*International Journal of Academic Research in Business and Social Sciences*
*February 2013, Vol. 3, No. 2*
*ISSN: 2222-6990*

# Regression Test of Independence of the Impact of Petroleum Industry on the Agricultural Sector in Nigeria (1972-2009)

**Sule Ja'afaru Garba**
Department Of Business Administration, Kogi State University, Anyigba

**Abstract**

This paper titled "the impact of petroleum sector on the agricultural development in Nigeria between 1972-2009' is a child of necessity. The negative impact of over relying on the petroleum sector thereby neglecting the Agricultural sector is seen here as the major problem that borders the mind of the researcher. The primary objective here is to analyze critical the implication of over reliance on petroleum sector as the only major source of foreign exchange for the country and as such try to suggest some possible ways out as one can never he sure of what will be the faith of the Nigeria economy tomorrow should the going get tough. The researcher used secondary method to obtain his data. It was discovered that reverse will be for the Nigeria economy tomorrow in case of economic meltdown due to over reliance on the oil sector. Simple regression model was used to test the degree of relationship between the dependent and the independent variable. Meanwhile, the researcher employed the coefficient of determination to test the goodness of fit, while f-test was employed to test the significance of the regression estimated and a priority and magnitude of the regression co-efficient evaluated. It has been recommended that revenue derived from petroleum export be expended on projects that will bring about meaningful transformation in the agricultural sector.

**Keywords:** productivity, Nigeria, Petroleum, supply, domestic, GDP

## Introduction

Few decades ago, Nigeria was able to produce substantial amount of food to feed herself. As revealed by United Nation F.A.O (1979) in Ekeyi (2005), "capital food production in 1970 was 120". Nigeria today has to import massive amount of food items and processed food. Statistics have shown that food import as a percentage of total import of Nigeria rose from $24.8^0$ to 78.5% in 1980 and 2007 respectively (CBN, 2007).

Before the emergence of the petroleum industry, the Nigerian economy was agrarian. Agriculture was the mainstay of the economy as it accounted for than 70% of Nigeria's revenue before independence.

Nigerian agricultural sector has declined tremendously both in the share of GDP and in absolute term. Agricultural sector contribution as a percentage of total export in Nigeria in 1970 was

*International Journal of Academic Research in Business and Social Sciences*
*February 2013, Vol. 3, No. 2*
*ISSN: 2222-6990*

30% which has been on the decline as it was 2.2, 0.8, and 0.4 in 1990. 2000 and 2004 respectively (Ekeyi. 2007). There are many factors that have hindered agricultural expansion aid transformation, among which are rural/urban migration, low investment, desertification, poor technology just to but a few.

The single most potent factor which depressed agricultural productivity in Nigeria as from 1970 has been located in the oil syndrome. Petroleum wealth creates economic environments which depress the incentive to farm. The advent of petroleum has led to a gross neglect of the agricultural sector. Nigeria now relies on petroleum as a main source of income and foreign revenue generation. And money could be gotten cheaply from it, there was no need to expend so much labour on the farm.

In spite of all efforts made by successive governments to revamp the collapsing agricultural sector, the sector is still pushed behind by the great impact of the oil sector(Ekeyi, 2007).

The neglect of the agricultural sector resulting from the impact of the petroleum sector needs to be addressed. This is because if there is anything that occupies the mind of the industrialized and developed Western capitalist countries, especially USA and Japan, is to find a way of rendering petroleum useless such that oil-producing nations, like Arabs and Nigeria will be on their knees. Imagine if such a happens what would be the faith of Nigeria. Coal, a leading source of energy then becomes useless. What then will be the fate of the Nigerian economy that today relies solely on oil? Beside petroleum is a non-renewable resource, though we seem to have it in abundance, but what if we blink one day and petroleum is no more, where then will the Nigerian economy be? Hence, the impact of over dependence on petroleum to the agricultural sector should bother one's mind, since no nation can survive without food.

The major objective of this paper is to empirically investigate to impact of the petroleum industry on the agricultural sector of the Nigerian economy. Also to examine the percentage contributions of both the petroleum and the agricultural sector to total export earning of the Nigerian economy.

Operationally, the study employed the econometrics method of simple regression analysis as the main tool to ascertain and estimate the relationship between dependent variable (agricultural percentage contribution to export earnings) and the independent variable (petroleum percentage contribution to export earnings). We relied on secondary source of data in this study which were mainly generated from Central Bank of Nigeria publications as well as other published and unpublished works.

**Literature Review**

The position occupied by the agricultural sector in the Nigerian economy before the advent of the oil industry when compared with the present days arouses a lot of interests. Many writers, observes, and analysts, both in the field of economics and other related social sciences, have attempted volumes of write up on this issue.

*International Journal of Academic Research in Business and Social Sciences*
*February 2013, Vol. 3, No. 2*
*ISSN: 2222-6990*

The Nigerian economy like other African countries was mainly agrarian before now. Besides, there is also the general opinion that the coming of the petroleum industry has drastically led to the neglect of the agricultural sector.

Halliner (1999) study is classical, the work presented a comparative analysis and documentation on peasant agriculture, government and economic growth in Nigeria. He posited that "no matter how much development and structural transformation is achieved, agricultural sector will retain its relative dominance in the economy for many decades to come. More importantly, it is from agriculture and in particular from agriculture exports that the economy has achieved the principal stimulus to economic growth".

The importance of the agricultural sector to the Nigerian economy was overwhelming considering its contributions to foreign trade and to the growth in Gross Domestic Product (GDP) in the past. In a report of mission sent to Nigeria by Word bank in 1974, there was the opinion that agricultural exports were primarily responsible for the average growth rate of about 5%, per annum during the 1950's and the early 60's.

Olalokun et al (2006), in their contain an excellent survey of the issue as viewed from the perspective of the Nigerian economy, agriculture they noted accounted for more than 70% of Nigerian revenue before independence in 1960. As at the time of independence in 1960, all country's future dreams hinged solidly on the productivity of agriculture. Their finding was that in 1965 to 1969, agricultural sector contribution to GDP was 60.9%, 5754.6% and 55.5% respectively.

The prominent position of agriculture was aided by the availability of vast acres of fertile land. Halliner (1998) as contained in Ekeyi (2007), "Characterized Nigeria as a land surplus economy". Olalokin, (2006) also ascertained that "it is pertinent to note that Nigeria covers a total land area of 983 million hectares of which only one third is cultivated. However, it has been ascertained that cultivatable land amounts to about 71.2million hectares.

Being the only major source of foreign exchange, agriculture invariably became the main source of revenue generation in Nigeria before the advent of petroleum discovery between,1950 to 1990.

**The Role Of Agriculture In The Development Of Nigerian Economy**

The customary approach to the role of agriculture in economy development is formulated in terms of the contribution of the agricultural sector during the process of economy development.

To Reynolds (1975) as contained in Anyanwu (2006), therefore, agricultural development can promote economy development of the underdeveloped countries in four distinct ways:

*International Journal of Academic Research in Business and Social Sciences*
*February 2013, Vol. 3, No. 2*
*ISSN: 2222-6990*

- By increasing the supply of food for domestic consumption and releasing the labour needed for industrial employment.
- By enlarging the size of domestic market for the manufacturing sector.
- By increasing the supply of domestic savings.
- By providing the foreign exchange earnings through agricultural export.

In their own contribution, Omawale and Rogriques (2005) opined that in most developing countries, agriculture has been assigned an important role in national development. To them, agriculture was as a means of reducing over dependence on certain importation of food items earning from foreign exchange, absorbing many new entrants to the labour market and increasing farm income at a time of severe unemployment and rural poverty.

**The Emergence Of Petroleum Industry In Nigeria**

It is striking to note that it was only in 1957 that crude oil was discovered in Nigeria by Shell B.P after about twenty years of fruitless efforts. The output of the crude oil since then has risen from 31,000 tones to a greater level in 2009. Since then, there has been a phenomenal structural change in the sectoral economic activities in the country.

Schetzl (1969) captures this by observing that, the main crude oil fields in Rivers state which produce a little over 50% of the total oil output in Nigeria are Agam, Odigbo, and Agbada and all of them lies within 26 miles radius from Port-Harcourt.

Olalokun (2006), stated that the history of petroleum development in Nigeria goes back to when company that had license to search for oil in part of the country then. But thereafter many companies have joined in prospecting for oil and among them were; Gulf Oil, Mobile oil, Agip Oil et cetera.

In 1956, the first successful exploration of oil was drilled at Oloibiri by Shell BP. In 1958, production was on 15.134 barrels per day from the well at Oloibiri in Rivers State. Between the period of 1920 to 1972, indigenous participation by government came to the scene when the Nigeria National Oil Company (NNOC) was formed by decree number 18 of 1971 to explore and prospect for petroleum, purchase petroleum and its bye products, and marketing petroleum and its products. The NNOC was replaced by NNPC in 1977 to combine the commercial function of NNOC.

**Petroleum Industry And The Nigerian Economic Growth**

Exploration and exploitation of crude oil had, to a large extent led to a significant transformation of the Nigerian economy. There is a tremendous metamorphosis in the structure of the Nigerian economy. In fact, with oil coming into the scene, the structure of the Nigerian economy remains not the same.

*International Journal of Academic Research in Business and Social Sciences*
*February 2013, Vol. 3, No. 2*
*ISSN: 2222-6990*

Oremade (1995) observed that from the initial trickle of 1958, crude oil has by 1972 already contributed about 80% of Nigerian export by value. He went further to assert that by 1958, petroleum made its appearance to the tune of only about one million pound. By 1962, it has over taken all other mineral resources put together by more than 100%.

The early 1970's, witnessed an almost unprecedented growth in crude oil production, for instance, there was 389 million barrels in 1970, 2200 in 1978.

**The Effect Of Petroleum Industry On The Agricultural Sector In Nigeria**

The petroleum industry has not only made structural changes in the overall economy as observed earlier, but has tremendously resulted to dramatic changes-in sectoral activities most especially in agricultural sector.

As reported by World Bank (1974) export in agriculture was undoubtedly the engine of growth of the Nigeria economy from 1940 to 1960. Dynamism in the sector was provided primarily by farmers' response to income incentives generated by the integration of traditional agricultural economy in the world market (Olalokun, 2006). The advent of petroleum they noted marked the turning point in the annual agricultural growth. The impetus, incentives, and morals of farming was slaughtered on the alter of petroleum industry. The oil boom led to urban shift to major Nigerian cities such Lagos, Port-Harcourt, Enugu, Kaduna, which were developed with oil money, began to witness population expansion. Farmers abandoned their holding and began to migrate to urban areas in search of easier lives.

A classical literature on this issue was the work of Ihimodu (1988), lie opined that, however, the phenomenon observed in the agricultural sector might have resulted from two major sources, the huge resources from oil completely dwarfed contribution from all the other sectors including the agricultural sector and most importantly, rather than attracting investment into agriculture, government decided to focused attention on urban projects. Consequently, upon the adverse terms of trade against agriculture, the economy witnessed the exodus of agrarian population from the farm into cities all in search of more lucrative activities.

Prior to the oil boom, Nigeria attained some level of self-sufficiency in food production, as only a very small proportion of imports was accounted for by food and those were mainly processed items that were not produced within the country but with emergence of petroleum, reverse was the case.

According to Lambo (1987), we have to import so as to supplement our domestic production of agriculture to meet our development needs. Worst still, most of the crops that used to be dominant in export basket for example palm oil, groundnut, cocoa are no longer there, some of these items are now imported into the country.

**Model Specification**

The simple regression model is specified as the lead model in this research work. This is stated as:

$Y = AX^{B}u$

To linearise the above model, it becomes;

Log Y Log A + B Log X + Logu

Divide both side by log, we have:

$Y = A + BX + u$

Where

Y = dependent variable, that is agricultural sector contribution to export.

A = the constant, meaning the value of agriculture export when petroleum export is zero.

B = coefficient of the parameter-value of X

X = independent variable, that is petroleum contribution to export.

U = stochastic error term

The equation becomes $Y = A_0 + B_0X_1 + U_1$ with the use of OLS method.

Where:

Y = estimated value of Y

The various estimates of AO and BO are derived thus:

$A_1 = Y – B_1X$

And

$B_0 = \frac{XY}{X^2}$

**Techniques Of Analysis**

Techniques of analysis implies the usual diagnostic checking. This entails the use of correlation coefficient (R) for testing the degree of relationship between the dependent and independent variable. Also employed is the coefficient of determination R) for testing goodness of fit, F-test used to test significance of the regression estimated and a priority signs and magnitude of regression co-efficient evaluated.

In order to fulfill the OLS assumption of non-serial correlation and of the constant variance of the random variable (U), the second order test like Durbin-Watson (d-statistics) test was employed for detecting autocorrelation.

**The Regression Results**

The regression results are presented as follows:

$Y = 80.555 – 0.805X$

S (bi) = 0.0204

R = 0.0985

$R^2 = 0.997$

T(bi) = -70.4
d* = 0.55 and B = 0.01019

**Interpretation Of Results**

The sample regression model is thus

Y = 80.55 – 0.805X
The result shows that:

a) Y which is the dependent variable, that is the agricultural sector contribution to export is inversely related to X independent variable, that is the petroleum sector. This inverse relationship is indicated by the value of T(bi) which is negative (-0.70.4) This indicates that 1% increase in petroleum export leads to 0.70.4% decrease in agricultural export during the period under consideration.

b) The constant (80.555) shows that with zero level of agriculture contribution to export, the contribution of petroleum to export will be the ratio of the intercept to the absolute value of the coefficient of petroleum export that is, 80.555/0.805 = 99.5. Meaning that with virtually almost nothing from agriculture, the petroleum sector will shoulder Nigeria's total export.

c) Correlation Coefficient (R): The value of R given as; (0.985) indicates that there is a perfect negative correlation between petroleum contribution to export and agricultural contribution to export. This implies that as petroleum contribution to export increases that of agricultural sector decreases.

d) Coefficient of Determination ($R^2$): The value of $R^2$ given as; (0.997) indicates that the regression model is of a good fit, almost exact. It means the regression line is a good fit to the observed data, since the line explains 99% of the total variation of agricultural sector contribution value around their means. The 1% of the total variation in Y is attributed to the disturbance variable (U).

e) Standard Error Test: The value of the standard error of the estimated B is given as 0.0 1019. This shows that the estimate is statistically significant. This is because S ($B_0$) < (B/2). We reject the null hypothesis Ho because the explanatory variable X (petroleum contribution to export) to which the estimate relates, does in fact influence the dependent variable (Y) i.e. agricultural sector contribution to total export.

f) T-test student t-test): Given the null hypothesis Ho = 0 and tested against the alternative hypothesis $H_0$ = 0, it would be possible to judge the statistical significant of the estimates.

To judge the statistical significance of the estimate given at a chosen level of significance (0.05) by performing a two tailed test, we now define the critical region by dividing the level of significant thereby validating the fact that petroleum industry has a negative effect on the agricultural sector.

g) The F-test : F* as shown on the regression result is 197.0062. It implies that at 0.05 level of significance when F-tabulated value is F 0.05, 1.65 = 8.42. therefore, F*>F 0.005v1v3. Hence, it can be concluded that the entire regression is meaningful. We reject the null hypothesis and we accept that the regression significant. That is, petroleum

*International Journal of Academic Research in Business and Social Sciences*
*February 2013, Vol. 3, No. 2*
*ISSN: 2222-6990*

contribution to export is a significant explanatory factor for the decline in the agricultural sector contribution to export in Nigeria.

h) The Durbin-Watson Test (d*).
The d* which is the second order test reveals the existence of autocorrelation. The d*=0.645 at 5% level of significance with $d_1$ = 1.85 and $d_u$ = 1.94. Therefore, 0.645<1.85; it shows that the pattern of autocorrelation is positive. With this, we reject the null hypothesis of no autocorrelation and accept that there is a positive autocorrelation.

**Summary, Conclusion And Recommendations**

**Summary**

The major objective of this work is to examine in detail the effect of the petroleum sector on the Nigerian agricultural sector from 1970-2009. To achieve this objective, the statistical record on both the agricultural sector and the petroleum sector contribution to export within the period under consideration. The major finding revealed that, the study of negative effect of the petroleum sector on the agricultural sector is very much high. Hence, the petroleum sector explains majorly the decline in agricultural production in Nigeria.

The various statistical analyses, for instance; the high negative correlation validates the inverse relationship between the agricultural sector and the petroleum sector.

**Conclusion**

The geographical entity called Nigeria today is immensely endowed with various forms of natural resources. Chiefly among these is fertile land for agricultural and crude oil. A little trickle of petroleum has resulted to change in virtually all ways of living in Nigeria.

Nevertheless, contribution to the growth and development recorded in Nigeria in the period under review shows that despite the huge investment in the agricultural sector, the role of agriculture in the economy cannot be justified.

**Recommendations**

In the light of the foregoing study and findings, it becomes imperative to offer the following recommendations:

a) Revenue derived from petroleum export should be expended on projects that will bring about meaningful transformation of the agricultural sectors.
b) Efforts should be made by government to increase inter-sectoral linkages. For examples, chemicals such as herbicides and insecticides for the agricultural sector can be produced by the petroleum industry and sold at a subsidized price so as to boost agricultural productivity.

*International Journal of Academic Research in Business and Social Sciences*
*February 2013, Vol. 3, No. 2*
*ISSN: 2222-6990*

c) Agricultural loans should be given to those farmers at an affordable interest rate or no interest rate at all as away of encouraging these groups that are still into farming.

**Reference**

Anyamvn, J.C. (2006); The Structure of the Nigerian Economy (1960-1997), Onitsha, Joance Educational Publishers Ltd. CL3N Statistical Bulletin (2004)

Ekeyi, .U.S. (2007); Impact of Oil Sector on Agricultural Sector of Nigeria (B.Sc. Unpublished Thesis), K.S.U, Anyigba.

Halliner, G.K (1999); Peasant Agriculture, Government and Economic Growth in Nigeria. London, Home Wood Publishers.

Ihimodu, J.I. (1988); The Adjustment Programme and Nigeria Agricultural Development Zaria, A.B.U Press.

Koutsoyiannis, A(1977); Theory of Economics, London McMillan Press.

Olalokun, A.K. (2006); Structure of the Nigerian Economy, Lagos, University of Lagos Press.

Orernade, T. (1995) Petroleum Profit Tax in Nigeria, Ibadan. Evans Brothers Publishers.

Omawale A. & Rogriques, A.M. (2005); Agricultural Credit Related to Nutrition and National Development in the Caribbean (A Case Study of the Guyana Agricultural Co-operative Bank ip Tropical Agriculture), Vol. 56.No.1.

Reynold, L.G (2975); Agriculture in Development Theory, London. Yale University Press.

Lambo Sule (1987); The oil Exploitation in Nigeria, “The Back Story.” Unpublished Seminar Paper, Ede Central, Nigeria.

Central Bank Nigeria (1972-2009); “Statistical Bullentins”.

World Bank (1974); “Annual Report.”

*International Journal of Academic Research in Business and Social Sciences*
*February 2013, Vol. 3, No. 2*
*ISSN: 2222-6990*

**Appendix A**
**Export Value Of Petroleum And Agricultural Productions (₦ Million)**

| YEAR | TOTAL EXPORT | PETROLEUM (Y) | AGRICULTURE(X) | %SHARE OF AGRIC | %SHARE OF PETROLEUM |
|---|---|---|---|---|---|
| 1970 72 | 885.4 | 510.1 | 265.2 | 30.0 | 57.6 |
| 1971 73 | 1293.4 | 953.0 | 242.8 | 18.8 | 73.7 |
| 1972 74 | 1434.2 | 1,176.2 | 164.8 | 12.5 | 82.0 |
| 1973 75 | 2794.8 | 1,89,3.5 | 250.1 | 10.9 | 83.1 |
| 1974 76 | 5794.8 | 5,365.7 | 276.0 | 14.7 | 92.6 |
| 1975 77 | 4925.5 | 4..563.1 | 230.6 | 4.7 | 92.7 |
| 1976 78 | 6751.1 | 6,321.6 | 27401 | 4.1 | 93.6 |
| 1977 79 | 7630.7 | 7,0722.8 | 375.7 | 4.9 | 92.7 |
| 1978 80 | 6064.4 | 5,401.6 | 412.8 | 6.8 | 89.1 |
| 1879 81 | 10.836.8 | 10,166.8 | 468.0 | 4.3 | 93.8 |
| 1980 82 | 14,186,7 | 13,632.3 | 340.1 | 2.4 | 96.1 |
| 1981 83 | 11,023.3 | 10,680.5 | 108.8 | 1.0 | 98.2 |

*International Journal of Academic Research in Business and Social Sciences*
*February 2013, Vol. 3, No. 2*
*ISSN: 2222-6990*

| | | | | | |
|---|---|---|---|---|---|
| 1982 84 | 8,206.4 | 8,003.2 | 79.2 | 0.9 | 98.8 |
| 1983 85 | 7,502.5 | 7,201.2 | 259.0 | 3.4 | 96.0 |
| 1984 86 | 9,088.0 | 8,840.6 | 208.0 | 2.3 | 97.2 |
| 1985 87 | 11,720.6 | 11,223,7 | 192.1 | 1.6 | 95.8 |
| 1986 88 | 8,920.6 | 8,368.5 | 407.4 | 4.5 | 92.5 |
| 1987 89 | 30.360.6 | 28.205.6 | 937.4 | 3.1 | 95.0 |
| 1988 90 | 31,192.8 | 28,435,4 | 1,780.4 | 5.7 | 91.2 |
| 1989 91 | 57,971.2 | 55,016.8 | 1,726.9 | 3.0 | 94.9 |
| 1990 92 | 109,886.1 | 10,6,626.5 | 2,429.3 | 2.2 | 97.0 |
| 1991 93 | 121,535.4 | 116,858.1 | 3,425.0 | 2.8 | 96.2 |
| 1992 94 | 205,611.7 | 201,383.9 | 3,034.9 | 1.5 | 98.0 |
| 1993 95 | 218,770.1 | 213,778.8 | 3,437,3 | 1.6 | 97.7 |
| 1994 96 | 206,059.2 | 200,710.2 | 3,818.8 | 1.9 | 97.4 |
| 1995 97 | 950,661.4 | 927,565.3 | 15,512.0 | 1.6 | 97.7 |
| 19 | 1,30 | 1,286,215. | 18,020.4 | 1.1 | 98.2 |

*International Journal of Academic Research in Business and Social Sciences*
*February 2013, Vol. 3, No. 2*
*ISSN: 2222-6990*

| | | | | | |
|---|---|---|---|---|---|
| 97 98 | 9,543.4 | 9 | | | |
| 19 97 99 | 1,241,662.7 | 1,212,499.4 | 19,826.1 | 1.6 | 97.7 |
| 19 98 20 00 | 751,856,7 | 717,786.6 | 16,394.3 | 1.2 | 76.4 |
| 19 99 20 01 | 1.188969.8 | 1,169,476.9 | 17,241.0 | 1.5 | 98.4 |
| 20 02 | 1,945,723.3 | 1,920,900.4 | 15,301.6 | 0.8 | 98.7 |
| 20 03 | 2,001,230.8 | 1,973222.2 | 14,302.0 | 0.7 | 98.6 |
| 20 04 | 1,88,668.1 | 1,787,622.0 | 15,001.1 | 0.8 | 95.0 |
| 20 05 | 2,924,135.0 | 2,829,042.5 | 13,301.0 | 0.5 | 96.7 |
| 20 06 | 3,143,800.0 | 3,030,065.3 | 12,666.7 | 0.4 | 96.4 |
| 20 07 | 4,562,600.0 | 4,030,095.3 | 12,400.7 | 0.35 | 96.2 |
| 20 08 | 5,624,500.0 | 5,050095.3 | 13,500.5 | 0.45 | 96.6 |
| 20 09 | 5,724,400.0 | 5,960067.2 | 13,522.6 | 0.46 | 96.7 |

**Source: Central Bank Of Nigeria Statistical Bulletin (1972 – 2009).**