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Fuel subsidy removal and economic welfare of Nigerians

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Abstract
The study investigated the effects of the fuel subsidy removal on the economic welfare of Nigerians within the period 1990 to 2022. Using a price pass-through model, the study employed the use of unit root test, cointegration, Pairwise Granger Causality Tests, and VECM. The study examines both the short and long run effect of fuel subsidy removal on the economic welfare of Nigerian. The test for trend variability (unit root) to determine the stability of data was done using the Augmented Dickey Fuller and Phillip-Perron test. The result revealed that the Price of Petroleum Motor Spirit, Inflation rate, Unemployment, Population increase will lead to decline on economic welfare of most Nigerians due to the negative impact of this variables on economic welfare. While Per Capita Income will improve the economic welfare in Nigeria. The study recommend the followings: fuel subsidy removal should not be a prompt decision without addressing the issue of mass unemployment in Nigeria; The government should set aside funds to take care of the welfare of the masses for fuel subsidy removal to thrive, as is obtainable in other countries of the world; The government should tackle the issue of sore inflation in Nigeria. The government should promote the adoption of renewable energy sources such as solar, wind, and hydropower

Keywords: Fuel subsidy removal, per capita consumption, economic welfare, price pass-through

1. Introduction

Nigeria is a nation endowed with a wealth of natural resources, particularly crude oil. According to DFID (2012), the country is the world's eighth-largest producer of proven natural gas reserves and ranks 10th overall in terms of proven reserves. However, this classification in both crude oil and natural gas has not transformed into an improvement in quality of life and living standard on greater proportion of Nigerians. According to (Osawe and Uwa, 2023) [33], the nation essentially imports a net amount of gasoline (PMS), diesel (AGO), kerosene (HHK), and aviation kerosene (ATK).The need to subsidize the product for the benefit of its citizens stems from the high demand and limited supply of certain goods. According to a research of fuel pump prices in Nigeria, the cost of petroleum products has been rising steadily since 1978, when it was priced at N0.5k per liter. As of 2022, the price of gasoline at the pump is N168.00k per liter. The fuel subsidy in Nigeria has largely been based on two arguments: providing a welfare package for the poor and accounting for an ample drain on the budget. This has been one of the contentious issues over the years in Nigeria. In a country where 75% of the population lives in less than $2/day; subsidized Petroleum Motor Spirit (PMS) make key services inexpensive to the poor, thus providing affordable means of transportation and cushioning the effect of rising in prices of goods and services resulting from general increased price of Petroleum Motor Spirit (PMS). They also offset some of the initial pains of economic reform for low income earners. The subsidy program, however, constitutes a severe strain on state resources. The cost subsidy is assumed too high and unjustifiable. Fuel subsidy gulped N10.413trillion from 2006 to 2019; an average of N743.8 billion per annum (Onyedinefu, G. 2020). [34]. According to Nuhu-Koko (2008), significant portions of the public treasury are used for subsidy spending. It amounted to roughly US$2.03 billion (1.4% of GDP) in 2006, $1.3% of GDP, or US$2.3 billion, and US$5.37 billion in 2007 (1.3% of GDP) in 2010, primarily as a result of rising oil prices, declining currency rates, and rising demand (Adeola, 2010) [3]. Thus, government petroleum subsidies payments to marketers between 2008 and 2010 were estimated to be worth US$10.7 billion.

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These amounts exceeded the 2009 budget's total capital allotment to priority sectors of US$6.57 billion, which included US$1.11 billion for human capital development, US$3.20 billion for critical infrastructure, US$0.62 billion for security, US$0.68 billion for the Niger Delta, and US$0.96 billion for land reform and food security (Adeola, 2010) [3]. The government believes that because of the numerous drawbacks, it can no longer afford to subsidize petrol prices. Among them is a return to the expensive subsidy system, which currently generates about 60% fewer revenues. One potential risk is the reemergence of fuel queues. Fuel subsidies increased from N257 billion in 2006 to N2.105 trillion in 2011, whence they finally dropped to N595 billion in 2019. Following the sharp decline in crude oil prices to nearly nil, the decision to deregulate fuel prices was crucial. The government believed that fuel subsidies were no longer practical given the nation's current economic circumstances. This is because the government can no longer afford fuel subsidies due to the oil sector's decline in fortunes; foreign exchange profits and revenues have dropped by 60%. In order to maintain spending, particularly on capital projects and salaries, the government had to eliminate subsidies. The government was forced to make some difficult choices in order to stop unsustainable practices that were negatively impacting the economy. One of these tough choices was the liberalization of PMS (premium motor spirit, also known as gasoline) prices (Oluwabukola A, 2023) [33].

Given the foregoing, this paper examines how Nigeria's decision to remove oil subsidies has affected the financial security of its people, especially the low-income inhabitants. The first of the paper's four sections is the introduction. In the second section of the paper, pertinent research on oil price subsidies was evaluated. Part three employed the ex-post facto study design process. Part four of the article had the data that were presented and examined, while section five covered the conclusions and suggestions of the study.

2. Literature review
2.1. An Overview on Fuel Subsidy
A subsidy is defined as "compensation offered by the government to people or organizations, commonly in the form of a monetary reward or tax cut". The subsidy is frequently believed to be in the best interests of society and is offered to alleviate some suffering. Subsidies are strongly influenced by politics; the right argues that firms should be able to function without government support, while the left is more in favor of subsidized operations (Investopedia, 2015, p. 1) [16].

The definition provided above makes it abundantly evident that a subsidy is any type of free money provided to the general public by the government. It is important to note that the definition made clear that politics affects subsidies, with left-wing politicians (such as Democrats in the US) supporting them. The Merriam-webmaster dictionary defines subsidy as "money that is usually paid by a government to keep the price of a product or service low or to help a business or organization to continue to function" (Merriam-webmaster, 2015, p. 1) [17]. A strategy that lowers the retail price of energy sourced from fossil fuels by partially offsetting the cost to other participants in the economy is known as a fossil fuel consumer subsidy. In order to keep energy prices low, the cost burden is typically transferred to the public budget, which uses taxpayer funds

or forfeited tax revenue. However, there are further ways to shift expenses, such as making energy distributors run at a loss. If a country offers energy generated domestically at a price lower than the level of the global market, it is still considered a consumer subsidy because the economic cost of energy includes opportunity costs. Subsidies for fossil fuels only change who pays and how much energy costs a nation; they don't actually lower it. (Kitson, L., et al (2016) [21]. A policy known as a fossil fuel producer subsidy transfers the cost of energy production from corporations who locate, extract, refine, and generate fossil fuels to other economic players. The cost burden is typically transferred to the public budget, including instances in which taxpayer funds are used to fund project infrastructure, tax breaks are guaranteed to encourage investment, or access to government land, commodities, and services are supplied for free or at a discount to market rates. Kitson, L., et al (2016) [21].

According to Sagagi (2011) [38], Nigeria is the world's fourteenth-largest producer of crude oil and possesses the tenth-largest proven crude oil reserve globally. Transparency International (TI) rated Nigeria 134 out of 178 as a corrupt, ill-run state where the populace experiences increasing levels of inequality and poverty (Sagagi, 2011) [38]. The Nigerian Government believe a service or product is essential, and the prices of such items are high and decided to pay part of the price of such items to lower the price.

Table 1: History of fuel price increase in Nigeria from 1973 to 2023

Year	Regime	Price (N)
1973	Gowon	6k to 8.45k
1976	Murtala	8.45k to 9k
1978	Obasanjo	9k to 15.3k
1982	Shagari	20k to 39.5k
1984-1985	Buhari	20k to 20k
1986-1991	IBB	20k to 70k
1993	Shonekan	70k to N5
1995-1998	Abacha	N5 to N11
1998-1999	Abdusalami	N11 to N20
2000-2007	Obasanjo	N20 to N75
2008	Yar'adua	N75 to N65
2012-2015	Jonathan	N65 to N141
2015-2021	Buhari	N141 to N212
2023-2024	Tinubu	N220 to N670

Source: Revised Table; taken from Abdulbasit Toriola

The fuel pump prices are displayed in the above table, which shows that they have been rising since 1978. The introduction of fuel subsidies in Nigeria's energy sector in the mid-1980s was prompted by harsh economic realities and frequent fluctuations in the price of crude oil globally (Akov, 2015) [6-7]. Given the country's economic realities, the government was forced to provide these subsidies, which have the unintended consequence of diverting funds intended for economic development to the payment of subsidies. It is for this reason that successive Nigerian governments have attempted to remove these subsidies, and this study explores the implications of fuel subsidy removal.

2.2. Empirical Literature
Nigeria is one of the world's top oil producers, with proved oil reserves estimated to be 37.2 billion barrels. But the majority of Nigerians, 64 percent of whom live in poverty,

have not seen a significant increase in their standard of living as a result of the nation's mineral wealth. Nigeria's oil exports brought in $59 billion in revenue in 2010. According to Moyo and Songwe (2012) [27], Nigeria has not run out of resources to meet its development objectives; rather, its resources have been used inefficiently.

The political landscape of Nigeria's fuel subsidy withdrawal was studied by Ering and Akpan (2012). The report firmly argues that national leaders and multinational companies profit from the policies, not the general public. This explains why the withdrawal of fuel subsidies and increases in pump prices were typically met with frequent, large-scale protests by the Nigerian Labour Congress, Civil Liberty Organizations, and the general populace of Nigeria. Accordingly, they advised that in order to ensure the smooth running of the petroleum subsector, the government should constantly involve the public in policies that will impact them. The construction of additional refineries to increase product availability and lower pump prices for the general public.

Onyemaechi (2012) [35]. Analyze a few effects of the different petroleum policies. To determine the economic effects of the various petroleum policies, available time-series data on pertinent variables were scrutinized. The results showed that the number of economic players in the Nigerian petroleum industry was growing quickly, that the transportation system was developing quickly, and that the GDP, employment, and foreign direct investment were all improving. Tayo, Elegbeleye, Chukwuedozie, and Idowu (2014) [13] look into how the loss of fuel subsidies affects Nigerian families socially and psychologically. The findings showed that eliminating subsidies would reduce wasteful fuel use, which will lower carbon emissions. Additionally, the money saved might be used to fund the building of local refineries and other infrastructure, which would stimulate the Nigerian economy. Lawal (2014) [22] investigated the numerous price hikes for petroleum goods, the payments for subsidies, and how well these measures worked to encourage investment in Nigeria. According to the study, the elimination of the subsidy had the opposite effect of what was intended—violent reactions from the populace.

Sani (2014) [39] used case studies from Lagos, Enugu, and Kano to assess the effects of the elimination of fuel subsidies on small businesses in Nigeria. The effect was estimated in the study using the chi-square distribution analysis. The study discovered that, at the 5% level of significance, the elimination of fuel subsidies had a detrimental effect on the performance of small-scale enterprises in Nigeria. It also demonstrates how crucial fuel is to the growth of Nigeria's small enterprises.

Soile *et al*. (2014) [42-43] looked at how the elimination of subsidies affected the growth of Nigeria's transportation industry. The data showed a significant positive relationship between the transportation sector and subsidies, indicating that eliminating fuel subsidies may raise transportation sector operating costs and cause the nation's GDP to decline. According to the study, the highest likelihood of success is a thorough, well-thought-out, well-communicated, and transparent reform strategy. To lower the local demand for and cost of fuel, develop substitute energy alternatives for home and automotive use. The

primary course of action in this case is to unbundle the idle PPMC pipelines and storage systems and liberalize product importation, allowing all importers—not only NNPC—to utilize them for open access throughput for discharge and subsequent distribution to other regions of the nation. Increased competition will reduce the profiteering and cartel mentality ingrained in the current imports.

3. Theory of welfare economics explained
The study of how economic policies and resource distribution affect the well-being of individuals and communities is known as welfare economics. The research was first presented as a crucial component of economic theory in the 20th century. The founder of welfare economics is the English economist Arthur Cecil Pigou. It assesses the distribution of income, allocative or social efficiency, and their impact on the populace. It assists in creating policies that enhance overall pleasure while achieving socioeconomic gains. Amartya Sen's Welfare Theory, Scitovisky Criterion, Pareto Optimality, Kaldor-Hicks Compensation Criterion, and the Social Welfare Function of Samuelsson and Bergson are some of the significant welfare theories. An essential component of microeconomics, welfare economics examines the effects of resource distribution and economic policies and activities on people's well-being. It examines how markets and the economy are related to individuals and society. Essentially, it centers on the ways in which different economic situations affect social welfare and the variations in those contributions (Boyle, and Kvilhaug, 2023) [10].

4. Research method
The research employed secondary data sources, which were obtained from World Bank Development Indicator (WDI) reports, Nigeria National Petroleum Corporation (NNPC), National Bureau of Statistics (NBS), and the Central Bank of Nigeria's (CBN) yearly statistical bulletin. The study employed time series data spanning from 1990 to 2022. The econometric model is expressed as follows:

$$ECWF = \beta_0 + \beta_1 PMSP + \beta_2 INF + \beta_3 UNEMP + \beta_4 POP + \beta_5 PCapIN + \mu_t$$

Where,
ECWF=Economic welfare proxy for per capita consumption
PPMS=Price of Petroleum Motor Spirit
INF=Inflation rate
UNEMP=Unemployment
POP= Population
PCapIN=Per Capita Income
μ_t = error term

The model's parameters that need to be determined are β_0, β_1, β_2, β_3, β_4, and β_5.

We therefore expect $\beta_1 < 0$, $\beta_2, \beta_2 < 0$, $\beta_3 < 0$ $\beta_4 < 0$ $\beta_5 > 0$. This is justified by the fact that we anticipate fuel subsidy, inflation, unemployment and population rate to adversely affect the economic welfare of Nigerians. However, the per capita income is anticipated to have a positive effect on the economic welfare of Nigerians. We then proceed to the estimation.

4.1. Estimation Technique: For the unit root test in this study, both the Phillip-Perron and ADF tests were utilized. Next, the components' long-term association is examined.

4.2. Results Presentation
4.2.1. Descriptive Analysis: The result in Table 1 indicates that Economic Welfare (ECWF) proxy for Per Capita Consumption with 1.710000 billion naira average value, Price of Petroleum Motor Spirit (PPMS)) and Inflation rate (INF) with an average value of 6.37% and18.76% respectively. Unemployment rate (UNEMPR) and Population (POP) have an average value of 6.21.43% and 2.26% respectively. Per Capita Income (PCapIN) has an average value of 5.33%.

Table 1: Descriptive Statistics

	ECWF	PPMS	INF	UNEMP	POP	PCapIN
Mean	1.710000	6.374074	18.76926	21.43216	2.260000	5.380370
Median	6.770000	6.800000	12.22000	11.53620	6.130000	4.410000
Maximum	5.680000	7.600000	72.84000	53.78635	8.570000	33.74000
Minimum	1.580000	4.300000	5.380000	6.381122	2.020000	-1.620000
Std. Dev.	1.840000	0.932982	17.75316	27.757496	2.890000	6.594497
Skewness	0.992033	0.806368	1.914774	0.993677	1.085600	3.034457
Kurtosis	2.394498	2.470022	5.424036	2.423736	2.404756	13.87932
Jarque-Bera	4.841047	3.242019	23.10906	30.10958	5.701981	174.5902
Probability	0.088875	0.197699	0.000010	2.036471	0.057787	0.000000
Sum	4.61000	172.1000	506.7700	73.75834	6.100000	145.2700
Sum^2 Dev.	8.58000	21.63185	8294.537	5.537522	2.170000	1130.672
Obs.	32	32	32	32	32	32

Source: Author's Calculation (2023)

4.2.2 Correlation Breakdown
The correlation result reveals that INF, POP and UNEMP have a negative relationship with ECW. Hence, PCapIN has a positive an influence on economic welfare. All variables in the mode have negative relationship with ECWF except Per Capita Income (PCapIN).

Table 2: Authors Computation 2023 using Review 10.0

	ECWF	PPMS	INF	UNEMP	POP	PCapIN
ECWF	-0.59222	-0.36806	-0.98892	-2.92547	-0.01869	0.25062
PPMS	-0.36806	-0.35367	-0.32274	-0.326333	-0.27138	0.000331
INF	-0.98892	-0.32274	-0.35357	-0.237658	-0.05852	-0.29102
UNEMP	-0.01869	-0.27138	-0.05852	-0.365354	-2.35774	0.221161
PCapIN	0.25062	0.000331	-0.29102	-0.257702	0.221161	-0.73674

4.2.3 Unit Root Check

Table 3: Show displays that population

Variables Values	ADF Stat	P. Values	5% MacKinnon Crit. Val.	Order of Integ.
ECWF	-4.20013	0.0032	--2.98103	I(0)
PPMS	-4.20013	0.0034	--2.98103	I(0)
INF	2.32349	0.0413	-3.02997	I(1)
UNEMP	-2.25096	0.0345	--2.98103	I(1)
POP	-4.08374	0.0042	-2.98622	I(1)
PCapIN	-4.07351	0.0043	-2.98622	I(1)

Author's Calculation, 2023

The ADF test in Table 3 displays that population (POP), Per Capita Income (PCapIN), inflation (INF) and unemployment rate (UNEMP) are stationary at first difference I(1), while Economic Welfare (ECWF) and Price of Petroleum Motor Spirit (PPMS) are stationary at levels I(0).

4.2.4 Test of co-integration
The majority of the variables are integrated at I (1) in the ADF result, indicating the requirement for a co-integration test between the variables. The outcome indicates that co-integration equations exist.

Table 4: Show denotes rejection of the hypothesis at the 0.05 level

No of CE(s)	Eigenvalue	Stat	Criti. Value	Prob.
** None *	0.758058	97.2121	67.80380	0.0000
At most 1 *	0.575623	64.19184	63.87610	0.0053
At most 2 *	0.602895	27.37554	42.91525	0.0021
At most 3	0.465673	21.60875	25.87211	0.5105
At most 4	0.456283	9.213136	12.51798	0.2628
The test indicates 3 cointegratingeqn (s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level				

Table 5: Effect of subsidy removal increased in petroleum motor spirit and economic welfare

Variable	Coeff.	Std. Error	t-Stat	Prob.
C	4.262422	1.831072	2.571675	0.0002
PPMS	-0.120806	0.021503	-1.419814	0.0009
INF	-0.352176	2.126392	1.1943635	0.0212
UNEMP	-0.527745	1.468235	2.4343932	0.0054
POP	-0.100806	2.558773	2.6452735	0.0001
PCapIN	0.210422	2.623549	2.4263647	0.0036
R^2	0.623648	Mean dept. var		5.38037
Adjusted R^2	0.683942	S.D. dept. var		5.69543
S.E. of regr.	6.472714	Akaike info crit.		7.65525
Sum^2 resid	1027.721	Schwarz crit		8. 54024

Log likelihood	-62.68744	Hannan-Quinn crit	5.73379
F-stat.	1.978525	Durbin-Watson stat.	2.71598
Prob(F-stat.)	0.270915		

Source: Author's Computation (2023, Eviews10.0 Output)

4.2.5. Test of Hypotheses
4.2.5.1. Hypothesis One
- **H0:** Price of Petroleum Motor Spirit, Inflation rate, Unemployment, Population, and Per Capita Income has no effect on the economic welfare in Nigeria significantly.

Dep. Var.: ECWF
Method: Least Squ
Date: 07/05/23 Time: 14:28
Sample: 1990 2022
OBS.: 32

4.2.5.2. Hypothesis Two
H0: Causal relationship between Petroleum Motor Spirit and Economic Welfare in Nigeria is non-existence
The causality between petroleum motor spirit and economic welfare was carried out using the granger causality check.

Pairwise Granger Causality Tests
Date: 07/05/23 Time: 12:42
Sample: 1990 2022
Lags: 1

Table 6: causal relationship between subsidy removal increased in price of petroleum motor spirit and economic welfare

Null Hypothesis:	Obs	F-Stat.	Prob.
PPMS does not Granger Causes ECWF	32	0.32542	0.0027
ECWF does not Granger Causes PPMS	32	0.15481	0.0004

Source: Author's Calculation (2023 using Reviews 10.0 Output)

Between 1990 and 2022, there is no evidence of either unidirectional or bidirectional causality between Petroleum Motor Spirit (PPMS) and Economic Welfare (ECWF) in Nigeria, according to the pair-wise causality test. It has been demonstrated that there is a causal association between Petroleum Motor Spirit and Economic Welfare in Nigeria, the p-values are less than 0.05, and the hypothesis is rejected.

4.5.7.3. Hypothesis Three
H0: The price of petroleum motor spirit and economic welfare in Nigeria has no short run and long run relationship
Table 7's adjustment coefficients of-0.677711, which are adjusted at 6.7%, showed how the previous year deviated from the long-run equilibrium. Therefore, Petroleum Motor Spirit's price short run coefficient is 0.070590. According to this, a 0.07 percent increase in the price of petroleum motor spirit will result in a short-term increase in economic welfare (ECWF) in Nigeria. The variance in ECWF was explained by the 35% changes in the independent variable (PPMS). The study verifies the presence of a short-and long-term relationship between the price of petroleum motor spirit and economic welfare by rejecting the null hypothesis.

Date: 07/05/23 Time: 13:22
Sample (adj): 1991 2022
Obs: 31 after Adjustments
S.E in ( ) & t-stat. in [ ]

Table 7: Vector Error Correction Estimates

CointgEq:	CointEq1	
ECWF (-1)	1.000000	
PPMS (-1)	0.212082	
	0.212082	
	[2.26713]	
C	-9.468238	
Error Correction	D(ECWF)	D(PPMS)
CointEq1	-0.677711	-0.694780
	(0.29109)	(0.54665)
	[-2.32819]	[-1.27097]
D(ECWF(-1))	-0.066458	0.319376
	(0.22428)	(0.42119)
	[-0.29632]	[0.75827]
D(PPMS(-1))	0.070590	0.216281
	(0.11439)	(0.21482)
	[0.61708]	[1.00678]
C	-0.071589	0.222522
	(1.42712)	(2.68006)
	[-0.05016]	[0.08303]
R^2	0.353238	0.094926
Adjusted R^2	0.360844	-0.034370
Sum^2 resid	1065.064	3756.168
S.E. eq.	7.121611	13.37405
F-stat.	3.823152	0.734178
Log likelihood	-82.37240	-98.12695
Akaike AIC	6.909792	8.170156
Schwarz SC	7.104812	8.365176
Mean dep.	-0.040000	0.107600
S.D. dep.	8.283429	13.14998

Source: Author's Calculation, using E-view

4.6. Discussion of Findings
The tests examined the effect of Price of Petroleum Motor Spirit and economic welfare using the OLS, granger causality and VECM.

Table 5 shows a long-term association between the price of petroleum motor spirit and economic welfare, with a 7.3% adjustment rate applied to the previous year's deviance. In the short run, PPMS will boost economic welfare by 0.01 percent. In the short run, a 0.75% shift in UNEMP will result in a decrease in ECWF. Per capita income (PCapIN) changes by a percentage that raises economic welfare (ECWF) by 4.25%. Finally, a 1% change in population (POP) will result in a 1.09 percent short-term fall in economic welfare (ECWF).

Hypothesis 1 examined effect of price of petroleum motor spirit, inflation rate, unemployment, population, and per capita income on the economic welfare in Nigeria
Table 5 unveils the individual OLS estimates of-0.100806 coefficients and p-value of 0.0009 specifies that Price of Petroleum Motor Spirit (PPMS) has a substantial effect on economic welfare of Nigerian. The null hypothesis was rejected as the p-value is less than 0.05, thus, the Price of Petroleum Motor Spirit has significant effect on economic welfare between 1990-2022. According to the result, there is a negative effect of Price of Petroleum Motor Spirit (-0.100806) on economic welfare in Nigerian. This implies that an increase in Price of Petroleum Motor Spirit will lead to decline on economic welfare in Nigerian.

The p-value of inflation is 0.0212 which is less than 0.05, the null hypothesis is rejected and it is established that inflation has significant effect on economic welfare of Nigerian. According to the result, there is a negative effect of inflation (-0.352176) on economic welfare of Nigerian. The negative sign of the coefficient of inflation rate (INF) was the one anticipated by the model. This implies that an increasing INF will lead to decrease in economic welfare of Nigerian. The probability value of Unemployment is 0.0054 which is less than 0.05, the null hypothesis is rejected and it is concluded that Unemployment has significant effect on economic welfare of Nigerian. According to the result, there is a negative effect of Unemployment (-0.527745) on economic welfare of Nigerian. The negative sign of the coefficient of Unemployment rate (UNEMP) was the one anticipated by the model. This implies that an increasing Unemployment rate will lead to decrease in economic welfare of Nigerian. The probability value of Population is 0.0001 which is less than 0.05, the null hypothesis is rejected and it is concluded that Population has significant effect on economic welfare of Nigerian. According to the result, there is a negative effect of Population (-0.100806) on economic welfare of Nigerian. The negative sign of the coefficient of Population rate (POP) was the one anticipated by the model. This implies that an increasing Population rate will lead to decrease in economic welfare of Nigerian.

The probability value of Per Capita Income on economic welfare of Nigerian is 0.0036 which is less than 0.05 at 95% confidence interval. We thus reject the null hypothesis that Per Capita Income has no significant effect on economic welfare of Nigerian. According to the result, there is a positive effect of Per Capita Income (0.210422) on economic welfare of Nigerian. The positive sign of the coefficient of Per Capita Income was the one anticipated by the model. Therefore, the result shows that increase in Per Capita Income improves economic welfare of Nigerian.

Hypothesis two, if there is causal relationship between price of petroleum motor spirit and economic welfare
Because the p-values in Table 6 were less than 0.05, the hypothesis that there is no causal association between the price of petroleum motor spirit and ECWF in Nigeria was rejected. This means that between 1990 and 2022, inflation will have an effect on economic welfare. The results align with the study conducted by Mohanty *et al*. (2011), which investigated the connection between the price of petroleum motor spirit and the well-being of the Indian economy.

Hypothesis Three: There is no short run and long run relationship between price of petroleum motor spirit and economic welfare in Nigeria
From Table 7 above, the outcomes shows existence of both short and long run relationship between Price of Petroleum Motor Spirit and economic welfare in Nigeria.

5. Summary, Conclusion and Recommendations
5.1. Summary of Findings
The study observes the effect of Price of Petroleum Motor Spirit on economic welfare of Nigerian**s.** Price of Petroleum Motor Spirit is crucial for economic welfare. Specifically, the study found that Price of Petroleum Motor Spirit has impacted significantly on economic welfare between 1990-2022. The study revealed a causal relationship. A short and long run assessment was also led. The outcomes show that

the preceding year's nonconformity from long run equilibrium is modified at an adjustment Hilton speed of 6.7 %. On the other hand, the short run coefficient of Price of Petroleum Motor Spirit is 0.070590. A percent change in Price of Petroleum Motor Spirit in Nigeria will increase the economic welfare (ECWF) by 0.07%. The 35% changes in PPMS explained the variation in ECWF. This is in conformation with Chiwuike 2021; Musa *et al*, 2019 [12, 28].

5.3. Conclusion
The study observes the effect of Price of Petroleum Motor Spirit on economic welfare of Nigerians. Several studies suggest that increased Price of Petroleum Motor Spirit has negative effect on economic welfare and showed that the connection is influenced by either very high or very low price.

5.4. Recommendations
As identified from the findings of this study, removal of fuel subsidy proxy by increase in Price of Petroleum Motor Spirit had negative and significant impact on economic welfare in Nigeria, thus, the following recommendations are made.
1. Centered on the findings, removal of fuel subsidy should not be a prompt decision without addressing the issue of mass unemployment in Nigeria. This is because the burden of fuel subsidy removal will fall heavily on the large number of unemployed and underemployed segment of the population.
2. The government should set aside funds to take care of the welfare of the masses to cushion the effect of fuel subsidy removal, as is obtainable in other countries of the world.
3. The government should tackle the issue of sore inflation in Nigeria. Millions of Nigerians have been forced into poverty and the welfare of many more has been compromised by the double-digit price increases for food and other necessities throughout the past year, while earnings have remained stagnant or decreased. The sudden removal fuel subsidies may continue to negatively impact the poor and vulnerable.
4. One of the key measures the government can take before subsidy removal is the introduction of transportation vouchers and mass transit. This is because the instantaneous pang of the subsidy removal is likely to manifest through higher public and informal transport prices.
5. The utilization of renewable energy sources, such as hydropower, wind, and solar energy, should be promoted by governments. This would reduce the country's dependency on fuel imports and provide families and businesses with a backup energy source.
6. The government should create more jobs by boosting the economy, intervening in procurement and financing, assisting small businesses, developing youth entrepreneurship to alleviate hardship poses by fuel subsidy removal.

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