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"Resource Curse" Hypothesis and Economic Growth in Nigeria

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Abstract

This study is an empirical evaluation of the implication resource curse on the Nigeria's economic growth using annual data from secondary sources of a 32 years period from 1981-2013. The resource curse, which is mostly referred to as paradox of plenty; geographical confines or regions blessed with overflow nature given resources, especially, point-source unrenewable resources like minerals and fuels, likely contribute less to the growth of the economy, let alone developing it when compared to countries with fewer natural resources. The study employed descriptive statistical tool of two-dimensional graphs and econometric model of Ordinary Least Squares (OLS) multiple regression analysis. The results of the research paper show that crude oil production has a long-run relationship and is significant to the growth of the Nigerian economy. Findings from long-term regression analysis reveal that Nigeria depends heavily on the export of crude for her revenue generation. This heavy dependence has resulted in the deepened resource curse the nation has being bedeviled with since 1970's. Further results from the study also indicate that industrial and agricultural output is positively related and significant with crude oil production and the growth of the Nigerian economy. Based on the findings of the vexed issue of resource curse and its impact on the economic growth of Nigeria, it was recommended that government should provide peaceful atmospheric environment for robust manufacturing sector by tackling infrastructural deficit, which happens to be the principal disincentive to investment. Proper policy enactment of local content policy in Nigeria should also be vigorously pursued to bring home the "domiciliation" of economic activities in Nigeria. Policies aligned with agricultural sector should be put in place for unprecedented output through rapid import substitution, as well as export promotion by transforming the sector from a development-oriented sector into a business sector.

Keywords: *Economic growth, Natural Resources, Curse, Crude oil, Industrial output, Agricultural output*

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Background to the Study

Despite the petro-dollar income and rebased Gross Domestic Product (GDP) that places Nigeria as the biggest economy in Africa and the 26^{th} in the world, the UN 2013, Human Development Index paints a dismal picture of how she has fared in the area of welfare improvements for a great percentage of the population. According to the report, Nigeria was ranked amongst countries with low development index at 153 out of 186 countries that were ranked. Life expectancy in Nigeria is placed at 52 years while other health indicators reveal that only 1.9 percent of the nation's budget is expended on health. 68 percent of Nigerians are stated to be living below $1.25 daily while adult illiteracy rate (both sexes) is 61.3 per cent.

Statement of the Problem

Nigeria is a colossal failure in her developmental experiment. She is a big disappointment and embarrassment to her political and economic partners and has been derided as the giant of Africa with clay feet. At the time of her independence in 1960, the world saw her as a beacon of hope for the black race in terms of Economic Growth considering her huge human and natural resources. But more than five decades later, with billions of petro-dollar revenue, she is in far more worse condition when viewed against the backdrop of various development indicators. The crux of the matter is that Nigeria is yet to realize her full developmental potential, despite her huge natural endowments.

Objectives of the Study

The main objective of this study is to examine the impact of resource curse if any exists on the Growth of the Nigerian economy.

Specifically, the study shall look at the following set of objectives:

1. To examine the trend in accountability/governance and environmental degradation in the economy of Nigeria since the discovery of oil in commercial quantity;
2. To investigate the effect of crude oil production on growth rate in Nigeria;
3. To determine the extent to which crude oil production has impacted on contribution of the agricultural sector to economic growth in Nigeria; and
4. To analyze the impact of crude oil production on the output from the industrial sector of the economy of Nigeria.

Hypotheses of the Study

- $\mathbf{H_0}$: Crude Oil production does not significantly impact on the growth of the Nigerian economy.
- $\mathbf{H_0}$: Crude Oil production does not significantly impact on the contribution of the agricultural sector to economic growth in Nigeria.
- $\mathbf{H_0}$: Crude Oil production does not significantly impact on the output from the industrial sector of the Nigerian economy.

Literature Review

Conceptual Issues on Resource Curse

Resource course and its impact on Economic Growth is an emerging and very interesting subject matter amongst Economists and Political Scientists. While some have argued that resource endowment is directly related to Economic Growth of a country, citing examples with countries like Canada, United States of America, Botswana and a few others that maximally utilized their resources to better the lot of the generality of their people. Others are of the opinion that resource endowment have impeded Economic Growth of these countries like Nigeria, Russia, Venezuela, Liberia and a few others where they are found especially those countries whose export potentials rests on those resources. On this premise hinges the resources curse mantra, which further opines that resources poor countries like Japan, Hong Kong, Singapore and a few others in that category are performing better economically than their resource rich counterparts.

Along this mindset, Frankel (2010) says that it has been observed for some decades that the possession of oil, natural gas, or other valuable mineral deposits does not translate into economic success. Many African countries such as Angola, Nigeria, Sudan, and the Congo are rich in oil, diamonds, or other minerals, and yet their peoples continue to experience low per capita income and low quality of life. Meanwhile, the East Asian economies Japan, Korea, Taiwan, Singapore and Hong Kong have achieved western-level standards of living despite being rocky islands (or peninsulas) with virtually no exportable natural resources. Auty (1993, 2001) is apparently the one who coined the phrase "natural resource curse" to describe this puzzling phenomenon.

Prior to the late 1980s, the conventional wisdom concerning the relationship between natural resource abundance and development was that the former was advantageous for the latter Rosser (2006). In the 1950s, for instance, geographer Norton Ginsburg argued that: 'The possession of a sizable and diversified natural resource endowment is a major advantage to any country embarking upon a period of rapid economic growth' (as cited in Higgins 1968: 222). Similar views were also expressed by mainstream economists during this period (see, for instance, Viner 1952 and Lewis 1955). In the 1960s, the prominent development theorist Walter Rostow (1961) went further, arguing that natural resource endowments would enable developing countries to make the transition from underdevelopment to industrial 'take-off', just as they had done for countries such as Australia, the United States, and Britain. In the 1970s and 1980s, neoliberal economists such as BelaBalassa (1980), Anne Krueger (1980) and P.J. Drake (1972) put forward similar arguments, with the former, for instance, arguing that natural resources could facilitate a country's 'industrial development by providing domestic markets and investible funds' (1980: 2). A number of radical economists challenged these views prior to the late 1980s, arguing that the structure of the global economy and the nature of international commodity markets put developing countries that were reliant on natural resource exports at a serious disadvantage (Singer 1950; Prebisch 1950). But theirs was a minority view – in general natural resources were seen as a blessing for developing countries.

Taking the disquisition further, Rosser (*ibid*) confirms that since the late 1980s, there has emerged a sizeable scholarly literature that has challenged this conventional wisdom. Rather than a blessing, this literature has suggested that natural resource abundance (or at least an abundance of particular types of natural resources) increases the likelihood that countries will experience negative economic, political and social outcomes including poor economic resources used in Sachs and Warner and others—measure resource dependence rather than resource abundance or endowment. Using data for 61 countries from 1970 to 1990, the authors constructed two new measures, based on the World Bank's estimates of natural resource capital including agricultural land, pasture land, forests, protected areas, metals and materials, coal, oil, and natural gas (see also, Kunte et al., 1998). Resource dependence was measured as natural resource capital as a percentage of total capital; resource abundance was measured as natural resource capital per population.

Research Design

This study will be quasi-experimental in nature. We shall employ the descriptive statistics and econometric method of Ordinary Least Square (OLS) in achieving the set objectives as stated.

Model Specification

Growth Model

The functional specification of the growth model is expressed thus:

RGDP = f(Crude_Oil,Agric_Out,Ind_Out) (1)

The growth model can be estimated as follow:

$$RGDP = \Phi_0 + \Phi_1 CRUDE\_OIL + \Phi_2 AGRIC\_OUT + \Phi_3 IND\_OUT + u_t \quad (2)$$

The a priori expectations: $\Phi_1 \succ 0, \Phi_2 \succ 0, \Phi_3 \succ 0$

Agricultural Output Model

The functional specification of the growth model is expressed thus:

Agric_Out=f(Crude_Oil,Oil_Export,ACGS_Loan) (3)

The agricultural output model can be estimated as follow:

$$AGRIC\_OUT = \beta_0 + \beta_1 CRUDE\_OIL + \beta_2 OIL\_EXPORT + \beta_3 ACGS\_LOAN + u_t \quad (4)$$

The a priori expectations: $\beta_1 \prec 0, \beta_2 \prec 0, \beta_3 \succ 0$

Industrial Output Model

The functional specification of the growth model is expressed thus:

Ind_Out=f(Crude_Oil,Credit_Private,Int) (5)

The industrial output model can be estimated as follow:

$$IND\_OUT = \Psi_0 + \Psi_1 CRUDE\_OIL + \Psi_2 CREDIT\_PRIVATE + \Psi_3 INT + u_t \quad (6)$$

The a priori expectations: $\Psi_1 \prec 0 or \succ 0, \Psi_2 \succ 0, \Psi_3 \prec 0$

Where;

RGDP= Real Gross Domestic Product
AGRIC_OUT= Agricultural Output
IND_OUT= Industrial Output
CRUDE_OIL= Crude Oil Production
OIL_EXPORT= Oil Export
CREDIT_PRIVATE= Credit from Deposit Money Banks to Private Sector
ACGS_LOAN= Agricultural Credit Guarantee Scheme Loans
INT= Interest Rate
CARBON= Carbon Monoxide (CO) Emission
CPI= Corruption Perception Index

Table 1: Data Presentation
Short Run Regression Result
Dependent Variable: RGDP
No of Observation: 33

Variable	Coefficient	t-statistic	Probability
C	2.739468	6.354166	0.0000
LOG(CRUDE_OIL)	-0.442749	-4.268348	0.0002
LOG(AGRIC_OUT)	0.891508	18.55177	0.0000
LOG(IND_OUT)	0.437367	3.695822	0.0009

R^2 = 0.991710, $\bar{R}^2$ = 0.990852, F – Statistic = 1156.402, Dw = 0.559190
Source: Authors Computation from E-view 7.1

From the table above the coefficient of determination R^2 is 0.99; indicating that the variation in economic growth explained by crude oil production, agricultural output and industrial output is 99 percent. Therefore, the explanatory power of the model estimated is 99 percent. The coefficient of crude oil production appeared with the wrong sign (negative). This indicates that increase in crude oil production will lead to decrease in economic growth. The result also indicates that there is a significant relationship between crude oil production and economic growth given that the t-statistics is less than 0.05 (i.e0.00).

The coefficient of agricultural output appeared with the right sign (positive). This indicates that increase in agricultural output will lead to growth in the economy. The result also shows that there is a significant relationship between agricultural output and economic growth given that the t-statistics is less than 0.05 (i.e0.00).

The regression coefficient of IND_OUT (industrial output) appeared with a positive sign and this conforms to a priori expectation. This meaning an increase in industrial output will lead to increase in economic growth. The result also shows that there is a significant relationship between industrial output and economic growth given that the t-statistics is less than 0.05 (i.e 0.00). The entire regression model is significant given the f-value of 1156.42 which is greater than the f-table of 3.31. The fact that Durbin Watson statistics of 0.56 is less than the R-squared statistics of 0.99 confirms the presence of autocorrelation in the model. Hence we conclude that the regression is spurious or useless for interpretation and policy recommendation.

One major factor that accounts for a spurious regression is the non-stationarity of time-series data. Hence the need to conduct stationarity (unit root) test and then estimate a long-run model after ascertaining the existence of a long-run relationship between the time-series from a cointegration test.

Table 2: Unit Root Test for RGDP, CRUDE_OIL, AGRIC_OUT, IND_OUT
ADF Unit Root Tests

Variables	ADF Test Statistics	1% critical Level	5% critical Level	10% critical Level	Order of integration
Log (RGDP)	-4.449814	-4.28458	-3.562882	-3.215267	I(1)
Log(Crude_Oil)	-5.752004	-4.309824	-3.574244	-3.221728	I(1)
Log (Agric_Out)	-7.891076	-4.296729	-3.568379	-3.218382	I(2)
Log (Ind_Out)	-5.943841	-4.284580	-3.562882	-3.215267	I(1)

Source: Computed (E-view 7.1)

The summarized result presented in table 2 above shows that at various levels of significance (i.e 1%, 5% and 10%), the variables were stationary. Although Log(RGDP), Log(Crude_Oil), and Log(Ind_Out) are integrated of order one {i.e at first difference I(1)}; Log (Agric_Out) is integrated of order two {i.e at second difference I(2)}. The testing for unit roots "naturally lead to the theory of cointegration because cointegration deals with the methodology of modelling non-stationary time series variables" (Iyoha & Ekanem, 2004).

Co-integration Test

The cointegration test is conducted based on the test proposed by Johansen. For detail result of the Johansen co integration, see appendix. Nevertheless, below is a table (i.e table 3) showing inference from the conducted cointegrationtests.

Table 3: Cointegration Result for Growth (RGDP) Model

Trace Test k=2				Maximum Eigenvalue Test k=2			
HO	HA	(λ trace)	Critical Values (5 %)	HO	HA	(λ Max)	Critical Values (5%)
r ≤ 0	r > 0	71.54964*	47.85613	r ≤ 0	r > 0	44.50253*	27.58434
r ≤ 1	r > 1	27.04711	29.79707	r ≤ 1	r > 1	17.94742	21.13162
r ≤ 2	r > 2	9.099690	15.49471	r ≤ 2	r > 2	9.098875	14.26460
r ≤ 3	r > 3	0.000815	3.841466	r ≤ 3	r > 3	0.000815	3.841466

Note: r represents number of cointegrating vectors and k represents the number of lags in the unrestricted VAR model. * denotes rejection of the null hypothesis at the 5% level.
Source: Computed (E-view 7.1)

The test statistics indicate that the hypothesis of no cointegration, H_0, among the variables can be rejected. The results reveals that one cointegrating vector exist among the variables in the RGDP model. The existence of a cointegrating equation justifies the estimation of an error correction growth model.

Long-run Growth Model

The role of the ECM is to reconcile the short-run equilibrium of an economic variable with the long-run equilibrium of an economic variable. The estimated equation obtained is shown in table 4 below:

Table 4: Parsimonious Error Correction Growth Model

Variable	Coefficient	T-statistic	Probability
C	-0.000517	-0.109544	0.9139
DLOG(RGDP(-1))	0.529120	3.516178	0.0022
DLOG(RGDP(-2))	0.288866	3.273609	0.0038
DLOG(IND_OUT)	0.231839	9.794684	0.0000
DLOG(IND_OUT(-1))	-0.186155	-3.674390	0.0015
DLOG(IND_OUT(-2))	-0.095431	-3.132641	0.0052
DLOG(AGRIC_OUT)	0.505361	8.799068	0.0000
DLOG(AGRIC_OUT(-1))	-0.293907	-3.109468	0.0055
DLOG(CRUDE_OIL(-1))	0.082441	2.103487	0.0483
ECM(-1)	-0.085205	-1.451472	0.1622
$R^2 = 0.95$; $\bar{R}^2 = 0.93$; F-Statistic =46.67; Durbin Watson=1.84			

Source: Author's Computation (E-view 7.1)

From table 4 above, we can see that a positive and significant relationship exists between the main variable of interest (i.e Crude_Oil) and economic growth. The result shows that a percent increase in one period lag of crude oil production will lead to an 8.52% increase in real gross domestic product. The result also shows that the industrial and agricultural sector (i.e IND_OUT and AGRIC_OUT respectively) has positive and significant relationship with economic growth in Nigeria between 1981 and 2013.

The overall fit is satisfactory with an R-squared statistics of 0.95; thus 95 percent of the systematic variation in real GDP is explained by the error correction model (ECM). The F-statistic of 46.67 is significant at 5% level. Though not significant, the coefficient of the error correction term (i.e ECM) has the expected negative sign. Therefore, it corrects any deviation from long-run equilibrium. That is the short run dynamics adjust to long run equilibrium relationship.

Table 5: Agricultural Output Model: below presents the regression result of the agricultural output model.

Short Run Regression Result
Dependent Variable: AGRIC_OUT
No of Observation: 33

Variable	Coefficient	t-statistic	Probability
C	-13.56246	-0.362416	0.7197
CRUDE_OIL	0.005685	0.024943	0.9803
OIL_EXPORT	0.086035	0.348048	0.7303
ACGS_LOAN	1.46E-05	7.600740	0.0000

$R^2 = 0.917830$; $R^2 = 0.909330$; F–Statistic = 107.9759; DW = 1.649895
Source: Authors Computation from E-view 7.1

From the table 5 above the coefficient of determination R^2 is 0.92; indicating that the variation in agricultural output explained by crude oil production, oil export and agricultural credit guarantee scheme loans is 92 percent. Therefore, the explanatory power of the model estimated is 92 percent. The coefficient of crude oil production appeared with a positive sign and does not conform to a priori expectation. This indicates that increase in crude oil production will lead to increase in agricultural output. The result also indicates that there is no significant relationship between crude oil production and agricultural output given that the probability of the t-statistics is greater than 0.05 (i.e0.98). The coefficient of oil export appeared with the wrong sign (i.e positive). This indicates that increase in crude oil export will lead to increase in agricultural output. The result also shows that there is no significant relationship between crude oil export and agricultural output given that the probability of the t-statistics is greater than 0.05 (i.e0.73).

The regression coefficient of agricultural credit guarantee scheme loans (i.e ACGS_LOAN) appeared with a positive sign and this conforms to a priori expectation. This means that an increase in agricultural credit guarantee scheme loans will lead to increase in agricultural output. The result also shows that there is a significant relationship between agricultural credit guarantee scheme loans and agricultural output given that the probability of the t-statistics is less than 0.05 (i.e 0.00). The entire regression model is significant given the f-value of 107.9759 which is greater than the f-table of 3.1 Though greater than the R-squared statistics of 0.92, the Durbin Watson statistics of 1.64 does not fall within the acceptable range of 1.9 and above therefore confirming the presence of autocorrelation in the model. Hence we conclude that the regression is spurious and unacceptable interpretation and policy recommendation. Therefore the stationarity test was conducted on each of the variables and result presented and interpreted accordingly.

Table 6: Unit Root Test for Agric_Out, Crude_Oil, OIL_Export and ACGS_Loan
ADF Unit Root Tests

Variables	ADF Test Statistics	1% critical Level	5% critical Level	10% critical Level	Order of integration
Agric_Out	-7.891076	-4.296729	-3.568379	-3.218382	I(1)
Crude_Oil	-5.752004	-4.309824	-3.574244	-3.221728	I(1)
Oil_Export	-4.287633	-4.323979	-3.580623	-3.225334	I(1)
ACGS_Loan	-6.574781	-4.296729	-3.568379	-3.218382	I(1)

Source: Computed (E-view 7.1)

The summarized result presented in table 6 above shows that at various levels of significance (i.e 1%, 5% and 10%), the variables were stationary. All the time-series (i.e. Agric_Out, Crude_Oil, Oil_Export and ACGS_Loan) were integrated of order one {i.e at first difference I (1)}. The result and interpretation of the cointegration test is presented in the following sub-section.

Co-integration Test

The result of the Johansen cointegration test conducted is shown in table 7 below:

Table 7: Cointegration Result for Agricultural Output Model

Trace Test k=2				Maximum Eigenvalue Test k=2			
HO	HA	(λ trace)	Critical Values (5 %)	HO	HA	(λ Max)	Critical Values (5%)
$r \leq 0$	$r > 0$	62.65287*	47.85613	$r \leq 0$	$r > 0$	25.13566	27.58434
$r \leq 1$	$r > 1$	37.51721*	29.79707	$r \leq 1$	$r > 1$	20.62652	21.13162
$r \leq 2$	$r > 2$	16.89069*	15.49471	$r \leq 2$	$r > 2$	13.55732	14.26460
$r \leq 3$	$r > 3$	3.333377	3.841466	$r \leq 3$	$r > 3$	3.333377	3.841466

Note: r represents number of cointegrating vectors and k represents the number of lags in the unrestricted VAR model.* denotes rejection of the null hypothesis at the 5% level.
Source: Computed (E-view 7.1)

The test statistics indicate that the hypothesis of no cointegration, H_0, among the variables can be rejected. The result reveals that there are three cointegrating vectors. The existence of a cointegrating equation justifies the estimation of an error correction agricultural output model.

Long-Run Agricultural Output Model

The parsimonious estimated error correction agricultural output model is table 4.8 below:

Table 8: Parsimonious Error Correction Agricultural Output Model

Variable	Coefficient	T-statistic	Probability
C	5.208384	3.063101	0.0055
D(AGRIC_OUT(-1))	0.494167	3.091368	0.0052
D(CRUDE_OIL(-2))	-0.112510	-1.846084	0.0778
D(OIL_EXPORT(-1))	-0.006482	-0.623011	0.5394
D(OIL_EXPORT(-2))	0.108592	1.726915	0.0976
D(ACGS_LOAN(-2))	1.02E-06	1.594803	0.1244
ECM(-1)	-0.015553	-0.298080	0.7683
R2= 0.45; $\bar{R}$ 2= 0.31; F-Statistic =3.143240; Durbin Watson=2.281073			

Source: Author's Computation (E-view 7.1)

Table 8 above shows that, though only significant at 10% level of significance, a negative relationship exists between the main variable of interest (i.e Crude_Oil) and agricultural output. The result shows that an additional one barrel per day of the two lagged period of crude oil production reduces agricultural output by 0.1125 billion naira annually. The result also shows that oil export has a positive relationship with agricultural output but only significant at 10% level of significance.

The overall fit of the model was 0.45 (i.e R-squared statistics = 0.45); thus 45 percent of the systematic variation in agricultural output is explained by the error correction model (ECM). The F-statistic of 3.14 was also significant at 5% level. Though not significant, the coefficient of the error correction term (i.e ECM) has the expected negative sign. Therefore, it corrects any deviation from long-run equilibrium as short run dynamics adjust to long run equilibrium.

Table 9: Industrial Output Model
Short Run Regression Result
Dependent Variable: IND_OUT
No of Observation: 33

Variable	Coefficient	t-statistic	Probability
C	-0.379193	-0.363937	0.7185
LOG(CRUDE_OIL)	0.644418	4.306579	0.0002
LOG(CREDIT_PRIVATE)	0.044361	3.568720	0.0013
INT	0.000489	0.167293	0.8683

R^2 = 0.934950; $\bar{R}^2$ = 0.928221; F–Statistic = 138.9370; Dw = 1.210117
Source: Authors Computation from E-view 7.1

The coefficient of determination of the short-run industrial output model, as shown in table 9 above, is 0.93. This implies that 93% of the variation in industrial output is explained by crude oil production, credit from deposit money banks to the private sector and interest rate. Therefore, the explanatory power of the estimated model is 93 percent.

The coefficient of crude oil production appeared with a positive sign and this conforms to a priori expectation. This indicates that increase in crude oil production will positively impact on industrial output. The result also indicates that there is a significant relationship between crude oil production and industrial output given that the probability of the t-statistics is less than 0.05 (i.e0.00). The coefficient of credit from deposit money banks to the private sector appeared with the right sign (i.e positive). This indicates that increase in credit from deposit money banks to the private sector will lead to increase in industrial output. The result also shows that there is a significant relationship between credit from deposit money banks to the private sector and industrial output given that the probability of the t-statistics is less than 0.05 (i.e0.00).

The regression coefficient of interest rate (i.e INT) appeared with a positive sign and this does not conforms to a priori expectation. This means that an increase in interest rate will lead to increase in industrial output. The result also shows that there is no significant relationship between interest rate and industrial output given that the probability of the t-statistics is greater than 0.05 (i.e 0.87). The entire regression model is significant given the f-value of 138.94 which is greater than the f-table of 3.1

Though greater than the R-squared statistics of 0.92, the Durbin Watson statistics of 1.21does not fall within the acceptable range of 1.9 and above. This shows that the model is characterized by autocorrelation that may have been, among others, by non-stationary of the time series data at levels. As such the short-run result shall not be used for our interpretation and policy recommendation. We shall therefore proceed to conducting stationarity tests for the time series to ascertain the possibility of attaining stationarity when differenced at most twice.

Table 10: Unit Root Test for IND_Out, Crude_Oil, Credit_Private and INT
ADF Unit Root Tests

Variables	ADF Test Statistics	1% critical Level	5% critical Level	10% critical Level	Order of integration
Log (Ind_Out)	-5.943841	-4.284580	-3.562882	-3.215267	I(1)
Log (Crude_Oil)	-5.752004	-4.309824	-3.574244	-3.221728	I(1)
Log (Credit_Private)	-4.239927	-4.284580	-3.562882	-3.215267	I(1)
INT	-3.279109	-3.653730	-2.957110	-2.617434	I(0)

Source: Computed (E-view 7.1)

The summarized result presented in table 10 above shows that, in exception of interest rate that was stationary at levels, three of time series integrated of order one {i.e at first difference I (1)}. We can now conclude that the time series have the ability to attain stationarity when differenced at most once. Having established the stationarity of the time-series, we shall then proceed to ascertain the existence of a long run relationship between the times series by conducting a cointegration test.

Co-integration Test
The result of the Johansen cointegration test conducted is shown in table 11 below:
Cointegration Result for Industrial Output Model

Trace Test k=2				Maximum Eigenvalue Test k=2			
HO	HA	(λ trace)	Critical Values (5 %)	HO	HA	(λ Max)	Critical Values (5%)
$r \leq 0$	$r > 0$	53.79350*	47.85613	$r \leq 0$	$r > 0$	32.28780*	27.58434
$r \leq 1$	$r > 1$	21.50569	29.79707	$r \leq 1$	$r > 1$	10.93566	21.13162
$r \leq 2$	$r > 2$	10.57004	15.49471	$r \leq 2$	$r > 2$	10.19308	14.26460
$r \leq 3$	$r > 3$	0.376956	3.841466	$r \leq 3$	$r > 3$	0.376956	3.841466

Note: r represents number of cointegrating vectors and k represents the number of lags in the unrestricted VAR model.* denotes rejection of the null hypothesis at the 5% level.
Source: Computed (E-view 7.1)

The test statistics indicate that the hypothesis of no cointegration, H_0, among the variables can be rejected. The result reveals that there exists one cointegrating vector. The existence of a cointegrating equation justifies the estimation of an error correction industrial output model.

Long-Run Industrial Output Model

The parsimonious estimated error correction industrial output model is table 12 below:

Parsimonious Error Correction Industrial Output Model

Variable	Coefficient	T-statistic	Probability
C	0.006732	0.489266	0.6293
DLOG(IND_OUT(-2))	0.186396	0.861225	0.3980
D(INT)	-0.004106	-1.171026	0.2536
DLOG(CRUDE_OIL)	0.535916	2.665809	0.0138
DLOG(CRUDE_OIL(-1))	0.231404	1.242499	0.2266
DLOG(CRUDE_OIL(-2))	-0.176173	-0.672897	0.5077
ECM(-1)	-0.690162	-3.387871	0.0025
R2= 0.510907; $\bar{R}$ 2= 0.383318; F-Statistic =4.004310; Durbin Watson=1.885940			

Source: Author's Computation (E-view 7.1)

Table above shows that a positive and significance relationship exists between the main variable of interest {i.e. Log (Crude_Oil)} and industrial output. The result shows that a one percent increase in daily crude oil production will lead to 53.59% increase in industrial output annually. The result also shows that, though not significant at any level of significance, interest rate appeared with the expected negative sign implying a negative relationship with industrial output.

Conclusion

Available figures shows that there has been an increase in environmental degradation due to oil exploration, decrease in agricultural output and decrease in industrial output due to Dutch disease. As pointed out earlier, industrial output is the bed-rock of any economy due to the role it plays in forming a linkage with other sectors. The regression analysis shows that the variables used have a long-run relationship as shown by the cointegration tests. Again, these variables are stationary at 5% level. Finally, crude oil, industrial output and Agricultural output were found to have a positive and significant relationship with economic growth at 5% level of significance. Having known this, it is important that the government rationalizes its expenditure by allocating more expenditure budget to the productive sectors of the economy rather than the protective sectors of the economy.

Recommendations

1. The manufacturing sector needs to be strengthened by the federal government by providing the enabling environment for it to thrive.
2. The implementation of the Nigerian Government local content policy with a minimum local content target of 75% by 2010 for all works and contracts to be undertaken in or by Nigerians should be earnestly pursued for its capacity to rejig the manufacturing and industrial sector and reduce the incidence of capital fight and employment of expatriates for positions that Nigerians can occupy by way of "domiciliation" of economic activities in Nigeria.

3. Agriculture policies should be put in place to achieve food security through rapid import substitution, as well as export promotion by transforming the sector from a development-oriented sector into a business sector.

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