International Journal of Humanities and Social Science Research
ISSN: 2455-2070; Impact Factor: RJIF 5.22
www.socialresearchjournals.com
Volume 2; Issue 5; May 2016; Page No. 46-48

Determining the relationship between the supply and price of petrol in Tanzania: A case study

Samuel Nyambega Nyang'au

School of Business & Economics, Garissa University College, P.O. BOX 1801- 70100 Kenya.

Abstract
The present study deals with the determination of the relationship between the supply and price of petrol in Tanzania, taking Gulf Africa Petroleum Corporation in Mwanza city as a case study. Over the years the supply of petrol has not been stable. It fluctuates from time to time prompting an automatic fluctuation of its prices and related products. Tanzania alone has witnessed and continue to witness occasional changes in the price of petrol being orchestrated by petrol supply changes. The present paper was guided by the following objectives: To find the response of price to the changes in the supply of petrol and the influence of petrol price on other economic variables. The study used secondary data whereby time series was employed to get data from the year 2000 to 2011. The study employed simple Ordinary Least Square regression model whereby data was analysed using STATA 9.1. The results showed that a slight change in the supply of petrol leads to a change in its price. Changes in the supply of petrol hence its price will automatically lead to changes in the price of other economic variables dependent on petrol. As a recommendation, the study calls for government intervention so as to keep the price of petrol on check. Other sources of energy such as natural compressed gas (NCG) should be sought as an alternative to petrol.

Keywords: Price, supply, petrol, Tanzania, Mwanza

1. Introduction
Basic economic theory holds that the price of any commodity is determined at a point of interaction between supply and demand of that commodity. Petroleum is one of the basic commodities that form the lifeline of most economies. Just like any other commodity, the price of petroleum is determined at a point where the forces of supply and demand interact. On the international scale, oil prices respond to the changes in supply and demand and such sensitivity of petroleum prices to the changes in demand and supply affect many economies in a number of ways than one (Yan, 2012) [11]. In their bid to control the price of petrol, Organization of Petroleum Producing Countries (OPEC) has always used supply as the main instrument for controlling petroleum prices. For instance when it (OPEC) wants to increase the price of petrol, it reduces the amount of supply and when it wants to reduce the price it increases the amount of petrol and petroleum products (GAO, 2005). This means that Organization of Petroleum Producing Countries (OPEC) juggle with the supply and demand of petroleum to determine the future trend of the price of petroleum by adjusting oil production capacity by way of decreasing or increasing oil production in a bid to protect the interests of oil producing member countries. Sometimes OPEC regulates the supply not only to protect the interests of members but to check and put embargoes on other countries. This happened in 1974 when OPEC limited the production of oil, a step that had an effect on the price of oil as it rose from $4 per barrel to $12 per barrel (Federal Trade Commission, 2005) [2].

The sensitivity of petroleum price to the changes in supply and demand is such that a very small change causes a big change in its price. The 1974 incident illustrates this point. With the change in the production capacity by the Organization for Petroleum Producing Countries (OPEC) by then, the price of petrol tripled from $4 to $12 per barrel (Lin, 2011) [8]. This point is supported by Erceg and others who reveal in their research that a persistent shortage of petroleum supply leads to a sharp increase in its price (Erceg, *et al*., 2011) [1]. As the price of petrol changes due to the changes in supply, there is an automatic effect on other economic variables that are closely related with petrol. For instance, factories or industries which rely on petrol for their production activities experience very high cost of production as petrol prices shoot up. The high cost of production in turn translates into increased prices of products produced by such factories. At the same time the increased price of petrol lead to the increase in the cost of transportation which in turn curtails commuter or transportation activities of persons/goods. Overall, the affected economies stagnate as the cost of living becomes expensive and unbearable due to the escalation of the cost of production (OECD, 2008, Litman, 2013) [9, 7].

1.1Objectives of the study
To find the response of supply to the changes in price of petrol in Tanzania.

Hypothesis of the Study
H0: Price of petrol does not influence its supply
H1: Price of petrol influences its supply

2. Literature Review
This section concentrates on reviewing various researches related to the topic.

In his paper presented in a conference organised by the department of economics, University of West Indies, Greigg (2011) [3] has shown that high petroleum prices will lead to reduced demand for it. In its petroleum briefing note, the World Bank (2009) [10] revealed that international oil prices quadrupled because its demand shot up because its supply and that of its related products had shrank greatly. This led to an increase in price. This is supported by Yan (2012) [11] who carried out a study based on international oil prices and found

out that petroleum prices are affected by changes in the quantity of petrol. The US GAO (2005) carried out a study in the year 2005 and found out that Organisation of Petroleum Producing Countries (OPEC) use the quantity of petroleum to regulate the price of petrol.

Lin (2011) [8] carried out a study which revealed that changes in the production capacity of petroleum leads to drastic changes in its price. Hamilton (2008) concurs with Lin after his study indicated that changes in the price of petroleum are caused by changes in its quantity.

In their study of the non-linearities of the oil price –output relationship, Kilian and Vigfusson (2011) [6] found that an increase in the price of oil leads to a reduction in people's disposable income (in the short-run) which automatically leads to a decrease in their demand for various goods and services.

3. Research Methodology and Design

This research was a quantitative as well as a qualitative type of study.

3.1 Study area

Mwanza city in Nyamagana district.

3.2 Method of data collection

The study engaged time series data. Various documents were explored and data relevant to the study was collected.

3.3 Data analysis

Data analysis included explanations based on the econometric model. The estimation was done using STATA 9.1 econometric package so as to get credible results. After necessary estimations, tests were undertaken.

3.4 The model

The model involved the following equation in which the dependent variable was assumed to be the Supply of oil while the explanatory variable was the price of oil.

$S=f(P)$

But price is not the only factor that determines the supply; there are other factors such as income (y), climate (cl), and consumption (c).

Equation

$Qs = \beta_0 + \beta_1 P + \mu$

$\text{Log } Y = \beta_0 + \log \beta_1 X + \mu$

Where

Qs Quantity of oil supplied

β_0 & β_1 are parameters

P (X) price of oil

μ Error term (contain other factors like y, cl and c)

3.5 Estimation techniques

Before actual estimation, summary statistics and series of tests were conducted: Initially the variables were not normally distributed hence were transformed from the log form to linear, serial correlation (Autocorrelation) heteroscedasticity and ov (omitted variables) test. The econometric package used for empirical analysis and estimation was Stata 9.1.

3.6 Type of data and source

The type of data used in this study was secondary time series data obtained from the records of Gulf-Africa Petroleum Corporation in Tanzania between the period 2000 and 2011. Time series was used because its data is easily obtained.

4. Descriptive Results, Empirical Findings and Interpretation.

4.1 Descriptive analysis

Table 1: Statistical Analysis

Variable	Obs	Mean	Std. Dev	Min	Max
Year	12	2005.5	3.605551	2000	2011
Priceperli-s	12	1314.167	361.3977	870	1940
Supplyperli-y	12	407887.5	114761.5	219000	547500

Source: Field data, 2013

The information contained in the table above shows the statistical analysis (summary) after being collected from the various documents. The study had 12 observations, with the mean of 1314.167 of price per litre while supply had a mean of 407887.5 per litre in a year, with the standard deviation of 361.3977 and 114761.5 respectively.

4.2 Empirical findings

By using simple Ordinary least square, an equation was formed comprising of quantity supplied (represented by log of quantity supplied) which is influenced by the price (represented by log of prevailing price at a specific time).

$\log Y = \beta_0 + \beta \log X_1$

Table 2: Regression results from STATA

logsupply	Coef.	Std. Err.	T	p>I t I
Logprice	1.032488	.1254159	8.23	0.000
-cons	5.500013	.8968054	6.13	0.000

$R^2 = 0.8714$, Probabilty F=0.0000

Source: Field data, 2013

logsupply=5.5005 + 1.032 *logprice*

After obtaining the above regression results, the overall model was found to be significant at 1 percent with the probability value of 0.000. Conversely R-square was 0.87 meaning that about 87 percent of the supply of petrol was influenced by the price changes. A unit increase in the price led to the increase in the supply of petrol by 1.032488.

4.3 Diagnostic tests

Various model diagnostic tests were performed and the results indicated that the model was well specified. However, the ov test indicated that some variables were omitted because the researchers aimed at assessing the relationship between supply and price only. Further, Breusch-Godfrey LM test revealed that there was no serial correlation with probability value of $chi^2$0.1440. The F-statistic test for the joint significance of the dependent variables in the model was highly significant at one percent level with the probability value of 0.0000, while the R-squared (coefficient of determination) was 0.87 meaning that about 87 percent of the variations in supply is caused by change in price.

4.4 Hypothesis Testing

H0: Price of petrol does not influence its supply

H1: Price of petrol influences its supply

From the above analysis, it has been shown that about 87 percent of the variations in the supply is caused by a change in the price. This leads to the rejection of the null hypothesis that the price of petrol does not influence its supply.

5. Results and Discussion

The present study examined the relationship between the supply and price of petrol in Tanzania between the years 2000-2011.

The results of the study revealed that a slight change in the price of petrol influences its supply. This can be verified from the results where R-squared was found to be 0.87, meaning that 87 percent of the supply of petrol was influenced by the price changes. A unit increase in the price therefore led to the increase in the supply by 1.032488. Consequently, a change in petroleum price reflects its effects on many other economic activities that have a bearing on petrol.

Most vehicles for transport do use petrol hence an increase in the petrol price will directly lead to the increase in the transport costs (fares). On the other hand the industries which use petrol in running their machines will also be affected because it will increase their operating costs thereby leading to the increase in the prices of those goods produced by such industries.

6. Conclusions and Recommendations

The research found out that the price of petrol plays a leading role in determining the amount of its supply. This means that the higher the price of petrol the higher the supply and vice versa. The onus is on the Government of Tanzania to intervene and regulate the price of petrol. This can be done by investing more money in exploring more oil deposits (as has been done in the neighbouring countries of Kenya and Uganda where both countries have discovered huge oil deposits) so as to supplement it with imported oil. This will make petrol to be under reasonable and affordable price hence reducing the problems of price instabilities. The Government should also discover other sources of energy apart from oil.

7. References

1. Erceg C, Guerrieri L, Kamin SB. Did Easy Money in the Dollar Bloc Fuel the Oil Price Run up? International Journal of Central Banking. 2011; 7(1):154-155.
2. Federal Trade Commission, Gasoline Price Changes: the Dynamic of Supply, Demand and Competition. Federal Trade Commission, USA, 2005.
3. Greigg K. What to Do about the Petroleum Fuel Subsidy in Trinidad and Tobago?. A Sustainable Reform of the Fuel Subsidy. A Paper Presented in the Conference organised by the Department of Economics, the University of West Indies, 2011.
4. Govt. Accounting Office, Motor Fuels. Understanding the Factors that Influence the Retail Price of Gasoline. United States Government Accounting Office, Washington D.C.: USA. 2005.
5. Hastard B. Buy Coal. A Case for Supply –Side Environmental Policy. Journal of Political Economy. 2012; 120(1):71-86.
6. Kilian L, Vigfusson R. Non-linearities in the Oil-Price Output Relationship. Board of Governors of the Federal Reserve System International Finance Dicussion Paper No.1013, USA, 2011.
7. Litman T. Understanding Transport Demands and Elasticities: How Prices and other Factors affect Travel Behaviour. Victoria Policy Transport Institute, 2013.
8. Lin CYC. Estimating Demand and Supply in the World of Oil Market. International Centre for Energy and Economic Development. Journal of Energy and Development. 2011; 34(1):3.
9. OECD, Oil Dependence. Is Transport Running out of Affordable Fuel? Summary and Conclusions. Joint Transport Research Centre, *Discussion,* 2008.
10. World Bank Cambodia, Getting Petroleum Products to the Market. Oil and Gas Special Supplement. Petroleum Sector Briefing Note, 2009, 16.
11. Yan L. Analysis of the International Oil Price Fluctuations and its influencing Factors: Scientific Research, International Journal of Industrial and Business Management. 2012; 2:39-46.