

# **A Contribution to the Debate on Petroleum Subsidy and Its Removal in Nigeria: Positive Economics Perspective<sup>1</sup>**

By

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## **Abstract**

This paper examines how Nigeria arrived at a controversial fuel subsidy, the implications of the subsidy on consumers, oil market, government expenditure and general economic performance. Simple tools of positive economics are used in the analysis. The analysis shows that: (i) complementing domestic shortage with importation despite the country has comparative advantage in fuel production is the initial policy error that put Nigeria into subsidy burden; (ii) there is consumption and welfare gains to consumers with subsidy and its removal negatively affect the two due income and substitution effects; (iii) subsidy creates inefficiency in the market, but its removal without liberalizing the market will generate hardship for consumers; (iv) expansion in domestic supply will lead to fall in price and subsidy will be eliminated naturally; and (v) subsidy constitute fiscal burden, but its removal would lead to better economic situation only if the revenue gain is spent on productive services which is function of level of political rent.

Keywords: Subsidy, consumer, domestic supply, comparative advantage, fiscal burden

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**Introduction:** The debate on fuel subsidy and its removal has occupied public discuss in Nigeria over the years. There are mainly two different contrasting views. The first view consists of people who see payment of fuel subsidy in Nigeria as economic waste which constitute huge fiscal burden on government, hence hindering investment in essential infrastructure. It is also argued that the subsidy benefits rich people more than the poor. Thus, this group of people argued strongly for the removal of fuel subsidy. The second view strongly opposed removal of fuel subsidy because the subsidy is perceived as the only benefit the common man is enjoying in the country. It is often argued further that removal of subsidy will make life costlier for the common man while increasing the rent to political elite. However, what is apparent from the different episodes of subsidy removal in the history of Nigeria is that fuel price always rise when subsidy is removed. The increase in price of fuel most often would in turn lead to exorbitant increase (more than double sometimes) in transport fare and prices of many market goods. All these usually ignites nation-wide reactions such as strike by labour union and sometimes protests.

The debate generally raise a number of issues such as: who gains and who loses from subsidy and its removal? How did Nigeria arrived at this controversial subsidy regime? What is the effect of subsidy on oil market? Can effective and efficient market operation be achieved by removal of subsidy? Would subsidy removal lead to better and more infrastructure? There is upsurge of research papers particularly since year 2012 which examined these issues and even more (see for example, Nwachukwu & Chike 2011; Obayi et al 2012; Bazilian & Onyeji 2012; Majekodunmi 2013; Umar & Umar 2013; Siddig et al 2014; Akanle & Adebayo 2014; Akinyemi et al 2015; Okwanya et al 2015; Igbokwe-Ibeto et al 2015; Adeoti et al 2016 Rentschler 2016; Adeoti et al 2016; Olaniyi et al 2017; Akor 2017; Iwayemi 2019; Omitogun et al 2021; McCulloch et al 2021 among others).

This paper contributes to the literature on subsidy and its removal by examining different issues around subsidy using the tools of positive economics. Specifically, the paper examines the: expected gains from subsidy; effects of subsidy and its removal on consumers' choice; implication of subsidy on the market; peculiarity of Nigeria fuel subsidy; and who loses from the

subsidy removal policy, and the political economy of the linkage between subsidy and government expenditure, monopoly rent, as well as smuggling.

**What is subsidy?:** There is no generally acceptable definition of subsidy, however, it could be defined as a payment made by government to a firm or household with the intention of reducing the cost of factor(s) or goods and services. Shoup (1973: 307) defines subsidy as “a measure that provides financial advantage to a firm or household in the private sector that is linked with buying or selling some good or service or factor of production, which is intended to increase or to decrease the purchase, sale, or use of that particular good or service or factor”. International Energy Agency (IEA, 1999) has defined energy subsidy as any government action that: lowers the cost of energy production; raises the prices received by energy producers; or lowers the price paid by energy consumers. Subsidy can also be viewed as negative tax, that is, tax that is less than zero.

**Types of subsidy:** subsidy can either be production or consumption subsidy. A subsidy that encourages production of a commodity is regarded as production subsidy, while consumption subsidy do not add to production but affect the consumers choice. There are different types of production subsidy: corrective subsidy; export subsidy; pigovian subsidy or wage subsidy. Similarly, consumption subsidy can either be quantity subsidy, ad valorem subsidy or lump-sum subsidy. Specifically on energy subsidy, IEA identified four major forms of energy subsidies: grants and credits (soft loans or interest rate subsidy) to producers or consumers of energy; market price support; differential tax rates on different fuels; and publicly funded research and development programs.

**Expected gains from subsidy:** there are gains associated with subsidy such as reduction of production cost or market price, increase social efficiency, and releases resources for other purposes. Meanwhile if subsidy is paid for a long period of time it becomes a burden and can distort the economy, particularly, it discourages innovations and market competition/efficiency. The effectiveness and efficiency of a subsidy program (or subsidy removal program) depend heavily on the specifics of implementation. The design of subsidy programs need to take into account a number of factors, such as political acceptability, leakage of benefits to households outside the target group and cost effectiveness.

**Subsidy and consumers' choice:** assuming a representative consumer has to choose consumption bundle from different combinations of two commodities: fuel and a composite goods that stands for everything else that the consumer wants to consume other than fuel. Let  $X_f$  represent fuel and  $X_o$  all other commodities respectively. The prices for the two commodities are  $P_f$  and  $P_o$ . The consumer has amount of money  $M$  to spend on consumption of  $X_f$  and  $X_o$ . The budget constraint of the consumer is therefore written as:

$$P_f X_f + P_o X_o \leq M \quad (1)$$

Where  $P_f X_f$  is the total amount spend on consumption of fuel and  $P_o X_o$  is the amount spend on other goods. The budget presented in equation (1) requires that the total amount of money the consumer spent on the two commodities cannot be more than the total money income of the consumer. Thus, the consumer's affordable consumption bundles are those that do not cost more than  $M$ . Let the consumer utility function be given as:

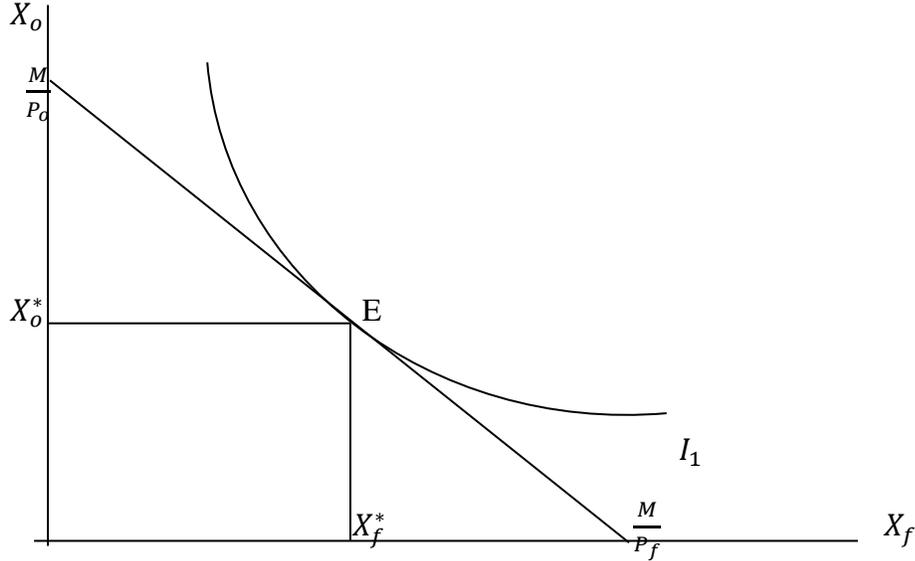
$$U = u(X_f, X_o) \quad (2)$$

The choice problem of the consumer is to maximize equation 2 with respect to equation 1. The optimal choice will be at a point where:

$$\frac{\partial U / \partial X_f}{\partial U / \partial X_o} = \frac{P_f}{P_o} \quad (3)$$

Equation 3 says that the marginal rates of substitution must equal the price ratio for the consumer to make an optimal choice. This is depicted graphically in **Figure 1** below, it is the optimal choice of the consumer without subsidy.

**Figure 1: Consumer Equilibrium Without Subsidy**



$X_f$  is the quantity of fuel, while  $X_o$  is the quantity of other commodities. If the consumer consumes only fuel, he can consume up to  $\frac{M}{P_f}$ , similarly, if he consumes zero fuel, he can consume total of  $\frac{M}{P_o}$  of other goods. However, this representative consumer consumes the two commodities and maximize his utility at point E where he consume  $X_f^*$  and  $X_o^*$  amount of fuel and other goods respectively.

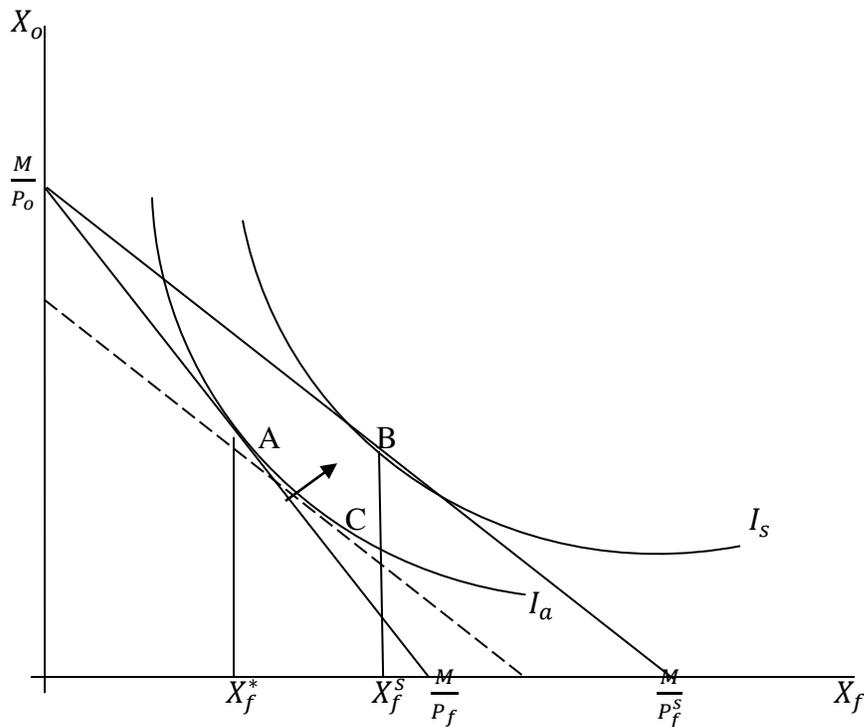
Assuming there is  $s$  naira subsidy per litre of fuel (commodity  $X_f$ ). For a quantity subsidy, the actual price of fuel the consumer pays is  $P_f - s$ , which is less than  $P_f$ . If the subsidy is an ad valorem subsidy that is based on certain percentage of the price of fuel, the consumer pays  $(1 - \varphi)P_f$ , where  $\varphi$  is the rate of the subsidy. Irrespective of the type of subsidy, the consumer pays less than  $P_f$ . Let the price after the subsidy be  $P_f^s$ , such that  $P_f^s < P_f$ . How does this affect the welfare of the consumer?

Since  $P_f^s < P_f$ , subsidy reduces the price of fuel, hence, commodity  $X_f$  becomes relatively cheaper. This will first alters the budget constraint of the consumer and thus affects his choice and welfare. This change would have two types of effects: first, the substitution effect and second, the income effect. Now that fuel is relatively cheaper, the rate at which the market allows the consumer to substitute other goods  $X_o$  for fuel  $X_f$  would decrease. The change in demand due to change in rate of exchange or substitution is the substitution effect. Generally, the demand for a normal good will increase if its price falls. With subsidy on fuel, the consumer's money income  $M$  can buy more of fuel  $X_f$ . That is, there is an increase in consumer's real income

though the nominal income remains the same. The change in demand due to change in purchasing power is the income effect. This is display in figure 2 below,.

Point A is the initial equilibrium with indifference curve  $I_a$  and  $X_f^*$  amount of fuel is consumed. When a subsidy of  $s$  naira per litre of fuel is paid by government, the price of fuel falls from  $P_f$  to  $P_f^S$  and thus the budget line becomes flatter from  $\frac{M}{P_o} \frac{M}{P_f}$  to  $\frac{M}{P_o} \frac{M}{P_f^S}$ . The indifference curve also shifts outward from  $I_a$  to  $I_s$  and new equilibrium is established at point B with  $X_f^S$  amount of fuel consumed. It is obvious from the graph that  $X_f^S > X_f^*$  and  $I_s > I_a$ , it therefore implies that payment of subsidy will leads to increase in bundle of goods consume as well as improve the welfare of the consumer. The two effects are also depicted in the graph. Movement from point A to C is the substitution effect while the movement from C to B is the income effect.

**Figure 2: The Effect of Subsidy on Consumer Utility**



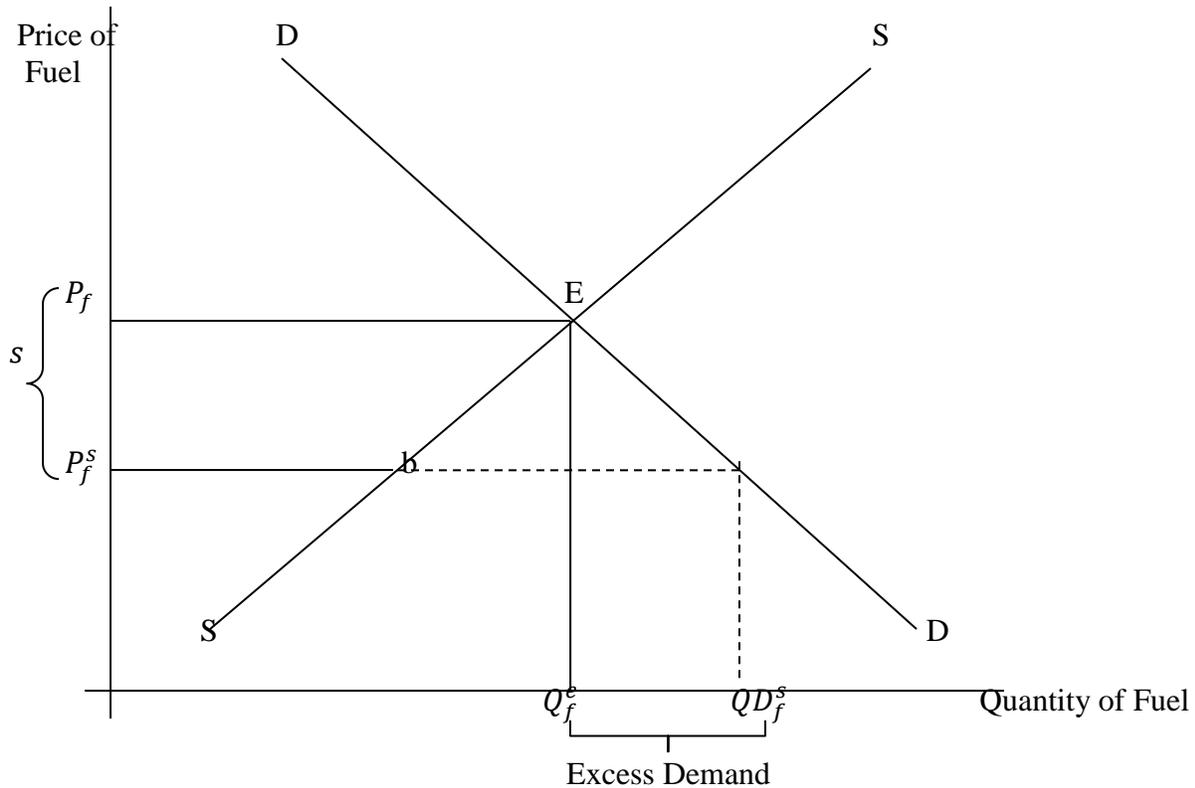
**Subsidy removal and consumers' choice:** figure 2 can also be used to explain what happens if the subsidy  $s$  naira subsidy per litre is removed. Let us assume that point B is the initial equilibrium position of the consumer. If the subsidy is removed, budget line will shift inward

from  $\frac{M}{P_o} \frac{M}{P_f^s}$  to  $\frac{M}{P_o} \frac{M}{P_f}$  (that is, the budget line become steeper), the indifference curve will also shift backward and new equilibrium is established at lower welfare level. It is therefore obvious that subsidy removal will have negative impact on the consumer, because rate of substitutions between fuel and other commodities will increase and the purchasing power of the consumer will decrease.

Similarly, this explanation holds for the case of production subsidy. A subsidized input becomes relatively cheaper, such that producer can buy more of such input and the rate of substitution between other inputs and the subsidized input decreases. Thus, the isocost line becomes flatter, the isoquant shift outward and new equilibrium is established at higher level of output. However, the fuel subsidy in Nigeria that is the focus of this paper is not production subsidy.

**Subsidy and the Market:** As discussed above, average consumer benefits from payment of subsidy. Figure 3 below shows the implication of subsidy in the market in terms of market demand and supply. DD is the demand curve of fuel, SS is supply curve of fuel,  $P_f$  is equilibrium or market price of fuel and  $Q_f^e$  is equilibrium quantity demanded and supplied at price  $P_f$ . The government thinks this price is too high for the consumers and then decided to pay  $s$  naira subsidy on each litre of fuel. The consumers now pay  $P_f^s$  instead of  $P_f$ . Demand and supply respond to this change in price. First, there will be increase in demand from  $Q_f^e$  to  $QD_f^s$ , creating excess demand. There will be short of supply in the market to meet the excess demand created by the subsidy. Then, producers will respond by increasing supply. Thus, subsidy can have positive externality in the economy. However, if there is no expansion in supply, then the market will disequilibrium and inefficiency will prevails.

**Figure 3 Implication of Subsidy in the Market**



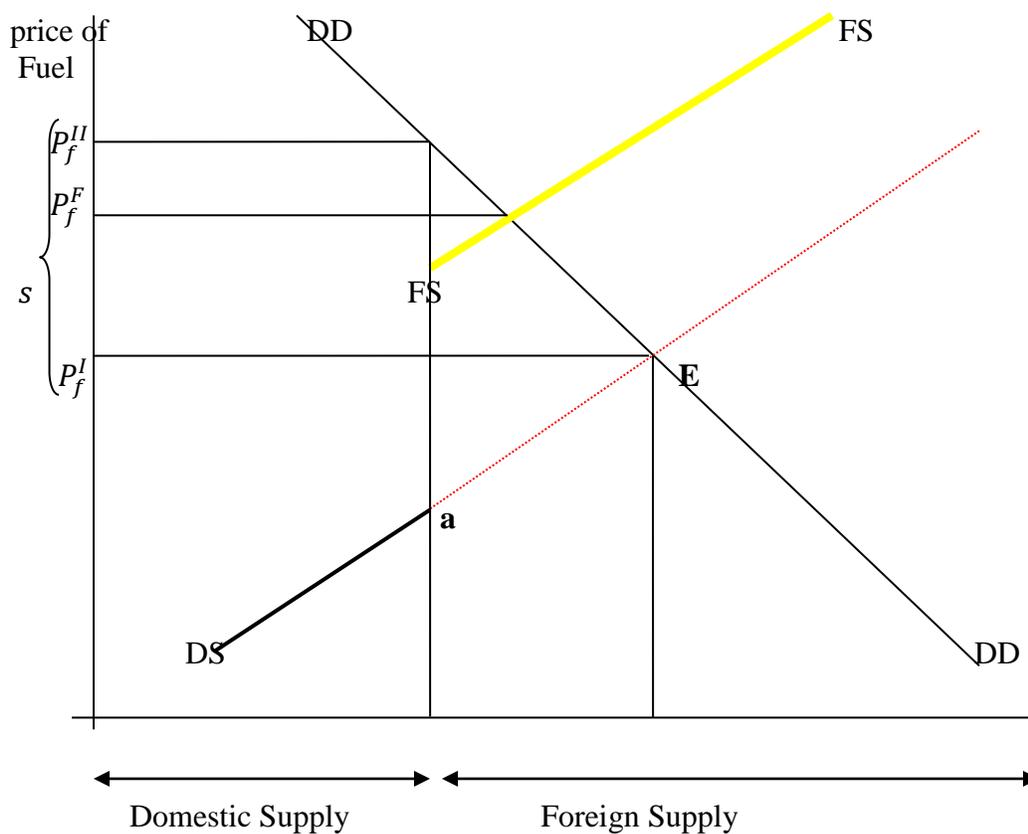
**The Nigeria Fuel Subsidy:** The discussion above described the impact of subsidy in general context, however, this did not captures the case of how Nigeria arrived at the subsidy in the first place. Following Prof. David West interview, Nigeria did not start with subsidy but subsidy started when there was shortage of domestic supply at a point in time, and the shortage was supplemented with foreign supply. This scenario is depicted in figure 4: DD is domestic demand, DS is domestic supply and FS is foreign supply respectively. Before the shortage, the domestic market price of fuel was  $P_f^I$ . There was shortage, thus the domestic market could only supply up to point a. The immediate consequence of this shortage was increase in price from  $P_f^I$  to  $P_f^{II}$ .

Naturally there is need for government intervention in this type of situation. If the government comes in, the most appropriate economic decision was to make policies that would boost domestic supply. If domestic supply increases up to equilibrium point E, price will fall to the equilibrium price  $P_f^I$ . Instead the government of Nigeria decided to import from foreign market at foreign price  $P_f^F$ . The foreign price is higher than the domestic market price ( $P_f^F > P_f^I$ ).

Meanwhile, when the shortage occurred the reservation price was  $P_f^{II}$  which is higher than the foreign price ( $P_f^{II} > P_f^F$ ). A rational supplier (domestic and foreign) will want to sell to consumers who are willing to pay the reservation price  $P_f^{II}$ . However, government pegged price at  $P_f^I$  and pay  $s$  naira subsidy per litre of fuel. Though, government paid the subsidy so that fuel will be sold at price  $P_f^I$ , since the reservation price is high, there is still incentive for suppliers not to sell at the regulated price. This is the reason for black market in the industry.

It is apparent from the figure that, if domestic supply increases up to equilibrium point, foreign supply will be eroded, the subsidy will disappear automatically and consumer would still be paying equilibrium price  $P_f^I$ .

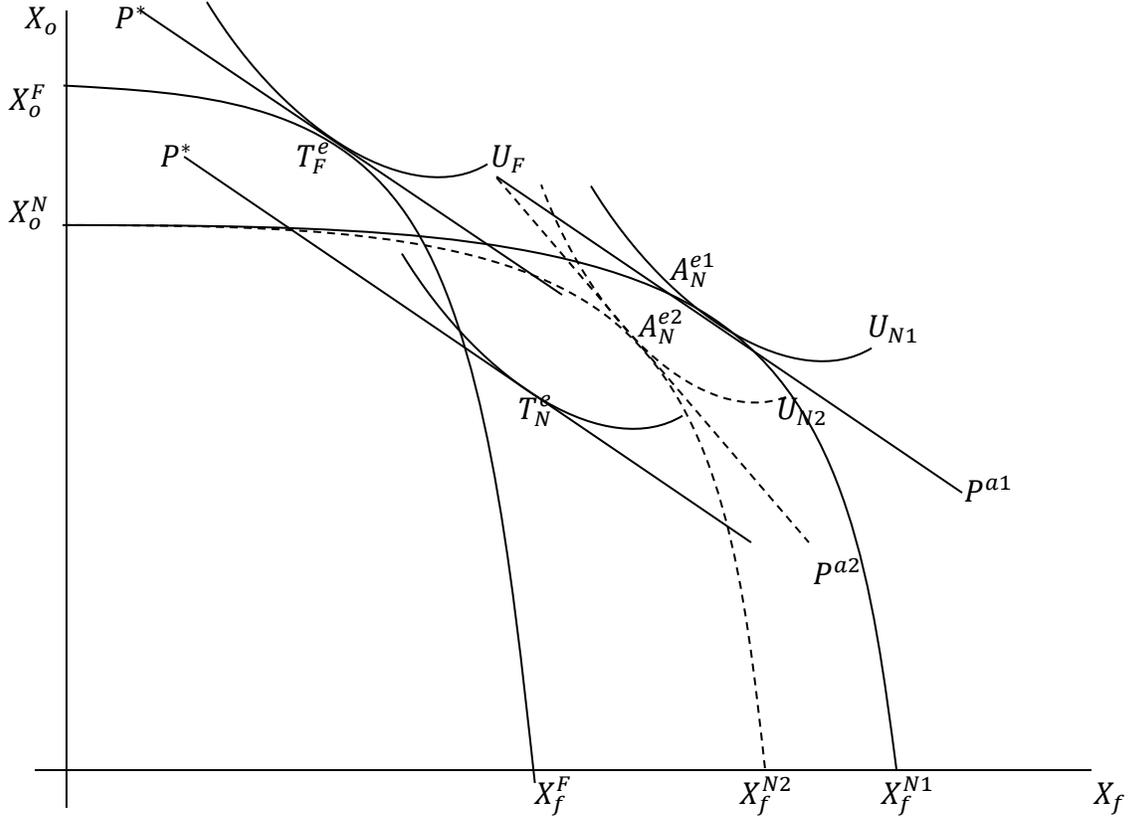
**Figure 4: Supply Shortage, Imports and Subsidy**



**The Original Error:** The initial mistake was supplementing domestic supply with foreign supply. Why was it an error? Since Nigeria is endowed with crude oil, the country has comparative advantage in the production of commodity  $X_f$ . As shown in figure 5, at the autarky price ratio, fuel  $X_f$  is relatively cheaper. Basically, Nigeria should specialize in production of refine oil (in this case fuel,  $X_f$ ) and export. The country will gain from trade by exporting  $X_f$  and importing  $X_o$  (commodities where the country is disadvantaged).

The initial autarky equilibrium is at point  $A_N^{e1}$ . After the shortage of supply, the Production Possibility Frontier (PPF) shift inward and new autarky equilibrium is established at a sub-optimal level  $A_N^{e2}$ . The autarky price ratio before the shortage is flatter (that is,  $P^{a1} < P^{a2}$ ) than new price ratio. The consumer now faces a relatively higher price ratio, thus the community welfare level declined from  $U_{N1}$  to  $U_{N2}$ . The consumers will naturally prefer the initial welfare level, because they enjoy bigger consumption bundles at that level. One major implication of the inward shift of Nigeria's PPF is that, there are unused potentials in oil sector (particularly the down stream sub-sector). The most desirable thing government could have done at that time was to make policies that will boost production of  $X_f$ , such that the PPF will adjust back to it initial position. Instead government opted to import fuel at world price ratio  $P^*$  to supplement domestic supply. This world price ratio is not tangential to Nigeria PPF and the trade equilibrium is below the autarky equilibrium. This is because the world price is relatively higher particularly in the oil market. Notice that the marginal cost (which is the cost of import) is higher than the domestic market price of fuel. Government in its desire to keep Nigerians at the autarky welfare level, provide subsidy to take care part of the price consumers would have paid.

**Figure 5: Endowment and Gains from International Trade on Fuel**



$X_0^F X_f^F$  is the production possibility frontier (PPF) of foreign country,  $X_0^N X_f^{N1}$  is the initial PPF of Nigeria,  $X_0^N X_f^{N2}$  is Nigeria PPF after supply shortage,  $A_N^{e1}$  is the initial autarky equilibrium of Nigeria,  $A_N^{e2}$  is the new autarky equilibrium,  $U_{N1}$  is initial community utility of Nigeria,  $U_{N2}$  is new community utility of Nigeria,  $T_F^e$  is trade equilibrium of foreign,  $U_F$  is the community utility of foreign country,  $T_N^e$  is trade equilibrium of Nigeria,  $P^*$  is the world price ratio,  $P^{a1}$  is the initial autarky price ratio and  $P^{a2}$  is the new autarky price ratio respectively.

**Subsidy and Government Expenditure:** A number of reasons have been given why the subsidy should/was removed. These reasons include among others: (i) The subsidy has grown to unsustainable level, hence becomes a burden on government so much that government cannot provide basic infrastructure such as education, energy, transport and health care e.t.c.; (ii) The subsidy is benefiting more a “cabal” that has the monopoly of importing fuel than the masses; and (iii) The subsidy encourages smuggling of fuel to neighbouring countries.

The first reason is the main argument of government why subsidy must be removed. To scrutinize this argument, it is required to address questions such as: is fuel subsidy a burden? Can removal of the subsidy increase investment in infrastructure?

Since Barro's 1990 paper on the impact of government expenditure on growth, growth researchers are found of specifying growth model with government expenditure as one of the explanatory variables. Barro (1990) extended the endogenous growth models to include tax-financed government services that affect production or utility. He shows that growth and saving rates fall with an increase in utility-type expenditures, while the two rates rise initially with productive government expenditures but subsequently decline as income tax increases. Now assume producers in Nigeria have access to Barro type production function given as:

$$y = \Phi(k, g) \quad (4)$$

Where  $y$  is per capita output,  $k$  is representative producer's quantity of capital per capita and  $g$  is per capita quantity of government services. Barro argues that the idea of including  $g$  as a separate argument of the production function is that private inputs ( $k$ ) are not a close substitute for public inputs. Assuming  $g$  consist only productive government spending, then more  $g$  would result to more  $y$  (more output for individuals in the economy). Government like the individual has a budget constraint that can be written as:

$$T_{i(t)} + G_{(t)} + S_{(t)} \leq \gamma \int \tau_{i(t)} Y_{i(t)} di + R_{(t)} \quad (5)$$

Or  $T_{i(t)} + G_{(t)} \leq \gamma \int \tau_{i(t)} Y_{i(t)} di + R_{(t)} - S_{(t)}$  if subsidy is defined as negative tax

Where  $T_{i(t)}$  is transfer (political rents) to politicians,  $G_{(t)}$  is aggregate productive government spending,  $S_{(t)}$  is subsidy on fuel, the parameter  $\gamma \in [0, 1]$  measures how much of the total revenue is used in providing productive public services,  $\tau_{i(t)}$  is a linear tax rate on output,  $Y_{i(t)}$  is output and  $R_{(t)}$  is rent from natural resources (in this case oil). Notice that  $\frac{G_{(t)}}{L_{(t)}} = g$ .

The subsidy in question is a utility-type public expenditure, thus, is a deadweight loss because it did not contribute to  $g$  which matters for production. The bigger  $T_{i(t)} + S_{(t)}$  relative to  $G_{(t)}$ , the smaller  $\gamma$  will be and vice-visa. Therefore, all else remaining the same,  $\gamma$  will increase when subsidy is remove and the budget constraint becomes:

$$T_{i(t)} + G_{(t)} \leq \gamma \int \tau_{i(t)} Y_{i(t)} di + R_{(t)} \quad (6)$$

The change in  $\gamma$  depend on the behavior of  $T_{i(t)}$ , if  $T_{i(t)}$  is constant,  $\gamma$  will increase and  $G_{(t)}$  will rise proportionately to the size of the subsidy. On the other hand, if  $T_{i(t)}$  rise and if the increment is equal to  $S_{(t)}$ , then  $\gamma$  will not change and productive expenditure remains the same, consequently  $g$  and  $y$  will not change.

This analysis shows that subsidy is a burden and can deprive government from spending on productive services. However, the revenue gains from subsidy removal will have positive impact on the economy only and only if, it is spent on productive type expenditure.

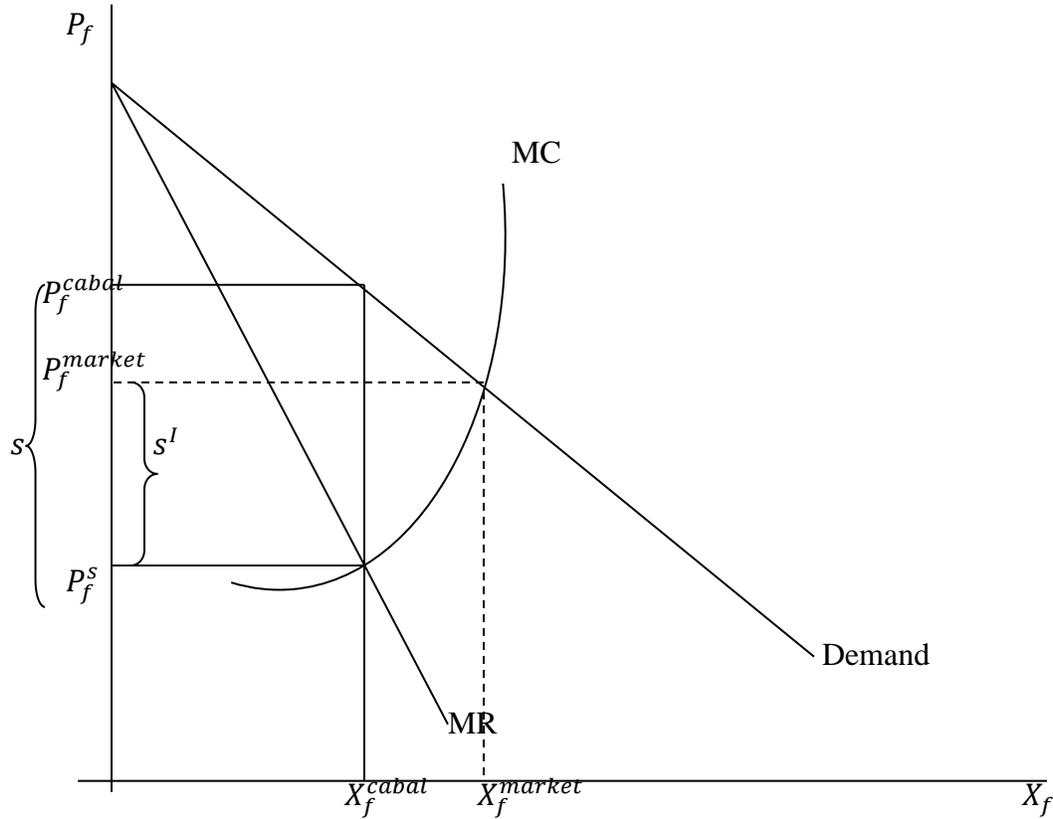
**Subsidy and the “Cabal”:** Nigerians have been made to understand that there is a cabal that has the monopoly of importing fuel to the country and that the subsidy benefits this cabal more than the masses. Would removal of subsidy solve the problem of the cabal? And who suffers more from subsidy removal – the cabal or the masses? It is important to mention here that government created the cabal by restricting the number of licenses issues for importation of fuel to few firms. This restriction created barrier to entry in the industry and economic rents (‘cabal rents’) to those who got the license.

Figure 6 depicts that both the cabal and the masses benefit from the payment of subsidy. The difference between market and cabal price of fuel is the gains that goes to the cabal. If subsidy is removed without liberalizing the market, the cabal will still exist and fuel would be sold at cabal price. Thus, cabal would not suffer any loss, only the consumers suffer. If the market is liberalized by increasing the number of licenses without removing subsidy, output will increase from  $X_f^{cabal}$  to  $X_f^{market}$ , price will fall from  $P_f^{cabal}$  to  $P_f^{market}$ , and subsidy will decline from  $s$  to  $s^l$ . Cabal will lose the total ‘cabal rents’ with liberalization and hence the cabal will disappears and consumers suffer no harm. If subsidy removal is implemented along with liberalization, both the cabal and the consumers suffer. Fuel will sell at market price which is lower than cabal price but higher than the subsidized price. Cabal rents will disappear and consumers pay higher price. Note that the analysis here does not include domestic supply.

The administration of President Buhari did some reforms which has transferred the monopoly right of importing fuel to NNPC, hence, eliminating the cabal rents. However, this does not eradicate subsidy. The best that can happen with this reform is that price would decline from

$P_f^{cabal}$  to  $P_f^{market}$ , consequently the amount of subsidy to be paid will fall a little. If there is zero rent to NNPC, the amount of decline in subsidy would equals the cabal rent.

**Figure 6: Import Subsidy and the Cabal**



*MC is the marginal cost (marginal cost of importation), MR is the marginal revenue,  $P_f^{cabal}$  is the cabal price of fuel,  $P_f^{market}$  is the market price of fuel,  $P_f^S$  is the subsidized price of fuel,  $X_f^{cabal}$  is the cabal quantity supplied and  $X_f^{market}$  is the market quantity supplied of fuel.*

**Subsidy and Smuggling:** The last reason alluded for removing the subsidy on fuel is the argument that the subsidy encourages people to smuggle the product to neighbouring countries. Naturally, rational seller would prefer to sell to consumers who are willing to pay higher price and consumers would on the other hand want to buy from market that offers lower price. As shown in Figure 5, the autarky price of fuel is lower relative to foreign price. Since subsidy was made to keep the domestic price at autarky price, fuel will be relatively cheaper in Nigeria comparing to neighbouring countries that do not have comparative advantage in production of fuel. Thus, smuggling to the neighbouring countries is a profitable business for any rational seller.

**Concluding Remarks:** This paper examines how payment of fuel subsidy and its removal affects the consumer, the cabal, fuel market and government spending. How Nigeria arrived at fuel subsidy despite abundant endowment of crude oil is also discussed in the paper. It is shown in the analysis that subsidy lowers the price consumers pay for fuel and thus increase consumption bundles due to substitution and income effects. On the other hand, removal of subsidy will increase price, reduce consumption and welfare in general.

Nigeria arrived at the controversial fuel subsidy as a result of complementing domestic supply of fuel with imported fuel instead of promoting domestic production. The importation and the subsequent subsidy paid on the imports was the original policy error the government committed. Sufficient increase in domestic supply will erode importation and consequently the subsidy will automatically disappear.

The paper concludes that, subsidy removal without liberalization of the downstream oil sector would not solve the problem of supply shortage rather inflict hardship in term of higher prices on the consumers. Government can also liberalize without removing subsidy, in such way, supply will increase, price will fall, subsidy will decrease and cabal monopoly will disappear.

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