International Journal of Innovative Finance and Economics Research 6(4):24-32, Oct.-Dec., 2018

© SEAHI PUBLICATIONS, 2018 www.seahipaj.org ISSN: 2360-896X

Investigating Dutch Disease (DD) In Nigeria Using Johansen Multivariate Cointegration Technique

[1]Ibe, R. C. PhD. & [2]Ihejirika, U. A.

Department of Finance and Banking, Faculty of Management Sciences, University of Port Harcourt, Port Harcourt, Nigeria
[1]Email: ribec2000@gmail.com & [2]Email: egodiya4ann@yahoo.co.uk

ABSTRACT
This paper empirically investigated the presence of Dutch disease (DD) in Nigeria covering the period from 1981-2015 by using unit root test, Johansen cointegration technique and Granger Causality test. The study concentrated on two objectives. First is to detect if there exist a long run relationship between real gross domestic product (RGDP), agricultural export (AGRICEX) and Crude oil exports (OILEX). Second, the relationship between crude oil and agriculture, when normalized with agriculture as the dependent variable, and finally, to test for causality amongst the variables in the study. Three variables were used namely RGDP, AGRICEX and OILEX. Unit root tests of the variables were carried out to check the stationarity of the variables. The results are: the variables were stationary in order I (1), there is a long run relationship among the variables as indicated by the Trace and maximum Eigen values of Johansen test. There was one cointegrating equation and when normalized with RGDP as dependent variable n OILEX had the expected sign and significant in explaining the expected relationship while AGRICEX had a negative and insignificant in disagreement with a priori expectation. There was a unidirectional causal relationship from OILEX to RGDP and from AGRICEX to OILEX. The findings of this paper indicate the presence of Dutch Disease (DD) in Nigeria.
Keywords: Dutch disease, Cointegration, Trace statistics, Maximum eigenvalue, Stationarity.

INTRODUCTION
The term, Dutch Disease (DD), according to Corden (1984) was coined by *The Economist of November 26, 1977.* The term was used to describe the woes of the Dutch economy. The Dutch Disease (DD) refers to a situation where reversal of positive effects or negative effects of natural resources booms on countries hamper their economic transformation where they are extracted. This theory conceptually emanated from the Netherlands now Holland in the 1960s as a result of exploration and tapping of newly found gas reserves discovered in the north sea, revenues denominated in hard currencies was earned and the domestic Dutch Guilder began to appreciate in value sharply, hurting non-oil sector like “agriculture and manufacturing” and their exports dwindled in the world markets, with an overall negative effect on the whole economy, leaving oil or hydrocarbons to dominate the economy. From 1970 to 1977 unemployment rose from 1.1% to 5.1% and corporate investment tumbled. The *Economist* explained the puzzle by pointing to the high value of the Guilder. Gas exports had led to an influx of foreign currency, which increased demand for the Guilder and thus made it stronger and made other parts of the economy less competitive in international markets.
Although Dutch disease is generally associated with a natural resource discovery, it can occur from any development that results in a large inflow of foreign currency, including a sharp surge in natural resource prices, foreign assistance, and foreign direct investment. Whilst voluminous literature on the subject matter has focused mostly on oil-resource exports, Al-Sabah (1988) argues that, although the DD was experienced in the Netherlands following gas discoveries, the disease is not however exclusive to oil-resource countries, but rather it has also occurred in other non-oil exporting countries. For instance,

Japan's manufacturing sector's technological advance boom in the 1960s adversely affected less dynamic tradable sectors, including the agricultural sector. Also the booming of Swiss bonds and money exports in the 1970s resulted in real appreciation of the Swiss Franc hurting the country's traditional exports and export-competing industries. Economists have used Dutch disease model to explain economic performances of countries facing similar conditions. Mineral and agricultural booms in Latin America during colonial and republican times have been examined in DD terms, as well as cases of Sub-Saharan economies (Gelb, 1988,). Such episode as the flow of American treasures into 16th century Spain and gold discoveries in Australia in the 1850s has been approached in DD terms.

Nigeria is blessed with over 89 natural resources documented as of 2018, with lush agricultural landscape. Her initial source of economic sustenance was mainly agricultural exports namely cash crops such as Cocoa, Timber, Cashew, Kolanut, Palm oil, Palm Kernel, Rubber and Groundnut. Most economic analysts who have studied the Nigerian oil sector recall that the impact of this new sector was not felt until the mid-1970s when it became a major source of foreign exchange earnings and contributed to National Income (NI) and Gross National Product (GNP) due to the middle-east crisis of that period. While Nigeria enjoyed this oil boom the agricultural sector diminished. Crude oil accounts for over 90% of Nigeria's foreign exchange earnings, even though agriculture was responsible for the highest employment of our labour force (World Bank, 1975). World Bank (1975) report also indicated that during the 1960‟s, Nigeria was a major exporter of cash crops in the world with over three hundred thousand tonnes annually. As at 2000, oil and gas exports accounted for more than 98% of export earnings and about 83% of Federal Government revenue, as well as generating more than 14% of its GDP. It also provided 95% of foreign exchange earnings and about 65% of government budgetary revenues. According to the International Energy Agency (IEA), Nigeria produced about 2.53 million barrels (402.000 m3) per day, well below its oil production capacity of over 3 million barrels (480,000 m3) per day in 2011. It is quite obvious that crude oil is thriving with Nigeria producing over two million barrels per day while the agricultural sector has dwindled because of the fact that attention has shifted to the oil sector.

Over a period of thirty years starting from 1965 through 1998, oil prosperous nations had an average per capital GNP growth ranging from [(-1%,-2%,-3% and -6%) for countries like (Iran and Venezuela, Libya, Iraq and Kuwait, Qatar)] respectively, who are members of OPEC (World Bank, 2000). For Oil producing exporting countries in general where GNP per capita reduction was monitored; there was a slash of 1.3% average per year in comparison to 2.2% per capita growth on average in these regions. Nigeria had a growth rate of 1.45% in her per capita GDP in the first 30years of her existence which compares unfavorably with estimates reported by emerging market economies in Asia, such as (China, Hong-Kong, Singapore, Taiwan, and South Korea), each having 5.1%, 6.7%, 6.1% and 6.8% respectively in their per capital GDP. In Sub-Saharan Africa, Botswana witnessed a steady development in growth rate of real GDP per capital assumed at 8% in mid to late 1980s (Iyoha, 2008).

With crude oil exploration growing rapidly and the agricultural sector dwindling geometrically, there are indications of the "DUTCH DISEASE". Nigeria experienced exchange rate appreciation during the 1970 boom period. Imports of all types of goods were strongly and positively associated with oil prices. Most pertinently, exports of agricultural products and non-hydrocarbon natural resources were negatively associated with oil prices. Stijns (2003) emphasized that "deindustrialization" in developed economies and "de-agriculturalisation" in developing economies if Dutch Disease takes effect. In light of the fore mentioned, there is enough reason to investigate the presence of (DD) in Nigeria. Granted, some studies have been conducted to determine the existence of "Dutch Disease", but most of them assumed the manufacturing sector as the initial resource sector that dwindled. Not many of the relevant studies, to the best of the author's knowledge, looked at the agriculture – crude oil nexus. More so, even the fragmented studies were based on the experiences of developed countries. The experiences of developing countries are yet to be fully documented. That of Nigeria may be better recognized more in its absence than its dearth, from our review standpoint. In recognition of this obvious research gap, this study aims at making a contribution to existing literature by empirically investigating the presence of Dutch Disease (DD) in

Nigeria using agriculture as the initial resource sector that dwindled as opposed to the manufacturing sector.

The rest of this paper proceeds as follows: the preceding section is introduction as well as objectives. Section Two is a brief review of both theoretical and empirical literature. Section Three outlines the methodology with data description and source. Section Four is data presentation and analyses of empirical results. Section Five is conclusion.

Section 2: Literature Review

2.1: Why does a dramatic increase in wealth have this paradoxically adverse consequence?

In a classic paper by Corden and Neary (1984), which divides an economy experiencing an export boom into three sectors: the booming export sector(B) (crude oil in the Nigerian case) and the lagging export sector (L) (agriculture), both of which are traded-goods sectors; and the non-traded-goods sector (N), which essentially supplies domestic residents. The non-traded goods sector might include retail trade, the service industry, and construction. The authors show that when a country catches Dutch Disease, the traditional export sector gets crowded out by the other two sectors. The model assumes that:

- Labour is perfectly mobile among all the three sectors and makes sure that wages equalize across them;
- All goods are for final consumption;
- Trade is always balanced as national output always equals expenditures; and
- Commodity and factor prices are not distorted.

A resource boom affects the rest of the economy through two channels: the resource movement effect boom and the spending effect

The Resource Movement Effect

The resource movement effect is normally assumed to happen on the supply side of the economy, where it occurs when the profitable natural resource sector lures productive resources (human talent and labour, capital, public spending, etc.) from other sectors, tradable or non-tradable, with the latter sectors facing reduced employment of such resources, thus resulting in them having depressed growth. In other words, the resource movement has the impact of 'crowding out' other sectors as the dominant oil, gas or mining industry takes priority claim on scarce resources (local capital, skills, infrastructure, and suppliers).

The Spending Effect

The *spending effect* which normally happens on the demand side is a direct result of the 'windfall' of revenues in the natural resource which leads to increased income at home, thus creating a rising demand (and thus inflation) for all goods in other sectors in the economy, both tradable and non-tradable. Given that the prices for the tradable sectors are determined by the world markets, the country's products on the international market become less competitive in that sector. This situation is further aggravated by the *exchange rate effect*.

The exchange rate effect comes into play since a huge inflow of foreign exchange from oil (or natural gas or minerals) exports result in increased demand for the domestic currency of the oil (gas or mineral) exporting country, with this increased currency demand in turn causing an appreciation of the exporting country's real exchange rate. Due to this appreciation tradable products become relatively more expensive and less competitive both domestically and on external markets. At the same time, strong domestic currency versus other currencies imply an increase in imports as they become relatively cheaper and affordable, resulting in domestically produced goods

The end result, according to Carneiro (2007) will be the withering of the agricultural, manufacturing, and other sectors of the economy, as well as potential loss of jobs in these sectors, and development of an even greater economic dependence on the oil (natural gas or mineral) industry.

2.2: Empirical Review

Empirical literature on Dutch Disease syndrome has traditionally been far less developed than the theoretical literature. However, a number of empirical Dutch Disease papers have been produced. Caselli

& Michaels (2009) in their study examined the differences in oil endowment across Brazilian municipalities, finding little effect on non-oil GDP. Allcott & Keniston (2013) and Black et al (2005) used the boom and bust approach to assess the impact of boom and bust on several outcomes and concluded that oil booms increase manufacturing output in oil-rich United States counties.

In the cross-country literature, Rajan & Subramanian (2011) considered aid rather than resources as the windfall, and concluded that aid-dependent countries experienced slower growth in tradable manufacturing sectors relative to non-tradable sectors during the 1980s and 1990s. Ismail (2011) and Harding & Venables (2013) both found a negative relationship between price movements and manufacturing value added and exports among oil-exporting countries. Gelb (1988) and Sala-i-Martin (2003) used a case study approach, but did not find evidence of oil revenues harming the manufacturing sector.

Stijns (2003) employed a gravity trade model to empirically test the Dutch Disease syndrome on a number of countries. The study found strong evidence of the DD, with energy price led booms systematically tending to hurt manufacturing exports of the energy exporters

Budina et al (2007) investigated the possibility of the Dutch Disease and debt overhang on the growth part of Nigeria since the 1970s. The study found out that, although Nigeria experienced an oil boom, that boom failed to halt the country's continuous stagnation in the non-oil economy of the country. After a careful examination of the macroeconomic policies over the years and government's management of the windfall oil revenues, the study concluded that extreme volatility of national or government expenditure were the main cause behind the disappointing non-oil growth record and not Dutch Disease. The study argues that the country's fiscal policies over the years did not only fail to smooth highly volatile oil income, but rather, government expenditure was even more volatile than oil income.

Olusi .J, and Olagunju, M (2005), empirically investigated Dutch Disease (DD) in Nigeria, using quarterly data from the International Monetary Fund (IMF) database, they analyzed it using the Structural VAR approach with (IRF) Impulse Response Function and Variance Decomposition. Their study revealed that (DD) symptoms were yet to manifest, and should serve as a warning to the government to revitalize the agricultural sector.

Mohammed, Pavar and Hassan (2008), illustrated that the potency of Dutch Disease (DD) phenomenon by checking the reaction between oil prices and real exchange rates using 14 OPEC countries (including Nigeria) as observation. They used the Autoregressive Distributed lag (ADRL) bound tests of cointegration to test the stability between the two variables in all countries which yielded a strong claim for the evidence of the (DD) phenomenon.

This paper uses the agriculture as the lagging sector or the diminishing tradable part instead of manufacturing as earlier hypothesized by other researchers for the Nigerian case. In summary, an abundance of natural resource may be accompanied by the existence of Dutch Disease, which must be properly investigated to detect its presence, because the availability of natural resources may corrode the quality of social, infrastructure, weaken human and physical capital and thus impede rapid socio-economic growth.

SECTION 3: DATA AND METHODOLOGY

In other to detect the presence of (DD) in Nigeria, this study will examine the relationship between booming oil sector (Crude oil), the lagging agricultural sector (AGR). The impact of crude oil and agricultural exports on gross domestic product (GDP), since crude oil exports make up the majority of our total exports. We shall apply the Johansen Multivariate Cointegration technique using existing statistical data in the country and E Views 9 statistical package.

3.1: Model Specification

Different techniques have been used in various studies to test the relationship between crude oil export and agricultural output. However, this paper shall carry out an empirical investigation on the impact between these two variables on each other and gross domestic product (GDP) so as to see if there exists the presence of Dutch Disease in the Nigeria. In doing so, we confine ourselves to the Johansen Multivariate Cointegration model and Granger Causality test to explain this effect.

The model to be estimated can be stated as follows:
Y =f (X_1, X_2)
RGDP = f (AGRICEX, OILEX) ……………………. (Eq. 1)
Using t to denote time period (annual) the model can be rewritten as follows:
$RGDP_t = f\,(AGRICEX_t + OILEX_t)$
Y = $\beta_0 + \beta_1 X_1 + \beta_2 X_2$ ………………………………. (Eq. 2)
We specify the above model linearly in the form of an equation
$RGDP_t = \beta_0 + \beta_1 AGRICEX_t + \beta_2 OILEX_t + U_t$ …………… (Eq. 3)

RGDP = Real Gross Domestic Product
AGRICEX = Agricultural Exports
OILEX = Crude Oil Exports
β_0 = Constant
β_1, β_2 = Coefficients of the explanatory/independent variables
U_t = Stochastic or Error Term
A priori expectations of the coefficients of the model
$\beta_1, \beta_2 > 0$

3.1: Unit Root Test

We have a multivariate context, the conventional wisdom is to generalize this idea of non-stationarity inherent in time series data and adjust it by implementing the difference(s) of all the non-stationary variables used in the regression analysis, for it is proper to have a linear combination of such integrated variables that is stationary. H we check for the unit root properties of the single series as non-stationary behaviour is s prerequisite for including them in the cointegration analysis. If the series are stationary in their first differences, they are said to be integrated of order one, i.e., I (1); if stationary in their second difference, then they are integrated of order two, i.e., I (2). The order of integration of the variables is investigated using the Augmented Dickey-Fuller (ADF) (Dickey –Fuller, 1981) and Phillips-Perron (PP) (Phillips-Perron, 1988).

3.2: The Johansen Approach of Cointegration

$\boldsymbol{X_t = A_0 + A_1 X_{t-1} + A_2 X_{t-2} + A_3 X_{t-3} + e_{1t}}$ …………… 1
$\boldsymbol{X_t = A_0 + A_1 X_{t-1} + e_{2t}}$ ……………………………. 2
$\boldsymbol{\Delta X_t = A_0 + II X_{t-1} + II_{1\Delta} X_{t-1} + \epsilon_t}$ …………………….. 3
$\boldsymbol{X_t}$ = the (n.1) vector of variables
$\boldsymbol{A_0}$ = (n.1) matrix of intercept terms
$\boldsymbol{A_t}$ = (n. n) matrices of coefficients
$\boldsymbol{e_{1t}}$ and $\boldsymbol{e_{2t}}$ = vector of error terms.

The aim is to find out whether crude oil exports affect gross domestic product positively while agricultural output affects negatively in Nigeria, hence a case of the detection of the Dutch Disease.

Section 4: Analyses of empirical results

Using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests, stationarity checks were conducted because time series data are always presumed to be non-stationary. Annual data from (1981 – 2015) was used and on the basis of preliminary tests all the variables were integrated order I (1). Non stationary variables wander away from their means when there is a shock and we have higher variances which are not desirable features at all but there could be linear combination or relationship between these non-stationary variables. Since they are integrated at order (1), the analysis was pushed further to ascertain whether the variables are co-integrated or not. Thus, the study employed the Unrestricted Cointegration Rank Tests (Trace and Maximum Eigenvalue) after the order of linear deterministic trend, the results of which are on Table 4.1a and 4.1b respectively.

4.1: Cointegration

Date: 11/14/18 Time: 11:07
Sample (adjusted): 1983 2015
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: RGDP AGRICEX OILEX
Lags interval (in first differences): 1 to 1

Table 4.1a Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.933428	101.1855	29.79707	0.0000
At most 1	0.289918	11.77281	15.49471	0.1681
At most 2	0.014274	0.474450	3.841466	0.4909

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 4.1b Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.933428	89.41270	21.13162	0.0000
At most 1	0.289918	11.29836	14.26460	0.1399
At most 2	0.014274	0.474450	3.841466	0.4909

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Eviews 9 Printout

From Table 4.1a, it can be seen that the Trace Statistic is computed to be 101.1855 while the Critical value at alpha 0.05 is 29.79707 which indicates a rejection of the null of no co-integrating equation. Thus the alternate hypothesis of one cointegrating equation is not rejected. Equally, the Max-eigenvalue in table 4.1b indicates 1 cointegrating equation at the 0.05 level (Max-Eigen statistic = 89.41270; Critical value = 21.13162). These results indicate the existence of a sustainable long run equilibrium relationship between the RGDP and the duo of AGRICEX and OILEX. .Both tests give us 1 cointegrating equation; we are very sure of long run equilibrium relationship among these variables.

Relative Long Run Relationships between RGDP, AGRICEX, and OILEX

Table 4.2 depicts the long run cointegration equation showing the nature and magnitude of the observed long run relationships. The equation is normalized for RGDP – the dependent variable.

Table 4.2 Normalized cointegrating coefficients (standard error and t-statistics in parentheses)

1 Cointegrating Equation(s):	Log likelihood	-760.5776

Normalized cointegrating coefficients (standard error in parentheses)

RGDP	AGRICEX	OILEX
1.000000	-4.817252	0.176029
	(0.08560)	(0.24300)

Source: Eviews 9 Printout

The normalized beta coefficient representing the long run relative statistical relationship between the RGDP and AGRICEX is shown to be -4.817252 and Standard error of 0.08560, suggestion a t-statistic of -56.276. This is significant at 5% level. By implication, there exist a statistically significant relationship between the RGDP and the AGRICEX variable. The sign implication suggests a negative relationship which disagrees with a priori expectation. On the other hand the normalized beta coefficient representing the long run relative statistical relationship between the RGDP and OILEX is calculated to be 0.176029 with a standard error of 0.24300 (t-statistic = 0.0724). The computed t-statistic is far from being significant at 5% significant level. Thus though the relationship between RGDP and OILEX is positive as a priori expected, it is not statistically significant at the conventional 5% level.

Table 4.3 Normalized cointegrating coefficients (standard error and t-statistics in parentheses) AGRICEX – dependent variable.

1 Cointegrating Equation(s):	Log likelihood	-760.5776

Normalized cointegrating coefficients (standard error in parentheses)

AGRICEX	RGDP	OILEX
1.000000	-0.207587	-0.036541
	(0.00432)	(0.04665)

Source: Eviews9 Printout

Table 4.3 shows the normalized cointegrating coefficient with AGRICEX as dependent variable, since other variables belong to the RHS of the equation. The relationship between AGRICEX and OILEX is negative, with OILEX coefficient now negative and the t statistic (-7.833) is significant. This is indicative of Dutch Disease in Nigeria, while RGDP still maintains a negative relationship with AGRICEX and highly significant t-statistic (48.053) value also. We can comfortably posit that agriculture has not been contributing its fair amount to gross domestic product in Nigeria.

4.4: Causality between RGDP, AGRICEX and OILEX

That there exist relationships between variables does not necessarily imply causality. To test the existence of causality, the study employs the Granger Causality procedure to test the direction of causality among the nominated variables of RGDP, AGRICEX, and OILEX. The results of the pairwise Granger Causality test are summarized on Table 4.4

Pairwise Granger Causality Tests
Date: 11/14/18 Time: 11:12
Sample: 1981 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
AGRICEX does not Granger Cause RGDP	33	82.1320	2.E-12
RGDP does not Granger Cause AGRICEX		0.17305	0.8420
OILEX does not Granger Cause RGDP	33	7.42889	0.0026
RGDP does not Granger Cause OILEX		0.74149	0.4855
OILEX does not Granger Cause AGRICEX	33	1.72120	0.1972
AGRICEX does not Granger Cause OILEX		6.30404	0.0055

Source: Eviews 9 printout.

It can be seen from the Table that OILEX granger-caused RGDP (F= 7.42; Prob. = 0.0026), On the other hand, RGDP does not granger-cause OILEX (F=0.74149; Prob. = 0.4855). This implies that causality flows from OILEX to RGDP and not vice versa. Thus we reject the null hypothesis of no causal relationship between OILEX and RGDP. Next it is observed that AGRICEX granger-caused OILEX (F= 6.30404, Prob. 0.0055). This is also a unidirectional causality from agriculture to oil exports.

SECTION 5: CONCLUSION

Crude oil, gas and mineral resources cannot be assumed to be limitless so the accumulated revenues must be preserved for the future generations and should be properly invested. This is how to extend the benefits of the resource boom even when it is ended. The rapid growth experienced presently in Asia Tigers especially China, India, Turkey, Singapore, Taiwan, South Korea, Malaysia, Thailand, Indonesia and emerging market economies and many others has led to higher demand for crude oil related products while Crude oil prices remain as high as ever due to major unrest in the middle east countries or anywhere in the world there is no assurance that oil prices will be stable or continue to rise forever. The Nigerian government should properly channel the excess crude oil funds to improve the non-oil export sector, strengthen the oil sector itself by making it more productive and less extractive based, so that the other non-oil export sector should concentrate on having competitive advantage rather than depending on price competitiveness through government subsidies.

REFERENCES

Allcott, H., & Keniston, D. (2013). Dutch disease or agglomeration? the local economic effects of natural resource booms in modern America. Technical report, Working Paper.

Al-Sabah, (1988). Dutch disease in an oil-exporting country: Kuwait. OPEC review

Black, D., McKinnish, T., & Sanders, S. (2005). The economic impact of the coal boom and bust. *The Economic Journal*, 115(503), 449–476.

Budina, N., Pane, G., & Wijnbergen, S. S. (2007). Nigeria's growth record: Dutch Disease or debt overhang? World Bank Policy Research Working Paper, WPS4256, Washington, D.C. USA

Carneiro, F. (2007). Developing challenges of resource-rich countries: The case of oil exporters. Paper presented for the VI International Colloquium, Macro dynamic Capabilities and Economic Development. University of Brasilia, Brazil (March, 2007).

Caselli, F. & Michaels, G. (2009). Do oil windfalls improve living standards? Evidence from brazil. Technical report, National Bureau of Economic Research.

Corden, W. M. (1984). Booming sector and Dutch disease economics: survey and consolidation. *Oxford economic Papers*, 36(3), 359–380.

Corden, W. M. & Neary, J. P. (1982). Booming sector and de-industrialization in a small open economy. *The Economic Journal*, Vol. 92, (December), No.368, 825–848.

Dickey, D. A., & Fuller, W. A. (1981). The likelihood ratio statistics for autoregressive time series with a unit root, *Econometrica 49, 1057-1072.*

Enders, W. (2005). Applied Econometrics. Time Series 2nd Edition, Wiley, New York.

Gelb, A. H. (1988). *Oil windfalls: Blessing or curse?* Oxford University Press.

Gylfason, T. (2001). Nature, power and growth. *Scottish Journal of Political Economy,*48, 558-588.

Harding, T. & Venables, A. (2013). The implications of natural resource exports for non-resource trade.

Ismail, K. (2011). The structural manifestation of the 'Dutch' disease: The case of oil exporting countries. *IMF Working Papers*, 1–36.

Johansen, S., & Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Cointegration with Applications to the Demand for Money, *Oxford Bulletin of Economics and Statistics* 52, 169-210

Olusi, J.O. & Olagunju, M. A. (2005). The primary sectors of the economy and the 'Dutch' disease in Nigeria. *The Pakistan Development Review*, 44, 159-175.

Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression, *Biometrica, 75, 335-346.*

Rajan, R. G. & Subramanian, A. (2011). Aid, Dutch disease, and manufacturing growth. *Journal of Development Economics*, 94(1), 106–118.

Sala-i Martin, X. & Subramanian, A. (2003). Addressing the natural resource curse: An illustration from Nigeria. Technical report, National Bureau of Economic Research.

Stijns, J. P. (2003). An empirical test of the Dutch disease hypothesis using a gravity model of trade. *Available at SSRN 403041*.

World Bank (2000). World Development indicators.