Fuel Subsidy Removal and Exchange Rate Volatility in Nigeria: Implications on Macroeconomic Stability

**[1]Hamza Zubairu Kofarbai, [2]Zubairu Ahmad, &
[3]Usman Muhammad Dakingari**
[1&2]*Department of Business Administration, Al-Qalam University Katsina*
[3]*Bursary Department, University of Science and Technology Aliero, Kebbi State*

Abstract

The paper examines empirically the implications of fuel subsidy removal and exchange rate volatility vis-à-vis macroeconomic stability in Nigeria. The paper employs ex-ante and ex-post as the research design using time series data from January, 2023 to January, 2024 to measure the causal relationships among the fuel subsidy removal and macroeconomic variables which include; exchange rate, inflation, interest rate, international oil price and Gross Domestic Product. The study employs Statistical Package of Social Science (SPSS) as techniques of data analysis using estimation method to ascertain the positive and causality or otherwise among the explained and the explanatory variables. The result shows that fuel subsidy removal and foreign exchange volatility within the period under review triggers low capacity utilization leading to collapse of some companies, increase headline inflation, low saving and diminishing real income leading to vicious circle of poverty in the country. Result of the study further reveals that one of the factors that induced higher prices (inflation), particularly food prices and other commodities are as a result of high exchange rate and fuel subsidy removal, due to their affinity with international crude oil prices. The paper concludes that fuel subsidy removal and exchange rate volatility has exacerbated the level of poverty in the country, leading to reduction of productivity in the real sector. The paper recommends to the policy makers the gradual removal of fuel subsidy in the country in order to ameliorate the sufferings of the populace as the economy experiences severe shock. The paper further recommends infrastructural development in transport and roads as well as incentivizing tax holiday for companies with a view to spur production, growth and brings price stability.

Keywords: *Fuel Subsidy Removal, Exchange Rate Volatility, Gross Domestic Product, Headline Inflation*

Corresponding Author: **Hamza Zubairu Kofarbai**

Background to the Study
Fuel subsidy and foreign exchange have become synonymous with macro-economic (in) stability in the country, in the sense that both policies trigger economic shock to the system, if not properly managed. These policies can exercabated the level of borrowing from the government to meet up with the rising demand of fuel importations, which would lead to exchange rate volatility (devaluation of the nation currency) leading to cost-push inflation affecting consumer demand (Olayinka, Nwakaego & Ugonwa, 2022). While exchange rate volatility posed a serious challenge to the nation's economic recovery and sustainability, over the years, fuel subsidy regime has become a cog in the wheel of the nation development as its serves as a conduit pipe by successive government for perpetuating corruption.

In a report published by the Central Bank of Nigeria (CBN) in August 2023, about 40 percent of the $34 billion in external reserves the country held as current account through the CBN, as at December 2022, were collaterized in an asset-financing in a form of forward contracts (CBN, 2023). The nation debt management has become unsustainable, as for every dollar raised as revenue, is being used to service the nation's debt, of which the government financing of fuel subsidy is the major principal components of the nation debt profile. Owing to this development, the Nigerian officials asserts that subsidy regime is no longer sustainable, hence maintaining fuel subsidy regime as according to the policy makers, can no longer be sustained, which led to its total removal in June of 2023.

The macroeconomic variables are aggregate economic indicators such as interest rate, exchange rate, Gross Domestic Product (GDP), inflation, investment, national savings as well as import and export. The price stability is an important variable that the monetary authority like the CBN continues to monitor on consistent basis, because of its contagious to exchange rate and value of the nation currency. The general price level refers to the average price of commodities (composite consumer price index) recorded over time and any changes in the average general price level can trigger inflation (Olayinka, et al, 2022). Inflation also significantly affects the domestic economy due to consistent rise in the prices of the commodities like food items which are all linked to fuel subsidy removal and the recent exchange rate policy of the present government. It is argued that a rise in the prices of commodities makes raw materials prices higher, and as a result consumer purchase less (Bhattacharjee & Das, 2022). This reduction in consumption affects the company's income and profitability in both the short and long run, which leads to slow economic growth and therefore, inflation can be negatively link to fuel subsidy removal and exchange rate volatility which triggers macroeconomic instability in the country.

Reports have it that as at March 2024, Nigerians suffer the highest cost of living and the lowest standard of living since independence. Inflation is at 27% and still counting, debt servicing is more than 90% of our earnings, Nigeria have about the highest level of employment and poverty in the world, due to sudden change in fiscal and monetary policies by removing petrol subsidy and introducing floating exchange rate mechanism respectively (NBS, 2024). The lack of putting proper mechanisms in place to hedge against consistent rise in consumer price index, and the ultimate backlash as a result of these twin policies of fuel subsidy removal and

liberalizing the foreign exchange market has exercabated macroeconomic instability in the country. In an attempt to find a feasible solution to stabilize the Nigerian macro-economic indices, a lot of researchers, and experts offered probable solutions which appeared not to have made any noticeable successes when applied. The fuel subsidy removal coupled with the unification of exchange rate by the current government as argued by the Economist magazine (2023) has crippled the ordinary Nigerians, as the poor lament the rising cost of commodities while the few elite's smiles to the banks as the policy favour them. The floating exchange rate dealt a big blow to the nation economy especially to industries which affect capacity utilization, as overnight, the nation currency was devalued by around 34% in exchange of one dollar at official rate, and the naira has continued its downward trajectory, losing it values by over 63 percentage point as at September 2023 ending and still counting.

The change of policy with regards to petrol subsidy removal in the nation economy stands as important milestone in the economic, social and environmental settings. This sudden policy changes in 2023 has affected the overall economic and social standings of the citizenry, and therefore requires an in-depth analysis in order to understand its negative ramifications. The essence or justification of conducting this study lies in uncovering the multiple effects of the policy; be it favourable, unfavourable or having a harsh negative consequence that arises as a result of sudden simultaneous policy change in fuel subsidy together with unification of exchange rate and examines their effects on macroeconomic stability in the country. Therefore, in this research, we intend to apply a mean-variance analysis and standard deviation modelling to improve the results unlike in previous studies and afterwards apply regression analysis to model relationship between fuel subsidy removal and the other explanatory variables.

The Concept of Fuel Subsidy
The Nigerian economy has been heavily subsidized in different for far too long and consequently generate far reaching consequences on macroeconomic stability. Fuel subsidy regime started around 1970's and became entrenched in 1977, owing to the enactment of the Price Control Act, which prohibit certain commodities to be traded over and above official price cap. According to Oyedele, Chime, Akindutiye and Olajubu (2023), the introduction of the official price on petroleum products is good and worthwhile, but the way and manner the regime is being administered cast a big doubt as a result of its opaque nature over a long period of time. Though, fuel subsidy regime is a fiscal policy but has a bidirectional relationship with macroeconomic variables like exchange rate and inflation (Olayinka, et al, 2022).

According to the World Bank (2023) Nigeria's total revenue in 2000 was $10.8 billion but by 2010, this amount has multiplied six times to the tune of $67.9 billion. Yet, the Nigerian government has spent over $30 billion on fuel subsidies over the last 18 years (2005-2023). This development has had a significant impact on funds available for critical infrastructure and other essential sectors such as education, health and food security. While on Nigeria's debt profile, according to DMO (2023), the country's debt profile has increases astronomically, owing to the concentration of risk by the Nigerian government, in borrowing almost =N=1 trillion to subsidize petrol consumption in the country in year 2022 alone.

The subsidy regime on fuel is adjudged to be the monumental problem to the nation's economic policy makers, as year-in-year-on, a major chunk of the country's budget is earmarked to finance the fuel subsidy regime living other critical sectors of the economy starved of funds as shown in Figure 1:

Figure 1: Nigeria's Fuel subsidy Payment (2013-2022)
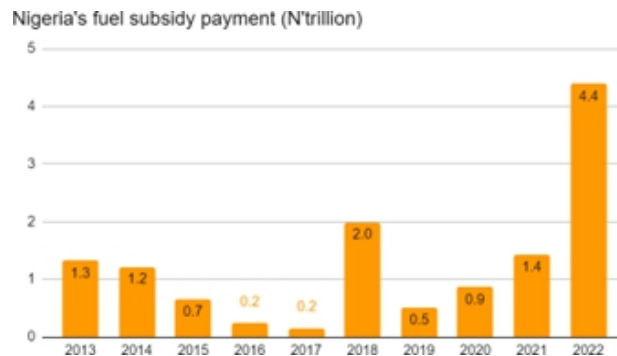
For example in 2013 Nigeria spent 1.3 trillion as fuel subsidy and it dropped to 1.2 trillion in 2014 and the amount continues to fell up to 2017 then it astronomically rose to 2 trillion in 2018, reaching it pick in 2022 with a sum of 4.4 trillion. These amount of fuel subsidy payment year-in-year-out on an annual basis were a substantial portion of the national budget committed to funding the scheme. The reasons being advanced by the policy makers were the price of crude oil in the international market, volume of PMS consumed in the country and the Naira devaluation as the drivers as shown in figure 2..

Figure 2: Nigeria's fuel subsidy payment versus annual fuel consumption in billions per litre
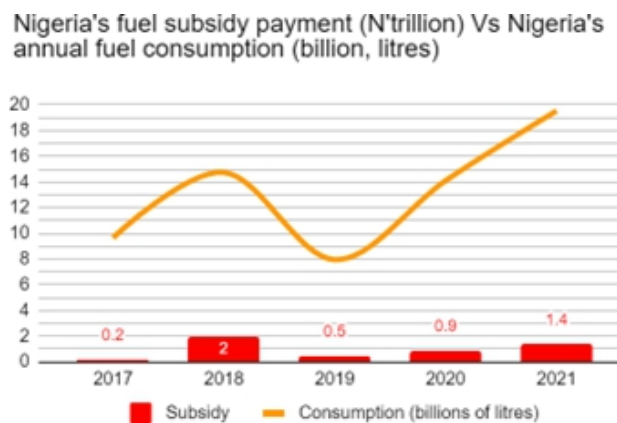
Source: PriceWaterCoopers (2023)

Concept of Exchange Rate
The concept of exchange rate is literally referred to price of imported goods; it may also point to financial and economic conditions of a country. Modi (2006) stated that exchange rate

serves as nominal value for domestic prices, and as a result, it can be defined as the price of one country currency vis-à-vis another and is the number of units of a currency required to purchase another currency. It means that exchange rate performs dual purpose functions; as a price and as a medium of exchange to acquire foreign goods via foreign currency. For an import dependent economy like Nigeria, exchange rate is very crucial for business transaction and generally price stability.

Foreign currency exchange rate to the domestic economy can either be positive or negative. According to CBN (2021), an economy that is export oriented dominant with a weak domestic currency against a strong currency like the dollar, is beneficial to the economy, as a weak nations currency is directly proportional to its export as the goods exported internationally would have low price. This would expand the production capacity of the company profits - just like the model China adopted. However, for an import-oriented economy like Nigeria with a weak nation currency in relation to a strong currency like the dollar, posed serious problem on its domestic economy. A devalued domestic currency signifies high cost of imports and consequently, with high cost of raw materials, the cash inflow and returns to the company's greatly reduced. For that reason, the economic growth of a country can be truncated; profitability of firms stunted or dwarfed and that could trigger hyper-inflation as being witnessed in Nigeria currently.

Empirical Literature Review
Fuel subsidy removal and exchange rate volatility are adjudged to be the driving force of macroeconomic instability in Nigeria. The review of related literature schedule in Table 2 provides a concise overview of the research objectives, methodologies used in the study and key findings as well as their implications from each of reviewed sources, highlighting the different dimensions and impacts of fuel subsidy removal and exchange rate volatility across different contexts. In the review literature several key dimensions emerge across the various studies. In a study conducted by Evans, et al, (2023), Duntoye (2023), Oyedele, Chime, Akindutiye and Olajubu (2023) focuses on the effect of fuel subsidy removal and its overall implications to the socioeconomic factors of the citizenry. Evan, et al (2023) highlight the significance of making an informed decision before announcing the removal of fuel subsidy due its negative multiplier effects to the economy and the citizenry. Duntoye (2023) found through their focus group meeting with the respondents that barely after making the announcement on the 29th of May, 2023, the price of food and other commodities as well as transportation costs skyrocketed beyond the rich of the common man by as much as 53% and 137% respectively in Nigeria. Oyedele, et al (2023) on the other hand, posit that fuel subsidy regime was no longer sustainable in the country, but it sudden and outward removal should have been done in phases, and add, politically wise it is not a feasible solution to embark upon in the current situation in the country.

The effects of fuel subsidy removal are also examined by several studies within the context of having an impact on macroeconomic stability. Omotosho (2023), Olayinka, et al (2023) and Nigeria Economic Summit Group (Oyinlola, Dapel & Omotosho, 2023) report, all highlight how fuel subsidy removal led to higher macroeconomic instability. Omotosho (2023) study

revealed headline inflation increases, depreciation of exchange rate or devaluation of the local currency and its affect production output as aggregate GDP decreases. However, Olayinka, et al (2023) study shows that volatility clustering in exchange rate are noted and general price level increases, low saving and slowing down of investment as well as diminishing income of the populace leading to circle of poverty in the country. However, Oyinlola, et al (2023) using dynamic stochastic general equilibrium as methodology of the study found that subsidy reform generates both higher macroeconomic fluctuations and significant welfare implications in the short term.

On the effects of exchange rate fluctuations, Boubakri, Guillauminn and Silanine (2019) established that flexible exchange rate system and extreme financial openness would normally aggravate volatility of exchange rate and prevent economic stability. While other studies focuses on the effect of exchange rate on food prices, oil prices and inflation. Ajibade, Ayinde and Abdoulaye (2020), Nuhu (2021) found that exchange rate especially floating one drives food prices, oil shocks and a bidirectional relationship exists. That is exchange rate drives high price of oil and vice versa. However, a study by Manera (2021) for emerging economies and developing countries showed that volatility clustering occurred mostly as a fall out of the oil price shocks.

Based on the findings of the literature reviewed it is imperative to conclude that exchange rate volatility and fuel subsidy removal led to oil price shocks and price instability. Therefore, monetary policies as well as fiscal policies are a fundamental key role in volatility of exchange rate and the rise of general price of commodities leading to push-cost inflation. In this study, we extrapolate the significance of having a synergy between the monetary authority and fiscal policies managers in a situation where by it warrant sudden change in policy by a government, need to table and debated by the two policy makers in order to have a seamless outcome. This paper as a gap to other studies, models the two policies (that is, fuel subsidy removal and exchange rate volatility) together to examine their impacts on macroeconomic stability in the country. Previous studies focus only on either fuel subsidy removal or exchange rate volatility.

Table 1: Review of Related literature on the effects of fuel subsidy and Exchange Rate volatility

Author & Year	Title & Journal Source	Objectives	Methods	Findings
Evans, O., Nwagwugu, I., Vincent, O., Wale-Awe, O., Mesagams, E., & Ojapino, T. (2023)	The socio-economics of the 2023 fuel subsidy removal in Nigeria.	The study underscore the importance managing public sentiment and stakeholders reactions from the complexity of fuel subsidy removal	Case study using content analysis	The results highlight the significance of informed decision-making to mitigate short term impacts, harness long term gains and safeguard the vulnerable segments of the society as a result of fuel subsidy removal.
Duntoye, S., J. (2023).	Impact Assessment of fuel subsidy removal on small-holder farmers and Agricultural Market Actors in North-East Nigeria. CBN statistical bulletin downloaded on researchGate @ www.researchgate.net/publication/373144080	This study highlights how Nigerian citizens and residents have expressed and concern over fuel subsidy removal policy and how it affects their livelihood, standard of living and transportation cost.	Focus group	The study found that barely after the removal of subsidies on May 29, 2023, the price of food commodities increased by an average of 53%, while of transportation increases by an average 137%.
Omotosho, B., S. (2023)	Oil price shocks, fuel subsidy and macroeconomics stability in Nigeria	The paper studies the macroeconomic implications oil price shocks and the extant fuel subsidy regime in Nigeria	Forecast error Variance Decomposition	The findings revealed that fuel subsidy removal leads to higher macroeconomic instabilities and generate non-trivial implications for the response of monetary policy to an oil shock and generate significant and persistent impacts on output.
Price Water Coopers (2023)	Fuel subsidy in Nigeria-Issues, Challenges and the way forward	The paper looked into the significant amount committed to funding fuel subsidy regime and a way forward to mitigate the risk associated with its maintenance		the analysis found that the present practice of fuel subsidy is unsustainable and may lead to a debt crisis of the highest magnitude in the medium to long term.
Olayinka, M., S, Nwakaego, U., C, Ugonwa, N., C. (2022).	Exchange Rate and Positive Volatility in Nigeria: Implications on Macroeconomic stability. Bayero University Review. Vol. 6(2). ISSN: 0189-4684	The study focused on exchange rate and price stability in Nigeria because of its rapid changes, high volatile trend leading to macroeconomic instability.	ARCH & GARCH models were employed	The result shows volatility clustering in the exchange rate and general price level in Nigeria. The implications are low saving and low investment and diminishing real income leading to circle of poverty.
Boubakri, S., Guilaaumin, C., & Silanine, A. (2019)	Non-linear relationship between real commodity price volatility and real exchange rate: The case of Commodity exporting countries. Journal of macroeconomics, (60), 212-223	The study examines the price volatility and real exchange rate	ARCH	Flexible exchange rate regime and extreme financial openness aggravate volatility exchange rate leading macroeconomic instability
Ajibade, T, B., Ayolade, O, E., & Abdoulaye, T. (2020).	Food Price fluctuations: Evidenced from GARCH estimates. International Journal of food and agricultural economics (IJFAEC), (8), 367-380	The aim of the study is explores the impact of exchange rate volatility in relation to rise in food prices.	GARCH	The study found that exchange rates volatility drives food prices
Nuhu, M. (2021).	Impact of exchange rate volatility on inflation in Nigeria. Journal of contemporary research in Business, economics and finance. 3(1), 26-38	The study examines the volatility nature of exchange rate in relation to inflation	Variance Decomposition	Floating exchange rate due to its volatile nature have the tendency to induce higher inflation
Mordi, C, N. O. (2006).	Challenges of exchange rate volatility in Nigeria. CBN Bullion 30(3), 16-25	The study compare the effect of post-era of SAP in relation to exchange rate volatility		The study found in the post-era of SAP, exchange rate appeared to be kept relatively stable with the exception of external price shocks.

Source: Designed by the Authors (2024).

Theoretical Framework
Analyzing the effects of fuel subsidy removal and exchange rate fluctuations requires the applications of different theoretical framework since the two policies in questions have multifaceted impacts on social, economic and political consequences to the citizenry and the government. The underpinning theories in this study looked at the economic, social and political implications of sudden removal of fuel subsidy and exchange rate volatility due to the unification of exchange rate.

From the economic point of view, economic theories explain the repercussions of subsidy removal and one theory that stands in this direction is the Rational Choice theory. The theory postulates that, citizens manage to maximize their self-interest within a constraint they found themselves (Evan, et al, 2023). Taking fuel subsidy removal into context, this theory explains how citizens react to price changes by adjusting their consumption preferences. Data obtained from the Nigerian Bureau of Statistics aftermath the removal of fuel subsidy shows that citizens change their buying habit, cut their movements in term s of transportation, car owners reduced their level of fuel consumption and those using generators to generate electricity convert it to gas rather than petrol, all in effort to reduce cost as a result of sudden removal of subsidy.

From the social theories point of view, it helps to understand the negative multiplier effect as a result of removal of subsidy and the unification of exchange rates leading to Forex volatility and general price increase. In this context, the theory of social conflict explains how pressure groups such as labour unions, human right, religious and traditional leaders engaged the governments in conflict resolution when sudden shifts in policies threatened the well-being of their groups (Evans, et al, 2023). The theory elucidates the current reality in Nigeria where labour leaders are demanding to go on strike if living wage as they called it is not given to Nigerian workers. Religious and traditional leaders telling the political actors to do more to ameliorate the suffering of their people, as there is hunger in the land. Human right groups advocating for palliatives to cushion the effects of the twin policies of fuel subsidy removal and introduction of floating exchange rate. In conclusion, a multi-dimensional analysis of subsidy removal and foreign exchange rate volatility suggest application of various theories. Economic theories explained market dynamics and consumer buying habit; social theories reveal societal implications while a political theory underscores the rivalry and conflict of interest between the leaders and the led.

Methodology
The paper uses ex-ante and post-ante as the methodology of the study employing mean-variance analysis and regression analysis as the techniques of analysis. The ex-ante refers to what happened before the removal of fuel subsidy while the post-ante explains what changes had happened after the removal of the subsidy using fuel exchange volatility as a control. The study uses a time series data from January 2023 to January 2024.

The Model of the study is shown below:
$$\beta FSRt + \beta_1 FOREXt + \beta_2 INFLt + \beta_3 GDPt + \beta_4 INTRt + \beta_5 CRUDEOILt + e\ldots\ldots(1)$$

Where;

FSR   fuel subsidy
FOREX   foreign exchange
INFL   Inflation
GDP   Gross Domestic Product
INTR   interest rate
CRUDE OIL   international oil price

Data Analysis and Results

In the analysis we first use descriptive statistics to explain the nature, properties and characteristics of the data employed as shown table 2, then followed by pre-testing using correlations and Analysis of Variance (ANOVA) before the estimation technique of regression analysis.

In table 2 the mean return of the foreign exchange showed a 666.0123 with a standard deviation of 185.732 revealing some level of volatility. The fuel price after removal of subsidy has a mean-variance return of 396.447 and a standard deviation of 227.37 showing significant variation to the mean. The level of economic growth proxy as the GDP after the removal of subsidy showed that the mean return-variance (53089.25) is large and also recorded a large standard deviation of 2248.235 to the mean. This indicates that the level of economic growth in the country from June 2023 to January 2024 was drastically affected leading to low capacity utilization. The inflationary trend, interest rate and international price of oil maintained a modest outlook as their mean-variance remains stable in the period under review.

Table 2: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
foreign exchange	12	459.90	897.50	666.0125	185.73226	-.219	.637	-2.067	1.232
Inflationary trend	12	18.62	28.90	20.9133	3.61130	1.961	.637	2.439	1.232
fuel price after subsidy removal	12	65.00	675.00	396.4467	227.37085	.009	.637	-1.930	1.232
Gross domestic product	12	51242.00	56757.00	53089.2500	2248.23475	1.195	.637	-.443	1.232
interest rate	12	17.50	18.75	18.3750	.49429	-1.016	.637	-.520	1.232
International price	12	35.88	74.79	65.3381	13.79656	-1.927	.637	2.314	1.232
Valid N (listwise)	12								

Source: Author's computation using SPSS version 25 (2024)

Table 3 revealed a correlational analysis of the variables in the model. The analysis confirms the absent of multi-collinearity among the variables in the study, as none of the variables has a value greater or equals to 0.8 in the table. Therefore, the model is not suffering from any collinearity problem.

Table 3: Correlations

		foreign exchange	Inflationary trend	fuel price after subsidy removal	Gross domestic product	interest rate	International price
foreign exchange	Pearson Correlation	1					
	Sig. (2-tailed)						
	N	12					
Inflationary trend	Pearson Correlation	.475	1				
	Sig. (2-tailed)	.118					
	N	12	12				
fuel price after subsidy removal	Pearson Correlation	.645*	.526	1			
	Sig. (2-tailed)	.024	.079				
	N	12	12	12			
Gross domestic product	Pearson Correlation	.445	-.175	.566	1		
	Sig. (2-tailed)	.148	.587	.055			
	N	12	12	12	12		
interest rate	Pearson Correlation	.626**	.330	.621*	.592*	1	
	Sig. (2-tailed)	.001	.295	.031	.043		
	N	12	12	12	12	12	
International price	Pearson Correlation	.550	.183	.420	.420	.735**	1
	Sig. (2-tailed)	.064	.569	.174	.174	.001	
	N	12	12	12	12	12	

Source: Authors Computation using SPSS version 25 (2024)
*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 4: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	297199.753	5	59439.951	4.335	.051[b]
	Residual	82261.430	6	13710.238		
	Total	379461.184	11			

Source: Authors Computation using SPSS version 25 (2024)
a. Dependent Variable: fuel price after subsidy removal
b. Predictors: (Constant), International price, Inflationary trend, Gross domestic product, foreign exchange rate, interest rate

Table 4 revealed the Analysis of Variance (ANOVA) of the model and the F-value is statistically significant at 0.05 levels which confirm that the five (5) independent variables are statistically capable of predicting the dependent variable.

Table 5: Regression Result: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.885[a]	.783	.603	117.09073	.783	4.335	5	6	.051	2.759

Source: Authors Computation using SPSS version 25 (2024)
a. Predictors: (Constant), International price, Inflationary trend, Gross domestic product, foreign exchange rate, interest rate
b. Dependent Variable: fuel price after subsidy removal

Table 5 revealed the summary of the regression result. From the table the R-square is 0.783 and when adjusted it amount to 0.603 which simply means that 78% variation in fuel subsidy removal is caused by changes in all the predictors variable, while the remaining 22% that are not shown in the model but also affects fuel subsidy removal. The F statistics is 0.05 which equals 5%, shows that the results are statistically significant and the null hypothesis of the independent variables having no effect on FDI inflow in Nigeria as a result of fuel subsidy removal is therefore rejected.

Table 6 shows the regression result and the coefficients of the individual independent variables when regressed with the explained variable (fuel subsidy removal) and also the table 6 will form the basis of testing the following hypotheses:

Table 6: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-2512.935	4905.074		-.512	.627		
	Inflationary trend	38.848	17.712	.617	2.193	.071	.568	1.760
	Gross domestic product	.069	.032	.682	2.161	.074	.452	2.213
	interest rate	-98.794	336.659	-.215	-.293	.779	.084	11.914
	International price	1.796	7.435	.109	.242	.817	.221	4.527
	foreign exchange	.204	.551	.166	.369	.725	.222	4.510

Source: Author's Computation using SPSS version 25

a. Dependent Variable: fuel price after subsidy removal

H_{01}:   *Inflation has no significant effect on fuel subsidy removal in Nigeria.*

The unstandardized coefficient from table 6 of inflationary trend variables reveals a positive value of 38.85 and statistically significant at 10 percent (p-value = 0.07). This means that a one percentage change in the way a fuel subsidy is removed in Nigeria will cause a significant change in the inflationary trend of the country to the tune of 38% point. This work is consistent with the findings of Duntoye (2023), Nuhu (2023) and Ajibade, et al (2020) triggers food inflation and a rise in transport cost. Therefore, the null hypothesis of no relationship is here by rejected.

H_{02}:   *GDP has no significant effect on fuel subsidy removal in Nigeria.*

The GDP has a positive coefficient value of 0.069 and statistically significant when regressed with fuel subsidy removal at 10 percent level (p-value = 0.07). This result shows that a one percentage change in the way a fuel subsidy is removed in Nigeria will have a significant change of domestic production to the tune of six percentage point as revealed in table 6. This work is consistent with the work of Omotosho (2023) as the study found that fuel subsidy removal generates significant and persistent impacts on output (production). Therefore, the null hypothesis of no relationship is here by rejected.

H_{03}:   *Interest rate has no significant effect on fuel subsidy removal in Nigeria.*

Table 6 shows that the coefficient of interest rate after removal of fuel subsidy was negative (-98.79) and also statistically not significant (p-value = 0.7). That is a one percentage change will have a low interest rate as fuel merchant would rather avoid importation of fuel because of the significant effect it will have on their returns and low patronage from the consumers. Therefore, the null hypothesis of no relationship is here by accepted.

H_{04}: *International oil price has no significant effect on fuel subsidy removal in Nigeria.*

The coefficient of international oil price when regressed with fuel subsidy removal is positive (1.796) and statistically not significant (p-value = 0.8). This result shows that one percentage change will brings only 17 percentage increase in the importation of oil into the country. This work disconfirms the work of Modi (2006). Therefore, the null hypothesis of no relationship is accepted.

H_{05}: *Foreign exchange rate has no significant effect on fuel subsidy removal in Nigeria.*

The coefficient of foreign exchange rate shows a positive value of 0.204 but statistically not significant (p-value = 0.7). This result shows that a one percentage change in fuel subsidy removal will bring a twenty-percentage change in the way Forex is accessed by the fuel suppliers in the country. This result confirms the work of Olayinka, et al (2022) and Boubakri, et al (2019) which revealed that removal of subsidy on fuel shows volatility clustering in the exchange rate and affect general price level. Therefore, the null hypothesis of no relationship is accepted.

Conclusion and Recommendations

The paper examines the effect of fuel subsidy removal in the country and the foreign exchange volatility vis-à-vis the macroeconomic stability in Nigeria. The paper employs both qualitative and quantitative methods in explaining the study. The study found that although fuel subsidy regime is good for the generality of the populace in the country but also its outright removal has a negative multiplier effects in the economy; from the government in terms of general price instability and other macroeconomic indices like production output level, inflation and higher transportation costs associated with subsidy removal.

The findings of the paper and its conclusions prompt the following recommendation:
  i. Fuel subsidy should be removed but at a slower phase in order to alleviate the sufferings of the generality of the citizenry.
  ii. Provision of infrastructure to energize the economy should be the watchword of the federal government in terms of building railway lines and waterways to crisscross the country. Findings show that transportation cost is the first to be affected and ultimately affect the price level of food and other commodities in the country.
  iii. Unification of exchange rate has really triggered price volatility in the country and it is recommended that rather than adopting a floating exchange rate system which plunge this country into this economic mess we are experiencing, a managed-floating exchange rate system would have been a preferred option.
  iv. A combination of well refined monetary policy and fiscal policy ought to have been put in place by the federal government in order to bring price stability at the onset before the implementation of the floating exchange rate system (which is a monetary policy) and the removal of fuel subsidy.

References

Ajibade, T. B., Ayolade, O. E., & Abdoulaye, T. (2020). Food price volatility in Nigeria and its driving factors: Evidenced from GARCH estimates. *International Journal of Food and Agricultural Economics (IJFAEC), 8, 367-380*

Boubakri, S., Guilaaumin, C., & Silanine, A. (2019). Non-linear relationship between real commodity price volatility and real exchange rate: The case of commodity exporting countries, *Journal of Macroeconomics, 60, 212-223*

Evans, O., Nwogwugwu, I., Vincent, O., Wale-Awe, O., Mesagams, E., & Ojapino, T. (2023). *The socio-economics of the 2023 fuel subsidy removal in Nigeria.*

Duntoye, S. J. (2023). Impact Assessment of fuel subsidy removal on small-holder farmers and Agricultural Market Actors in North-East Nigeria, *Central Bank of Nigeria Statistical Bulletin Downloaded on researchGate @ www.researchgate.net/publication/373144080*

Mordi, C. N. O. (2006). Challenges of exchange rate volatility in Nigeria, *Central Bank of Nigeria Bullion 30, 16-25*

Musa, S. O., & Ifarajimi, G. D. (2022). Macroeconomic functions in the atmosphere of floating exchange rate in Nigeria. *Al-Hikamah International Journal of Finance 2, 1-12.*

Nuhu, M. (2021). Impact of exchange rate volatility on inflation in Nigeria, *Journal of Contemporary Research in Business, Economics and Finance. 3, 26-38*

Obadan, M. I. (2006). Overview of exchange rate management in Nigeria, *The CBN Bulletin, 3, 1-9*

Olayinka, M. S., Nwakaego, U. C., & Ugonwa, N. C. (2022). Exchange rate and positive volatility in Nigeria: Implications on macroeconomic stability, *Bayero University Review, 62, 160-180*

Omotosho, B. S. (2023). Oil price shocks, fuel subsidy and macroeconomics stability in Nigeria, *CBN Statistical Bulletin.*

Oyedele, T., Chime, E., Akindutiye, A., & Olajubu, O. (2023*). Fuel subsidy in Nigeria: Issues, challenges and the way forward*, *PriceWaterCoopers. www.pwc.com/ng*

Oyinlola, M., Dapel, Z., & Omotosho, B. (2023). *Fuel subsidy reform in Nigeria: Macroeconomic implications and policy options (19-2023).* A publication of the Nigerian EconomicSummit Group (NESG), Non-residential fellowship programme @ www.nesgroup.org