

Fuel Subsidy and Education Sector Financing in Nigeria: A Short-run Adjustment to Equilibrium Approach

Najeem O. Bashir*¹ & Kamilu A. Raheem¹

¹Department of Economics & Actuarial Sciences, Crescent University, Ogun State, Nigeria

*Correspondence Email: tunjibash@cuab.edu.ng

Abstract

This study examined the impact of fuel subsidy on education sector financing in Nigeria from 1990 through 2023. Annual data were obtained from the Nigeria Petroleum Corporation and World Development Indicators, (WDI) on variables such as fuel subsidy, government expenditure on education sector, Oil Revenue, pump price of Premium Motor Spirit and secondary school enrolment in Nigeria. A bound cointegration test and ECM were employed. Granger test for causality was also used to ascertain the direction of causation in the series. The estimated error correction term, ECT (-1) is significant. There is no causal relationship from fuel subsidy to education sector financing. However, education sector financing granger causes fuel subsidy. Premium Motor Spirit and education sector financing were found to granger-cause each other. The study recommends that government should ensure that fuel subsidy is not allowed to deprive education of its fair share of government spending, given that current spending on the sector has been established to have implication for the sectors growth in the future years.

Keywords: Fuel subsidy, Education sector financing, ECM

JEL Classification: D14, H25, I21

1. Introduction

Fuel subsidy, which is a practice where the government is responsible for part of the fuel pump price sold to consumers in order to lower the burden of the cost, it has been in existence in Nigeria for many years. In the face of high landing cost of imported refined fuel, it is a way through which the government ensures to make petroleum products affordable for the people (Adenikinju & Omenka, 2013). Fuel subsidy thus, involves the provision of fuel to consumers at a price lower than the actual market price (Oyekale & Adeyemi, 2016). Fuel subsidy, though previously being in existence, became prominent in Nigeria after the refineries in Nigeria were shut down for Turn-Around Maintenance, leading to the excessive importation of refined petroleum products (Waratimi, Wordu & Nkoi, 2020). The Nigerian education sector is responsible for the delivery of knowledge and skills that prepare its people for the workforce while impacting the country's social and economic development. The teaming youth population in the country underscores the importance of the sector, hence its importance in the general development of the country.

The sector has been continuously recording dearth in its ability to take care of the educational need of the increasing Nigerian population. The UNESCO ascertained that about 20 million Nigerian youths were found not to have enrolled in school as at 2022, (The Guardian, 2023). Quality of education has also deteriorated with widespread poor infrastructure, shortage of resource persons and poor research and development program funding (Oyekale & Adeyemi, 2016).

Budgetary allocation to education in the past years have been low, partly because good part of the government revenue goes into fuel subsidy. In 2011, Nigeria spent about N2.1tr on fuel subsidy. It further spent N1.99tr and N1.43tr on it in 2018 and 2021, respectively. Education sector in Nigeria, on the other hand, got N393.8 billion, N605 billion and N742.5 billion in 2011, 2018 and 2021, respectively (NEITI, 2023). Government's decision to allocate resources towards fuel subsidy therefore has implications for education funding and its development. Nevertheless, the effect of fuel subsidy does not directly impact on the development of Nigeria's education sector. However, it has indirectly caused financial deprivation of the education sector, and has grown to the extent that the cost of subsidizing fuel products to Nigeria is unsustainable. In 2022, the Minister of Finance, Budget & National Planning mentioned that Nigeria spends about N120 billion monthly on fuel subsidies, with a projection of N6.72 trillion if the country continued with the policy through 2023 (Izuaka, 2022). The retrogressive funding of the education sector encourages its slow rate of development with a far-reaching effect. The inability of learners to attain their full academic potentials as caused by poor education standard has a damaging effect on the economy. This engenders social and economic inequalities. The under-developed education sector becomes responsible for the dearth of trained personnel and increased skills gap, in the country. This does not only hamper national productivity but also affect the country's international outlook and competitiveness. It further perpetrates social and economic inequalities. These are indicators that the government's effort to increase funding for the education sector has not yielded a positive impact. Several moves by the government to put a stop to the leakage were met by protest and agitation from people in the country. Such decision led to national industrial action in 2012, where the government was forced to put the agenda on hold. Subsequent attempts were not also welcome (Adenikinju & Omenka, 2013).

Existing literature revealed that there are studies that evaluated the general impact of fuel subsidy regimes on the economic well-being of the country (Adeoti, Chete, Beaton & Clarke, 2016; Estan Beedell, 2017; Aruofor & Ogbeide, 2023). Other studies concentrated on areas where fuel subsidies can be used to fund a specific education or other programmes (Ogunode, Ahmed & Olugbenga, 2023; Taiwo & Olusola, 2020). Some other studies advocated for fuel subsidy removal as a means to provide better funding for the education sector (Ogunode & Aregbesola, 2023; Adenikinju & Omenka, 2013). However, how the various fuel subsidy regimes impact education sector financing has not been attended to, hence the relevance of this study. Having observed that fuel subsidy had garnered recognition in the budget of Nigeria than the education sector, the research attempts to provide solutions to the questions; what are the effects of fuel subsidy on education sector financing? Does a causal relationship exist between fuel subsidy and education sector

financing in Nigeria? Looking at the trends of fuel subsidy and education sector financing in Nigeria, this study examines the effects of fuel subsidy on education sector financing and determines if there exists a causal relationship between fuel subsidy and education sector financing in the country.

Brief Overview of Fuel Subsidy Regime in Nigeria

Nigeria has been dependent on imported refined fuel to power its economy for decades and has, therefore, adopted a regime of fuel subsidy to cushion the cost-price effect on the masses. The policy has been in place since the 1970s. It was introduced in 1977 during the military regime of President Olusegun Obasanjo, through the Price Control Act, to reduce effects of the price hike that was caused by the general rise in energy price, the world over, (Odude, 2024). Fuel subsidy in Nigeria cater for the up-shoot between the real market price, which comprises of the sum of landing costs, the cost of distribution and the various marketers' profit margins, and the government's fixed retail price that is paid to marketers (Adeoti, Chete, Beaton & Clarke, 2016). While PMS was sold to Nigerians at below cost price, the Act also forbids the sale of petrol and some other petroleum products above the fixed prices. The country operated a subsidy regime for Premium Motor Spirit and household kerosene, with PMS being the largest consumed fuel (Adeoti, *et. al.*, 2016; Onyeiwu, 2024). Mixed reactions about the policy had been on-going for decades after its implementation. However, the period that marked pronounced alterations in the policy were in 2016, during the first tenure of President Muhammadu Buhari when Price Modulation policy was put in place, (Evans *et. al.*, 2023). The government, through the independent and NNPC outlets, reviewed the price of PMS downward, and adjusted upward Kerosene price given that it had enjoyed a lower price regime than PMS in the past (Onyekwena, Adedeji, Akanonu, & Momoh, 2017). This translates to more subsidies on PMS while Kerosene received lesser. Before the end of 2016, the government reviewed the pump price of PMS upward, and per litre price of Petrol rose to N145. Although same upward price review was not immediately done for Kerosene, it was later increased before the end of the year (Onyekwena, *et. al.*, 2017). The recovery in the world oil price, was partly responsible for the increase in the pump price of PMS and Kerosene. However, increase in general fuel prices are usually resisted by citizens, thus forcing the government to compromise and reduce fuel level of prices. However, the current dispensation announced the abolishment of the policy in May, 2023, sending the prices of all fuel products parabolic (Ozili, 2023).

2. Literature Review

Subsidies are forms of economic support given by governments through payments and or any other means (Mankiw, 2014). Governments' subsidies are put in place when the objective is to enhance improvement of economic activities or when cost of living is overwhelming. Fuel subsidy is a public policy targeted at bringing down the cost of fuel products in the country by providing financial support to the producers or importers of fuel (Ayodele & Olusola, 2020). Fuel subsidy in Nigeria comes in the form of the federal government being responsible for the off-shoot between the landing cost of imported petroleum products and the final price at which the product gets to the masses. This resultant practice became pronounced when refineries in the country were put under maintenance,

leading to the importation of fuel products at higher cost (Waratimi, *et. al.*, 2020). The purpose was to make fuel accessible and affordable in the country.

The growing population of Nigerian youths requires continuous investment in the education sector. Policies and initiatives towards catering for the need of the sector include the Primary Basic Education (PBE), which provides basic education to all Nigerian children, and the Tertiary Education Trust Fund (TETFund), which provides funding for infrastructure development in tertiary institutions (World Bank, 2020). Over the years, however, government's budgetary allocation to these major bodies have nosedived below the recommended benchmark of the twenty six per cent of the national budget set by the UNESCO (World Bank, 2020). This has adversely affected education standard in the country in the form of poor infrastructure, low-quality teaching and learning materials, and inadequate remuneration for teachers (Oyekale & Adeyemi, 2016).

Classical economics, however, believes that subsidies often lead to market distortions, hence causing a dis-incentive to the improvement in the economy. This thought is guided by the consumer behaviour's axiom that more of a beneficial resource is preferred than lesser of it (Ekanem and Iyoha, 2000). When prices are artificially lowered, therefore, buyers over-consume and waste. Subsidies put the nation as a whole at the expense of rent-seekers whose consumption out-shoots their economic contribution to the economy (Mankiw, 2014). The resultant effect of such government policy is the diversion of resources from other essential sectors such as education, healthcare, and infrastructure development. This creates fiscal burden for the government, as financial resources required for more productive investments to promote long-term economic growth and development, would have to be sourced elsewhere.

The Walrasian General Equilibrium Model theory (GEM) was developed in the late nineteenth century, to understand general macroeconomic fluctuations and the then great depression (Walras, 1874). The model is an economy-wide concept which analyses the impact or repercussion on the whole economy, of a change that is triggered from just a sector. Often, a change that emanates from one sector resonates beyond the sector of its occurrence to the economy-wide system. General equilibrium models therefore helps to understand the overall consequences of policies taken at various individual sectors of the economy.

The theory of Regulated Monopolies in relation to the education sector reveals that the provision of education can be considered a natural monopoly, where the government plays a dominant role due to the high overhead costs it provides, and public interest nature of the services the sector renders (Koutsoyiannis, 1993). Governments' intercession in financing education ensures quality standards, equitable access, and efficient resource allocation. Even where privately-owned education establishments are involved, regulatory bodies oversee their operations to ensure they meet benchmark standards (Obioma & Okoli, 2018). The act of academic research funding, subventions and compliance assurance aligns with the classical theory of regulating monopolies to prevent excessive and indiscriminate actions by market participants (Uwatt, 2018).

The Keynesian theory, developed in the 20th century elucidates on role of government spending to stimulate economic growth and reducing unemployment (Jahan, Mahmud & Papageorgiou, 2014). It explains the role of government funding in aiding the development of real sectors of a country. The theory expatiates on the role of aggregate demand and how government intervention addresses economic fluctuations and promotes stability. The Keynesian theory suggests that in the Nigerian situation, if the government discontinues the funding of fuel subsidy, it could use the saved funds to invest in education and other social services, which could stimulate economic growth and reduce poverty (Stiglitz, 2000).

The General Equilibrium Model lends to provide a theoretical framework for this study. In the Nigerian context, fiscal implication of fuel subsidies is accounted for through the examination of its effects on government revenue and expenditures. Central to this analysis is the concept of Opportunity cost where investments in other real sectors of the economy are jettisoned in order to subsidise fuel price. This, by implication resonates across all other sectors of the economy, leading to market distortion (World Bank, 2022). The model is therefore a pointer to adequate measure, given its potency, to capture the proportional effect of subsidies on a nation's budget and spending.

On the empirical review, Dauda (2011), worked on how government spending on education sector and other macroeconomic variables impact schooling in the country. ECM and VAR Models were used in the analysis. While government spending on education positively impact on learning outcome, macroeconomic instability adversely affects it. Results from the VDM analysis showed that "own shocks" is largely responsible for variation in schooling outcome. Obi, Obi and Ejefobihi (2014) studied the efficiency of education sector expenditure in Nigeria. The study covered the year 1990 through 2018 using series on government education sector expenditure, literacy level in Nigeria, economic growth and human capital development. The study used ARDL model in the analysis, and found that government spending on education negatively impacted economic growth in the country. However, government spending on education has a positive and significant impact on human capital development in Nigeria. The study did not establish long-run association among adopted variables. Estan and Beedell (2017) evaluated the impact of Nigeria's fuel subsidy regimes and tested their validity by evaluating the economic, social and political impacts. The study analysis was based on literature review supported by data collected from the Nigerian National Bureau of Statistics and other organizations. The study results suggested that subsidy regime has created economic inefficiency, escalated by negative externalities associated with fossil fuels. The study further found that the inefficiency created by the fuel subsidy policy had worsened the nation's macroeconomic stability through discretionary government spending

Ejitu and Ecoma (2017) conducted a study on how crises in the Nigeria state has influenced the Education Sector. The study used the Focus Group Discussion to gather data, and adopted an expository method of analysis. It was found that the financial neglect that the sector was subjected to has poised it for retrogression and placed the country's present and future educational and economic growth on a dangerous pedestal. Agbaeze and Ishaku (2018) worked on how oil subsidy management affected economic performance in

Nigerian economy using time series sourced from the PPPRA and the CBN Annual Report. The study covered the period between 2006 and 2015, and the method of data analysis was Ordinary Least Square Simple Linear regression. The study found that, fuel subsidy had positive and significant impact on GDP during period of study. Hence, suggesting that fuel subsidy may have favourable impact on some productive sectors in Nigeria. Omotosho (2019) looked into price shock effect and fuel subsidy on the macroeconomic stability in Nigeria. The study developed and estimated a New-Keynesian DSGE model, and found that subsidy on fuel prices is useful in stabilising the economy. The study cautioned that a successful exit strategy from subsidy regime will have to put in place adequate provisions for the people. The study also recommended further investigation on effects of subsidy on long-run economic growth, peoples' welfare and fiscal activities of the government.

Eme, Ugwu and Asogwa, (2019) examined the socioeconomic effects of subsidy regime in Nigeria between 1999 and 2014 with the use of a documentary research methodology. It was revealed that fuel subsidy policy in Nigeria was infested with corruption and, therefore, amount to loss of revenue to the government. Ogunode & Aregbesola (2023) examined how fuel subsidy removal has influenced education sector financing, through the use of secondary data drawn from various publications. The study established that discontinuation of fuel subsidy by the government will negatively impact the general administration of schools in Nigeria. Aruofor & Ogbeide, (2023) analysed the impact of fuel subsidy on the Nigerian economy in the 4th Republic to determine the annual levels of amount spent by the government since 1981. The research employed the use of Ecostatometrics referred to as Total Differential Modeling Approach, and found that fuel subsidy positively impact the Nigerian economy but suggested that its administration needs major reform. In the work of Abdullahi and Abdullahi (2023) where they studied the impact of oil subsidy on the Nigerian State, documentary approach to information gathering was used to harvest facts from various publications. The study covered a period of 2015 through 2022, and found that so much resource that would have aided growth and development in Nigeria were spent on oil subsidy and therefore amounts to waste, This is especially so when funds available to take care of other sector were not enough.

3. Methodology

This study used an annual data to examine the impact of fuel subsidy on Education sector financing in Nigeria from 1981 through 2023. The variables used in the model are fuel subsidy, government expenditure on education sector, crude-oil Revenue, pump price of petroleum motor spirit and secondary school enrolment in Nigeria during the period of study. Fuel subsidy, Oil Revenue and pump price of petroleum motor spirit data were gotten from the NNPC, (Nigeria Petroleum Corporation) and government spending on education sector and secondary school enrolment data were gotten from World Development Indicators.

The individual features of the adopted time series were examined through the use of descriptive analysis. Graphs were used to report the trends of the adopted variables. ADF test for Unit Root was carried out to determine the level of stationary, while cointegration by bound test was employed to determine if there is co-integration among the time series. An

ECM is used to show the effect of fuel subsidy on the education sector Nigeria, in the short-run. Granger test for causality was used to ascertain if there exists causality between the variables. Period under study is from 1981 to 2023. The functional relation where the effects of crude-oil revenue, pump price of PMS, fuel subsidy and secondary school enrolment are tested on the government spending on education sector is as shown below;

$$GEES_t = f(FS, OIL REV, PMS, SSEN R) \dots\dots\dots 1$$

The explicit form of the study model is rendered below as

$$GEES_t = \alpha_0 + b_1 FS_t + b_2 OIL REV_t + b_3 PMS_t + b_4 SSEN R_t + U_t \dots\dots\dots 2$$

In order to examine the proportional effects of the regressors on government spending on education sector, equation 3.1 is rendered in a natural logarithm form;

$$\ln GEES_t = \alpha_0 + b_1 \ln FS_t + b_2 \ln OIL REV_t + b_3 \ln PMS_t + b_4 \ln SSEN R_t + U_t \dots\dots\dots 3$$

Where; GEES = Government Spending on Education Sector (Billion ₦), FS = Fuel Subsidy (Billion ₦), OIL REV = Oil Revenue (Billion ₦), PMS = Premium Motor Spirit (Naira), SSEN R = School enrolment, secondary (percentage), b_0, b_1, b_2, b_3, b_4 = Coefficients to be estimated, U_t = Stochastic term

Causal relationship between fuel subsidy and the education sector in Nigeria is modeled as shown below:

$$\ln GEES_t = \alpha_1 + \sum_{i=1}^p Y_i \ln GEES_{t-i} + \sum_{i=1}^p Y_i \ln FS_{t-i} + \sum_{i=1}^p Y_i \ln OIL REV_{t-i} + \sum_{i=1}^p Y_i \ln PMS_{t-i} + \sum_{i=1}^p Y_i \ln SSEN R_{t-i} + U_t \dots\dots\dots 4$$

$$\ln FSU_t = \alpha_2 + \sum_{i=1}^p \theta_i \ln FS_{t-i} + \sum_{i=1}^p \theta_i \ln GEES_{t-i} + \sum_{i=1}^p Y_i \ln OIL REV_{t-i} + \sum_{i=1}^p Y_i \ln PMS_{t-i} + \sum_{i=1}^p Y_i \ln SSEN R_{t-i} + U_t \dots\dots\dots 5$$

Causality would be established in the models specified above when the estimate of a variable differs from zero in an equation, while the coefficient is not different from zero in the other complementary equation. When the estimated F-statistics in the model is statistically significant, the null hypothesis of no causality among the variables is therefore rejected.

4. Results

Descriptive Analysis

The features of the adopted variables in the study analysis are examined and presented below. Following the table are discussions of the features.

Table 1: Descriptive Statistics

Variables	Mean	Maximum	Minimum	Std Dev.
GEES	175.8061	646.7500	0.2900	187.9925
FS	516.9032	2110.000	76.0000	539.5296
PMS	60.75097	161.0000	0.6300	51.5263
OIL REV	3206.042	8879.000	71.9000	2683.025
SSEN R	32.18694	56.21000	23.5500	9.2924

Source: Author's computation

Table 1 provides descriptive statistics for government spending on education sector, fuel subsidy, premium motor spirit, Oil revenue, and school enrolment at the secondary school level, respectively. Government spending on education has a mean value of about N175.81 billion. Average fuel subsidy in Nigeria during the study period is about N516.90 billion. The average price of Premium Motor Spirit, PMS is N60.75. While average Oil revenue is about N3206.042 billion, average secondary school enrolment at the period is around 32.18%. Government spending on education has standard deviation of 187.9925, fuel subsidy has a standard deviation of 539.5296 and Premium Motor Spirit has a standard deviation of 51.52635. Oil revenue and secondary school enrolment have standard deviations of 2683.025, and 9.292444%, respectively.

Trends

Graphs were used to describe the trends of Fuel subsidy, Government spending on Education, Oil Revenue, price of Premium Motor Spirit and Secondary School enrolment in Nigeria. Figure 1 shows trend of Premium Motor Spirit. For about two decades from the beginning of the study period, fuel subsidy was relatively low until it soared in subsequent years, starting from 2010 till the end of the study period. Reasons for the astronomical growth in subsidy amount could be attributed to increase in volume of PMS consumed in the country, Naira devaluation and rise in crude-oil price at the world market. This has led to substantial portion of the national income being committed to its funding. This finding is in line with the research work carried out by PricewaterhouseCoopers International, (2023).

Figure 2 shows the trend of government spending on education in Nigeria. The first decade in the study period revealed a very low level of government expenditure in the sector. The depicted trend corroborates the finding of the United Nations Educational Scientific and Cultural Organizations (UNESCO) that Nigeria, as a developing country, was yet to earmark the recommended 15 to 20 of its public expenditure to its education sector. The sector however, experienced improved government spending in later years. This may be attributed to the effort of the immediate past government of President Muhammadu Buhari as contained in his penultimate budget and the signed appropriation bill of 2023, (Ojo, 2023).

In figure 3, the trend of crude-oil revenue in Nigeria is depicted. Revenue from oil was relatively low between 1990 and 2002. It started fluctuating upwards in the following years and climaxed around 2012. This coincided with the period when there were concerns about possible international oil supply disruption, hence forcing oil price to skyrocket, (EIA, 2012). Subsequent years witnessed downward fluctuation in oil revenue, in response to fall in world oil revenue. Figure 4 shows the trend of price of Premium Motor Spirit in Nigeria. In 1990, price of a litre of petrol was less than a Naira and was later increased to N15 in 1994, during the regime of General Sani Abacha. It rose to N25 in 1998 during the tenure of President Mustapha Abubakar, (Ukpong, 2004). In 2010, it was N65. Despite the slight increment over the years, the price of a litre of petrol was less than N100 for almost 25 years from 1990 to 2015, on the average. This relative low pump price of PMS in relation to the high landing cost of its importation explains the reason for government fuel subsidy policy in the country. While PMS pump price had risen to N195 in early 2023, it skyrocketed to N557 when the new government of President Tinubu announced the discontinuation of fuel subsidy regime. In response, a litre of PMS was sold for about N617 in April 2024. This

upward trend in PMS pump price in the later part of the period of study is shown in figure 4 below. Trend of Senior Secondary School Enrolment in Nigeria as depicted below in figure 5, revealed that for almost 15 years (between 1990 and 2004), enrolment was just about 25 percent of children within secondary school age in the country. In 2010, the enrolment rate slightly rose by 18%. It got to 47% in 2020 and remained so till the end of the study period.

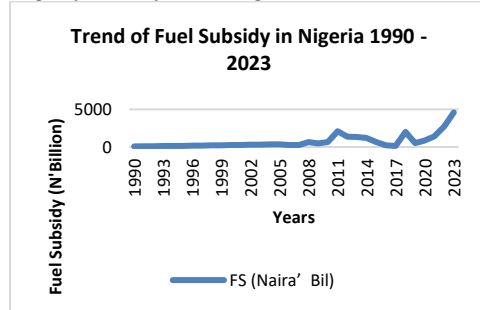


Figure 1

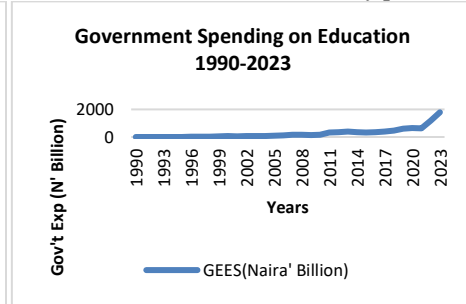


Figure 2

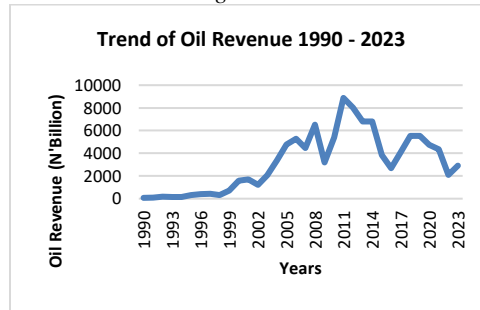


Figure 3

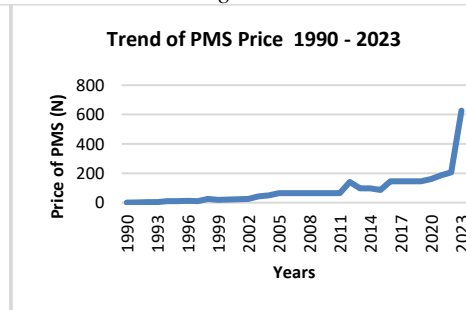


Figure 4

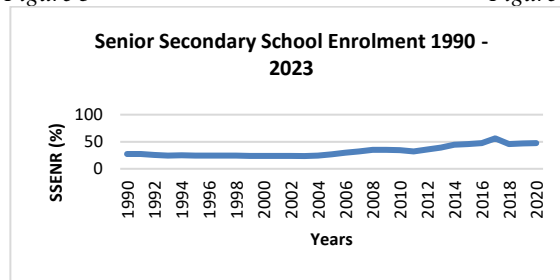


Figure 5

Test for Unit Root

From Table 2 natural log of GEES and PMS are stationary at level. SSENR, natural log of GFS, OIL-REV and FS require first differencing to attain stationarity. These results provide

insights into the long-term properties and dynamics of the employed time series. Result of the ADF unit root test for stationarity conducted on the time series is reported below

Table 2: Unit Root Test Result

Variable	Levels	First Difference	Decision
lnGEES	-5.8565 (0.0000)	–	I(0)
lnFS	-2.1798 (0.2172)	-7.5488 (0.0000)	I(1)
lnOIL REV	-2.2787 (0.1872)	-5.1168 (0.0002)	I(1)
lnPMS	-5.3473 (0.0001)	–	I(0)
SSENR	-0.7111 (0.8290)	-5.9412 (0.0000)	I(1)

Source: Author's computation

Bound test Co-integration

Bound test cointegration was carried out on the variables given that the generating process underlying the time series was of mixed levels of stationarity. The result is presented as shown below.

Table 3: Bound Test Result

	F-statistic	k	p-value	Lower Bound	Upper Bound
Model	7.805491	3	10%	2.45	3.52
			5%	2.86	4.01
			2.5%	3.25	4.49
			1%	3.74	5.06

Source: Author's computation

Result of the bound test co-integration between fuel subsidy and education sector financing in Nigeria above, indicate a significant F-statistic, with a value of 7.805491. The lower bound critical value of 2.86 and the corresponding upper bound value of 4.01, at 5%, indicate a significant relationship between the variables. Evidence of co-integration between fuel subsidy and education sector financing in Nigeria is thus established.

Lag Selection

The establishment of long-run association among the study variables by the bound test requires that an ECM is fitted. The VAR lag selection approach is therefore employed to select the optimum lag required to fit the Error Correction Model.

Table 4: Optimum Lag Selection Result

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-204.1360	NA	1.263545	14.42317	14.65891	14.49700
1	-93.86343	174.9150*	0.003636*	8.542306*	9.956750*	8.985292*
2	-72.30065	26.76759	0.005458	8.779355	11.37250	9.591497

Note: * indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion. Source: Author's computation, 2023

Table 4 presents results of optimum lag selection carried out in the study. The results show that SC, AIC and HQ suggest the adoption of one lag as the optimum. The fitted ARDL regression, therefore adopts the suggested optimum lag of one.

Error Correction Model

The ECM is used in this study to test the extent to which the disequilibrium from the long-run influences the short-run dynamics. Hence, the rate at which education financing returns to equilibrium after some changes in fuel subsidy is estimated and presented below.

Table 5: Error Correction Results

Variable	Coefficient	Std Error	t-statistics	Prob
C	-0.0754	0.0830	-0.9087	0.3729
D(lnGEES(-1))	0.3033	0.1110	2.7320	0.0109
D(lnFS(-1))	0.0495	0.1446	0.3424	0.7351
D(lnOIL(-1))	0.1736	0.1768	0.9820	0.3363
D(lnPMS(-1))	1.1129	0.1713	6.4945	0.0000
D(SSEN(-1))	-0.0234	0.0279	-0.8396	0.4098
ECT(-1)	-0.3923	0.0560	-7.0009	0.0000
R-squared	0.8309	Mean dependent var		0.2066
Adj R-squared	0.7868	S.D dependent var.		0.7389
S.E or regression	0.3412	Akaike info cfiterion		0.8882
Sum squared resid	2.6776	Schwarz criterion		1.2152
Log likelihood	-6.3242	Hannan-Quinn criter.		0.9928
F-statistic	18.8374	Durbin-Watson		1.3607
Prob(F-statistic)	0.0000			

Source: Author's computation, 2023

The $ECT(-1)$ has a coefficient of -0.392339 and is significant at 1%. This shows that about 39% of effect the disequilibrium in education financing has experienced in the short run. However, it will take about 21 months (a year and 9 months) for half or 50% of the disequilibrium to be felt. D(lnGEES(-1)) has an estimated coefficient of 0.303375 and imply that a percentage rise in government expenditure on education sector in the previous year causes the sector to significantly grow by 30%. D(lnPMS) has a coefficient of 1.112959 which imply that a percentage increase in pump price of PMS led to over a hundred percent increase in education financing. The coefficient is significant at 1%.

Diagnostic Check

The heteroscedasticity test is carried out to check if the variance of errors from the model output does not correlate with the values of the independent variables.

Table 6: Heteroscedasticity Test Results

F-statistic	0.9410	Prob.F(6,23)	0.4769
Obs*R-squared	5.9581	Prob.Chi-Square(6)	0.4279
Scaled explained SS	3.3423	Prob.Chi-Square(6)	0.7648

Source: Author's computation, 2023

The test result shows F-stat of 0.9410 which has p-value of 0.4796, and not statistically significant. Therefore, the null hypothesis of no heteroskedasticity cannot be rejected

Granger Causality

The granger test for causality examines the causal relationship between educational spending and the different proxies for fuel subsidy as adopted in this study. It helps to establish the possibility of educational financing and fuel subsidy being able to forecast one another.

Table 7: Granger Causality Result

Causality	Obs	F-statistic	Prob
lnGEES does not Granger Cause LOGFS	31	7.9207	0.0088
lnOIL REV does not Granger Cause lnGEES	31	9.3944	0.0048
lnGEES does not Granger Cause lnPMS	31	9.4733	0.0046

Source: Author's computation, 2023

The table present results of the pairwise Granger causality tests conducted on Fuel Subsidy, Government spending on Education sector, crude-oil Revenue and Premium Motor Spirit. Based on the F-stat of 1.6260 and a probability of 0.2127, the study cannot reject the null hypothesis. Hence, no causal association exists from Fuel Subsidy to Government spending on Education sector. However, Government spending on Education sector granger causes Fuel Subsidy, having an F-stat of 7.9207 and a significant probability value of 0.0088. A uni-directional causality from Oil revenue to Government spending on Education sector is established with F-statistic of 9.3944 which is significant at 1%. Petrol Motor Spirit, PMS and Government spending on Education sector were found to granger-cause each other, with both variables having statistically significant F-statistics of 66.2867 and 9.4733, respectively. Hence, there exists a bi-directional causality between both variables.

5. Conclusion and Recommendation

The trend analysis revealed that while government spending on fuel subsidy annually rise at a faster rate, government education financing increased at a decreasing rate throughout the period of study. The error correction model showed that while fuel subsidy does not have significant influence on education sector financing, past expenditure on education by the government tends to have significant influence on the education sector and it's financing. So also is the pump price of PMS. The error correction term (ECT) showed that almost 39% effect of the disequilibrium in education financing is experienced in the short-run, and this proportion is corrected each year through adjustment in the influencing variables. Half or 50% of the total disequilibrium caused during the 31 year period is felt in about 2 years. The causality test established that fuel subsidy cannot be directly used to forecast Education financing in Nigeria. This corroborates the findings of Aruofor & Ogbeide, (2023), that fuel subsidy does not have significant influence on education sector financing in Nigeria. The study concludes that fuel subsidy does not have significant influence on government spending on education in Nigeria during the period of study. It, therefore, cannot be used to forecast for government spending on Education in the country. This suggests that changes in fuel subsidy regimes do not appear to have a significant impact on education sector financing. Thus alterations in fuel subsidy policies may not directly affect government spending on education sector.

The study recommends that fuel subsidy should not be allowed to deprive education of its fair share of government spending. This is important because current spending on the sector has been established to have implication for the sectors growth in the future years. It is equally important because the overall adverse effect of the disequilibrium in fuel subsidy tends to have long lasting effect on educational sector spending in the country.

Reference

- Abdullahi, A., & Abdullahi, S. (2023). The Nigerian State and the Issue of Oil Subsidy. *International Journal of Law, Politics & Humanities Research*. Published by Cambridge Research and Publications, 28(6)
- Adenikinju, A., & Omenka, S. (2013). Fuel Subsidy Removal in Nigeria: An Analysis of Dynamic General Equilibrium Effects. *The Nigerian Journal of Economic and Social Studies*. 55(2), 163-188
- Adeoti, J., Chete, L., Beaton, C., & Clarke, K. (2016). Overview of the Fuel Subsidy Regime in Nigeria. *International Institute for Sustainable Development (IISD)*. <http://www.jstor.com/stable/resrep14771.5>
- Agbaeze, E.K., & Abner, I.P. (2018). Oil Subsidy Management and Performance of the Nigerian Economy. *International Research Journal of Finance and Economics*. 165
- Aruofor, R.O., & Ogbeide, D.R. (2023). The Impact of Fuel Subsidy on the Nigerian Economy in the Fourth Republic: An Analysis. *International Journal of Social Sciences and Management Research*, 9 (5). www.iiardjournals.org
- Ayodele, T. R., & Olusola, O. I. (2020). Fuel Subsidy, the Nigerian economy, and the Renewable Energy Imperative. *Energy Exploration & Exploitation*, 38, (5)
- Babatunde S., Omotosho. (2019). Oil Price Shocks, Fuel Subsidies and Macroeconomic stability in Nigeria. *CBN Journal of Applied Statistics*, 10(2)
- Dauda, R.O. (2011). Effect of Public Educational Spending and Macroeconomic Uncertainty on Schooling Outcomes: Evidence from Nigeria. *Journal of Economics, Finance & Administrative Science*, 16(31), 7
- Ekanem, O.T & Iyoha, M.A (2000) "Microeconomic Theory". Mareh Publishers. 47, Jonathan Akpoborie, BDPA Benin City, Edo State Nigeria.
- Eme, O.I., Ugwu, C.C., & Asogwa, M. (2019). Subsidy Regime in Nigeria, 1999 – 2014. *Journal of Management and Economic Studies*. 1(1): 34-47.
- Estan Beedell, (2017). Evaluating the Impact of Nigeria's Fuel Subsidy Regime. University of Ottawa Graduate School of Public and International Affairs.
- Evans, O., Nwaogwugwu, I., Vincent, O., Wale-Awe, O., & Mesagan, E.O. (2023): The Socio-economics of the 2023 Fuel Subsidy Removal in Nigeria. *Munich Personal RePEc Archive*, 17, 12-32.
- Izuaka, M. (2022). Retaining Petrol Subsidy in 2023 will Cost Nigeria nearly N6.7 trillion - Government. Premium Times. July, 22nd 2022.
- Jahan, S., Mahmud, A.S., & Papageorgiou, C. (2014). What is Keynesian Economics? *Journal of Finance and Development*. 51 (3)
- Koutsoyiannis, A. (1993). Modern Microeconomics. Macmillan Education Ltd, London and Basingstoke. 2nd edition. ISBN 0-333-39737-1

- Mankiw, N.G. (2014). Principles of Economics. Cengage Learning, United States of America.
- Obi, Z.C., Obi, C.O., & Ejefobihi, U.F. (2020). The Efficiency of Education Expenditure in Nigeria. *European Journal of Education Studies*.7 (1)
- Obioma, G.O., & Okoli, C.C. (2018). Financing Education in Nigeria: Challenges and Strategies. *Journal of Education and Practice*, 9(3), 1-6.
- Odude, F. (2024). Issues in Using Price Control in Nigeria. Financial Nigeria. *Commercial and Energy Law Practice (CANDELP)*. March, 2024
- Ogunode, N.J., & Aregbesola, B.G (2023). Impact of Subsidy Removal on Nigerian Educational System. *Middle European Scientific Bulletin*.
- Ogunode, N.J., Ahmed, I., & Olugbenga, A.V. (2023). Application of Petrol Subsidy Funds to Address the Problems of Universal Basic Education for Sustainable Development in Nigeria. *Multidimensional Research Journal*, 2(1)
- Onyeiwu, S. (2024). Nigeria's Fuel Subsidy Removal was too Sudden: Why a Gradual Approach would have been Better. *The Conversation, Academic Rigour Journalistic flair*.
- Onyekwena,C., Adedeji, A., Akanonu, P.C., & Momoh, A. (2017). Energy Subsidies in Nigeria: Opportunities and Challenges. Centre for the Study of the Economies of Africa (CSEA) Abuja, Nigeria
- Ota, E.N., & Ecoma, C.S. (2017) 'The Education Sector and the Crises of the Nigerian State. *Journal of Asian Development*. 3(2), 23-42.
- Oyediji, O. (2023). Nigeria's Expenditure on Fuel Subsidy in 17-Years adequate to build Three 450,000BPD Refineries. *Nigeria Extractive Industries Transparency Initiative*.
- Oyekale, A.S., & Adeyemi, S.A. (2016). Challenges and Prospects of Funding Education in Nigeria: The Way forward. *Journal of Social Sciences*, 5(3)
- Ozili, P.K (2023). Implications of Fuel Subsidy Removal on the Nigerian Economy. *Munich Personal RePEc Archive* MPRA. Paper No. 120509. <https://mpra.ub.uni-muenchen.de/120509/>
- Stiglitz, J.E. (2000). Economics of the Public Sector. WW Norton & Company Inc, 500 Fifth Avenue, Newyork N,Y 10110. 3rd edition.
- Umeh, K. (2023). "Tackling the menace of out-of-school children in Nigeria". The Guardian 10th February, 2023
- Uwatt, U. B. (2018). Education funding and economic growth in Nigeria: An empirical analysis. *International Journal of Economics and Financial Issues*, 8(2), 25-33.
- Walras, L. 1874. Elements d'Economie Politique Pure. Lausanne: Corbaz. 7, 628-632
- Waratimi, E. O, Wordu, A. A & Nkoi, B., (2020). Statistical Model to Evaluate Turn-Around-Maintenance of Port Harcourt Refinery in Nigeria. *American Journal of Engineering Research (AJER)*. 7(12), 166-178
- World Bank. (2022). Nigeria Economic Memorandum: Charting a New Course. World Bank Group Publication. December, 2022.