

The relationship between natural resources and economic growth in nigeria: an implication for resource curse

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Abstract

The relationship between resource abundance and economic growth has been used to determine if a resource rich country suffered from resource curse or not. If the relationship was negative the country would be deemed to have suffered from resource curse in the midst of plenty. This study analyzed data sourced from the World Development Indicator (WDI, 2020) for the period 1970 -2020 on variables like Gross Domestic Product Growth Rate (GDPGR) and the various components of resource rents like oil rent (OILRT), natural gas rent (NGRT), forest rent (FORT) all as percentages of GDP. The vector autoregressive (VAR) results showed that the variables were positively related to GDPGR but they were all not statistically significant as their joint contribution was only (R^2) 35%. The fact that the value of $\ln GDPGR_{t-1}$ was -0.074769 indicated that Nigeria economy suffered from resource curse in the period analyzed. The Granger causality also showed no causal relationship between total natural resource rent (TNRR) and GDPGR. The Error correction model (ECM) revealed that the speed of adjustment of GDPGR back to equilibrium relationship was 50%. It was therefore, recommended that Nigerian government should make judicious use of the natural resource rents in the area of qualitative education, health, food production, industrial production and reduce unemployment, inflation and poverty so as to boost economic performances with the ever increasing natural resource rents.

Keywords: GDPGR, Oil Rent, Natural Gas Rent, Natural Resources Rent, VAR

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I. Introduction

The term Dutch Disease and Resource Curse were closely related but one was derived from the other. Dutch Disease was first used in the British Journal titled the 'Economist' in November 1977 to refer to the economic situation in Netherland following sudden discovery and exportation of large deposit of natural gas in the North Sea. Larsen (2006) described Dutch Disease as a phenomenon that displaced the growth essential manufacturing and agricultural sectors of natural resource endowed countries. Arising from this was another term coined by Auty (1993) called Resource Curse (RC) which was used to refer to a situation in which negative relationship existed between natural resource abundance and economic growth of the natural resources endowed countries.

Larsen (2006) further claimed that counter to intuition, growth studies showed that the discovery of natural resources in a particular country might not necessarily connote blessing, it could rather turn out to be a curse and this might make the economy of resource rich countries slower than those of their resource-poor counterparts. Sachs and Warner (2001) corroborated Auty (1993) assertion after their research on the relationship between natural resource abundance and the economic growth of such countries.

Nigeria was one of the natural resource endowed countries of the world being the 6th largest oil producer, supplier and exporter in the world. Studies have shown that Nigeria suffered from Dutch Disease. But did Nigeria also suffer from Resource Curse? Studies have also shown that Dutch Disease was an important way to describe the economic effect of Resource Curse phenomenon and that a naturally endowed country might or might not suffer from one or both of these economic misalignments (Larsen 2006). Gylfason (2001a) claimed that despite the commanding vast of oil riches of Nigeria, her Gross National Product (GNP) remained at the same 1960s level forty years after.

To suffer from resource curse a number of indicators must be present which included the following among others: discovery and exploitation of natural resources in a country, negative relationship between natural resource abundance and economic growth, resource export must be growing at the expense of manufacturing and agricultural exports, misuse and mismanagement of increasing resource revenues, rent seeking behavior and internal conflict of redistribution, stagnant growth with diverse export base, stagnant growth with non-diverse export base, corruption, poverty, inequality, regional environmental impacts, non-diversification of export base and so on.

The main cause of natural resource curse or resource trap was over-concentration of all of a country's (especially naturally endowed country) means of production on a single industry like the natural resource industry by neglecting other industries like manufacturing and agriculture and others. Resource curse could also arise from government corrupt practices due to excessive wind falls from natural resource export revenues. Resource curse is a paradoxical situation in which a non-renewable natural resource discovery led the country to underperform both economically, socially, and politically, which was the so called "theory of paradox of plenty". Countries endowed with natural resources like oil, diamond, copper, uranium, gold, silver, coal and so on which constituted rich sources of wealth were more vulnerable to suffer from resource curse. This study was designed to investigate the relationship between economic growth of Nigeria and her resource abundance proxy by the various components of resource rents. The rest of the study was divided and arranged into sections such that section two was devoted to relevant literature review followed by the data and method of study in section three while data analysis was the subject matter of section four and the study concluded in section five.

II. Literature review

Since the concept resource curse was introduced by Auty in 1993, a lot of studies have been conducted to verify the so called paradox of plenty hypothesis, resource gap or resource curse in Nigeria and around the world (Sachs and Warner 2001, Sala-i-Martin and Subramanian 2003, Rosser 2006, Obi 2010, Lujala 2010, Vertigans 2011). Expressing the extent to which resource curse had affected Nigerian economy Sal-i-Martin and Subramanian (2003) lamented Nigeria has been a disastrous development experience, on just about every conceivable metric Nigerian (economic) performance since independence has been dismal. In PPP terms, Nigeria's per capital GDP was US\$ 1,113 in 1970 and is estimated to have remained at US\$1,084 in 2000. The latter figure places Nigeria among the 15 poorest nations in the world for which such data are available. This statement was a confirmation of the presence or existence of resource curse in Nigeria.

Even though expectation was always high that resource rent would boost economic performance of resource rich countries. (Fredrick van der Ploeg 2011; Ross 2014; Vokes, 2012 and Weszkalnys, 2014) empirical researches have shown that resource rich economies were more susceptible to corrupt practices compared to their non-resource rich counterparts which encouraged autocracy in such countries (Ahmadou 2014; Wright, Frantz and Geddes 2015).

But some writers have criticized the basic tenets of resource curse thesis. Such critics include Brunnschweiler (2008), Alexeev and Conrad (2009). Some authors like Haber and Menaldo (2001), Cavalcanti, Mohaddes and Raisi (2011) were of the view that the effect of resource curse could be beneficial to economic growth after all. But Anderson and Ross (2014); Wiens, Poast and Clark (2014) were of the opinion that such views of positive or beneficial effects of resource windfalls depended on the resource rich countries studied as well as the period reviewed and the possibilities that such studies underestimated the negative effects. The truth of the matter was that countries like America and Britain were able to avoid the curse of oil because they were already running democratic governments before oil discovery. Again countries like Norway, Canada and Botswana were able to escape the curse of oil because they have records of good governance and economic diversification with their oil discovery (Mehlum, Moene and Torvik (2006). As to the causes of resource curse in resource rich countries studies have suggested that mere expectation of future resource windfalls could generate tension, conflict, corruption and other social, economic and political discontents (Vincente 2010; Hayat, Ganiev and Tang 2013)

III. DATA AND METHOD

The data for this study were Gross Domestic Product Growth Rate (GDPGR) as the dependent variable, while the independent variables were a group of natural resource abundance variables proxy by the following natural resource rents such as oil rent (OILRT), natural gas rent (NGRT), and forest rent (FORT). Data on all these variables were secondary data sourced from the

World Development Indicator (WDI) 2020 edition. These data were subjected to diagnostic tests such as the Augmented Dickey-Fuller (ADF) test for unit root given by the equation:

$$\Delta y_t = \alpha_0 + \beta y_{t-1} + \sum \rho_i \Delta y_{t-i} + \mu_t \dots \dots \dots (1)$$

Where: $\Delta y_{t-1} = y_{t-1} - y_{t-2}$, also $\Delta y_{t-2} = y_{t-2} - y_{t-3}$ and so on.

And the Phillips-Perron unit root equation:

$$y_t = \delta_t + \theta y_{t-1} + \theta_1 \Delta y_{t-1} + \theta_2 \Delta y_{t-2} + \dots + \theta_n \Delta y_{t-n} + \mu_t \dots \dots \dots (2)$$

The general form of ADF and PP equations to test for unit root was specified as:

$$\Delta y_t = a_0 + b y_{t-1} + d_1 \Delta y_{t-1} + d_2 \Delta y_{t-2} \dots + d_n \Delta y_{t-n} + e_t \dots \dots \dots (3)$$

Where: y_t was the variable (dependent and independent) tested for unit root, a_0 was the intercept, b was the coefficient of the measuring unit root, d_i 's were parameters of the lagged variables and finally, e_t was the white noise error term. The basic model of this study was specified as:

$$GDPGR_t = \beta_0 + \beta_1 FORT_t + \beta_2 NGRT_t + \beta_3 OILRT_t + \varepsilon_t \dots \dots \dots (4)$$

In logarithm form the model translated to:

$$LGDPGR_t = \beta_0 + \beta_1 LFORT_t + \beta_2 LNGRT_t + \beta_3 LOILRT_t + \varepsilon_t \dots \dots \dots (5)$$

The co-integration equation was derived from equation 4 as followed:

$$\varepsilon_t = GDPGR_t - \beta_0 - \beta_1 FORT_t - \beta_2 NGRT_t - \beta_3 OILRT_t \dots \dots \dots (6)$$

To determine the speed of adjustment of the dependent variable from its short run to its long run equilibrium level we would run the following Error Correction Model (ECM):

$$\Delta GDPGR_t = \beta_0 + \beta_1 \sum \Delta FORT_{t-1} + \beta_2 \sum \Delta FORT_{t-1} + \beta_3 \sum \Delta OILRT_{t-1} + \delta ECM(-1) + e_t \dots (7)$$

Finally this study would conduct the Granger Causality test to establish whether $GDPGR_t$ Granger cause total natural recourse rent ($TNRR_t$) or the other way round or both ways using the following Granger Causality models.

$$GDPGR_t = \sum k_{11j} GDPGR_{t-j} + \sum k_{12j} TNRR_{t-j} + \mu_{1t} \dots \dots \dots (8)$$

$$TNRR_t = \sum k_{21j} GDPGR_{t-j} + \sum k_{22j} TNRR_{t-j} + \mu_{2t} \dots \dots \dots (9)$$

IV. DATA ANALYSIS AND RESULTS

This study was based on the paradox of plenty hypothesis which stated that negative relationship existed between resource abundance and economic growth of resource rich countries. Nigeria was a resource abundant country endowed with resources like crude oil, natural gas, arable land, coal, forestry and many more from which the country generated a lot of rents over the years. This study employed various statistical analyses to test the paradox of plenty hypothesis to obtain the following results.

TABLE 4. 1: UNIT ROOT TEST

Variable	ADF	0.05 cv @level	0.05 cv @ 1st diff	0.05 cv @ 2 nd diff	Integration order	status
GDPGR	-5.611655	-2.921175			I (0)	S
OILRT	-4.211518	-2.922449			I (0)	S
TNRR	-3.318312	-2.923780			I (0)	S
FORT	-1.645889	-2.921175	-7.899172		I (1)	S
NGRT	2.658851	-2.935001	0.024690	-5.827071	I (2)	S

Source: Author's Computation, 2022

Apart from economic growth variable (GDPGR), six other variables that were related to resource abundance were analyzed in this study. They were first of all tested for unit root to determine their level of stationarity and the outcomes of the unit root test were presented in table 4.1 above. Three of the variables namely GDPGR, OILRT and TNRR were found to be I (0) or integrated at their level form, indicating that they contained no unit root problems. Two variables namely FORT and NGRT exhibited evidence of unit root problems and were forced to be integrated at I(1) and I(2) or their first difference and second difference levels respectively. Overall all the variables were stationary.

Table4. 2: COINTEGRATION TEST

Hypothesized no of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Probability
None *	0.721392	57.30070	47.85613	0.0051
At most 1	0.416742	25.35193	29.79707	0.1492
At most 2	0.306348	11.87380	15.49471	0.1631
At most 3	0.103419	2.729162	3.841466	0.0985
Hypothesized no of	Eigenvalue	Maximum Eigenvalue	0.05 Critical Value	Probability
None *	0.721392	31.94878	27.58434	0.0129
At most 1	0.416742	13.47813	21.13162	0.4092
At most 2	0.306348	9.144639	14.26460	0.2743
At most 3	0.103419	2.729162	3.841466	0.0985

Source: Author’s Computation, 2022

In Table 2 above the result of the Johansen Cointegration tests were presented. This was to establish whether these variables could exhibit existence of long run relationship despite the fact that they were integrated of different orders. The results showed that the Trace test indicated 1 cointegrating equations while the Maxi-mum Eigenvalue test also indicated 1 cointegrating equation. The implication of these was that the variables could work together in the long run irrespective of their different levels of integration. With all these established the study proceeded into the statistical analysis of the variables as presented below.

Table 4.3: VAR LAG SELECTION CRITERIA

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-90.45410	NA	0.022483	7.556328	7.751348	7.610418
1	-31.38748	94.50659*	0.000733*	4.110998*	5.086099*	4.381450*
2	-16.61883	18.90388	0.000906	4.209506	5.964687	4.696319

* indicates lag order selected by the criterion

The above VAR lag selection criteria in Table 4.3 above showed that all the selection criteria indicated one lag at the 5% level. On that basis the outputs of the vector auto regression were presented at their one lag levels. The vector autoregressive (VAR) model results in Table 4.4 below showed that all the variables of resource rents were positively related to economic growth but were not statistically significant. The negative coefficient of LGDPGR_{t-1} of -0.074769 indicated existence of resource curse in Nigeria during the period reviewed and hence the low value of R² of (0.347268).

Table 4.4: VAR OUTPUTS

Variable	Coefficient	Standard Error	t-Statistic
LGDPGR (-1)	-0.074769	0.25719	-0.29072
LFORT(-1)	0.987856	1.36498	0.72372
LNGRT(-1)	0.390336	0.54312	0.71870
LOILRT(-1)	0.787437	0.66344	1.18689
C	1.826744	1.41717	1.28901
R ² = 0.347268	Adj R ² = 0.020902		

Source: Author’s Computation, 2022

Table 4.5: VECTOR ERROR CORRECTION RESULTS

Variable	ECM	Standard Error	t-Statistic
D(LGDPGR)	-0.503443	0.32643	-1.54228
D(LFORT)	-0.214594	0.07346	-2.92141
D(LNGRT)	-0.090907	0.19720	-0.46100
D(OILRT)	0.164374	0.20541	0.80022

Source: Author’s Computation, 2022

The results of the error correction model were presented in Table 4.5 above. This result showed that the dependent variable LGDPGR was too high to be in equilibrium relationship. The speed of adjustment was -0.503443 indicating that LGDPGR must adjust downward by 50% next time to maintain its long run and short run equilibrium relationship. The possible speed of adjustment of other variables was shown under the ECM column if each of them were made to be dependent variable.

Table 4.6: GRANGER CAUSALITY TEST RESULT

Null Hypothesis	Observations	F-Statistic	Probability
TNRR does not Granger Cause GDPGR	49	0.40361	0.6704
GDPGR does not Granger Cause TNRR		0.35215	0.7051

Source: Author’s Computation, 2022

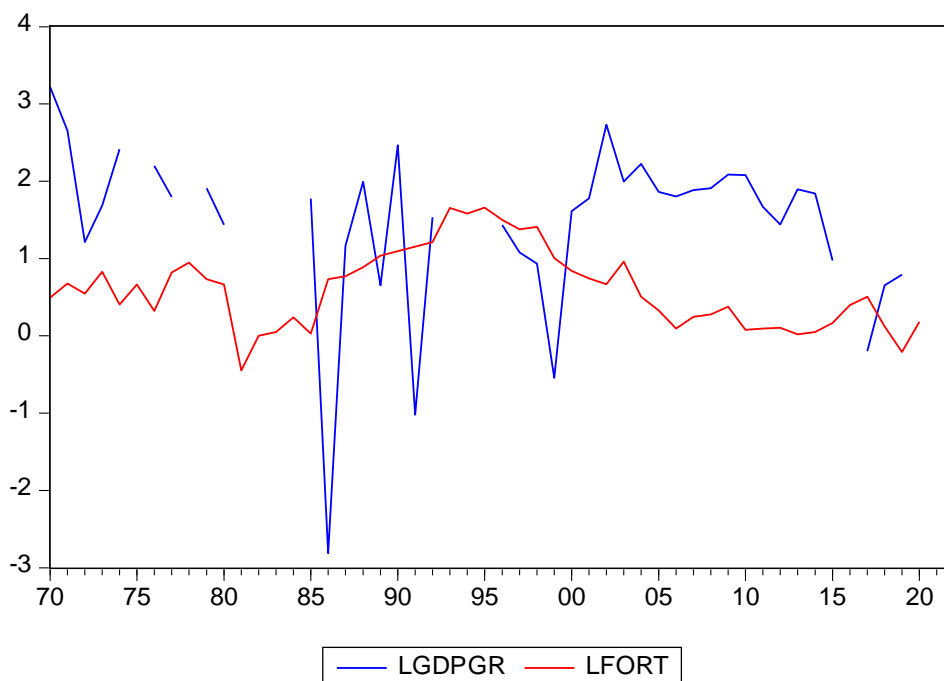
The result of the Granger Causality was presented in Table 4.6 above between total natural resource rent (TNRR) and Gross Domestic Product Growth Rate (GDPGR). The result showed that there was no causal relationship between TNRR and GDPGR as their F-Statistic were not statistically significant. This was to support the VAR result above that even though their relationship was positive but it was not significant because of the presence of resource curse in the country.

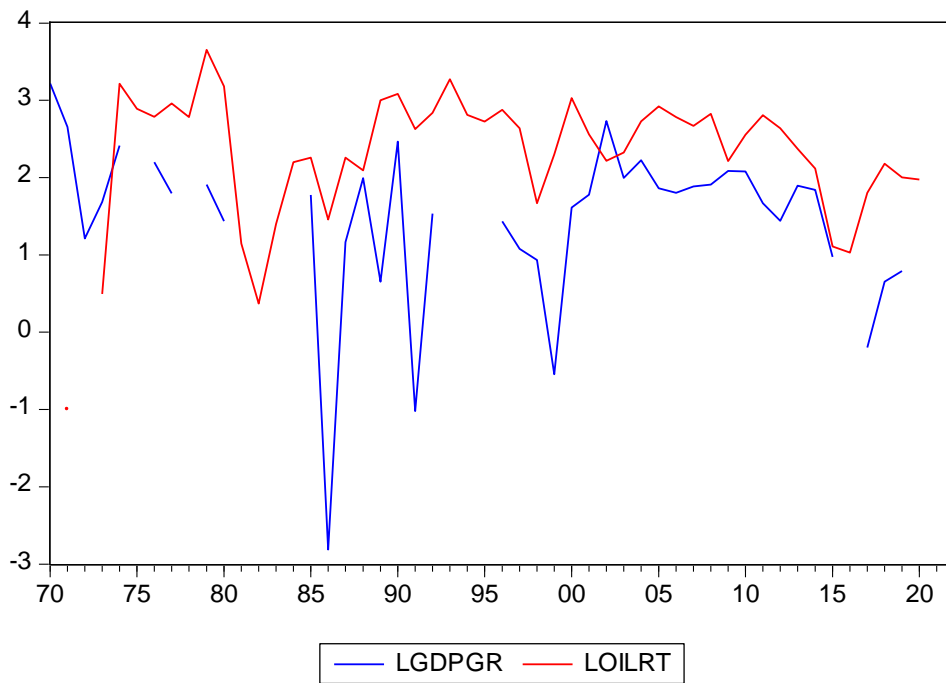
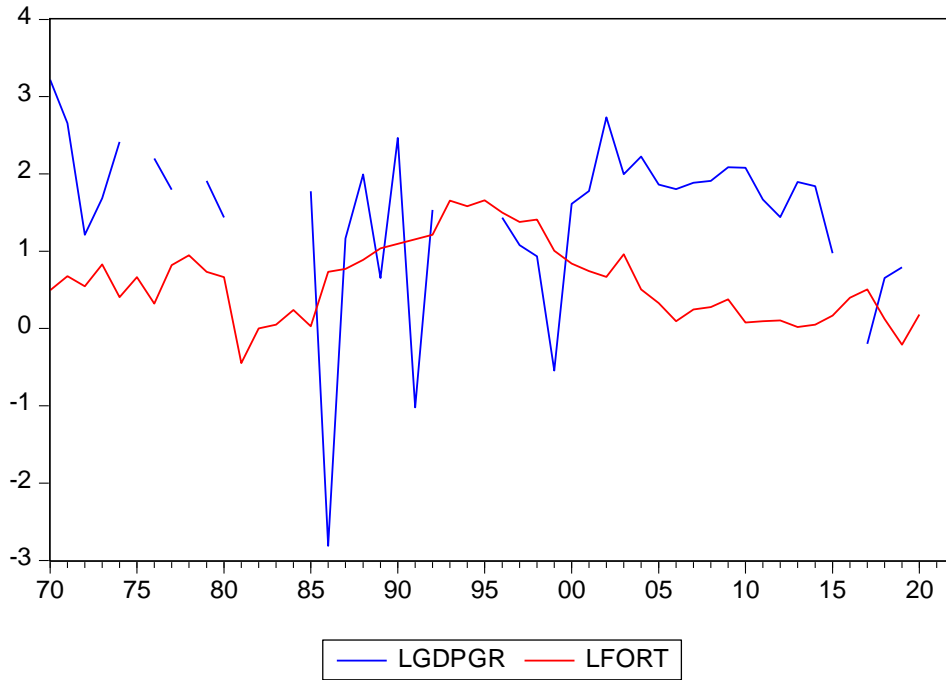
GRAPHICAL ANALYSIS

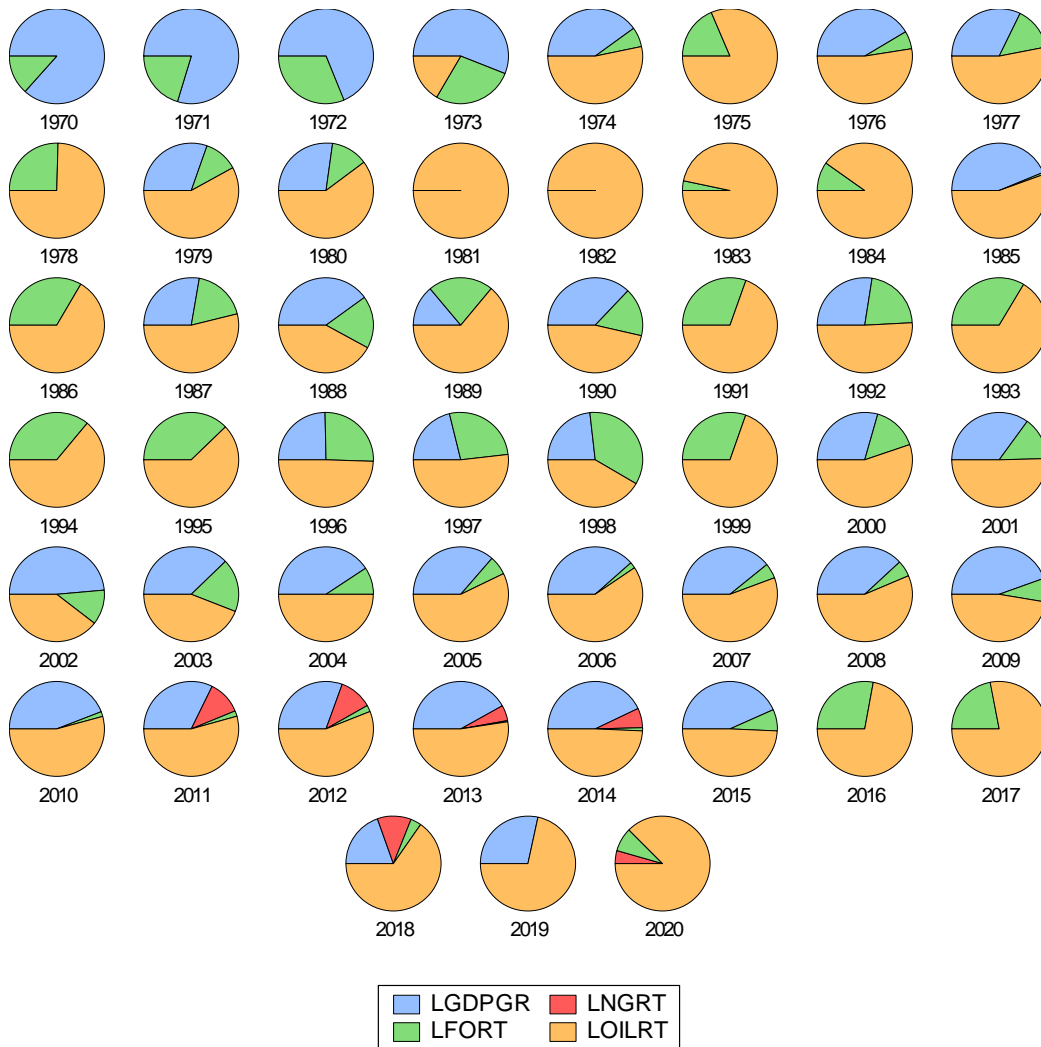
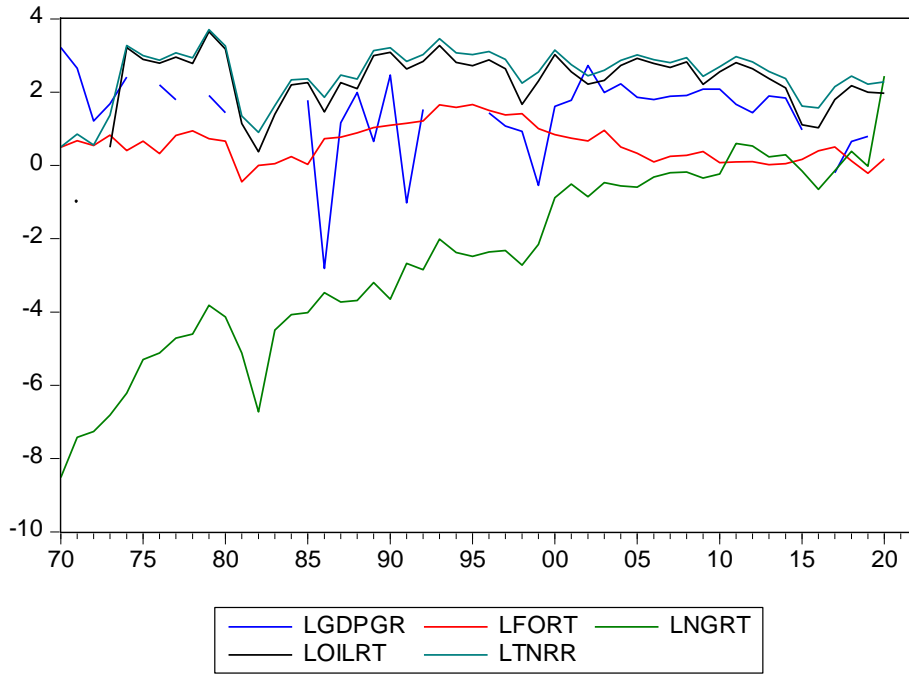
The individual variable graph with the GDPGR showed that forest rent (FORT) and natural gas rent (NGRT) fell much below GDPGR while the oil rent (OILRT) perform better than GDPGR. But the combined graph showed that the total natural resource rent (TNRR) still performed woefully compared to GDPGR indicating presence of resource curse. It was clearly discernible that the share of economic performance (blue colour) which was so high in the early 70s has disappeared totally as at 2020 with the growing resource rent indicating resource curse phenomenon in the country.

GRAPHICAL ANALYSIS

The individual variable graph with the GDPGR presented below showed that forest rent (FORT) and natural gas rent (NGRT) fell much below GDPGR while the oil rent (OILRT) performed better than GDPGR. But the combined graph showed that the total natural resource rent (TNRR) still performed woefully compared to GDPGR indicating presence of resource curse. It was clearly discernible in the pie chart that the share of economic performance (blue colour) which was so high in the early 70s has disappeared totally as at 2020 with the growing resource rent indicating resource curse phenomenon in the country.







V. CONCLUSION AND RECOMMENDATIONS

From the data analysis presented above we drew the following conclusions: that the resource rent variables analyzed were positively related to GDPGR but they were all not statistically significant and their joint contribution was only (R^2) 35%; that the value of $\ln GDPGR_{t-1}$ was -0.074769 which indicated that Nigeria economy suffered from resource curse in the period analyzed; that the Granger causality also showed no causal relationship between total natural resource rent (TNRR) and GDPGR and that the Error correction model (ECM) revealed that the speed of adjustment of GDPGR back to equilibrium relationship was 50%. It was therefore, recommended that Nigerian government should make judicious use of the natural resource rents in the area of qualitative education, health, food production, industrial production in order to reduce unemployment, inflation and poverty so as to boost economic performances with the available natural resource rents.

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