

## Impact of Oil and Gas Revenue on Gross Domestic Product and National Development in Nigeria (1980 - 2010)

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### Abstract

Empirically, the paper investigates the impact of oil and gas revenue on GDP of Nigeria. Data were obtained from secondary sources, notably from the Central Bank of Nigeria statistical bulletin. The study adopted regression techniques and time series data for the various years analyzed. The finding of the study reveals that oil & gas revenue generated from the Nigerian National Petroleum Corporation (NNPC) has a positive and significant influence on the GDP vis-a-vis national development. It is recommended among others that, the Nigerian government should utilize revenue derived from the sale of petroleum and gas related products to cater for the environs affected by the unnecessary and deliberate flaring and venting of greenhouse gas. Also, the Nigerian government should utilize the revenue generated to enhance the development and revival of local refineries in the country.

**Keywords:** *Oil & Gas Revenue, National Development, Greenhouse Gas Emissions.*

### Background to the Study

Oil and gas are major sources of energy in Nigeria and the world at large. The resources had being the mainstay of the Nigerian economy over times and play a vital role in shaping the economic and political destiny of the country. Although Nigeria's oil industry was founded at the beginning of the century, it was not until the end of the Nigeria civil war that the oil industry began to play a prominent role in the economic life of the country (Odularu 2008).

Rewane (2007) stated that 1973-1985 was the period of Nigeria's Third and Fourth National Development Plans, which were launched against a background of abundant financial resources following sharp increases in both the price of crude oil and Nigeria's level of production. From late 1973 to mid-1974, oil revenues almost quintupled because of higher prices, greater production, and an increase in its share of oil revenues through greater public ownership and higher taxes and royalties" (Gelb, 1988).

Subsequent eras have also witnessed vast revenue from the oil and gas industry in Nigeria. However, according to Anyanwa (1997), Petroleum has transformed poor nations into rich ones desert into watersheds and bankrupt nations into creditors. Specifically, with respect to Nigeria, there is no gain saying that the oil sector has undergone tremendous transformation over the years. The excess revenue made from the oil sector can be invested into viable sectors in order to diversify the economy and also increase the total Gross Domestic Product (GDP) of the economy. Over the past decades the oil industry has made a variety of contributions to the Nigerian economy. These have included the creation of employment opportunities; local expenditure on goods and services; contributions to government revenues and to foreign exchange reserves; and the supply of energy to industry and commerce. But the main question remains; has the impact of the oil revenue generated over the decades been equally significant on the Nigerian economy in terms of increase the total GDP, increase the total per capital income and the overall standard of living of the Nigerian populace?.

According to CIA (2012), Nigeria is ranked the 13th largest oil producing country in the world as at 2013 with a total of 2,525,000 bbl/day. However, almost fifty years after oil was discovered at Oloibiri in South Eastern Nigeria, the evident economic and social infrastructural development in the country does not reflect the revenue derived from the petroleum industry. This is clearly evident in the absence of the basic infrastructural facilities in the form of health care, educational services, developmental projects, basic amenities like electricity, water, among others that should befit the world's 13th largest oil producing country. The absence of these basic infrastructural facilities is due to the fact that revenue derived from oil exports had been largely mismanaged by the successive governments in power.

Thus, one of the biggest challenges for Nigeria an oil-producing country is how to use its oil revenue strategically to promote sustainable national development, since it has become apparent that the revenue from Oil and Gas had not been properly allocated, or better still used adequately to the benefits of the country (NEITI, 2009). Although large proceeds are obtained from the domestic sales and export of petroleum products, its effect on the growth of the Nigerian economy as regards returns and productivity is still questionable, hence, the need to evaluate the relative impacts of crude oil on the economy. In light of the problem of the study, this study stands to analyze the impact of oil & gas revenue generated from the Nigerian National Petroleum Corporation (NNPC) to national development in Nigeria.

#### Objective of the Study

The main objective of this study is to examine the impact of oil and gas revenue on the GDP of Nigeria.

## Hypothesis

One hypothesis is stated to guide this study.

H<sub>0</sub>: Oil and gas revenue has no significant impact on the GDP of Nigeria.

## Review of Related Literature and Theoretical Framework

Petroleum is currently the most important and valuable natural resource in Nigeria. It is exploited in ways that maximized benefits to the nation through economic rents and a fair share of profits while offering stable and attractive terms for investors. For the producing nations, petroleum is an important source of foreign revenue and this is the reason why such an important resource should be properly accounted for to enable the government and citizens of oil producing nations maximize the benefits derivable from the natural endowment (NEITI 2009). Also, domestic economic performance is measured in terms of a country's rate of growth and its rate of inflation. Previous studies on the Nigeria economy in the last decade show that the petroleum industry has been playing a dominant role and occupies a strategic position in the economic development of Nigeria (Azaiki and Shagary, 2007). However, studies on oil revenue as it affects the economy include; Bawa and Mohammed (2007) assert that "Nigeria with all its oil wealth has performed poorly, with GDP, per capita income today not higher than at independence in 1960". This means that an average Nigerian was better off before independence in 1960. Bawa and Mohammed acknowledged poor performance of Nigeria's economy but did not provide any empirical evidence or percentage figures by way of hypotheses testing and thereby confirming the fact that some of their works must have been based on assumptions that cannot be statistically verified and generalized according to Baridam (2008).

Baghebo and Atima (2013) studied the impact of petroleum on economic growth of the Nigerian economy for the period 1980-2011. Data were analyzed using econometric approach. The stationary status of the time series data was examined using Augmented Dickey Fuller test. The Parsimonious model was established to account for the short run dynamic adjustments required for stable long run equilibrium. It was discovered that the variables: oil revenue and corruption index (CI) impacts negatively on Real GDP, while Foreign direct investment (FDI) and External debt (EXDEBT) have positive impact on the growth of the economy. This meant that the resource curse theory is proven to be true in Nigeria. The study concluded that, if the petroleum industry bill is passed and implemented, there exists hope for Nigeria. The limitation to this study relied on the methodology adopted.

Greg & Effiong (2013) attempted to descriptively analyze the trends of oil revenue and oil export as it related to other potential economic variables required for the transformation of the Nigerian economy. They also made a comparative analysis of how such chosen variables behave before and after democracy to determine the period where oil revenue management impacted positively on the economy as a means of enhancing the standard of living of the ordinary Nigerian, their health status, infrastructural facilities like power. Recommendations were proffered for policy makers and the stakeholders, which if adequately implemented will enhance efficient and effective management of Nigeria oil revenue with the broad aim of transforming the economy and positioning it for global

relevance. The limitation to this study relied on the fact that it studied the Nigerian economy descriptively with the use of trend analysis as the methodology.

Odularu (2008) analysed the relationship between the crude oil sector and the Nigerian economic performance using the Ordinary Least Square regression method. The study revealed that crude oil consumption and export have contributed to the improvement of the Nigerian economy. However, one of the recommendations of the study was that government should implement policies that would encourage the private sector to participate actively in the crude oil sector. The limitation to this study relied on the fact that it studied a time frame within 1970–2005 which could be considered obsolete compared to present date.

Arman & Aghajari (2009) investigated the impact of oil revenue on the inflation and growth rates of Iran in the period of pre-exchange rate reform of 1993. They found out that oil revenue only influences growth by a slow direct effect. Also inflation is influenced by oil revenue through a direct effect, foreign prices, and the real exchange rate. The net effect is that greater oil revenue has tended to reduce inflation, though the effect has been greatest since the revolution.

Salehi & Mohaddes (2009) developed a long run growth model for a major oil exporting economy and derives conditions under which oil revenues are likely to have a lasting impact. They showed that (log) oil exports over the period 1979–2006 enter the long run output equation with a coefficient equal to the share of capital and found clear evidence for two long run relations: an output equation as predicted by the theory and a standard real money demand equation with inflation acting as a proxy for the (missing) market interest rate. They also defined that the Iranian economy adjusts quite quickly to the shocks in foreign output and oil exports, which could be partly due to the relatively underdeveloped nature of Iran's financial markets. Although the study draws reference from the Iranian economy which is different from the Nigerian economy, there are significant lessons to be drawn from it.

Mehrara, Maki and Tavakolian (2010) studied the non-linear relationship between oil revenues and real output growth of the Iranian economy during 1959–2007 using a threshold error correction model. They showed that the response of economic growth to oil revenue growth in low regimes of oil revenues is greater than in high regimes of oil revenues. Hassani and Amirali (2010) employed the error correction version of ARDL procedure to examine the factors determining Iran's oil revenues using the time series data for 1970–2008. The model found that factors such as oil production, oil price, and oil proved reserves have long run effects on Iran oil export revenues. In the longterm, the effects of variables such as domestic oil consumption and world oil production are negative. Greg & Effiong (2013) maintained that the Nigerian economy shares in the same experience.

**Methodology**

The research design adopted for this work is the experimental research design. The reason is that experimental research design combines the theoretical consideration with empirical observation. It enables a researcher therefore to observe the effects of explanatory variables on the dependent variables. The Ordinary Least Square (OLS) technique was used in obtaining the numerical estimates of the coefficients in different equations using stata. The OLS method is chosen because it is the best linear unbiased estimator. Where GDP is proxied as the dependent variable which is used to proxy the level of economic activities that reflect national development and Oil and gas revenue is proxied as the independent variable which is used to proxy the level of contribution to the economy. The estimated period covered 1980 to 2010. The choice of this period was guided by data availability and the vast revenue derived from oil and gas as a result of the favourable oil and gas price. The data for this study was obtained mainly from secondary sources, particularly time series data from Central Bank of Nigeria (CBN) Statistical Bulletin. The study adopted the regression analysis model.

In general, the regression model is described as

$$Y_1 = F(a + bx_1) + e_1 \dots\dots\dots \text{Therefore:}$$

$$GDP_1 = F(a + b_1OILREV) + e_1$$

Where:

GDP = Gross Domestic Product.

a = Constant

b = Co-efficient of independent variable

OILREV = Oil and gas Revenue

$e_1$  = Term Error

**Results and Discussions**

This section presents the result of data analysis and tests of hypotheses formulated earlier in the paper. First, descriptive statistics, followed by the correlation matrix table and then the summary of Regression Result are presented and analyzed, and then policy implications and Recommendation will be drawn and made from the findings of the study. The sample descriptive statistic is first presented in table 1 where the minimum, maximum, mean, standard deviation and kurtosis of the data for the variable used in the study are described.

Table1: Descriptive Statistic

Variable	Min	Max	Mean	Std. dev	Skewness	kurtosis	Obs
GDP	3038.04	3096.213	5043.893	2112.008	1.230991	3.126502	30
OIL REV	7253	7814.9	1239190	1866378	1.517609	4.064063	30

Source: Data Output

From Table 1, the mean value for GDP is 5043.893 for Nigeria, while oil and gas revenue has an average value of 1239190 within the study period. The minimum value for GDP is 3038.04 while the maximum is 3096.213. Oil and gas revenue, the explanatory variable recorded a minimum value of 7253 while the maximum is 7814.9. The skewness values were 1.230991 and 1.517609 for the dependent and independent variable respectively. Hence, the

data is considered to be tolerably mild and normally distributed. Finally, the kurtosis reveals that data obtained for all the variables including dependent and independent variable are not abnormal. This signifies the normality of the data and substantiates the validity of the regression results.

#### The Correlation Matrix

Table 2 shows the correlation values between the dependent variable and the independent variable. The values were extracted from the Pearson correlation of two-tailed significance.

Table 2: Correlation Matrix

Variable	GDP	Oilrev
GDP	1.0000	
OILREV	0.9306* 0.0000	1.0000

Source: Data Output

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

In Table 2, looking at the pattern of association between the explained and explanatory variable, it shows that the variables correlates perfectly such that the independent variable OILREV is positively related with GDP at 5% level of significance indicating a strong association.

#### The Summary of Regression Result and Implications to the Nigerian Economy

The table below presents the regression result of the dependent variable (GDP) and the independent variable of the study (OILREV). The presentation follows the analysis of the association and impact between the independent variable and the dependent variable of the study and also the cumulative analysis.

$$GDP_1 = F(a + b_1 OILREV) + e_1$$

Table 3: Summary of Regression Result

Variables	Coefficient	t – statistics	P-Values
Constant	3738.925	21.57	0.0000
OILREV	0.0057131	13.45	0.0000
R <sup>2</sup>			0.8660
Adj. R <sup>2</sup>			0.8612
F – stat			181.00
F sig.			0.0000
Chi <sub>2</sub> (1)			13.75
Prob Chi <sub>2</sub> (1)			0.0002
VIF			1.00
1/VIF			1.000000

Source: Data Output

From table 3 above, the cumulative  $R^2$  correlation between the dependent variable and the independent variable is 0.866 which is the multiple coefficients of determination gives the proportion of the total variation in the dependent variable explained by the independent variable. Hence, it signifies that 87% of the total variation in GDP of Nigeria is caused by the oil and gas revenue generated in Nigeria. This indicates that the model of the study is fit and the independent variable is properly selected and used. The F-statistic value of 181.00 shows that the model of the study is well fitted; this is further substantiated by the significant value of 1%.

Consequently from table 3 above, OILREV has a t-value of 13.45 and a beta value of 0.0000 which is significant at 5%. This signifies that OILREV is positively, strongly but slowly significantly impacting on GDP of Nigeria. It therefore implies that for every one Naira (N1) increase in oil and gas revenue, the GDP will increase by thirteen Naira forty five Kobo (N13.45). This may be as a result of the fact that recorded revenue from oil and gas has been consistent over the years. It also may serve as a good signal for investors and potential investors in Nigeria and the oil and gas industry. From the economic theory, it is expected that a positive relationship should exist between oil revenue and economic growth. The result from the regression shows that oil revenue has positive significant impact on the gross domestic product of Nigeria. Thus we can conclude by rejecting the null hypothesis thereby stating that oil revenue has a significant effect on GDP in Nigeria. This provides an evidence of rejecting the null hypothesis of the study which states that oil and gas revenue has no significant impact on GDP of Nigeria. This finding is in line with Odularo (2008) and negates Baghebo and Atima (2013).

The tolerance values and the variance inflation factor (VIF) are two good measures of assessing multicollinearity between the independent variable in a study. The result shows that variance inflation factor were consistently smaller than ten (10) indicating complete absence of multicollinearity. This shows the suitability of the study model been fit with the independent variable. Also, the tolerance values were consistently smaller than 1.00, therefore extend the fact that there is complete absence of multicollinearity.

### Conclusion

The paper investigates the impact of oil and gas revenue on GDP of Nigeria. The oil and gas revenue constituted the determinant factor, while the GDP represent the dependent variable of the study. It was found that oil and gas revenue has a positive and significant influence on GDP at 5% level of significance. Therefore the result implies that the more oil and gas revenue derived the greater Nigeria's gross domestic product will be with a slow direct effect.

### Recommendations

From the result above, the study recommend as follows,

1. The Nigerian government should utilize revenue derived from the sale of petroleum and gas related products to cater for the environs affected by the unnecessary and deliberate flaring and venting of greenhouse gas.

2. Also, the Nigerian government should utilize the revenue generated to enhance the development and revival of local refineries in the country in order to boost greater revenue and in turn cut cost and provide vast employment opportunities which will harness national development.
3. Revenue from oil and gas should be effectively utilize in providing infrastructures and other social and economic facilities that are significant in improving the wellbeing of Nigerians, especially those most vulnerable to poverty and diseases.

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