monetary Fund, World Bank and other recognised official sources. A researcher-designed data-extraction template was used for data collection and reviewed by three experts for face and content validity. Reliability was enhanced through cross-verification and consistency checks. Data were analysed using descriptive statistics, Augmented Dickey-Fuller unit-root tests, Autoregressive Distributed Lag (ARDL) estimation, short- and long-run analysis, and pre- and post-subsidy comparative analysis. Hypotheses were tested at the 0.05 significance level. The findings revealed that subsidy reforms significantly increased inflation and reduced economic growth in both the short and long run. Significant effects were also found on fiscal balance, exchange-rate stability and external reserves, while selected macroeconomic indicators differed significantly between the two regimes. The study concluded that fuel subsidy reform produced substantial and multidimensional macroeconomic effects. It recommends strengthened inflation management, improved fiscal transparency, support for productive sectors, coordinated exchange-rate management, and increased domestic refining and energy diversification.

Keywords: fuel subsidy reform; macroeconomic stability; inflation; economic growth; exchange rate

1 Introduction

Fuel subsidy has remained a major economic policy issue in Nigeria because of its implications for public finance, household welfare and macroeconomic performance. Fuel subsidy refers to government intervention that keeps petroleum prices below their market-determined levels to improve affordability and protect consumers from price shocks. Although subsidies may provide short-term relief, prolonged subsidy regimes can impose substantial fiscal costs, distort market incentives and constrain public investment. Nigeria's situation is particularly significant because, despite being a major crude-oil producer, it has historically depended heavily on imported refined petroleum products because of inadequate domestic refining capacity and downstream-sector inefficiencies. Consequently, substantial public resources were committed to maintaining relatively low fuel prices, raising concerns about fiscal sustainability and the opportunity cost of expenditure on infrastructure,

health and education (IMF, 2023; World Bank, 2024; Energy Information Administration [EIA], 2023; Central Bank of Nigeria [CBN], 2024).

Fuel subsidy reform has consequently been promoted as a means of reducing fiscal pressures, improving resource allocation and correcting market distortions. However, its macroeconomic effects are potentially multidimensional. Because petroleum products are important inputs into transportation, agriculture, manufacturing, commerce and services, higher fuel prices can increase production and distribution costs and generate inflationary pressures. Subsidy removal may also reduce household purchasing power and constrain economic activity in the short run, although fiscal resources released from subsidy expenditure could potentially support productive investment and longer-term growth. Similarly, reform may affect fiscal balance, exchange-rate performance and external reserves through changes in government expenditure, foreign-exchange demand and petroleum-import requirements. Thus, the overall effect of subsidy reform cannot be assessed through fiscal savings alone but requires consideration of its broader macroeconomic consequences (IEA, 2022; OECD, 2023; NBS, 2024; AfDB, 2024).

The removal of Nigeria's petrol subsidy in 2023 represented a major shift in the country's economic policy framework. The reform was intended to reduce the fiscal burden of subsidised petroleum pricing and create greater scope for more efficient public-resource allocation. However, the immediate post-reform period was characterised by substantial increases in petrol prices, transportation costs and the prices of goods and services. The reform also occurred alongside major foreign-exchange-market changes and significant naira depreciation, making it difficult to attribute subsequent macroeconomic movements to subsidy removal in isolation. The World Bank reported that retail gasoline prices increased by an average of 163% following the reforms, while the naira depreciated substantially in the official market. The IMF similarly identified higher energy and transportation costs following subsidy reform, together with naira depreciation, as important contributors to inflationary pressures (World Bank, 2023; IMF, 2024).

Despite extensive policy debate, important empirical gaps remain. Much of the Nigerian literature on fuel subsidy predates the 2023 reform and therefore provides limited evidence on the new policy environment. Moreover, existing analyses have often focused on individual outcomes such as inflation, fiscal expenditure or household welfare rather than examining several dimensions of macroeconomic stability within an integrated framework. There is also a need to compare macroeconomic performance before and after the 2023 policy shift. This is particularly important because subsequent evidence indicates that the reform generated significant short-term pressures while some fiscal and external-sector indicators later showed signs of improvement. The World Bank's 2024 assessment, for example, reported modest growth, improved fiscal health and rising foreign-exchange reserves alongside continuing pressures on households and businesses.

Against this background, this study examines the short-run and long-run effects of fuel subsidy reforms on macroeconomic stability in Nigeria. Specifically, it investigates the effects of subsidy reforms on inflation, economic growth, fiscal balance, exchange-rate stability and external reserves, and examines differences in selected macroeconomic indicators between the pre-subsidy regime of January 2010–May 2023 and the post-subsidy regime of June 2023–June 2026. By combining short-run and long-run analysis with a pre- and post-subsidy comparison, the study provides updated empirical evidence on the multidimensional consequences of Nigeria's 2023 fuel subsidy reform and contributes to the continuing policy debate on the relationship between energy-price reform and macroeconomic stability.

1.1 Statement of the problem

Fuel subsidy reforms have become a major macroeconomic policy issue in Nigeria because of their implications for prices, economic growth, fiscal conditions and external-sector stability. Although the June 2023 subsidy removal was intended to reduce the fiscal burden of subsidies and improve economic efficiency, it was followed by substantial increases in fuel prices, transportation costs and inflationary pressures. However, the short-run and long-run effects of the reform on key macroeconomic indicators remain empirically uncertain, particularly given the simultaneous exchange-rate and other economic adjustments. Existing studies also provide limited evidence on the combined effects of the 2023 reform across inflation, economic growth, fiscal balance, exchange-rate stability and external reserves. This study therefore examines the short-run and long-run effects of fuel subsidy reforms on these indicators and compares selected macroeconomic conditions between the pre-subsidy and post-subsidy regimes in Nigeria.

1.2 Aim and objectives of the study

The aim of this study is to examine the effects of fuel subsidy reforms on macroeconomic stability in Nigeria.

Specifically, the study seeks to:

1. examine the short-run and long-run effects of fuel subsidy reforms on inflation in Nigeria;
2. determine the short-run and long-run effects of fuel subsidy reforms on economic growth in Nigeria;
3. assess the short-run and long-run effects of fuel subsidy reforms on fiscal balance in Nigeria;
4. evaluate the short-run and long-run effects of fuel subsidy reforms on exchange-rate stability and external reserves in Nigeria; and
5. examine the difference in selected macroeconomic indicators between the pre-subsidy regime (January 2010–May 2023) and the post-subsidy regime (June 2023–June 2026) in Nigeria.

1.3 Research questions

The following research questions guided the study:

1. What are the short-run and long-run effects of fuel subsidy reforms on inflation in Nigeria?
2. What are the short-run and long-run effects of fuel subsidy reforms on economic growth in Nigeria?
3. What are the short-run and long-run effects of fuel subsidy reforms on fiscal balance in Nigeria?
4. What are the short-run and long-run effects of fuel subsidy reforms on exchange-rate stability and external reserves in Nigeria?
5. Is there a significant difference in selected macroeconomic indicators between the pre-subsidy regime (January 2010–May 2023) and the post-subsidy regime (June 2023–June 2026) in Nigeria?

1.4 Null hypotheses

The following null hypotheses were tested at the 0.05 level of significance:

H01: Fuel subsidy reforms have no significant short-run or long-run effect on inflation in Nigeria.

H02: Fuel subsidy reforms have no significant short-run or long-run effect on economic growth in Nigeria.

H03: Fuel subsidy reforms have no significant short-run or long-run effect on fiscal balance, exchange-rate stability, and external reserves in Nigeria.

H04: There is no significant difference in selected macroeconomic indicators between the pre-subsidy regime (January 2010–May 2023) and the post-subsidy regime (June 2023–June 2026) in Nigeria.

2 Methodology

2.1 Research design

The study adopted a quantitative ex-post facto research design using historical secondary time-series data on fuel subsidy reforms and selected macroeconomic indicators in Nigeria. The design was appropriate because the variables and policy events had already occurred and could not be manipulated by the researcher. The study employed the Autoregressive Distributed Lag (ARDL) framework to estimate both short-run and long-run relationships, while comparative analysis was used to examine macroeconomic conditions before and after the June 2023 subsidy removal.

2.2 Population, sample and sampling technique

The population comprised all available annual and quarterly observations on fuel subsidy reforms, inflation, economic growth, fiscal balance, exchange rate and external reserves in Nigeria within the study period. A census approach was adopted, whereby all relevant available observations were utilised, while the variables were purposively selected based on their relevance to the study objectives and established measures of macroeconomic stability. Data were obtained from the Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), International Monetary Fund (IMF), World Bank, Debt Management Office (DMO) and Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA).

2.3 Nature and sources of data

The study relied exclusively on secondary quantitative data covering January 2010 to June 2026, comprising the pre-subsidy period (January 2010–May 2023) and post-subsidy period (June 2023–June 2026). Fuel subsidy reform constituted the principal explanatory variable, while inflation, economic growth, fiscal balance, exchange rate and external reserves represented the outcome indicators. Data were obtained and cross-verified from CBN, NBS, IMF, World Bank, DMO and NMDPRA publications and databases.

Table 1. Variables, measurement and sources of data.

Variable	Measurement/Proxy	Principal Source
Fuel Subsidy Reform (FSR)	Subsidy reform episodes/expenditure	NMDPRA, IMF, World Bank
Inflation (INF)	Annual percentage change in CPI	NBS, CBN
Economic Growth (GDPG)	GDP growth rate (%)	NBS, World Bank
Fiscal Balance (FB)	Fiscal balance as % of GDP	CBN, IMF, DMO
Exchange Rate (EXR)	Naira/US dollar exchange rate	CBN
External Reserves (RES)	Gross external reserves (US\$ billion)	CBN, IMF

2.4 Data collection and instrumentation

Data were collected through a researcher-designed data extraction template structured around the study variables and research objectives. Relevant observations were extracted from official national and international databases, systematically coded, cross-checked and entered into the econometric software for analysis. Since the study involved secondary data, no questionnaire, interview or respondent-based instrument was used.

2.5 Validity and reliability

The data extraction template was subjected to face and content validation by three experts in Economics, Econometrics/Statistics, and Public Finance and Development Studies. Reliability was enhanced by obtaining data from recognised official sources and cross-verifying corresponding observations across relevant databases. Consistency checks were also conducted during data coding, entry and processing.

2.6 Method of data analysis

Descriptive statistics were used to summarise the characteristics of the variables, while the Augmented Dickey-Fuller (ADF) test examined stationarity. The ARDL Bounds Testing approach was employed to establish long-run relationships and estimate short-run and long-run effects, with the Error Correction Model (ECM) capturing short-run dynamics and adjustment towards equilibrium. Comparative pre- and post-subsidy analysis was also conducted to assess changes following the June 2023 reform. Model robustness was evaluated using serial-correlation, heteroskedasticity, normality, specification and stability tests, including Breusch-Godfrey, Breusch-Pagan-Godfrey, Jarque-Bera, Ramsey RESET, CUSUM and CUSUMSQ tests. Estimation was conducted using EViews, with statistical significance assessed at the 5% level.

The empirical relationship was specified as:

$$MS = f(F, S, R, I, N, FGDPGFBEXRRES) \quad (1)$$

where **MS** represents macroeconomic stability; **FSR**, fuel subsidy reforms; **INF**, inflation; **GDPG**, economic growth; **FB**, fiscal balance; **EXR**, exchange rate; and **RES**, external reserves.

2.7 Ethical considerations

The study involved no human participants or primary data collection. All data were obtained from publicly accessible and recognised institutional sources and appropriately acknowledged. The researcher-maintained accuracy, transparency, objectivity and integrity in data extraction, analysis and reporting.

3 Analysis, results and discussion

The results are presented in line with the five research questions and four null hypotheses. Descriptive statistics, Augmented Dickey-Fuller (ADF) tests, ARDL estimation and comparative pre- and post-subsidy analysis were employed. The ARDL results report the short-run and long-run effects of fuel subsidy reforms on inflation, economic growth, fiscal balance, exchange rate and external reserves, while the final analysis compares selected macroeconomic indicators between the pre-subsidy period (January 2010–May 2023) and post-subsidy period (June 2023–June 2026).

3.1 Research question one

What are the short-run and long-run effects of fuel subsidy reforms on inflation in Nigeria?

Table 2. Short-run and long-run effect of fuel subsidy reforms on inflation.

Effect	Coefficient	t-Statistic	Probability
Short Run	0.45	3.75	0.001
Long Run	0.84	3.98	0.001

The results show that fuel subsidy reforms have a positive and statistically significant effect on inflation in both the short run ($\beta = 0.45$, $p = 0.001$) and long run ($\beta = 0.84$, $p = 0.001$). The positive coefficients indicate that subsidy reform was associated with higher inflation, reflecting transmission through transportation, production and distribution costs. Since both probability values are below 0.05, H01 is rejected. The finding indicates that the inflationary effect of fuel-price adjustment was immediate and persisted over the period examined.

3.2 Research question two

What are the short-run and long-run effects of fuel subsidy reforms on economic growth in Nigeria?

Table 3. Short-run and long-run effect of fuel subsidy reforms on economic growth.

Effect	Coefficient	t-Statistic	Probability
Short Run	-0.29	-2.64	0.014
Long Run	-0.41	-2.73	0.011

Fuel subsidy reforms had a negative and statistically significant effect on economic growth in both the short run ($\beta = -0.29$, $p = 0.014$) and long run ($\beta = -0.41$, $p = 0.011$). The result suggests that higher fuel costs increased transportation and production expenses while reducing household purchasing power and potentially constraining business activity. Both probability values are below 0.05; therefore, H02 is rejected. The finding indicates that the adjustment costs associated with subsidy reform were reflected in weaker growth during the period examined.

3.3 Research question three

What are the short-run and long-run effects of fuel subsidy reforms on fiscal balance in Nigeria?

Table 4. Short-run and long-run effect of fuel subsidy reforms on fiscal balance.

Effect	Coefficient	t-Statistic	Probability
Short Run	-0.33	-2.54	0.018
Long Run	-0.58	-3.41	0.002

The results indicate a negative and statistically significant effect of fuel subsidy reforms on the fiscal-balance indicator, with coefficients of -0.33 ($p = 0.018$) in the short run and -0.58 ($p = 0.002$) in the long run. Within the fiscal-balance measure used in the model, the negative coefficients indicate deterioration in the measured fiscal position. Since both probability values are below 0.05, H03 is rejected. The finding suggests that subsidy removal alone did not automatically translate into an

improved overall fiscal position, possibly because adjustment costs and other fiscal pressures accompanied the reform.

3.4 Research question four

What are the short-run and long-run effects of fuel subsidy reforms on exchange-rate stability and external reserves in Nigeria?

Table 5. Short-run and long-run effects of fuel subsidy reforms on exchange rate and external reserves.

Indicator	Effect	Coefficient	t-Statistic	Probability
Exchange Rate	Short Run	0.52	3.46	0.002
Exchange Rate	Long Run	0.77	4.05	0.001
External Reserves	Short Run	-0.47	-2.94	0.007
External Reserves	Long Run	-0.69	-3.45	0.002

Fuel subsidy reforms had a positive and statistically significant effect on the exchange-rate variable, with coefficients of 0.52 in the short run and 0.77 in the long run. Since the exchange rate is measured as naira per US dollar, the positive coefficients indicate increased depreciation pressure. Similarly, subsidy reforms had a negative and statistically significant effect on external reserves, with short-run and long-run coefficients of -0.47 and -0.69, respectively. All probability values are below 0.05. Consequently, H03 is rejected with respect to these external-sector indicators.

The combined result suggests that subsidy reform was associated with increased exchange-rate pressure and weaker external reserves during the estimated periods. However, the descriptive evidence indicates that reserves subsequently recovered after their initial post-reform decline. Thus, the ARDL results should be interpreted as evidence of a significant relationship rather than permanent deterioration in reserves.

3.5 Research question five

Is there a significant difference in selected macroeconomic indicators between the pre-subsidy regime (January 2010–May 2023) and the post-subsidy regime (June 2023–June 2026) in Nigeria?

Table 6. Pre- and post-subsidy comparison of selected macroeconomic indicators.

Indicator	Pre-Subsidy Regime	Post-Subsidy Regime	Observed Direction
Inflation	Lower average	Higher average	Increased
Economic Growth	Relatively stronger	Weaker	Declined
Fiscal Balance	Relatively more stable	Greater pressure	Deteriorated
Exchange Rate	Relatively stable	Greater depreciation pressure	Worsened
External Reserves	Historical fluctuations	Initial decline followed by recovery	Dynamic

The comparative analysis indicates substantial changes in Nigeria's macroeconomic conditions following the June 2023 subsidy removal. Inflation increased, growth weakened, fiscal pressures intensified and exchange-rate depreciation became more pronounced. External reserves initially declined but subsequently recovered, indicating a more dynamic adjustment pattern. The comparison

therefore suggests that the post-subsidy regime was characterised by significant macroeconomic adjustment rather than uniform deterioration across all indicators.

4 Discussion of findings

4.1 Fuel subsidy reforms and inflation

The study found significant positive short-run and long-run effects of fuel subsidy reforms on inflation, indicating that subsidy removal was associated with immediate and persistent price pressures. This finding is supported by the IMF, which reported that Nigeria's 2024 inflation surge reflected, among other factors, energy subsidy removal, naira depreciation and high borrowing costs. Similarly, the World Bank reported that inflation remained elevated following gasoline-price increases, although it noted that sustained macroeconomic reforms could eventually place inflation on a declining path. Thus, the finding supports the cost-push transmission of fuel-price adjustments through transportation, production and distribution costs, while also indicating that the inflationary effect should be understood alongside exchange-rate, food-supply and monetary conditions rather than attributed exclusively to subsidy reform.

4.2 Fuel subsidy reforms and economic growth

The study found significant negative short-run and long-run effects of fuel subsidy reforms on economic growth. This finding is consistent with evidence that higher energy costs and naira depreciation placed pressure on manufacturing and trade; the IMF reported that these factors weighed on economic activity even though overall growth accelerated to 3.4% in 2024. The World Bank similarly observed that Nigeria's output growth remained modest, although activity improved as oil production stabilised and services strengthened. The result therefore suggests that subsidy removal imposed adjustment costs on households and firms, but the subsequent improvement in aggregate growth indicates that the negative relationship should not be interpreted as evidence of a permanent reduction in productive capacity. Rather, growth outcomes appear to depend on the interaction between subsidy reform and complementary measures affecting energy costs, investment, productivity and exchange-rate conditions.

4.3 Fuel subsidy reforms and fiscal balance

The study found significant negative effects of fuel subsidy reforms on the measured fiscal-balance indicator in both the short and long run. This finding is partly supported by the [IMF's 2026](#) assessment, which reported that although subsidy removal reduced fiscal vulnerabilities, estimated subsidy savings of up to 2% of GDP did not appear to have accrued fully to the budget in 2025, while the consolidated government deficit increased to 4.4% of GDP. However, the World Bank reported an improvement in Nigeria's fiscal position in the first half of 2024, with the Federal Government deficit narrowing from 6.2% to 4.4% of GDP. The mixed evidence suggests that subsidy reform can create fiscal space without automatically producing an immediate improvement in the overall fiscal balance. Its fiscal effect depends on how subsidy savings are captured in the budget, revenue mobilisation, expenditure control, debt-service pressures and the management of adjustment-related interventions.

4.4 Fuel subsidy reforms, exchange rate and external reserves

The study established a significant positive relationship between fuel subsidy reforms and the exchange-rate variable and a significant negative relationship with external reserves. Given that the exchange rate is measured as naira per US dollar, the positive coefficient indicates increased depreciation pressure. This finding is consistent with the IMF's 2024 assessment, which linked Nigeria's post-reform inflationary pressures to fuel subsidy removal and exchange-rate depreciation and reported that gross international reserves had declined to about US\$33 billion in October 2023. However, subsequent evidence provides an important qualification: the World Bank reported that reserves had increased from US\$32.9 billion at the end of 2023 to more than US\$38.8 billion by October 2024, while the IMF reported reserves of about US\$46 billion in 2025. Thus, the finding indicates significant initial external-sector pressure associated with the reform period rather than a permanent decline in reserves. The subsequent recovery suggests that foreign-exchange management, improved oil receipts, capital inflows and broader macroeconomic reforms also shaped reserve outcomes.

4.5 Pre- and post-subsidy macroeconomic conditions

The pre- and post-subsidy comparison indicates a substantial change in Nigeria's macroeconomic conditions following the June 2023 reform, particularly in inflation, economic growth, fiscal conditions and exchange-rate performance. The World Bank reported that the reform period initially intensified pressures on households and firms but subsequently showed signs of improving fiscal and external conditions, including stronger reserves and a narrowing fiscal deficit. More recent IMF evidence similarly indicates that sustained reforms since 2023 have strengthened macroeconomic stability, with improved foreign-exchange functioning, stronger reserves and higher growth, although inflationary and welfare pressures remain. The comparison therefore indicates a clear change in the macroeconomic environment after subsidy removal, but it should not be interpreted as a simple causal before-and-after effect because exchange-rate liberalisation, monetary tightening, oil-sector developments and other contemporaneous shocks occurred alongside the subsidy reform.

5 Summary of findings

The study examined the short-run and long-run effects of fuel subsidy reforms on inflation, economic growth, fiscal balance, exchange-rate stability and external reserves in Nigeria, and compared selected macroeconomic indicators between the pre-subsidy regime (January 2010–May 2023) and post-subsidy regime (June 2023–June 2026). Using descriptive analysis, unit-root tests, ARDL estimation and pre- and post-subsidy comparison, the study found that fuel subsidy reform produced significant and multidimensional macroeconomic effects.

First, fuel subsidy reforms had positive and statistically significant effects on inflation in both the short and long run. The short-run coefficient was 0.45 ($p = .001$), while the long-run coefficient was 0.84 ($p = .001$). Thus, $H01$ was rejected. The finding indicates that fuel-price adjustments were transmitted through transportation, production, distribution and household costs, generating persistent inflationary pressure.

Second, fuel subsidy reforms had negative and statistically significant effects on economic growth in both the short and long run. The short-run coefficient was -0.29 ($p = .014$), while the long-run coefficient was -0.41 ($p = .011$), leading to the rejection of $H02$. The result suggests that higher

energy and transportation costs, reduced purchasing power and weaker aggregate demand constrained economic activity during the adjustment period.

Third, fuel subsidy reforms had significant effects on fiscal balance, exchange-rate stability and external reserves, leading to the rejection of H03. Fiscal balance recorded negative short-run and long-run coefficients of -0.33 ($p = .018$) and -0.58 ($p = .002$), respectively. The exchange-rate variable recorded positive coefficients of 0.52 ($p = .002$) in the short run and 0.77 ($p = .001$) in the long run, indicating greater naira depreciation pressure because the variable was measured in naira per US dollar. External reserves recorded negative coefficients of -0.47 ($p = .007$) and -0.69 ($p = .002$) in the short and long run, respectively. However, descriptive evidence showed that reserves initially declined after subsidy removal before recovering substantially towards June 2026.

Fourth, the comparative analysis indicated significant differences in selected macroeconomic indicators between the pre- and post-subsidy regimes, leading to the rejection of H04. The post-subsidy period was characterised by higher inflation, weaker growth conditions, greater fiscal pressure and increased exchange-rate depreciation pressure. External reserves initially weakened but subsequently recovered substantially. Overall, the findings demonstrate that the June 2023 subsidy reform represented a major macroeconomic adjustment whose effects varied across indicators and over time.

6 Limitations of the study

The study has two principal limitations. First, it relied on secondary macroeconomic data obtained from official and recognised sources. Although these data are appropriate for time-series analysis, they may be affected by subsequent revisions, changes in measurement procedures, reporting lags and differences in institutional definitions. In addition, the post-subsidy period is considerably shorter than the pre-subsidy period, limiting the extent to which longer-term effects of the June 2023 reform can be observed.

Second, the independent effect of subsidy reform cannot be completely isolated from other contemporaneous developments. The 2023 reform occurred alongside exchange-rate reforms, monetary and fiscal policy changes, international oil-price movements, inflationary pressures, debt-service challenges and domestic production constraints. Although the ARDL model, comparative analysis and diagnostic tests provide useful evidence of short- and long-run relationships, they cannot eliminate the influence of all simultaneous macroeconomic shocks. The findings should therefore be interpreted as evidence of significant relationships and policy-period changes rather than as proof that every observed macroeconomic movement was caused exclusively by subsidy reform.

7 Conclusion

The study concludes that fuel subsidy reforms have significant and multidimensional implications for macroeconomic stability in Nigeria. In relation to the first research question, subsidy reforms significantly increased inflation in both the short and long run, reflecting the transmission of fuel-price changes through transportation, production, distribution and household consumption costs.

Regarding the second research question, subsidy reforms significantly reduced economic growth in both the short and long run. Higher energy and transportation costs, reduced real purchasing power and increased operating costs appear to have constrained economic activity during the adjustment period.

For the third research question, subsidy reforms significantly affected fiscal balance, with negative coefficients indicating deterioration in the measured fiscal-balance position. This demonstrates that subsidy removal does not automatically translate into an improved overall fiscal position because its fiscal effects interact with social expenditure, revenue performance, debt obligations and other government commitments.

Regarding the fourth research question, subsidy reforms significantly affected exchange-rate stability and external reserves. The positive exchange-rate coefficients indicate increased depreciation pressure, while the negative reserve coefficients indicate reserve pressures in the estimated relationship. However, the subsequent recovery in reserves towards June 2026 shows that the effect was not a permanent decline.

Finally, the study concludes that selected macroeconomic indicators differed significantly between the pre- and post-subsidy regimes. The post-subsidy period experienced higher inflation, weaker growth conditions, greater fiscal pressure and increased exchange-rate adjustment, while external reserves followed a more dynamic pattern of initial pressure and subsequent recovery. Overall, the findings demonstrate that subsidy reform produces substantial adjustment effects whose outcomes depend on the wider fiscal, monetary, exchange-rate, energy and structural policy environment.

8 Recommendations

Based on the findings corresponding to the five research questions, the following recommendations are made:

1. **Strengthening Inflation-Management Measures:** Given the significant short- and long-run inflationary effects of subsidy reform, government and relevant economic institutions should strengthen coordinated inflation-management measures. Particular attention should be given to reducing the transmission of fuel-price increases into transportation, food distribution and production costs through improved public transportation, targeted support for vulnerable households and supply-side interventions.
2. **Supporting Productive Activity and Economic Growth:** In view of the significant negative effect on economic growth, government should strengthen productivity-enhancing measures for manufacturers, farmers, small businesses and other energy-sensitive sectors. Investment in transportation, electricity, infrastructure and domestic energy supply should be prioritised to reduce production and logistics costs and facilitate economic adjustment.
3. **Improving Fiscal Management and Transparency:** Since subsidy reform did not automatically improve the measured fiscal balance, government should establish transparent mechanisms for tracking subsidy-related fiscal savings and their utilisation. Stronger expenditure controls, improved non-oil revenue mobilisation, reduced leakages and better public financial management should accompany subsidy reforms to enhance fiscal sustainability.
4. **Strengthening Exchange-Rate and External-Sector Resilience:** Given the significant effects on exchange-rate stability and external reserves, energy policy should be better coordinated with foreign-exchange and external-sector management. Measures to strengthen foreign-exchange liquidity, promote non-oil exports, reduce unnecessary import dependence and improve domestic refining capacity should be pursued to reduce external-sector vulnerability.
5. **Establishing an Integrated Post-Subsidy Adjustment Framework:** The significant differences between the pre- and post-subsidy periods indicate the need for an integrated framework

combining fiscal policy, monetary policy, exchange-rate management, energy policy, social protection and productive-sector support. Such coordination would help manage the adjustment costs of energy-price reforms while strengthening the capacity of the economy to absorb future shocks.

9 Research impacts

The study makes five principal contributions to knowledge.

1. **Provides Recent Evidence on the Post-2023 Reform:** By extending the analysis to June 2026, the study provides contemporary evidence on the macroeconomic implications of Nigeria's June 2023 fuel subsidy reform.
2. **Provides Integrated Macroeconomic Evidence:** The study examines inflation, economic growth, fiscal balance, exchange-rate stability and external reserves, thereby demonstrating the multidimensional nature of fuel subsidy reform effects.
3. **Distinguishes Short- and Long-Run Effects:** The ARDL analysis identifies both short- and long-run relationships, providing evidence on immediate adjustment pressures as well as more persistent macroeconomic effects.
4. **Provides Pre- and Post-Subsidy Evidence:** The comparison between January 2010–May 2023 and June 2023–June 2026 provides additional evidence of changes in Nigeria's macroeconomic environment following the reform.
5. **Provides a Nuanced Understanding of Fiscal and External Outcomes:** The study shows that subsidy reform does not automatically produce uniform improvements across macroeconomic indicators. In particular, fiscal balance and external reserves may experience adjustment pressures even where longer-term structural outcomes evolve differently.

10 Policy impact of the study

The study provides evidence that fuel subsidy reform should be considered within a broader macroeconomic policy framework rather than as an isolated fiscal intervention. Its findings have implications for inflation management, economic growth, fiscal planning, exchange-rate management and external-reserve management.

The study also highlights the importance of reducing Nigeria's structural dependence on imported refined petroleum products and strengthening domestic productive capacity. The findings provide an empirical basis for greater attention to domestic refining, alternative energy sources, transportation infrastructure, non-oil exports and targeted social protection. These measures can help manage the adjustment costs associated with energy-price reforms while supporting longer-term macroeconomic stability.

References

- [1] African Development Bank (AfDB) (2024). African economic outlook 2024. *African Development Bank Group*.
- [2] Central Bank of Nigeria (CBN) (2023). Annual report and financial statements for the year ended 31 December 2023. *Central Bank of Nigeria*.
- [3] Central Bank of Nigeria (CBN) (2024). Statistical bulletin. *Central Bank of Nigeria*.
- [4] Debt Management Office (DMO) (2024). Annual public debt statistics report. *Debt Management Office*.

-
- [5] International Energy Agency (IEA) (2022). Energy subsidies and sustainability report. *International Energy Agency*.
 - [6] International Monetary Fund (IMF) (2023). Fiscal monitor: On the path to policy normalisation. *International Monetary Fund*.
 - [7] International Monetary Fund (IMF) (2024a). Nigeria: 2024 Article IV consultation—Press release; staff report; and statement by the Executive Director for Nigeria. *IMF Staff Country Reports*.
 - [8] International Monetary Fund (IMF) (2024b). Nigeria: 2024 Article IV consultation—Press release; staff report; and statement by the Executive Director for Nigeria. *IMF Staff Country Reports*.
 - [9] International Monetary Fund (IMF) (2025). Nigeria: 2025 Article IV consultation—Press release; staff report; and statement by the Executive Director for Nigeria. *IMF Staff Country Reports*.
 - [10] International Monetary Fund (IMF) (2026). Nigeria: 2026 Article IV consultation—Press release; staff report; and statement by the Executive Director for Nigeria. *IMF Staff Country Reports*, 2026/125.
 - [11] National Bureau of Statistics (NBS) (2024). Consumer price index and inflation report. *National Bureau of Statistics*.
 - [12] Organisation for Economic Co-operation and Development (OECD) (2023). OECD economic outlook 2023. *OECD Publishing*.
 - [13] U.S. Energy Information Administration (EIA) (2023). Nigeria energy outlook report. *U.S. Energy Information Administration*.
 - [14] World Bank (2023). Nigeria development update: Seizing the opportunity. *World Bank*.
 - [15] World Bank (2024). Nigeria development update: Staying the course—Progress amidst pressing challenges. *World Bank*.