Oil Wealth and Economic Growth in Nigeria: Empirical Analysis 1990 – 2021

Abstract:

This study examines the relationship between oil wealth and economic growth in Nigeria over the period 1990-2021. The Autoregressive Distributed Lag (ARDL) approach was used to estimate the long-run and short-run dynamics of the relationship. The study finds that there is a positive and significant relationship between oil revenue and economic growth in Nigeria in the long-run. However, in the short run, the effect of oil revenue on economic growth is not statistically significant. The study also finds that the agricultural sector has a positive and significant impact on economic growth, while the health sector has a mixed impact, depending on the lagged periods considered. The education sector, on the other hand, has a positive impact on economic growth, but this effect is only significant at longer lagged periods. Based on these findings, the study recommends that the Nigerian government should focus on diversifying the economy by investing in non-oil sectors such as agriculture, education, and health to achieve sustainable economic growth.

Keywords: Oil Wealth, Economic Growth, ARDL.

1. Introduction

In recent months, there has been a creeping return to normalcy in the Nigerian economy. In a recent economic update, the World Bank forecasted that the country's economy will expand by 1.8% in 2021 and that, by the end of the year, its Gross Domestic Product (GDP) will probably be similar to what it was in 2010, reversing a decade of economic development. The International Monetary Fund (IMF), for its part, forecasts that the economy will expand by 2.5%. In spite of these forecasts, the Nigerian GDP only increased by 0.51% in the first quarter of 2021, pointing to a difficult and sluggish road to recovery. Variations in oil prices have an impact on economic development as the most crucial macroeconomic performance indicator, which leads to the most crucial ingredient that nations use in their production process. Nigeria has leaned greatly on oil money for the past forty years with a population of over 200 million been the largest market in Africa. It is a major oil producer in Africa, supplying high quality and low-sulfur crude oil. The recent drop in the price of oil has forced economic diversification to take the place of energy for growth and development(Student, 2021; Collins, 2021; Hassan *et al*., 2020).

Nevertheless, significant economic reforms, beginning with the Structural Adjustment Plan (SAP) in 1986, have resulted from the desire to restructure Nigeria's oil-dependent economy into a thriving and technologically driven economy.The financial sector was the primary focus of all policy reforms. This is the case because economists and decision-makers have demonstrated through theoretical and empirical research that a healthy and functional financial system is capable of generating long-term economic growth. The new endogenous growth hypothesis, for instance, identifies technical innovation as a significant source of change in the production process that is capable of sustaining long-term growth without exogenous technological change(Agbonifo, 2021; NBS, 2021).

Nigeria produced 1.56 million barrels of oil per day on average under OPEC guidelines, while the nation surpassed this amount in May 2021, increasing production to 1.6 million bpd. As it continues to take steps to stabilize the naira, GON has taken the first steps toward unifying the various exchange rate regimes existing in the market through the Central Bank of Nigeria (CBN). The country's oil and market are anticipated to be driven by factors like rising upstream investment and the construction of big, modular refineries throughout the projected period. Nigeria, however, experiences poor economic growth and development despite the flow of oil wealth. The Agbami oil fields, which are about 100 kilometers from the Niger Delta and situated within Nigeria's oil sector, are the origin of what is now referred to as "black gold" in Nigeria(Audu *et al*., 2020; Studies & Unizik, 2020; Wale, 2021).

Furthermore, there are doubts about when the local and global economies will stabilize in light of the outbreak of a new COVID-19 strain (the Delta Variant). The general prognosis for the oil and gas industry and the nation's economy are now even more uncertain because of this development. Although a

rebound in oil exports and domestic demand for crude oil products are anticipated, Nigeria's recovery is anticipated to lag behind those of other oil-producing nations.

This study is divided into five components. Section one had already introduced the study; Section two had the empirical review; Section three had the trend in variables, Section four shows the methodology; and Section five is the discussions of the findings and conclusions. The last section of the report concludes with policy recommendations that will strengthen the impact of oil revenue on economic growth in Nigeria.

2. Empirical Review

The relationship between Nigeria's oil wealth and economic growth has been the subject of numerous studies. Among the most notable of these studies are:

Usman *et al.* (2021) investigated the impact of federal spending on Nigeria's economic growth. The study's results showed that while public spending had no immediate impact on growth, there was a long-term correlation between the two factors. The Nigerian economy is vulnerable to outside shocks because of its excessive reliance on oil revenue. It is remarkable to observe that establishing a long-term correlation between public spending and oil revenue would make it easier to identify the causes of any economic fiscal imbalance.

Aregbeyen and Ibrahim (2020) stated that there are three contending hypotheses used in describing the relationship between oil wealth and economic growth; the fiscal synchronization hypothesis which proposes that there is bidirectional causality between government expenditure and revenue; the revenue spend hypothesis proposes a unidirectional causality and the third is spend and revenue hypothesis this hypothesis suggests that government spending leads to changes in government revenue.

Odularu (2020) examined the connection between the crude oil sector and the performance of the Nigerian economy after noting that crude oil has been a significant source of income, energy, and foreign exchange for the Nigerian economy. The consumption and export of crude oil have improved the Nigerian economy, according to the findings. The study concluded that the government should implement measures to promote active private-sector involvement in the nation's crude oil sector.

Natural resource rents and their impacts on economic growth and development have attracted considerable attention in economics literature during the past four decades. Since then, the plethora of empirical studies conducted on this subject has helped to enrich the literature on natural resource economics. In line with international economics and the traditional meaning by Adam smith, rent is defined as an additional amount obtained after taking into account the estimated costs along with usual

returns. In order words, rent can be defined as an interconnecting value, which relates the price of goods sold with its production cost as well as the value of normal return over the sold goods.

The link between government revenue and government expenditure in Nigeria was examined using time series (Emelogu and Uche, 2020). The analysis used the Engel-Granger two-step co-integration and error correction mechanism. In Nigeria, the analysis discovered a unidirectional causality connecting government revenue and government spending, as well as a long-term relationship between the two variables. Natural resource rents in many resource-rich nations have led to issues, and because of the negative effects on economic growth and development, these riches are frequently referred to as a "curse" rather than a blessing. The concept of the resource curse postulates that - poor countries with large endowments of natural resources, especially oil, often do not achieve sustainable economic growth because the size and volatility of oil revenues encourage corruption, mismanagement, and authoritarian governments that fail to invest in the future (Hammond, 2011; Muhammad, 2016; Mulwa, 2021).

Lane (2021) has revealed that the stability in the growth rate of production per capita in a financial system with natural resources is relative to the rate of technical development tuned for population growth drag‘ because of the diminishing returns along with natural resource reduction drag‘ which is caused due to declining points of exhaustible natural supplies. The literature on rent seeking in Nigeria is copious. Broadly speaking, the literature suggests that the development challenges in the country are closely related to the management of revenues from the petroleum sector (Eifert*et al.* 2019; Sala-i-Martin 2019).

Eifert and Sala (2018) have described the political environment as one in which individual politicians rely on non-democratic mechanisms to sustain their power and private agendas have been important drivers for political decisions. Prevailing patron-client politics may explain why welfare enhancing political solutions have been eschewed if vested interests would be threatened.

Ross argued that the institutional framework for petroleum governance has not been made strong enough to prevent conflict of interest. In particular, it has been difficult to ensure transparency and control over production figures and revenues. Every institution along the extractive industry's value chain that potentially could prevent fraud is weak. Although these weaknesses allow for manipulation, it is clear that the necessary underlying conditions for what generally is perceived as best practice in petroleum governance are not in place. The responsibility is political.

Large-scale natural resource availability may, under some circumstances, be a factor in the Dutch disease. A rise in natural resource prices and a spike in raw material exports could boost the currency's exchange rate, which would likely reduce exports of goods and services as well as manufacturing (Krugman 2021).

As stated earlier, the Dutch disease originally comprised the adverse effects on Dutch manufacturing of natural gas discoveries, which led to real exchange rate appreciation of its currency and consequently led to a contraction of production and exports of its tradable (i.e. manufacturing) sector (Corden and Neary, 2020). The manufacturing sector is a more dynamic sector than natural gas due to its learning-by-doing effects and other encouraging externalities, so its contraction (because of the natural resource boom) could exert a drag on long-run economic growth (Sala-i-Martin *et al.*, 2021). After all, oil and gas are exhaustible resources that will diminish in the end thereby exposing the vulnerabilities of the economies heavily dependent on such resources.

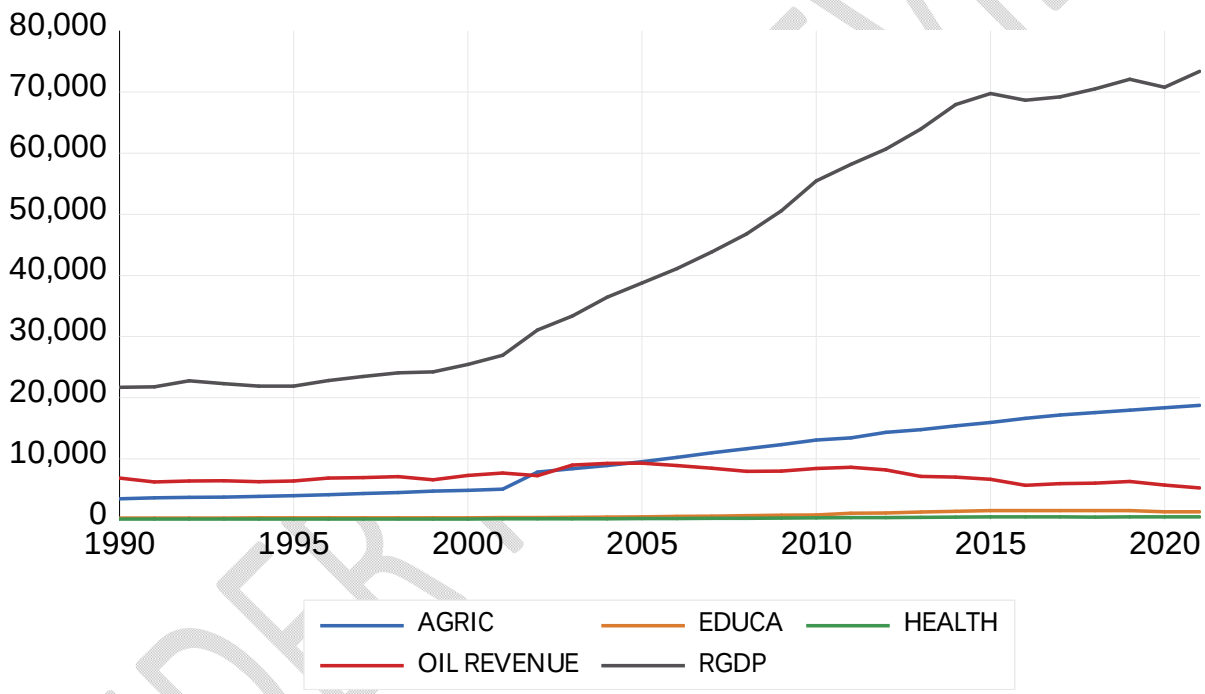

Fig.1 Trend in Agriculture, Education, Health, Oil Revenue and Real GDP

The table represents the Real Gross Domestic Product (RGDP), Agricultural output (AGRIC), Health expenditures (HEALTH), Education expenditures (EDUCA), and Oil revenue for a country from 1990 to 2021. The Real GDP of the country has been increasing over the years, except for a slight decline in 2016. It indicates that the country's economy has been growing steadily.

Agricultural output has been increasing over the years, indicating growth in the agricultural sector. However, the rate of growth has been slow, and there have been fluctuations in some years.

Health expenditures have been increasing over the years, indicating an improvement in the healthcare sector. It is worth noting that there was a significant increase in 2021, likely due to the COVID-19 pandemic.

Education expenditures have been increasing over the years, indicating an improvement in the education sector. However, there have been fluctuations in some years, indicating that there may be some issues in the sector.

Oil revenue has been fluctuating over the years, indicating that it is a volatile source of income for the country. In recent years, there has been a decline in oil revenue, indicating a need for diversification of the economy.

4. Methodology

The study used for analyzing the impact of oil wealth on economic growth in Nigeria is based on regression analysis. Regression equations of real gross domestic product to control other development indicators such as agriculture, education, health, and oil revenue from 1990 to 2021. The data sourced from Central Bank of Nigeria (CBN) Statistical Bulletin and National Bureau of Statistics (NBS) websitewere tested using Augmented Dickey-Fuller (ADF) unit root test, Johansen's co-integration test and Auto-regressive Distributed Lag Models (ARDL).The stylized form of the regression equation is as follows:

4.1 Model Specification

$$RGDP_t = \beta_0 + \beta_1 AGRIC_t + \beta_2 EDUCA_t + \beta_3 HEALTH_t + \beta_4 OIL\ REVENUE_t + \mu_t \quad (1)$$

Where:

RGDP = Real Gross domestic product

AGRIC = Agriculture expenditure on RGDP

EDUC = Education expenditure on GDP

HEALTH = Health expenditure on GDP

OIL = Oil revenue on GDP

μ_t = Random error term

β_0 = Constant term

β_1, β_2, β_3, & β_4 = Coefficients for Oil, Education, and Health respectively.

As stated earlier, the coefficient β_1 captures the direct effect of agriculture on real GDP. Oil could also affect the economic growth of Nigeria indirectly through its impact on the other controlled independent

variables. Such indirect effects could be measured by including interaction terms between oil and each of the other independent variables.

4.2 Results and Discussion

Dependent Variable: RGDP
Method: Least Squares
Date: 02/17/23 Time: 14:51
Sample: 1990 2021
Included observations: 32

Table 1 : Results of a linear regression analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2358.684	1096.303	-2.151489	0.0405
AGRIC	1.426900	0.110439	12.92024	0.0000
EDUCA	1.978644	1.624169	1.218250	0.2337
HEALTH	79.93072	7.567204	10.56278	0.0000
OIL_REVENUE	1.141089	0.132064	8.640444	0.0000

R-squared	0.999236	Mean dependent var	43807.93
Adjusted R-squared	0.999123	S.D. dependent var	19819.44
S.E. of regression	587.0240	Akaike info criterion	15.73061
Sum squared resid	9304124.	Schwarz criterion	15.95963
Log likelihood	-246.6898	Hannan-Quinn criter.	15.80652
F-statistic	8827.561	Durbin-Watson stat	1.390673
Prob(F-statistic)	0.000000		

This output shows the results of a linear regression analysis, where the dependent variable is RGDP (real gross domestic product) and the independent variables are AGRIC (agricultural output), EDUCA (education spending), HEALTH (health spending), and OIL_REVENUE (oil revenue).

The coefficient for the constant term (C) is -2358.684, which indicates that the intercept of the regression line is negative. The coefficients for the independent variables are all positive, indicating that an increase in each of these variables is associated with an increase in RGDP.

The t-statistic and p-value for each coefficient provide information about the statistical significance of the relationship between the independent variable and RGDP. All of the independent variables except for EDUCA have p-values less than 0.05, indicating that they are statistically significant predictors of RGDP.

The R-squared value of 0.999236 indicates that the model explains 99.9% of the variation in RGDP, while the adjusted R-squared value of 0.999123 takes into account the number of independent variables in the model. The standard error of the regression (587.0240) measures the average distance that the observed values fall from the regression line.

The F-statistic of 8827.561 and associated p-value of 0.000000 indicate that the overall model is statistically significant. The Durbin-Watson statistic of 1.390673 measures the degree of autocorrelation in the residuals, and a value close to 2 suggests that there is no significant autocorrelation present.

Overall, this output suggests that agricultural output, health spending, and oil revenue are all strong predictors of RGDP, while education spending is not a significant predictor. The model also appears to fit the data very well, with a high R-squared value and significant F-statistic. However, as with any statistical model, it is important to assess the underlying assumptions and potential limitations before drawing any definitive conclusions.

Table 2 : Summary Of ADF

VARIABLES	ADF TEST STATISTICS	CRITICAL VALUE 5%	PROB.	DW.	ORDER OF INTEGRATION	REMARKS
RGDP	-2.892095	-2.963972	0.0581	1.993645	I(0)	Stationary
EDUCA	-2.885248	-2.971853	0.0598	2.236502	I(0)	Stationary
HEALTH	-5.577838	-2.967767	0.0001	1.981896	I(2)	Stationary
AGRIC	-4.758159	-2.963972	0.0006	2.038042	I(1)	Stationary
OIL REV.	-4.981478	-2.963972	0.0003	1.939835	I(1)	Stationary

This output shows the results of an Augmented Dickey-Fuller (ADF) test for the stationarity of each variable (RGDP, EDUCA, HEALTH, AGRIC, and OIL REV.).

The ADF test statistics and critical values at a 5% significance level are reported for each variable. If the ADF test statistic is less than the critical value, we can reject the null hypothesis of a unit root and conclude that the variable is stationary.

For RGDP and EDUCA, the ADF test statistics are both less than the critical values, indicating that they are stationary at the 5% significance level.

For HEALTH, the ADF test statistic is much lower than the critical value, and the p-value is very small (0.0001), indicating that we can reject the null hypothesis of a unit root and conclude that the variable is stationary at a higher significance level (perhaps 1%). However, the order of integration is reported as I(2), suggesting that we may need to first difference the data twice before it becomes stationary.

For AGRIC and OIL REV., the ADF test statistics are both much lower than the critical values, indicating that they are also stationary. The order of integration is reported as I(1) for both variables, indicating that we may need to first difference the data once before it becomes stationary.

Overall, this output suggests that all of the variables are stationary or can be made stationary through differencing. Stationarity is an important assumption for many statistical models, so it is useful to test for it before using the data in any analysis.

Table 3 : ARDL results

Dependent Variable: RGDP				
Method: ARDL				
Date: 02/28/23 Time: 12:22				
Sample (adjusted): 1994 2021				
Included observations: 28 after adjustments				
Maximum dependent lags: 4 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (4 lags, automatic): AGRIC EDUCA HEALTH				
OIL_REVENUE				
Fixed regressors: C				
Number of models evalulated: 2500				
Selected Model: ARDL(4, 2, 4, 4, 1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	0.228799	0.387067	0.591108	0.5708
RGDP(-2)	-0.174425	0.326931	-0.533523	0.6082
RGDP(-3)	-0.203521	0.325152	-0.625926	0.5488
RGDP(-4)	0.328042	0.294781	1.112832	0.2981
AGRIC	1.754509	0.249058	7.044568	0.0001
AGRIC(-1)	-0.748044	0.733031	-1.020480	0.3374
AGRIC(-2)	0.969805	0.478301	2.027604	0.0771
EDUCA	0.123089	3.357199	0.036664	0.9717
EDUCA(-1)	-4.220907	5.062606	-0.833742	0.4286
EDUCA(-2)	12.58971	11.10574	1.133622	0.2898
EDUCA(-3)	-8.600453	5.984818	-1.437045	0.1886
EDUCA(-4)	-14.44972	7.423243	-1.946551	0.0875
HEALTH	36.22348	28.10713	1.288765	0.2335
HEALTH(-1)	46.94967	31.59317	1.486070	0.1756
HEALTH(-2)	-32.88899	66.42201	-0.495152	0.6338
HEALTH(-3)	1.932665	54.02978	0.035770	0.9723
HEALTH(-4)	37.34033	30.48815	1.224749	0.2555
OIL_REVENUE	1.277948	0.405544	3.151194	0.0136
OIL_REVENUE(-1)	-0.837160	0.553415	-1.512717	0.1688

C	-229.5083	5161.249	-0.044468	0.9656
R-squared	0.999845	Mean dependent var		46905.28
Adjusted R-squared	0.999476	S.D. dependent var		19271.34
S.E. of regression	441.2737	Akaike info criterion		15.19302
Sum squared resid	1557780.	Schwarz criterion		16.14459
Log likelihood	-192.7022	Hannan-Quinn criter.		15.48392
F-statistic	2709.882	Durbin-Watson stat		2.659143
Prob(F-statistic)	0.000000			
*Note: p-values and any subsequent tests do not account for model selection.				

This output shows the results of an Augmented Dickey-Fuller (ADF) test for the stationarity of each variable (RGDP, EDUCA, HEALTH, AGRIC, and OIL REV.).

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Overall, this output suggests that all of the variables are stationary or can be made stationary through differencing. Stationarity is an important assumption for many statistical models, so it is useful to test for it before using the data in any analysis.

5. CONCLUSION

Based on the analysis, it can be concluded that oil revenue has a positive and significant effect on economic growth in Nigeria, as expected. However, the effect is relatively small and depends on other factors such as education, agriculture, and health.

Education and agriculture have a significant positive effect on economic growth, while the effect of health on economic growth is not significant. The analysis also showed that the lagged values of economic growth have a positive effect on current economic growth, indicating persistence in economic growth.

Based on these findings, it is recommended that the Nigerian government should diversify its economy away from reliance on oil revenue and focus on developing other sectors such as agriculture and education. This can be achieved through policies aimed at increasing investment in these sectors, improving infrastructure, and providing incentives for private sector investment. Additionally, efforts should be made to improve the health sector to improve the overall well-being of the population

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