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The Implications of Price Changes on Petroleum Products Distribution in Gwagwalada Abuja, Nigeria

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Abstract
Nigeria is one of the leading oil producing country in the world, but despite these abundant natural resources. The country still suffers from massive shortage of premium motor spirit (PMS) and distribution to cater for the needs of the numerous users of its ends product. This study investigates the implications of price changes on petroleum products distribution in Gwagwalada for a period of 12 years (2000-2012).Questionnaire was used to collect primary data from ten wards within Gwagwalada Area Council which was used as study area. The statistical package for social sciences (SPSS) was used to analyze the raw data and determined whether to accept or reject a problem item as being a reflection of the thinking of the majority for taking a decision. The results from the study show that, there was a statistically significant effect of price changes of petroleum products distribution in Gwagwalada, that the price changes significantly cause fluctuation to supply and distribution of petroleum products, the price increases of PMS significantly lead to increase in cost of distribution of other commodities including agricultural products and there exists statistical significant relationship between price increase and the development of "Black Market'' and long queues at filling stations across Nigeria. The study recommends that government should strive to make the product available all times, monitor effectively the distribution channels to avoid disruption of distribution or scarcity, Consistency and efficiency of government pricing policy, the government to encourage more private participation and deregulation of the downstream sector and fight corruption as well as total market concept in the chain of petroleum product supply and distribution.
Keywords: Petroleum, Price, Products, Distribution, Premium Motor Spirit (PMS) Nigeria.

1. Introduction

Nigeria is blessed with abundant natural resources of which petroleum products are important factors in her domestic economy. According to Odularu (2008), Nigeria is the eight among the world's oil producing countries. The Nigerian economy is heavily dependent on petroleum products, which account for over 95 percent of export earnings and about 85 percent of government revenues (World Bank Report, 2010). Petrol or Premium Motor Spirit (PMS), Diesel and Kerosene are the basic products used in road transport services, manufacturing industries, power generation, household cooking and private vehicles.

The frequent and incessant price changes (price hike) of petroleum products in Nigeria have been a source of worry, contention and many a times controversy. Olorunfemi (2010) stated that various Nigerian governments increased fuel prices more-than ten (10) times, between the year 2000 and 2012 period when prices were adjusted sometimes twice a year.

In spite of the four refineries situated in Port Harcourt, Warri and Kaduna, and storage depots located strategically at different parts of the country, yet on various occasions, many Nigerians still experienced fuel shortages. It is a fact that during the fuel shortages, the economic and administrative life of the nation becomes disturbed and almost disrupted. The prices of food stuff skyrocketed as transportation fare rose, farmers had to pay more for transporting their goods and services to the market. Most Nigerians found it difficult to obtain fuel at the filling stations, if they open at all. Others resorted to purchasing fuel at exorbitant "Black Market" prices.

Many Nigerians have advanced different reasons for fuel shortages in the country. Some suggested that the constant and incessant price hike by successive governments was the problem. Other people believe that the pipelines and product marketing company (PPMC) was not doing well in products distribution. Another reason given for the problem was that some oil companies, independent marketers and other petroleum dealers, fuel haulage contractors, filling station owners and tanker drivers were too greedy and allegedly capitalized on the period of scarcity of fuel to sell at higher prices.

The adverse effect of pipeline vandalization according to PPMC induce shortages of petroleum products, because of the damage inflicted on the pipeline system which made it was unsafe to pump petroleum product through the lines. As a result, more products were moved by trucks. Distribution by trucks was very costly and also much slower. For example, a large volume of products could easily be pumped within hours from Lagos to Maiduguri, but many trucks will take some days carrying less volume to reach the same destination. This slow movement coupled with the limited quantity transportable through tankers, PPMC argued, create shortages, which breeds black marketing forcing consumers to pay exorbitant prices.

The federal government on its own part claimed that the existence of subsidy is the major course of price instability and problems of distribution of petroleum in Nigeria. That the selling price of petrol (PMS) per litre is below the cost of production, distribution and the allowable profit margins. Therefore the subsidy element is the difference which the government bears.

The marketing aspect of petroleum products goes beyond production and refining, because pricing policy and effective distribution play a key role in products availability, market stabilization and consumer satisfaction in general. However, some authors like Soylas and Sari (2006) argue that a casual relationship existed between the two marketing mix elements: price and distribution; since they are both factors of demand and supply and one of them on the supply side distribution is influenced by price elasticity. Previous researchers on related topics like Henry and Orhenwere (2006), Ogunbodede, Ilesanmi and Olurankinsa (2010) and Arenze (2011), have focused on different combination of such variables like price changes and its effect on inflation, unemployment or Gross Domestic Product (GDP). It has therefore become imperative for the researcher to find out the effect of constant price changes of petroleum products on distribution in Gwagwalada.

On various occasions in the period under review: (2000 to 2012), Gwagwalada Area Council have experienced frequent scarcity and acute shortages of fuel. The major problem was that some of the petroleum products, especially the premium motor spirit (PMS) were very limited in the market it hardly reach the final consumers. Therefore, motorists spent hours, sometimes days queuing at the filling stations. Most motor parks were empty; offices were closed as people moved out in search of fuel. Travellers' and inhabitants of towns and cities found it difficult to get transport services to different destinations. Therefore, there is need to explain why Nigeria, which is one of the world major producers of oil and which has four (4) refineries and 17 main oil deports strategically located across the country for easy distribution should frequently experience shortages throughout the country.

1.1 Statement of the Problem

On various occasions in the period under review: (2000 to 2012), Gwagwalada Area Council have experienced frequent scarcity and acute shortages of fuel. The major problem was that some of the petroleum products, especially the premium motor spirit (PMS) were very limited in the market it hardly reach the final consumers. Therefore, motorists spent hours, sometimes days queuing at the filling stations. Most motor parks were empty; offices were closed as people moved out in search of fuel. Travellers' and inhabitants of towns and cities found it difficult to get transport services to different destinations. Therefore, there is need to explain why Nigeria, which is one of the world major producers of oil and which has four (4) refineries and 17 main oil deports strategically located across the country for easy distribution should frequently experience shortages throughout the country.

Nigeria seems to be a society that is constantly in petroleum scarcity crises. It is regrettable that in the nation nothing follows the normal pattern; petroleum products prices are arbitrarily increased several times in a short period and each time government has given flimsy reasons for the upward adjustment (Dike, 2011). However, the leaders do not seem to realize some of the distributive consequences of the constant petroleum price hikes in the nation that has for sometimes now been experiencing decay of infrastructure, high crime rate, poverty and weak economy. Many studies like Raymond (2010), Ehinomeri and Adeleke (2012) and others were carried out to investigate the implication of the effect of petroleum price changes on different variables such as the effect of price hike on poverty, on economic development, on inflation and many other variables. This study focused on investigation of the effect of price changes of premium motor spirit (PMS) on supply and distribution of petroleum products in Nigeria, the effect on the cost of distribution of other commodities including agricultural products, the emergence of ''black market prices'' and long queues at filling stations.

Objectives of the Study

i. To examine whether the constant increase of fuel prices causes a fluctuation to supply and distribution of petroleum products in Nigeria;
ii. To find out if the price hike of PMS leads to increase in cost of distribution of other commodities including agricultural products;
iii. To identify the relationship between price increase of PMS and the development of "Black Market Prices" and ,long queues at filling stations across Nigeria; and
iv. To examine the effects of petroleum products price hike on some macroeconomic variables such as inflation, unemployment, poverty and social unrest.

1.2 Hypothesis Tested

Four hypotheses are formulated and tested in this study:

H_{01}: Price changes do not cause fluctuation to supply and distribution of petroleum products in Gwagwalada.

H_{02}: Price increase of PMS does not lead to increase in cost of distribution of other commodities including agricultural products

H_{03}: There is no relationship between price increase and the emergence of "Black Market" and long queues at filling stations across Nigeria.

H_{04}: There is no significant effect of changes in prices of petroleum products in Nigeria on macroeconomic variables like unemployment, poverty, inflation and social unrest.

2. Literature Review

Many scholars have proposed different theories in their attempts to describe what is marketing and the relationship among different variables. Therefore some related theories were reviewed to provide a framework within which to investigate the effects of price changes of petroleum products distribution in Gwagwalada Abuja, Nigeria.

2.1 Conceptual Issues

Kotler (2000) defined marketing as "human activity directed at satisfying needs and wants through exchange processes". In this definition, marketing simply calls for the offering of value to someone in exchange for value and relationship. Through this exchange, various social units like individuals, small group, organizations or the whole nations attain what they need and become satisfied

2.2 Description of Price

As a result of the growing interest in marketing, business people and researchers have been flooded with number of terms that are related to price, such as economic view point of price, marketing view point of price, pricing strategies and price changes.

Price is all round us by whatever names you call it. For instance, fee, fare, rate, interest, toll, premium, honorarium, bribe, salary, commission, wages are all prices we pay under different names.

Price is the exchange values of a product or service from the perspective of both the buyer and the seller, (Reddy, 2010). Price can also be described as the value assigned to the utility one receives from a product or service. Usually price is the amount of money that is given up to acquire a given quantity of goods and services.

The concept of price is described as that which the buyer gives up in exchange for something that provides satisfaction.

Historically, prices were set by buyers and sellers negotiating with one another. Sellers would ask for higher price than they expect to receive and buyers would offer less than they expected to pay. Through bargaining they would arrive at an acceptable price.

In the modern business ideals, especially in marketing, one unit price of a commodity is set for all buyers and that is done according to the prevailing forces of demand and supply. This is because, it is understood that price has operated as a major determinant of buyers' choice. Nevertheless, non price factors have become more relatively important in buyer choice in recent times. (Kotler 2000)

Price is the only element of the marketing mix that produces revenue. The other three elements (product, promotion and distribution) represent cost. Pricing a product is crucial because;

i. It affects the saleability of the product.
ii. It affects profitability of the firm and it affects product image.

2.2.3 Economic View Point on Price

Hicks (2009) stated that the price consumers pay to fill their tanks can be broken up into several entities such as distribution cost, logistic and profit margin. Like any other consumer product, supply chain of several groups is responsible for setting the price of the product taken into consideration the all the available entities.

From the economic point of view, price is considered to act as a rate of exchange. That means, price is the amount of money that is charged by the manufacturer for the products they produced. Exchange occurs when the buyer is willing to spend that amount of money to obtain the product. In this case, the transaction between buyer and seller represent the law of demand.

2.2.4 Marketing View Point on prices

From a marketing point of view, the demand curve the economist much relies on cannot remain the same under different market conditions. And it is not applicable to all types of products. The traditional standpoint fails to take into account prices and their relationship to consumer behaviour. The economic point of view of price which states that price is considered to act as a rate of exchange has been criticized along the following points:

i. Consumers are portrayed by economic theory as rational at all times. The assumption of this theory is that consumers have perfect knowledge and act on it in buying decision. This of cause is not true. Consumers of petroleum products many times do not have perfect knowledge about products including the price. (Debel, 2000).
ii. Consumers are represented by the economic theory as not influenced by social circumstances. However, we have learnt that social and cultural factors influence individuals' purchasing habits.
iii. Consumers are described as being aware of all the factors in the market place.
But in the actual sense consumers are limited by their perception and Ego defence. (Kotler, 1994).

iv. The economic law which states that the higher the price, the lower the purchase does not always apply, because that doesn't usually influence the amount purchased of necessity products such as milk, bread, eggs and petrol.

v. Economic theory assumes that consumers are logical and will spend to maximize the worth for their money. Thus, a consumer is referred to as the "economic man". But a consumer research carried out by stone, (2002) discovered that only 33 percent of consumers are economical. The rest of the 67 percent made their purchase based on other reasons including convenience. No wonder many Nigerians go to purchase fuel at "Black Market" price, rather that stay for a long queue at service station.

2.3 Pricing Strategies at the Producers and Retailers Levels

According to Kotler (2000); Different strategies commonly used by various organizations are skimming the market price and penetration price. The application for these strategies largely depends on the product type and the stage of the product life cycle. And all these strategies are applicable and used in setting prices of petroleum products in Nigeria.

2.3.1 Price Changes

Over the years (2000-2011), a series of petroleum products price changes have occurred. The federal government through the Nigerian National Petroleum Corporation (NNPC) controls the refining, importation, storage, distribution and pricing, whereas the private companies are responsible for the distribution and marketing of the products.

2.3.2 Price Increase

Most Nigerian consumers exhibit dislike and apathy towards increasing prices. This, perhaps, is due to the present economic problem faced by majority of consumers. Some of the reasons advanced for consumer dislike of the present increasing price in the market place include:

i. The failure of the producers, the middlemen and the government to explain the reason behind the continuing increase in prices of petroleum products.

ii. Generally, consumers show signs of distrust in the activities of Federal, State and Local Governments in Nigeria.

iii. Consumers in Nigeria are of the view that increase in price promotes other social problems such as hoarding, shortages and artificial scarcity.

iv. Nigerian consumers always express fear of buying sub-standard adulterated petroleum products and fear of being cheated by dubious business people.

In the final analysis, each price the Nigerian National Petroleum Corporation might charge could lead to different level of demand and will therefore have different impact on its marketing objective especially on demand, supply and distribution.

The Federal Government set up a committee in April, 2000 to review and overhaul and reform the Oil and Gas industry. According to Alabi (2003), that was done with an intention of deregulating and privatizing the downstream sector. Under that arrangement, the Federal Government through the NNPC, through the newly established Petroleum Product Price Regulatory Agency (PPPRA) came out with the unpopular announcement of deregulation policy: deregulation of the downstream sector of the oil industry. Since the announcement, the price of petroleum products did not witness any stability. The table I below captured the price fluctuation of Premium Motor Spirit since the year 2000.

2.4 Distribution

Distribution is one of the variables fundamental to decision making factors in marketing. Distribution provides the necessary support for marketers by ensuring that the right quantities of goods or services are offered at the right point, at the right time.

John, (2002) the author of Dictionary of Economics defined distribution as: "The process of moving goods and services from producers to final consumers via a network of channels". The network of channels were further explained by Reddy, (2010) as "all of the companies, corporations, other organizations, groups and individuals involved in the process of moving products from producers to consumer."

One of the basic ingredients of marketing concept is to know buyers current and potential requirements. Such knowledge extended beyond the intermediaries to the other buyers down the channel. Thus, it may help develop a more complete understanding of trends in the channel serving various customers.

A well managed distribution system gives rise to high level of customer service. This is because, among the objectives of distribution is the need to solidify relations with customers, improve the market coverage, increase deliveries and minimize stock out (shortages).

Webster (1994), categorized distribution system into two district areas:

i. Physical Distribution Management

ii. Management of channels.

i. Physical distributions and logistics are activities that involved physical movements and storage of products. While in the channel management, we noted that the management of distribution system of an organization includes its agents, middlemen and other form of resellers.

2.5 Transportation

The choice of transport carriers affects the price of the products; delivery time and condition of goods when they arrive. All of which affect customer satisfaction.

Kotler (1980) postulated that transportation aids mobility and helps in the improvement of the standard of living of an average citizen. More importantly improved transportation system contributes in reduction of price for goods. This occurs not only because of increased competition in the market place, but also because transportation is a component cost along with production, selling and other distribution cost that made up the aggregate cost.

Stanton (1981) state five (5) major forms of transportation mostly used in distribution. These are rail road, truck road, water ways, pipelines and air ways. The nature of a company's product dictates the mode of transportation to be employed.

Therefore, transport planning requires careful considerations of all underlining factors that might affect the way and manner in which the strategy is chosen. He confirmed that with many problems facing the industry, transportation is high on the list of management concern. This he observed was due to the fact that distribution is a major cost in business and very strategic in price stability.

2.6 Theoretical Considerations

2.6.1Theory of Demand and Supply

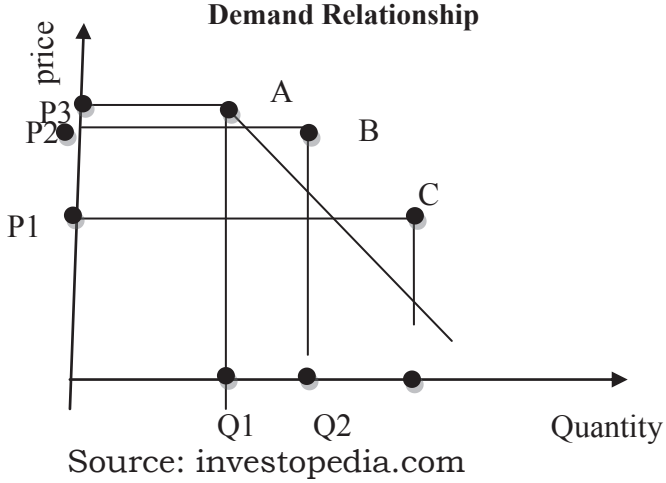
The theoretical framework adopted for this research follows the conventional Adam Smith (1776) demand and supply analysis. In his book the Wealth of Nations, Smith generally assumed that the supply price was fixed but that its merit (value) would increase as its scarcity increase. In microeconomics supply and demand is an economic model of price determination in a market. It concludes that in a competitive market, the unit price of a particular good will vary until it settles at a point when the quantity demanded by consumers (at current price) will equal the quantity supplied by producers (at current price) resulting in an economic equilibrium for price and quantity.

The relationship between demand and supply explains the forces behind the allocation (distribution) of resources. The assumptions of market might allocate (distribute) resources in the most efficient way, possible. This is done through the process of law of demand and supply.

a. The Law of Demand

The law states that, if all other factors remain equal, the higher the price of goods, the less people might demand for those goods. In other words, as the old principles say, the higher the price, the lower the quantity demanded.

Demand Relationship



Source: investopedia.com

In the diagram above points A, B & C on the demand curve reflects a direct relationship between quantities demanded (Q) and price (P). So, at point A, the quantity demanded will be Q, and the price will be P1, and so on. This illustrates a negative relationship between price and quantity demanded. The higher the price the lower the quantity demanded.

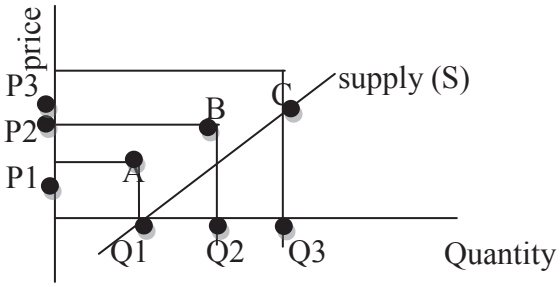
b. The determinants of demand are:

(a) Income
(b) Tastes and preferences
(c) Price of related goods and services

(d) Consumers expectations about future prices and incomes that can be checked
(e) Number of potential consumers.

c. Law of Supply

This law states that the higher the price the higher the quantity supplied. In other words, producers supply more quantity at a higher price because selling higher quantity at a higher price brings in more revenue and more profit.



Source: investopedia.com

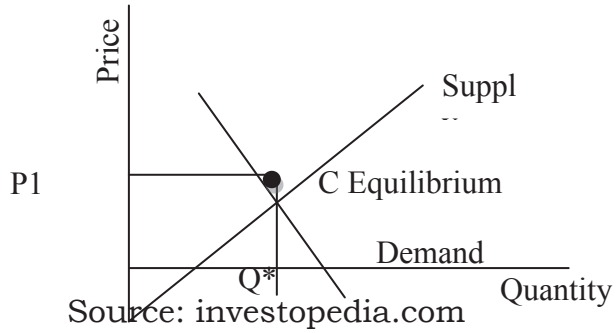
Points A,B & C on the supply curve above reflects a direct correlation between quantity supplied (Q) and price (P). At point A, the quantity supplied will be Q1 and the price will be P1 and so on. Unlike the law of demand, the supply relationship shows an upward slop.
Here, it means the higher the price, the higher the quantity supplied.

d. The Determinants of Supply are:

a. Production cost, how much goods to be produced cost.
b. The technology used in production and/ or technical advances.
c. firms expectations about future price
d. Number of suppliers.

e. Equilibrium:

Equilibrium is a market situation where the quantity demanded is equal to the quantity supplied when the supply function and demand function intersect, the market is said to be at equilibrium. At this point, the allocation of goods is said to be at its most efficient, because the amount of goods being supplied is exactly the same as the amount of goods being demanded. Thus, everyone (individuals and firms) is satisfied with the current market condition.



Source: investopedia.com

As shown in the diagram above, equilibrium occurs at the intersection of the demand and supply curve, which indicates demand, is equal to supply. At this point (C), the price of the goods will be P* and the quantity will be Q*. This is also referred to as equilibrium of price and quantity. Disequilibrium occurs whenever the price or quantity is not equal to P* or Q*

2.6.2 Capital Replacement Theory

In a fundamental sense, capital consists of any product that can enhance a person's power to perform economically useful work therefore capital is an input in the production function.
In Marxist political economy, capital is money used to buy something only in order to sell, to realize a financial profit, (Henning's, 1987). For Marx, capital formed the basis of the economic system of capitalism.

According to Boldizonic, (2008) some thinkers, such as Werner Sambart and Max Weber, locate the concept of capital as that amount of wealth which is used in making profit and which enters into the account.
The classical economist, Adam Smith's Wealth of Nations, Book 11, chapter 1(1776) distinguished fixed capital from circulating capital. The fixed capital is physical assets not consumed in the production of a product like machinery and storage facilities. While the circulating capital referred to physical assets consumed in the process of production like raw materials and intermediate products for an enterprises.
The Capital Replacement Theory discussed above is predicated on the basic economic principles of demand and supply,, which is called the market- bussed approach. The theory recognizes the need to price petroleum product in such a way that the producers recover the capital invested. Since Nigeria follows capitalist economic system, the pricing policy is expected to be consistent with the market-based approach.

2.6.3 Exhaustible Resources Theory

This theory was propounded by Hotelling in 1931. He advocated the need to price oil and other fossil resources in a way that recognizes the temporariness of their availability. According to this theory, the price becomes a user cost or depletion charges which compensate for the fact that future generation are denied access to the commodity. This price may or may not be consistent with the equilibrium outcome of demand and supply.
Similarly, according to the derived demand theory proposed by Marshall, the demand schedule for any factor of production of a final product can be driven from the final product, assuming an unchanged demand schedule for a final product and given supply prices for other factors of production. The supply increase of other factors held constant and increase in the demand of the final goods would lead to an increase in the demand of a given factor of production.
Blomberg and Harris (1995) agree that supply shock (or distribution problem) will lead to higher price impacts when the derived demand is inelastic. Marshall notes that the derived of a factor will be more inelastic when (1) the factors were more essential in the production process of the final product (2) The more price inelastic is the demand for final production (3) the smaller the fraction of total cost that is contributed by the factor, and the more price inelastic is the supply (distribution) of the other factor.
Petroleum products play a critical role in the economic development of Nigeria. Premium Motor Spirit (PMC) or petrol serves as an intermediate input to production, and thus changes in its price, quantity or quality affect the profitability of production and productivity of other factors of production. Given the role of fuel in the economy, most governments in Africa-especially Nigeria-intervene extensively in the oil market.
The relationship between petrol price changes (price hike) and distribution in Nigeria is an area that was not given direct attention by scholars. Nevertheless, many authors researched on several related topics and came up with different findings. For instance, Raymond (2010) in his paper entitled: "The Relationship among petroleum prices" evaluates in a multivariate framework the relationship among the spot prices of fuel, gasoline, heating oil and diesel. The author examined the relationship among the petrol prices with focus on assessing whether or not the direction of price information flow was predicated on derived demand theory. The econometric results provided strong evidence that the price of oil and its refinery products are co integrated. The author argued that in terms of long run adjustment, the oil price is found to be weakly exogenous and many factors are responsible for the adjustment towards the long-run equilibrium.

2.7 Review of Empirical Literature

Petroleum products play a critical role in the economic development of Nigeria. Premium Motor Spirit (PMC) or petrol serves as an intermediate input to production, and thus changes in its price, quantity or quality affect the profitability of production and productivity of other factors of production. Given the role of fuel in the economy, most governments in Africa-especially Nigeria-intervene extensively in the oil market. The relationship between petrol price changes (price hike) and distribution in Nigeria is an area that was not given direct attention by scholars. Nevertheless, many authors researched on several related topics and came up with different findings. For instance, Raymond (2010) in his paper entitled: "The Relationship among petroleum prices" evaluates in a multivariate framework the relationship among the spot prices of fuel, gasoline, heating oil and diesel. The author examined the relationship among the petrol prices with focus on assessing whether or not the direction of price information flow was predicated on derived demand theory. The econometric results provided strong evidence that the price of oil and its refinery products are co integrated. The author argued that in terms of long run adjustment, the oil price is found to be weakly exogenous and many factors are responsible for the adjustment towards the long-run equilibrium.
Ehinomeri and Adeleke (2012) shared their views that the distribution of petroleum products in the Nigerian economy is fraught with complex problems resulting sometimes in products outages, inflated price of products and contentions on the pump price of products. Their research examines the various issues regarding the distribution of products and recommends that the downstream activities of the industry be completely deregulated to allow private sector and entrepreneur's full participations in the distribution of the products. Their findings hypothesized that the participation of entrepreneurs will drive effectiveness into the sector.

Effectiveness according to them will bring down cost of operations with the consequence reduction of price of products for the benefit of all the stake-holders in the country.

Arenze (2011) asserted that upward adjustment of petroleum products prices have resulted in inflation, high cost of living and inequitable distribution of income in Nigeria. The author observed that between 1978 to 2007, the various Nigerian regimes increased fuel prices a total of 8 times. Most of the increase occurred in the 1990-2007 period. He examined the economic impact of price instability and identified the causes of increase in prices of oil products, using simple regression analysis of data to find out the relationship between dependent and independent variables. The study revealed that whenever petroleum prices increase, the inflation rate also increases. The explanation of their research was that the relationship between the inflation and the price of petrol is significant. Ougunbodede, Ilesanmi and Olurankinsa (2010) posit that incessant price hike of petroleum products have led to crisis and industrial actions led by some pressure groups in Nigeria. Based on this problem, their research examine petroleum Motor Spirit pricing crisis and the Nigerian public passenger transportation system. They used perception scale on a 4-point Likert scale to elicit response from the operators of public passenger transport system. The Mean Weight Value (MWV) was calculated from the ranking of the perception scale. The results of these MWV were compared with the Group Arithmetic Mean (GAM) of each group to determine whether to accept or reject a problem item as being a reflection of the thinking of the majority for taking a decision. The results from that study indicated that price increase in PMC have increased transport fare, led to hoarding of fuel and many other related problems too numerous to list here. The study suggested that further research in related areas be carried out to identify more problems that exerted a lot of hardship on the people and the economy of the country to the extent that the poor were the worst hit. Many scholars in the past have talk extensively on the issue of incessant effect of price changes on petroleum product in Nigeria but most of them have failed to capture its effect on all the macro-economic variables, Raymond (2010) look at the effect of price changes of petroleum product in the short and long run and the factors responsible for the changes itself, he failed to realize that both the short and long run if taken as a variable is a function on its own, as they will reflect as an independent variable which its efficacy will be a function of dependent variable i.e. price changes. Ehinomeri and Adeleke (2012), study the causes of fuel shortage in Nigeria and how it can be resolved but it only proffer recommendations on how the issue can be resolved base on the economic situation of Nigeria as at the time of the research, he failed to look at it from the futuristic point of view, though the recommendations if properly applied in the economy as at the time of the study will work but it will fail to last long as the policy on crude-oil sale especially the deregulation of the downstream sectors and the removal of fuel subsidy will generate other problems which the study did not cover. Arinze (2011), work on the effect of price changes of petroleum products in Nigeria taken into consideration inflation, high cost of living and equitable distribution of income as the is resulting effects and variable, but the study fail to capture unemployment, poverty, Gross domestic product and other macro-economic variables. Ogunbodedi,Ilesanmi and Olurankinsa (2012), only limit their work to price hike of petroleum products crisis and transportation system but the present study investigate the effects of price changes of petroleum products taken into consideration all the macro-economic variables like inflation, unemployment, poverty, petroleum distribution, gross domestic products and the resulting effect on the standard of living which no previous study have captured.

3 Research Methodology

3.1 Research Design and Sample Size

The study used a survey to investigate the implications of price changes on petroleum products distribution in Gwagwalada Abuja, Nigeria. The design was adopted because of its appropriateness in describing the current situation of phenomenon. The population of this study is the various users of petroleum products in Gwagwalada Abuja, Nigeria. Nwankwo (1999) stated that the population of any research work is the universe of such group of people or object which a researcher is interested. In obtaining the sample size of the population, petroleum products users from Gwagwalada local government area in Abuja, North-Central Nigeria were selected through random sampling. The primary sources of data collection were through the use of questionnaire, personal observation and interview. A total of 285 respondents were used as a sample size for this study.

3.2 Research Instrument and Technique

The primary instrument used for the collection of data for this study is the questionnaire. The questionnaires were designed in open and closed ended patterns and administered directly petroleum products users. Further, in order to reduce the possibility of questionnaire missing or getting lost in transit, the questionnaire were retrieved the same manner in which they were administered. The data collected were presented in tables and analyzed using regression model statistical technique with the use of statistical package for social sciences (SPSS VERSION 15) in order to confirm the stated hypothesis.

4. Research Findings and Analysis

Research Findings and Analysis

In the course of this study, 320 questionnaires were distributed to the respondents, A total of 300 questionnaire were returned out of which 285 was found to be valid and useful for this study, this represent 89% which is good enough for the study

The hypothesized statements were tested using regression model statistical tool with the help of SPSS as earlier stated. The tests conducted at 95% confidence interval and 0.005 level of significant. The decision rule was that if the calculated P-value is less than the critical value (0.05), we reject the Null hypothesis, otherwise it will be accepted.

Table 4.1

Price changes of Premium Motor Spirit (PMS) 2000-2012 (per liter)

S/N	Year	Price		
1	2000	N22.00	Increase	10.00
2.	2001	N26.00	Increase	18.18
3	2002	N30.00	Increase	15.39
4	2003	N40.00	Increase	33.33
5	2004	N49.00	Increase	22.50
6	2005	N52.00	Increase	6.21
7	2006	N64.00	Increase	24.04
8	2007	N75.00	Increase	16.25
9	2008	N75.00	Stable	0.00
10	2009	N65.00	Decrease	(13.33)
11	2010	N65.00	Stable	0.00
12	2011	N141.00	Increase	120.00
13	2012	N97.00	Decrease	(49)

Source: PPPRA, Available at www.pppra-nigeria.org (Various Editions)
National Bureau of Statistics, Abuja, Annual Abstracts of Statistics (2010)

Table 4.1 shows changes of price per liter of petrol charged by the federal government through the Petroleum Product Price Regulatory Agency (PPPRA) from 2000 to 2011. The available figures presented here captured only the steady average officials selling prices that consumers paid. This table also shows chronological price changes for the period of more than ten years under review.

It should be noted that in June 2007, the price of petrol was increase from N65 to N70 per litre, but later reduced to N65 as a result of nation-wide strike action. The history repeated itself in 2011/2012 when the price of a litre of petrol was increased from N65 to N141 naira at filling stations and then reduced to N97 in 2012.

The removal of subsidy was announced by the executive secretary of the Petroleum Product Price Regulatory Agency; Reginald Stanley, (2012). The price increase triggered serious problems across Nigeria. Protesters took to the streets and blocked major roads in many cities and formed human barricades along motorways. The Nigeria Labour Congress and Trade Union Congress announced an indefinite strike and mass demonstration on Monday, 9th January, 2012 unless the removal of fuel subsidy policy was reversed.

Table 4.2
Price changes of Premium Motor Spirit (PMS), Inflation Rate, Unemployment and GDP

S/N	Year	Price Changes	Inflation Rate	Unemployment	GDP
1	2000	N22.00	6.94	13.1	3.5
2.	2001	N26.00	18.03	13.6	3.5
3	2002	N30.00	13.08	12.6	3.0
4	2003	N40.00	14.02	14.8	7.1
5	2004	N49.00	15.02	13.4	6.2
6	2005	N52.00	17.86	11.9	6.9
7	2006	N64.00	8.23	12.3	5.3
8	2007	N75.00	5.39	12.7	6.4
9	2008	N75.00	11.58	14.9	5.3
10	2009	N65.00	11.96	19.7	5.6
11	2010	N65.00	11.50	21.1	8.4
12	2011	N141.00	12.20	23.9	7.2
13	2012	N79.00	12.10	23.9	7.0

Source: CIA World Fact Book, National Bureau of Statistics, Central Bank of Nigeria (CBN)

Table 4.2 shows the changes of premium motor spirit (PMS), inflation rate and unemployment between the years 2000 - 2012. It can be seen from the table that the price of PMS was #22 while the inflation rate was 6.94, unemployment rate 13.1 and GDP stood at 3.5.

But in 2001, when the price of fuel was increased from #22 to #26 it really had a great effect on the inflation rate which increased to double digit i.e. 18.03 while the increase also had a slight change on the unemployment rate (13.6), while the GDP still remained constant. This increment continue on a yearly bases till 2011 when the federal government of Nigeria increase the price of petrol from #65 in 2010 to #141 in 2011 which affected the three major variable at hand i.e. inflation rate, unemployment rate, GDP rate which stood at 12.20, 23.9 and 7.2 respectively.

The situation was the same in 2012, despite the reduction in the price of premium motor spirit from #141 to #12.20 it only has a little effect on the inflation rate which reduced to 12.10 from the previous 12.20 and also the GDP rate from 7.2 to 7.0 while the unemployment rate remained constant.

In conclusion, what this table indicate is that the higher and frequent the increase in the price of petroleum products, the higher the effect and impact on inflation rate, unemployment, and the gross domestic product of the economy which will hinder the growth and development of the economy.

4.1 Presentation of Result of Testing the Null Hypotheses

Regression Model 1

Hypothesis 1

H_0: Price changes do not cause fluctuation to supply and distribution of petroleum products in Gwagwalada.

H_1**:** Price changes cause fluctuation to supply and distribution of petroleum products in Gwagwalada.

Table 4.3 Coefficients of hypothesis 1

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.536	.907		2.987	.000
	Effect of price changes on petroleum products	.741	.486	.092	.866	.004

a. Dependent Variable: supply and distribution of petroleum products

Source: SPSS, 2014.

After establishing an Ordinary least square (OLS) model of "effect of price changes " on fluctuation to supply and distribution of petroleum products in Nigeria" it is observed that the significance probability of independent variable SMEs performance is 0.004 which is less than 0.05 level of significance which is termed "Significant". We reject the null hypothesis H_o and conclude that price changes cause fluctuation to supply and distribution of petroleum products in Gwagwalada.

Regression Model 2

Hypothesis 2

H_0: The price increase of PMS does not lead to increase in cost of distribution of other commodities including agricultural products.

H_1**:** The price increase of PMS leads to increase in cost of distribution of other commodities including agricultural products.

Table 4.4 Coefficients of hypothesis 2

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.690	.944		3.245	.001
	Effect of price changes on petroleum products	.248	.722	.034	.472	.002

a. Dependent Variable: Distribution of other commodities

Source: SPSS, 2014

From the Ordinary least square (OLS) model built for "Increase in cost of distribution of other commodities" it is observed that the significant probability of independent variable distribution of other commodities is 0.002 which is less than 0.05 level of significance which is termed "Significant". We reject the null hypothesis H_o and conclude that the price increase of PMS leads to increase in cost of distribution of other commodities including agricultural products as per the sampled population.

Regression Model 3

Hypothesis 3

H_0: There is no relationship between price increase and the development to "Black Market" and long queues at filling stations across Nigeria.

H_1**:** There is relationship between price increase and the development to "Black Market" and long queues at filling stations across Nigeria.

Table 4.5 Coefficients of hypothesis 3

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.264	.287		11.357	.000
	Effect of price changes on petroleum products	0.355	.197	-.129	-1.802	.043

a. Dependent Variable: black Market and Long Queues

Source: SPSS, 2014.

From the Ordinary least square (OLS) model built for "effect of price increase" on the development of black market and long queues at filling stations across Nigeria", it is observed that the significance probability of independent variable price changes effect is 0.043 which is less than valid positive 0.05(5%) level of significance which is termed "Significant". We reject the null hypothesis H_o and conclude that there is a relationship between price increase of petroleum products and the development of black market and long queue at filling stations across Nigeria as per the sampled population.

Regression Model 4

Hypothesis 4.

H_0: There is no significant effect of price changes of petroleum products in Nigeria on macro-economic variables

H_1**:** There is significant effect of price changes of petroleum products in Nigeria on macro-economic variables.

Table 4.6 Coefficients of hypothesis 4

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.543	.111		15.933	.000
	Effect of price changes on petroleum products	.191	.070	.193	2.269	.007

a. Dependent Variable: petroleum products

Source: SPSS, 2014.

After establishing an Ordinary least square (OLS) model of "effect of price changes on "petroleum products" it is observed that the significant probability of independent variable is 0.007 which is less than 0.05 level of significance which is termed "significant" We reject the null hypothesis H_o and conclude that there is a Significant effect of price changes of petroleum products in Nigeria.

4.2. Discussions of Findings:

From the above analysis it was found that that in all the four Null Hypothesis tested, they were all rejected. Details of the findings of each hypothesis tested are presented below.

It is revealed in null hypothesis 1 (HO_1) that price changes caused fluctuation to supply and distribution of petroleum products in Gwagwalada. This hypothesis was empirically tested and the result revealed that fluctuation to supply and distribution of petroleum product had a positive Pearson product moment correlation. Thus, the effect of price changes resulted to fluctuation of supply and distribution of petroleum product in Nigeria supported by the empirical data. The Null hypothesis in these dimensions was "REJECTED". This is a fact, because most time when government increases the price of premium motor spirit (PMS), it normally altered or causes fluctuation to supply and distribution of the product because most marketers tended to gain more during this period thereby causing artificial scarcity of the product throughout the country. Nigerian governments, all democratically elected increased fuel prices more-than ten (10) times, between the period 2000 and 2011 when prices were adjusted sometimes twice a year. In spite of four refineries situated in Port Harcourt, Warri and Kaduna and storage depots located strategically at different parts of the country, there is still distribution problem leading to, many Nigerians experiencing fuel shortages. It is a fact that during the fuel shortages, the economic and administrative life of the nation becomes disturbed and almost disrupted, The problem of petroleum products distribution in Nigeria has also been linked to the daily vandalization of pipeline by militants in the Niger Delta which is a problem federal government is still finding difficult to solve despite the various billions of naira injected into fighting crude-oil theft annually. This is consistent with findings in previous studies such as Raymond (2010). It was revealed in null hypothesis2 (HO_2) that price increase of PMS does not lead to increase in cost of distribution of other commodities including agricultural products. This hypothesis was empirically tested.

The result revealed that the effect of Price increase of petroleum products on other commodities had a Pearson product moment correlation i.e. sig. = 0.002. Thus, price increase of PMS leads to increase in cost of distribution of other commodities including agricultural products was supported by the empirical data. The Null hypothesis in these dimensions was "REJECTED".

The findings revealed that most prices of other commodities skyrocketed as transportation fare rose during price increase of PMS. Farmers had to pay more for transporting their goods and services to the markets; this resulted in increase in price of PMS which caused increase in transportation fare thereby leading to increase in the cost of other commodities including all agricultural products.

Also in null hypothesis 3 (HO_3), it was revealed that there is a relationship between price increase and the development of black market and long queues at filling stations across Nigeria. This hypothesis was empirically tested and the result revealed that build-up of queues at filling stations in Nigeria caused by price increase had a positive Pearson product moment correlation with sig. = 0.043 (see regression model 3). The study revealed that that some oil companies, independent marketers and other petroleum dealers, fuel haulage contractors, filling station owners and tanker drivers became greedy and allegedly enjoyed the period of scarcity of fuel to sell at higher prices. The adverse effect of pipeline vandalization induced shortages of petroleum products, and damages on the pipeline system; it became unsafe to pump product through the lines. As a result, petroleum products were transported by trucks. Distribution by trucks was costly and also much slower. For example, a

large volume of the products could easily be pumped within hours from Lagos to Maiduguri, but many trucks will take some days carrying less volume to reach the same destination. This slow movement coupled with the limited quantity transportable through tankers, created shortages, which caused long queues in filling stations across the country and bred black marketing, therefore made consumers to pay exorbitant prices.

Conclusively, It was revealed in null hypothesis 4 (HO_4) that there was no statistically significant effect of petroleum products in Nigeria. This hypothesis was empirically tested.

The result revealed that Price changes of petroleum products had a Pearson product moment correlation i.e. sig. = 0.007. Thus, the significant effects of price changes of petroleum products in Nigeria were supported by the empirical data. The Null hypothesis in these dimensions was "REJECTED".

This finding revealed that constant changes in the price of petroleum products in Nigeria have a great adverse negative effect on the macro-economic variables. It also reduces the productivity of workers, it also leads to hoarding of fuel by various marketers, it leads to queue in most filling stations, resulted to overloading of passengers and goods by commercial bus drivers, it also causes fire outbreak in most houses as a result of storage of PMS resulting in the destruction of lives and properties; it also reduced vehicles in most roads as a result of the fuel scarcity, macro-economic variables like social unrest, inflation, poverty and reduced the standard of living of the citizen were also affected negatively as a result of frequent price changes/increment. This is consistent with findings in previous studies such as Arenze (2011), Ougunbodede, Ilesanmi and Olurankinsa (2010) who have also posited that incessant price hikes of petroleum products have led to crisis and industrial actions led by some pressure groups in Nigeria which has caused distortion in the economy activities of Nigeria overtime.

5. Conclusion and Recommendations

The analysis of the data revealed that, in general, there is a significant impact of price changes of petroleum products in Nigeria. The following were the specific findings that answered the research questions:

i. That price changes significantly causes fluctuation to supply and distribution of petroleum products in Gwagwalada, Nigeria.
ii. That price increase of PMS significantly leads to increase in cost of distribution of other commodities including agricultural products.
iii. There was a statistically significant relationship between price increase and the development of "Black Market" and long queues at filling stations across Nigeria.
iv. There was a statistically significant effect of price changes of petroleum products in Nigeria on macro-economic variables.

Other findings included the rate at which constant petroleum product price increase affect other macroeconomic variables like unemployment, poverty, inflation and social unrest. The study revealed that the constant increase in price of PMS has a negative impact on employment generation; it has also led to high rate of inflation over the years.

The study also revealed that the regular increase in the prices of petroleum products in Nigeria also led to high rate of unemployment, poor standard of living which in general led to poverty thereby causing a drastic decline in the economic growth and development of Nigeria.

Petroleum products play a critical role in the economic development of Nigeria. Premium Motor Spirit (PMS) or petrol serves as an intermediate input to production, and thus changes in its price, Quantity or quality affect the profitability of production and productivity of other factors of production. Given the role of fuel in the economy, most governments in Africa-especially Nigeria-intervene extensively in the oil market.

The increase in the prices of petroleum products in Nigeria was caused due to the following key reasons:

Frequent changes of crude oil price, Federal government policies as they relate to fuel subsidy, Distribution problem, Vandalization of petroleum pipeline and Corruption

The major challenges facing prices of petrol in Nigeria is that sellers charge different prices in different places at different towns and cities, activities of the government officials and intermediaries and artificial scarcity created by almost all the stakeholders in the industry which had caused great havoc to the gross domestic product of the country. The price increase of PMS also led to high rate of unemployment, social unrest, poverty and above all inflation which is the major negative effect of fuel price instability in Nigeria. Increase in petroleum price also lead to an increase in the inflation rate in Nigeria.

5.1 Recommendations

Based on the problems and findings of the study and to enhance stability in the price of premium motor spirit (PMS) and reduce its negative implications in Gwagwalada and Nigerian economy as a whole, there is need to pursue the following recommendations vigorously;

i. Due to the heavy reliance or dependence on the petroleum products, the government should strive to make the products available at all time.

ii. More of other resources should be tapped so as to diversify the economy.
iii. The distribution channel of the flow of the petroleum products should be well monitored to avoid disruption of the distribution system or scarcity.
iv. The Nigerian National Petroleum Corporation (NNPC) should diversify its export/output baskets through adequate downstream activities. This will enhance self-sufficiency in petroleum products and economic growth. Nigeria's fuel shortages can never be solved by importing more fuel. Importing fuel is a temporary (short term) measure. Building more refineries in Nigeria to meet our domestic consumption and possibly export to neighbouring countries undoubtedly is the best solution to Nigeria's perennial fuel shortages.
v. The government should encourage more private company participation. Deregulated downstream requires adequate industry facilities, relaxation of some laws, a change in pricing policy as well as provision of transport and storage facilities, To attract new entrants into the market, product prices (before taxes) have to be set by the market in line with economic border prices.
vi. Government should fight corruption by establishing institutions that will arrest and prosecute corrupt public office holders. The major obstacle to Nigeria's self-sufficiency in refining fuel are the cabal and cartels of public/political officials and the fuel importing syndicate that combine to frustrate any attempt to formulate and implement sustainable policies that would enable the proliferation of refineries in Nigeria. Surely it will be cheaper to refine the fuel in Nigeria and our neighbouring countries will prefer to buy from us rather than import form far-away lands.
vii. The federal government as well as the state and local governments should begin to source fund from other sectors of the economy by tapping other resources in the country and stop depending on oil as the main source of revenue.
viii. The market forces should be allowed to determine the prices of petroleum product in the country this will mean total removal of subsidies. Even though the price will be high but with time it will adjust.

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