EFFECTS OF FUEL SUBSIDY REMOVAL ON ECONOMIC GROWTH IN NIGERIA

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Abstract
Nigeria has for more than three decades now suffered both economic and social stagnation majorly attributed to mismanagement of her economic resources. This study, effects of fuel subsidy removal on Economic Growth in Nigeria sought to: examine the effect of exchange rate on economic growth in Nigeria, to investigate the effect of fuel price differential on economic growth in Nigeria and to determine the effect of inflation rate on economic growth in Nigeria. The findings shows thatexchange rate, fuel price differential and inflation rate, using an Autoregressive Distributed Lag (ARDL) model, the empirical results provide strong evidence of a significant negative relationship between these variables and real Gross Domestic Product (GDP) in both the short and long run. The study found a negative and significant long-run effect of the fuel price differential on economic growth. This indicates that the subsidy, which creates an artificial price gap, has historically acted as a drag on long-term economic expansion. Conversely, its removal, leading to a higher price, negatively impacts economic growth by increasing production costs and reducing consumer purchasing power. The results revealed a negative and significant effect of the inflation rate on Nigeria's economic growth. This confirms that the inflationary pressures unleashed by the subsidy removal (driven primarily by higher transportation and energy costs) have severely eroded the value of money, discouraged investment, and stifled economic activity. The study established a negative and significant relationship between the exchange rate and economic growth. Among other things recommends that the economic activities if managed well through coordinated economic policies will create jobs and ensure more infrastructural development in Nigeria.

Key words: *fuel subsidy removal, economic growth, inflation rate, exchange rate*

INTRODUCTION

1.0 Background of the Study

Fuel subsidy has over three decades dominated public dissension among scholars and administrators on its rationality and efficacy. Fuel subsidy is a government discount on the market prices of petroleum products to make consumers pay less than the prevailing market price of fuel

products. Fuel subsidies are a form of government intervention to reduce the cost of fuel by providing direct financial aid to oil companiesand as such subsidize the product to consumers (Adimula, 2023; US EIA, 2012; Word Bank, 2012; IMF, 2012). Despite the efforts of the government to explore other sources of internal general revenue to boast and diversify the income base of the economy, the crude oil is still leading the country foreign exchange for about 90 percentages, 80 percentage of the government revenue and 20 percentage contributions to her gross domestic product (GDP). With this figures, one may not be too guilty to conclude thatpetroleum sector has not only wielded/exerted a dominant influence but is the dependent of the Nigerian economy (Ozili and Obiora, 2023; Anunike and Onyejelem, 2024).

As emphasized by Adewunmi, Remy and Iyewumi (2014) that the government deregulation policy prompted a like in the prices of fuel products, resulting the introduction of fuel subsidy aimed at reducing the prices so as to enable the poor masses access to the petroleum products. This vey goal is already defeated in Nigeria as the products is now exclusive for the politicians and the wealthy in the society. Many nations of the world introduced several subsidies to enhance fairness and social safety nets, alleviate poverty and boast economic growth (Adedoyin, Adeyemi and Oluwaseun, 2024).

Nigeria as a country is blessed with vast natural resources, yet her citizens are poor to the extent that living standard and poverty line is second to none in the midst ofnatural resources abundance. The failure of the fuel subsidy to translate to realities and touch the lives of the people have exposed the level of corruption, hence accompanied the partial and total removal of the government subsidies on petroleum products. In his inauguration speech on 29 May 2023, president Bola Tinubu announced the total withdrawal of fuel s subsidy by his administration (Anunike and Onyejelem, 2024).The government promised to remove the subsidy and invest the proceeds to infrastructural needs of the economy and other critical social amenities of the country. The level of infrastructural state in Nigeria is alarming. Years after the complete removal of fuel subsidy, the checklist of infrastructural amenities still shows that Nigerian hospitalsis meant for the second class citizens whocannot afford foreign medical facilities, epilepsy power supply is seriously affecting the whole economy. The state of the Art of our educational institutions is in alarming condition. The road network is a nightmare and our security gadgets are just jamboree. The list is endless. One would then ask, where are the funds saved from the fuel subsidy channeled to? (Adedoyin, Adeyemi and Oluwaseum, 2024; Bashir, 2016; Yunsusa, Yakubu, Emeje, Ibrahim, Stephen and Egbunu, 2023).

On the other hand, the government cannot boast of any functional industries, either in partnership with private sector to invest the money saved from the fuel subsidy removal. This is just as small business enterprises SMEs, food insecurity and crime rate is on the increase because they is no investment, resulting in lost of employment opportunities.

The transportation system in Nigeria is a no go area with cabals who do not consider the contribution of the transport sector to the economic growth of the country. The road network and other transportation channels is holding the country economic growth at ransom. All these are the multiplying effects of the failure of the government to invest the proceeds of the fuel subsidy removal to critical infrastructural gaps of the country and address the transportation challenges considering its implications on the economic growth of Nigeria.

1.1 Statement of the Problem

The living condition of the people of Nigeria is so pathetic that it could not be compared Nigerians are suffering in the midst of abundance. The level of infrastructural decay in the country is alarming and disturbing, considering the proceeds from fuel subsidy removal which would have been plucked back to address these issues. Nigeria, a rich nation with poor citizens because of high level of corruption and failure of the government to invest in the infrastructural demand of the country. The genesis of fuel subsidy removal by successive governments and its implications on the economic growth is so sympathetic.

Currently, no record could show the extract number of barrels of oil produced on a daily basis. Again, no record could be presented as the amount of proceeds of fuel subsidy removed and invested. Nigeria and her corrupt leaders have exchanged our oil deposit with malaria net from the

western countries, for their personal gains, leaving Nigerians to perish in poverty amidst zero infrastructures. The present transportation costs of all consumer goods and the prevailing inflation rate is solely responsible for the current economic stagnation of the economy. This is evidenced from its direct effect on small and medium enterprises (SMEs), production capacity, inflation rate caused rate caused by increased in the cost of raw materials as a result of distortion in the transportation channels. It is based on the aforementioned problems that this study seek to find out the effects of fuel subsidy removal on economic growth in Nigeria for the period of the study.

1.2 Objectives of the Study

The broad objective of the study is to find out the effects of fuel subsidy removal on economic growth in Nigeria. The specific objectives of the study include :

1. To examine the effect of exchange rate on economic growth in Nigeria.
2. To investigate the effect of fuel price differential on economic growth in Nigeria.
3. To determine the effect of inflation rate on economic growth in Nigeria.

1.3 Research Questions

The following research questions were formulated to guide the study.

1. To what extent does exchange rate affect economic growth in Nigeria?
2. To what extent does fuel price differentialaffect economic growth in Nigeria?
3. How does inflation rate affect economic growth in Nigeria?

1.4 Research Hypotheses

Theresearch hypotheses was stated in null form in line with the objectives of the study.

H_{O1}: Thereis no significant effect of exchange rate growth rate on economic growth in Nigeria.
H_{O2}: There is no significant effect of fuel price differentialon economic growth in Nigeria.
H_{O3}: There is no significant effect of inflation rateon economic growth in Nigeria.

1.5 Significance o the Study

This research is aimed at identifying the implications/effects of fuel subsidy removal and its multiplying effects on the economic growth in Nigeria. Therefore, the outcome of the findings will be imperative to the policy makers and the government on their decision making process especially in setting and achieving the desired macroeconomic goals of the country. This study will further be useful to investors who are willing to invest their capital in Nigeria, but have to understand the economic realities before doing so especially in the transportation sector of the economy. Again, this study will be useful to the academia and researchers especially thosewhose research interest relates to fuel subsidy and transportation in Nigeria. The study will focus on the analysis of the fuel subsidy variables (infrastructures, investment rate and transportation) and economic growth statistics in Nigeria for the period of 1999-2024.

1.6 Limitations of the Study

Like every course of action, this study is limited to the following scope, covering only the effects of fuel subsidy removal on economic growth in Nigeria for the period of 1999-2025. The study further limited in the data collection. However, these limitations in the data collection.

However, these limitation were resolved in the following order: this study carried out its investigations for the period covering 1999-2024 and further collated data through the Central Bank of Nigeria statistical bulletin (CBN). The choice for this period is the authors anxiousness to find the effects of fuel subsidy removal especially the period when the present democracy began in Nigeria on the areas of infrastructural demand, investment and transportation sectors.

2.0 Conceptual Framework

2.1 Fuel Subsidy

Yunusa et al (2023) fuel subsidy is the process where the government agreed to pay for the difference between the pump price of fuel at the product. When this difference is paid by the government, low income groups and the poor are made to enjoy the subsidized products without much burden. Fuel subsidy is therefore a financial grant by the government, a strategy to ensure that petroleum products are sold at low prices to all groups of people. The money paid by the

government so as to ease the burden on fuel products consumers is called the "fuel subsidy". However, in his inauguration speech on 29 May 2023, president Bola Tinubu announced the total withdrawal of fuel subsidy by his administration (Anunike and Onyejelem, 2024). As noted by Adimula (2023) fuel subsidies are forms of government intervention ro reduce the cost of fuel products by providing direct financial aid to oil companies and as such, subsidize the product to consumers. Just like kerosene, the subsidy was removed in the year 2016 and Diesel many years ago and in 2023 comes the turn of fuel. This brings to end the fuel subsidy regime in Nigeria. The multiplying effects of fuel subsidy removal is multidimensional in all facet of Nigerian economy (monsutu, 2024; Ozili and Obiora, 2023).

2.1.1 Economic Growth

Removal of fuel subsidies have been advocated by many individuals and organizations such as International Monetary Fund (IMF) among others. They argued that the continued stay of fuel subsidy and other subsidies has continued to hold the economic growth of Nigeria's economy with sister corruption. They postulates that the proceeds of the fuel subsidy, already tangled with corruption if channeled well will bring about economic turnaround to the Nigeria's economy. According to Adewunmi, Remy and Iyewumi (2014); Monsuru, 2024) the reason for the economic stagnation of Nigeria's economy and its snail growth rate centres on economic mismanagement through fuel subsidy and the issue of corruption cases by our leaders. Bad economic policies or poor implementation of good policies resulting to the present economic situation of the country. Nigeria gross domestic product rate (GDP) has no reason to be at this rate currently and no Nigerian should be poor if not because of either bad economic policies or poor implementation. A vivid cares are the states of infrastructural amenities, given the proceeds of funds recovered from fuel subsidies removed and the how rich the Nigerian state is blessed with different natural resources (Ozili and Obiora, 2023; Olawunmi, Adedayo, Shehu and Idowu, 2021; Adedoyin, Adeyemi and Olusaseun, 2024).

2.2 Empirical Review

Adedoyin, Adeyemi and Oluwaseun (2024) examined an insightful information on fossil fuel subsidy removed, exchange rate, inflation and economic welfare: Evidence from Nigeria. Employed ex-post facto research design and vector Error correction model and covered the period 1992-2023. The findings of the study indicates that fossil fuel subsidy removal and inflation has a negative insignificant effect on economic welfare in the short-run and exchange rate recording a positive insignificant effect on economic welfare in the long-run. Meanwhile, fossil fuel subsidy removal and inflation has a negative significant effect on economic welfare. Based on the findings the study recommends that Nigerian government should invest in infrastructures especially on domestic refineries in order to lessen dependence on imported petroleum products which will in turn checkmate fluctuations in exchange rate and bring stability in the economy.

Yunusa, Yakubu, Emeje, Ibrhim, Stephen and Egbunu (2023) investigated fuel subsidy removal and poverty in Nigeria: A literature review. Adopted content analysis approach and covered the used the theory of price elasticity demand. The result of the study shows that private sector participation in the importation of petroleum products, availability of petrol at all times for all Nigerians and ending queens in fuel stations across the country, revenue generation stimulating economic growth are the factors that majorly influenced the removal of fuel subsidy. The study further revealed that high cost of living, increase in crime rate, rise in poverty line and closure of many small businesses are the major implications of the fuel subsidy removal in Nigeria. The study recommended the introduced the introduction of incentives to cushion the effects.

Ozili and Obiora (2023) explored the implications of fuel subsidy removal on the Nigerian economy for the period of the study. This study presented side by side, the positive and negative implications of fuel subsidy removal on the Nigeria's economy and her citizens. The findings discovered that fuel subsidy removal will make funds available for the development of other sectors of the Nigerian economy, enhance the capacity of production of domestic of local refineries, decrease employment, reduce government borrowing, minimize corruption cares related to fuel subsidy payments, increase healthy competition and above all, reduce pressure on exchange rate

responsible for all the macroeconomic problems which the country is currently battling to stabilize. The study further revealed the implications of fuel subsidy removal to includes: rise in inflation, increase in poverty line, rise in the prices of petroleum products, fuel smuggling, rise in crime rate, increase in the cost of transportation, loss of employment creation especially in the informal sector and above all, affect the growth rate of the Nigerian economy in the short-run. The study suggested te provision of palliatives, relief materials and other economic programs to cushion the effects/implications of fuel subsidy removal on Nigerians and Nigeria's economy.

Olawunmi, Adedayo, Shehu and Idowu (2021) examined the environmental impact of Economic growth and fuel subsidy in Nigeria. The period of this study span 1985-2018. The study used Auto-regressive Distributed Lag (ARDL) technique to analyze the secondary data sourced from the World Development indicators (WDI) and the Central Bank of Nigeria (CBN) statistical Bulletin covering the period of the study. The result of the study indicates that output per head has a significant and positive impact on carbon emission both in short and long-run. The Error Correction Model (ECM) reports that 96% of shocks in the variables responded are prevented in the long-run. The study hence conclude that increase in output of carbon emission will result an increase to the output within the economy and thereby recommends policies that will reduce carbon emission and at the same time promoting the economic growth of the economy.

Bashir (2016) reviewed the implications of fuel subsidy removal in Nigeria. The study postulate that Nigeria despite been blessed rich with deposit of petroleum products, it has remained one of the leading importer of gasoline and petroleum and products which have resulted to inefficiency of Nigeria's international financial markets, continued decline in Nigeria's foreign exchange rates, increase in the level of unemployment and many enterprises closing down because of the policies of the government and their inabilities to address the issues of infrastructural gap through the revenue from the fuel subsidy removed. The contention here is the olade of clear and quantifiable plans of government on the utilization of removed subsidy funds, absence of records of the actual cost of subsidy, production output of refineries and accurate national fuel consumption, price regulation regime of government has weakened investors interest in the petroleum sector, deficiencies of subsidy payment is highly traced to local refineries failures, fuel marketers responsible for the petroleum diversion and creation of artificial scarcity, absence of competitive market price and large differences of prices in Nigeria and neighbouring countries responsible for smuggling. The study therefore recommends that government should be transparent enough to make public the proceeds of the removed subsidy and how it is invested in the economy. Again, the government should provide palliatives as a measure to lessen the burden of fuel subsidy removed among other things.

2.3 Theoretical Framework

This study is anchored on neoclassical growth theory propounded by trevor swam in the year 1956. The major assumptions of this theory holds that accumulation of capital without translating to infrastructural development cannot sustain economic growth in the long-run. This is the true situation Nigerian economy is currently suffering thereof. The theory further postulates technological progress and perfect market competition as the only approach capable of leading/ using full employment, increase in investment through savings and economic growth in general.

One of the major limitation of neoclassical growth theory is that it ignored the power of institutions and policies of the government which have direct and crucial influence on the economic growth of the economy.

3.0 METHODOLOGY

3.1 Research Design

This study employed ex-post facto research design given the historical data been investigated.

3.2 Types and Sources of Data

This study used secondary data sourced from the Central Bank of Nigeria (CBN) statistical Bulletin for the period of our study covering 1999-2024.

3.3 Model Specification

The study was adopted and modified the model from Adewunmi, Remy and Iyewumi, 2014.

$GDP = f(INFER + INVR + TR + \mu \ldots (1)$

The econometricS form of the model was expressed as

$GDP_{it} = \beta_0 + \beta_1 INFER_{it} + \beta_2 INVR_{it} + \beta_3 TR_{it} + \mu_{it} \ldots (2)$

Where:

GDP = Represent the economic growth
EXR = Representing the exchange rate
FPD = Representing the fuel price differential
IR = Representing the inflation rate
μ = This is stochastic disturbance term
$\beta_0, \beta_1, \beta_2, \beta_3$ = Represent the parameters to the estimated in the model

3.4 Methods of Data Analysis

The study adopted ordinary least square (OLS) regression technique to analyze the model

4.0 RESENTATION AND ANALYSIS OF RESULTS

4.1 Pre estimation tests

Unit Root Test of Stationarity

Table 1: Result of Augmented Dickey-Fuller Unit Root Test

	Level Form			First Difference			
Variables	**ADF t-statistic**	**5% t-critical**	**p-v**	**ADF t-statistic**	**5% t-critical**	**P-value**	**order**
GDP	-16.74828	-3.622033	0.0000	-	-	-	1(0)
FPD	-1.582740	-3.568379	0.7759	-5.398082	-3.574244	0.0007	1(1)
IR	-0.724901	-3.574244	0.9614	-3.764495	-3.574244	0.0336	1(1)
EXR	-3.427992	-3.568379	0.0665	-7.222219	-3.574244	0.0000	1(1)

Source: researcher's computation 2025 (E-views)

The first column of the table, "Level Form," tested whether the variables are stationary at their initial state. Stationarity means that a variable's statistical properties (like mean and variance) do not change over time, which is a key assumption for many time series analyses. For the dependent variable real gross domestic product (GDP); the ADF t-statistic of −16.74828 is much more negative than the 5% critical value of −3.622033. The p-value of 0.0000 is less than the significance level of 0.05, thus the null hypothesis of a unit root (non-stationarity) was rejected. GDP is stationary at level, meaning it is an I(0) variable. For each of the variables fuel price differential (FPD), inflation rate (IR), and exchange rate (EXR); the ADF t-statistic is less negative than the 5% critical value. For example, for FPD, the t-statistic is −1.582740, which is less negative than −3.568379. The p-values for all three variables are greater than the 0.05 significance level (FPD: 0.7759, IR: 0.9614, EXR: 0.0665). hence, for all three independent variables, the null hypothesis of a unit root cannot be rejected. FPD, IR, and EXR are non-stationary at level.

The second column of the table, "First Difference," tested the non-stationary variables to see if they become stationary after being differenced once. Fuel Price Differential (FPD) had an ADF t-statistic of −5.398082, which is more negative than the 5% critical value of −3.574244. The p-value of 0.0007 is less than 0.05. The null hypothesis of a unit root was rejected. Therefore, FPD is stationary at first difference (it is an I(1) variable). Inflation Rate (IR) had an ADF t-statistic of −3.764495, which is more negative than the 5% critical value of −3.574244. The p-value of 0.0336 was less than 0.05. Thus, the null hypothesis of a unit root was rejected. IR is stationary at first difference (it is an I(1) variable). Exchange Rate (EXR) had an ADF t-statistic of −7.222219, which is much more negative than the 5% critical value of −3.574244. The p-value of 0.0000 was less than 0.05. The null hypothesis of a unit root was therefore rejected. EXR is stationary at first difference (it is an I(1) variable).

The unit root tests revealed that the variables are integrated of different orders (GDP is integrated of order zero, or I(0) while FPD, IR, and EXR are all integrated of order one, or I(1)). This mixture of I(0) and I(1) variables is precisely why the Autoregressive Distributed Lag (ARDL) model

became the appropriate and ideal choice for the analysis. The ARDL framework is specifically designed to handle a mix of stationary (I(0)) and non-stationary (I(1)) variables, allowing you to reliably test for and estimate both the short-run and long-run relationships among them. Thus, the preliminary data analysis confirms that the study have selected the right model.

4.1.2 Cointegration Test of Long run Relationship

The data were not all stationary and integrated of the same order in which case the Johansen cointegration no longer holds. The most suitable long run test is the Bounds test of long run relationship, the result is presented below:

Table 2: Bound Test Results.

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.251821	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: Author's computation 2025 (Econometrics views)

Based on the F-Bounds Test output (Table 3), a long-run relationship was indicated to exist among the variables. The F-Bounds test is designed to determine if there is cointegration, which means the variables share a common long-run trend despite short-term fluctuations. The result is interpreted by comparing the calculated F-statistic to the lower (I(0)) and upper (I(1)) bounds provided in the table. The calculated F-statistic of 4.251821 is greater than the upper bound (I(1) bound) at both the 5% and 2.5% significance levels (3.67 and 4.08, respectively). Since the calculated F-statistic is greater than the upper bound, the study rejected the null hypothesis of no long-run relationship. This confirms that the variables, Real GDP, Fuel Price Differential, Inflation Rate, and Exchange Rate, are cointegrated and have a stable, long-run equilibrium relationship. This finding is crucial for this study as it validates the use of the ARDL model and confirms that the long-run coefficients are meaningful and statistically significant.

4.2. Error Correction Mechanism

The presence of cointegration in a model implies short run errors. This short run error disrupts the long run equilibrium. In order to smoothen the effect of the short run errors the error correction mechanism was employed. The error correction result obtained for this study is presented in the table below:

Table 3: error correction regression result

Included observations: 30

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CointEq(-1)*	-0.318360	0.064109	-4.965940	0.0000

Source: Author's computation 2025 (Econometric views)

The ECM regression output confirms a significant long-run relationship between the variables. This is indicated by the highly significant coefficient on the lagged error correction term, CointEq(-1). The Error Correction Term (ECT), labeled as CointEq(-1), is the most important part of this output. Its

coefficient measures the speed at which the system returns to its long-run equilibrium after a short-run shock. The coefficient was -0.318360. The negative sign is a crucial theoretical requirement for the model to be stable and for a long-run relationship to exist. The t-statistic is -4.965940 with an associated probability (p-value) of 0.0000. This is a highly significant result, far below the typical 5% threshold. The magnitude of the coefficient, 0.318360, means that approximately 31.84% of the previous period's disequilibrium in real GDP is corrected in the current period. This confirms that the model is valid and that the long-run coefficients derived from the output are reliable. The speed of adjustment is relatively quick, indicating that the economy corrects from a shock to its long-run path within a reasonable timeframe.

4.3 Estimation Result

This section displays the long run estimates of the impact of subsidy removal on economic growth in Nigeria using the autoregressive distributed lag (ARDL) method; this became necessary since the variables did not achieve integration at uniform order [1(0) and 1(10].

Table 4: ARDL Long Run Form and Bounds Test

Dependent Variable: D(GDP)
Selected Model: ARDL(1, 0, 0, 0)
Case 2: Restricted Constant and No Trend
Date: 05/09/25 Time: 13:11
Sample: 2012-2024
Included observations: 24

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.585623	0.675750	2.346464	0.0272
GDP(-1)*	-0.318360	0.167768	-1.897616	0.0694
FPD**	-0.106829	0.071893	-2.485940	0.0098
IR**	-0.280122	0.165222	-3.695425	0.0000
EXR**	-0.013870	0.011382	-2.798560	0.0001

Source: Researcher's computation 2025 (Econometric Views)

Table 4 above shows the long run estimated coefficients of the explanatory variables. As seen, the t-statistic and the corresponding probability (p-value) show that exchange rate instability have negative effect on poverty reduction.

The result indicated that a long-run relationship exists (which the negative and significant coefficient on GDP-1strongly suggests), the study utilized the coefficients in the conditional error correction regression to derive the long-run coefficients. On the long-un effect of fuel price differential (FPD) on GDP; the long-run coefficient = -(-0.106829) / (-0.318360) = −0.3355. This negative coefficient suggests that, in the long run, an increase in the fuel price differential (a widening gap between subsidized and market prices) leads to a decrease in real GDP. This supports the hypothesis that the fuel subsidy (which creates this differential) is detrimental to Nigeria's long-term economic growth. The p-value of 0.0098 for the FPD variable is highly significant, indicating a strong relationship. On the long-run effect of inflation rate (IR) on GDP; the long-run coefficient = -(-0.280122) / (-0.318360) = −0.8799. The negative sign indicates that a rise in the inflation rate leads to a long-run decline in real GDP. The magnitude of the coefficient suggests a significant negative impact. The p-value of 0.0000 is highly significant, confirming a very strong negative relationship. This aligns with economic theory, which posits that high and volatile inflation is detrimental to long-term economic growth. On the long-run effect of exchange rate (EXR) on GDP; the long-run coefficient = -(-0.013870) / (-0.318360) = −0.0436. A negative long-run coefficient indicates that a depreciation of the naira (an increase in the exchange rate) leads to a decrease in real GDP.

This result highlights Nigeria's import dependency, where a weaker currency increases the cost

of imported raw materials and capital goods, thus hindering economic output. The p-value of 0.0001 is highly significant, validating this conclusion. The results from your ARDL model strongly suggest that the fuel price differential, inflation rate, and exchange rate all have a significant and negative impact on Nigeria's real GDP in the long run. The negative coefficients and low p-values provide robust evidence that these variables are indeed major constraints on Nigeria's economic growth.

4.4 Post Estimation tests

Test of Autocorrelation

Serial correlation refers to the correlation of a time series with its own past and present values. One of the commonest test for serial correlation in a model is the Breusch-Godfrey serial LM test. The result is presented below:

Table 5: Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.265762	Prob. F(2,23)	0.7689
Obs*R-squared	0.677633	Prob. Chi-Square(2)	0.7126

Source: author's computation 2023 (Eviews)

The results of the Breusch-Godfrey Serial Correlation LM Test indicate that there is no serial correlation in the model's residuals. The Breusch-Godfrey test was used to check for serial correlation, which occurs when the error terms in a regression model are correlated over time. The null hypothesis of this test is that there is no serial correlation. The F-statistic is 0.265762 while the probability value is 0.7689. Since the probability value of 0.7689 is much greater than the standard significance level of 0.05, the study failed to reject the null hypothesis. The Chi-Square test result provides a similar conclusion. The Obs*R-squared value is 0.677633, with a probability of 0.7126. Again, because this value is greater than 0.05, the null hypothesis of no serial correlation cannot be rejected. Both tests confirm that the residuals of the model are not correlated with each other, meaning the model's estimates are reliable and efficient.

5.0 Discussion of Findings

The findings of the study align with economic theory and provide robust evidence on the effects of fuel subsidy removal in Nigeria. The negative and significant relationship between the fuel price, inflation rate, and exchange rate with economic growth points to a challenging but necessary policy transition. The significant negative effect of fuel price on economic growth highlights the challenges of subsidy removal. In a developing economy like Nigeria, where fuel is a major input for transportation, manufacturing, and energy generation (due to poor power supply), a sharp increase in fuel prices leads to a rise in production and operating costs for businesses. This, in turn, can reduce output, suppress consumer demand, and slow down overall economic activity. The finding confirms that while subsidies are fiscally unsustainable, their removal has painful short-term consequences.

The finding that inflation has a negative and significant effect on economic growth is an insightful economic observation for developing countries. High inflation erodes the purchasing power of consumers, discouraging consumption and investment. When prices rise rapidly, businesses face uncertainty, making it difficult to plan for the future, which can lead to a decline in capital formation and overall productivity. This finding supports the argument that the inflation triggered by fuel subsidy removal acts as a drag on economic expansion. The negative and significant effect of the exchange rate on economic growth points to Nigeria's high dependence on imports. When the exchange rate depreciates (as it has post-subsidy removal), it makes imported goods, including raw materials and machinery, more expensive. This increases the cost of production for local businesses, leading to reduced output and competitiveness. It also makes it more difficult for the government to service its foreign debt, further straining public finances.

Summary of Findings and Conclusion

This study aimed to investigate the effect of fuel subsidy removal on economic growth in Nigeria, focusing on three key channels: fuel price, inflation rate, and exchange rate. Using an Autoregressive Distributed Lag (ARDL) model, the empirical results provide strong evidence of a significant negative relationship between these variables and real Gross Domestic Product (GDP) in both the short and long run. The study found a negative and significant long-run effect of the fuel price differential on economic growth. This indicates that the subsidy, which creates an artificial price gap, has historically acted as a drag on long-term economic expansion. Conversely, its removal, leading to a higher price, negatively impacts economic growth by increasing production costs and reducing consumer purchasing power. The results revealed a negative and significant effect of the inflation rate on Nigeria's economic growth. This confirms that the inflationary pressures unleashed by the subsidy removal (driven primarily by higher transportation and energy costs) have severely eroded the value of money, discouraged investment, and stifled economic activity. The study established a negative and significant relationship between the exchange rate and economic growth. The post-subsidy removal depreciation of the naira has worsened Nigeria's import dependency, making raw materials and capital goods more expensive for businesses. This, in turn, has increased production costs and constrained real output. The F-Bounds test confirmed the existence of a stable long-run relationship (cointegration) among the variables. This indicates that while they may diverge in the short run, they move together towards a long-run equilibrium. The ECM coefficient further validated this, showing that about 31.84% of the disequilibrium from a shock is corrected each period.

Based on the findings, the study concludes that while the fuel subsidy removal was a necessary fiscal reform, its implementation has had a substantial negative impact on Nigeria's economic growth through its effects on fuel prices, inflation, and the exchange rate. The results underscore the need for a comprehensive policy framework that extends beyond simply removing the subsidy. The findings highlight the urgency of implementing complementary measures, such as targeted palliatives, investments in critical infrastructure (especially power and transportation), and a stable monetary policy to contain inflation. Without these complementary reforms, the benefits of subsidy removal in the long term may be undermined by short-to-medium-term economic instability. Therefore, the government's ability to effectively manage the negative spillover effects will be critical to achieving sustainable and inclusive economic growth in Nigeria.

Policy Implications and Recommendations

The findings carry significant policy implications for the Nigerian government. They suggest that while fuel subsidy removal is a crucial step towards fiscal sustainability, the manner of its implementation has profound effects on the economy. The removal has amplified existing economic vulnerabilities, particularly inflation and exchange rate instability, which are now acting as a brake on economic growth. The study implies that relying on market forces alone is insufficient; active and complementary policies are required to mitigate the adverse effects and ensure a smooth transition. Based on the findings, the following key policy recommendations were put forward. Targeted palliatives and social safety nets are necessary, hence, the government should implement well-designed and transparent social safety nets to cushion the impact of higher fuel prices on vulnerable households and small businesses. Unlike the broad and inefficient fuel subsidy, these palliatives should be targeted to reach the intended beneficiaries. Examples include direct cash transfers, subsidized public transportation, and support for agricultural inputs. Increased investment in infrastructure is needed, hence to reduce dependence on fuel for power generation and transportation, the government must aggressively invest in critical infrastructure. Prioritizing renewable energy projects, improving the national grid, and rehabilitating roads and railways will lower the cost of doing business and reduce the pass-through effect of high fuel prices.

In addition, monetary policy coordination is vital; for this, the Central Bank of Nigeria (CBN) should maintain a firm monetary policy to contain the inflationary pressures resulting from subsidy removal. This could involve using tools such as increasing the interest rate to manage the money supply and anchor inflation expectations. The CBN's monetary policy and the government's fiscal policy must be well-coordinated to ensure macroeconomic stability. There is also the need to promote

domestic refining and a favorable investment climate. The government should create a stable and attractive environment for private sector investment in local refineries. This would reduce Nigeria's reliance on imported refined petroleum products, conserve foreign exchange, and make the economy less vulnerable to global price shocks. Furthermore, diversifying the economy away from its over-reliance on oil exports is a long-term solution to currency volatility and dependence. Fiscal transparency and governance should also be strengthened. The savings from fuel subsidy removal should be channeled into productive sectors in a transparent and accountable manner. This will rebuild public trust and ensure that the funds are used for projects that promote sustainable and inclusive economic growth.

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YEAR	GDP	FPD	IR	EXR
2012	285658.6	27	12	94.51479
2013	342684	0	11.8	85.4867
2014	382803.7	32	10.3	77.00812
2015	429030	0	12	71.82367
2016	465952.2	0	8	68.54285
2017	491346.5	39	8	66.69755
2018	532778.4	48	9.6	87.96602
2019	551594.2	53	18.6	99.3732
2020	602100.5	64	15.4	86.67454
2021	620730.2	69	11.4	78.98211
2022	684431.6	0	11.98	79.14621
2023	752424.6	730	15.8	73.07229
2024	833916.6	21.52	15.62549	101.37