Research Article

Impact of Premium Motor Spirit Price Adjustment on Nigerian Economy (1986-2023)

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Abstract

This study examined the impact premium motor spirit price adjustment on economic growth in Nigeria 1986- 2023. It applied descriptive statistics, Augmented Dickey Fuller (ADF) and ARDL on time series data sourced from Central Bank of Nigeria Statistical Bulletin and World Bank Development Indicator for the period of 1986-2023. It revealed that the data were normally distributed based on Jargue Bera statistics and its p-value whereas the unit root test result indicated mixed order of integration which necessitated the choice of ARDL. In addition, the F-Bounds test for the Autoregressive Distributed Lag (ARDL) model revealed that the variables exhibit cointegration with one another and it was confirmed that long run relationship exist among the variables. Moreover, the Error Correction Mechanism (ECM) indicated the speed of adjustment in ARDL modelling from short-run to long-run convergence. This coefficient of -0.65 implied that in 1 year 5 Months the divergence among the variables studied will converge back to equilibrium point. On the part of long-run, this study revealed that there are positive impact of oil revenue on economic growth and it statistically significant while exchange rate and inflation rate had negative impact on economic growth and statistically insignificant. On the short-run dynamism, this study indicated that impact of oil revenue on economic growth was positive but statistically insignificant while exchange and inflation rates were negative but statistically significant in the model. The model passed all of the tests for normality, serial correlation, heteroscedasticity, and Ramsey RESET test and model stability as revealed in diagnostic tests. This study concluded that the oil revenue has positive impact on economic growth in Nigeria and statistically significant in the long-run. Hence this study recommended that government should implement diversification policy aside changing oil price on economic growth in Nigeria. All measures to be taken by the government and other stakeholders in the oil sector should be on long-run basis because the study has established long-run relationship between oil revenue and other macroeconomic variables in Nigeria and should reinforce and stabilize the Nigerian macroeconomic structure with a focus on diversification of the economy away from oil in order to minimise the negative impact of inflation and exchange rates on economic growth in Nigeria.

Keywords: Motor Sprit, Adjustment, ARDL, Economic Growth.

1.0 Introduction

Premium motor spirit in any of its processed forms is used in the generation of energy. In spite of the abundant oil reserves in Nigeria and its neighboring countries, they still have a low capability of energy generation with its inhabitants suffering the highest form of energy poverty in the world (IAE, 2023). In trying to bridge the gap, residents of urban areas litter every neighborhood with generators powered by fossil fuel, thereby endangering the environment. It is, yet astonishing that for a region naturally endowed with rich fossil fuel and abundant sources of renewable energy to be suffering from energy poverty (Ifediora, 2020; Njiru & Letema, 2018).

Nigeria is the largest country in Africa with a population of about 2013 million people and is the 6th largest oil exporter in the world with the second largest oil reserves in Africa. Similarly, it is one of the highest producers of oil producer in

African continent (The World Bank, 2017). Crude oil played a dominant role in Nigerian economy given its huge contribution to the revenue of the country and its foreign earnings (Central Bank of Nigeria, 2022).

For instance, Central Bank of Nigeria (2024) showed that oil receipts accounted for 82.1%, 83% and about 90 per cent of the nation's foreign exchange earnings over the years. The trend of oil revenue to national budget in Nigeria within the period of this study can be depicted as: in 1986, it was amounted to ₦ 8.1billion, by 1995 it has grew to ₦324.5 billion. In addition, in the year 2005, it was amounted ₦4,762.4 billion but the highest value of total revenue earnings in Nigeria was ₦ 8,879.0 billion in 2011. More to that, it decreases to ₦3,830.1 billion as the lowest value in 2016 as result of recession. Meanwhile, it picked marginally to ₦ 4,109.7 billion in 2017. However, it has maintained steady growth from 2018 of ₦ 5,545.6 billion to ₦4, 641.97 billion in 2022 within the study period.

In fact, oil, it is very versatile and flexible, non-reproductive, depleting natural (hydrocarbon) is a fundamental input for modern economic activities providing about 50% of the total energy demand in the world. Petroleum or crude oil is an oily, bituminous liquid consisting of a mixture of many substances, mainly the element of carbon and hydrogen known as hydrocarbons. It also contains very small amounts of non-hydrocarbon elements, chief amongst which are sulphur (about 0.2 to 0.6% in weight), then nitrogen and oxygen. Petroleum has its value chain products which include premium motor spirit (PMS) literally known as petrol, dual purpose kerosene (DPK) known as kerosene, automotive gas oil (AGO) known as diesel, cooking gas, bitumen etc, which are used both domestically for personal consumption and for industrial production of goods and services (Amagoh, Odoh, & Okuh, 2014; Eregha, Mesagan, & Ayoola, 2015).

It is of note that the international oil price affects the domestic pricing of its petroleum products. This is because the domestic pricing of its products has been under the control of the government. The government therefore intervenes in the market, to influence the domestic market prices (Eregha et al., 2015). The interventions is termed fuel subsidy, which according to Majekodunmi (2013) makes Nigerians to pay less for petroleum products consumption; thus, ensuring they are protected from the international price volatility of crude oil viz-a-viz its value chains – PMS (petrol), AGO (diesel) and DPK (kerosene).

Despite the availability of subsidy and a bridging fund, PEF (Petroleum Equalization Fund), there still exists petroleum pump price disparity among the different regions and states in Nigeria (Ozo Eson & Muttaqa, 2016). Petroleum products being a major source of productive sector inputs in the Nigerian economy, increase in prices would affect economic growth and development in Nigeria. Therefore, this study explores the impact of premium motor spirit price adjustments on Nigerian economy.

2.0 LITERATURE REVIEW

Premium motor spirit in any of its processed forms is used in the generation of energy. In spite of the abundant oil reserves in Nigeria and its neighboring countries, they still have a low capability of energy generation with its inhabitants suffering the highest form of energy poverty in the world. In trying to bridge the gap, residents of urban areas litter every neighborhood with generators powered by fossil fuel, thereby endangering the environment. is, yet astonishing that for a region naturally endowed with rich fossil fuel and abundant sources of renewable energy to be suffering energy poverty (Ifediora, 2020; Njiru & Letema, 2018).

Nigeria is the largest country in Africa with a population of about 200 million people and is the 6th largest oil exporter in the world with the second largest oil reserves in Africa, and is similarly the continents highest oil producer (The World Bank, 2017). Oil plays a dominant role in Nigerian economy given its huge contribution to the revenue of the country. For instance, CBN (2015) shows that oil receipts accounted for 82.1%, 83% and about 90 per cent of the nation's foreign exchange earnings in 1974, 2008 and 2010 respectively. Similarly, the value of Nigeria's total export revenue in 2015 was US$70,579 million and the revenue of petroleum exports from the total export revenue was US$61,804 million which is 87.6% of total export revenue.

Oil, a very versatile and flexible, non-reproductive, depleting, natural (hydrocarbon) is a fundamental input into modern economic activity, providing about 50% of the total energy demand in the world. Petroleum or crude oil is an oily, bituminous liquid consisting of a mixture of many substances, mainly the element of carbon and hydrogen known as hydrocarbons. It also contains very small amounts of non-hydrocarbon elements, chief amongst which are sulphur (about 0.2 to 0.6% in weight), then nitrogen and oxygen. Petroleum has its value chain products which include premium motor spirit (PMS) literally known as petrol, dual purpose kerosene (DPK) known as kerosene, automotive gas oil (AGO) known as diesel, cooking gas, bitumen etc, which are used both domestically for personal consumption and for industrial production of goods and services (Amagoh, Odoh, & Okuh, 2014; Eregha, Mesagan, & Ayoola, 2015). It is of note that the international oil price affects the domestic pricing of its products. This is because the domestic pricing of its products has been under the control of the government. The government therefore intervenes in the market, to influence the domestic market prices (Eregha et al., 2015). The interventions is termed fuel subsidy, which according to Majekodunmi

(2013) makes Nigerians to pay less for petroleum products consumption; thus, ensuring they are protected from the international price volatility of crude oil viz-a-viz its value chains – PMS (petrol), AGO (diesel) and DPK (kerosene). Despite the availability of subsidy and a bridging fund, PEF (Petroleum Equalization Fund), there still exists petroleum pump price disparity among the different regions and states in Nigeria (Ozo Eson & Muttaqa, 2016). Petroleum products being a major source of productive sector inputs in the Nigerian economy, increase in prices do have effects on the country's economic growth. Therefore, this study explores the impact of premium motor spirit price fluctuation on Nigerian economy.

The economic difficulties have been compounded by rising food prices. Between January 2004, when world oil prices began to soar, and January 2013, energy and food Petroleum products being a major source of productive sector inputs in the Nigerian economy, increase in prices do have effects on the country's economic growth. Therefore, this study explores the impact of premium motor spirit price on Nigerian economy 1986-2023.

Name of Head of states / President	Year	Price variation
Gen. Yakubu Gowon	1973	6k to 8.45k
Gen. Muritala Muhammed	1976	8.45k to 9k
Gen. Olusegun Obasanjo	Oct 1,1978	9k to 15.3k
Alhaji Shehu Shagari	Apr 20,1982	15.3k to 20k
Gen. Muhamadu Buhari (Stable price)	Dec.1983-Aug.1985	15.3k to 20k
Gen. Ibrahim Babangida	Mar 31, 86:	20k 39.5k
Gen. Ibrahim Babangida	10-Apr-88	39.5k to 42k
Gen. Ibrahim Babangida	1-Jan-89	42k to 60k
Gen. Ibrahim Babangida	6-Mar-91	60k to 70k
Chief Ernest Shonekan (82 days in power)	8-Nov-93	70k to N5
Gen. Sani Abacha-: (Price dropped)	22-Nov-93	N5 to N3.25k
Gen. Sani Abacha	2-Oct-94	N3.25k to N15
Gen. Sani Abacha (Price dropped)	4-Oct-94	N15 to N11
Gen. Abdusalam Abubakar	20-Dec-98	N11 to N25
Gen. Abdusalam Abubakar (Price dropped)	Jan 6,1999	N25 to N20
Chief Olusegun Obasanjo	1-Jun-00	N20 to N30
Chief Olusegun Obasanjo (Price drops)	8-Jun-00	N30 to N22
Chief Olusegun Obasanjo	1-Jan-02	N22 to N26
Chief Olusegun Obasanjo	June, 2003	N26 to N42
Chief Olusegun Obasanjo	29-May-04	N42 to N50
Chief Olusegun Obasanjo	25-Aug-04	N50 to N65
Chief Olusegun Obasanjo	May 27, 2007:	N65 to N75
Alhaji Umaru Musa Yar' Adua- (price drops)	June, 2007:	back to N65
Dr. Goodluck Ebele Jonathan (New year present)-:	1-Jan-12	N141
Dr. Goodluck Ebele Jonathan (forced by Labour strike)	17-Jan-12	N97
Muhamadu Buhari	2016-2017 Dec	N97 to N145
Muhamadu Buhari (Price not stable)	2017 Nov-till Feb. 2018	N145 to N350 and above
Muhamadu Buhari (Relatively stable price)	2018 March till Date	N145 and above
Bola Ahmed Tinubu (Price not stable)	30th May 2023	N197 to N670 Until now

Note: ₦ = Naira, k = kobo.
Source: http://www.researchgate.net, 2023.

Theoretical Review
Dutch Diseases Theory
One of the impacts of oil price shocks on economic growth and performance of an oil exporting countries like Nigeria is the Dutch Disease Syndrome. Windfalls from sharp surge in oil price cannot sweep through a developing economy that is yet to be diversified and large enough to absorb the inflow without causing inflation. Resource pull effect and spending

effect result when large inflow from oil export hits a less diversified economy (Mieiro and Ramos, 2010). The booming export sector (trading internationally) experiences rise in marginal productivity and thus pay factors employed relatively more than other sectors do. As a result, factor inputs/resources are pulled to the booming sector (oil/export sector) at the expense of other tradable sectors (agriculture and manufacturing) and the non-tradable sector. This results in direct de-industrialisation of the economy.

As a result, output of industrial sector declines while prices of domestic products rise. As domestic price level (P) rises, real exchange rate ε (EP/P*) rises, nominal exchange rate (E) and foreign price level (P*) remaining constant (Blanchard, 2004). The appreciation in the real exchange rate penalises exports of other tradable sectors as they become relatively more expensive in the international market, and hence less competitive (Mieiro and Ramos, 2010).

Nigeria's poor policy formulation results in structural imbalance of the economy. This imbalance refers to a situation where the non-oil sector declines while the oil sector booms. This phenomenon is termed the Dutch Disease Syndrome (DDS). Nigeria has been exhibiting this phenomenon since the 1970s (Ibrahim, et al, 2014). The relative boom of the oil sector encouraged excessive government spending (Budina and Wijnbergen, 2008); and this resulted in inflation and real exchange rate appreciation.

Ibrahim, et al, (2014) identifies weak linkage between the oil industry and other sectors in Nigeria. He blames this on the low level of technological development in the country. This results in limited growth of the downstream sector. As a result, the avenues through which downstream oil sector could have forward and backward linkages with other sectors are thus limited.

Consequently, growth differential in oil and non-oil sectors is inevitable, and may explain backward development of the economy. Ibrahim, et al, (2014), posits that when oil is not economically integrated with the rest of the economy, oil revenues tend to be divorced from the circular flow of income in the domestic economy. It would thus have no impact on growth and development.

As an oil exporting nation, Dutch Disease Syndrome is one of the consequences of oil price instability on the Nigerian economy. The Dutch-Disease is an insight employed to describe the potentially damaging consequences on a country's production by a boom in common assets. Akalpler and Nuhu (2018) established the application and hypothetical analysis of Dutch disease syndrome. They assumed that countries with characteristic assets have two fragments, namely the tradable and non-tradable portions. The natural resource boom will disturb the economy through the asset advancement and spending effect. The resource development impact diminishes the efficiency in the non-tradable industry by moving labour away from the business. The spending effect includes intensification of government expenses reinforced by a boom, which intensifies internal adjustment and a harmoniously intensified exchange rate (Akalpler and Nuhu, 2018).
Since the 1970s, Nigeria has experienced the Dutch Disease Syndrome. The poor approach has resulted in structural disparity of the economy and has subsequently led to a situation where the non-oil sector has diminished despite the boom in the oil sector.

2.2.3 Theoretical linkages
The endogenous growth theory forms the theoretical underpinning of this study. Van Zon and Yetkiner (2003) employed energy as input in the intermediate goods sector. As modified by Rebelo (1991) and Barry (1996) the endogenous growth model in this case consumables segment of the economy uses energy as an input capital. The simple production function is thus:
Q=f(K, L) …………………………………………………………………………….(2.1)

From (2.1): Q= Output, K= Capital and = Labour

Assuming Q to be real output (Economic growth or GDP), K is total capital - capital here includes the prices of the petroleum products (PMS, DPK and AGO), and L is index of labour input. Thus, if Labour productivity is a dynamic measure of economic growth, competitiveness and living standards within an economy, hence it is a revealing indicator of several economic indicators in the economy.

Empirical Review
There are scholars whose arguments have been in support of pump price of petroleum products impacting on economic growth in Nigeria positively and those who supported the negative impact of oil price on economic growth in Nigeria. However, some of these studies can be review here as follows:

Shiro etal (2022) examined the impact of oil price changes on Nigeria's economic expansion. Johasen Co-integration, VECM on Oil price Fluctuation, Gross Domestic Products, Trade Balance, Inflation Rate, Foreign exchange Rate. It examined the effect of oil price changes have a significant impact on Nigeria's economic expansion. In addition, it was shown that the interest rate and inflation rate had a significant negative effect on Nigeria's economic growth.

Moreover, Jude etal (2021) examined the impact of fuel pump price adjustment and the causal relationship between fuel pump price adjustments and economic growth in Nigeria. It makes use of Premium motor spirit (PMS), GDP, Exchange rate, domestic price of automotive gas, domestic price of dual purpose kerosene (DGK). Descriptive statistics, unit root test, Johansen cointegration test, VECM and Granger causality test. The result showed that a 1% increase in the prices of PMS and AGO increased economic growth by 0.014%, 0.038% and 0.018% respectively while AGO is reduced by 0.002%. Also the prices of PMS, AGO and DPK does not granger cause economic growth in Nigeria.

In addition, Ighosewe etal (2021) evaluate the effect of Crude Oil Price Dwindling and the Nigerian Economy. It applied A Resource-Dependence Approach on Crude oil price, GDP, INF, Exchange Rate and it revealed the negative impact economic growth in Nigeria.

Jude etal (2021) examined the impact of fuel pump price adjustment and the causal relationship between fuel pump price adjustments and economic growth in Nigeria. It make use of Premium motor spirit (PMS), GDP, Exchange rate, domestic price of automotive gas, domestic price of dual purpose kerosene (DGK). Descriptive statistics, unit root test, Johansen cointegration test, VECM and Granger causality test. The result showed that a 1% increase in the prices of PMS and AGO increased economic growth by 0.014%, 0.038% and 0.018% respectively while AGO is reduced by 0.002%. Also the prices of PMS, AGO and DPK does not granger cause economic growth in Nigeria.

Hassan and Meyer (2020) analysed the non-linear effect of petrol price changes on inflation in South Africa. Applying ARDL on Petroleum price change, inflation, GDP in Nigeria and revealed that short run price increase does not impact significantly on economic growth and inflation, meaning that the continued increases in the price of petrol have had negative but significant impact on economic growth and inflation in Nigeria. Raifu et al (2020) investigate the effect of changes in oil prices on unemployment rate in Nigeria, using real oil prices of Brent and West Texas International with linear and nonlinear autoregressive distributed lag (NARDL) estimation methods. Findings from linear ARDL show that changes in oil prices have little or no significant effects on unemployment rate. The NARDL results indicate that an increase and a decrease in oil prices have an insignificant positive effect on unemployment in the short run. However, in the long run, an increase in oil prices worsens unemployment situation, while a decrease has insignificant reducing effect. We also find evidence of a long-run asymmetric relationship between oil prices and unemployment. The need for government to invest oil revenues in generating more electricity or in providing alternative sources of energy with the objective to reduce the costs of production of firms is recommended.

Ifeonyemetalu Ogu. & Ojimadu (2020) examined "Impact of Oil Price Fluctuation on Economic Growth in Nigeria". The study made use of Generalized Auto-Regressive Conditional Heteroskedasticity GARCH (1, 1) model to estimate effect of oil price fluctuation on economic growth in Nigeria. The data used was Quarterly data covering the period from 1984 - 2017 sourced from Central Bank of Nigeria Statistical Bulletin and OPEC database 2018. The variables used in the analysis are Gross Domestic product (GDP) was used as dependent variable, oil price, exchange rate and interest rate was used as the independent variable. The results shows that Oil price has positive and significant effect on the economic growth in Nigeria; Fluctuations in oil prices, though has positive effects on economic growth but insignificant; Exchange rate has positive and significant effect on economic growth in Nigeria. It was recommended that Since oil price is positively related to economic growth, government should utilize properly the proceeds received from oil occasioned by oil price increase to basic and improve basic infrastructures like good and motorable roads, quality education and stable power supply. Government should as a matter of urgency create both vertical and horizontal linkages in oil sector to diversify the economy through the proceeds from oil. Government should continue to judiciously invest in infrastructural development to address key bottlenecks in order to reduce the cost of domestic production and increase domestic supply.
Olauyadu (2019) examined effects of oil export revenue on economic growth in Nigeria: A time varying analysis of resource curse. It uses on Bayesian time-varying parameter (TVP) model Oil revenue, Human capital index, GDP. The result provides new insights into the oil curse phenomenon in Nigeria. Therefore, using annual data from 1970 to 2015, oil revenue export is found to positively and significantly contribute to economic growth throughout the period of study. Empirically, Nigeria's economy is found to be a resource dependent economy. It is further found that unfavourable openness and low educational quality are possible transmission channels of slow growth experienced in Nigeria despite the receipt of huge oil revenue over the sample period.

Research design

The *ex-post facto* research design is adopted to enable the researcher used secondary data in analysing the impact of premium motor spirit on economic growth in Nigeria for the period of 1990-2023. The method of data collection in this study was secondary sources because of its nature. The data were sourced from the World Bank Development Indicator (World Bank Database, 2023), Petroleum product pricing agency database, (2023), National Bureau of Statistics (NBS, 2023) and Central Bank of Nigeria (CBN) Statistical Bulletin for various years. The time series data used are on the following variables GDP = Real Gross Domestic Product which was proxied for economic growth, PMS = Premium Motor Spirit Price, INF = inflation rate and EXR = exchange rate.

Sources and types of data

This study relies only on secondary sources of data which are publications of World Bank Development Indicator (World Bank Database, 2023), Petroleum product pricing agency database, (2023), National Bureau of Statistics (NBS, 2023) and Central Bank of Nigeria (CBN) Statistical Bulletin for various years. These sources have been used by many researchers in the field of public sector economics and public finance. The types of data used are secondary data and it is the preferred data for the analysis on impact of premium motor spirit price adjustment on Nigeria economy.

Method of Data Analysis

This research work adopts five basic techniques to carry out its analysis. The first is normality test to ascertain the behaviour of the variables using descriptive statistics. The second technique is unit root test for stationarity verification using Augmented Dickey-fuller (ADF) test. The third method is cointegration test using Autoregressive Distributed Lag (ARDL) Bound test for long-run equilibrium checking among the variables captured in the model. Fourthly, Autoregressive Distributed Lag Model (ARDL) is applied to estimate the impact of premium motor spirit price adjustment on economic growth in Nigerian economy from 1986 to 2023.

This method uses here depending on the behaviour of the variables and stationarity level that informed the selection of ARDL Model which was introduced by Pesaran *et al.* (2001) in order to incorporate I (1) and I (0) variables. Moreover, Error Correction estimate is conducted to check the point of convergence among variables included in the model.

Model Specification

The functional model showing the technical relationship between the economic growth proxied by Real Gross Domestic Product (NGDP) and premium indicators in Nigeria as stated in the previous studies (see Obayori *et al* (2019) & George, *etal*, 2020) are modified and specified thus:

GDP=f (PMSP)…………………………………………………………………….….. (3.1)

Where: GDP = Gross Domestic Product, PMSP = Premium Motor Spirit Price

This model can be transformed into equation (3.2) as:

GDP = f (PMSP, INF, EXR)……………………………………...…………...……….… (3.2)

Mathematical form of the equation (3.2) is given as:

$Ln\ GDP = \partial_0 + \partial_1\ Ln\ PMSP + \partial_2\ Ln\ INF + \partial_3\ EXR$ ………………….………………... (3.3)

Econometric form of the model in (3.2) is specified thus:

$Ln\ GDP_t = \partial_0 + \partial_1\ Ln\ PMSP_t + \partial_2\ Ln\ INF_t + \partial_3 EXR_t + \mu_t$ ……………………………… (3.4)

Where:

GDP = Real Gross Domestic Product

PMSP = Premium Motor Spirit Price

INF = Inflation Rate

EXR = Exchange Rate

Moreover, ∂_0 is the intercept of the equation, $\partial_1 - \partial_3$ are the coefficients of the explanatory variables to be estimated, µt is the stochastic term.

In addition, the idea behind using natural log (Ln) is to achieve linearity. Moreover, the Ln of a variable represents a relative change (rate of return), whereas a change in the variable itself represents an absolute change.

The *appriori* expectation of the variables included in the model would be specified thus: $\partial_1 < 0$, $\partial_2 > 0$, and $\partial_3 >$ or < 0.

Autoregressive Distributed Lag Estimates (ARDL)

Pre-conditions for estimating ARDL includes:
  i)   Dependent variable must be non-stationary in order for the model to behave better.
  ii)   None of the variables should be $I_{(2)}$ in normal conditions (ADF test).

The model for this study is denoted as:

$$\Delta LnGDP = \partial_0 + \partial_1 \text{ Ln } GDP_{t-1} + \partial_2 \text{ Ln } PMSP_{t-1} + \partial_3 LnINF_{t-1} + \partial_4 \text{ Ln } EXR_{t-1} + \partial \text{ LnTBL}_{t-1}$$
$$+ \sum_{m=0}^{p} \lambda \text{ } \Delta Ln \text{ } GDP_{t-1} + \sum_{n=0}^{q} \phi \text{ } \Delta Ln \text{ } PMSP_{t-1} \sum_{n=0}^{q} \psi \text{ } \Delta Ln \text{ } INF_{t-1} + \sum_{n=0}^{q} \delta \text{ } \Delta Ln \text{ } EXR_{t-1} + \sum_{m=0}^{p} \lambda \text{ } TBL +$$
$$\theta ECM_{ti} + \varepsilon_t ....(3.6)$$

Where:

The null and alternative hypotheses are as follows:

H_0:　　$\partial_0 = \partial_1 = \partial_2 = \partial_3 = \partial_4 = 0$　　　　　　　(No long run relationship exist)

Against the alternative hypothesis:

H_1:　　$\partial_0 \neq \partial_1 \neq \partial_2 \neq \partial_3 \neq \partial_4 \neq 0$　　　　　　　(Long run relationship exist)

$\partial_1 - \partial_4$ are the long run multipliers (parameters), ∂_0 is the intercept (the drift component); $\lambda, \phi, \psi,$ and δ the short-run parameters, θ is the coefficient of speed of adjustment while ECM_{t-i} is the speed of adjustment and ε_t is the stochastic error term.

4.0 DATA PRESENTATION AND ANALYSIS

Data presentation

The time series data used in this study are presented in Appendix I. These data includes: real gross domestic product (RGDP) which is proxy for economic growth in Nigeria while premium motor spirit (PMS) represented the adjustment in petroleum price as the main target variable. More to that, inflation rate (INF) and exchange rate (EXR) were used as independent variables in this analysis and they are presented in Appendix I.

However, this study would begin its analysis from the preliminary test of descriptive statistics and unit root test using Augmented Dickey Fuller (ADF) criteria. Moreover, the result of various tests would be presented in different tables for interpretations and discussion of the findings.

Descriptive Statistics

The summary of the descriptive statistics is presented in Table 4.1. It has revealed so many criteria to judge some of the characteristics of the data. It presents the summary of the mean, mode, median, maximum and minimum as seen in Table 4.1.

It revealed the mean value RGDP of N45198.95 bn, PMS of ₦95.19853, inflation rate of 20.08% and ₦158.2648 within the study period. This study showed median value of N42044.78bn of RGDP, ₦65.00000 of premium motor spirit price, 14% of the inflation and exchange rate of119.3365.

Furthermore, the summary of descriptive statistics showed that the maximum value of RGDP, PMS, INF and EXR are N75639.47bn, N671 per litre of premium motor spirit, 72.9% of inflation rate and N760 per US dollar with the period of this study.

Moreover, the minimum value of RGDP, PMS, INF and EXR are 21462.73, 0.600000, 5.400000 and 8.037800 respectively.

Table 4.1: Summary of descriptive statistics

Sample: 1990 2023

	RGDP	PMS	INF	EXR
Mean	45198.95	95.19853	20.08235	158.2648
Median	42044.78	65.00000	14.00000	119.3365
Jarque-Bera	3.853028	186.8339	37.43041	44.16712
Probability	0.145655	0.000000	0.000000	0.000000
Observations	37	37	37	37

Source: Authour's compilation using Eviews Version 10 (2024)

In Table 4.1, it also revealed that the standard deviation of N20443.69 bn, 129.5168, 15.66564 and 163.3959.From the Table 4.1 revealed that the skewness has the following value 0.157353, 2.922236, 1.971950 and 1.925918 for RGDP, PMS, INF and EXR respectively. This evidence shown in the table demonstrates that RGDP, PMS, EXR, and INF all

have a positive skewness. As a result, the distribution of the research data scattered along the right side or tail, which represents the fact that this data from their frequency distribution is dominated by positive values.

In addition, the kurtosis measure for the distribution of the variables is captured in Table 4.1. As a precondition, the kurtosis of the series is regarded normal if the value of its distribution is 3, relatively normal if it exceeds 3 (i.e., leptokurtic), and negative excess kurtosis or less normal if it falls below 3 (i.e., platykurtic). Hence, Table 4.1 reveals that RGDP, PMS, INF and EXR are leptokurtic while RGDP is platykurtic.

Also, the normality test conducted for each series using the Jarque-Bera statistic procedure showed that 3.853028 (0.145655), 186.8339(0.000000), 37.43041(0.000000) and 44.16712 (0.000000) indicated RGDP is normally distributed whereas PMS, INF and EXR are not normally distributed.

Unit Root Test

The unit root test criteria applied in this study is Augmented Dickey Fuller (ADF) and it is the most important unit root criteria used by many scholars because its advantage over Dickey Fuller (DF) and Philip Perror test used in conducting researching. The summary of the unit root test result is presented in Table 4.2.

Table 4.2: **Unit Root Tests**

Level				
Test/Variables	GDP	PMS	INF	EXR
ADF	-0.839283 (0.7940)	-2.072843 (0.2563)	-2.300824 (0.0092)**	-2.072803 (0.0939)
First Difference				
Test/Variables	GDP	PMS	INF	EXR
ADF	-2.886999 (0.0580)**	-4.238351 (0.0023)**	Nil	-5.541231 (0.0001)**

Source: Authour's compilation using Eviews Version 10 (2024)

Note: ** denoted significance @ 5% level

From the Table 4.2, it reveals that real GDP was not stationary at level based on the value of ADF of-0.839283 and critical value of -2.957110 and *p*-value of 0.7940 that is, it was insignificant in the model. However, it becomes stationary at first differencing as seen in its ADF of -2.886999 which was greater than critical value of -2.157110 and it was statistically significant in the model.

Moreover, premium motor spirit was stationary at first differencing as indicated in the ADF value of -4.238351 which was higher than the critical value of -2.957110. This means that premium motor spirit (PMS) in Nigeria was stationary at first difference as seen in its p-value of 0.0023.

On the other hand, inflation rate was stationary at level since its ADF of-2.300824 at level when the test was conducted and it was higher than critical value of -2.154021. it implied that inflation rate was stationary at level assuming all other things being equal and versa.

In conclusion, Exchange rate (EXR) was not stationary at level but becomes stationary at first difference. This can be seen in Table 4.2, where ADF value of -5.541231 was higher than critical value of -2.948404. It also showed that EXR was stationary at first difference and even the probability value was significant in this analysis.

Optimum Lag Length selection

This study obtained its optimum length in Table 4.3; it showed that lag two (2) was the best lag for this analysis. This can be noticed by the level of Asterisk on row two (2). It uses Akaike Information criteria (AIC) which have the minimum value compare to other criteria in this analysis.

Sample: 1990 2023
Included observations: 32

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-841.2699	NA	1.03e+18	52.82937	53.01258	52.89010
1	-697.1406	243.2182	3.47e+14	44.82129	45.73737	45.12494
2	-655.7819	59.45307*	7.49e+13*	43.23637*	44.88532*	43.78295*

Source: Authour's compilation using Eviews Version 10 (2024)

From Table 4.3, it was cleared that lag 2 was the optimum length for this study. Therefore, the choice of ARDL was made based on the Unit root test result of integrated in mixed order of the integration. Similarly, the choice of lag two (2) as the most appropriately was based on asterisk in Table 4.3 at 5% level of statistical significant in this study.

Bound test for co-integration

The ARDL limits test for cointegration was used in order to explore the impact of privatization on economic growth in of Nigeria. In addition, the bound test was used to ascertain whether there are long-run relationship among the studied variables. The results of the cointegration test, which was performed to determine whether or not the regressors in the study had a long-term equilibrium or not. The results are provided in Table 4.4. This test was used to establish whether or not the regressors in the study had a long-term relationship.

Table 4.4: ARDL F-Bound Test Result for Long-run Equilibrium

Equation	Test statistic	Value of F-Statistic	K	Sign.	I(0)	I(1)
RGDP=f(PMS, INF, and EXR)	Sample size (n) = 32	3.151351	3	5%	3.03	4.35

Source: Author's computation using Eviews Version 10.0, 2024.

The limits test for cointegration in the two equations used in this study is shown in Table 4.4. Firstly, it was discovered that although the computed F-statistic (3.151351) in the cointegration relationship between RGDP, PMS, INF, and EXR exceeded the lower bounds values at 5% (3.03) but less than 5 % (4.35). It therefore means that the result is inconclusive. Since there are significant long-run equilibrium among real gross domestic product, premium motor spirit, inflation rate and exchange rate. Therefore, this study submits that there is long-run relationship among studied variables. We reject the null hypothesis that there are none at the 5% significance level. In other words, privatization has impact on economic growth in the long-run.

Long-Run Results on impact of privatization
Table 4.5: Long-run Results
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(PMS)	-0.147057	0.282615	-0.520343	0.6083
LOG(INF)	-0.536801	0.358307	-1.498162	0.1490
LOG(EXR)	0.488919	0.363752	1.344100	0.1933

The results contained in Table 4.5, showed the premium motor spirit on the economic growth in Nigeria in the long-run. To be more explicit, it was found by examining the result in Table 4.5 that an increase of one unit in premium motor spirit would result in an insignificant fall of -0.147057 units in economic growth. This conclusion was reached after determining that an increase in economic growth would be negative impact. The probability value of 0.6083 which was greater than 0.5 as threshold indicated that in the long-run premium motor spirit would not have significant impact on economic growth in Nigeria.

In addition, inflation has negative coefficient of -0.536801 on economic growth in Nigeria. This shows that 1 unit increase in MCP would result in -0.536801 units in RGDP in Nigeria. This variable was also statistically insignificant in the model. This can be noticed from the p-value of 0.1490.

Furthermore, exchange rate has positive impact on economic growth in Nigeria. This indicated that 1 unit increase in exchange rate would reduce economic growth by 0.488919. Although, exchange rate would not be significant in the future economic situation of Nigeria, i.e the current level of exchange rate affect economic growth in Nigeria will be minimize.

5.0 SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

This study examined the impact of premium motor spirit price adjustment on economic growth in Nigeria for the period of 1990-2023. This study underpinned its analysis on the endogenous growth theory. This is because the premium motor spirit are generated within the economy and serve as an endogenous factor that can possibly affect output, seeing its importance in production and distribution process.

Furthermore, this study applied both descriptive statistics and inferential statistics. In descriptive statistics, normality test revealed by Jacque Berra statistics and its probability values that all variables were normally distributed except. It used

Augmented Dickey Fuller (ADF) to examined the stationarity of the time series data obtained from Central Bank of Nigeria Statistical Bulletins (CBN, 2023) and World Bank Development indicators of 2023 (WDI, 2023) and submits that the variables have mixed order of integration. That is, real GDP, PMS and EXR were stationary at first difference and only INF was stationary at level.

In addition, the F-Bounds test for the Autoregressive Distributed Lag (ARDL) model was inconclusive as to whether there is a long run relationship between the variables since the F - statistic was higher than the lower bound and less than the higher.

On the part of long-run, this study revealed that there are negative relationship between PMS, INF and real GDP. while EXR exhibit a positive relationship. But all these long run relationships were not significant given their p - values.

On the short-run dynamism, this study indicated that the previous value of RGDP has positive impact on economic growth in Nigeria. However, all other variables exhibit signifcant negative relationship with economic growth of Nigeria. The model successfully passed all of the tests for normality, serial correlation, heteroscedasticity, the Ramsey RESET test, and model stability, according to the results of the diagnostic tests. This demonstrates the model's suitability for policy recommendations.

5.2 Conclusion

According to the findings of this research, premium motor spirit prices have significant negative impacts on Nigerian economic growth in the short run and insignificant negative impacts in the long run. Therefore, it's concluded that fluctuations or adjustment in premium motor spirit prices only have immediate but not a sustained impact on the economic output of the country. Furthermore, the study also concludes that inflation and exchange rate have significant negative impacts on Nigerian economic growth in the short run, but in the long run, they are insignificant in influencing economic output in Nigeria.

Recommendations

This study made the following policy recommendations based on the major findings and empirical reviewed as:
   i) Government of Nigeria should formulate policy that will stabilize the price of premium motor spirit so as to reduce the negative effects it may have on the national output of the country.
   ii) Seeing the importance of premium motor spirit in production and distribution process of goods and services, the Nigerian government should enact policies geared towards repair of refineries in the country to ensure its timely and constant supply across the country.
   iii) Since premium motor spirit price adjustment doesn't have any long run impact on Nigerian economic growth, the government after the removal of fuel subsidies should utilize the fund generated to create enabling environment for domestic firms to thrive.
   iv) Finally, the government should use strong fiscal and monetary policies to curbs the negative impacts of inflation on national output of the Nigerian economy.

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