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An analysis of the abolition of premium motor spirit (PMS) subsidies in Nigeria: a breach of social contract or climate change action?

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Abstract
The study examines the payment of fossil fuel subsidies made in Nigeria on petrol, with an analysis of the laws governing its payments. It explores the reasons for the removal of the petrol subsidy and examines the merits advocated by proponents of its elimination. Additionally, it investigates the diverse pricing methods employed for petroleum products. Employing a doctrinal legal research methodology, the article relies on the existing primary and secondary sources of laws to provide insights for the reforms. The study concludes with recommendations such as the implementation of a mixed economic system, reinforcement of trade laws, consumer protection and competition laws, improvement of transparency and accountability, promotion of investments in local refineries, adoption of cleaner alternative energy sources such as renewable energy sources by adopting the global energy transition agenda, and provision of palliatives. The findings unravel the complexities surrounding petrol subsidy payments which have occasioned corruption, rent-seeking activities and insufficient utilization of clean sources of energy. A significant gap exists in Nigeria's energy sector compared to the selected case study countries. The study provides valuable insights for policymakers and stakeholders. The recommendations promote transparency, and accountability and will facilitate the necessary reforms for sustainable downstream petroleum industry and global energy security.

Keywords Deregulation · Downstream petroleum sub-sector · Subsidy · Oil and gas · Nigeria

Abbreviations

SURE-P	Subsidy Reinvestment and Empowerment Programme
OPEC	Organisation of Petroleum Exporting Countries
NEITI	Nigeria Extractive Industries Transparency Initiative
PPMC	Petroleum Products Marketing Company
SAP	Structural Adjustment Programme
TCF	Trillion cubic feet
PMS	Premium motor spirit
NNPC LTD	Nigerian National Petroleum Corporation Limited
PSF	Petroleum Support Fund
PPPRA	Petroleum Products Pricing Regulatory Agency

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1 Introduction

Over the years, payment of fossil fuel subsidies has been a contentious issue in Nigeria, which is an oil-producing nation with abundant oil and natural gas endowments [1]. The payment of fossil fuel subsidies on petroleum products like Premium Motor Spirit (PMS), Dual Purpose Kerosene (DPK), and Automotive Gas oil (AGO) started in 1970 by the Federal Government to minimise the effect of global oil price volatility on Nigerians and its inhabitants (These refined petroleum products are called PMS, DPK, and AGO according to the international fuel type standards). The International Monetary Fund avers that Nigeria spent approximately NGN 1.894 trillion (USD 2,357,187,170.00) in 2021 equal to 38 per cent of its oil revenues of NGN 4.98 trillion (USD 6,197,883,900.00) on Premium Motor Spirit (PMS) subsidies [2]. Equally, in 2022 Nigeria spent approximately NGN 4.611 trillion (USD 5,738,643,105.00) which amounted to 61.4 per cent of its NGN 7.512 trillion (USD 9,349,097,160.00) oil revenues with subsequent decline in oil production but paid more on petrol subsidies to the detriment of other essential and developmental sectors such as health, education, social security, other critical social infrastructure thereby leading to an increase in the country's total debt obligations [3].

The removal of the payment of fossil fuel subsidies led to a hike in the prices of Premium Motor Spirit sold in Nigeria, The rise in prices of petroleum products in Nigeria has been decried by labour unions and Nigerians due to the resulting economic hardship.

Despite Nigeria's enviable status as the largest oil producer in Africa and also a member of the Organisation of Petroleum Exporting Countries (OPEC) [4–6]). Nigeria has witnessed crude oil theft, illegal refining, pipeline vandalism and inadequate infrastructure, incessant petrol scarcity and corruption occasioned by subsidy payments and other rent-seeking activities [7, 8]. These have significantly hindered the country from benefiting from the global crude oil price surge and meeting the OPEC quota of 1.8million Barrels Per Day ('bpd') in 2022 and its foreign reserves declined by US$3.12 billion (NGN 2,461.68 with an exchange rate of NGN789.00 for December 9, 2023) in ten months [2].

Nigeria's oil and gas industry is classified into three (3) sub-sectors namely the upstream, midstream and downstream sub-sectors [4–6]. The upstream sub-sector covers exploration and production. This involves drilling exploration wells and searching for underwater and underground natural gas fields or crude oil fields. This is the extractive part of petroleum production operations. This involves exploration, prospecting, development production and decommissioning of abandonment. This sub-sector is regulated by the Nigerian Upstream Petroleum Regulatory Commission under section 4 Petroleum Industry Act 2021.

The midstream sub-sector involves the transportation, processing of gas, transportation and marketing of natural gas. It is regulated by the Nigerian Midstream and Downstream Petroleum Regulatory Authority under section 30 Petroleum Industry Act 2021. The downstream sub-sector involves oil and gas refining, distribution and supply, marketing and sales of petroleum products. This sub-sector is also regulated by the Nigerian Midstream and Downstream Petroleum Regulatory Authority.

Nigeria's oil sector has suffered crude oil theft of US$3.3 billion (NGN 2,651,550,000.00) in 2023. Approximately 141 million barrels of crude oil were produced in the first quarter of 2022 and approximately 132 million barrels were received at the export terminals due to crude oil theft, pipeline vandalism and the defence of force majeure were utilised by the international oil companies to circumvent their contractual obligations to the Federal Government of Nigeria [4–6]. To combat this menace, the Federal Government introduced some initiatives such as setting up a special investigative committee on crude oil theft, formulation of stringent regulations, obligatory installation of meters, tracking of export crude oil and measurement of crude oil at several points from production to export. Improved community surveillance of the pipelines through the engagement of private companies to monitor petroleum activities, crude oil ships or vessel movements in the Nigerian Exclusive Economic Zone. The infrastructure deficit such as the absence of functioning state-owned refineries and regulation of prices of petroleum products in the downstream sector has occasioned heavy reliance on importation of refined petroleum products despite the country being a major oil producer in the world. This study is concerned with Nigeria's downstream oil and gas sub-sector which has the most visible impact on Nigeria's populace. Nigeria's downstream oil and gas sub-sector has been subject to price controls by the Federal Government of Nigeria through regulatory agencies in the oil and gas sector [3].

The pricing of petroleum products in Nigeria always follows a 'Cost-Plus' approach. If the cost primarily involves crude oil, then refining, distribution, interest costs, and profits are added to establish the pump price [9]. If the cost involves imported products, then port handling, distribution, and profit are added. Any price below this cost would result in a subsidy or the operator operating at a loss. The government pays the marketers of refined petroleum products to subsidize the prices of these imported refined products and assuage the inevitable economic hardship on the people that would follow in the absence of these subventions that make the selling price of petroleum products lower than the price when imported.

Before the enactment of the Petroleum Industry Act, the Petroleum Products Pricing Regulatory Authority (now defunct) was created to fix the prices of petroleum products sold in the country. Before the 29th day of May 2024, only the price of Petrol is regulated because the prices of Kerosene and Automotive Gas Oil (Diesel) have been deregulated or left to the market forces for price determination [10].

Despite the government's attempt at subsidising the cost of petroleum products, there has been profound discontent in the downstream sub-sector as it has been bedevilled with incidents of hikes in petrol prices, petrol scarcity, hoarding, smuggling, product adulteration, strikes and industrial actions by concerned private actors. This has led to calls by some interested parties for the absolute deregulation of the downstream petroleum industry with the consequence being that the petroleum products are subject to the market forces of demand and supply. Some of the proponents of deregulation claim that total deregulation is the panacea that could bring an end to the perennial problems inhibiting the smooth operations of the downstream sector such as the lingering petrol scarcity and the payment of petroleum subsidies. The proponents further argue that the subsidy scheme places a huge strain on the government's budget and revenues thus restricting the ability of the government to undertake development projects [11].

The term 'subsidy' refers to direct or indirect payment, economic concessions or privileges granted, usually by the government, to private firms, households or other governmental units to promote public objectives. These objectives may include amelioration of inequalities in the distribution of income, through the implementation of some programmes to improve general welfare and to mitigate some unintended effects of market forces. A significant objective of subsidies is to encourage the growth of subsidized industries or sectors relative to others that do not receive subsidies (in the case of business enterprises) and thus alter the uses to which an economy puts its resources. Deregulation involves the deliberate reduction or elimination of government regulations imposed on a specific industry to promote a more efficient market. Its purpose is to diminish government control and encourage increased competition [12]. Another way to express this is the removal or easing of governmental regulations on economic activities. The term 'deregulation' is sometimes used interchangeably with the term 'liberalisation'. Before the removal of subsidies in Nigeria, the payment of subsidies on petroleum products and government regulation through price control were like Siamese twins. Deregulation was only possible where and when the practice of paying subsidies had ended [13].

At this juncture, it is important to state that this study does not intend to canvass for the restoration of fossil fuel subsidies but rather, it aims to advocate for the decisive abolition of the payment of fossil fuel subsidies as a way of transiting to low-carbon sources of energy which is in line with efforts to combat climate change and promote the use of renewable energy sources being the global trend that will promote energy security and sustainability, and environmental protection. Climate change is a front-burner issue in today's world and it has been identified as a sustainable development goal by the United Nations. The United Nations Sustainable Development Goal 13 is about climate action and it seeks to take urgent action to combat climate change and its impacts. The Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC, 2007) concluded that greenhouse gas (GHG) emissions for the change in climate since the mid-twentieth century [14]. As greenhouse gas emissions blanket the Earth, they trap the sun's heat. This leads to global warming and climate change. A greenhouse gas (GHG) is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range Many greenhouse gases occur naturally, such as water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Others such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF6) result exclusively from human industrial processes. Key greenhouse gases are carbon dioxide (CO_2), methane (CH_2), nitrous oxide (N_2O) and other chlorofluorocarbons (CFC). Due to the scale of industrial activities since the Industrial Revolution in the eighteenth century, the ozone layer has been thickening. Fossil fuels such as coal, oil and natural gas which are used in powering machines emit carbon dioxide and other noxious gases which escape into the ozone layer and cause its depletion.

The impacts of climate change are injurious and pervasive. Climate change affects countries, economies and people's welfare. Climate change is responsible for many natural disasters such as desertification, droughts, hurricanes and floods.

The study objective and the rationale are to examine the legal framework for the payment of subsidies on petrol in Nigeria, the petroleum products' pricing methods employed in Nigeria as well as the justifications and merits of the cessation of payment of subsidies on petrol in Nigeria.

The purpose of this study is to comprehensively analyse the impact and legitimacy of subsidized petrol payments in Nigeria and offer alternatives to such payments. The study is timely and appropriate it came at the time Nigeria removed subsidy payment on Petrol called the Premium Motor Spirit (PMS). The study is different from the previously published studies because the study examined the comprehensive legal analysis of subsidized petrol payments in Nigeria, it evaluates the impact and legitimacy and it explored the alternatives. It formulates guidelines for optimizing energy systems which other existing studies have not considered. The findings conform with the previously published studies by Ozili and Obiora [15] titled "Implications of Fuel Subsidy Removal on the Nigerian Economy" and Adeoti et al. [16] respectively. The study aims to contribute to knowledge by analysing the subsidized payments on petrol in Nigeria, evaluating the impact, legitimacy and exploring alternatives which is the transition to low carbon sources of energy which is clean, environmentally friendly and inexhaustible being the gap in the existing literature that this study intends to fills in the subsidy literature.

The research implications are to suggest findings that are fundamental for policy formulation by policymakers to overhaul energy practices and theories to guarantee sustainable energy futures and security.

This paper will examine the abolition of payment of fuel subsidies in Nigeria. Part one is the introductory aspect while part two deals with the research methodology employed and a brief exposition of relevant literature, part three will look at the relevant theoretical frameworks. Part four will consider some legal frameworks and findings made while part five will provide recommendations and conclusions.

2 Research methodology

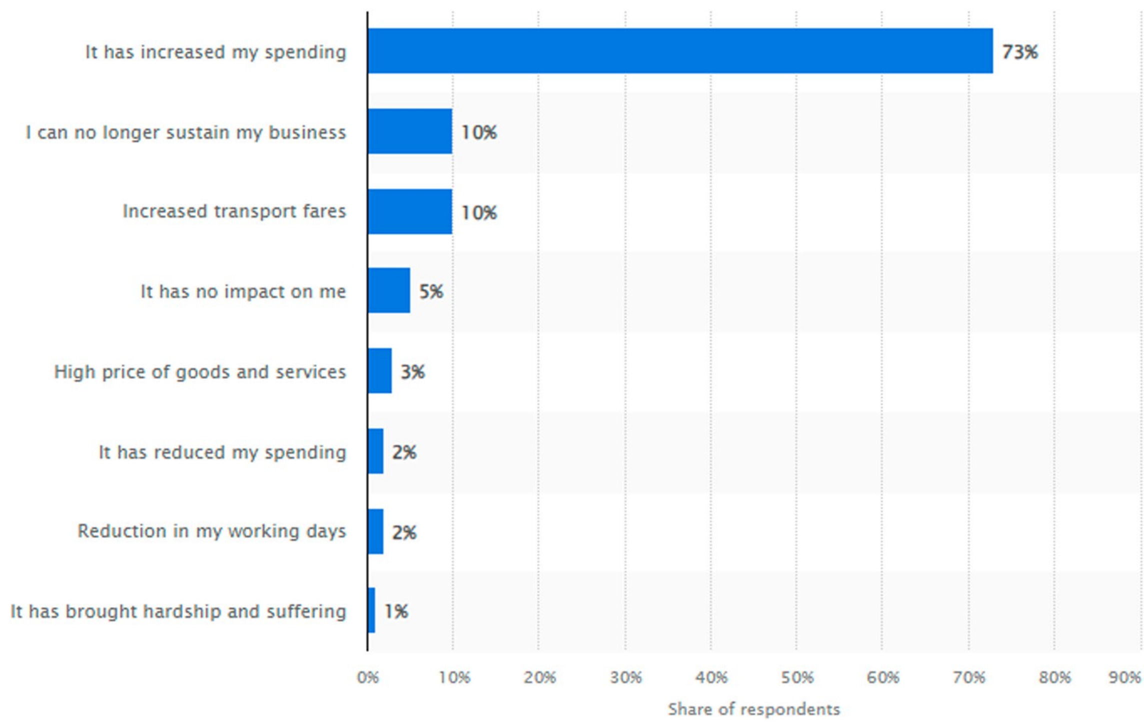
The study adopts a doctrinal legal research method with a conceptual legal research approach. The study utilised both the Primary and secondary sources of law. Primary sources of laws such the Constitution of the Federal Republic of Nigeria 1999 (as amended), the Nigeria Extractive Industries Transparency Initiative Act, 2007, the Petroleum Industry Act 2021 and case laws among others. The secondary sources of laws such as peer-reviewed journals, and books written by renowned energy scholars among others were examined. The justifications for using the methodology are that it is reliable and verifiable in the field of energy study.

3 Literature review

To clearly understand the objective of this research paper, there is a need to conduct a critical examination of the relevant literature in the area of fossil fuel subsidies. This is necessary for a comprehensive investigation of the interaction between the law and policy as it relates to the economic condition of Nigerians.

Moyo and Songwe [17, 18] argued that ending the payment of fossil fuel subsidies was the correct decision as Nigeria's fossil fuel subsidy programme was a monumental drain on its revenues. They further stated that the payment of fossil fuel subsidies had hindered developmental spending in other sectors and that keeping the artificial price ceilings has discouraged further investments in Nigeria's oil and gas sector. The researchers submitted that Nigeria's fuel subsidy disproportionately benefits the rich, not the poor, despite what the general public believes. Respectfully, the opinions of the researchers are incorrect as it has been demonstrated with the removal of the subsidy paid on petrol that Nigerians have been adversely affected, with 73 per cent of the respondents of a survey conducted in 2023 stating that the removal of the fuel subsidy has increased their spending [19]. The urban poor are the most affected by the subsidy with many finding it difficult to pay for transportation and businesses laying off staff due to increased costs of doing business [20]. From the time of the removal of the subsidy till now, the Federal Government has yet to realise any meaningful improvement in the lives of Nigeria with the President in his Independence Day speech making pleas to the Nation to endure the hard times [21].

Impact of the removal of fuel subsidy by the Nigerian federal government in 2023 © Statista 2024



Ozili and Obiora [15] considered the implications of fuel subsidy removal on the Nigerian economy. In their work, they noted the positive effects of the removal of fossil fuel subsidies including: saved funds from fuel subsidy removal which would be used to develop critical infrastructure and channelled towards the development of the other sectors. The authors also noted that the elimination of fossil fuel subsidies could reduce the budget deficit and generate a budget surplus, cause an increase in employment, reduce pressure on the foreign currency exchange rate and reduce Nigeria's dependence on imported petroleum. The authors were however balanced in their assessment and considered the negative implications of the decision to scrap payment of fossil fuel subsidies such as high inflation and a reduction of consumers' purchasing power, increase in poverty and crime rates, loss of jobs in the informal sector, etcetera. The current socio-economic realities in Nigeria tend to align with the negative implications outlined in the authors' work. For instance,the inflation rate In December 2023 increased to 28.92% relative to the November 2023 headline inflation rate which was 28.20%, and the inflation rate in October was 27.33% relative to the September 2023 headline inflation rate which was 26.72%. August inflation rate was 25.80% relative to the July 2023 headline inflation rate which was 24.08%. In June 2023, the inflation rate rose to 22.79% relative to the May 2023 headline inflation rate which was 22.41% [22]. In addition to this, kidnapping has been on the rise, with the Federal Capital Territory, Abuja gaining notoriety in recent months [23].

Okongwu and Imoisi [24] also considered the implications (legal) of the removal of petrol subsidies in Nigeria and reached conclusions similar to the points raised by Ozili and Obiora [15]. Okongwu and Imoisi [24] argued that the negative effects of the removal of fossil fuel subsidies by the Nigerian government outweighed the positive side. They predicted an economic recession which would usher in many undesirable socioeconomic occurrences like inflation, increased crime rates, escalating transportation costs, and worsening poverty rates. The authors also noted that the removal would have negative effects on the Fiscal Responsibility Act 2007. A consideration of the work of the authors revealed certain gaps which need to be addressed. Apart from the trite socioeconomic consequences resulting from the scrapping of fossil fuel subsidies, the authors failed to convincingly show how the implementation of the Fiscal Responsibility Act 2007 will be affected. It is important to note that the Fiscal Responsibility Act of 2007 was enacted to *inter alia* promote the economic objectives enshrined in section 16 of the Constitution of the

Federal Republic of Nigeria 1999. Section 16 of the Constitution of the Federal Republic of Nigeria 1999 outlines certain economic objectives which can be interpreted as forming a set of non-justiciable obligations of the State to its citizens under the social contract theory. Some of the objectives include the obligation of the State to control the national economy in such a manner as to secure the maximum welfare, freedom and happiness of every citizen based on social justice ideals; the obligation of the State to manage and operate the major sectors of the economy; the obligation of the State to harness and distribute Nigeria's material resources to serve the common good. It is the opinion of the authors of this present study that these socio-economic objectives enshrined in section 16 are the statutory provisions that have been adversely affected by the decision to terminate the fossil fuel subsidy program in Nigeria because the citizens are negatively affected by this decision in a way that runs contrary to the provisions of section 16 of the Constitution of the Federal Republic of Nigeria 1999.

Figure 1 shows the annual subsidy expenditure of the Federal Government of Nigeria on Premium Motor Spirit (PMS) (2005–2021).

3.1 Historical foundation

As a result of the increment in global oil prices, the Federal Government of Nigeria ('the Government') in a reactionary move, made a promulgation on petroleum subsidy in 1973 [25]. The Federal Government paid subsidies through the sale of crude oil to local refineries below market prices. This practice which commenced in the early 1970s was later discontinued in 2003. The prices of the refined products from these refineries did not accurately reflect their production costs. Efforts to adjust prices based on energy and asset replacement costs were unsuccessful due to government policies or yielding to public pressure [26].

The implementation of subsidies took another dimension in 1977 when the Government enacted the Price Control Act. This Act applies to petroleum products as they are listed as item seven (7) on the First Schedule to the Price Control Act. It is worthy of note that the Government stopped price controls on all items on the first schedule except petroleum products, notwithstanding the austerity measures of 1983 and the Structural Adjustment Programme ('SAP') of 1985.

As a result of the issues arising out of the payment of subsidies, the Government tried to remove it in 1986 when the Ibrahim Badamasi Babangida administration announced a partial removal of petroleum subsidies [24]. This accompanied the implementation of SAP. On the 1st day of January 2012, former President Goodluck Ebele Jonathan announced the removal of the subsidy, after widespread nationwide protest, the Government of the day rescinded the abolition of the subsidy and instead reinstated it [13]. Recently, on May 29 2023, President Bola Ahmed Tinubu declared that the payment of subsidies on petrol had ended [27]. However, the International Monetary Fund (IMF) claims that the Federal Government of Nigeria surreptitiously government reintroduced the payment of subsidies on

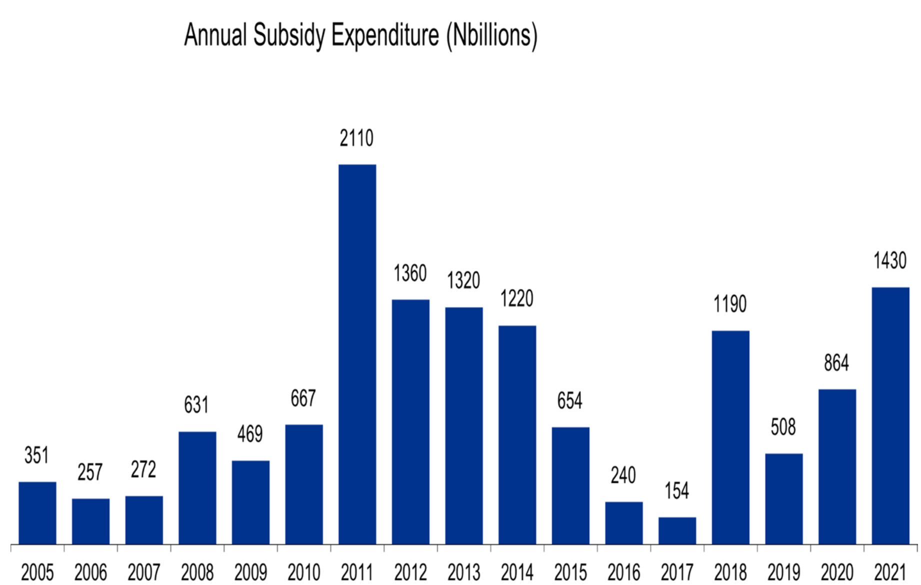


Fig. 1 Annual subsidy expenditure on premium motor spirit (PMS) in Nigeria (2005–2021) (Source: KPMG [2])

the premium motor spirit (PMS) [28, 29]. This recent development serves as a basis for the advocacy for the abolition of fossil fuel subsidies by the authors through this article.

4 Theoretical framework

Certain legal theories are relevant and offer a clear logical relationship to the practice of paying subsidies on petrol in Nigeria. A few of these theories will be discussed in connection to the payment of subsidies on petrol in Nigeria. The starting point is the Resource Curse theory. The phenomenon known as 'the resource curse', or 'paradox of plenty', pertains to the inability of numerous countries abundant in natural and mineral resources to put their wealth to optimal use, and the incapacity of their governments to adequately address the welfare requirements of their populations. Although the discovery of natural and mineral resources might give rise to the anticipation of improved developmental results, countries rich in these resources tend to experience high levels of conflict and authoritarianism, as well as diminished economic stability and growth rates in comparison to neighbouring countries with fewer resources. [30]. The Resource Curse theory has two economic subsets which are: The Dutch Disease and the Rentier State [31]. The Dutch Disease posits that a significant increase in income derived from natural resources can have adverse effects on other sectors of the economy, particularly export-oriented manufacturing, due to factors such as inflation or the appreciation of the exchange rate. This phenomenon (Dutch Disease) leads to a diversion of labour and capital from non-resource sectors to the resource sector, causing long-lasting impacts that can persist for decades. The detrimental consequences of natural resources on other industries have been extensively observed in countries like Iran, Russia, Trinidad and Tobago, and Venezuela, where manufacturing sectors have either been stunted or experienced a sharp decline. In the 1970s, Venezuela experienced the Dutch Disease and during this period, the Venezuelan government decided to alleviate the financial burden on the agriculture sector by using the money generated from oil exports to cancel all agriculture-related debt. The intention was to boost agricultural production and relieve the industry, however, contrary to expectations, this action had an adverse effect. As a result of the debt cancellation, many owners of large farms, known as *latifundios*, opted to sell or shut down their estates. These landowners then migrated to urban areas and established non-agricultural businesses. Consequently, Venezuela, like Nigeria, suffered a significant decline in its agricultural sector due to the overwhelming focus on its resource wealth, particularly oil. The decline in agriculture and the subsequent growth of the oil industry and other service sectors led to a substantial influx of immigration and internal migration from rural areas to major cities. The other variant which is the rentier-state model posits that oil-producing states primarily generate revenue through external rents rather than taxation [32].

4.1 Assessing rentier states exhibit three (3) main features

Firstly, they have economies heavily reliant on rent, which refers to non-productive elements like mineral or natural resources. Secondly, a significant portion of this rent is derived from external sources (foreign companies or markets), allowing the economy to sustain itself without a robust domestic productive sector. Lastly, only a minority of the population participates in the actual production of rent, the majority is actively engaged in the distribution and utilization of these rent-based resources.

The concept of the rentier state seems to apply to Nigeria because Nigeria can be characterized as a rent-seeking state, which is heavily dependent on oil revenue derived from rents or royalties paid by multinational oil and gas companies for their activities in Nigeria [33].

Oil and gas make up a significant portion of Nigeria's revenue and foreign exchange earnings, highlighting the country's heavy reliance on oil as its primary economic driver. Another relevant theory is the theory of utilitarianism, which was propounded by the legal theorist Jeremey Bentham (1748–1832), an English philosopher, economist and legal theorist [34]. Utilitarianism is a theory that evaluates actions and institutions based on their contribution to overall happiness or pleasure, rather than pain [35]. It suggests that the goal of government should be to maximize the happiness of the greatest number of people. According to Jeremy Bentham, individuals are driven by pain and pleasure, and what is good for the individual is also right for society and all sentient beings. Bentham posited that law should be used as a tool of social engineering as well as a means to increase happiness and minimise pain. Jeremy Bentham propounded that there are four major utilities or goods any society should seek to promote which are: security, equality, liberty and abundance. Jeremy Bentham further posited that the government in making laws and policies to achieve these goods should promote the interest of the state above and against that of the individual. Thus, the state should promote the greatest good for the greatest number of people.

The utilitarian theory is relevant to the analysis of payment of subsidies on petrol in Nigeria as it considers the consequences of the payment of or removal of the subsidies on the Nigerian people. The final theory is the theory of economic regulation which encompasses various forms of taxes and subsidies, along with express regulatory controls imposed by statutory and administrative instruments that govern rates, entry, and other aspects of economic activities [36]. The economic regulation theory has two sub-theories. One is the 'public interest theory' which holds that regulation is implemented to address the public demand for rectifying market practices that are deemed inefficient or unfair. The second sub-theory the 'Capture theory' posits that regulation is provided as a response to the requests of interest groups that compete with each other to maximize the financial gains of their members.

Some of these listed countries are importers of refined petroleum products, However, few countries among the listed countries own functional refineries and produce oil. The cost of production and distribution of the product, statutory taxes, Dollar exchange rates and crude oil price fluctuations are factors influencing the pump prices of petroleum products prices in a country which has deregulated its downstream petroleum industry [37].

Table 1 shows the historical changes in premium motor spirit prices in Nigeria from General Yakubu Gowon's and President Bola Ahmed Tinubu's Administration 1966–2023 using an exchange rate of N789.5/$ as of 11/12/2023.

Table 2 below shows the Pump Prices of Premium Motor Spirit (PMS) Prices in African Countries, expressed in Naira (NGN) and United States Dollars ($) Equivalents.

Figure 2 below is the Map of Nigeria showing the Pump Prices of Premium Motor Spirit Prices PMS Prices (NGN) in Various States in Nigeria and the USD ($) Equivalents.

Table 3 shows the old NNPC Petrol Pump Price Across the States in Nigeria and the Current New Pump Price from June 1, 2023, with the Dollar (USD) Equivalent.

Table 4 shows the ongoing private initiatives or projects upon successful completion will boost the availability of refined petroleum products in Nigeria and promote the export of refined petroleum products.

5 Legal and administrative frameworks governing the payment of subsidies on premium motor spirit (PMS) or petrol in Nigeria

As was previously discussed in the literature review. Section 16 of the Constitution of the Federal Republic of Nigeria 1999 outlined certain economic objectives which constituted non-justiciable obligations of the State to its citizens under the social contract theory. These objectives imposed obligations on the State to take measures that serve the common good. One of these measures was the payment of fossil fuel subsidies which served to lower the cost of transportation and procuring energy options for the masses. To understand how the Nigerian Government did this, we need to examine the regulatory instruments used, thus the necessity of detailing and examining the legal and administrative frameworks governing the payment of subsidies on Premium Motor Spirit (PMS) or Petrol in Nigeria.

Before the enactment of the Petroleum Industry Act 2021, Nigeria had statutes that regulated government intervention in the downstream sub-sector. These laws include the Constitution of the Federal Republic of Nigeria 1999 (as amended), Petroleum Act 1969 (Repealed), Petroleum Equalization Fund (Management Board, etc.) Act 1975 (Repealed), Petroleum Production and Distribution (Anti-Sabotage) Act 1975, Crude Oil (Transportation and Shipment) Regulations 1984, Petroleum Products (Uniform Retail Prices) Order 1986, Petroleum Products (Prices of Automotives and Lubricating Oils) Order 1996 and the Petroleum Products Pricing Regulatory Agency (Establishment) Act 2003.

5.1 The constitution of the Federal Republic of Nigeria 1999 (as amended)

The Constitution vests the legislative powers of the Federal Republic of Nigeria in the National Assembly as stated under section 4(1) Constitution of the Federal Republic of Nigeria 1999. The National Assembly is empowered to make laws for the peace, order and good government of the Federation concerning matters listed in the Exclusive Legislative List as stated under section 4 (3) Constitution of the Federal Republic of Nigeria 1999. By the provisions of section 44(3) of the Constitution, the vests ownership and authority over all minerals, mineral oils, and natural gas found on or beneath any land in Nigeria, as well as within the territorial waters and Exclusive Economic Zone of Nigeria, are held by the Government of the Federation. Laws relating to petroleum fall within the exclusive preserve of the National Assembly by

Table 1 Past changes of premium motor spirit prices in Nigeria from Gowon-Tinubu administration. Source: Authors

S/N	Administration	Year	Trajectory changes of premium motor spirit prices (PMS) pump prices	USD ($) equivalents	Price variations in USD percentage	Remarks
1	General Yakubu Gowon	1 August 1966–29 July 1975	6Kobo to 8.45Kobo	USD 0.000076 to USD 0.00011	44.7%	Subsidy policy was actively in force that is it was rigorously enforced for the benefit of Nigerians and the economy was booming
2	General Murtala Ramat Mohammed	29 July 1975–13 February 1976	8.45Kobo to 9Kobo	USD 0.00011 to USD 0.00011	No significant change in USD value for the period (0%)	Subsidy policy was actively in force or strictly enforced for the benefit of Nigerians and the economy was flourishing
3	Chief Olusegun Aremu Obasanjo (Military Head of State)	13 February 1976–1 October 1979	9Kobo to 15.3Kobo	USD 0.00011 to USD 0.00019	72.7%	Subsidy policy was actively in force and the economy was booming
4	Alhaji Shehu Shagari	1 October 1979–31 December 1983	15.3Kobo to 20Kobo	USD 0.00019 to USD 0.00025	31.6%	Subsidy policy was actively in force for the benefit of the citizens and the economy was booming
5	General Muhammadu Buhari	31 December–27 August 1985	20Kobo (price remains the same)	USD 0.00025 to USD 0.00025	No change in prices during this period (0%)	Subsidy policy was actively in force for the benefit of the citizens and the economy was booming
6	General Ibrahim Badamasi Babangida	27 August 1985–26 August 1993	• 20Kobo to 39.5Kobo • 39.5Kobo to 42Kobo • 42.5Kobo to 60Kobo • 60Kobo to 70Kobo	USD 0.00025 to USD 0.00050 USD 0.00053 to USD 0.00053	100% No significant change in USD value for the period (0%) 6%	Subsidy policy was enforced rigorously for the benefit of Nigerians and the economy was flourishing
7	Late Chief Earnest Adegunle Shonekan	26 August 1993–17 November 1993	70Kobo to NGN5 Naira	USD 0.00089 to USD 0.0064	619.1%	The subsidy policy was enforced rigorously for the benefit of Nigerians
8	General Sani Abacha	26 August 1993–8 June 1998	• NGN5 to NGN3.25 Kobo (price reductions) • NGN3.25Kobo to NGN15 • From NGN15 to NGN11 (reduction of price)	USD 0.0064 to USD 0.0041 USD 0.0041 to USD 0.019 USD 0.019 to USD 0.014	35.9% 363.4% 26.3%	Subsidy policy was forced rigorously for the benefit of Nigerians and the economy was booming
9	General Abbulsalami Abubakar	8 June 1998–29 May 1999	• NGN11 to NGN 25 • From NGN25 to NGN 20 (price reduction)	USD 0.014 to USD 0.032 USD 0.032 to USD 0.025	128.6% 21.8%	Subsidy policy was in force and every attempt to remove it was frustrated

Table 1 (continued)

S/N	Administration	Year	Trajectory changes of premium motor spirit prices (PMS) pump prices	USD ($) equivalents	Price variations in USD percentage	Remarks
10	President (Chief) Olusegun Obasanjo	29 May 1999–2007	• NGN20 to NGN30 • NGN30 to NGN22 (price reduction) • From NGN22 to NGN 26 • NGN26 to NGN42 • NGN42 to NGN50 • NGN50 to NGN65 • NGN 65 to NGN75	USD 0.025 to USD 0.038 USD 0.038 to USD 0.028 USD 0.028 to USD 0.033 USD 0.033 to USD 0.053 USD 0.053 to USD 0.064 USD 0.064 to USD 0.076 USD 0.076 to USD 0.095	52% 26.3% 17.9% 60.6% 20.8% 18.8% 25%	Subsidy policy was in force. However, the challenge was poor enforcement and prevalent corruption in the sector
11	President Umaru Musa Yar'Adua	16 August 2007–5 May 2010	NGN75 to NGN65 (price reduction)	USD 0.095 to USD 0.076	20%	Subsidy policy was actively forced for the benefit of Nigerians and the economy was booming
12	Dr. Goodluck Ebele Jonathan	5 May 2010- 29 May 2015	The upward review of the PMP pump price was a new year present to Nigeria from NGN 65 to NGN 141 After the Labour Union strike) it was reduced to NGN 97 In February 2015 toward the general election, it was reduced to NGN87	USD 0.083 to USD 0.18 USD0.18 to USD0.12 USD 0.12 to USD 0.11	116.9% 33.3% 8.1%	Attempts to remove the subsidy policy were resisted by the labour union with the threat of industrial strikes
13	President Muhammadu Buhari	29 May 2015–May 29, 2023	It was increased from NGN87 to NGN165	USD 0.11 to USD 0.21	90.9%	Attempt to remove the subsidy policy was resisted by the labour union
14	President Asiwaju Bola Ahammed Tinubu	May 29, 2023–till date	• From NGN165 to NGN500 • NGN580–NGN 650	USD 0.21 to USD 0.64 USD 0.74 to USD 0.83	67.2% 12.2%	The subsidy Policy was removed with negotiation with the labour union

Table 2 The pump prices of premium motor spirit prices PMS prices (NGN) in African countries and USD ($) equivalents

S/N	Countries	Premium motor spirit prices PMS prices (NGN)	USD ($) equivalents
1	Nigeria	NGN 580	0.74 US Dollars
2	Liberia	NGN747	0.98 US Dollars
3	Sierra-Leone	NGN 863	1.13 US Dollars
4	Benin	NGN878	1.15 US Dollars
5	Ghana	NGN 892	1.17 US Dollars
6	Togo	NGN 946	1.24 US Dollars
7	Guinea	NGN 1095	1.43 US Dollars
8	Cote d'Ivoire	NGN1101	1.44 US Dollars
9	Burkina Faso	NGN1148	1.50 US Dollars
10	Cape Verde	NGN1149	1.50 US Dollars
11	Mali	NGN1170	1.53 US Dollars
12	Mauritania	NGN1204	1.58 US Dollars
13	Senegal	NGN1337	1.75 US Dollars

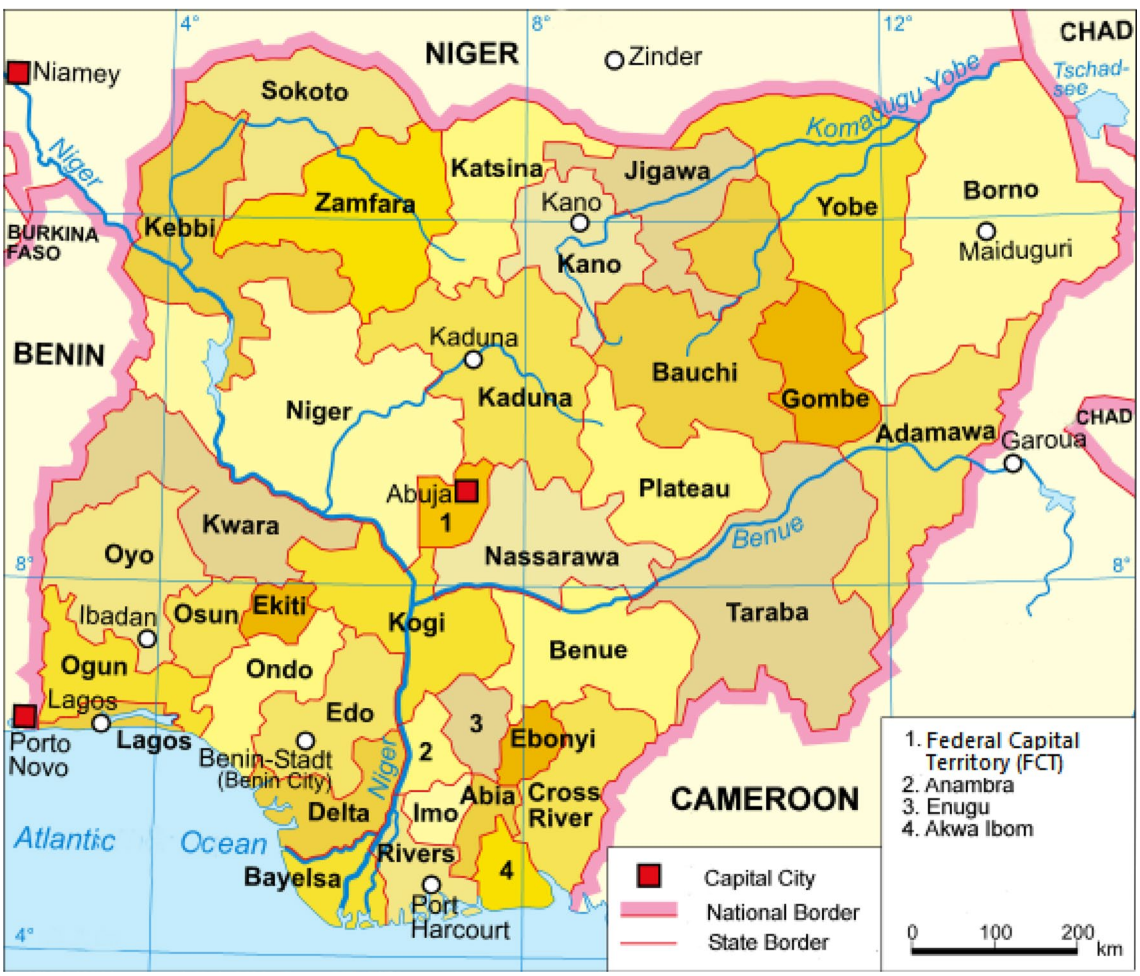


Fig. 2 The map of Nigeria showing the pump prices of premium motor spirit prices PMS prices (NGN) in various states in Nigeria and the USD ($) equivalents (Source: KPMG [2])

Table 3 The old NNPC petrol pump price across the states in Nigeria and the current new pump price from June 2023 with the Dollar (USD) equivalent

S/N	States	State capital	Geopolitical zone	Old NNPC petrol pump price	New pump price from June 2023	Dollar (USD) equivalent
1	Abia State	Umuahia	South East	189	NGN600–NGN680	USD 0.78–USD 0.88
2	Adamawa State	Yola	North East	199	NGN630–NGN540	USD 0.82–USD 0.71
3	Akwa Ibom State	Uyo	South South	194	NGN550	USD 0.72
4	Anambra State	Awka	South East	189	NGN 600	USD 0.78
5	Bauchi State	Bauchi	North East	199	NGN550–NGN630	USD 0.72–USD 0.82
6	Bayelsa State	Yenagoa	South South	189	NGN 595–NGN600	USD 0.78–USD 0.78
7	Benue State	Makurdi	North Central	189	NGN550–NGN 600	USD 0.72–USD 0.78
8	Borno State	Maiduguri	North East	199	NGN 600	USD 0.78
9	Cross River State	Calabar	South South	189	NGN550–NGN 600	USD 0.72–USD 0.78
10	Delta State	Asaba	South South	189	NGN 600	USD 0.78
11	Ebonyi State	Abakaliki	South East	189	NGN550–NGN 600	USD 0.72–USD 0.78
12	Edo State	Benin City	South South	189	NGN 580-NGN 617	USD 0.76–USD 0.81
13	Ekiti State	Ado Ekiti	South West		NGN 580–NGN 617	USD 0.76–USD 0.81
14	Enugu State	Enugu	North East	199	NGN 580–NGN 617	USD 0.76–USD 0.81
15	Gombe State	Gombe	North East	199	NGN557–NGN600	USD 0.72–USD 0.78
16	Imo State	Owerri	South East	189	NGN640–NGN650	USD 0.84–USD 0.85
17	Jigawa State	Dutse	North West	194	NGN620–NGN650	USD 0.81–USD 0.85
18	Kaduna State	Kaduna	North West	194	NGN620–NGN650	USD 0.81–USD 0.85
19	Kano State	Kano	North West	194	NGN617–NGN650	USD 0.81–USD 0.85
20	Katsina State	Kastina	North West	194	NGN620–NGN650	USD 0.85–USD 0.85
21	Kebbi State	Birnin Kebbi	North West	194	NGN620–NGN650	USD 0.85–USD 0.85
22	Kogi State	Lokoja	North Central	189	NGN580–NGN 620	USD 0.76–USD 0.76
23	Kwara State	Ilorin	North Central	189	NGN595 NGN612	USD 0.78–USD 0.80
24	Lagos State	Ikeja	South West	184	NGN568- NGN617	USD 0.74-USD 0.81
25	Nasarawa State	Lafia	North Central	189	NGN568–NGN650	USD 0.74–USD 0.85
26	Niger State	Minna	North Central	189	NGN580–NGN650	USD 0.76-USD 0.85
27	Ogun State	Abeokuta	South West	189	NGN580–NGN617	USD 0.76–USD 0.81
28	Ondo State	Akure	South West	189	NGN580–NGN617	USD 0.76–USD 0.81
29	Osun State	Oshogbo	South West	189	NGN580–NGN617	USD 0.76–USD 0.81
30	Oyo State	Ibadan	South West	189	NGN580–NGN617	USD 0.76–USD 0.81
31	Plateau State	Jos	North Central	189	NGN617–NGN650	USD 0.81–USD 0.85
32	Rivers State	Port Harcourt	South South	189	NGN 580–NGN650	USD 0.76–USD 0.85
33	Sokoto State	Sokoto	North West	194	NGN617–NGN650	USD 0.81–USD 0.85
34	Taraba State	Jalingo	North East	199	NGN 580–NGN650	USD 0.76–USD 0.85
35	Yobe State	Damaturu	North East	199	NGN617–NGN 650	USD 0.81–USD 0.85
36	Zamfara State	Gusau	North West	194	NGN617–NGN 640	USD 0.81–USD 0.84
	Federal Capital Territory (FCT)	Federal Capital Territory (FCT)	North Central	194	NGN617–NGN 640	USD 0.81–USD 0.84

the combined provisions of Item 39 (mines and minerals, including oil fields, oil mining, geological surveys and natural gas) as contained in the Exclusive legislative list and section 4(1), (2) and (3) of the Constitution [38].

5.2 Petroleum equalisation fund (management board, etc.) act

The Act came into force in 1975 intending to reimburse petroleum marketing companies for any losses incurred by them arising from the sale of petroleum products at uniform prices throughout Nigeria. Section 1 of the Act established a Petroleum Equalisation Fund ('the Fund'). Sources of the fund include net surplus revenue recovered from oil marketing companies and monies provided for the Fund by the Federal Government (Section 1 Petroleum

Table 4 Current projects that will enhance the availability of refined petroleum products in Nigeria upon completion. Source: ([52–56])

S/N	Name of projects	Location	Capacity (barrels per day)	Completion date	Remarks
1	Dangote refinery[a]	Lekki Free Zone, Lekki, Lagos State	650,000	First quarter of 2023	This is a private initiative project that will promote healthy competition and availability of refined petroleum products, improve the prices of petroleum products in Nigeria and export the product. It will position the country as the largest crude oil refiner in Africa
2	Greenfield refinery[b]	Port-Harcourt, Rivers State	100,000	First quarter of 2023	It is a private sector-led project that will promote competition and availability of refined petroleum products, improve the prices of petroleum products in Port Harcourt and export the product
3	Assa North–Ohaji South (ANOH) gas processing company[c]	Imo State	300 million standards cubic feet per day (MMscfd)	Fourth quarter 2023	It is a private sector-led project that will promote healthy competition and availability of refined petroleum products and improve the prices of petroleum products in Imo State and export of the product
4	Edo modular refinery[d]	Edo State	6000 barrels per day, to be improved to 21,000 bpd	First quarter of 2023	It is a private-sector-piloted project, in partnership with the Edo State government to promote healthy competition and availability of refined petroleum products and improve the prices of petroleum products in Edo State. and export of the product
5	Onose refinery	Delta State	20,000	2027	It is a private sector-controlled project in partnership with the Delta State government to promote healthy competition in the oil sector and availability of refined petroleum products and improve the prices of petroleum products in Delta State and export of the product

[a]The Dangote refinery commenced operations after its inauguration by former President Muhammadu Buhari in May 2023

[b]The refinery is being constructed by African Refineries Port Harcourt Limited (ARPHL), joint venture partner of the Nigerian National Petroleum Corporation Limited (NNPCL). It is due to be operational in 2025

[c]The mechanical completion of the refinery occurred on December 29, 2023

[d]The Edo modular refinery was ready for production activities as far back as June 2021. It began production in January 2023

Equalisation Fund (Management Board Act) (Repealed). The Act established the Petroleum Equalisation Fund Management Board ('the Board') which is responsible for administering the Fund as provided under section 3 Petroleum Equalisation Fund (Management Board) Act. The Fund is to be used for reimbursement of oil marketing companies for any loss sustained by them solely and exclusively as a result of the sale by them of petroleum products at uniform prices throughout Nigeria being prices fixed by the Minister according to section 6 (1) of the Petroleum Act (repealed) and section 2 Petroleum Equalisation Fund (Management Board, etc.) Act (repealed).

5.3 Petroleum act 1969 (repealed)

By the provisions of section 4 of the Act, no person could import, store, sell or distribute any petroleum products in Nigeria without a licence granted by the Minister of Petroleum Resources. Section 6(1) further empowered the Minister to fix the prices at which petroleum products could be sold in Nigeria via an order published in the Federal Gazette.

5.4 Petroleum products pricing regulatory agency (establishment, etc.) act, 2003 (repealed)

Section 1 established the Petroleum Products Pricing Regulatory Agency ('the Agency'). The functions of the Agency included inter alia, the determination of the pricing policy of petroleum products under section 7 of the Act. Under the Act, the President had the authority to issue general directives or guidelines to the Agency or its Executive Secretary regarding their functions and policies as stated under section 23 of the Act. The Act mandated that these directives, deemed necessary by the President, must be followed and implemented by the Agency or the Executive Secretary. It should be noted the Act has been repealed by section 310(1)(f) of the Petroleum Industry Act 2010. The Act further transferred all assets and liabilities of the Agency to the Nigerian Midstream and Downstream Petroleum Regulatory Authority ('the Authority'), thus making the Authority a successor to the Agency as stated under sections 313 and 314 Petroleum Industry Act 2021.

5.5 Price control act

The Act established the Price Control Board ('the Board') and prescribed the constitution (membership) of the Board under section 1 of the Act. Under section 2 of the Act, it set up a Price Control Committee for each state in Nigeria. The Act provides for the continuation of the imposition of price control on goods specified in the First Schedule to the Act under section 4 specifies petroleum products as number 7 on the list of Controlled commodities. Section 5 empowers the Board to fix a basic price for any controlled commodity through a notice published in the Federal Gazette under section 5(1) of the Act. Section 6 prohibits and criminalises the sale of controlled commodities above the controlled price. Section 7 prohibits and criminalises the hoarding of controlled commodities.

5.6 Petroleum industry act 2021

The Act established the Nigerian Midstream and Downstream Petroleum Regulatory Authority and charged it with the responsibility of technical and commercial regulation of the midstream and downstream sectors in the petroleum industry as stated under section 29(1) and (3) Act. One of the objectives of the Authority, as it concerns this study, is the development and enforcement of a framework on tariff and pricing for natural gas and petroleum products provided for under section 31 of the Act. The function of the Authority is to, *inter aia*, set cost benchmarks for midstream and downstream petroleum operations, and provide pricing and tariff frameworks for natural gas and petroleum products among others as stated under section 32 of the Act. The Act further provides that tariffs charged by holders of licences for use in the downstream sector shall follow the tariff methodologies adopted by the Authority under section 123(1) of the Act [39]. Section 310(2) of the Act transfers the responsibilities of the Petroleum Equalisation Fund Management

Board to the Authority. Section 313 of the Act transfers the assets and liabilities of the Petroleum Equalisation Fund Management Board to the Authority.

5.7 Nigeria extractive industries transparency initiative act, 2007

Section 1 of the Nigeria Extractive Industries Transparency Initiative Act, 2007 established the Nigeria Extractive Industries Transparency Initiative ('NEITI'), which is a body corporate with perpetual succession as stated under section 1 (2) (b) of the Act. NEITI is an autonomous self-accounting body which reports to the President and the National Assembly as stated under section 1(2)(a) of the Act. NETI's primary objectives include, *inter alia*, ensuring transparency and accountability by the Government in the application of resources from payments received from extractive industries or companies. Section 21 defines an 'extractive industry company' to mean:

> any company in Nigeria that is engaged in the business of prospecting; mining, **extracting, processing and distributing minerals and gas, including oil**, gold, coal, tin, bitumen, diamonds, precious stones and such like; and includes any agency or body responsible for the payment of extractive industry proceeds to the Federal Government or its Statutory Recipient;

NEITI has the responsibility of, *inter alia*, ensuring that all fiscal allocations and statutory disbursements due from the Federal Government to statutory recipients are duly made under Section 3 (f) of the Act.

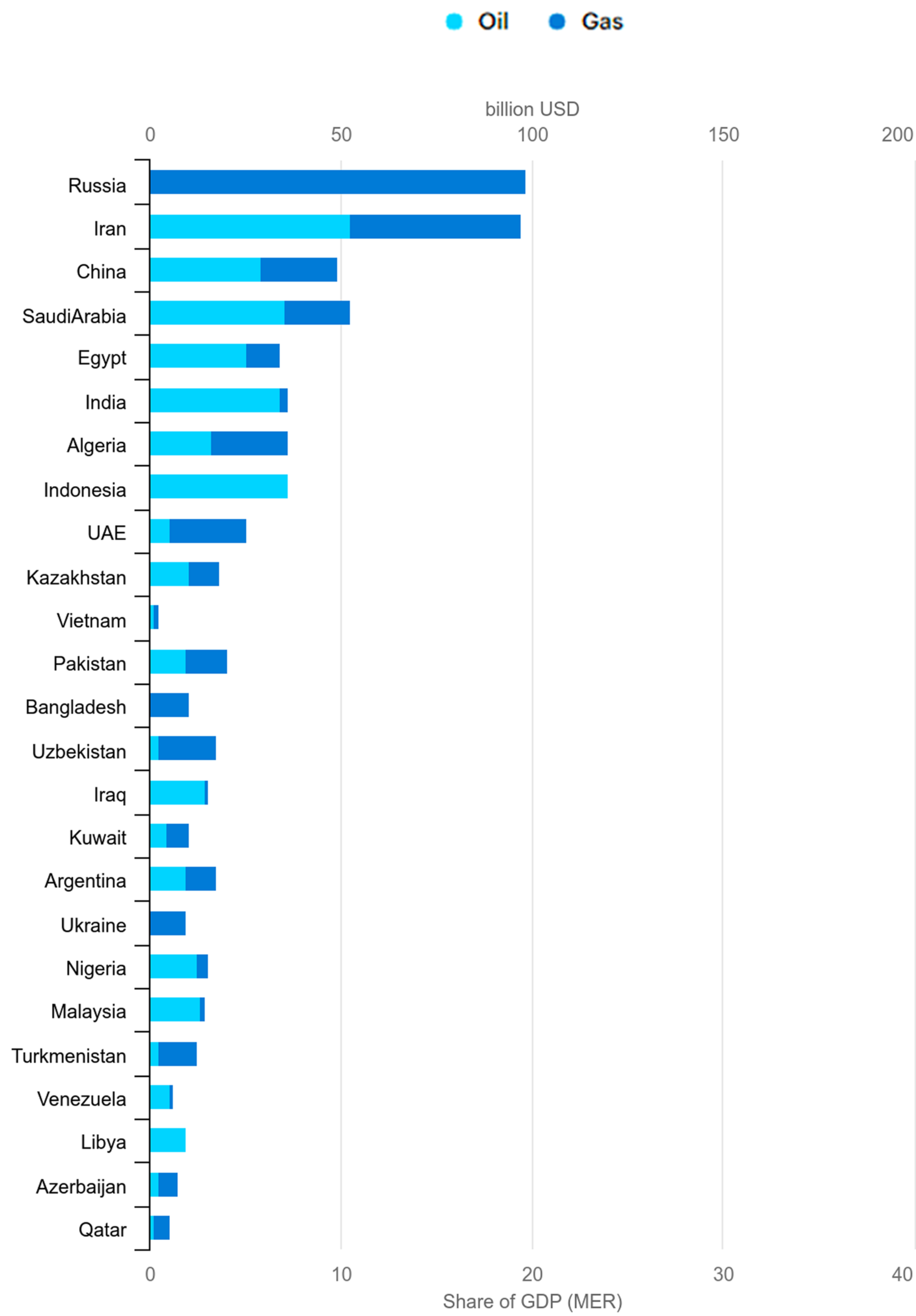
5.8 Petroleum support fund

The Government established the Petroleum Support Fund ('PSF') as an interventionist fund and it was to take effect in January 2006. Petroleum Products Pricing Regulatory Agency ('PPPRA'), Revised Guidelines for The Administration of Petroleum Support Fund (PSF) 2009). The funding of the PSF came from budgetary provisions and contributions made by all tiers of Government in Nigeria to stabilize the domestic prices of petroleum products against volatility in international crude and product prices. The participants or stakeholders in the PSF included the Central Bank of Nigeria, Oil Marketing/ Trading Companies, the defunct Department of Petroleum Resources, the defunct Petroleum Equalization Fund Management Board, and the defunct Petroleum Products Pricing Regulatory Agency. The PSF was scrapped in 2015 [40].

5.9 Subsidy reinvestment and empowerment programme (SURE-P)

The discontinuation of petroleum product subsidies by the Government in January 2012 resulted in the creation of the Subsidy Reinvestment and Empowerment Programme (SURE-P). (National Planning Commission, Subsidy Reinvestment and Empowerment Programme Performance Monitoring Report 1st January 2012–31st December 2013). SURE-P aimed to mitigate the effects of rising petroleum prices on the Nigerian population. It was to utilize the Government's portion of the funds previously allocated for subsidies to implement various initiatives focused on stimulating the economy, improving infrastructure, and implementing safety net projects to alleviate poverty. The Buhari-led civilian administration scrapped SURE-P (The Guardian 22 November 2015).

Value of fossil-fuel subsidies by fuel in the top 25 countries, 2022 (International Energy Agency, 2023)



6 Justifications for the removal of petrol subsidy in Nigeria

In the Performance Monitoring Report (1st January 2012–31st December 2013) of The Subsidy Reinvestment and Empowerment Programme, the following were listed as the reasons for the removal of subsidies: petrol subsidies had become a significant financial burden that was unsustainable [41] a momentous drain on Nigeria's resources which have

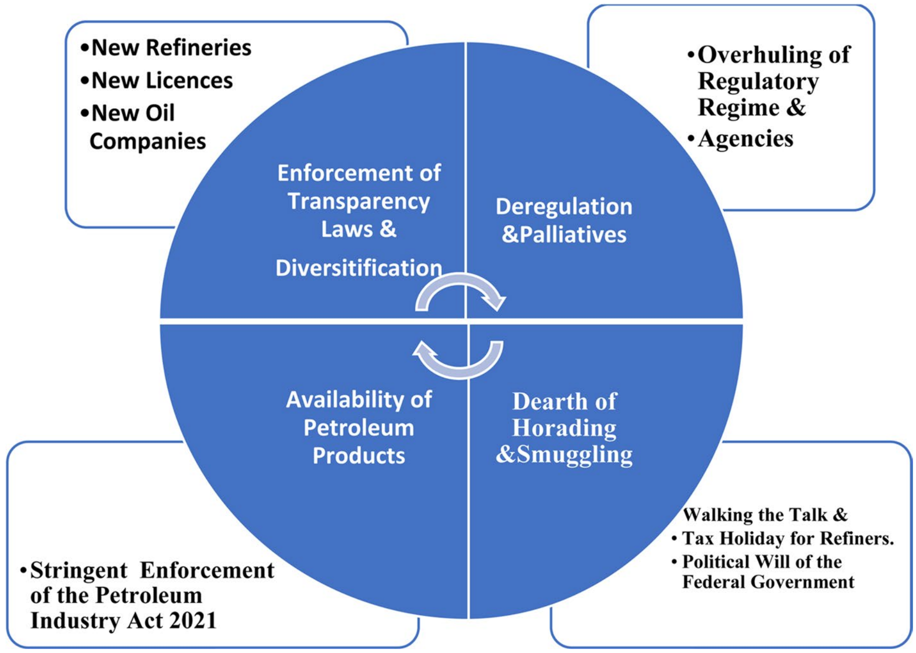


Fig. 3 Hybrid model designed to eradicate the payment of subsidized petroleum products in Nigeria (Source: Authors)

occasioned inefficiencies and corruption. The intended beneficiaries of the subsidies do not receive the benefits. The administration of subsidies was plagued by inefficiencies, leakages, and corruption [42]. Subsidies had led to the diversion of limited public resources away from critical infrastructure investments, putting strain on government finances. Subsidies hindered competition and discouraged private investment in the downstream sector of the petroleum industry, such as refineries, petrochemicals, and fertilizer plants [43]. Lack of deregulation and investment had resulted in minimal progress in constructing new refineries, despite the issuance of multiple licenses. Deregulating the downstream sector of the petroleum industry would attract private sector investment, leading to the construction of refineries and petrochemical plants, creating employment opportunities and fostering prosperity. The significant price disparity between Nigeria and neighbouring countries motivated the smuggling of petroleum products across borders, as prices are higher in those countries. Nigeria ends up subsidizing petroleum consumption in neighbouring countries.

6.1 Benefits of the removal of petrol subsidy

Several positives have been touted as the benefits of the removal of subsidies on petrol in Nigeria. They include the following: removal of petrol subsidies reduces government borrowing and the associated large deficit, allowing resources to be allocated to other sectors [44].

The freed-up resources from subsidy removal can be invested in critical sectors like education, healthcare, security, and infrastructure, improving the standard of living and fostering economic growth [45]. Eliminating the subsidy reduces the incentive for fuel smuggling, which addresses security risks related to illegal refining, pipeline vandalism, and criminal activities [4–6, 46]. The absence of subsidies creates an environment for private sector investment in the downstream sector, leading to the development of local refineries, job creation, and enhanced energy security [45]. Subsidy removal reduces the massive importation of fuel, resulting in reduced demand for foreign exchange, a stronger currency (Naira), and a decline in imported inflation. Deregulation of the downstream sector stimulates increased activity and profitability for downstream companies, contributing to higher tax revenue and benefiting various players in the value chain. As provided under the Petroleum Industry Act, 2021 absolute deregulation of the Premium Motor Spirit (PMS) market is a good option over the partial deregulation because it averts subsidy policy politicisation and petrol pricing in Nigeria. Also, the removal of subsidies can have a huge positive impact on human health and this is supported by a World Bank study which found that removing fossil fuel subsidies in 25 countries could save a total of 360,000 lives by 2035 due to improved air quality and health outcomes. The absolute consumption burden of fossil fuel subsidy reform on the richest decile would be 13 times larger than on the lowest-income decile, supporting evidence that fuel subsidies are an inefficient way of supporting lower-income groups [47].

Figure 3 shows a hybrid model designed to eradicate the payment of subsidized on petroleum products in Nigeria.

7 Conclusion and policy implications

The summary of the main findings and scientific value or contributions of this study to the existing knowledge is the study designing a hybrid model (see Fig. 3) to eradicate the payment of subsidized petroleum products in Nigeria and a mechanism for the promotion of transparency and accountability in the sector which is the novelty of the study among others.

The findings unravel the complexities surrounding petrol subsidy payments which have occasioned corruption, other rent-seeking activities and insufficient utilization of clean sources of energy. The study provides valuable insights for policymakers and stakeholders involved in the oil and gas industry to improve the sector.

Nigeria's oil and gas petroleum sub-sector has long been plagued by challenges such as petrol scarcity, hoarding, smuggling, and industrial actions. The Government's approach of subsidizing petrol has faced criticism due to its strain on the budget and the perception of inefficiencies in the subsidy scheme. Deregulation of the downstream sub-sector, coupled with strengthened regulatory oversight, transparency, and accountability, has been proposed as a potential solution. An incisive and impassioned analysis of the history of payment of subsidies on petroleum products in Nigeria will no doubt reveal that subsidy has always been a money pit which needs to be removed. This position is further reinforced by the justifications for and merits of the removal of subsidy considered in this paper. However, one should not be oblivious of or indifferent to the fact that the increased costs of petrol are likely to have a multiplier effect on the prices of goods and services in the country, which will inexorably lead to increased costs of living in a country reported by the National Bureau of Statistics to have 63% of its population (133 million people) being multidimensionally poor. To remedy the hardship and difficulties that will arise as a result of the decision to remove petrol subsidies, the following recommendations should be considered for implementation:

Implementation of a mixed economic system with the downstream sub-sector of Nigeria's oil and gas industry: the downstream sub-sector of Nigeria's petroleum industry should be fully deregulated, allowing market forces to determine the prices of petroleum products and the Nigerian Midstream and Downstream Petroleum Authorities should monitor the activities of market players to combat sharp practices and other activities that infringed the law and their practices and sanction where appropriate. The rationale behind this is to avoid situations where a monopoly, duopoly or oligopoly will emerge, kill competition and then engage in unfair or oppressive market practices such as setting exorbitant prices. There is a need to strengthen the enforcement of consumer protection and competition laws: as the downstream sub-sector is deregulated, it is crucial to ensure stringent enforcement of the existing consumer protection and competition laws such as the Federal Competition and Consumer Protection Act, the Petroleum Industry Act and the Price Control Act.

The need to enhance transparency and accountability: in the downstream sub-sector of the oil and gas industry to combat corruption and rent-seeking activities that may be connected to the revenue derived from the removal of subsidies. Civil Society organisations in Nigeria should collaborate with the Nigeria Extractive Industries Transparency Initiative to promote transparency and accountability in the downstream sub-sector [48–50].

The encourage investment in local refineries to reduce over-dependence on imported petroleum products and to mitigate the impact of fluctuations in international oil prices, the government should incentivize and support investments in local refineries to promote self-sufficiency, create jobs, and enhance economic growth.

The government should facilitate the adoption of natural gas as a cleaner alternative to petrol and other fossil fuels energy sources in line with Nigeria's Energy Transition Plan. Natural gas is the most abundant natural resource in Nigeria than oil [48–50]. Nigeria proudly boasts an impressive 188 trillion cubic feet (tcf) of proven gas reserves, ranking it as the 9th country globally with the largest gas reserves (Ministry of Petroleum Resources, Nigeria National Gas Policy 2017). Gas can be used for the generation and supply of electricity by way of gas turbines [4–6]. Compressed and liquefied natural gas can be used for powering vehicles for transportation purposes [51]. Compressed Natural Gas has been projected to be over 400 per cent cheaper than petrol when deployed [4, 5]. The government should implement measures that accelerate the transition from fossil fuel to renewable energy and other sources of low-carbon energy. The exploitation of renewable energy sources, especially in the area of electricity generation, will reduce the over-dependence on fossil fuels like petrol. Furthermore, the government should revisit policy documents like the Renewable Energy Master Plan (REMP), and Nigeria's Renewable Energy Roadmap [48–50].

The government should provide evidence-based palliatives to the poor and those who deserve social welfare benefits: this should be done through the National Social Investment Programme administered by the Ministry of Humanitarian Affairs, Disaster Management and Social Development. The government through the Ministry should also implement the National Social Investment Programme Agency Act to assuage the hardship faced by the poor and vulnerable persons due to the adverse effects of the removal of petrol subsidies. Besides, the statutory transfers made by the government should be properly monitored by NEITI and other relevant regulatory bodies as stated under section 3 (j) Nigeria Extractive Industries Transparency Initiative Act, 2007 to combat corruption in the exercise.

The present administration should revisit the Subsidy Reinvestment and Empowerment Programme (SURE-P) which was instituted by former President Goodluck Jonathan and either reinstate it or adopt strategies and the ideas of SURE-P for the benefit of Nigerians.

There is a need to strengthen the various investment, trade and securities laws through the provisions of economic incentives to investors to boost investment in domestic refineries. The provisions of palliatives supports or interventions by each tier of government to mitigate the adverse consequences of subsidy removal on vulnerable Nigerians.

The introduction of functioning greener mass transportation technologies schemes such as functioning electric buses which are ecologically responsive to the vulnerable Nigerians serves as a succour to the hardship created due to the removal of subsidies in the various states in the federation. This will further offer gainful employment opportunities and infrastructure to Nigerians.

The use of nanotechnology to track the movement of Nigerian Premium Motor Spirit across borders will discourage the smuggling of petroleum products to neighbouring countries' oil markets for exorbitant gains or prices. Establishment of a robust and sustainable market for foreign exchange ('FX') by withdrawing the gaps between the official and parallel exchange rates.

Prompt clear, transparent information and regular communication to Nigerians on the benefits of removal of subsidies to the economy and the mode of utilisation of the saved funds with the various measures put in place to cushion the impact on the vulnerable. This will build Nigerians' confidence in the government and avert public protests or social unrest in the country. The reduction in the escalating costs of governance in Nigeria by executing the Orosanye's Committee report. This will save the government the sum of NGN1.3 trillion (USD 1,617,921,500.00) for the execution of capital or developmental projects in the country.

8 Limitations of the study

The absolute reliance on current literature to examine the study as a result of poor security in Nigeria. Yet, the study sagaciously exploits appropriate literature and primary sources of laws. Despite the obstacle which hampers access to data, which impacts the efficacy of consultation of many oil and gas companies because of the occurrence of COVID-19 and its civility that requires social distancing and avoidance of public meetings in the absence of a face shield or mask and due to the prevalence of insecurity in the country. Hence, the a need for further research in the field of low-carbon energy in Nigeria's energy sector.

Author contributions O.O.J. and O.S.I: conceived and designed the experiments; O.J.O, and O.S.I: performed the experiments; O.J.O. and O.S.I: analyzed and interpreted the data; O.J.O. and O.S.I: contributed reagents, materials, analysis tools or data; O.O.J and O.S.I: wrote the paper.

Data availability Supporting data are included in the article.

Declarations

Ethics approval and consent to participate Not applicable.

Consent for publication Not applicable.

Competing interests The authors declare no conflict of interest.

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