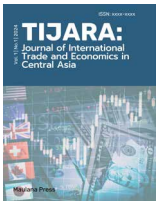

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Fuel subsidy removal and macroeconomic performance in Nigeria: A Vector Error Correction Model (VECM) approach

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Abstract

This study investigates the impact of fuel subsidy removal on macroeconomic performance in Nigeria between 1990-2024. This research paper employed secondary data on specified variables in Nigeria that is, time series data was used for the study. The data was collected from National Bureau of Statistics (NBS) reports, Central Bank of Nigeria (CBN) statistical bulletins, International Monetary Fund publications, Nigeria Ministry of Finance, World Bank Development Indicators. Vector Error Correction Model (VECM) was employed in analyzing the data collected using Econometrics views (E-views) as the tool. The estimation further encompasses of unit root test (Augmented Dickey Fuller (ADF) test) and Johansen cointegration test accompanied by related post-diagnostic test. The ADF revealed that most of the variables are stationery at first difference and only fuel subsidy removal is stationery at level and the cointegration test confirmed a long run relationship which drove the use of VECM. The result of the study noted that fuel subsidy removal has a short run impact on economic growth and long run impact on inflation rate, unemployment rate, and economic growth while exchange rate remained unaffected. The study recommends that post-subsidy monetary policy should prioritize inflation management because it has a lasting effect on GDP and the government should make job creation top priority because unemployment and GDP have a substantial negative link.

INTRODUCTION

The withdrawal of fuel subsidies has been an issue of dispute in Nigeria, where the government must make a difficult trade-off between social welfare and economic restraint. Assuring sustainable economic growth and development by avoiding the burden of unsustainable subsidies can be seen as the economic restriction in this context, while protecting the marginalized population from the negative consequences of rising fuel prices is an indication of social welfare. It can be difficult to strike a balance between social welfare and economic constraints because eliminating fuel subsidies might result in poverty and inequality, and putting this policy into effect may impede or restrict economic progress. Nigeria's Federal Government has been struggling to address the fuel subsidy issue, which has had a significant negative impact on the country's finances (resulting in a budget deficit), foreign exchange reserves, and overall economy, leading to corruption and incompetence; inadequate resource allocation that allows more resources to be diverted to the oil sector, neglecting other crucial sectors like healthcare and education (IMF, 2021); and concerns about the negative environmental effects

of increased fossil fuel use, which increase carbon emissions,(Sweeney, 2020) road congestion, and air quality degradation. (McCulloch, Moerenhout and Yang, 2021).

The country's endowments, which were estimated to be worth $1 trillion in 2022 from $325 billion in 2018 (International Energy Agency, 2019), are under tremendous strain as a result of the fuel subsidy program, which was started in the 1970s to ensure affordable fuel for the general public, especially the low-income citizens (IMF, 2020). This led to the June 2023 suggestion to discontinue the fuel subsidy, with the goal of using the money saved to give the underprivileged and vulnerable population the critical assistance they need (Ozili and Ozen, 2021; Couharde and Mouhoud, 2020) because the majority of these fuel-powered industries and businesses (such as gasoline and diesel) are owned by high-income citizens and the low-income citizens do not benefit. While some argue that eliminating subsidies will result in economic downturns, higher prices and inflationary pressures, and lower consumer disposable income, others argue that it will increase government revenue, encourage investment in other areas that will open up opportunities for the private sector, and ensure that resources are distributed efficiently, all of which will support economic growth (Evans et al., 2023). Overall, the impact of eliminating fuel subsidies on the Nigerian economy is a complex matter that calls for a thorough analysis of a number of factors. Potential disadvantages include price increases and market volatility, but there are also potential benefits like higher government revenue that can be used to invest in other areas.

The removal of fuel subsidies in Nigeria has been a polarizing subject, with both proponents and critics presenting compelling arguments. On the one hand, proponents argue that subsidy removal is necessary to curb fiscal deficits, reduce corruption, and redirect resources toward productive sectors such as healthcare and education. On the other hand, critics contend that subsidy removal disproportionately affects the poor, exacerbating inequality and eroding the purchasing power of households (Abubakar & Saidu, 2019). These conflicting perspectives underscore the complexity of the issue and highlight the need for an evidence-based approach to evaluating its macroeconomic effects. Despite extensive research on energy subsidies, significant gaps remain in understanding how their removal impacts key macroeconomic indicators such as inflation, exchange rates, unemployment and economic growth in Nigeria. Existing studies often focus on the short-term socio-economic consequences of subsidy reforms, with limited emphasis on long-term macroeconomic stability and sectoral performance. Additionally, there is a paucity of empirical research incorporating recent policy changes, such as the comprehensive subsidy removal in 2023 (Adeoye & Olayemi, 2023).

This study addresses these gaps by examining the relationship between fuel subsidy removal and macroeconomic performance in Nigeria. It seeks to provide insights into how subsidy reforms influence economic stability, government revenue, employment level and overall welfare. The findings will inform policymakers on the trade-offs involved in subsidy removal and guide the design of complementary policies to mitigate adverse effects.

LITERTURE REVIEW.

Conceptual Framework

Fuel subsidies represent government interventions aimed at reducing the cost of fuel for consumers by absorbing part of the market price. These subsidies are typically justified on grounds of social equity, economic development, and political stability. However, over time, the fiscal sustainability of such policies has been questioned, particularly in resource-dependent economies like Nigeria (Iyoha & Oriakhi, 2015). Conceptually, the removal of fuel subsidies entails a shift from government-funded price stabilization to market-driven pricing mechanisms,

which can have profound implications for macroeconomic performance. Key macroeconomic indicators affected include inflation, fiscal deficits, exchange rates, and economic growth.

Economic theory suggests that subsidies distort market efficiency by encouraging overconsumption and discouraging investment in alternative energy sources. The removal of subsidies is expected to align fuel prices with market realities, improve fiscal balance, and foster economic efficiency. However, the socio-economic consequences, such as increased transportation costs and reduced disposable incomes, often spark public resistance (Adedokun, 2017; Eboh & Ogbonna, 2021).

Theoretical Framework

The theoretical underpinning of this study is rooted in the Public Choice Theory and Keynesian Economics.

Public Choice Theory

This theory posits that government decisions, including subsidy policies, are influenced by the self-interests of policymakers and pressure groups. In Nigeria, subsidies have often been used as a political tool to gain public support, leading to inefficiencies and corruption (Abubakar & Saidu, 2019). The removal of subsidies, from this perspective, represents a policy shift aimed at addressing these inefficiencies and promoting economic rationality.

Keynesian Economics

This framework emphasizes the role of government intervention in stabilizing the economy. While fuel subsidies can act as a stabilizing tool during periods of economic downturn, their removal is viewed as a necessary adjustment to reduce fiscal deficits and reallocate resources to productive sectors (Okonkwo et al., 2020). The Keynesian perspective also highlights the potential inflationary effects of subsidy removal, necessitating complementary policies to mitigate adverse impacts on aggregate demand.

Empirical Literature

Subsidies are a type of government intervention that distorts the natural market forces by giving direct financial assistance to individuals or private businesses that are deemed to benefit the public. The term "fuel subsidy" refers to financial assistance provided by the government to lower fuel prices and costs, making fuel more affordable for more consumers. This is achieved by lowering the price of fuel relative to the market price, with the government paying the difference for fuel suppliers in an effort to increase fuel consumption, protect vulnerable groups, and advance industrial development (Onwuka et al., 2013). Fuel subsidies in Nigeria were introduced in the 1970s to make fuel affordable and stabilize domestic prices during a period of rising oil revenue. The intent was to use oil wealth to reduce living costs, maintain social stability, and encourage industrial development by lowering transportation and production costs (Onwuka et al., 2013). Over time, the policy expanded throughout the 1990s and 2000s, becoming a central but increasingly unsustainable component of Nigeria's economic strategy (Ovaga & Okechukwu, 2022).

Despite its initial social benefits, the fuel subsidy regime gradually became a major fiscal burden. It consumed significant portions of government revenue, created large budget deficits, and limited capital investment in critical sectors such as infrastructure, healthcare, and education (Adebayo, 2020; Federal Budget, 2023). The World Bank (2019) estimated that Nigeria spent approximately $30 billion on petrol subsidies, and in 2022 alone, the government borrowed ₪1 trillion to fund subsidy payments, further aggravating the country's public debt (DMO, 2022). In addition to its financial strain, the subsidy system was riddled with inefficiencies and corruption. Fuel was routinely smuggled into neighboring countries due to the price differential,

with as much as 58 million litres of petrol smuggled out daily, depriving the Nigerian economy of potential revenue (Blueprint, 2022; Chapel Hill Denham, 2022). Fraudulent claims for non-existent fuel imports were also facilitated through collusion among corrupt officials in agencies such as NNPC, DPR, Customs, and PPPRA (Nweze, 2012; NEITI, 2023).

Several administrations attempted to reform or eliminate the subsidy, including President Obasanjo, who established the Petroleum Products Pricing Regulatory Agency (PPPRA) in 2003. President Jonathan's 2012 removal attempt sparked widespread protests, forcing partial reinstatement. Buhari's administration made gradual moves to deregulate the sector between 2016 and 2021, though indirect price controls remained (Ameh & Dalatu, 2024).

The final removal came under President Bola Ahmed Tinubu in 2023, who argued that the subsidy benefited only a few elites and oil marketers, not ordinary Nigerians. His administration cited four key reasons: the policy's corruption-prone structure, its fiscal burden, the need to redirect funds to education and infrastructure, and its distortion of consumption over productive investment (Yusuf Garba Manjo, 2023). Proponents claim that redirecting savings from subsidies can boost development and reduce long-term dependence on imported fuels (Cottrell et al., 2020). However, the removal has not been without consequences. Fuel prices skyrocketed, leading to increased transportation and production costs, and triggering inflation. The poorest households, who already spend a larger share of their income on energy, were hit hardest (Adeyemi & Adetutu, 2013). The government responded by proposing palliatives such as cash transfers to cushion the impact (Ameh & Dalatu, 2024). Furthermore, Nigeria's commitment to net-zero carbon emissions by 2060 (as signed at COP26 in Glasgow) and the 2021 Climate Change Bill aligned with subsidy removal. Continued subsidization of fossil fuels contradicted the country's climate pledges and discouraged investment in renewable energy. The failure to build adequate domestic refining capacity also distorted the energy market and made Nigeria overly reliant on imported fuel, despite being a top oil-producing country (NEITI, 2023).

This study examines these effects of four main macroeconomic variables which includes; inflation, unemployment, exchange rate and economic growth. In Nigeria, fuel subsidy removal has significantly impacted inflation. As subsidies were eliminated, fuel prices surged, raising transportation and production costs, thereby increasing the overall cost of living (Granado et al., 2012). The Central Bank of Nigeria (2020) warned that such reforms could trigger short-term inflation spikes. Removing fuel subsidies can raise production costs, leading to business contractions, layoffs, and job losses especially in fuel-dependent sectors like agriculture and transportation (Andrew et al., 2014). This can increase cyclical unemployment and reduce consumer demand. However, long-term impacts depend on how subsidy savings are reallocated (Raifu & Afolabi, 2024). While fuel subsidy removal can contract the economy in the short term, it may promote long-term growth if savings are redirected into infrastructure and human capital (IMF, 2022). Growth indicators include GDP, GNP, and their real (inflation-adjusted) forms, which reflect actual improvements in output and productivity (Amadeo, 2023). Fuel subsidies previously helped stabilize domestic prices but placed pressure on foreign reserves. Their removal in 2023 increased demand for foreign exchange, leading to depreciation of the naira and inflationary pressures (World Bank, 2023; IMF, 2023). Despite efforts by the Central Bank of Nigeria to unify exchange rates, the naira fell sharply in both official and parallel markets (CBN, 2024). This study employed theories such as opportunity cost theory, cost-push inflation theory, public choice theory, fiscal space theory and Keynesian economics but the theoretical foundation of this work was built in Keynesian economics.

Oyegun, & Omo-Ojugo (2022), examined the impact of petroleum products price regulation on inflation rate in Nigeria using secondary data extracted from the Central Bank of Nigeria

annual report and National Bureau of Statistics publications spanning from 1980 - 2021. Descriptive statistics, unit root test, Johansen cointegration test and error correction model were employed to analyse the collected data. The result showed that a 1% increase in the prices of PMS and AGO increased inflation rate by 0.073985 and 0.021989 respectively. Although, PMS recorded the highest positive value, the prices of PMS and AGO have no statistical significant impact on inflation rate in Nigeria within the period of this study. The simple interpretation is that, Nigeria becoming importer of petroleum products and other macroeconomics variables such as misguided exchange rate policy should be blamed for the level of inflation rate in Nigeria. Based on the findings, the following were recommended; Government should reduce PMS Price by truly deregulating the downstream sector and equally inspiring private company participation in crude oil refining in order to inspire competition thus bringing down the price of PMS. Government should make sure that the existing refineries are functioning at full capacity and also build new ones; by so doing the existing refineries can meet Nigerians internal petroleum products needs and export the excess. This can be made possible when the nation refineries Turn-Around-Maintenance are consolidated with transparency and accountability.

METHODOLOGY

The ex-post facto research design used in this study is ideal for analyzing how previous policy changes have affected macroeconomic performance because it records changes and patterns in macroeconomic indicators over a given time period, enabling assessment of both immediate and long-term impacts. This method makes it easier to analyze the connection between the elimination of fuel subsidies and macroeconomic indicators by utilizing data that is already available for a predetermined period of time (Creswell & Creswell, 2018). The study looked at Nigeria's macroeconomic statistics from 1990 to 2024, a time when major reforms to subsidies were implemented until subsidies were eliminated entirely in 2023. All pertinent macroeconomic metrics from both domestic and foreign databases were included in the population. Secondary data was used on important macroeconomic variables such as the rate of inflation, the rate of unemployment, economic growth, and exchange rate. Secondary data gathered from credible sources, such as National Bureau of Statistics (NBS) reports, Central Bank of Nigeria (CBN) statistical bulletins, International Monetary Fund publications, Nigeria Ministry of Finance, World Bank Development Indicators, scholarly and policy-focused research publications that are pertinent were used in this study. Dependent variables include inflation rate, unemployment, economic growth (GDP) and exchange rate; Independent variable include fuel subsidy removal and control variables include crude oil price and government expenditure.

Model Specification.

The study examines the connection between macroeconomic performance and the elimination of fuel subsidies using a Vector Error Correcting Model (VECM). The following is the expression for the model's functional form:

$$\Delta GDP_t = \propto_1 + \beta_1 ECT_{t-1} + \sum_{i=1}^{\rho} Y11,i\Delta GDP_{t-1} + \sum_{i=1}^{\rho} Y12,i\Delta INFR_{t-1}$$

$$+ \sum_{i=1}^{\rho} Y13,i\Delta UNER_{t-1} + \sum_{i=1}^{\rho} Y14,i\Delta EXCR_{t-1} + \sum_{i=1}^{\rho} \delta 1,i\Delta FSR_{t-1}$$

$$+ \sum_{i=1}^{\rho} \delta 2,i\Delta OIP_{t-1} + \sum_{i=1}^{\rho} \delta 3,i\Delta GOVE_{t-1} + \varepsilon_{1t}$$

$$\Delta INFR_t = \propto_2 + \beta_2 ECT_{t-1} + \sum_{i=1}^{\rho} Y21,i\Delta GDP_{t-1} + \sum_{i=1}^{\rho} Y22,i\Delta INFR_{t-1}$$
$$+ \sum_{i=1}^{\rho} Y23,i\Delta UNER_{t-1} + \sum_{i=1}^{\rho} Y24,i\Delta EXCR_{t-1} + \sum_{i=1}^{\rho} \delta 1,i\Delta FSR_{t-1}$$
$$+ \sum_{i=1}^{\rho} \delta 2,i\Delta OIP_{t-1} + \sum_{i=1}^{\rho} \delta 3,i\Delta GOVE_{t-1} + \varepsilon_{2t}$$

$$\Delta UNER_t = \propto_3 + \beta_3 ECT_{t-1} + \sum_{i=1}^{\rho} Y31,i\Delta GDP_{t-1} + \sum_{i=1}^{\rho} Y32,i\Delta INFR_{t-1}$$
$$+ \sum_{i=1}^{\rho} Y33,i\Delta UNER_{t-1} + \sum_{i=1}^{\rho} Y34,i\Delta EXCR_{t-1} + \sum_{i=1}^{\rho} \delta 1,i\Delta FSR_{t-1}$$
$$+ \sum_{i=1}^{\rho} \delta 2,i\Delta OIP_{t-1} + \sum_{i=1}^{\rho} \delta 3,i\Delta GOVE_{t-1} + \varepsilon_{3t}$$

$$\Delta EXCR_t = \propto_4 + \beta_4 ECT_{t-1} + \sum_{i=1}^{\rho} Y41,i\Delta GDP_{t-1} + \sum_{i=1}^{\rho} Y42,i\Delta INFR_{t-1}$$
$$+ \sum_{i=1}^{\rho} Y43,i\Delta UNER_{t-1} + \sum_{i=1}^{\rho} Y44,i\Delta EXCR_{t-1} + \sum_{i=1}^{\rho} \delta 1,i\Delta FSR_{t-1}$$
$$+ \sum_{i=1}^{\rho} \delta 2,i\Delta OIP_{t-1} + \sum_{i=1}^{\rho} \delta 3,i\Delta GOVE_{t-1} + \varepsilon_{4t}$$

RESULT

Table1 Unit Root Test (Augmented Dicky-Fuller (ADF) test)

Variables	ADF @ level	5%test	ADF@1st Diff.	5% test	Result
GDP	-0.516053	-2.951125	-5.918977	-2.954021	I (1)
INFR	-2.178425	-2.954021	-4.645122	-2.957110	I (1)
EXCR	1.582730	-2.951125	-5.883367	-2.976263	I (1)
UNER	0.160527	-2.951125	-5.095255	-2.954021	I (1)
FSR	-5.138341	-2.954021	-5.971639	-2.960411	I (0)
OIP	-1.531685	-2.951125	-5.282432	-2.957110	I (1)
GOVE	2.494865	-2.967767	-4.320455	-2.967767	I (1)

Source: Author's Computation with E-Views10.

Following the test in table 4.1 above, it was determined that FSR is stationery at level and the majority of the variables (GDP, INFR, EXCR, UNER, OIP, and GOVE) are stationery at first differencing when employing the ADF test. It implies that in order to determine whether the series are in a long-term equilibrium relationship, co-integration needs to be carried out. A Johansen co-integration test was therefore performed.

Table 2 Co-Integration Test (Johansen co-integration test)

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Hypothesized No. of CE(s)	Max-Eigen Statistic	0.05 Critical Value
None *	174.4461	125.6154	**None ***	61.46710	46.23142
At most 1 *	112.9790	95.75366	**At most 1**	37.08915	40.07757
At most 2 *	75.88986	69.81889	**At most 2**	28.75716	33.87687
At most 3	47.13270	47.85613	**At most 3**	23.50657	27.58434
At most 4	23.62613	29.79707	**At most 4**	11.36887	21.13162
At most 5	12.25727	15.49471	**At most 5**	9.363998	14.26460
At most 6	2.893268	3.841466	**At most 6**	2.893268	3.841466

Source: Author's computation with E-Views10.

The Max-Eigenvalue test in table 4.2 revealed that, only one cointegrating equation at the 0.05 significance level, indicating only one long-term stable relationship among the variables, whereas the trace test revealed three cointegrating equations at the 0.05 significance level, indicating three stable, long-term relationships among the variables. The most consistent conclusion from these results is that there was at least one significant long-term relationship between the variables, though there was some disagreement between the two tests.

Table 3. Vector Error Correction Estimates (short and long run coefficients).

Variables	Coefficient	Standard Error	t-statistics
ECT (CointEq1)	-0.165703	0.06031	-2.74731
D(GDP(-1))	-0.508253	0.19016	-2.67273
D(GDP(-2))	-0.608483	0.23090	-2.63529
D(INFR(-1))	0.199579	0.84192	0.23705
D(INFR(-2))	1.403027	0.94948	1.47769
D(EXCR(-1))	-1.142594	0.52582	-2.17298
D(EXCR(-2))	-0.613589	0.46855	-1.30954
D(UNER(-1))	-8.346477	3.89335	-2.14378
D(UNER(-2))	-5.604409	3.60722	-1.55366
C	26.50528	36.3545	0.72908
	VECM long run	**coefficients**	
INFR (-1)	8.264662	4.14096	1.99583
EXCR (-1)	-0.004289	0.99837	-0.00430
UNER (-1)	-45.31918	10.0280	-4.51925
C	238.9215		

Source: Author's computation using E-views10.

According to the VECM results in table 4.3, the unemployment rate and inflation rate had a substantial impact on GDP over the long term, with the unemployment rate having a negative impact on GDP and the inflation rate having a positive one. On the other hand, the exchange rate had no lasting effect. Current GDP was significantly impacted negatively in the short term by previous GDP changes and the unemployment rate, indicating that these variables react swiftly to shocks. Exchange rate fluctuations had a short-term impact, albeit a smaller one than other variables, but the inflation rate had no long-term effects. The significant error correction term attested to the slow correction of long-term equilibrium deviations.

Post Diagnostic Tests.

Table 4. Autocorrelation test (Breusch-Godfrey serial Correlation LM Test).

F-statistics	16.89397	**Prob. F (2,26)**	0.0000
Obs*R-squared	19.21441	**Prob. Chi-Square (2)**	0.0001

Source: Computed by author using E-views10.

The aforementioned test revealed autocorrelation with p-values of 0.0000 (F-statistic) and 0.0001 (Obs*R-squared), indicating serial correlation between the residuals. However, the Vector Error Correction Model utilized in this investigation, has a built-in mechanism to adjust for this serial correlation.

Table 5. Heteroscedasticity test (Breusch-Pagan-Godfrey test).

F-statistic	0.468369	**Prob. F (6,27)**	0.8256
Obs*R-squared	3.205186	**Prob. Chi-Square (6)**	0.7827
Scaled explained SS	4.988316	**Prob. Chi-Square (6)**	0.5453

Source: Author's computation using E-views10.

There is no indication of heteroscedasticity in the results displayed in the above table. The p-values for Obs*R-squared and the F-statistics were both higher than 0.05. The lack of heteroscedasticity was also supported by the Scaled Explained SS statistic and its p-value. As a result, non-constant error variance is not a problem for the model.

Table 4.6 Multicollinearity test.

Variable	Coefficient Variance	Uncentered VIF
INFR	0.983245	1.864448
EXCR	0.043006	7.715788
UNER	18.29706	16.58979
FSR	1174.444	3.051385
OIP	0.638483	7.620211
GOVE	8.466087	5.050654

Source: Computed by the researcher using E-views10.

The Variance Inflation Factor (VIF) was used in a multicollinearity test to guarantee the accuracy of the predicted coefficients in the VECM. With the exception of the unemployment rate (UNER), which had a VIF of 16.59 and indicated the presence of strong multicollinearity, the data showed that the majority of the explanatory variables fall below the acceptable VIF threshold, or below 10 (Gujarati & Porter, 2009). UNER was nevertheless kept in the model due to its importance to the framework of the study.

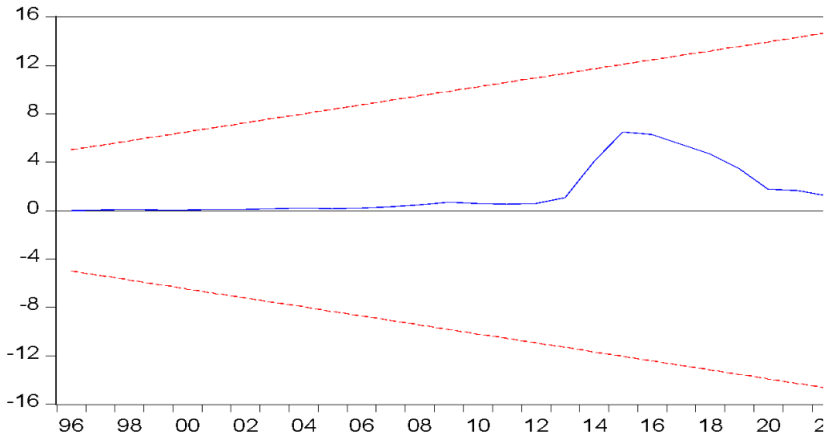

Fig. 4.1 Recursive (CUSUM) stability test for the VECM residuals
Source: Generated by the author using E-views10.

Model stability is evaluated using the CUSUM of Squares Test chart. The red line indicates 5% significance boundaries, and the blue line shows cumulative squared residuals. The model is regarded as structurally stable in the above result since the blue line stayed inside these boundaries, demonstrating constant relationships between the variables.

Table 4.7 Ramsey RESET test.

	Value	Probability
t-statistic	1.469633	0.1532
F-statistic	2.159822	0.1532
Likelihood ratio	2.616468	0.1058
	Sum of square	**Mean Squares**
Restricted SSR	290976.0	10392.00
Unrestricted SSR	269423.9	9978.661

Source: Generated by researcher using E-views10.

The aforementioned Ramsey RESET (Regression Equation Specification Error Test) was used to check for model misspecification; the likelihood ratio test and its p-value likewise confirmed no misspecification, and the t- and F-statistics also had high p-values (0.1532). Finally, there was only a minor difference in the SSR between the restricted and unrestricted models, which does not indicate a concern.

CONCLUSION

This study investigated the impact of fuel subsidy removal on Nigeria's macroeconomic performance between 1990 and 2024, focusing on key indicators such as inflation rate, unemployment rate, exchange rate, and economic growth (GDP). Using data from reliable sources including the CBN, NBS, IMF, and World Bank, the study employed econometric techniques such as the Augmented Dickey-Fuller (ADF) unit root test, Johansen cointegration test, and the Vector Error Correction Model (VECM) to evaluate the long-run and short-run dynamics among the variables. The core findings revealed that fuel subsidy removal had a significant impact on economic performance. In the short run, economic growth was affected, while in the long run, inflation, unemployment, and GDP were all significantly influenced. Inflation had a strong positive relationship with economic growth in the long term, suggesting that a 1% increase in inflation was associated with an 8.26% rise in GDP. Conversely, unemployment had a severely negative impact, as a 1% rise in unemployment led to a 45.3% decline in GDP. The exchange rate, however, showed no significant long-term effect on growth, though short-term volatility existed. The error correction term indicated that 16.6% of disequilibrium from the long-run path was corrected each period, confirming the model's stability and relevance.

In light of these findings, several recommendations were proposed. First, monetary policy should focus on managing inflation due to its lasting influence on economic growth. A targeted inflation framework would help preserve purchasing power and macroeconomic stability. Second, addressing unemployment through labor market reforms is essential. Investments in labor-intensive sectors such as manufacturing, agriculture, and infrastructure would not only cushion the negative effects of subsidy removal but also stimulate job creation. Third, while the exchange rate did not significantly affect GDP in the long term, its short-term fluctuations suggest the need for a more stable and transparent exchange rate policy to support investor confidence and market stability. Furthermore, to mitigate the immediate social impact of subsidy removal, the government should implement targeted social safety nets. These could include direct cash transfers, support for small businesses, and transport subsidies for vulnerable groups. Lastly, the study recommends a phased approach to subsidy removal. Gradual implementation with clear timelines and consistent public engagement would help minimize economic shocks and build public trust in the reform process.

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