



Natural Resources Abundance and Economic Growth Nexus in Nigeria

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ABSTRACT

The link between natural resource abundance and economic growth is well recognized in the literature, but the causation of the link is quite ambiguous. Understanding the direction of causality between the natural resource abundance and economic growth is instructive for policy formulation. This study therefore explores the time series data which spanned the period 1970-2016 to establish the link between these variables. The key variables in the estimation are GDP per capita and resource rent. Engel-Granger causality test was used to test the direction of the causality between the variables. The results indicated no causality between natural resource abundance and economic growth in Nigeria. The paper concludes with the recommendation that good governance supported with strong transparent institution to monitor the proceeds from natural resource would guarantee growth.

Keywords: GDP per capita, Natural Resource, Granger Causality Test, Governance Quality

JEL Classification: O4, Q34, C5, K0

1. INTRODUCTION

The nexus between natural resources and economic growth remains unresolved. Specifically, a number of development theorists posited that natural resource abundance enhances growth process particularly from primitive stage to developed status, as the exploitation of resources promotes industrial take off, creates new markets and promotes new investment. Developing countries, particularly Nigeria whose economy are driven by natural resources experienced persistent volatility in their commodity prices in international market and this exposes the economy to undue fluctuations. The instability in the international market prices increases uncertainty, and makes it difficult for countries to forecast revenue accruable from natural resources (see Davis and Tilton, 2005; Frankel, 2010).

The link between natural resource abundance and growth performance in developing and less developed countries is highly contentious. The literatures have documented contradictory views on whether natural resource abundance catalyzed or slowed down economic growth. In particular, batteries of studies suggested that countries endowed with vast deposits of natural resources perform poorly in terms of growth performance (Ranis, 1991; Lal & Myint, 1996; Sachs & Warner, 1995, 1999; Auty, 2001). On the opposite side, handful of studies have also admitted that countries deficient in natural resources performs creditably well in terms of growth and development (Gylfason, 2000; Kronenberg, 2004).

A number of studies have indicated that a large number of resource rich countries in less developed countries experienced "resource curse" rather than "resource blessing". African countries and few Latin American countries are good example of resource cursed economy. For example, Nigeria, Sudan, Algeria, Sierra Leone and Congo are naturally endowed with varieties of mineral resources, but the per capita income and quality of life in these countries are perpetually low, below subsistence level (Auty 1993).

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What is experienced in resource-rich African countries is entirely an opposite case compared to the East Asian countries that have fewer or no natural resources. For example, countries such as Japan, Korea, Taiwan, Singapore and Hong Kong are deficient in natural resources yet, the per capita income in these countries are very high. The resource cursed experienced in African countries has added to the factors truncating growth structures. The poor growth experienced in resource-rich countries could be attributed to defective utilization, misallocation and mal-administration of natural resources. The channel of stunted growth experienced are encapsulated in poor economic policies and planning, adverse political environment and mismanagement of public funds (corruption). Nigeria is a peculiar example of a resource cursed economy that has large deposits of natural resources in which its exploitation has no relevance in the growth framework. Poverty is ubiquitous in all corners of the society (Sachs and Warner 1995, 1997, Torvik 2002).

The stock of natural resources in Nigeria can be taxonomized into commercial and subsistence resources. Commercial resources comprised oil and natural gas, tin, columbite, iron ore, coal, limestone, lead, bitumen and zinc while the subsistence counterpart include: rice, maize(corn) yams, cassava, sorghum and millet (mainly agricultural products). Nigeria has abundance, non-renewable resources and yet remains stagnant in terms of exploitation, thus resulting into a curse⁴. Over the past few years, Nigeria's economy profoundly depended on oil and gas resources as against non-oil resources as major source of revenue. The increase in oil & gas revenue has spurred growth. The expansion in oil & gas exploitation has contributed positively to exchange rate system and caused decline in the competitiveness of non-oil resources (Dutch Disease). On average, statistical evidence has shown that oil & gas resource share in the total revenue increased sharply from 43.9% to 79.9% during 1970-1979 and 2000-2009. It recorded a decline of 76.8% during 2010-2015. The instability in the Niger Delta area and the crash in the global oil prices have reduced the prospects from oil & gas resources in GDP (see Nili and Rastad 2007). Similarly, non-oil resource share in the total revenue dropped from 27% to 23.2% during 1970-1979 and 2010-2015⁵. It should be noted that despite huge revenue and rents received from oil & gas resources, GDP per capita stood at US\$1,418 while poverty became ubiquitous with about 54% of the population lived below 1 US \$ per day⁶. The miserable show of the Nigerian economy with enormous rents from oil has rekindled attention on the importance of oil in the growth process in Nigeria.

The abysmal and stunted growth performance of most oil rich countries in the 1980s gave negative view regarding natural resources as a blessing to economic growth. During these periods, it was found that most oil rich countries are perpetually backward in terms of growth basics. The presence of natural resources has only served as conduit pipe where state resources are stolen, it also provided an avenue for rent-seeking activities and corruption. The literature has provided a number of channels through which natural resources could slow growth process. The most common channel of transmission is Dutch Disease. Dutch Disease is a concept peculiar to Netherlands after the discovery of natural gas. The discovery has brought significant turn-around in Netherlands national currency, causing the currency to appreciate against US dollar and catalyzed wages faster than expected productivity efforts in non-gas sector of the economy. Consequently, the manufacturing sector activities suffered while the demand for domestic non-tradable goods increased, resulting in inflation. The fluctuations experienced in the natural gas earnings triggered macroeconomic volatility. When revenue from natural resources are fluctuating, policy makers in mineral abundant countries find it extremely difficult to follow a cautious fiscal policy stance (Gylfason, 2001; Rosser, 2006). The analysis given here mirrors Nigeria's experience when crude

⁴. Resource curse occur when a country focuses attention and energies on a single product for economic survival at the expense of other major sectors. Overdependence on a single product may be extremely unpredictable particularly if the price of the product fluctuates in the international market.

⁵ The statistics given here were computed from Central Bank of Nigeria Statistical Bulletin, 2014.

⁶ For more discussion, see: <http://go.worldbank.org/FIIOT240K0>

oil was discovered in 1958⁷. Natural resource abundance could spur negative growth if saving and investment drive are deficient (Gylfason & Zoega, 2002). Similarly, natural resource abundance may prove to be a curse and growth drag if governance quality⁸ is perpetually low and the institutional quality are in favour of rent-seeking activities. Few studies which claimed that natural resources dragged backward growth potentials did not converge in opinion on what actually the cause of natural resource-curse and the dynamics behind it.

Given the synopsis of natural resource abundance trajectory in both developed and less developed economies, the question that comes to mind is whether the growth experienced in resource-endowed countries, particularly Nigeria could be tied to the availability and exploitation of the resources? The proposition upheld is whether the divergence in growth structure in Nigeria could be linked to natural resource abundance? This paper contributes to the existing literature by investigating the contribution of natural resources to economic growth in Nigeria over the period 1970-2016. This enquiry built on Akinlo(2012), Dada(2013) expositions on the contribution of oil resources to the Nigerian economy. While Akinlo and Dada's studies attributed economic growth experienced in Nigeria to revenue inflow from oil and gas resources, others tilted towards theoretical discussion of natural resources potentials and economic growth (Odularo,2008; Jerome et.al,2009; Opeyemi,2012; Edame & Efeiom, 2016). This work is unique in the sense that it utilized data for rents accruable from natural resource (coal, forest, mineral, natural gas and oil) in Nigeria. The study further enhanced the frontiers of empirical model of resource curse and economic growth by incorporating governance quality and rule of law into the growth framework. To the knowledge of the authors, based on previous studies in Nigeria, no study has used this method.

Apart from the introduction, the remaining part of the paper is organized as follows: Section two provides the theoretical and empirical literature on natural resources and the link with economic growth. Section three analyzes the performance of oil resources in Nigeria. Section four presents the methodology, data and estimation strategy. Section five presents the empirical analysis while section six discusses the empirical results. Section seven gives the summary and recommendations.

2. Review of Literature

The literature documented three distinct stand on natural resource abundance and economic growth: positive, negative and no effect. Scholars that shared positive effects are more in number than the proponents of other two effects. By 1980s, some evidences came up in developing countries which indicated that natural resource abundance worked against economic growth. Those that advocated "blessing position" of natural resource abundance maintained that growth remains a sufficient end product of effective use of resources from primitive to industrial "take off" stage as espoused by W. Rostow (1960) in growth theory.

Empirical studies on resource curse and its associated channels are rather mixed and can be explained under three classifications. The first category tilts to Sachs and Warner's specification but differs based on the measures used to proxy resource abundance. The second category of empirical group placed more emphasis on economic factors which affects economic growth as a result of natural resource spill over. The third group of empirical studies maintained a "stand on the fence" position, by not finding any significant validity of resource curse hypothesis on economic growth.

In the study carried out by Sachs and Warner (1995,1997) on whether natural resource abundance encouraged Dutch Disease with a sample of 95 developing countries during the period 1970-1990. The model used expressed economic growth as a function of the share of natural resource in total exports.

⁷. Crude oil was produced in large quantity and this exerted positive influence on GDP and enhance foreign exchange position. The windfall from oil contributed immensely to spending programmes of government, create employment opportunities, boost foreign exchange position and supply energy to industries. The glut experienced in the international oil market during 1980 due to over-supply resulted into sharp drop in crude oil prices and this impacted negatively on government finances.

⁸. Quality of governance captures the reliability, impartiality and the level of corruption of governmental institutions.

Findings from the study suggested that resource rich countries exhibited stunted growth. The author attributed rent-seeking behaviour, corruption, poor institution and governance structure as factors responsible for the defective growth. Anderson (1998) gave a comparative analysis of resource-rich and resource-deficient countries. The study noted that countries deficient in natural resources recorded faster growth compared to resource-rich countries. Resource-rich countries were found to exhibit stagnant growth. The key variables in the estimated equation are natural resource abundance and GDP. Empirical findings showed that natural resource abundance negatively correlated with GDP growth rates in resource-rich countries. In another related study, Gylfason(2001) analyzed the effect of natural resources on economic growth using 65 resource-rich countries during the period 1980-1997. Human capital development was used as growth proxy, while the share of natural capital in national wealth proxied natural resource. Findings from the study indicated adverse effect of natural resources on education variable and economic growth.

Atkinson & Hamiton (2003) conducted a study on natural resources and economic growth using 103 countries during the period 1980-1995. Savings variable was used as indicator of economic growth while the share of natural resource rent in GDP was used as proxy for resource abundance. Findings from the study showed a combination of natural resource, macroeconomic and public expenditure policies influenced savings negatively, thus retarding growth. Kronenberg (2004) investigated whether abundance of natural resources in transition economies resulted into a curse. The study employed stepwise regression technique to estimate several variables (lagged one period growth value, initial GDP, trade liberalization, capital formation and school enrolment) on per capita growth among transition countries. Findings from the study ranked corruption as the main factor causing natural resource curse in transition countries. Similarly, in another study carried out by Gylfason & Zoega(2002) using a sample of 85 countries to analyze the effect of natural resources on economic growth during the period 1965-1998. The study employed savings and investment variables to capture growth. The measure of natural resources used is the share of natural capital in national wealth. Findings from the study suggested that resource-driven economy has growth constraints in saving and investment, thus retarding development of the financial system.

Mehrara (2009) study showed a non-linear relationship between growth in oil resources and economic growth in Middle East and African countries. From a panel data of thirteen oil exporting countries with five year interval during the period 1965-2005, the study indicated a phenomenal growth in oil revenue within the range of 18-19% and beyond which it exerted negative influence on economic growth. Within the same study environment, Arezki & Nabli (2012) explained the economic performance in resource-driven countries in the Middle East and North African countries during the period 1960-2008. The critical indicator variable (income level) indicated that many sampled countries had high income per capita but when assessed on growth criteria performs poorly. The study further suggested that resource-driven countries did not embrace growth inclusive policy and suffers high macroeconomic volatility.

Treading the same line of reasoning, Apergis & Payne (2014) analyzed the performance of oil resource-led growth countries on economic growth in Middle East and North African countries during the period 1990-2013. This study documented two separate results based on the regression outcome. The regression result for the period 1990-2003 indicated negative influence of oil resources on economic growth. The second estimation showed that oil resources positively drive economic growth. Wizarat (2014) explored whether natural resource abundance drives or retards economic growth. The study separately gathered data for developed and less developed countries for the period 1980-2009. Findings from the study showed that natural resource endowment affects economic growth positively in developed countries but recorded insignificant and negative relationship with growth in less developed countries. From the foregoing, there is need to further explore the relationship between natural resource abundance and economic growth in African countries, particularly in Nigeria, where natural resources are ubiquitous in all ramification.

The most challenging task in the literature is how to find an acceptable proxy for natural resource curse variable. Different terminologies have been used to explain resource curse. The two terms commonly used are resource dependence and resource abundance. The terms are used interchangeably in misleading

ways. Resource dependence shows the extent to which a country relies on revenue accruable from resource revenue. Resource abundance shows the stock of a country's estimated limited deposits of endowed resources. Different measures have been used to capture natural resource curse. For example, Brunnschweiler (2008) used the share of natural resource in GDP, while Sachs and Warner (1995) used the share of primary exports in GDP. More recently, some authors have embraced rents from natural resource extraction as proxy for resource curse (Philippot, 2010). The justification advanced in support of rents emanates from the fact that resource rent tracks the world price of resources and local cost of extraction/production. Table 1 show the indicators used by many authors to measure natural resource dependence and abundance.

Table 1: Natural Resource Dependence and Abundance Indicators

	Proxy	Authors
Natural Resource Dependence	(i) Primary Exports divided by GDP.	Sachs & Warner(1995); Neumayer(2004); Arezki & Vander Ploeg(2011); Beck(2011); Boschini et.al.(2007).
	(ii) Rents from natural resources divided by GDP.	Ross(2004); Auty(2007); Collier & Hoeffler(2004); Boos & Holm-Muller(2013); Bhattacharyya and Hodler(2014); Bhattacharyya & Collier(2014).
	(iii) Share of natural capital in national wealth.	Gylfason(2001); Gylfason & Zoege(2002).
	(iv) Share of mineral exports in total exports.	Dietz et.al. (2007); Barajas et.al.(2013); Daniele(2011).
Natural Resource Abundance	(i) Total natural capital and mineral resource assets in US\$ per capital.	Stijns(2005); Brunnschweiler(2008)
	(ii) Subsoil wealth	Stijns(2005); Brunnschweiler & Bulte(2008); Beck(2011).

Source: Steven and Dietsche (2008)

Empirical studies has not sufficiently provided a conclusive answer to whether abundant natural resource is a curse or blessing. Most studies that claimed that natural resource curse exist did not converged in opinion on what factors which motivates the curse and how such factors can be controlled. This explains the need for further research to ascertain the causal link between natural resource abundance and economic growth in resource-driven countries.

3. Performance of Oil Resources in Nigeria: An Overview

Natural resource performance would be explained using oil revenue and resource rents as reference point. Nigeria's natural resources is oil dominant. Tables 2 & 3 provides the evidence. The average share of oil in the total revenue stood at 58.8% during 1970-1979. It increased sharply to 71.3%, 77.1% and 81.2% during 1980-1989, 1990-1999 and 2000-2009 respectively. It dropped to 75.5% during 2010-2015. During the same period, the share of non-oil resources in the total revenue stood at 35.8% during 1970-1979. It declined continuously from 28.7% to 22.9%, 20.4% and 24.3% during 1980-1989, 1990-1999,

2000-2009 and 2010-2015 respectively. In terms of growth in oil and non-oil resources, during the period 1970-1979, oil revenue stood at 0.87%. It declined sharply to 0.25% and 0.43% during the period 1980-1989 and 1990-1999. Between 2000-2009 and 2010-2015, the figure declined continuously. The decline was as a result of glut in the oil supply in international market which led to fluctuations in oil prices during 1980s. The global economic meltdown coupled with the crash in oil prices could be adduced as justification for the downturn in oil revenue growth. Despite the low performance recorded in oil revenue growth, the non-oil revenue growth performed below expectation (See table 2). To concretized the dominance of oil in Nigeria, table 2 further revealed that oil revenue share in the total federally collected revenue far outstripped that of the non-oil revenue. There is need to also point out that the dominant role played by oil resources in Nigeria relegated agriculture perpetually to the background.

Table 2: Contribution of Oil & Non-Oil Resources to Total Revenue in Nigeria, 1970-2015

Year	1970-1979	1980-1989	1990-1999	2000-2009	2010-2015
Oil Revenue % in Total	58.8	71.3	77.1	81.2	75.5
Non-Oil Revenue % in	35.8	28.7	22.9	20.4	24.3
Oil Revenue Growth (%)	0.87	0.25	0.43	0.32	0.08
Non-Oil Revenue Growth (%)	0.21	0.26	0.44	0.34	0.14
Oil Revenue Growth	0.31	-0.007	0.008	0.007	-0.01
Non-Oil Revenue Growth	-0.08	0.08	0.02	0.09	0.04

Source: Computed from Central Bank of Nigeria Statistical Bulletin, 2014

Following Philippot (2010), natural resource rent can used as a measure of natural resource abundance. The rents which accrued to the government affects directly government spending capacity and the behaviour of economic units in the economy. In line with this, government in Nigeria collects rents on five (5) natural resources namely, coal, forest, mineral, natural gas and oil. Rent received on oil far outstripped the other rents received from other resources (See table 3).

Table 3: Natural Resource Rents in Nigeria (% of GDP), 1970-2015

Year	1970-1979	1980-1989	1990-1999	2000-2009	2010-2015
Coal Rent	0.004	0.004	0.0008	0.0001	0.0003
Forest Rent	1.157	1.196	3.152	1.3096	0.5266
Mineral Rent	0.038	0.008	-0.008	0.002	0.014
Natural Gas Rent	0.073	0.746	1.058	3.601	2.165
Oil Rent	21.816	33.930	34.899	31.653	39.684
GDP Growth (%)	7.0%	-1.4%	2.6%	8.9%	6.1%

Source: Computed from World Development Indicator Data Base (WDI).

4. Methodology and Sources of Data

4.1 The Model

Adam Smith (1723-1790) and David Ricardo (1772-1823) advocated that countries blessed with abundant resources aligned their development process on these resources and use them as spring ladder for achieving sustained growth. Following the literature evidence, the model for the study can be specified as:

$$Ecogr_t = f(nrm_t, opens_t, finc_t, gov_t, rule_t) \quad (1)$$

The log-linear expression of the equation is given as:

$$\ln Ecogr_t = \omega_0 + \omega_1 \ln nrm_t + \omega_2 \ln opens_t + \omega_3 \ln finc_t + \omega_4 gov_t + \omega_5 \ln rule_t + \mu_t \quad (2)$$

Where: $Ecogr_t$ denotes economic growth (proxied by GDP/Population); nrm_t is natural resource abundance (proxied by resource rents); $opens_t$ represents trade openness (proxied by imports + exports divided by GDP); $finc_t$ stands for final government consumption; gov_t represents governance quality

(proxied by corruption), $rule_t$ denotes rule of law and μ_t is the error term while t stands for time. All the variables except governance quality are in their log forms.

4.1.1 Estimation Techniques

This study attempts to establish the direction of causality between the variables in the model, especially that between the growth variable ($Eco gr_t$) and the explanatory variables ($nrm_t, opens_t, finc_t, gov_t, rule_t$), after carrying out some diagnostic tests such as the unit roots and co-integration tests.

4.1.2 Scope of the study and sources of data

The data employed for this study covers the period 1970 - 2016. The choice of this period was largely informed by the availability of data as well as the need to examine the relationship between the variables in Nigeria over considerable length of time. In order to facilitate the time series analysis, data were generated from the World Development Indicator (WDI) Data base Archive. Specifically, the data used for all the variables except governance quality were obtained from WDI. Governance quality data were obtained from the website of Transparency International (TI).

5.0 Empirical Analysis

The first step here is to establish the stationarity of the variables used in the model using the Augmented Dickey-Fuller test (ADF) procedure. The reason for this is to avoid spurious regression results. The study further established the long run relationship and conducted causality tests on the variables used in the model.

5.1 Unit Root Tests

The unit root test is conducted on each series that enters the model to determine whether it is stationary and also ascertained their order of integration. The result of the ADF unit root test procedure is reported in Table 4. From the table, final government consumption is stationary at level I(0), while other variables except rule of law are stationary at first difference I(1). The rule of law variable is stationary at second difference I(2).

Table 4: ADF Unit Root Tests

Variable	Critical Value	Level	Prob*	First Difference.	Prob**	Maximum lag no	Order of Integration
<i>Lgrowth</i>	t-stats.	-1.3764		-5.2372	0.0005	9	I(1)
	1%	-4.1756	0.8545	-4.1756			
	5%	-3.513		-3.513			
	10%	-3.1868		-3.1868			
<i>Lnrm</i>	t-stats.	-2.9115		-4.4602	0.0049	9	I(1)
	1%	-4.2268	0.1706	-4.1864			
	5%	-3.5366		-3.518			
	10%	-3.2003		-3.1897			
<i>Lopens</i>	t-stats.	-3.5097		-4.8228	0.0258	9	I(1)
	1%	-4.1809	0.1506	-4.2118			
	5%	-3.5155		-3.5297			
	10%	-3.1882		-3.1964			
<i>Lfinc</i>	t-stats.	-4.8688		-3.6568	0.0428	9	I(0)
	1%	-4.2845	0.0024	-4.3239			
	5%	-4.2845		-3.5806			
	10%	-3.2152		-3.2253			
<i>Lrule</i>	t-stats.	-1.917		-12.3197			

	1%	-4.1864	0.6284	-4.1864	0.0000	9	I(2)
	5%	-3.518		-3.518			
	10%	-3.1897		-3.1897			
Gov	t-stats.	-0.4232		-5.9489			
	1%	-4.2436	0.9826	-4.2528	0.0001	9	I(1)
	5%	-3.5442		-3.5484			
	10%	-3.2046		-3.207			

Note: ** denotes rejection of null hypothesis at the 5% and 10% respectively. One of the variable is stationary at levels, four were stationary at first difference, while one variable stationary at second difference.

5.2 Co-integration results

Having ascertained the stationarity properties of the variables, this study proceeds to investigate the existence of co-integration among the variables. The Johansen multivariate cointegration technique was adopted. It is observed from Table 5 that the variables in the equation are cointegrated. The trace test detected the presence of two cointegrating equations at 5% level, while the max-eigen value test detected the presence of one cointegrating equation at 5% level of significance. The existence of cointegration implies the existence of long run equilibrium relationship between the variables in the equation. This implies that if a set of variables are cointegrated, the effects of a shock to one variable spread to the others, possibly with time lags, so as to preserve a long run relationship between the variables.

Table 5: Cointegrating Relationship

Hypothesized CE(s)	Max-Eigen Statistics	Critical Value @ 5%	Trace Statistics	Critical Value @ 5%	Prob** (Eigen)	Prob** (Trace)
None	49.37746	40.07757	124.4284	95.75366	0.0034	0.0001
At most 1	32.38803	33.87687	75.05093	69.81889	0.0745	0.0180
At most 2	27.27726	27.58434	42.66290	47.85613	0.0547	0.1410
At most 3	11.33297	21.13162	15.38564	29.79707	0.6141	0.7546
At most 4	3.911714	14.26460	4.052677	15.49471	0.8685	0.8992
At most 5	0.140963	3.841466	0.140963	3.841466	0.7073	0.7073

Note: Trace test indicates 2 cointegrating eqn (s) at the 0.05 level while Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level.

** MacKinnon-Haug-Michelis (1999) p-values.

Source: Author's computation

5.3 Granger Causality Test

In granger causality procedure, three possible outcomes are expected. The first possibility is that the variable shows unidirectional causality. The second is bi-directional causality while the third possibility is outright no causality between variables. The granger causality test result is presented in table 6 below. The decision rule is based on the alpha (α) value with respect to the probability (P-value) value. If the P-value is less than the alpha value, we reject the null hypothesis that a variable granger causes one another, hence we establish bi-directional causality between the variables. Thus, if P-value is greater than the alpha value, we do not reject the null hypothesis, hence we establish no causality between the variable.

Table 6: Pairwise Granger Causality Results

Pairwise Hypothesis	Obs.	F-Statistic	P-Value	Type of causality
LNRM does not Granger Cause LGROWTH	45	1.55913	0.2228	LNRM does not cause LGROWTH
LGROWTH does not Granger Cause LNRM		0.44889	0.6415	LGROWTH does not cause LNRM
LOPENS does not Granger Cause LGROWTH	45	0.78485	0.4631	LOPENS does not cause LGROWTH
LGROWTH does not Granger Cause LOPENS		2.92702	0.0651	LGROWTH causes LOPENS
LFINC does not Granger Cause LGROWTH	34	2.39086	0.1094	LFINC does not cause LGROWTH
LGROWTH does not Granger Cause LFINC		0.58286	0.5647	LGROWTH does not cause LFINC
LRULE does not Granger Cause LGROWTH	45	4.85142	0.0130	LRULE causes LGROWTH
LGROWTH does not Granger Cause LRULE		3.73422	0.0326	LGROWTH causes LRULE
GOV does not Granger Cause LGROWTH	35	1.03503	0.3676	GOV does not cause LGROWTH
LGROWTH does not Granger Cause GOV		4.30151	0.0228	LGROWTH causes GOV
LOPENS does not Granger Cause LNRM	45	2.22340	0.1214	LOPENS does not cause LNRM
LNRM does not Granger Cause LOPENS		0.06628	0.9360	LNRM does not cause LOPENS
LFINC does not Granger Cause LNRM	34	0.10025	0.9049	LFINC does not cause LNRM
LNRM does not Granger Cause LFINC		4.86862	0.0150	LNRM causes LFINC
LRULE does not Granger Cause LNRM	45	0.63541	0.5350	LRULE does not cause LNRM
LNRM does not Granger Cause LRULE		0.82616	0.4451	LNRM does not cause LRULE
GOV does not Granger Cause LNRM	35	1.99484	0.1537	GOV does not cause LNRM
LNRM does not Granger Cause GOV		1.55738	0.2272	LNRM does not cause GOV
LFINC does not Granger Cause LOPENS	34	0.01071	0.9893	LFINC does not cause LOPENS
LOPENS does not Granger Cause LFINC		0.56050	0.5770	OPENS does not cause LFINC
LRULE does not Granger Cause LOPENS	45	0.86531	0.4286	LRULE does not cause LOPENS
LOPENS does not Granger Cause LRULE		5.43643	0.0082	LOPEN causes LRULE
GOV does not Granger Cause LOPENS	35	1.29742	0.2881	GOV does not cause LOPENS
LOPENS does not Granger Cause GOV		1.46753	0.2466	LOPENS does not cause GOV
LRULE does not Granger Cause LFINC	34	1.12383	0.3388	LRULE does not cause LFINC
LFINC does not Granger Cause LRULE		0.20027	0.8196	LFINC does not cause LRULE
GOV does not Granger Cause LFINC	34	3.07058	0.0617	GOV causes LFINC
LFINC does not Granger Cause GOV		2.41801	0.1068	LFINC does not cause GOV
GOV does not Granger Cause LRULE	35	1.55365	0.2280	GOV does not cause LRULE
LRULE does not Granger Cause GOV		2.19127	0.1293	LRULE does not cause GOV

Note: The p-values shows the direction of causality flow among the variables at 0.05 level of significance.

6.0 Discussion of Empirical Results and Policy Implications

As shown in the results of section 5.3 of table 6 on the relationship between natural resource abundance (LNRM), trade openness (LOPENS), final government consumption (LFINC), governance quality (GOV), rule of law (LRULE) and economic growth (LGROWTH), the study accepted the null hypothesis in both cases that natural resource abundance does not granger cause economic growth and that economic growth does not granger cause natural resource abundance and rejected the alternative hypothesis in both cases. This is obvious, given the values of their respective probability in the granger causality table. In this situation, it is concluded that there is no causality between natural resource abundance and economic growth in Nigeria. The causality did not run in both ways. The justification for no causality between natural resource abundance and economic growth in Nigeria could be attributed to poor governance quality, corruption, lack of transparency and accountability in managing natural resource proceeds.

The results obtained from the causality test reinforced the common position established in the literature that countries that has abundance natural resources lagged behind in terms of growth fundamentals. To further reinforced the causality test results, the two stage least squares regression estimation confirmed that natural resource abundance affected economic growth negatively (see appendix A). Any policy geared at reducing effective utilization, monitoring and efficient exploitation of resources in Nigeria will inhibit economic growth. Accountability of responsibility and transparency in handling exploitation of natural resources would foster economic growth in Nigeria. The results obtained here indicated that natural resource abundance does not influence economic growth on one hand, and that economic growth does not guarantee effective exploitation of natural resources. These results corroborate the findings by Arezki & Nabli (2012), Payne (2014) for Middle East and North Africa. The causality test results also provide support to the findings of Wizarat (2014), Kronenberg (2004) and Sachs and Warner (1995, 1997). Other variables in the no causality direction are final government consumption (LFINC) and economic growth (LGROWTH), trade openness (LOPENS) and natural resource abundance (LNRM), rule of law (LRULE) and natural resource abundance (LNRM), governance quality (GOV) and natural resource abundance (LNRM), final government consumption (LFINC) and trade openness (LOPENS), governance quality (GOV) and trade openness (LOPENS), rule of law (LRULE) and final government consumption (LFINC), and governance quality (GOV) and rule of law (LRULE). Unidirectional causality runs among the following paired variables: economic growth (LGROWTH) and trade openness (LOPENS), economic growth (LGROWTH) and governance quality (GOV), natural resource abundance (LNRM) and final government consumption (LFINC), trade openness (LOPENS) and rule of law (LRULE) and governance quality (GOV) and final government consumption (LFINC). There is bi-directional causality between rule of law (LRULE) and economic growth (LGROWTH).

7.0 Summary and Recommendation

This study used causality test to establish the relationship between economic growth and natural resources abundance in Nigeria. The study is mindful of the fact that natural resources conferred some positive externality to Nigeria in terms of revenue generation which mediates burgeoning sectoral demands. However, a number of existing studies have demonstrated the existence of resource curse not only in Nigeria but also in other developing countries endowed with natural resources. Natural resource abundance has yielded negative growth due to weak institutional structure, incoherent policies and corruption. However, several theories have been advanced to explain resource curse. These include: Dutch Disease theory, rent-seeking theory and endogenous institutions theory. These studies have linked natural resource abundance to economic growth and socio-economic needs.

A simple economic model predicated on Adam Smith and David Ricardo's exposition was explored. The model examined the link between economic growth, natural resource abundance and some welfare indicators. The granger causality technique was explored. The findings of no causality between natural resource abundance and economic growth has vital policy implications for economic planners. This implies that resource abundance yielded slow growth process. The following conclusions are to be drawn from the tests:

1. Governance quality affects effective monitoring of structures upholding natural resource stock. There is need to strengthen governance quality.
 2. Degree of trade openness of a country affects the exploitation of natural resources. There is need to streamline trade relations for better exploitation of resources.
 3. Since positive link between natural resource abundance and economic growth are weakly established, there is need for economic diversification from resource based sectors to other sectors such as agricultural cultivation, science and technology, tourism, manufacturing, etc. This will obviate Dutch Disease and preserve other sectors.
- Above all, there must be strong and transparent institutions on ground in Nigeria before some of the proffered solutions can work well like those in Angola, Norway and Canada.

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APPENDIX A

Dependent Variable: LGROWTH

Method: Two-Stage Least Squares

Instrument specification: LNRM LOPENS LFINC GOV LRULE

Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.889234	1.200260	-1.574020	0.1260
LNRM	-0.071504	0.496604	-0.143987	0.8865
LOPENS	1.583360	0.394240	4.016230	0.0004
LFINC	-0.304848	0.308047	-0.989618	0.3303
GOV	-0.121580	0.060785	-2.000156	0.0546
LRULE	0.921411	0.112739	8.172932	0.0000
R-squared	0.938812	Mean dependent var		4.296405
Adjusted R-squared	0.928614	S.D. dependent var		0.935464
S.E. of regression	0.249939	Sum squared resid		1.874091
F-statistic	92.05793	Durbin-Watson stat		0.776178
Prob(F-statistic)	0.000000	Second-Stage SSR		1.874091
J-statistic	2.22E-38	Instrument rank		6

Source: Computed using E-View 8.0

Authors' contribution

Ogunlana initiated the idea and designed the study and also have the overall responsibility for the conduct of the authors. Bakare contributed to the study in the area of literature review and methodology; Awotundun contributed to the study's methodology and analysis; Ogunlana contributed to study's literature, methodology, analysis and draft reports' preparation. All authors read and approved the final draft.