

Assessing the Impact of Fuel Subsidy Removal on Economic Growth in Nigeria: A VECM Approach

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Abstract

The yearly budgetary allocation on subsidy in Nigeria has remained a concern for policymakers and other agents of the economy as to whether it has achieved the targeted goal of economic growth in Nigeria. Thus, this study examined the impact fuel subsidy payments had on economic growth in Nigeria from 2005 to 2023. Secondary data were sourced from the Central Bank of Nigeria (CBN) Statistical Bullentin, the World Bank World Development Indicator (WDI) and the Nigerian Extractive Industry Transparency Initiative (NEITI) working paper. The data were converted into quarterly data for ease of analysis and estimation. Gross Domestic Product (GDP) growth rate was used as the dependent variable while Fuel Subsidy Expenditure (FSE), Exchange Rate (EXC) and Inflation Rate (INF) were the independent variables. The long run relationship among the variables was confirmed using the Johansen Co-integration technique while the Vector Error Correction Model (VECM) technique of analysis was adopted for estimation of the data. The study found that a negative significant relationship exists between fuel subsidy expenditure and economic growth in Nigeria within the period under study. The study therefore recommends a re-direction of government expenditure on subsidy to other critical area of the economy that can propel the growth of the economy.

Keywords: Fuel subsidy, Keynesian theory, Economic growth and VECM

JEL Classification: H23, H24, E12, O47, C49

1. Introduction

Subsidy is generally an integral part of government expenditure both in developed and developing countries. Subsidies have long been employed by governments worldwide to support various sectors of the economy, ranging from agriculture and energy to transportation and healthcare. The Keynesian economists advocated government spending not only to stimulate economic growth and stabilize economies during times of economic downturn, but also as a means of cushioning the impact of increased cost burden on the consumer or populace. Thus, subsidies are targeted at achieving various economic and social objectives by providing financial assistance to some specific and strategic industries in order to mitigate market failure. However, the efficacy and sustainability of these

subsidies have come under scrutiny due to their potential distortive effects on market mechanisms and fiscal sustainability (Lanjouw & Ravallion, 1999).

Subsidy reforms have been a focal point of economic restructuring efforts, particularly in developing and emerging economies, where subsidies often constitute a significant portion of government expenditure (Clements et al., 2013). The persistence of subsidies can lead to fiscal imbalances, crowding out essential public investments, and exacerbating macroeconomic vulnerabilities (Oomes & Kalcheva, 2007). As such, policymakers face the challenge of balancing the short-term social implications of subsidy removal with the imperative of fostering sustainable economic growth (Apergis et al., 2018). Opinions are diverse on whether subsidy expenditure had contributed to the growth of economies or if subsidy is a leakage in the economy and as such dampened economic growth.

Petroleum products are used as a supplementary factor of production in a variety of industries, including transportation, manufacturing, agriculture, and residential applications like cooking and electricity generation in small plants or homes, particularly in developing nations with erratic power supplies (Sakanko, Adejor & Adeniji, 2021). The immediate effect of subsidy removal is the increase in price of petroleum products which has a multiplier effect in the final cost of products; with the attendant multifaceted macroeconomic implications.

In May 29, 2023 the Nigerian government announced immediate removal of subsidy on petroleum products. This announcement sent shock waves throughout the economy with immediate upward adjustment in prices of goods and services. Economic analysts and thinkers blamed the rashness in total removal of subsidy while failing to address the underlying structural constraints and social dislocations, hence undermining the intended benefits of subsidy reform initiatives. Clements et al., (2013) posited that the timing and sequencing of subsidy removal can significantly influence its economic and social ramifications. Gradual and well-sequenced reforms are often recommended to mitigate potential adverse effects on vulnerable populations and allow for the adjustment of affected sectors.

In addition, the distributional consequences of subsidy removal merit careful consideration, as certain segments of society may bear a disproportionate burden of adjustment (Arze del Granado *et al.*, 2012). Vulnerable groups, including low-income households and smallholder farmers, may face increased hardship in the absence of targeted social assistance and compensatory measures (Clements *et al.*, 2013).

Nigeria has long grappled with the issue of fuel subsidies, which have imposed a significant fiscal burden on the government while distorting market incentives and hindering economic efficiency (Akinboade *et al.*, 2018). Despite being a major oil-producing nation, Nigeria has struggled to maintain affordable fuel prices due to the reliance on fuel imports and the inefficiencies of domestic refining capacity (World Bank, 2019).

The decision to remove fuel subsidies in Nigeria has been a subject of heated debate and political contention, reflecting on the trade-offs between short-term social considerations and the imperative of fiscal sustainability and economic reform (Onyekwena & Eghosa, 2019). The government has implemented several subsidy removal measures over the years,

accompanied by varying degrees of public outcry and social unrest (Bodunde et al., 2020). Moreover, the effectiveness of subsidy removal measures are contingent upon complementary policy interventions, such as targeted social safety nets and structural reforms to enhance competitiveness and productivity (Apergis & Payne, 2014). Interventions like the Graduate Internship Scheme (GIS) and the Subsidy Re-investment and Empowerment Programme (SURE-P) in Nigeria were designed to mitigate the negative consequences of the partial elimination of subsidies.

Advocates of fuel subsidy removal maintained that it is a critical step towards promoting fiscal sustainability, freeing up resources for much-needed public investments in infrastructure, education, and healthcare (Adeola & Evans, 2019). Adenikinju and Oyinlola, (2018) highlighted the potential economic benefits of the reform to include; improved fiscal space, enhanced resource allocation efficiency, and increased private sector investment. However, the timing, sequencing, and accompanying policy measures of subsidy removal are critical determinants of its overall impact on economic growth and welfare (Adeola & Evans, 2019).

As a highly import-dependent country, Nigeria imports all her petroleum products. With a very weak export, the removal of subsidy on petroleum product has worsened the exchange of the Naira (₦) to the US dollar (\$). The importation of raw materials and other manufacturing inputs has led to increase in cost of production which invariably leads to inflation. Thus, worsening exchange rate and increased inflationary pressure, these are the indirect and unanticipated consequences of the humongous subsidy payments over the years. Furthermore, the effectiveness of subsidy removal in Nigeria hinges on the government's ability to address underlying structural issues, including inadequate infrastructure, corruption, and inefficiencies in the energy sector (Omolara & Amoo, 2020). Without complementary reforms to improve governance, enhance revenue mobilization, and diversify the economy, the benefits of subsidy removal may be limited, and the potential for adverse consequences heightened (Bodunde *et al.*, 2020). Moreover, the impact of fuel subsidy removal extends beyond the domestic economy to regional and global dynamics. As Africa's largest oil producer, Nigeria's subsidy policies have implications for regional energy markets, trade flows, and geopolitical relations (World Bank, 2019). Thus, the research on the effect of subsidy removal on economic growth encompasses multifaceted considerations, ranging from macroeconomic dynamics such as increase inflation rate, and worsening exchange rate. This study aims to provide answers to questions about the short- and long-term effects of gasoline subsidy removal on Nigeria's economic growth as well as how subsidy payments over time affect important macroeconomic indicators including GDP growth, inflation rates, and exchange rate.

These problems remain inadequately understood, necessitating a comprehensive investigation. Thus, by examining these interrelated dimensions, the research aims to provide a holistic understanding of the complex relationship between subsidy reform and economic growth, informing evidence-based policy formulation and implementation. The paper was organised with literature reviews in Section 2 following the introduction, then methodology in Section 3. Evidence from the results discussion is presented in Section 4, and the work is concluded and recommendations are made in Section 5.

2. Literature Review

Conceptual Review

A government subsidy is a measure that lowers the price that consumers pay for consumption or raises the price that producers charge for their goods. A subsidy is a policy that maintains consumer prices for goods or products at or above producer market prices (CPPA, 2014). Fuel subsidies have been implemented in various ways, with varying results. Subsidies fall into two broad categories: production subsidies, which are primarily associated with industrialised economies, and consumer subsidies, which are prevalent in poor nations. The rationales behind the adoption or withdrawal of subsidies differ significantly. Environmental concerns, foreign trade policies and the need to maintain competitiveness are the main drivers of the policy in developed economies. Subsidies are typically provided in developing nations like Nigeria due to concerns about welfare, poverty reduction, and election cycle politics. The renewed focus on governance change promoted by the Breton Woods Institutions is a new element in the current mix of policy drivers (Idress, Rabi & Nura, 2024). Nigeria operates consumer subsidies where the government holds prices below the full economic cost of supply. Oyasipe and Olukoya (2024) described subsidies as essentially a form of a reverse tax, serving as a deliberate government intervention to bolster selected economic agents, be it consumers or producers. Subsidies can be applied across various markets involving the exchange of goods and services. It is an intervention by the government designed to reduce consumer prices or increase producer selling prices. These interventions find extensive application in numerous countries and industries, spanning commodities such as petroleum products, food items, and agricultural inputs like fertilizers and machinery. Subsidies can serve as potent policy instruments to address market failures and achieve specific social objectives

According to reports from the federation's budget office, Nigeria has spent nearly as much on fuel subsidies since 2005 as it has on defence, health, education, and agriculture combined over the last five years, and nearly as much on capital expenditures over a ten-year period between 2011 and 2020 (NEITI, 2021). Subsidy expenditure payments in 2011 exceeded allocations for defence and security by twofold, education by more than five times, health by eight times, power by twenty-four times, agriculture by thirty-two times, and transportation by thirty-eight times, including transportation infrastructure (NEITI, 2021). For example, in 2011 subsidies accounted for twice as much as all capital investment and much outweighed all other important sectors of the economy (NEITI, 2021). The consistent rise in a country's overall output over an extended duration is commonly regarded as an indicator of economic growth. According to Todaro and Smith (2011), it is the total amount of finished goods produced in a nation in a given year, determined by the market price of the goods while accounting for price fluctuations and the estimated cost of the goods and services produced in the nation less its net foreign income. According to Audu (2018), economic growth is the steady and positive rise in the total amount of goods and services generated in an economy over a specific time frame.

Theoretical Review

Keynesian Theory of government expenditure advocated active state intervention in the economy. This theory refutes the arguments of the classical school that the economy is self-

regulating and that the government should not intervene. Arising from the great depression of the 1930s, Keynes postulated the imperative of government expenditure in boosting aggregate demand and general economic stability (Ogwuche, 2021). Therefore, in an attempt to control the economy, Keynesians believe that the best way to promote growth and development is through fiscal policy, which affects aggregate demand levels (Zahariev, 2021).

Public spending was classified by Keynes as an exogenous variable rather than an endogenous phenomena that can lead to economic growth. Government spending is thought of as a short-term stabilising mechanism for economies, but it must be done carefully because excessive public spending can trigger inflationary conditions, while insufficient public spending can result in unemployment, as the Great Depression of the 1930s demonstrated. According to Keynes' theory of public expenditure, active government policies could be useful for controlling the economy. Keynes supported countercyclical fiscal policies, tide of the business cycle, and deficit spending when a country's economy suffers from a recession or when recovery is protracted and unemployment remains high. These measures are either through tax cuts or spending reductions by the government. He did not view an unbalanced government budget as incorrect. Because "in the long run, we are all dead," he contended, government should address issues now rather than waiting for market forces to do so later (Keynes, 1936). The rational choice theory on the other hand, stressed the rational calculations of the government to cut subsidy payments seen as a corruption mill in order to benefit the entire economy in the long run. This theory underpins the classical economic thinking of the invisible hand and rational actors seeking to minimize losses which in this context is seen in the humongous subsidy payments and yet increased poverty of the Nigerian masses. As a result, the government will make decisions that are sensible and motivated by self-interest and that will benefit the entire economy.

Subsidy removal is seen by the government as the best interest of the collapsing Nigerian economy. Policy makers weigh the benefits of subsidy removal, such as reduced fiscal burden and more efficient resource allocation, against potential negative consequences like inflation. With the resultant increase in cost of produce as a result of subsidy removal, individuals would evaluate how the removal affects their finances and cost of living viz-a-vis the long run objectives of provision of infrastructures from increased government revenue. In the same vein, the symmetric relationship theory of growth maintains that eliminating subsidy could potentially lead to more equitable growth by reallocating resources towards more productive uses and fostering market efficiency in the long run. The theory posits that economic growth and income distribution are interconnected, with improvements in one reinforcing the other. In all, the symmetric relationship theory suggests that subsidy removal, if done thoughtfully and accompanied by complementary policies, can contribute to sustainable and inclusive economic growth by fostering efficiency and improving income distribution.

Empirical Review

The impact of fuel subsidy removal on economic growth reflects a complex interplay of factors. While some studies highlight the potential benefits of subsidy removal in terms of fiscal sustainability and resource reallocation, others underscore the short-term challenges

such as inflationary pressures and adverse effects on income distribution. For instance, Idress, Rabi and Nura (2024) employed exploratory research design and secondary data by means of qualitative content analysis examined the implications of fuel subsidy removal on Nigeria's sustainable development. The study found that debt reduction, increased inflationary pressures, short term increase in poverty, improvement in fiscal sustainability are some of the expected consequences of subsidy removal. Similar to this, Oyasipe and Olukoya (2024) evaluated the impact of the elimination of gasoline subsidies on the profitability of start-up companies in Lagos State, Nigeria, using Chi-square analysis. The results showed that the elimination of fuel subsidies increased operating costs, decreased sales, lowered stock levels, and decreased the profitability of small businesses.

The study recommended subsidy investment programme and improvement in energy supply to ease the effect of the subsidy removal on entrepreneurial businesses. Meluda, Komolafe, and Chilaka (2024) used both descriptive and inferential statistics to investigate how the elimination of subsidies affected food products in southeast Nigeria. The results showed that, in the short time after the termination of subsidies, the prices of rice, beans, yam, garri, and tomatoes fluctuated greatly, which contributed to a rapid increase in the price of food and other commodities.

Other studies such as Bhattacharyya and Timilsina, (2009), Coady *et al.* (2010), Kojima *et al.* (2010) argued that fuel subsidy removal enhances economic efficiency by reallocating resources towards more productive sectors. The removal reduces fiscal burdens, allowing governments to reallocate funds towards critical sectors such as education, healthcare, and infrastructure. In addition, subsidy removal will stimulate investments in the energy sector, leading to technological advancements, increased production efficiency, and ultimately fostering long-term economic growth. Conversely, Arze del Granado *et al.* (2010), Bello (2016), Clements *et al.* (2013), Ebeke and Fouejieu (2015) suggested that fuel subsidy removal may lead to short-term spikes in inflation and increased price volatility, impacting consumer spending and overall economic activity as well, the removal may disproportionately affect low-income households through increased transportation costs and higher prices of goods and services.

Most of the study reviewed focused the effect of subsidy removal on private businesses and households without any direct implication on the economy. Other studies like Bello (2016), Clements *et al.* (2013), Ebeke and Fouejieu (2015) theoretically emphasized the anticipated consequence of fuel subsidy removal on the economy without backing their postulations with any empirical data. This study, which examined the effect of eliminating fuel subsidies on economic growth in Nigeria experimentally, is a radical departure from earlier research. Thus, this study filled a major gap by using empirical data to examine how fuel subsidy removal affects Nigeria's economic growth.

3. Methodology

Because it includes impact analysis and periodic variable measurement on a group before and after treatment, this study uses the times series ex-post facto research design (Ogwuche, 2021). Ex-post facto research design precludes any opportunity to control the variables mainly because they have already occurred and cannot be manipulated. Thus, pre-estimation

tests were carried out to discover the most applicable method of estimation to analyse the impact of fuel subsidy removal as it affects economic growth in Nigeria.

Theoretical Framework

The theoretical underpinning for this study was chosen to be the Keynesian theory of government expenditure. Since fiscal policy serves the interests of the whole public, Keynesians believe that it is the best way to promote growth and development in any economy. The expansionary role of government spending (in this case, through subsidy payments) increases aggregate demand, which in turn boosts output and employment. This is the multiplier effect of government spending, in Keynes's estimation. Considering the following national income model:

$$Y = C + I + G + (X-M) \dots\dots\dots 1$$

The change in output will be equal to the multiplier times the change in government expenditure

$$\Delta Y = \frac{1}{\Delta G} \dots\dots\dots 2$$

Where $1 = \frac{K}{1-b}$

$$\Delta Y = K \Delta G \dots\dots\dots 3$$

$$\frac{\Delta Y}{\Delta G} = K \dots\dots\dots 4$$

Therefore change in output over change in government expenditure is equal to the multiplier. This shows that government expenditure can be used to influence economic growth in an economy.

Model Specification

The short- and long-term dynamics of fuel subsidy withdrawal on economic growth, exchange rate, and inflation rate in Nigeria are all examined using the Vector Error Correction Model (VECM). According to Ezie and Ezie (2021), the VECM is suitable for handling cointegrated, non-stationary time series.

The model that was modified for this study is based on the Keynesians' theoretical explanation of how subsidy payments can affect economic growth. In this sense, it is believed that government spending on subsidies determine economic growth, with inflation and currency rates acting as intervening variables. Zhattau, Abdullahi, and Pam (2016) corroborate this, using government spending on transfer payments to assess the influence of federal government spending on Nigeria's economic growth. Therefore, the implicit model captures the mathematical formulation of the research topic as follows:

$$GDP = f(FSE, EXC, INF) \dots\dots\dots 5$$

Where GDP is the growth rate of the gross domestic product, a gauge of economic expansion, FSE refers to fuel subsidy expenditure, EXC entails the Naira's exchange rate against the dollar, and INF is inflation rate. Setting up equation (5) in an econometric form and adding natural logarithm gives:

$$GDP = \beta_0 + \beta_1 \ln FSE + \beta_2 \ln EXC + \beta_3 \ln INF + \mu_t \dots\dots\dots 6$$

Where β_0 is the intercepts for fuel subsidy, $\beta_1 - \beta_3$ are the coefficients of fuel subsidy expenditure, exchange rate and inflation rate respectively. μ_t stands for error term, and \ln signifies natural logarithm.

Based on the postulation of economic theory, the coefficients of the study are expected as $\beta_1, \beta_2 > 0, \beta_3 < 0$. This implies that the expected relationship between GDP and subsidy expenditure is positive based on the Keynesian postulation of increase in government expenditure boosting aggregate demand and employment and thus, stimulating economic growth. While there should be a negative correlation between the inflation rate and GDP, the exchange rate and GDP are predicted to have a positive correlation.

4. Results

Table 1: Descriptive Statistics

Variables	Mean	Maximum	Minimum	Std. Dev.
GDP	4.1178	8.04	-1.79	2.9010
FSE	1041.94	3360	154	864.19
EXC	243.162	638.71	118.56	135.67
INF	13.2931	28.92	6.6	5.2497

Source: Author's Computation

The descriptive statistics in Table 1 indicated that Gross Domestic Product (GDP) growth rate from 2005–2023 had maximum and minimum values of 8.04% and -1.79% respectively. With a standard deviation of 2.9% and an average GDP growth rate of 4.12% for the period, the data indicated a 1.22% divergence from both sides of the mean. This suggests that the GDP growth rate in Nigeria was not evenly distributed during the study period, resulting in a relative variation in GDP growth rate that might be linked to Nigeria's unfavourable investment climate, especially under the previous administration. FSE had minimum and maximum values of 154.0000 and 3360.000, respectively, for the period. The FSE average was 1041.947, with a standard deviation of 864.1946, meaning that there was a 177.7524 departure from both sides of the mean. Given that the standard deviation was found to be lower than the mean value, this implies that the FSE data was widely distributed from the mean over the sample period. With a magnitude of 107.4913, EXC is widely spread from the mean, as indicated by its minimum and maximum values of 118.5667 and 638.7105, respectively, and its mean value and standard deviation of 243.1623 and 135.6710, respectively. Finally, INF ranged from 6.600000 at the minimum to 28.92000 at the maximum. Throughout the period, the average INF value was 13.29312, with a standard deviation of 5.249795, meaning that the data varied by 8.043325 from the mean value. The fact that the standard deviation was less than the mean value suggests that INF in Nigeria was broadly distributed during the study period.

Unit Root Test

As non-stationary data frequently produces erroneous regression results, it's critical to determine whether the time series data is stationary. We used the Philips-Perron and the Augmented Dickey-Fuller (ADF) tests to determine the order of stationarity of the data.

Table 2 showed that at levels, the variables are non-stationary. After initially differencing at the 5% threshold of significance, the variables did, however, become stationary.

Table 2: Unit Root Test Results

Variables	ADF Test		PP Test		Remark
	ADF Order of Values Integration	5% Critical Values	PP Order of Values Integration	5% Critical Values	
GDP	-8.44505 I(1)	-3.4716	-8.4450 I(1)	-3.4716	Stationary
lnFSE	-8.6996 I(1)	-3.4716	-8.7015 I(1)	-3.4716	Stationary
lnEXC	-6.5366 I(1)	-3.4734	-10.4526 I(1)	-3.4716	Stationary
INF	-8.7521 I(1)	-3.4716	-8.7626 I(1)	-3.4716	Stationary

Source: Author's Computation

Cointegration Test

Since the data are integrated of order one, or I(1), co-integration must be examined to see if the series are in a long-run equilibrium relationship. Thus, a Johansen co-integration test is carried out.

Table 3: Johansen Cointegration Test Result

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None*	0.320799	54.38462	54.07904	0.0469
At most 1	0.204455	26.14539	35.19275	0.3339
At most 2	0.093419	9.448252	20.26184	0.6937
At most 3	0.030867	2.288792	9.164546	0.7198

Note: Trace test indicates 1 cointegrating eqn(s) at the 0.05 level; * denotes rejection of the hypothesis at the 0.05 level. Source: Author's Computation

At the 5% level of significance, the Johansen cointegration results showed the existence of a long-run equilibrium relationship. Table 3 shows that the trace statistics, when analysed under the null hypothesis, are 54.38462, more than the critical value of 54.07904. At the 0.05 level of significance, the associated probability value, 0.0469, is less than that. As a result, the null hypothesis that there is no cointegration relationship is rejected. When this happens, the trace statistics take precedence over the greatest eigen value, indicating that there is a cointegration link between the series. The cointegration of the time series indicates that they move together throughout time, preserving an equilibrium that corrects for short-term errors. To model this relationship, a Vector Error Correction Model (VECM) is advised.

Lag Length Criteria

The various lag selection criteria suggested a maximum lag length of either 1 or 5. This research chose a lag length 1 suggested by SC (Schwarz information criterion) as shown by the asterisk (*) at the 5% level.

Vector Error Correction Estimates

The findings of the VECM regression for the long- and short-term relationships between GDP, FSE, EXC, and INF are displayed in Table 3. The findings showed that while all of the variables were deemed insignificant in the short term, they are all significant in the long run. LFSE has a statistically significant negative long-term impact on GDP. Therefore, GDP will decrease by -1.492% with a 1% increase in LFSE. This is contrary to a priori expectation and Keynesian postulation that government expenditure has expansionary effect on the economy. This is particularly so with the Nigerian economy where fuel subsidy has over the years been shrouded in corruption. In addition, the benefit of fuel subsidy has not been felt by the poor masses which it was intended for.

Table 4: Vector Error Correction Estimates (Short run and Long run coefficients).

Variable	Coefficient	Standard Error	T- Ratio
C	0.003532	0.15744	0.02243
D(GDP(-1))	0.081261	0.13909	0.58422
D(LFSE(-1))	-0.077888	0.38922	-0.20011
D(LEXC(-1))	-0.096044	2.18867	-0.04388
D(INF(-1))	-0.077964	0.08515	-0.91556
ECM(-1)	-0.207840	0.07103	-2.92597
VECM Long Run Coefficients			
LFSE(-1)	-1.491866	0.52527	-2.84018
LEXC(-1)	8.362861	1.32316	6.32039
INF(-1)	-0.559717	0.14301	-3.91370
C	-31.71565		

Source: Author's Computation

LEXC has a positive and statistically significant impact on GDP. Thus, a 1% appreciation of naira to dollar will increase GDP by 8.363%. This is consistent with a priori expectation. Thus, improvement in the naira to dollar exchange rate contributes significantly to economic growth. INF has a negative and statistically significant impact on GDP. Specifically a 1% increase in INF will reduce GDP by -0.560. This is consistent with a priori expectation. Thus, inflation has a dampening effect on economic growth.

Discussion of Findings

Based on the findings of the VECM, the Fuel Subsidy Expenditure (FSE) and GDP are the primary variables of interest in this study. The outcome showed that a quarterly GDP decline of 1.492% would arise from a 1% increase in LFSE. This is contrary to a priori expectation and Keynesian postulation that government expenditure has expansionary effect on the economy. Nonetheless, this finding suggests that the corrupted fuel subsidy payments that Nigeria's successive administrations have neglected to rectify are the likely cause of the

inverse association between fuel subsidy spending and economic growth. Fuel subsidy allocation has over the years been shrouded in corruption by government officials who themselves are the major beneficiary of fuel subsidy in Nigeria. This goes to confirm that fuel subsidy payments over the years were not channelled in the right direction. This view corroborates the works of Omolara and Amoo, (2020). In addition, the benefit of fuel subsidy has not been felt by the poor masses whose plight subsidy was intended to improve.

As predicted a priori, there was a positive and strong correlation between the exchange rate and economic growth. The GDP would rise by 8.363% on a quarterly basis if the naira to dollar exchange rate appreciated by one unit. This means that the exchange rate of the naira poses significant changes and distortions to macroeconomic variables as well as the growth and development of Nigeria's economy, which has been beset by a steady decrease in the naira over the years. Inflation rate had a negative significant relationship with GDP which is consistent with a priori expectation. Specifically, by reducing the purchasing power of the masses, inflation hinderance limits economic growth. Inflation disrupts long term planning and creates atmosphere of uncertainty which can deter investment, stifle productivity and consequently a contraction in economic growth. Hence, a unit decrease in inflation rate will lead to an increase in GDP by 0.560%. The coefficient of the ECM(-1) value of -0.207840 implies that about 20% departure from equilibrium in the long run is corrected quarterly. The ECM(-1) is in line with a priori expectation, correctly signed (negative), less than one (-0.207840) and significant at the 5% level of significance.

Diagnostic Test

Heteroscedasticity and normality Test: To identify heteroscedasticity or homoscedasticity, the data was tested using Vector Error Correction (VEC) Residual Heteroskedasticity Tests which is presented in Table 5

Table 5: VEC Residual Heteroskedasticity Jarque- Bera Tests

Chi-sq	df	Prob.
75.58783	180	1.0000
Jarque-Bera		
3130.171		0.0000

Source: Author's Computation

From Table 5, the Chi-square probability value being greater than 5% (P-value > 0.05) level of significance implies that there is no heteroscedasticity in the model. Hence, we accept H_0 and reject H_1 . The Jarque test revealed that the series are not normally distributed given that the probability value is less than 0.05 (P-value < 0.05).

5. Conclusion and Recommendations

The empirical findings supported the hypothesis that, between 2005 and 2023, there was a negative long- and short-term link between the amount spent on fuel subsidies and economic growth. This suggests shifting government spending away from subsidies and towards infrastructure development and other initiatives that directly improve citizens' quality of life. Thus, it can be said that among other things, a stable exchange rate is crucial for Nigeria's economic progress. On contribution to extant knowledge, this study revealed that corruption

in the management of fuel subsidy have dampening effect on exchange rate since Nigeria imports most of her petroleum product; and this impact negatively on economic growth. Thus re-channelling government expenditure from subsidy to a more productive sector of the economy is capable of enhancing the growth of the economy.

Arising from the findings, this study recommends a thorough probe and investigation into the payments of fuel subsidy over the years with a view to unravelling the fuel subsidy syndicates and cabals for punitive measures since subsidy payments have not positively impacted on the economy. Also, the study recommends the re-direction of government expenditure to education, research and development as well as other critical sector of the economy.

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