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ANALYSIS OF THE EFFECTS OF OIL AND NON-OIL EXPORT ON ECONOMIC GROWTH IN NIGERIA

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Abstract

This study investigated the role of oil and non-oil exports on the Nigerian economy over the period of 1981 to 2015. The ADF and PP unit root test, Johansen cointegration test, Granger causality test, impulse response functions (IRF) and variance decomposition (VD) were used in the analysis of the study. The cointegration test indicates that GDP, Oil and Non-oil exports were cointegrated. The Granger causality test indicates short run unidirectional causality running from oil export to GDP. There are also bidirectional long run causality relationship between oil export and GDP, and unidirectional long run causality running from non-oil export to GDP. The study result indicates that oil exports have inverse relationship with economic growth while non-oil exports have positive relationship with economic growth.

Key words: Economic growth, oil exports, non-oil exports and Granger causality

1.0 Introduction

Exports of goods and services represent one of the most important sources of foreign exchange income that ease the pressure on the balance of payments and create employments opportunities, Ruba and Thikraiat, (2014). Generally export activities are said to stimulate economic growth in a number of ways such as: through production and demand linkages, and economies of scale due to larger international markets.

Export led Growth is said to be an economic development strategy in which export expansion play a central role in a country's economic growth. Although practical evidence in support of export led growth may not be universal, it is widely acknowledge that carefully managed openness to trade through an export led growth can be a mechanism for achieving rapid growth, Giles and Williams, (2000).

Nigeria been a developing country, has been grappling with the realities of developmental process not only politically and socially but also economically. In the 1960s, agriculture contributed 80% of the total export making agriculture the main stay of the Nigeria economy and the greatest foreign exchange earner. By the middle of 1970, the situation changed in favor of oil which then contributes 94% of total export making oil the main stay and the greatest foreign exchange earner of the Nigeria economy. Since 70's, till the present moment, oil has been playing the leading role in the Nigeria economy being the major source of foreign exchange. This mono cultural nature of the economy makes Nigeria susceptible to the effects of oil price shock. The over reliance of the country on oil was manifested in the inability of the country to manage her economy as a result of fall in the price of oil globally towards the end of 2015 which now push Nigeria economy into recession according to report. Therefore, not only that export is important for the survival of an economy but also the composition of export is of paramount important.

Several researchers which include, Javad et.al (2014); Kilavuz and Topcu (2012); Udude and Okulegu (2012); Safdari and Zaroki (2012); Oyatoye et.al (2011); among others studied the relationship between export and economic growth within the neo-classical framework. These studies concluded in support of the export-led growth. Syed (2015) and Noula et.al (2013) found negative relationship and mixed effect of export on economic growth. Researchers such as Abayomi et.al (2015), Adedokun (2012), Baghebo and Atima (2013) among others had also tended to focus attention on the relationship between oil export and economic growth. While some studies had focused attention on the relationship between non-oil export and economic growth these include Ali Shah et.al (2015), Abogan et.al (2014), Kalu and Agodi (2014), Mehrara (2013). But few research works which include Muhrabadi

et.al (2012), Mohsen (2015), Hosseini and Tang (2014) had sought to examine the effect of oil and non-oil export on economic growth. It is important therefore to contribute to this area by investigating the extent of the contribution of oil and non oil export on the growth of Nigeria economy and to offer appropriate suggestions based on the findings of the study.

2.0 Literature Review

Several studies have examined the export-led growth hypothesis, findings from the empirical literature point to the possibility of several types of relationships between exports and economic growth. Depending on the econometric model, data frequency, and the country or region studied, export is causing growth, growth is causing export, there is bidirectional causality, and there is no causality, Konya (2004).

Shujaat (2012), examined the causal relationship between GDP and exports for the period of 1975 to 2010. The aim of the study is to check affectivity of export promotion policy adopted by Pakistan during 1990s. Johansen test of Co-integration and Granger Causality employed to determine short run and long run causality. The result of Co-integration reveals existence of one positive co-integrating equation. The result of Causality test show short run and long run causality run from GDP to exports. The result concludes that both in short and long run only growth in production cause exports growth.

Safdari and Zaroki (2012), observed the effect of exports on economic growth (industry & mining sector, services and agriculture). The data were collected from 1961-2006 and were analyzed using Ordinary Least Squares (OLS) model. The results of this study show that each section export growth has a positive effect on the growth of value added in the same section. But the effect of export growth on the value added in industry and mining sector is more than other sectors.

Mehrabadi et.al (2012), examined the effects of oil and non-oil export on economic growth. Time series data and the method of VAR (Vector Auto Regressive) were used in the analysis. It was found that both oil and non-oil export had positive effect on the economic growth of Iran.

Udude and Okulegu (2012), examined whether there is bi-directional relationship between exports and economic growth in Nigeria. It also tries to evaluate significant impact of exports on the economic growth in Nigeria. It was found that there exist a long-run relationship with economic growth and export in Nigeria. Having integrated the short run dynamics and long run equilibrium, Imports (IMP) and Exchange Rate were positively correlated with GDP while Exports (EXC) was negatively related with GDP. The short-run dynamics adjusts to the long-run equilibrium at the rate of 0.866% per annum.

Noula et.al (2013), explored and quantified the contribution of agricultural exports to economic growth in Cameroon. It employs an extended generalized Cobb Douglas production function model, using food and agricultural organization data and World Bank Data from 1975 to 2009. The findings showed that the agricultural exports have mixed effect on economic growth in Cameroon. Coffee export and banana export has a positive and significant relationship with economic growth. On the other hand, cocoa export was found to have a negative and insignificant effect on economic growth.

Javad et.al (2014), examined the relationship between exports and economic growth in the industrial sector in Iran. Based on the research results, the hypothesis of a positive impact of increased exports on the growth of the industrial sector in Iran is to be accepted.

Ruba and Thikraiat (2014), examined the causal relationship between economic growth and exports in Jordan using the Granger methodology in order to determine the direction of the relationship between the two variables during the period 2000-2012. The study found that there is a causal relationship going from the economic growth to Export, and not vice versa.

Turan and Bernard (2014), observed the relationship between export, import and Gross Domestic Product (GDP) in Albania by using annual data for the period between 1984 and 2012. Different empirical researches and macro econometric models indicates that there is an equilibrium relationship between exports, imports and GDP in the long term. Based on the study done, the imports have negative relationship with GDP while exports have a significant positive relationship with GDP.

Abogan et.al (2014), observed the impact of non-oil export on economic growth in Nigeria between 1980 and 2010. It examined the significant role of non-oil export on economic growth which the previous studies might have ignored and the aggregate non-oil exports data used by them might bias their conclusions. This study revealed that the impact of non-oil export on the economic growth was moderate and not all heartening as a unit increase in non-oil export impacted positively by 29% on the productive capacity of goods and services in Nigeria during the period.

Mohsen (2015), investigated the role of oil and non-oil exports in the Syrian economic over the period of 1975-2010. The cointegration test indicates that GDP is positively and significantly related to oil and non-oil exports. The Granger causality test indicates bidirectional short-run causality relationships between GDP, oil exports and non-oil

exports. There are also bidirectional long-run causality relationship between non-oil exports to GDP, and unidirectional long-run causality relationship running from oil exports to GDP. The study result indicates that oil exports have the biggest effect on the GDP.

Syed et.al (2015), estimated the relationship between Gross domestic product (GDP) and agricultural and non-agricultural exports for Pakistan employing Johansen co-integration technique by using secondary data for the period 1972-2008. It was found that agricultural exports have a negative relationship with economic growth of Pakistan while non-agricultural exports have positive relation with economic growth.

Istaiteyeh and Ismail (2015), analyzed the relationship between foreign direct investment, economic growth and exports in Jordan. The co-integration method and vector error correction model were applied. The results confirm the existence of long-term causal links between variables studied. The results show a positive impact of export on GDP, rather foreign direct investment has no effect on GDP.

3.0 Data and Methodology

For the purpose of this study, annual time series data for Nigerian for the period 1981 to 2015 will be collected from the Central Bank of Nigeria Statical Bulletin of 2015. The model will consists of three variables: the gross domestic product (GDP), oil exports (OX), and non-oil exports (NOX). This study employed Vector Autoregressive Models (VAR) technique for the analysis. The basic model employed in this paper can be expressed as follows:

 $\ln GDP_t = \alpha_0 + \alpha_1 \ln OX_t + \alpha_2 \ln NOX_t + \varepsilon_t...(1)$

Where α_0 is the intercept, α_1 and α_2 are the slope coefficients to be estimated, lnGDP is the natural log of the real gross domestic product (GDP), lnOX is the natural log of real oil exports, lnNOX is the natural log of real non-oil exports and ε_i is the error term.

4.0 Empirical Results and Discussion

	lnGDP	lnOX	lnNOX
Mean	10.19444	6.407228	3.090832
Median	10.01381	7.100439	3.211767
Maximum	11.14221	9.569633	7.030124
Minimum	9.530920	1.974248	-1.593565
Std. Dev.	0.519951	2.656751	2.717442
Skewness	0.492623	-0.428095	-0.160318
Kurtosis	1.862179	1.757264	1.871064
Jarque-Bera Probability	3.303632 0.191701	3.321289 0.190016	2.008568 0.366307
Sum Sum Sq. Dev.	356.8054 9.191874	224.2530 239.9832	108.1791 251.0726
Observations	35	35	35

Table 1: Descriptive Statistics

According to the table 1 above, all the series display a high level of consistency because their mean and median values are within maximum and minimum values of the series. Also, all the series are normally distributed which manifested in the probability value of the Jarque-Bera which accepts the null hypothesis at 10% significant level.

Unit Root Test

Table2A: Unit Root Result

LEVEL						
	Augmented Dickey-Fuller			Phillip Perron		
	Constant	Constant and	None	Constant	Constant and	None
		Trend			Trend	
lnGDP	0.724410	-2.219401	2.658256	1.799207	-2.311338	4.571776
lnOX	-1.223317	-0.971545	1.909118	-1.274879	-0.971545	1.893532
lnNOX	-0.904175	-2.917969	1.381813	-0.998075	-3.057758	1.389652
		FIRST	DIFFERENCE	E		
lnGDP	-3.378729**	-3.602994**	-1.985629	-3.220256**	-3.461891	-1.793479
lnOX	-5.959428***	-4.910210***	-4.869608***	-5.964082***	-6.640349***	-4.953879
lnNOX	-6.792092***	-6.833623***	-5.236281***	-7.651386***	-10.75930***	-5.306522***

	Augmented Dickey-Fuller (ADF)			Phillip-Perron (PP)		
	Level	First Difference	I(d)	Level	First Difference	I(d)
lnGDP	-2.219401 ^b	-3.602994 ^{b**}	I(1)	-2.311338 ^b	-3.220256 ^{a**}	I(1)
lnOX	-1.223317 ^a	-5.959428 ^{a***}	I(1)	-1.274879 ^a	-6.640349 ^{b***}	I(1)
lnNOX	-2.917969 ^b	-6.833623 ^{b***}	I(1)	-3.057758 ^b	-1075930 ^{b***}	I(1)

Table2B: Summary of Unit Root Test

Note: *******,****** imply statistical significance at 1% and 5% respectively. Also, 'a' denotes model with constant, 'b' is for model with constant and trend.

From table 2 above, the result of ADF and PP tests shows that all the three variables are integrated of order one and that none of the variables is integrated of order two.

Co-integration Test

From the unit root, all the variables are integrated of order one which justified the use of Johansen Co-integration test to examine whether a long-run association between variables exists and to examine the presence of co-integrating relationships in the data. The null hypothesis in the Johansen test is that there is no co-integration among variables and the alternative hypothesis states that there is co-integration.

Null	Alternative r	Max-Eigen	Critical Value	Trace	Critical Value
$r \leq 0$	1	41.59585*	21.13162	72.89005*	29.79707
r ≤ 1	2	25.26180*	14.26460	31.29420*	15.49471
r ≤ 2	3	6.032397*	3.841466	6.032397*	3.841466

Table 3: Johansen-Juselius Cointegration Test

Note: * denotes significance at 5% level

Based on the table 3 above, the result of the Johansen cointegration test shows that there are three cointegrating equations based on the Trace and Max-Eigen value tests. That is, the results indicate that there is a long-run relationship between lnGDP, lnOX and lnNOX, the cointegrating equation was normalized by using the real GDP variable as thus:

Table4: Cointegrating equation normalized with respect to GDP

InGDP	lnOX	lnNOX	С
1.000000	0.140978	-0.294127	-10.16777
	(5.79359)	(-11.0478)	

From the Table 4 above, the long run lnGDP equation can be written as:

lnGDP=10.16777-0.140978lnOX+0.294127lnNOX

The estimated long-run equation above reveals that both variables are statistically significant. It also reveals that export of non-oil products (InNOX) has positive relationship with economic growth in Nigeria while export of oil and gas products (InOX) has negative effects on the economic growth of Nigeria. That is, for every one percent increase in oil export, the GDP will reduce by 14% while for every one percent increase in non-oil export, the GDP will be increased by 29%. Even though the contribution of non oil export to GDP during the period under consideration was small, it has positive impact on the economic growth. The negative effect of oil and gas export on the economic growth can be attributed to the resource curse hypothesis introduced by Auty (1993). There has been a belief that the export of mineral resources is a blessing, especially for developing countries Nigeria inclusive to promote their economic growth. Nevertheless, Auty (1993) argued that developing countries usually lack the skill and technology for processing their mineral resources before such resources can be exported to other countries. Stokes and Jaffee (1982) also found that the exports of raw materials or goods with low levels of processing are less likely to promote economic growth. Therefore, the export of mineral resources does not necessarily contribute to economic growth and sometimes worsens the process of development, particularly for countries and regions with an abundance of mineral resources, Hosseini and Tang (2014). Palley (2003) from his own view added that the resource curse hypothesis happens because the revenues from these resources are usually mismanaged and are not channeled into productive sectors that can effectively stimulate economic growth, due to corruption and other institutional problems. Therefore, it is not surprising finding the negative impact of oil export on economic growth of Nigeria.

Having established the existence of long run co-integration between the variables within the period under study, the study will proceed to estimate VECM. The VECM adopted in this paper is specified as follows:

Independent Variables						
	$\sum \Delta \ln GDP$	$\sum \Delta \ln OX$	$\sum \Delta \ln NOX$	ECT(-1)		
$\Delta \ln GDP$	_	3.680687*	1.323995	-0.190176*		
		[0.0299]	[0.3182]	[0.0548]		
$\Delta \ln OX$	1.420201	_	0.700195	-3.754429*		
	[0.2856]		[0.6338]	[0.0484]		
$\Delta \ln NOX$	0.828498	0.918260		1.089608		
	[0.5533]	[0.5016]		[0.5407]		

Table5:Granger Causality Test Results

Note: * denote significance at 10%

The table above shows the direction of causality between the variables with the VECM framework. The F-test results show the significance of the short-run causal effects, while the long-run causal effect based on the significance of the one period lagged error-correction term is presented with [ECT(-1)]. It is clear from the Table above that in the short-run, there is only a unidirectional causality running from lnOX to lnGDP which means that lnNOX does not cause either lnGDP or lnNOX in the short-run. But in the long-run, there are bidirectional causality relationship between lnOX and lnGDP, and unidirectional causality running from lnNOX to lnGDP.

 Table 6:
 Results of the statistical diagnostic tests on the VECM

The Dependent Variables	lnGDP	lnOX	lnNOX
Normality tests	0.842300	1.334707	0.948559
	[0.656292]	[0.513065]	[0.622333]
Serial correlation LM tests	1.732435	0.398559	0.173408
	[0.2454]	[0.8358]	[0.9643]
Heteroskedasticity(ARCH) test	1.171977	1.181272	1.473184
	[0.3609]	[0.3568]	[0.2473]

Table 6 above presented the result of diagnostic tests which the VECM was subjected to. The results of normality tests, serial correlation tests and heteroskedasticity tests accepted the null hypothesis for all the series at 5%.

Impulse Response Function



Impulse response function will allow us to study the effects of a shock in a particular variable on the other variables that are included in the model. According to the diagram above, the real GDP respond negatively to shocks in oil export and positively to shocks in non oil export. This figure complement the result presented earlier that oil export has negative relationship with GDP. The positive response of real GDP to shocks in non oil export approached zero by period nine, this can be linked to decrease in the contribution of non oil to export over the period of time.

Also, the figure shows the response of oil to shocks in real GDP and non oil export. Oil export responds negatively to shocks in real GDP and positively to shocks in non oil export. Lastly, the response of non oil export to GDP was positive until fourth period when it turns negative while it responds positively to shocks in oil export.

 Table7A:
 Variance Decomposition of LOG(GDP)

Period	S.E	LOG(GDP)	LOG(OIL)	LOG(NOIL)
1	0.023669	100.0000	0.000000	0.000000

2	0.047663	91.21591	2.180120	6.603974
3	0.079583	83.92821	1.088058	14.98373
4	0.104021	85.28141	0.701518	14.01707
5	0.129839	84.79398	4.780095	10.42593
6	0.157414	82.77602	9.729378	7.494598
7	0.183849	79.82449	14.61082	5.564688
8	0.205145	77.59955	17.88153	4.518923
9	0.225012	76.19237	20.05029	3.757341
10	0.243934	75.19012	21.59810	3.211780

Table7B: Variance Decomposition of LOG(OIL)

Period	S.E	LOG(GDP)	LOG(OIL)	LOG(NOIL)
1	0.452459	14.80287	85.19713	0.000000
2	0.718491	11.45343	77.48102	11.06556
3	0.890813	7.678230	74.02775	18.29402
4	0.984497	6.393739	75.49617	18.11009
5	1.133923	6.629268	73.70131	19.66942
6	1.273632	7.139784	74.41522	18.44500
7	1.408620	10.31458	72.52784	17.15757
8	1.524338	12.12121	71.24786	16.63094
9	1.681423	14.15641	70.21416	15.62943
10	1.858299	16.70741	68.72749	14.56509

 Table7C:
 Variance Decomposition of LOG(NOIL)

Period	S.E	LOG(GDP)	LOG(OIL)	LOG(NOIL)
1	0.458183	2.167348	51.29413	46.53852
2	0.634729	1.770105	60.24304	37.98686
3	0.775451	1.208751	62.77547	36.01578
4	0.850751	1.042528	67.25340	31.70407
5	0.893820	1.081248	63.60516	35.31359
6	0.897477	1.253134	63.68682	35.06005
7	0.915756	2.328259	63.82891	33.84283
8	0.970866	2.582670	65.24001	32.17732
9	1.068444	2.144074	66.44750	31.40843
10	1.152604	2.060336	67.34442	30.59525

Source: Computed by the Author

The results of Variance Decomposition (VDC) are presented in the table above. The results were reported for a 10-month horizon. The ordering of the variables is based on the Cholesky decomposition method which suggests the following order of the variables: LOG(GDP), LOG(OIL) and LOG(NOIL).

It can be seen from the table 7 above that in the short run, both oil and non-oil export caused variation in GDP with non-oil export responsible for 14% out of the total 15%. But in the long run, oil export was responsible for higher variation in GDP with 21% coming from oil export and 3% is coming from non-oil export. This signifies that both oil and non-oil exports are responsible for variation in GDP.

5.0 Conclusions

This study investigated the effect of oil and non-oil export on the economic growth of Nigeria using annual time series data from 1981 to 2015. The ADF and PP unit root test, Johansen cointegration test, Granger causality tests, Impulse response functions (IRF) and variance decomposition (VD) analysis were used in this study. The Johansen cointegration test showed all the variables are cointegrated. The cointegrating equation showed that oil export has negative effect on economic growth while non-oil export has positive effect on economic growth while non-oil export has positive effect on economic growth while non-oil export has positive effect on economic growth. The result of Granger causality tests showed that there is unidirectional causality running from lnOX to lnGDP in the short-run. But in the long-run, there are bidirectional causality relationship between lnOX and lnGDP, and unidirectional causality running from lnNOX to lnGDP. The impulse response functions indicated that when there is a shock to oil and non-oil export, GDP will respond positively to non-oil and negatively to oil export.

Based on the results of this study, Nigeria government should diversify her export from oil to non-oil because despite the huge revenue from oil, it impacted negatively on the economic growth of the country. Also, government should ensure that all the refineries are working up to date so that the country can depend less on the importation of finished product.

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