THE IMPACT OF PETROLEUM SUBSIDY ON THE CONSUMPTION OF PETROLEUM PRODUCTS IN NIGERIA

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BEING A PROJECT SUBMITTED TO THE DEPARTMENT OF ECONOMICS, FACULTY OF SOCIAL SCIENCES, UNIVERSITY OF BENIN, BENIN CITY.IN PARTIAL FULFLMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF SCIENCE (B.SC) DEGREE IN THE DEPARTMENT OF ECONOMICS, UNIVERSITY OF BENIN, BENIN CITY

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CERTIFICATION

This is to certify that the research project titled The Impact Of Health Petroleum Subsidy On The Consumption Of Petroleum Products In Nigeria was being researched and submitted by me MASTER, Ayemoba Silas Osilama for the certification of Bachelor of Science (B.Sc) degree in the department of economics, Faculty of Social Science University of Benin, Benin city. This research was carried out under the supervision of the following persons;

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DEDICATION

This Research work is dedicated specially to God, my family (THE AYEMOBA'S) and my humble self Ayemoba Silas Osilama

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ABSTRACT

This study examines the impact of petroleum subsidy on the consumption of petroleum products in Nigeria from 2000 to 2020 using an Error Correction Model (ECM). The analysis reveals that petroleum subsidies significantly stimulate consumption by enhancing affordability. Surprisingly, higher inflation rates are associated with increased petroleum consumption, challenging conventional economic theory which predicts reduced consumption due to diminished purchasing power. Conversely, the relationship between petroleum prices and consumption is weak and statistically insignificant, suggesting that factors beyond price influence consumer behavior. Additionally, higher Gross Domestic Product (GDP) per Capita is unexpectedly associated with decreased petroleum consumption, indicating the presence of other influential factors independent of income levels. These findings underscore the complexity of the factors influencing petroleum consumption in Nigeria and highlight the need for evidence-based policymaking. Recommendations include conducting a comprehensive review of subsidy programs, investing in renewable energy, pursuing economic diversification, managing inflation, and strengthening data-driven decision-making to promote sustainable and resilient petroleum consumption patterns while fostering inclusive economic growth and development.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Petroleum subsidy remains a highly debated and multifaceted issue in Nigeria, affecting the technical, economic, and political aspects of the petroleum industry. The implementation of different pricing systems significantly impacts the cost and profit-sharing dynamics between major stakeholders, such as the producer (NNPC) and consumers. Nigeria's entry into petroleum exploration in the mid-60s led to large-scale production by the early 70s, making it one of the world's top oil producers. However, the economic windfall brought challenges, including adjustments, false hopes, and questionable policy decisions (Onyishi, Eme & Emeh, 2012).

The historical perspective reveals that oil accounted for over 80% of Nigeria's foreign exchange earnings by 1973, marking a pivotal moment in the country's economic landscape. While the influx of petroleum revenue spurred development projects, it also led to issues such as wasteful expenditure and inefficiency. Attempts to remove the petroleum subsidy date back to 1980, driven by factors like a reduction in government revenue due to an oil glut in 1981, austerity measures, and loans from the International Monetary Fund (IMF) (World Bank, 2012).

The consequences of subsidy removal were evident in 1986 when the federal government eliminated 80% of the subsidy, with the remaining 20% inflated to nearly 100% due to foreign exchange market developments. This move aimed to curb financial losses, generate additional revenue, and conserve petroleum products for export. However, challenges persisted, leading to wasteful government expenditure and inefficient resource utilization (Heggie & Vickers, 1998). The heavy subsidy on

petroleum products contributed to the imbalanced development of Nigeria's energy system, creating economic distortions. The financial power derived from oil revenue led to the overextension of the federal government's activities, resulting in inefficiencies and waste. The consequences of subsidy removal, such as the FESTAC and UDORJI awards, highlighted the challenges associated with managing the country's petroleum resources (Sannders & Schneider, 2000). Nigeria's significance as a major crude oil source globally is underscored by the fact that petroleum products contribute almost 90% of the country's export earnings. The international nature of petroleum trade, influenced by political dynamics and the dollar currency, further complicates the subsidy scenario (World Bank, 1997). Historically, Nigeria has subsidized petroleum products to maintain lower prices domestically, a practice that came under scrutiny due to the economic challenges caused by an oil glut.

Energy subsidies play a crucial role in supporting economic growth, with governments globally implementing policies to ensure citizens have access to vital energy resources. However, scholars and international organizations like the IMF advocate for subsidy removal, citing distortions in market prices and inefficient consumption patterns (International Monetary Fund [IMF], 2012). The challenges of subsidy removal in sub-Saharan Africa are highlighted by the high percentage of the population living below the poverty line, making subsidy reform a complex task (World Bank, 2011). The Consumer Price Index (CPI) measures the average change in prices of a representative basket of goods and services, reflecting consumer expenditures, cost of living, and overall citizen welfare. In Nigeria, the dependence on premium motor spirit (PMS) for transportation and distribution adds significance to the relationship between PMS prices and the CPI (Ogubodede, Ilesanmi & Olurankinse, 2010). High prices of PMS contribute to inflation, affecting the overall economy.

Studies indicate that households with higher incomes benefit more from subsidies, leading to increased inequality. Subsidy reform, particularly in the context of fuel

subsidies, is seen as a way of addressing income disparities and making subsidies more targeted (Azel del Granado, Coady & Gillinghan, 2012). However, the extent to which fuel subsidy reform in Nigeria will affect the poor remains a subject of investigation. In conclusion, the effects of petroleum subsidy on the consumption of petroleum products in Nigeria are deeply intertwined with the country's economic, political, and social dynamics. The historical context, attempts at subsidy removal, and the current scenario highlight the complexities and challenges associated with managing petroleum resources. As Nigeria grapples with the need for economic reform, the study of the impact of subsidy removal on the consumption patterns of petroleum products becomes increasingly relevant for policymakers, economists, and the general population.

1.2 Statement of research problem

The research problem regarding the impact of petroleum subsidy on the consumption of petroleum products in Nigeria is multifaceted, rooted in historical events and contemporary economic challenges. The genesis of the issue can be traced back to the national debate on the International Monetary Fund (IMF) loan in 1985 when a significant portion of the Nigerian population opposed the withdrawal of government subsidies on petroleum products, a conditionality set by the IMF. Although the military government rejected the loan, it proceeded in 1986 to remove 80% of the subsidy, ushering in a period of economic turbulence marked by inflationary consequences and the introduction of the second-tier foreign exchange market (SFEM).

The need to scrutinize the impact on petroleum consumption arises from various concerns. Firstly, the domestic price of local petroleum products in Nigeria is considerably below the levels in other countries and neighboring nations. This pricing disparity has encouraged excessive usage, leading to distorted growth patterns that cannot be solely explained by the country's industrial growth rate. Moreover, the lower prices

have fueled active trafficking of petroleum products across borders, implicating the government in subsidizing a larger population than intended (Omitogun et al., 2021). Secondly, the existence of petroleum subsidy has led to distortions in the consumption patterns of petroleum products. Subsidies, particularly in the private sector, discourage consumers from being cost-conscious, fostering inefficient consumption behavior. This issue raises questions about the sustainability of the current subsidy system and its alignment with the goal of promoting mindful and sustainable use of petroleum products in the country. Thirdly, the current level of petroleum prices in Nigeria does not adequately reflect the capital outlay and overhead costs involved in the manufacturing and distribution of petroleum products. This pricing inadequacy raises concerns about the economic viability of the subsidy system, particularly whether it accurately accounts for the true costs incurred in the production and distribution processes (Adekunle & Oseni, 2021). Additionally, the early 80% subsidy withdrawal in 1986, coupled with the effects of an oil glut, inflation, and subsequent economic challenges, has deviated from the government's expectations regarding revenue generation. The recent fuel subsidy removal in 2023, without providing sufficient palliatives, has ignited controversy about its potential impact on the Nigerian economy and its citizens.

Despite existing evidence in the literature showcasing mixed effects of petroleum subsidy, there is a noticeable gap in the discussion regarding the specific consequences of the recent petroleum subsidy removal in 2023. The manner in which the subsidy was removed and the lack of immediate mitigating measures have fueled controversy and uncertainty about how this removal will affect both macroeconomic stability and individual households in Nigeria. Therefore, the research problem centers on the urgent need to identify and understand the macroeconomic and microeconomic implications of the petroleum subsidy in Nigeria, providing a comprehensive assessment of its impact on the consumption of petroleum products (Ozili & Obiora, 2023).

1.3 Research Questions

Sequel to the foregoing discussion, the study seeks to answer the following research questions

1. What is the impact of petroleum subsidy on the consumption of petroleum products in Nigeria
2. Does economic growth affect the level of petroleum products consumption in Nigeria
3. What effect does inflation have on the consumption of petroleum products in Nigeria

1.4 Research Objectives

The broad objective of this study is to comprehensively investigate and analyze the impact of petroleum subsidy on the consumption of petroleum products in Nigeria. The specific objectives of the study are to:

1. Examine the impact of petroleum subsidy on the consumption patterns of petroleum products in Nigeria.
2. Investigate the relationship between economic growth and the level of petroleum products consumption in Nigeria.
3. Assess the relationship between inflation rates and the consumption of petroleum products in Nigeria.

1.5 Research Hypothesis

1. Ho: Petroleum subsidy has no significant impact on the consumption of petroleum products in Nigeria.
2. Ho: Economic growth has no significant effect on the level of petroleum products consumption in Nigeria.
3. Ho:Inflation does not significantly affect the consumption of petroleum products in Nigeria.

1.6 Significance of the Study

The research on the effects of petroleum subsidy on the consumption of petroleum products in Nigeria holds critical significance, addressing multifaceted aspects of economic policy, resource management, and socio-economic equality. This study is of paramount importance for policymakers, economists, and the general population, providing essential insights into the complexities that define Nigeria's petroleum industry and shaping informed decision-making.

One primary significance of this research lies in its contribution to economic policy reform. Analyzing the repercussions of petroleum subsidy removal on consumption patterns offers crucial information for policymakers. This knowledge is pivotal for crafting targeted policies aligned with broader economic goals, such as sustainable development, reduced inequality, and enhanced fiscal responsibility. The study also plays a pivotal role in optimizing resource management in the petroleum sector. By understanding the historical context and consequences of subsidy removal, policymakers can develop strategies that promote efficient resource utilization, reduce wasteful government expenditure, and enhance overall economic efficiency.

Furthermore, the research addresses issues of consumer welfare and socio-economic inequality. Examining the impact of subsidy removal on the consumption of petroleum products provides insights into potential effects on different income groups. This information is crucial for designing interventions that prioritize the welfare of vulnerable populations, mitigating the risk of increased inequality. Given Nigeria's status as a major global crude oil source, the research has implications for international economic relations. Understanding the complexities of petroleum trade, influenced by political dynamics and currency fluctuations, informs decision-making in the context of global economic partnerships. This knowledge is crucial for navigating international trade negotiations and optimizing the benefits derived from petroleum exports. The study also delves into the relationship between petroleum subsidy, consumer prices, and overall macroeconomic stability. Examining the Consumer Price Index (CPI) and its correlation with petroleum prices allows policymakers to formulate strategies for effective inflation management. This insight is critical for maintaining economic stability and fostering an environment conducive to sustainable economic growth.

Additionally, the research offers valuable information for policymakers to adapt existing policies and strategies based on empirical evidence. Understanding the historical context and public perceptions surrounding petroleum subsidy removal allows for more nuanced and well-informed decision-making. This, in turn, can contribute to building public trust and support for economic reforms. This gap highlights the urgency and significance of the research, contributing to the academic discourse and ensuring that discussions around petroleum subsidy are grounded in contemporary realities.

In summary, the significance of studying the effects of petroleum subsidy on the consumption of petroleum products in Nigeria goes beyond immediate economic implications. It provides a comprehensive understanding of the historical context, contemporary challenges, and potential avenues for policy reform. This research

contributes to informed decision-making, fostering sustainable economic development in Nigeria.

1.7 Scope of the Study This research delves into the effects of petroleum subsidies on petroleum product consumption in Nigeria, aiming to address the insufficiently explored relationship between subsidy policies and consumption patterns. Over the period from 1990 to 2020, the study examines data sourced from the Central Bank of Nigeria (CBN), the National Bureau of Statistics (NBS), and the World Bank to analyze trends and patterns. By investigating how subsidies influence consumption behavior, the study seeks to provide valuable insights for policymakers and stakeholders in formulating strategies to enhance energy sustainability, economic efficiency, and social welfare in Nigeria's petroleum sector.

1.8 Limitations of the study

Despite the valuable insights it seeks to provide, this study on the impact of petroleum subsidy on the consumption of petroleum products in Nigeria has inherent limitations. Firstly, the research relies on historical data, and the dynamic nature of economic conditions may have evolved since then, potentially affecting the relevance of the findings. Additionally, the study's scope is focused on a specific time frame, and broader economic or geopolitical shifts may not be fully captured. The accuracy of the research is contingent on the availability and reliability of data, and any limitations or gaps in the data sources could impact the robustness of the study. The complexity of economic systems introduces inherent uncertainties, making it challenging to isolate and attribute changes in consumption patterns solely to petroleum subsidy dynamics. External factors such as global economic trends, geopolitical events, or unforeseen crises may introduce confounding variables that could affect the accuracy of the study's conclusions.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Literature Review

2.1.1 Petroleum Subsidy

Petroleum, a highly adaptable and valuable non-renewable natural resource, serves as a crucial component in modern economic activities, fulfilling approximately half of the global energy demand. It is a viscous liquid composed mainly of carbon and hydrogen compounds, with minor traces of non-hydrocarbons like nitrogen and oxygen, typically found at depths exceeding 1,500 meters. Petroleum plays a pivotal role in driving societal progress and government revenue generation. Its applications span a wide spectrum, from the production of pharmaceuticals, fertilizers, and textiles to essential consumer goods like petroleum jelly and candles, as well as infrastructure materials such as bitumen for road construction.

The issue of petroleum subsidy in Nigeria's petroleum industry is highly contentious and emotive. Regardless of the technical, economic, and political dimensions, the choice of pricing system significantly influences the distribution of costs and profits between producers and consumers. Various perspectives, including those of producers, consumers, and governments, define the concept of "subsidy." One such definition characterizes it as a government payment to individuals or businesses without receiving any corresponding product or service in return (McGraw-Hill Dictionary of Modern Economics, 1973, 496-497). Another perspective describes it as a payment made by the government or possibly by private individuals, creating a gap between the price consumers pay and the production costs incurred by producers, resulting in a price lower than the marginal cost (Pearce, 1983:373). Additionally, the Encyclopedia Britannica (1981:753) defines subsidy as direct or indirect government payments, economic

concessions, or special privileges granted to private firms, households, or other government entities to promote public objectives.

According to the Encyclopedia Americana, a subsidy is described as "a grant of money, property, or other forms of aid for which the donor receives no direct returns or payments." In the context of international affairs, a subsidy can also refer to financial assistance provided by one country to another for purposes such as military efforts or economic development. Subsidies serve as tools of public policy aimed at modifying outcomes that may occur under the operation of a free market, which are deemed socially, politically, or developmentally undesirable. These payments may be directed to producers or distributors to alleviate the high costs of production and, consequently, reduce prices for consumers. They are often employed to maintain essential services at affordable prices that may not be profitable under market conditions alone. Such payments have multiple objectives, including income transfers from taxpayers to producers or consumers of specific goods, and influencing supplier or consumer behavior through the elasticity of supply or demand.

In the context of petroleum, a subsidy can be understood as the difference between the production cost and the domestic price of the product, often referred to as an "implicit" subsidy rather than an "explicit" one. This discrepancy is evident in the variance between the price of locally produced crude oil sold to refineries and the subsequent domestic price for consumers. For instance, if local crude oil production costs $2 per barrel (approximately N8.00 in 1984) and is sold to the Nigeria Petroleum Corporation (NNPC) at a questionable price of $5.145 (around N20.58 in 1984), resulting in a profit margin of approximately 52.55%, it implies the absence of a subsidy. In such cases, the government, as a regulator of the national economy, would likely be concerned about maintaining economic balance and preventing excessively high profit margins. The term "subsidy" in its most specific application refers to the royal subsidies granted in England prior to the reign of Charles II (1660). These subsidies constituted financial

grants given by the House of Commons to English monarchs to supplement their income derived from taxes and aids collected through royal prerogative. These subsidies could manifest in various forms, such as direct grants of money, land, or other properties, reductions in taxes, exemptions from taxes or tariffs, low-interest loans, government guarantees, or payments exceeding standard rates for providing services to the government, such as mail delivery.

2.1.2 Effects of Subsidy

Subsidies can have both positive and negative impacts on firms, contingent on factors such as subsidy type and economic context. Positively, subsidies can lower production costs, fostering competitiveness and potentially expanding market share. Moreover, they may incentivize firms to invest in innovation, driving technological progress and productivity gains. Additionally, subsidies can support employment within subsidized industries, promoting stability and growth.

However, subsidies also carry drawbacks. They can distort market dynamics by favoring subsidized firms over competitors, leading to inefficiencies and resource misallocation. Furthermore, reliance on subsidies might diminish firms' incentives to innovate or adapt to changing market conditions. Subsidies may divert resources away from more productive sectors and strain government budgets.

Subsidies can also exert significant impacts at the national level. They may spur growth in strategic industries and enhance international competitiveness. Additionally, subsidies can foster regional development, reducing economic disparities and promoting inclusive growth. Moreover, subsidies targeted at employment-intensive sectors can contribute to job creation and social stability. Conversely, subsidies may provoke trade tensions if perceived as unfair advantages, potentially resulting in trade disputes. They can lead to market inefficiencies by distorting resource allocation. Furthermore, subsidies can strain government budgets, causing fiscal deficits or reduced funding for essential services.

There's also the risk of crowding out private investment or innovation, undermining long-term economic sustainability.

In conclusion, while subsidies offer short-term benefits, careful consideration is necessary to manage their potential drawbacks. Monitoring, evaluation, and thoughtful policy design are essential to ensure that subsidies achieve intended objectives while mitigating adverse effects on economic efficiency and sustainability.

2.1.3 Reasons for Subsidy

Subsidies are implemented for various reasons, each aimed at achieving specific economic, social, or political objectives. Here are some common reasons for providing subsidies:

1. Market Corrective Measures: Subsidies are often used to correct market failures or address externalities. For instance, subsidies may be provided to industries that produce goods with positive externalities, such as education or healthcare, to ensure their provision at socially optimal levels.

2. Economic Development: Governments may use subsidies to promote the development of specific industries or regions. By providing financial assistance to targeted sectors or geographic areas, governments aim to stimulate economic growth, create jobs, and reduce regional disparities.

3. Social Welfare: Subsidies are frequently utilized to support vulnerable populations or address income inequality. Subsidized housing, food assistance programs, and healthcare subsidies are examples of initiatives aimed at improving the welfare of low-income individuals or families.

4. Encouraging Innovation: Subsidies can incentivize research, development, and innovation within certain industries. By providing financial support to firms engaged in

innovative activities, governments aim to foster technological progress, enhance competitiveness, and spur economic growth.

5. Environmental Conservation: Subsidies may be employed to promote environmentally sustainable practices or technologies. For example, governments may offer subsidies for renewable energy production or energy-efficient technologies to reduce greenhouse gas emissions and combat climate change.

6. Strategic Considerations: Subsidies may be provided to support industries deemed strategically important for national security or sovereignty. This could include sectors such as defense, agriculture, or critical infrastructure, where government support is seen as essential to ensure domestic capability and resilience.

7. Social Stability: Subsidies can play a role in maintaining social stability by mitigating the impact of economic shocks or transitions. For instance, subsidies may be used to stabilize prices for essential goods or services during periods of inflation or economic downturns, helping to prevent social unrest.

8. Addressing Market Imperfections: Subsidies are sometimes employed to address specific market imperfections, such as monopolies or oligopolies. By providing financial support to new market entrants or competitors, governments aim to promote competition, consumer choice, and efficiency in markets.

In summary, subsidies serve a range of purposes, from correcting market failures to promoting economic development, social welfare, innovation, environmental conservation, strategic interests, social stability, and addressing market imperfections. The rationale for providing subsidies often reflects policymakers' objectives and priorities in addressing various economic, social, and political challenges.

2.1.4 Petroleum products in Nigeria

Petroleum products in Nigeria refer to various refined products derived from crude oil, which is the country's primary natural resource and a significant contributor to its economy. Nigeria, as one of the largest oil producers in Africa, processes crude oil into different petroleum products to meet domestic demand and for export. Some of the key petroleum products in Nigeria include:

1. **Premium Motor Spirit (PMS):** Commonly known as gasoline or petrol, PMS is the most widely used petroleum product in Nigeria, primarily used as fuel for automobiles, motorcycles, and power generators. It is essential for transportation and plays a vital role in the country's economy.

2. **Automotive Gas Oil (AGO):** Also known as diesel, AGO is used as fuel for diesel-powered vehicles, trucks, buses, and industrial machinery. It is crucial for transportation, particularly for commercial vehicles and heavy-duty equipment.

3. **Dual-Purpose Kerosene (DPK)**: Kerosene serves multiple purposes in Nigeria, including cooking, lighting, and heating for households without access to electricity or gas. It is also used as aviation fuel (Jet-A1) for aircraft.

4. **Aviation Turbine Kerosene (ATK):** ATK is a specialized type of kerosene used exclusively as aviation fuel for jet engines in commercial and military aircraft.

5. **Liquefied Petroleum Gas (LPG)**: LPG, commonly referred to as cooking gas, is used as a clean and efficient cooking fuel in households, restaurants, and hotels. It is also used for heating and as a fuel for certain industrial processes.

6. **Bitumen**: Bitumen, a byproduct of crude oil refining, is used in road construction and maintenance as a binding agent for asphalt pavement.

7. **Fuel Oil:** Fuel oil, also known as furnace oil or residual fuel oil, is used in industrial boilers, power plants, and maritime vessels for heating and electricity generation.

These petroleum products are essential for various sectors of the Nigerian economy, including transportation, manufacturing, agriculture, and household energy. The production, distribution, and pricing of petroleum products are critical issues in Nigeria due to their significant impact on the country's economy, government revenues, and public welfare. Government policies, market dynamics, international oil prices, and infrastructure constraints all influence the availability, affordability, and consumption patterns of petroleum products in Nigeria.

2.1.5 Overview of Petroleum Subsidy on Consumption of Petroleum Products in Nigeria

An overview of petroleum subsidies on the consumption of petroleum products in Nigeria reveals a complex interplay of economic, social, and political factors. Petroleum subsidies have long been a significant component of the Nigerian government's policy framework, aimed at ensuring affordable energy access for its citizens. These subsidies typically involve the government absorbing a portion of the cost of petroleum products, thereby reducing prices at the pump for consumers.

One of the primary effects of petroleum subsidies in Nigeria is the artificial suppression of retail fuel prices, which often leads to increased consumption of petroleum products. Lower prices incentivize higher consumption levels among consumers, leading to greater demand for gasoline, diesel, and other petroleum derivatives. This heightened demand, coupled with inefficient pricing mechanisms and inadequate regulatory frameworks, has contributed to significant fiscal burdens on the government over the years.

According to Eyiuche (2012), the federal government initiated fuel subsidies with the objective of ensuring the availability of petroleum products and alleviating the financial burden of market prices on the general populace. During the military era, the government recognized that the cost of production and transportation of fuel would be excessively burdensome for ordinary Nigerians. Therefore, they opted to subsidize part of

the fuel costs to make the product affordable and accessible. This practice, commonly referred to as fuel subsidy, proved effective from 1973 to 1983. However, the efficacy of the subsidy policy diminished over time. Gen Ibrahim Babangida's administration notably increased the pump price of petrol by approximately 97.5% in 1986. Subsequent democratic governments, including Chief Olusegun Obasanjo's, further raised fuel prices, signaling a departure from the original intent of the subsidy policy.

The federal government has claimed to have spent over a lot on fuel subsidies over the past years. Additionally, it asserts heavy expenditures on subsidizing kerosene imports through the Nigerian National Petroleum Corporation (NNPC). Despite these efforts, unintended consequences such as product smuggling and diversion have arisen. Moreover, the subsidy policy has impeded government efforts to address critical infrastructure challenges such as road maintenance, power supply, and refinery repairs. Onanya (2012) contends that fuel subsidies have primarily benefited wealthy fuel importers rather than ordinary Nigerians. Many economists view subsidies as breeding grounds for corruption and fiscal mismanagement. Consequently, the federal government abruptly announced the end of fuel subsidies on January 1st, 2012. The decision aimed to redirect funds previously allocated for subsidies towards economic development initiatives and sustainable wealth creation.

The idea of subsidizing petroleum products in Nigeria emerged following the collapse of the nation's refineries, attributed to management negligence. This collapse led to a supply-demand mismatch, necessitating imports through the NNPC. However, infrastructure challenges, including aged and dysfunctional pipelines, further exacerbated the situation. Importation became the primary means of meeting demand, but it posed economic challenges such as increased costs and reliance on truck transportation. In summary, while fuel subsidies initially aimed to benefit the general populace, their effectiveness waned over time due to economic challenges, mismanagement, and

infrastructure deficiencies. The decision to end subsidies reflected the government's acknowledgment of the need for alternative strategies to foster economic growth and address structural weaknesses in the petroleum sector.

2.1.6 Historical Overview of Nigeria Prior Attempts To Withdraw Subsidy

Oil exploration in Nigeria traces back to 1908 when the German company, Nigerian Bitumen Corporation, initiated exploration activities in the Araromi area of present-day Ondo State. However, these efforts ceased with the outbreak of World War I in 1914. The development of Nigeria's petroleum industry commenced in the early 20th century, primarily driven by the exploration endeavors of the German Bitumen Corporation. In 1937, Shell D'Arcy Exploration Parties were granted an oil prospecting license, marking significant progress in Nigeria's oil exploration history. Mobil Exploration Nigerian Incorporated obtained a concession over the former Northern Region in 1955 and conducted geological studies, including drilling three deep wells in the former Western Region, before relinquishing the concession in 1961.

The pivotal moment in Nigeria's oil history came with Shell's commercial discovery of crude oil in 1956, leading to production commencement that same year. Subsequently, in 1961, the Federal Government of Nigeria issued ten oil prospecting licenses for the continental shelf to five companies, each covering an area of 2,560 square kilometers, subject to a fee of ₦1 million each. This move facilitated extensive onshore and offshore oil exploration activities.

Commercial quantities of oil were discovered in Oloibiri in the Niger Delta, followed by additional discoveries in Afam and Borno, solidifying Nigeria's status as an oil-producing nation. By April 1967, Nigeria's oil production had surged to 2 million barrels per day, marking a significant milestone in the country's petroleum industry.

The Gulf Oil Company struck the first oil well on the Nigeria continental shelf at the Okan field, located off the coast of Bendel State. Following this milestone, other companies such as Elf, Mobil, Agip, and Texaco drilled additional offshore wells, leading to a significant increase in production rates over the years. However, the global oil glut of the 1980s halted this upward trend. Nigeria's crude oil production reached 2.25567 billion barrels per day in 1974 but declined to 1.389 billion barrels per day by 1984. During this period, the price per barrel also dropped significantly, from approximately ₦40 in 1980/81 to below ₦10 in 1986. By November 9, 2012, the Group Managing Director of NNPC announced that local crude oil production had reached an all-time high of 2.7 million barrels per day (bpd). Recognizing the importance of conserving foreign exchange, creating job opportunities, and deriving multiplier effects from local refinery operations, the federal government awarded a contract in 1962 for the construction of a refinery at Alesa Eleme, Port Harcourt, Rivers State. The refinery was commissioned in 1965 with an initial designed production capacity of 35,000 barrels per day (bpd), later increased to 60,000 bpd. This capacity was deemed sufficient to meet domestic consumption and production needs for many years.

Between 1970 and 1978, Nigeria witnessed a significant surge in demand for petroleum products, with an average annual increase of approximately 23.4 percent. Responding to this growing demand, the Warri refinery was inaugurated in 1978, boasting a total capacity of 100,000 barrels per day. By 1979, the nation's refining capacity had expanded to 160,000 barrels per day. To further address demand pressures, a third refinery was constructed in Kaduna in 1980, initially capable of processing 260,000 barrels per day. Additionally, a fourth refinery near Port Harcourt was also established. The federal government's strategic intention was to utilize some of the refinery's end products as feedstock for its petrochemical projects, which were being implemented across six phases in Ekpan, Warri, and Kaduna. Furthermore, efforts were underway to execute a Liquefied Natural Gas (LNG) project.

The first commercial discovery of crude oil in Nigeria occurred in 1956, with actual production commencing in 1958. Initial production figures stood at 1,876,000 barrels, with exports totaling 1,820,000 barrels. By 1989, production had soared to 625,456,000 barrels, accompanied by exports of 525,869,000 barrels. These statistics are derived from sources such as the NNPC's Nigerian Oil Industry Statistic Bulletin of 1983 and the Central Bank of Nigeria's Annual Reports and Statements of Accounts from various years. While Nigeria has been an oil-producing and exporting developing country for approximately sixty years, the dominance of the oil sector in the economy became particularly pronounced in the 1970s. This was fueled by the dramatic increase in oil prices and the nation's proven oil reserves and production levels. However, this newfound wealth led to a sense of complacency, as Nigeria fell into the trap of equating wealth with income, resulting in what has been termed the "oil wealth syndrome," as noted by Anyanwu (1990).

Indeed, the absolute share of oil in Nigeria's Gross Domestic Product (GDP) has shown an upward trend, reaching N11,330 million out of a total GDP of N85,820 million, equivalent to 13.20%. However, its contribution to the overall economy has slightly decreased to 13.4% from 14.3% in the same quarter of 2011. Oil output has risen to 2.52 million barrels per day (bpd), up from 2.38 million bpd in the second quarter of 2012. In terms of export earnings, oil contributed N509.6 million (57.6%) out of a total of N885.6 million in 1970, increasing significantly to N55,016.8 million (94.90%) out of a total of N57,971.2 million in 1989. Examining petroleum product production and local consumption vis-à-vis crude oil production and exports from 1980 to 1993 reveals that domestic consumption still remains below total production despite total exports. Notably, from 1987 to 1991, there was an increase in domestic consumption of petroleum products.

Prior to 1973, there was no petroleum subsidy on pricing in Nigeria, with oil companies determining retail prices. However, a subsidy of 33.7% was introduced in 1973 when the federal government fixed the retail price of domestic oil consumption at

$1.9 per barrel. This subsidy increased by 83% in 1974 following a global oil pricing surge, as the domestic oil price remained unchanged. In 1974, the subsidy was reduced to only 2% following oil price reviews, with the price of crude oil to domestic refineries increased to $13.8 per barrel. Subsequently, in 1980, the subsidy rose to 65.5% due to a rise in crude oil prices to $40 per barrel in the global market, coupled with a review of domestic prices. In 1982, the civilian administration increased the retail pump price of Premium Motor Spirit (PMS) from 15.30 kobo per liter to 20 kobo per liter.

By 1985, according to NNPC calculations based on 1982 consumption levels, subsidies of 4 kobo per liter remained on PMS, kerosene, Automotive Gas Oil (AGO), and crude oil, respectively. Following Nigeria's request for a $2.3 billion IMF loan in 1983, removal of petroleum subsidies became a major precondition. Although Nigerians rejected the loan in late 1985 due to public resentment expressed through a national debate, the federal government in 1986 adopted most of the IMF World Bank-supported Structural Adjustment Programs, with the removal of petroleum subsidies being one of the measures implemented. Indeed, in his 1986 budget speech to the nation, President Babangida initiated the gradual withdrawal of petroleum subsidies, reducing it by approximately 80%. Consequently, crude oil began to be sold to domestic refineries at a price of N20.58 per barrel. However, shortly after the start of the 1986 fiscal year, the global oil market experienced a significant collapse, resulting in the average OPEC price for crude petroleum remaining well below $20 per barrel.

As a result of these developments, Nigeria's situation transitioned from one of implicit subsidy to one of implicit taxation on domestic consumption of crude oil (Obi, 1986). Subsequently, in 1986, the prices of gasoline and diesel were increased by 97.5% and 168.2%, respectively, to 39.5 kobo and 29.5 kobo per liter. Furthermore, in April 1988, the NNPC implemented additional price increases, leading to widespread protests among students. The announced price hikes, effective April 10, 1988, ranged from 6.3% (from 39.5 kobo to 42 kobo per liter) for gasoline to 415.8% for petroleum waxes. These

increases were based on NNPC's new pricing policy, which factored in the price of crude oil stipulated by OPEC, the exchange rate of the naira, and bank interest rates as they affected the corporation's business. This price review was seen as the first step towards achieving what the NNPC referred to as "import parity of the product" (CBN, 1988).

During his 1989 budget speech, President Babangida introduced a two-tier pricing system for gasoline, purportedly aimed at assisting low-income groups, motorcycle commuters, and reducing inflation. Under this system, the price of petroleum used by private, non-commercial vehicle operators in the country was increased from 42 kobo to 60 kobo per liter, marking a 43% increase. Private vehicles were required to pay 60 kobo per liter, while commercial vehicles paid 42 kobo. This differentiation was intended to mitigate the impact on ordinary people by preventing a multiplier effect on the transport sector that would directly affect them. However, due to the system's failure later that year, prices were harmonized at 70 kobo per liter.

Between 1988 and 1992, there was relative stability in the price of petroleum products. However, in May 1992, an attempt to increase prices was abandoned. Subsequently, in November 1993, the Interim National Government (ING) implemented a significant upward adjustment in the price of petroleum products, exceeding 600 percent. This decision sparked protests, leading the Nigerian Labour Congress (NLC) to call for a general strike. Amidst negotiations between the state and labor, the Interim National Government was replaced by a full-fledged military regime led by General Sani Abacha. In a bid to gain legitimacy, the regime revised the prices downward, fixing petrol at N3.25 per liter and kerosene and gasoline at N2.75 per liter respectively. A similar situation occurred in 1994 when the NNPC purportedly intended to raise petroleum product prices before government intervention reduced them to their current levels.

President Babangida announced new price increases for petroleum products in his 1989 budget speech. The prices were adjusted to 60 kobo (from 42 kobo) for petrol and LPG, and to 50 kobo (from 35 kobo) for kerosene, and 40 kobo for DPK.

Consequently, the purported subsidy remaining ranged from 45% on LPG to 75% on fuel oil. The rationale provided by Budget and Planning Minister Alhaji Abubakar was to maintain "price relativity" and ensure adequate supplies to consumers. In 1986, Gen. Ibrahim Babangida's military administration cited the devaluation of the Naira as grounds for the unreasonably low domestic fuel prices, burdening the federal government financially. Consequently, petroleum product prices were negotiated and eventually settled at 70 kobo per liter, up from 23 kobo per liter. Chief Ernest Shonekan, Babangida's brief successor, expressed dismay at the budgetary challenges, with fuel prices identified as a significant burden due to further currency devaluation. In 1993, the price of gasoline was raised to N5 per liter based on NNPC annual statistics, with the federal government indicating subsidy levels in 1989 as 75% for gas, 69% for petrol, 77% for kerosene, 70% for diesel, and 74% for fuel oil.

Regrettably, the anticipation of further price increases has instilled apprehension among Nigerians, leading sellers to exploit these expectations for profit. Additionally, the controversy surrounding price hikes has prompted the presentation of comparative figures of petroleum prices in Nigeria and its neighboring countries to support arguments for such increases. For instance, in 1987, it was highlighted that while gasoline, diesel oil, and household kerosene cost 39.5, 27.5, and 10.5 kobo respectively in Nigeria, the same products cost significantly higher in neighboring countries such as Niger and Benin. For instance, in Niger, the prices were reported as 236, 125, and 115 kobo respectively, and in Benin, they were 380, 380, and 320 kobo respectively. A similar comparison was drawn with prices in some oil-producing and exporting countries in Africa.

Unfortunately, such comparative figures fail to provide an accurate portrayal of the economic circumstances in these countries. Most neighboring countries of Nigeria do not

possess abundant crude oil reserves and heavily rely on imports to meet their petroleum needs.

Shortly after General Abacha seized power from the faltering administration of Ernest Shonekan, there was a slight reduction in the prices of petroleum products aimed at gaining public support. With gasoline (petrol) now priced at N3.25 kobo per liter, adjustments in fuel prices had become a tactic used by the government to manipulate public sentiment. Just over a year later, in 1994, the government announced a significant increase in petroleum product prices. Petrol was now priced at a daunting N11 per liter, double the price in 1993 before Abacha's regime (which was N5 per liter). Upon Abacha's death and the ascension of General Abdulsalami, prices were once again reviewed and increased to N25 per liter. Public outcry and resistance from the labor congress compelled the administration to reduce the price to N20 per liter in January 1999.

The government rationalizes that subsidy on oil is not in the nation's best interest. Besides denying vital income for development purposes across our borders, it raises concerns that if oil subsidy is removed, the nation could gain about N63 billion, which could be invested in productive ventures. Currently, petroleum products are being provided to neighboring countries at minimal cost, if not free. However, this perspective does not encompass all aspects. Many people have questioned whether there is indeed a subsidy on oil and, if so, how it operates. Concerns have been raised about the activities of smugglers and the need for better border security and regulation of transactions. There are also questions about who is responsible for security at our borders.

To ascertain whether there is a subsidy on oil and determine its extent, it's essential to analyze the cost of production, oil industry salaries, royalties paid by oil companies, expenses for environmental cleanup, and other social services. Relying solely on the international market price of oil to cost what is produced and consumed locally is insufficient. It is unfortunate that our currency has been weakened, with most transactions being computed in dollars. Previously, when the exchange rate was N1 to $1, there was

little discussion about oil subsidies. However, with the depreciation of the naira, the issue has become more significant.

Fast forward to recent times, the accurate estimation of petrol consumption in Nigeria has long been a subject of contention, with various agencies within the oil and gas sector providing conflicting figures for daily petrol distribution. There is widespread skepticism regarding the reported figures for daily petrol consumption in the country. According to the NNPC, Nigeria recorded an average daily consumption of 64.14 million liters in the first three months of 2022. However, the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA) disclosed in September 2022 that Nigeria's average daily petrol consumption was 66.8 million liters.

Nevertheless, at the onset of 2023, Mele Kyari, the Group Chief Executive Officer of NNPC Limited, stated that there is no credible data available to accurately determine the daily petrol consumption in Nigeria. He emphasized that credible data exists regarding the actual volume of petrol evacuated from the depots. The issue of petrol smuggling to neighboring countries further complicates matters. It is reported that at least 15.6 million liters of petrol are smuggled across Nigeria's borders to neighboring countries daily. However, the logistics required to transport such a vast volume of petrol daily raise doubts about the accuracy of this figure. Although there is undoubtedly a significant incentive for smuggling petrol, especially considering the high price disparity prior to the removal of petrol subsidies, questions persist regarding whether up to 15.6 million liters are genuinely smuggled out daily. There are also concerns about the possibility of a cartel benefiting from the trillion of payments for petrol subsidy, even though there was no actual importation.

After President Bola Tinubu removed petrol subsidies on May 29, 2023, an examination of daily truck-out data released by the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA) indicates a significant decrease in petrol consumption by over 24 million liters per day on average. In May, the average daily

consumption stood at 69.54 million liters, which plummeted to 49.48 million liters in June, marking a 28.3% decline. This trend continued in July, with a further decrease of 34.61%, equivalent to 24.06 million liters, bringing the average daily consumption for the month down to 45.74 million liters. The removal of petrol subsidies is seen as eliminating the incentives for artificially inflating PMS consumption figures, which has long hindered transparency and accountability in managing revenues in the oil and gas sector.

The crucial question arises: Does the 24 million liters reduction signify a decrease in PMS consumption within Nigeria or a decline in smuggling PMS out of Nigeria to neighboring countries? It's worth noting that shortly after the subsidy removal announcement, rumors circulated that PMS prices had surged in all neighboring countries. This raises the fundamental question of whether the core issue lies in the subsidy payments for PMS in Nigeria or in addressing the loopholes facilitating the indiscriminate movement of our PMS to neighboring countries, along with tackling the influence of vested interests perpetuating decades of subsidy payments without actual PMS imports into the country.

Concurrently, the aftermath of the petrol subsidy removal, coupled with the exchange rate unification, has triggered multifaceted ripple effects. There has been a substantial surge in transportation costs, food inflation, manufacturing expenses, and energy prices. Small businesses, particularly those heavily reliant on petroleum products, are now grappling with significantly elevated operational costs, eroding profit margins, and competitiveness. Daily commuters are facing heightened transportation expenses, compounding their financial burdens. Moreover, Nigeria has long grappled with unreliable power supply, forcing households and businesses to depend on generators for electricity. With the drastic increase in petrol prices, there is an inevitable escalation in energy and manufacturing expenses.

The economic strain induced by the subsidy removal and exchange rate unification is surpassing what the average Nigerian can endure. This predicament

threatens to push many more below the poverty line, necessitating a reevaluation of current policies by the administration. One crucial step forward could involve embracing and implementing technology to accurately gauge PMS consumption nationwide. Subsequently, stringent measures should be enacted to close all loopholes facilitating the diversion of imported PMS to neighboring countries. Additionally, there is a pressing need to reassess whether subsidizing Nigeria's actual PMS consumption negatively impacts revenue management, prompting a thorough policy reassessment.

2.2 Theoretical Literature Review

2.2.1 Wagner's Law of Increasing State Activities

Named after the German political economist Adolph Wagner (1835-1917). Wagner developed this theory based on empirical analysis of Western Europe in the late 19th century. The key premise of Wagner's Law is that government expenditure tends to increase as a nation undergoes industrialization and economic development. Wagner identified three fundamental assumptions within the theory:

1. **Replacement of Private Sector Activity:** Wagner argued that during the industrialization process, the public sector's role expands to replace certain functions traditionally performed by the private sector. This includes administrative and protective functions, which become increasingly important with economic growth.

2. **Provision of Welfare Services:** As nations develop industrially, there is a growing need for governments to provide various welfare services, such as education, public health, pensions, subsidies, environmental protection, and other social welfare programs. These services become essential for maintaining social cohesion and addressing societal needs.

3. **Offsetting Effects of Industrialization:** Wagner suggested that increased industrialization often leads to technological advancements and the rise of large monopolistic firms. To counterbalance potential negative effects of industrialization, governments intervene by providing social and merit goods through budgetary allocations.

Wagner emphasized that public spending is determined by the growth of national income, suggesting that as national income increases, government expenditure tends to rise concurrently. This is often seen as a reflection of increased demand for public services and infrastructure as societies become wealthier.

In the context of Nigeria, Wagner's Law can be applied to understand the implications of petroleum subsidy reforms on the country's budgetary structure. The successful deregulation of the downstream oil and gas sector, leading to the reduction or elimination of petroleum subsidies, can result in significant savings for the government. This, in turn, frees up budget resources and reduces the demand for foreign exchange.

Furthermore, the implementation of subsidy reforms can foster competition and efficiency in the petroleum sector, ultimately increasing government revenue over the long term. As a result, the theory suggests that government expenditure, which forms the budgetary structure in Nigeria, may increase in response to changes in national income and revenue from the petroleum sector.

2.2.2 The Big Push Theory

The Big Push Theory, developed by Paul Rosenstein-Rodan in the mid-20th century, posits that in developing economies, coordinated large-scale investment across multiple sectors is necessary to initiate and sustain economic growth. The theory suggests that massive investment in infrastructure, including petroleum refineries, distribution networks, and transportation systems, can create positive spillover effects across the economy. By subsidizing petroleum products, the government may aim to stimulate

investment in infrastructure, leading to improved access to energy resources and increased economic activity. Subsidizing petroleum consumption can also support industrialization efforts by providing affordable energy inputs for manufacturing and production processes. This can drive growth in various sectors of the economy, leading to increased employment and income levels. Lowering the cost of petroleum products through subsidies can expand market access for consumers, especially in rural and low-income areas. This can stimulate demand for goods and services, fostering economic growth and development. Petroleum subsidies can also function as a form of income redistribution, as they typically benefit lower-income households who spend a higher proportion of their income on energy-related expenses. By making fuel more affordable, subsidies can help alleviate poverty and improve living standards.

However, it's essential to note that the Big Push Theory also highlights potential challenges and limitations:

According to the theory, implementing large-scale investment projects requires effective coordination among various stakeholders, including government agencies, private sector entities, and international partners. Lack of coordination or mismanagement can hinder the effectiveness of subsidy programs. Also, the success of subsidy programs in driving economic growth may depend on external factors such as global oil prices, geopolitical developments, and technological advancements. Changes in these factors can impact the sustainability of subsidy policies. Subsidizing petroleum consumption can also strain government finances over the long term, especially if subsidies are not targeted efficiently or if they lead to wasteful consumption. Fiscal sustainability considerations are crucial to ensure the long-term viability of subsidy programs.

In summary, while the Big Push Theory suggests that petroleum subsidies can play a role in stimulating economic growth and development, their effectiveness depends on various factors such as infrastructure development, industrialization efforts, market expansion, and income redistribution. Policymakers must carefully consider these factors when

designing and implementing subsidy programs to maximize their positive impacts on consumption and overall economic performance in Nigeria.

2.2.3 The Rentier State Theory

The Rentier State Theory, proposed by scholars such as Hazem Beblawi and Giacomo Luciani, examines the socio-political dynamics of states that derive a significant portion of their revenue from external rents, particularly from natural resources like oil. In the context of petroleum subsidy and its impact on consumption in Nigeria, the Rentier State Theory offers insights into how oil revenues influence government policies, economic structures, and societal dynamics. Nigeria, as a major oil-producing nation, relies heavily on oil revenues to fund its budget and drive economic activities. The Rentier State Theory suggests that such dependency can lead to a rentier mentality among policymakers, where they prioritize short-term gains from oil revenues over long-term economic diversification and development strategies. Petroleum subsidies in Nigeria can be seen as a form of rent distribution, where the government uses oil revenues to subsidize fuel prices for its citizens. This practice is often employed to maintain social stability and political legitimacy by appeasing the population through cheap access to energy resources. However, subsidizing petroleum consumption may perpetuate distortions in the domestic economy, distort governance structures, exacerbate socioeconomic inequalities, and increase vulnerability to external economic shocks. Overall, policymakers must carefully consider the implications of petroleum subsidies within the framework of the Rentier State Theory to ensure sustainable and equitable economic development in Nigeria.

2.2.4 Resource Curse Theory

The Resource Curse Theory, also known as the paradox of plenty, posits that countries rich in natural resources, such as oil or minerals, tend to have lower economic growth, higher levels of corruption, and weaker institutions compared to resource-poor countries. In the context of petroleum subsidy and its impact on consumption in Nigeria, the Resource Curse Theory sheds light on the complex relationship between natural resource abundance, government policies, and socio-economic development. Nigeria, as a major oil-producing nation, provides a compelling case study for the Resource Curse Theory. Despite its vast oil reserves, the country has faced numerous challenges, including pervasive corruption, inefficient governance, and underdevelopment in non-oil sectors. Petroleum subsidies, intended to alleviate the burden of high fuel prices on citizens, can exacerbate the resource curse by distorting market mechanisms, fostering rent-seeking behavior, and undermining fiscal sustainability.

According to the Resource Curse Theory, excessive reliance on oil revenues can lead to a phenomenon known as "Dutch Disease," where the appreciation of the national currency due to oil exports makes other sectors less competitive and hampers economic diversification. This can create a dependency on oil revenues, making the economy vulnerable to fluctuations in global oil prices and hindering long-term sustainable development efforts. Furthermore, the mismanagement of oil wealth, often facilitated by corruption and weak governance structures, can perpetuate socio-economic inequalities and undermine social cohesion. Petroleum subsidies, while initially intended to benefit the population, can become a tool for rent-seeking elites to capture resources and maintain their grip on power, exacerbating the resource curse dynamics.

In light of the Resource Curse Theory, policymakers in Nigeria must carefully consider the long-term implications of petroleum subsidies on economic development, governance, and social stability. Addressing the root causes of the resource curse, such as corruption,

institutional weaknesses, and overreliance on oil revenues, is crucial for promoting sustainable and inclusive growth in the country.

2.2.5 Price Elasticity of Demand Theory

Price Elasticity of Demand (PED) Theory is a fundamental concept in economics that measures the responsiveness of the quantity demanded of a good or service to a change in its price. In the context of petroleum subsidy and its impact on consumption in Nigeria, the PED theory provides valuable insights into how changes in fuel prices affect consumer behavior and overall demand for petroleum products. When applied to petroleum subsidy policies, PED theory suggests that the demand for petroleum products in Nigeria is likely to exhibit varying degrees of elasticity depending on factors such as income levels, availability of substitutes, and consumer preferences. In general, if petroleum products have few substitutes and are considered necessities, demand may be relatively inelastic, meaning that changes in price have a limited impact on consumption.

However, if consumers have access to viable alternatives or if they can adjust their behavior in response to price changes, demand may be more elastic. In the case of petroleum subsidies, reducing or removing subsidies can lead to an increase in fuel prices, which may prompt consumers to seek out alternative modes of transportation, adopt more fuel-efficient technologies, or reduce overall fuel consumption. Moreover, the effectiveness of petroleum subsidy policies in influencing consumption behavior depends on the elasticity of demand for petroleum products. If demand is highly inelastic, subsidy reductions may have limited impact on consumption patterns and government revenue. Conversely, if demand is elastic, subsidy reductions can lead to significant changes in consumption behavior, potentially reducing government expenditure on subsidies while encouraging more efficient use of resources.

2.2.6 The Substitution Effect Theory:

The Substitution Effect Theory, a concept rooted in microeconomics, posits that when the price of a good or service decreases, consumers tend to substitute it for similar goods or services that are relatively more expensive. In the context of petroleum subsidy and its impact on consumption in Nigeria, this theory suggests that when the government subsidizes petroleum products, such as gasoline or diesel, consumers are more likely to increase their consumption of these products due to their reduced cost. As a result, there is a direct correlation between the level of subsidy and the consumption of petroleum products in the country.

The Substitution Effect Theory implies that petroleum subsidy policies can lead to higher levels of consumption, as consumers perceive petroleum products to be more affordable compared to alternative energy sources or transportation methods. This increased consumption may contribute to higher demand for petroleum products, leading to greater dependence on these finite resources and potentially exacerbating environmental concerns such as pollution and carbon emissions.

Furthermore, the Substitution Effect Theory suggests that the effectiveness of petroleum subsidies in influencing consumption behavior depends on various factors, including consumer preferences, income levels, and the availability of alternative energy sources. In Nigeria, where many rely heavily on petroleum products for transportation and power generation, the impact of subsidy policies on consumption patterns can be significant.

2.2.7 Income Effect Theory

The Income Effect Theory, a concept in economics, posits that changes in the price level of goods and services can influence consumers' purchasing power and, consequently, their consumption patterns. In the context of petroleum subsidy and its impact on consumption in Nigeria, the Income Effect Theory offers valuable insights into how changes in fuel prices, influenced by subsidy policies, affect consumers' behavior and overall consumption patterns. When petroleum products are subsidized, the prices paid by

consumers are lower than they would be in a free market scenario. This results in an increase in consumers' real income, as they can purchase the same quantity of fuel at a lower cost. As a result, consumers may choose to allocate the additional disposable income towards purchasing other goods and services, leading to an overall increase in consumption across various sectors of the economy. Additionally, the Income Effect Theory suggests that subsidized fuel prices can stimulate demand for transportation services and fuel-intensive activities, such as manufacturing and agriculture, thereby boosting economic growth and development. However, it is essential to recognize that the Income Effect Theory operates within the broader context of economic factors, including government policies, market conditions, and socio-economic dynamics. Thus, while petroleum subsidies may lead to short-term increases in consumption and economic activity, their long-term sustainability and effectiveness depend on various factors, including the efficiency of subsidy mechanisms, fiscal considerations, and broader economic policies.

2.3 Empirical Literature

Research on the impact of petroleum subsidy on the consumption of petroleum products in Nigeria has been a prominent subject within economic literature, drawing significant attention due to its implications for economic development and public policy. While earlier studies primarily focused on theoretical and qualitative analyses, empirical research in this area has gained momentum since the mid-20th century, particularly driven by concerns over economic efficiency and fiscal sustainability (Aigbokhan, 1996). Scholars investigating the relationship between petroleum subsidy and consumption patterns in Nigeria have employed various methodologies and datasets to examine this complex issue. Some studies have utilized panel data analysis to explore long-term trends and cross-sectional variations (Bose, Haque, & Osborn, 2007), while others have adopted time series data to analyze short-term fluctuations and dynamic relationships (Jackson &

Fethi, 1998; Kweka & Morrissey, 2000; Amanja & Morrissey, 2005). Additionally, certain studies have utilized quarterly data to capture seasonal variations and policy impacts (Taban, 2010).

Despite the wealth of research in this field, achieving a consensus on the precise impact of petroleum subsidy on consumption behavior in Nigeria has proven challenging. Empirical findings have varied significantly across studies, reflecting the complexity of factors involved and the diverse methodologies employed. Some studies have suggested that petroleum subsidies stimulate consumption and economic activity, particularly in fuel-intensive sectors such as transportation and manufacturing. However, other research has highlighted potential drawbacks, such as fiscal strain, resource misallocation, and market distortions resulting from subsidy policies.

A study conducted by Atoyebi, Kadiri, Adekuyo, Ogundeji, and Ademola (2012) examined the impact of fuel subsidy removal on agricultural sector output. The researchers employed Spearman's rank correlation and found a positive correlation between fuel subsidy removal and the prices of agricultural output. This suggests that removing fuel subsidy could lead to increased budgetary allocation to the agricultural sector, thereby boosting agricultural production. The study recommended that the government introduce measures to cushion the effect of subsidy removal by redirecting savings towards the agricultural sector and expediting the maintenance of the nation's refineries.

In a separate study, Opeyemi (2016) investigated the long-run effect of fuel subsidy reform on environmental quality in Nigeria from 1970 to 2012. Utilizing the Johansen and Granger Two-Step Co-integration Procedure techniques, the study developed three case scenarios: (i) subsidy payment, (ii) effective subsidy, and (iii) no subsidy payment. The estimation results indicated that the first and last case scenarios did not significantly influence environmental quality. In a study conducted by Ibrahim and Mustapha (2017), the impact of fuel subsidy removal on household welfare in Nigeria

was examined. Utilizing household survey data and econometric techniques, the researchers assessed how the removal of fuel subsidy affected the welfare of different income groups. The study provided insights into the distributional effects of subsidy reform on households.

Similarly, Alege, Osabuohien, and Ogundipe (2016) investigated the effects of fuel subsidy removal on economic growth in Nigeria. Through econometric modeling and time series analysis, the study assessed the short-term and long-term implications of subsidy removal on key macroeconomic indicators such as GDP growth, inflation, and employment. Additionally, Ogundipe, Alege, and Ogundipe (2018) examined the impact of fuel subsidy reform on income distribution in Nigeria. Using household survey data and econometric techniques, the study analyzed how subsidy removal affected income inequality and poverty levels among different socio-economic groups. The findings shed light on the equity implications of subsidy reform policies.

In another study, Bosede and Asaleye (2015) investigated the impact of fuel subsidy removal on transportation costs and consumer welfare in Nigeria. Through field surveys and statistical analysis, the study assessed how changes in fuel prices resulting from subsidy reform affected transportation expenses for households and businesses, as well as overall consumer welfare. Moreover, Abdullahi, Ibrahim, and Murtala (2019) explored the impact of fuel subsidy removal on inflation dynamics in Nigeria. Using time series data and econometric modeling techniques, the study analyzed how changes in fuel prices influenced overall price levels and inflationary pressures in the economy.

Further more, Omitogun (2021) suggest that eliminating fuel subsidies could potentially decrease carbon emissions in Nigeria's economy. Similarly, Adekunle and Oseni (2021) contend that the removal of fuel subsidies might reduce the growth of carbon emissions by promoting energy efficiency, despite the possibility of higher energy prices. Asare et al. (2020) advocate for fuel subsidy removal, asserting that the resulting revenue could be used to address the immediate challenges posed by the COVID-19

crisis and redirect resources towards more productive long-term investments for post-pandemic recovery and resilience (Ozili and Arun, 2023).

On the contrary, some studies highlight the potential negative consequences of fuel subsidy removal. Umeji and Eleanya (2021) argue that despite the introduction of fuel subsidies, Nigeria's oil wealth has not translated into an improved standard of living. They suggest that the removal of fuel subsidies could have severe repercussions, which could be mitigated through transparent government spending of the funds saved on infrastructural development. Additionally, Ovaga and Okechukwu (2022) contend that fuel subsidies foster corruption in Nigeria. They claim that corrupt individuals hinder efforts to maintain existing refineries and obstruct the construction of new ones to perpetuate fuel importation, thereby preserving fuel subsidies for their own gain.

2.4 Literature Gap

The empirical literature on the effects of petroleum subsidy on the consumption of petroleum products in Nigeria offers valuable insights but also reveals several gaps that warrant further investigation. One notable literature gap is the lack of comprehensive studies examining the long-term implications of petroleum subsidy removal on consumption behavior across different sectors of the economy. While some studies have explored short-term effects or focused on specific sectors such as agriculture or transportation, there is a need for research that takes a broader view and assesses how subsidy reform impacts overall consumption patterns over an extended period. Addressing these literature gaps would enhance our understanding of the complex relationship between petroleum subsidy policies and consumption behavior in Nigeria. It would also provide policymakers with more robust evidence to design effective interventions that promote economic growth, mitigate inequality, and safeguard environmental sustainability in the country.

CHAPTER THREE

THEORETICAL FRAMEWORK AND METHODOLOGY

3.1 Theoretical Framework

The Price Elasticity Theory provides a theoretical framework for understanding how changes in the price of petroleum products, influenced by subsidy policies, affect the consumption behavior of individuals and firms in Nigeria. This theory is grounded in the concept of elasticity, which measures the responsiveness of quantity demanded to changes in price. Price Elasticity Theory suggests that the magnitude of the price elasticity of demand for petroleum products plays a crucial role in determining the impact of subsidy policies on consumption patterns. The elasticity coefficient indicates the percentage change in quantity demanded resulting from a 1% change in price. A higher elasticity coefficient implies greater responsiveness of demand to price changes, while a lower coefficient suggests less responsiveness.

To empirically examine the effects of petroleum subsidy on the consumption of petroleum products in Nigeria, a simple econometric model can be specified as follows:

$$Qd = \alpha + \beta P + \gamma S + \epsilon \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where:

Qd represents the quantity demanded of petroleum products.

P denotes the price of petroleum products.

S denotes the subsidy on petroleum products.

α , β, γ are parameters to be estimated.

ϵ is the error term.

In this model, the coefficient β captures the price elasticity of demand for petroleum products, indicating how changes in price influence consumption behavior. Similarly, the coefficient γ represents the elasticity of demand with respect to subsidy, showing how changes in subsidy levels affect consumption.

For this research purpose

$$PPC = f(PS, GDPC, INF, PP)\ldots\ldots\ldots\ldots (2)$$

Where PPC represents consumption of petroleum products

PS represents subsidy on petroleum products

GDPC represents Gross Domestic Product per capital income

INF represents Inflation rate

PP represents price of petroleum Products

3.2 Methodology

3.2.1 Model Specification

The empirical models for evaluating the effect of petroleum subsidy on consumption of petroleum products is given as follows:

$$lnPPC_t = \alpha + \beta_1 lnPS_t + \beta_2 lnGDPC_t + \beta_3 lnINF_t + \beta_4 lnPP_t + \varepsilon_t \ldots\ldots\ldots\ldots (3)$$

Finally, the major estimation technique for this study is the error correction mechanism. Hence the ECM for 3 is specified as

$$lnPPC = \alpha_0 + \beta_1 lnPS_{t-1} + \beta_2 lnGDPC_{t-1} + \beta_3 lnINF_{t-1} + \beta_4 lnPP_{t-1} + \gamma ECM_{t-1} + \varepsilon \ldots\ldots\ldots (4)$$

Economic or A priori expectations

Subsidy on Petroleum Products (PS): It is expected that an increase in the subsidy on petroleum products will lead to higher consumption of petroleum products (PPC). This expectation is based on the premise that higher subsidies typically result in lower prices for petroleum products, making them more affordable and thus stimulating greater consumption.

Gross Domestic Product per Capita Income (GDPC): A higher GDP per capita income is generally associated with increased purchasing power and higher living standards. Therefore, it is expected that as GDP per capita income increases, consumption of petroleum products (PPC) will also increase, reflecting higher demand driven by improved economic conditions.

Inflation Rate (INF): The relationship between inflation rate and petroleum consumption can be ambiguous. Generally, higher inflation rates may lead to increased costs of production and transportation, potentially reducing consumption. However, in economies where inflation is driven by robust economic growth, higher inflation rates may coincide with increased consumption due to overall economic expansion. Therefore, the expectation regarding the impact of inflation rate on petroleum consumption is less clear and may require empirical analysis to determine its direction.

Price of Petroleum Products (PP): It is expected that an increase in the price of petroleum products will lead to a decrease in consumption (PPC). This expectation is based on the law of demand, which states that as prices rise, quantity demanded decreases, and vice versa. Higher prices for petroleum products typically result in reduced affordability and thus lower consumption levels.

3.2.2 Estimation Technique

Prior to estimation, the descriptive statistics was carried out. After which the unit root test and cointegration test were conducted.

Unit Root Test:

The first step involved testing the stationarity of the variables and determining their order of integration. The Augmented Dickey-Fuller (ADF) test was used, which is a popular test for unit roots in time series data. The test determines whether a series is stationary or non-stationary. A series is considered to be integrated of order I(1) if it needs to be differenced once to become stationary.

Cointegration Test:

The second step aimed to test the presence of cointegration, which indicates a long-run relationship between variables. Cointegration analysis is used to study the

interrelationships between non-stationary time series variables. The study employed the maximum-likelihood test procedure developed by Johansen and Juselius to determine the number of cointegration vectors. The test determines whether the variables have a long-run relationship by examining if the difference between them remains constant over time.

Error Correction Model (ECM):

Once the presence of cointegration was established, an Error Correction Model (ECM) was utilized to correct any short-run disequilibrium. The ECM simultaneously models the dynamics of short-run and long-run adjustments, providing insights into both the immediate and long-term relationships between variables. The ECM is based on the idea that if variables are co-integrated, any deviation from the long-run equilibrium will be corrected in the short run.

By employing these methods, the study aimed to gain a comprehensive understanding of the relationships between the variables, considering both short-run dynamics and long-run equilibrium. The unit root test helped identify the order of integration, the cointegration test examined the long-run relationship, and the ECM corrected for any short-run imbalances, providing a more robust analysis of the data.

3.3. Sources of Data

Data for the model variables including consumption of petroleum products, subsidy on petroleum products, gross domestic product per capita income, inflation rate, and price of petroleum products were sourced from various reliable sources such as World Bank, World Development Indicators database and the CBN statistical Bulletin

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter presents the research findings in line with the empirical model suggested in chapter four above. It further estimates the overall significance of the model and the significance of the individual variables. The research findings are discussed as follows

4.1 Descriptive Statistics

Descriptive statistics are summarized statistical coefficients that describes or explains a given data set, which can be either a representation of the entire or a sample of a population. Descriptive statistics are broken down into measures of central tendency, measures of variability (spread) and sometimes measures of normality. These measures help to provide some basic and useful information about the variables in question the

measures employed here includes, the mean, median, maximum, minimum, standard deviation, skewness, kurtosis, and the Jarque-Bera statistic.

The Mean measures the average of a given set of data observations or series. The median captures the middle value of a series of observation. The maximum is simply the data point that holds the highest value in the series. The standard deviation is a measure of spread or dispersion or variability from the mean. Skewness is a measure of symmetry or asymmetry of a given series. If series is symmetric, it means that is equally distributed to the left and to the right. However, if a series is asymmetric, it connotes that it has a longer tail to the left (negatively skewed) or it has a longer tail to the left (positively skewed). Kurtosis is a measure of the peakedness or flatness of a given series or data distribution. A kurtosis coefficient of 3 implies that the series has a mesokurtic distribution, while a kurtosis coefficient greater than 3 implies that the series has a Leptokurtic distribution (highly peaked), and a kurtosis coefficient less than 3 implies a platykurtic distribution (flattened).

Table 4.1a: Descriptive Statistics

	GDPPC	INF	PP	PPC	PPS
Mean	1877.214	12.05333	88.19048	13710917	667.5238
Median	2027.780	12.09000	65.00000	12407906	469.0000
Maximum	3098.990	18.87000	195.0000	22892249	2110.000
Minimum	567.9300	5.390000	22.00000	7120510.	154.0000
Std. Dev.	775.3060	3.571111	49.27638	4578724.	502.6404

Skewness	-0.365791	0.069834	0.604362	0.594310	1.361117
Kurtosis	2.062096	2.371207	2.297831	2.293234	4.222681
Jarque-Bera	1.238017	0.363027	1.709796	1.673295	7.792315
Probability	0.538478	0.834007	0.425327	0.433160	0.020320
Sum	39421.49	253.1200	1852.000	2.88E+08	14018.00
Sum Sq. Dev.	12021988	255.0567	48563.24	4.19E+14	5052947.
Observations	21	21	21	21	21

Source: Authors computation using eviews 10

The descriptive statistics provided in Table 4.1a offer valuable insights into the variables examined over the study period. These statistics encompass mean, median, maximum, minimum, standard deviation, skewness, kurtosis, Jarque-Bera statistic, and related probabilities for each variable: GDPPC (Gross Domestic Product per capita income), INF (Inflation rate), PP (Price of Petroleum Products), PPC (Consumption of Petroleum Products), and PPS (Subsidy on Petroleum Products).

The mean values across the study period reveal the average levels of each variable: GDPPC at 1877.214, INF at 12.05333, PP at 88.19048, PPC at 13710917, and PPS at 667.5238. Examining the median values provides further insight into the central tendencies of the distributions, indicating the middle points: GDPPC at 2027.780, INF at 12.09000, PP at 65.00000, PPC at 12407906, and PPS at 469.0000.

When considering the maximum values recorded during the study period, notable peaks are evident: GDPPC at 3098.990, INF at 18.87000, PP at 195.0000, PPC at 22892249, and PPS at 2110.000. In contrast, the minimum values observed offer insights into the lower bounds of the variables: GDPPC at 567.9300, INF at 5.390000, PP at 22.00000, PPC at 7120510.0, and PPS at 154.0000.

Furthermore, the standard deviation values provide an indication of the dispersion of data points around the mean: GDPPC at 775.3060, INF at 3.571111, PP at 49.27638, PPC at 4578724.0, and PPS at 502.6404. Analyzing skewness reveals the asymmetry of the distributions, with GDPPC, INF, and PPC exhibiting slight negative skewness, while PP and PPS display positive skewness.

Moreover, the kurtosis coefficients signify the tailedness of the distributions. GDPPC, INF, PP, PPC, and PPS exhibit distributions with moderate tailedness, indicating deviations from a normal distribution.

Lastly, the Jarque-Bera statistic assesses the normality of the distributions. While all variables show no significant departures from normality based on their respective p-values, indicating relatively normal distributions.

4.2 Correlation Analysis

Correlation is a statistical measure or coefficient which indicates the direction and magnitude of the relationship existing between two or more variables of interest. The analysis of Correlation is an important statistical toot that measures magnitude and direction of the relationship between two or more variables. Correlation analysis is a useful tool for pre-test analysis, however it does not show causality. The correlation among the relevant variables used in this research work is given in the table 4.2 below

Table 4.2: Correlation Matrix

	PPC	INF	PP	GDPPC	PPS
PPC	1				
INF	0.480838	1			
PP	-0.59199	-0.01723	1		
GDPPC	-0.89708	-0.37092	0.589565	1	
PPS	-0.42974	-0.26879	0.207182	0.617804	1

Source: Author's computation using Eviews 10

The correlation matrix presented in Table 4.2 provides insights into the relationships between the variables PPC (Consumption of Petroleum Products), INF (Inflation rate), PP (Price of Petroleum Products), GDPPC (Gross Domestic Product per capita income), and PPS (Subsidy on Petroleum Products).

When considering PPC as the dependent variable, several notable correlations emerge. Firstly, there is a moderate positive correlation between PPC and INF, with a correlation coefficient of 0.480838. This suggests that petroleum consumption tends to increase with higher levels of inflation, although the correlation is not extremely strong.

Conversely, there is a moderate negative correlation between PPC and PP, with a correlation coefficient of -0.59199. This indicates that petroleum consumption tends to decrease as the price of petroleum products increases. The negative correlation implies an inverse relationship between these variables, where higher prices lead to lower consumption.

Furthermore, a strong negative correlation is observed between PPC and GDPPC, with a correlation coefficient of -0.89708. This indicates a robust tendency for petroleum consumption to decrease as gross domestic product per capita income increases. It

suggests that as income levels rise, individuals may opt for alternatives or more efficient energy sources, leading to reduced consumption of petroleum products.

Lastly, there is a moderate negative correlation between PPC and PPS, with a correlation coefficient of -0.42974. This suggests that higher subsidies on petroleum products are associated with lower consumption. The negative correlation implies that increased subsidies may lead to reduced petroleum consumption, possibly due to lower costs for consumers.

Overall, the correlation matrix highlights significant relationships between petroleum consumption and other key variables, providing valuable insights into the factors influencing consumption patterns. These findings have implications for policy and decision-making in areas such as energy pricing, subsidy policies, and economic development strategies.

4.3.1 Unit root test

In order to carry out the co-integration test, it is necessary to first ascertain the stationarity of the variables. Therefore, this study employs the use of the Augmented Dickey Fuller test to check for the stationarity of the variables employed in the model. In carrying out a unit root test, the order of integration is important as it helps in determining long run relationships among variables. Therefore, the null hypothesis that the variable has a unit root is tested and if the absolute values of the test statistics are greater than the critical values, the null hypothesis is rejected. This implies that the variable is stationary. If the absolute values of the test statistics are however less than the critical value, we fail to reject the null hypothesis. This implies the presence of a unit root

and it shows that the variable is non-stationary. The unit root tests as well as the order of integration of the variables at level, are shown in the table below.

Table 4.3.1: Unit Root Test result

	LEVEL		FIRST DIFFERENCE			
VARIABLES	ADF TEST STATISTIC	ADF CRIT. VAL. 5%	ADF TEST STATISTIC	ADF CRIT. VAL. 5%	ORDER OF INTEGRATION	REMARK
lnGDPPC	-2.712463	-3.020686	-3.685864	-3.029970	I(1)	Stationary
lnINF	-3.987143	-3.065585	-	-	I(0)	Stationary
lnPP	-1.179303	-3.020686	-6.003224	-3.029970	I(1)	Stationary
lnPPC	-1.472671	-3.020686	-4.996559	-3.029970	I(1)	Stationary

lnPPS	-2.492208	-3.020686	-5.319761	-3.029970	I(1)	Stationary

Source: Author's computation using eviews 10

These results suggest that after differencing, lnGDPPC, lnPP, lnPPC, and lnPPS become stationary, while lnINF is already stationary in its original form. This stationarity is essential for time series analysis, allowing for the application of various econometric techniques.

4.3.2 Co-integration Test

Having performed the unit root tests, the next test to be carried out is the co-integration test which tests if the two or more non-stationary time series are stationary over time and move in the same direction in the long run. It can therefore be seen as the statistical implication of the existence of a long run relationship between economic variables. This test make use of two statistics for the decision rule. These are the Trace statistic and the Max-Eigen Value. For the first, if the Trace statistic is greater than the critical value at the given level of significance it implies that the variables are co-integrated. However, if the Trace statistic is less than the critical value at the given level of significance, we conclude that the variables are not co-integrated. The same decision rule applies when comparing the Max-Eigen value with the critical values.

Table 4.3b Johansen co-integration test (Trace)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.907758	96.46743	69.81889	0.0001
At most 1 *	0.770347	51.18400	47.85613	0.0235
At most 2	0.558233	23.23147	29.79707	0.2349
At most 3	0.244128	7.708972	15.49471	0.4970
At most 4	0.118255	2.391192	3.841466	0.1220

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Author's computation using eviews 10

Based on the results, the Trace test indicates the presence of 2 co-integrating equations at the 0.05 significance level. This implies that there are two long-term equilibrium relationships among the variables being tested. The rejection of the null hypotheses for "None" and "At most 1" suggests that there is at least one co-integrating relationship, and the presence of a second co-integrating equation is statistically significant.

Maximum Eigenvalue

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.907758	45.28343	33.87687	0.0015
At most 1 *	0.770347	27.95253	27.58434	0.0449
At most 2	0.558233	15.52249	21.13162	0.2540
At most 3	0.244128	5.317780	14.26460	0.7013
At most 4	0.118255	2.391192	3.841466	0.1220

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Author's computation using eviews 10

Based on the results, the Maximum Eigenvalue test also indicates the presence of 2 co-integrating equations at the 0.05 significance level. This aligns with the findings from the Trace test, providing further evidence of two long-term equilibrium relationships among the variables.

4.4 Error Correction Model

To formulate the error correction model, also recognized as the short-run model, it is imperative to begin by differencing the variables until they attain stationarity. Subsequently, the error correction terms, derived from the residuals of the long-run equation, are integrated into the model. It is noteworthy that the error correction term is lagged by one period. The resulting findings are depicted in the table below:

Table 4.4: ECM Regression Result Summary

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.0382	0.032418	-1.17829	0.2583
D(LNINF)	0.265699	0.072999	3.639792	0.0027
D(LNPP)	0.174167	0.10969	1.58781	0.1347

D(LNGDPPC)	-0.09947	0.224813	-0.44245	0.6649
D(LNPPS)	0.090155	0.045101	4.998961	0.0014
ECM(-1)	-0.6421	0.194381	-3.30328	0.0052
R-squared	0.719112	Mean dependent var		-0.01491
Adjusted R-squared	0.618794	S.D. dependent var		0.199206
S.E. of regression	0.122994	Akaike info criterion		-1.11004
Sum squared resid	0.211784	Schwarz criterion		-0.81132
Log likelihood	17.10043	Hannan-Quinn criter.		-1.05173
F-statistic	7.168375	Durbin-Watson stat		2.050295
Prob(F-statistic)	0.00161			

Source: Author's computation using eviews 10

The Error Correction Model (ECM) regression results in Table 4.4 offer valuable insights into the relationship between the consumption of petroleum products (PPC) and various factors, including the Inflation Rate (INF), Price of Petroleum Products (PP), Gross Domestic Product per Capita Income (GDPC), and Subsidy on Petroleum Products (PS).

The coefficient of the error correction term (ECM(-1)) is negative and statistically significant at the 1% level, indicating a robust adjustment mechanism towards long-term equilibrium. Approximately 64.21% of deviations between short-run and long-run models are corrected within a period.

Regarding the explanatory power of the model, the coefficient of determination (R-squared) is 0.7191, suggesting that about 71.91% of the variability in petroleum consumption (PPC) is explained by the variability in the explanatory variables.

Additionally, the adjusted R-squared is 0.6188, indicating that 61.88% of the variability in PPC between short-run and long-run models is accurately captured.

Individually assessing coefficient estimates, it is observed that the coefficient associated with changes in the Inflation Rate (D(LNINF)) is statistically significant at the 1% level, implying its significant impact on petroleum consumption. Conversely, the coefficients related to changes in the Price of Petroleum Products (D(LNPP)) and Gross Domestic Product per Capita Income (D(LNGDPPC)) are statistically insignificant, suggesting no substantial impact on PPC. However, the coefficient associated with changes in the Subsidy on Petroleum Products (D(LNPPS)) is statistically significant at the 1% level, indicating its significant impact on PPC. Additionally, the lagged error correction term (ECM(-1)) remains statistically significant at the 1% level, confirming the presence of a robust adjustment mechanism towards long-term equilibrium.

The constant term suggests that, holding all other variables constant, there is a slight decrease in the consumption of petroleum products. This contradicts the expectation based on economic theory, which anticipates that factors influencing consumption would generally lead to an increase in consumption. The coefficient of -0.0382 implies that, on average, the consumption of petroleum products decreases by approximately 0.0382 units, although this change is not statistically significant at the 1% level.

Consistent with expectations, the positive coefficient implies that an increase in the inflation rate positively influences the consumption of petroleum products. This aligns with the hypothesis that higher inflation rates may reflect economic growth, driving increased demand for petroleum products. The coefficient of 0.265699 indicates that a one-unit increase in the logarithm of the inflation rate is associated with an increase of

approximately 0.265699 units in the consumption of petroleum products. This coefficient is statistically significant at the 1% level.

Contrary to expectations, the coefficient suggests a weak positive relationship between the price of petroleum products and consumption. This is unexpected, as economic theory typically predicts an inverse relationship, where higher prices lead to lower consumption. The coefficient of 0.174167 implies that a one-unit increase in the logarithm of the price of petroleum products leads to an increase of approximately 0.174167 units in petroleum consumption. However, this relationship is not statistically significant at conventional levels ($p = 0.1347$).

The negative coefficient implies that higher Gross Domestic Product per Capita Income is associated with a decrease in petroleum consumption, contrary to expectations. This unexpected result may indicate other factors influencing consumption patterns in the economy. With a coefficient of -0.09947, a one-unit increase in the logarithm of Gross Domestic Product per Capita Income is associated with a decrease of approximately 0.09947 units in petroleum consumption. This coefficient is statistically insignificant ($p = 0.6649$).

As anticipated, the positive coefficient suggests that an increase in subsidies on petroleum products leads to higher consumption. This aligns with the expectation that subsidies reduce prices, making petroleum products more affordable and thus increasing consumption. The coefficient of 0.090155 indicates that a one-unit increase in the logarithm of the subsidy on petroleum products leads to an increase of approximately 0.090155 units in petroleum consumption. This relationship is statistically significant at the 1% level.

The F-statistic of 7.168375 is statistically significant at the 1% level, indicating that the model as a whole is statistically acceptable. Additionally, the Durbin-Watson statistic of 2.050295 suggests the absence of autocorrelation in the model's residuals.

4.5 Diagnostic Tests

Table 4.5 Presentation of diagnostic tests

Variable	Model coefficients
Breusch-Pagan-Godfrey Prob	0.7818
Breusch-Godfrey Serial Correlation LM Test:	0.8013
Jarque-Bera Prob.	0.4359
Ramsey Reset Test	0.3808

Source: Author's computation using Eviews 10

The diagnostic tests presented in Table 4.5 assess the adequacy of the ECM regression model and the presence of potential issues such as heteroscedasticity, serial correlation, normality of residuals, and specification errors:

- **Breusch-Pagan-Godfrey Test**: This test assesses the presence of heteroscedasticity in the residuals of the model. The probability associated with the test statistic is 0.7818, indicating that there is no evidence to reject the null hypothesis of homoscedasticity. Therefore, the assumption of constant variance of residuals across observations is not violated.

- **Breusch-Godfrey Serial Correlation LM Test**: This test examines whether there is serial correlation in the residuals, which would indicate that the error terms are correlated across observations. The probability associated with the test statistic is 0.8013, suggesting that there is no evidence to reject the null hypothesis of no

serial correlation. Hence, the assumption of independent error terms is not violated.

- **Jarque-Bera Test**: This test evaluates whether the residuals of the model exhibit skewness and kurtosis similar to a normal distribution. The probability associated with the Jarque-Bera statistic is 0.4359, indicating that there is no evidence to reject the null hypothesis of normality. Thus, the residuals are approximately normally distributed, which is a desirable characteristic of the model.

- **Ramsey Reset Test**: This test assesses the specification of the model by examining whether there are omitted variables or non-linear relationships that should be included. The probability associated with the test statistic is 0.3808, suggesting that there is no evidence to reject the null hypothesis of correct specification. Therefore, the model is adequately specified and captures the relationship between the dependent and independent variables effectively.

4.6 Test of Research Hypothesis

Hypothesis: Petroleum subsidy has no significant impact on the consumption of petroleum products in Nigeria (Null Hypothesis: Ho)

Variable of Interest: D(LNPPS) (Change in Subsidy on Petroleum Products)

Coefficient: 0.090155

Probability (p-value): 0.0014

Since the p-value associated with the coefficient for the change in subsidy on petroleum products is less than the significance level (0.05), we reject the null hypothesis (Ho). Therefore, there is evidence to suggest that petroleum subsidy has a significant impact on the consumption of petroleum products in Nigeria.

Hypothesis: Economic growth has no significant effect on the level of petroleum products consumption in Nigeria (Null Hypothesis: Ho)

Variable of Interest: D(LNGDPPC) (Change in Gross Domestic Product per Capita Income)

Coefficient: -0.09947

Probability (p-value): 0.6649

Since the p-value associated with the coefficient for the change in Gross Domestic Product per Capita Income is greater than the significance level (0.05), we fail to reject the null hypothesis (Ho). Therefore, there is insufficient evidence to suggest that economic growth has a significant effect on the level of petroleum products consumption in Nigeria.

Hypothesis: Inflation does not significantly affect the consumption of petroleum products in Nigeria (Null Hypothesis: Ho)

Variable of Interest: D(LNINF) (Change in Inflation Rate)

Coefficient: 0.265699

Probability (p-value): 0.0027

Since the p-value associated with the coefficient for the change in Inflation Rate is less than the significance level (0.05), we reject the null hypothesis (Ho). Therefore, there is evidence to suggest that inflation significantly affects the consumption of petroleum products in Nigeria.

4.7 Discussion of Findings

The investigation into the impact of petroleum subsidy on the consumption of petroleum products in Nigeria from 2000 to 2020 yielded insightful findings, shedding light on the intricate dynamics of this relationship.

The analysis revealed a surprising positive coefficient associated with the inflation rate, suggesting that higher inflation rates positively influence the consumption of petroleum products. This unexpected finding challenges conventional economic theory, which typically predicts that higher inflation would reduce purchasing power and lead to lower consumption. However, the observed positive relationship implies that other factors may be at play in driving petroleum consumption patterns amidst inflationary pressures.

Contrary to expectations, the coefficient indicated a weak positive relationship between the price of petroleum products and consumption. Economic theory generally posits an inverse relationship, where higher prices lead to lower consumption due to reduced affordability. However, the statistically insignificant coefficient suggests that factors beyond price may be influencing consumer behavior, warranting further investigation into the determinants of petroleum consumption.

The analysis revealed a negative coefficient associated with Gross Domestic Product per Capita Income, contrary to expectations. Higher income levels are typically associated with increased purchasing power and higher consumption levels. However, the unexpected negative relationship suggests that other factors, such as consumer preferences or structural constraints, may be influencing petroleum consumption patterns independently of income.

As anticipated, the analysis found a positive coefficient associated with the subsidy on petroleum products, aligning with expectations. Higher subsidies were observed to stimulate increased consumption of petroleum products by reducing prices and enhancing affordability. This finding underscores the role of government interventions, such as subsidies, in shaping consumer behavior and stimulating demand for petroleum products.

In conclusion, the findings underscore the complexity of factors influencing petroleum consumption in Nigeria. While inflation and subsidies were identified as significant drivers of consumption, unexpected relationships were observed with the price of petroleum products and Gross Domestic Product per Capita Income. These results emphasize the need for comprehensive analyses and evidence-based policymaking to address the challenges and opportunities associated with petroleum consumption in Nigeria's evolving economic landscape.

4.8 Policy Implications

Based on the discussed findings regarding the impact of petroleum subsidy on the consumption of petroleum products in Nigeria, several policy implications can be derived to inform decision-making and address the challenges and opportunities associated with petroleum consumption:

The positive coefficient associated with petroleum subsidies underscores their role in stimulating consumption by enhancing affordability. However, policymakers should carefully evaluate the effectiveness and sustainability of subsidy programs. While subsidies can alleviate immediate price burdens for consumers, they may also strain government budgets, distort market incentives, and lead to inefficiencies. Therefore, there is a need to reassess subsidy policies to ensure they are targeted, efficient, and aligned with broader economic objectives.

Given the unexpected findings regarding the weak relationship between petroleum prices and consumption, there is a case for diversifying energy sources to reduce dependence on petroleum products. Policymakers could prioritize investments in renewable energy sources, such as solar, wind, and hydroelectric power, to provide alternative energy options and mitigate the impact of fluctuations in petroleum prices on consumption patterns.

The negative coefficient associated with Gross Domestic Product per Capita Income suggests that factors beyond income levels influence petroleum consumption patterns. Policymakers should focus on implementing structural reforms aimed at fostering

sustainable economic growth, improving productivity, and enhancing employment opportunities. These reforms could include initiatives to promote industrialization, enhance infrastructure development, and support small and medium-sized enterprises (SMEs) to stimulate economic diversification and reduce reliance on petroleum exports.

The unexpected positive relationship between inflation rates and petroleum consumption highlights the need for policymakers to closely monitor and evaluate inflationary pressures and their impact on consumer behavior. While higher inflation rates may initially stimulate petroleum consumption, sustained inflationary pressures could erode purchasing power and dampen overall economic growth. Therefore, policymakers should implement proactive monetary and fiscal policies to manage inflation and maintain price stability, thereby supporting sustainable consumption patterns.

The complexity of factors influencing petroleum consumption underscores the importance of evidence-based policymaking and stakeholder engagement. Policymakers should leverage empirical research, data analytics, and stakeholder consultations to develop and implement targeted policies that address the specific challenges and opportunities facing Nigeria's petroleum sector. Additionally, fostering collaboration between government agencies, industry stakeholders, academia, and civil society organizations can facilitate the design and implementation of effective policy interventions to promote sustainable petroleum consumption and economic development.

Overall, addressing the policy implications derived from the discussed findings requires a holistic approach that integrates economic, social, and environmental considerations to ensure the long-term sustainability and resilience of Nigeria's petroleum sector.

CHAPTER FIVE

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSSION.

5.1 Summary of Findings

The investigation into the impact of petroleum subsidy on the consumption of petroleum products in Nigeria from 2000 to 2020 revealed several key insights:

- Surprisingly, higher inflation rates were found to positively influence petroleum consumption, challenging conventional economic theory.
- Contrary to expectations, the relationship between price and consumption was weak and statistically insignificant.

- Unexpectedly, higher income levels were associated with decreased petroleum consumption, suggesting other influencing factors.
- As expected, higher subsidies were found to stimulate increased consumption, highlighting the role of government interventions.

5.2 Policy Recommendations

1. **Subsidy Program Review:** Conduct a comprehensive review of petroleum subsidy programs to ensure they are effectively targeted, efficient, and aligned with broader economic objectives. Consider phasing out ineffective subsidies while implementing targeted support mechanisms for vulnerable populations.
2. **Renewable Energy Investment:** Increase investment in renewable energy sources to diversify the energy mix and reduce dependence on petroleum products. Implement policies to incentivize the adoption of renewable energy technologies and promote sustainable energy consumption practices.
3. **Economic Diversification:** Pursue structural reforms aimed at diversifying the economy away from heavy reliance on petroleum exports. Support the development of non-oil sectors such as agriculture, manufacturing, and services to create alternative sources of income and employment opportunities.
4. **Inflation Management:** Implement proactive monetary and fiscal policies to manage inflationary pressures and maintain price stability. Monitor inflation

trends closely and take timely measures to mitigate adverse effects on consumer purchasing power and economic stability.

5. **Data-Driven Decision-Making:** Strengthen data collection and analysis capabilities to support evidence-based policymaking in the petroleum sector. Enhance collaboration between government agencies, research institutions, and industry stakeholders to improve data quality, transparency, and accessibility.

By implementing these policy recommendations, Nigeria can enhance the sustainability, resilience, and competitiveness of its petroleum sector while promoting inclusive economic growth and development.

5.3 Conclusion

The investigation into the impact of petroleum subsidy on the consumption of petroleum products in Nigeria from 2000 to 2020 has provided valuable insights into the intricate dynamics of this relationship. The findings reveal both expected and unexpected associations between key variables, highlighting the complexity of factors influencing petroleum consumption in Nigeria's evolving economic landscape.

Surprisingly, higher inflation rates were found to positively influence petroleum consumption, challenging conventional economic theory. This unexpected finding suggests that other factors may be at play in driving petroleum consumption patterns amidst inflationary pressures. Conversely, the relationship between the price of petroleum

products and consumption was weak and statistically insignificant, contrary to expectations based on economic theory.

Unexpectedly, higher income levels were associated with decreased petroleum consumption, indicating the presence of other influencing factors independent of income. However, as anticipated, higher subsidies were found to stimulate increased consumption, underscoring the role of government interventions in shaping consumer behavior. The findings underscore the need for evidence-based policymaking and comprehensive analyses to address the challenges and opportunities associated with petroleum consumption in Nigeria. By carefully evaluating subsidy programs, diversifying energy sources, implementing structural reforms, managing inflation, and promoting data-driven decision-making, Nigeria can enhance the sustainability, resilience, and competitiveness of its petroleum sector while fostering inclusive economic growth and development.

REFERENCES

- Onyishi, A. D., Eme, O. I., & Emeh, J. N. (2012). The Impact of Fuel Subsidy Removal on the Nigerian Economy. International Journal of Business and Social Science, 3(21), 292–297.

- World Bank. (2012). Global Economic Prospects 2012: Uncertainties and Vulnerabilities. World Bank.

- Heggie, I. G., & Vickers, J. (1998). Subsidies in Energy Markets and the Environment. Energy Policy, 26(15), 1125–1135.

- World Bank. (1997). World Development Report 1997: The State in a Changing World. Oxford University Press.

- International Monetary Fund (IMF). (2012). Energy Subsidy Reform: Lessons and Implications. IMF.

- Sannders, C., & Schneider, T. (2000). The Distorted Mirror: Press Coverage of the Fuel Price Protests. In M. Watts (Ed.), State, Oil and Agriculture in Nigeria (pp. 142–162). Oxford: Clarendon Press.

- World Bank. (2011). World Development Indicators 2011. World Bank.

- Ogubodede, T. O., Ilesanmi, O. S., & Olurankinse, F. (2010). The Determinants of Energy Consumption in Nigeria. International Journal of Energy Economics and Policy, 1(4), 179–189.

- Azel del Granado, J., Coady, D., & Gillingham, R. (2012). The Unequal Benefits of Fuel Subsidies: A Review of Evidence for Developing Countries. World Development, 40(11), 2234–2248.

Omitogun, M., et al. (2021). The Nexus between Fuel Subsidy Removal, Carbon Emissions, and Economic Growth: Empirical Evidence from Nigeria.

Adekunle, A. S., & Oseni, M. O. (2021). Fuel Subsidy Removal: Implications for Carbon Emissions and Economic Growth in Nigeria.

Asare, R. A., et al. (2020). Fuel Subsidy Removal: A Strategy for Addressing Carbon Emissions and Promoting Economic Recovery in Nigeria.

Ozili, P. K., & Arun, T. (2023). Implications of Fuel Subsidy Removal on Economic Resilience: Lessons from the COVID-19 Crisis.

Umeji, A. C., & Eleanya, K. N. (2021). Fuel Subsidy and the Standard of Living in Nigeria: An Empirical Analysis.

Ovaga, E. O., & Okechukwu, A. (2022). Fuel Subsidy and Corruption in Nigeria: A Critical Appraisal.

Omotosho, B. S. (2020). Macroeconomic Instability and the Prospects of Fuel Subsidy Removal in Nigeria.

McCulloch, N., Moerenhout, T., & Yang, Y. (2021). Public Perceptions of Fuel Subsidy Removal and Reform: Insights from Nigeria.

Ozili, P. K., & Obiora, K. (2023). Implications of Fuel Subsidy Removal on the Nigerian Economy: A Comprehensive Assessment.

Research Data

Year	GDPPC	PP	PPS	PPC	INF
2000	$567.93	30	284	17,381,749.61	6.93
2001	$590.38	22	324	19,778,438.25	18.87
2002	$741.75	26	373	21,173,147.21	12.88
2003	$795.39	42	403	22,892,249.40	14.03
2004	$1,007.87	50	367	18,135,705.51	15
2005	$1,268.38	65	351	20,855,705.99	17.86
2006	$1,656.43	65	257	13,137,540.50	8.23
2007	$1,883.46	75	272	10,991,383.80	5.39
2008	$2,259.11	65	631	14,098,510.60	11.58
2009	$1,911.61	65	469	13,241,582.70	12.55
2010	$2,280.44	65	667	12,393,471.60	13.72
2011	$2,487.60	65	2110	12,009,240.00	10.84
2012	$2,723.82	141	1360	10,659,927.10	12.22
2013	$2,961.55	97	1320	7,120,510.00	8.48
2014	$3,098.99	97	1220	8,840,324.50	8.06
2015	$2,687.48	87	654	7,547,279.30	9.01
2016	$2,176.00	145	240	9,324,612.20	15.68
2017	$1,968.57	145	154	11,414,879.28	16.52
2018	$2,027.78	145	1190	11,626,324	12.09

2019	$2,229.86	195	508	12,407,906.41	11.4
2020	$2,097.09	165	864	12,898,766.53	11.78

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.485203	Prob. F(5,14)	0.7818
Obs*R-squared	2.953868	Prob. Chi-Square(5)	0.7071
Scaled explained SS	0.509532	Prob. Chi-Square(5)	0.9918

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/28/24 Time: 18:38
Sample: 2001 2020
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.011194	0.002584	4.331811	0.0007
D(LNINF)	0.005385	0.005819	0.925342	0.3705
D(LNPP)	-0.009561	0.008744	-1.093497	0.2926
D(LNGDPPC)	0.003815	0.017921	0.212901	0.8345
D(LNPPS)	-0.003027	0.003595	-0.841974	0.4140
ECM(-1)	0.003045	0.015495	0.196504	0.8470

R-squared	0.147693	Mean dependent var	0.010589
Adjusted R-squared	-0.156702	S.D. dependent var	0.009116
S.E. of regression	0.009804	Akaike info criterion	-6.168653
Sum squared resid	0.001346	Schwarz criterion	-5.869933
Log likelihood	67.68653	Hannan-Quinn criter.	-6.110340
F-statistic	0.485203	Durbin-Watson stat	1.245471
Prob(F-statistic)	0.781786		

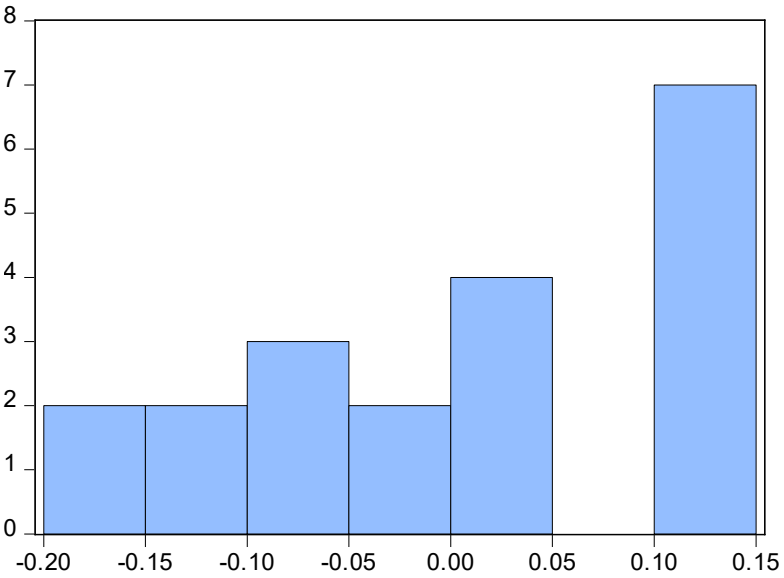
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.225647	Prob. F(2,12)	0.8013
Obs*R-squared	0.724895	Prob. Chi-Square(2)	0.6960

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 04/28/24 Time: 18:38
Sample: 2001 2020
Included observations: 20
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000766	0.035557	0.021543	0.9832
D(LNINF)	0.009840	0.079714	0.123440	0.9038
D(LNPP)	0.010727	0.118843	0.090261	0.9296
D(LNGDPPC)	-0.081555	0.274568	-0.297029	0.7715
D(LNPPS)	0.014926	0.052820	0.282587	0.7823
ECM(-1)	0.182584	0.341481	0.534681	0.6026
RESID(-1)	-0.347954	0.522494	-0.665948	0.5180
RESID(-2)	-0.111630	0.345981	-0.322648	0.7525

R-squared	0.036245	Mean dependent var	-5.55E-18
Adjusted R-squared	-0.525946	S.D. dependent var	0.105577
S.E. of regression	0.130419	Akaike info criterion	-0.946961
Sum squared resid	0.204108	Schwarz criterion	-0.548668
Log likelihood	17.46961	Hannan-Quinn criter.	-0.869210
F-statistic	0.064471	Durbin-Watson stat	1.791769
Prob(F-statistic)	0.999328		



Series: Residuals	
Sample 2001 2020	
Observations 20	
Mean	-5.55e-18
Median	0.018629
Maximum	0.126237
Minimum	-0.191660
Std. Dev.	0.105577
Skewness	-0.279887
Kurtosis	1.704068
Jarque-Bera	1.660656
Probability	0.435906

Ramsey RESET Test
Equation: UNTITLED
Specification: D(LNPPC) C D(LNINF) D(LNPP) D(LNGDPPC) D(LNPPS) ECM(-1)
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.907128	13	0.3808
F-statistic	0.822882	(1, 13)	0.3808
Likelihood ratio	1.227520	1	0.2679

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.012608	1	0.012608
Restricted SSR	0.211784	14	0.015127
Unrestricted SSR	0.199177	13	0.015321

LR test summary:

	Value
Restricted LogL	17.10043
Unrestricted LogL	17.71419

Unrestricted Test Equation:
Dependent Variable: D(LNPPC)
Method: Least Squares
Date: 04/28/24 Time: 18:39
Sample: 2001 2020
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.018565	0.039151	-0.474200	0.6432
D(LNINF)	0.251296	0.075161	3.343447	0.0053
D(LNPP)	0.145457	0.114838	1.266629	0.2275
D(LNGDPPC)	-0.078489	0.227427	-0.345117	0.7355
D(LNPPS)	0.073537	0.048947	1.502380	0.1569
ECM(-1)	-0.608138	0.199172	-3.053331	0.0092
FITTED^2	-0.625534	0.689576	-0.907128	0.3808

R-squared	0.735833	Mean dependent var	-0.014914
Adjusted R-squared	0.613910	S.D. dependent var	0.199206
S.E. of regression	0.123779	Akaike info criterion	-1.071419
Sum squared resid	0.199177	Schwarz criterion	-0.722913
Log likelihood	17.71419	Hannan-Quinn criter.	-1.003387
F-statistic	6.035219	Durbin-Watson stat	1.940738
Prob(F-statistic)	0.003315		