EFFECT OF NON-OIL SECTOR TRADE ON ECONOMIC GROWTH IN NIGERIA: EVIDENCE FROM AGRICULTURE AND MINING SECTOR

Alhassan Ali and Maryam A. Koko

Department of Economics,
Usmanu Danfodiyo University, Sokoto, Nigeria

ABSTRACT

The study examines the role of non-oil sector trade (agriculture and mining) on economic growth in Nigeria using annual data covering the period of 1970 to 2016. The study applied Multivariate Vector Error Correction Approach, Cointegration and Granger causality test in the analysis. The results from the unit root tests indicates all the variables to be integrated of order one I(1). Johansen cointegration test shows the presence of long-run economic relationship among the variables. The VECM results reveals Real Gross Domestic Product (RGDP) is positively relate to agricultural sector productivity, agricultural sector export, mining sector productivity, mining sector export and exchange rate. All the variables were found to be statistically significant in both the short run and the long run except for exchange rate which is statistically insignificant in both the periods. Granger causality test shows bidirectional causality relationship between RGDP and Agricultural Sector Export, RGDP and Mining Sector Export. It further reveals unidirectional causality relationship between RGDP, Agricultural Sector Productivity and Mining Sector Productivity i.e. both ASP and MSP granger cause RGDP in Nigeria. The study recommends government should redesign and improve the existing policies so as to optimize the growth of non-oil sector with special focus on agriculture and mining, this will fascinate investment from private and foreign investors, which will in turn improve productivity and exports, so as to provide alternative source of government revenue and employment opportunities in order to withstand fluctuations of oil price shocks in the future.

KEYWORDS:

Agriculture, Mining, Export, Productivity, Economic Growth, and Exchange Rate.

1. INTRODUCTION

In this era of globalization, it is more complicated to answer the question: what actually determines economic growth. it can be cause by several factors because of its complex nature. However, trade with foreign countries is also equally important for improving economic growth especially for developing nations like Nigeria. In many developing countries, international trade is very essential to all aspect of economic growth and development. Non-oil trade is an opportunity for many developing nations because it brings both the industrialized and developing countries together. This afford the participating nations the chance to use what they have to obtain what they need. International trade has been regarded as an engine of growth (Mudasser, 2014; Mohsen and Javad, 2016). For sustainable economic growth to occur in any economy, the gains from trade must be accompanied by autonomous productivity increases, savings and investment, with favourable economic policy to private enterprise, capital incursions and the efficient use of

resources. Nigeria like any other developing nations, is striving hard to achieve and sustain long run economic growth. The nation is blessed with vast natural resources that can make it to become a big player in international market and thus achieve economic growth through trade, but only crude oil constitutes the largest portion of Nigeria's export (Nageri, Ajayi, Olodo, and Abina, 2015). The goal for diversification of the economy give importance involved to reduce the dominance of crude oil in the export structure of the economy, has led to focus on the abandoned sectors of the economy.

For more than four decades now, Nigeria has relied on its huge crude oil resources as the main source of income, driving a monolithic economy. Regrettably, the oil income is being mismanaged (Olagunju, Oguninyi and Oguntegbe, 2015). Nigerian economy was at the same level of growth and development with nations such as Brazil, Indonesia, Malaysia and Pakistan in the 1950's - 60's, but today it is far behind in relation to overall level of economic growth and development. Furthermore, Nigeria had been left behind other oil producing countries in terms of development, especially as some of these nations are now emerging as newly industrialised nations (Olure, Adeyinka and Salako, 2016). There is an increasing emphasis on the potential importance of primary sectors in Nigerian. The need for diversification to break the dominance of crude oil in the export structure of the economy has given focus on the sub-sector. Yet, it must also be recognised that agriculture and solid mineral extraction had been major donor to the national economy in the past decades (Adeniyi, Adeleke and Olabode, 2013). For growth to take place, the nation must invest in other to build up productive capacity. It is this capacity that determines the amount of output in the economy. An expansion of productive capacity requires an increase in the natural resources, human resources, capital and the net increase in the stock capital of the economy (Comfort and Arigbede 2016; Ugwuegbe and Uruakpa 2013).

According to World Bank, (2015) Agriculture is among the African most important sectors. It has two major components which include food production and commodities export. Similarly, UNCTAD (2012) stated that in order for Africa to create a future, in which man, woman and child have the opportunity to lead a healthy and productive life, there must be a transformation in it capability to produce food. Growth on primary sectors production and productivity are crucial in achieving sustainable economic growth for developing nations. Because domestic production over its effect on foodstuff price changes can lead to some major consequences such as economic instability. Rising food prices due to supply constraints to the domestic market will have the effect of fuelling inflation, especially in low income countries like Nigeria where food accounts for large share of the consumer basket. In addition, inflationary conditions may trigger interest rates which discourage investment and private consumption (Oluwaseun, Adeniyi and Evans, 2013). Efficient distribution of national resources diminishes the over reliance on import and rise the production of exportable products which finally increases total output. However, increase of exportable goods and effective resource allocation can lead to comparative advantage which eventually result to high surplus production from agricultural sector (Nirodha, Jaime and Jeff, 2013; Udah and Nwachukwu, 2015).

Furthermore, Prior to oil discovery, Nigeria's economy was sustained by primary sectors i.e agriculture and exploration of solid minerals. The sectors form a key component of the Nigerian economy with a great return to investment. (David, Noah, and Agbalajobi, 2016). For over decades, despite gained from the sectors, Nigeria is among the countries with trade deficit. It became obvious the primary sector could not meet domestic food requirements, earn enough foreign exchange through exports and supply raw materials for it industry owing to various economic, social and other environmental problems. Food production become has major problem

in Nigeria and massive foreign exchange earnings are being utilized in importing food and raw materials. Nigeria became a net importer of basic food stuff she formerly exported (Olure, Adeyinka and Salako, 2016). Today despite low current production and output of mining sector to national economy, it contributes about 0.3% of national employment, 0.02% of exports and about 1.40 billion to the GDP (NMSIB, 2016).

Even though various studies have been conducted on this area, it is observed that the precise impact of non-oil trade toward economic growth has been subjected to several debates in various studies and findings have been inconclusive. this research is not without observed gaps in which this study intends to fill for example, the previous studies did not properly check the problem of non-stationarity related with time series data. Some of this studies include that of Comfort and Arigbede (2016), Akongwale, Olumide and Udefuna (2013); Udah and Nwachuku (2015) among others. Therefore, modern statistical time series procedure like unit root test will be used to know the nature of the series whether they are stationary or not in order to select appropriate study model. More so, this study serves as an update to the previous studies more especially that of Comfort and Arigbede (2016), David *et al.,* 2(016), Akongwale, *et al.,* (2013); Udah and Nwachuku (2015). Some of the studies suffered from theoretical and methodological problem, in which the authors did not relate their study to any theory. Furthermore, many of the studies use OLS, qualitative, descriptive statistics and spearman rank correlation method of analysis. These statistical techniques could not be appropriate in drawing useful conclusion. Thus, their study may prone to spurious result. Furthermore, none of the reviewed study investigate causality relationship between the variables in Nigeria. Similarly, the above mention studies failed to investigate long run relationship among the variable. Finally, the literatures reviewed here used annual or quarterly data which meant to further extend. Most recent among the works include: Kamil *et al*., (2017); Comfort and Arigbede (2016); Udah and Nwachuku (2015) and Victor, (2015). among others. Many of this studies have a wider time gap. Therefore, there is the need to extend the period to cover more recent year for which data is available to ensure compressive and up to date analysis.

Therefore, this study will serve as an update to the previous studies by employing large sample size, reviewing recent and relevant literature, extending the period to most recent year for which data is available and by conducting various econometric test and treatment for data to evade spurious results. It is expected that this multivariate Vector Error Correction approach will produce richer and more robust results which would be of greater benefit to macroeconomic policymakers in Nigeria, which is an oil-dependent economy. Against this background, the study intends to achieve the following objectives:

i.   To determine the impact of non-oil sector trade on economic growth in Nigeria.
ii.   To examine the long-run relationship between non-oil sector trade and economic growth in Nigeria.
iii.   To determine the direction of causality between non-oil sector trade and economic growth in Nigeria.

2. LITERATURE REVIEW

2.1. THEORETICAL FRAMEWORK

This study built on Heckscher-Ohlin trade theory. This theory was promulgated by Two Swedish economists, Eli Hecksher and Bertil Ohlin. The theory gives emphases on changes in relative factor prices and endowments between countries as the most causes of trade. The model suggested changes in pre-trade product and prices between countries as the foundation of trade. The model proposes that the developing nations which have abundant labour should give more concern in the production of primary products especially agricultural products and mining activities. Furthermore, developing nations should import their capital-intensive products generally finished goods from industrialized nations since they are capital-intensive. This is because each country has a comparative advantage once the costs of production differ between nations, for a product that detailed uppermost in production efficiency. The theory concludes that trade upsurge world aggregate output, through trade almost every nation benefits because it helps nations to secure consumption of goods and capital across the world. Thus, trade stimulates economic growth.

2.2 REVIEW OF EMPIRICAL STUDIES

Comfort and Arigbede (2016) carry out an empirical investigation on the effect of agricultural productivity on economic growth in Nigeria covering the period of 2000 to 2014 using OLS regression and Pearson correlation method of analysis. The result shows positive relationship between the study variable. In addition, Kamil *et al.,* (2017) examines the effect of agricultural sector on the economic growth of Nigeria covering the period of 1981 to 2013 using series data. The findings depict long-run economic relationship between GDP and agricultural output. David *et al.,* (2016) analyses the role of mining sector on economic growth in Nigeria from 1960 to 2012. The study employed regression techniques to examine the upshot of mining sectors contribution to economic growth. The study used time series data to evaluate the impact of the specified key sectors; crude petroleum and gas, solid mineral, manufacturing and agriculture on per capita income. The finding revealed that the value of solid mineral has a strong positive influence on economic growth and development in Nigeria. More so, Akongwale *et al.,* (2013) investigate the important of solid minerals on economic diversification in Nigeria adopting both qualitative and quantitative (descriptive) method of analysis, their study depicted the sector have all the potentiality of contribution to the economy of Nigeria. It further shows that development of the sector could aid to fight poverty in the country through job creation by given its forward linkage with the other sectors of the economy.

Udah and Nwachukwu, (2015) evaluate the factors that determine the growth of agricultural sector in Nigeria adopting multiple regression analysis on both micro and macroeconomic factors. The result reveals both labour and productivity are positively related to the growth of agricultural sector; while inflation rate and agricultural land negative agricultural growth. More so, Victor, (2015) conducted a study on the impact of agricultural export on economic growth in Nigeria covering from 1970 to 2012, the study use error correction model. The result depicted positive relationship between real exchange rate, agricultural export and economic growth over the study period. Olagunju *et al.,* (2015) on the effect of foreign trade on agricultural output growth in Nigeria using annual time series data covering the period of 1978 to 2008. Newey-West standard error regression model, descriptive statistics and correlation methods were used. The correlation

result depicts a strong positive relationship between the study variables. It further depicts negative significant relationship between food import and agricultural output growth. Henneberry and Khan, (2010) investigate the relation between agricultural exports and economic growth in low income countries using the data from 1980 to 2007 employing OLS regression techniques. Their study found agricultural exports lead the overall economic growth of those countries and agricultural imports is negatively related to their economy.

Furthermore, Faridi, (2012) explore the relationship between GDP, agricultural and non-agricultural exports for Pakistan using Johansen cointegration technique for the period 1972–2008. His result depicts negative significant effect of agricultural exports on economic growth. Bidirectional causality was noticed between the study variables. Muhammad and Atte, (2006) conduct study on production of agriculture in Nigeria using OLS regression techniques, their study reveals a negative relationship between food imports and domestic agricultural production. Positive relationship exist between GDP growth and domestic agricultural production. Domestic agricultural production is influence positively to government expenditure population increase and CPI. Similarly, Ahungwa *et al.,* (2014) examine the pattern and contribution of agricultural sector to the Gross Domestic Product of Nigeria covering the period of 1960 to 2012 using trend and regression analysis. The finding reveal downward trend share of agricultural sector to the total GDP, yet it maintaining a strong control over other sectors of the economy in 1960 to 1975 with positive significant value among the economic variables.

3. METHODOLOGY

The study examines the impact of non-oil sector trade (Agriculture and mining) on economic growth in Nigeria along with one control variables; exchange rate, covering 1970 to 2016 within Framework of Vector Error Correction model. The data employed for this study was secondary data source from the publications of Central Bank of Nigeria statistical bulletin of various years. The justification for selection of this period would ensure conformity to central limit theorem which required sample requirement for a minimum of 30 observations (Gujarati, 2007). The data collected for the study had been examined using, Vector Error Correction Model, VEC Granger Causality/Block Exogeneity Wald Test and Johansen Cointegration test for the specified econometric model. Since time series data are notably not stationary overtime, this study applied a conventional Augmented Dickey Fuller and Phillips-Perron tests in order to avoid spurious results. Diagnostic tests for serial auto correlations, normality and heteroscedasticity was carry out for the estimated model. The result was analyzed with the aid of EVIEWS 9.5 Software.

3.1 MODEL SPECIFICATION

In trying to evaluate the effect of non-oil sector trade on economic growth in Nigeria, the following model was adopted and modified from the works of Kamil *et al.,* (2017) expressed in linear econometric equation.

RGDP=f(ASE,ASP,MSE,MSE,EXCHR)…………………………………..…1

RGDP=α_0+α_1ASE+α_2ASP+α_3MSE+α_4MSP+ α_5EXCHR+ε_t……..….…….… 2

$\alpha_0 =$ Constant Term, $\alpha's$ = the parameters to be estimated, ε_t = disturbance term

Where the stochastic form as: Real Gross Domestic Product (RGDP), Agricultural sector export (ASE), Agricultural sector productivity (ASP), Mining sector export (MSE), Mining sector productivity, Exchange Rate (EXCHR)

To estimate this model, Vector Error Correction Model was used. As stated by Engle and Granger (1987) there is an existence of both Short-run and long-run equilibrium in VECM once variables are co-integrate of order 1(1). The VECM specifications for this study are presented in equation 3 to 8 below:

$$\Delta(\text{RGDP})_t = \alpha_0 + \alpha RGDP\phi_{t-1} \sum_{i=1}^{g_1} \alpha_{1i}\Delta(RGDP)_{t-1} + \sum_{i=1}^{h_i} \rho_{1i}\Delta(\text{ASE})_{t-1} + \sum_{i=1}^{r_1} \lambda_{1i}\Delta(ASP)_{t-1} + \sum_{i=1}^{d_i} \eta_{1i}$$

$$\Delta(MSE)_{i-1} + \sum_{i=1}^{v_i} \gamma_{1i}\Delta(MSP)_{i-1} + \sum_{i=1}^{s_i} \vartheta_{1i}\Delta(EXCHR)_{i-1} + \varepsilon_{1t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.3$$

$$\Delta(\text{ASE})_t = \rho_0 + \rho ASE\phi_{t-1} \sum_{i=1}^{g_2} \alpha_{1i}\Delta(RGDP)_{t-1} + \sum_{i=1}^{h_2} \rho_{1i}\Delta(\text{ASE})_1 + \sum_{i=1}^{r_2} \lambda_{1i}\Delta(ASP)_{t-1} + \sum_{i=1}^{d_2} \eta_{1i}$$

$$\Delta(MSE)_{i-1} + \sum_{i=1}^{v_2} \gamma_{1i}\Delta(MSP)_{i-1} + \sum_{i=1}^{s_2} \vartheta_{1i}\Delta(EXCHR)_{i-1} + \varepsilon_{2t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.4$$

$$\Delta(\text{ASP})_t = \lambda_0 + \lambda ASP\phi_{t-1} \sum_{i=1}^{g_2} \alpha_{1i}\Delta(RGDP)_{t-1} + \sum_{i=1}^{h_2} \rho_{1i}\Delta(\text{ASE})_{t-1} + \sum_{i=1}^{r_2} \lambda_{1i}\Delta(ASP)_{t-1} + \sum_{i=1}^{d_2} \eta_{1i}$$

$$\Delta(MSE)_{i-1} + \sum_{i=1}^{v_2} \gamma_{1i}\Delta(MSP)_{i-1} + \sum_{i=1}^{s_2} \vartheta_{1i}\Delta(EXCHR)_{i-1} + \varepsilon_{2t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.5$$

$$\Delta(\text{MSE})_t = \eta_0 + \eta MSE\phi_{t-1} \sum_{i=1}^{g_2} \alpha_{1i}\Delta(RGDP)_{t-1} + \sum_{i=1}^{h_2} \rho_{1i}\Delta(\text{ASE})_{t-1} + \sum_{i=1}^{r_2} \lambda_{1i}\Delta(ASP)_{t-1} + \sum_{i=1}^{d_2} \eta_{1i}$$

$$\Delta(MSE)_{i-1} + \sum_{i=1}^{v_2} \gamma_{1i}\Delta(MSP)_{i-1} + \sum_{i=1}^{s_2} \vartheta_{1i}\Delta(EXCHR)_{i-1} + \varepsilon_{2t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.6$$

$$\Delta(\text{MSP})_t = \gamma_0 + \gamma MSP\phi_{t-1} \sum_{i=1}^{g_5} \alpha_{1i}\Delta(RGDP)_{t-1} + \sum_{i=1}^{h_5} \rho_{1i}\Delta(\text{ASE})_{t-1} + \sum_{i=1}^{r_5} \lambda_{1i}\Delta(ASP)_{t-1} + \sum_{i=1}^{d_5} \eta_{1i}$$

$$\Delta(MSE)_{i-1} + \sum_{i=1}^{v_5} \gamma_{1i}\Delta(MSP)_{i-1} + \sum_{i=1}^{s_5} \vartheta_{1i}\Delta(EXCHR)_{i-1} + \varepsilon_{5t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.7$$

$$\Delta(\text{EXCHR})_t = \vartheta_0 + \vartheta EXCHR\phi_{t-1} \sum_{i=1}^{g_6} \alpha_{1i}\Delta(RGDP)_{t-1} + \sum_{i=1}^{h_6} \rho_{1i}\Delta(\text{ASE})_{t-1} + \sum_{i=1}^{r_6} \lambda_{1i}\Delta(ASP)_{t-1} + \sum_{i=1}^{d_6} \eta_{1i}$$

$$\Delta(MSE)_{i-1} + \sum_{i=1}^{v_6} \gamma_{1i}\Delta(MSP)_{i-1} + \sum_{i=1}^{s_6} \vartheta_{1i}\Delta(EXCHR)_{i-1} + \varepsilon_{6t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.8$$

3.2 TECHNIQUES OF ESTIMATION
3.2.1 UNIT ROOT TEST

First, we shall ensure all variables included in the model are stationary. That is, all variables have a constant mean and variance. This will make forecast of future value sensible. Therefore, when variable is not stationary at level value as expected for most macroeconomic variables, the data will be differenced. This study used Augmented Dickey-Fuller and the Phillips-Perron. Unit root

test is vital since existence of non-stationary variables will cause a spurious regression with high R^2 and significant t-statistic but the results would not consist of any economic meaning. The unit root test is conduct before the cointegration method of analyses. This test is used to observe the order of integration. If the series is stationary at level it is said to be integrated to order 0 i.e. I(0). If a variable is differentiated once in order for it to be stationary it is said to be integrated to order 1 that is I (1) (Dickey and Fuller, 1981; Phillips and Perron, 1988).

3.2.2 OPTIMUM LAG TEST

Before conducting cointegration test, we have to specify the proper lag to be include in the model. To determine lag-order selection, there are several methods such as Hanna and Quinn information criterion. Schwarz's Bayesian information criterion, final prediction error and Akaike's information criterion. The fitted lag is the lag that indicated by most of the criterion. Furthermore, after we get the fitted lag, then we continue with the cointegration test. (Engel and Granger 1987)

3.2.3 COINTEGRATION TEST

If variables are not stationary in level, differenced data are to be use. If all Variables have been differenced, it may lead to the possibility of the existence of the long run relationship them. In order to check whether the variables have a long run relationship, we use cointegration test. If there is cointegration in differenced data, VEC should be apply. On the other hand, if the result of cointegration test discloses absence of cointegration in differenced data, the model will be VAR in difference (Johansen and Juselius 1990). Johanson and Juselius have proposed a method to test the cointegration i.e. Trace statistic and Maximum Eigenvalue statistic. Both of the tests compare the Trace statistic or Maximum Eigen value statistic with its 5% critical value. The aim of Johansen test is to know the number of cointegration vectors in the model. The null is rejected if the trace statistic or Maximum Eigenvalue statistics is greater than the critical value (Johansen, 1988).

3.2.4 VECTOR ERROR CORRECTION MODEL

The ECM coefficient is identified as the speed of adjustment, it expresses how fast the system restore to equilibrium. It captures the appeasement of the variables over time from the position of instability to the period of equilibrium (Johansen and Juselius 1990).

3.2.5 VEC GRANGER CAUSALITY BLOCK EXOGENEITY WALD TEST

This model bagged from the vector error correction model resulting from the long-run cointegration (Granger, 1986). The Pairwise Granger causality has probable shortcomings of specification bias and spurious regression. Engel and Granger (1987) pointed out that when two variables are not stationary and cointegrated, the standard Granger causal inference will be invalid. To mitigate these problems, Granger Causality Block Exogeneity Wald test to be use. This procedure has been found to be superior to ordinary Pairwise Granger causality tests since it does not require pre-testing for the cointegrating properties of the system and thus eludes the potential bias related to unit roots and cointegration tests as it can be applied irrespective of series is I(0) or I(1). (Granger, 1986). The null hypothesis is rejected when test statistic from the test is larger than critical value.

4. RESULT AND DISCUSSION OF FINDINGS

4.1 UNIT ROOT TEST

Checking for consistency in the variables is of primal concern in time series econometric analysis to obtain reliable estimates. To know whether variables are stationary or otherwise; and if stationary, to determine their order of integration. As earlier stated in the methodology, the study used Augmented Dickey-Fuller and Phillips Perron approach.

Table 1 Unit Root Test Result

Variables Series	ADF Level Value	First Difference	PP Level Value	First Difference	Order of Integration
RGDP	2.4534	-6.4675***	-2.3833	-6.9044***	I(1)
ASE	1.8646	-5.0874***	4.4980	-9.5832***	I(1)
ASP	3.0256	-7.0469***	3.6949	-6.1969***	I(1)
MSE	1.0972	-6.3857***	-1.4756	-8.4920***	I(1)
MSP	-5.4784	-8.5738***	4.7139	-8.5648***	I(1)
EXCHR	2.1802	-6.0358***	0.7839	-7.5738***	I(1)

Note that *** indicate significant at 1% level.
Source: Author's Computation

As presented in table 1, the outcome of the unit root test for both Augmented Dickey Fuller (ADF) and Phillips-Perron's (PP) tests proved the series to be non-stationary at their level value, but appeared to be at their first difference. The variables are said to be integrated of order one i.e. I(1). There is no any mixture of integration order among our variables. Haven conduct unit root test, and the result confirmed the stationarity of the series variable at the same order I(1) which is one of the basic requirement for cointegration, therefore it is very essential to determine the of lag number to be use in the study.

4.2 OPTIMUM LAG TEST

Table 2 Optimum Lag Test Result

Lag	LogL	LR	FPE	AIC	SC	HQ
0	14.2073	NA	9.5554	5.4745	6.6046	8.4646
1	14.5353	18.4646	7.5446	7.5754	4.9465	7.0876
2	42.8576	43.5434	4.6363	7.9583	5.7456	7.8574*
3	53.2533	49.3853*	7.1324*	9.5462*	7.8568*	4.2051
4	55.5462	45.9461	5.5644	6.4639	5.8436	6.1974
5	36.3432	19.4743	6.4535	8.9407	5.2085	6.6463

Note that * indicate lag order selected by the criterion. LR: sequential modlified LR test statistic (each test at 5% level), FPE: Final Prediction Error, AIC: Akaike Information Criterion, SC: Schwarz Information Criterion; HQ: Hannan-Quinn Information Criterion.
Source: Author's Computation

From table 2, optimum lag order selection was used to examine the number of lag(s) to be included in the model prior to cointegration test. The maximum lag for the model was selected based on the five different information criteria. It is evident from the table only HQ agreed at 2

lag, all the remaining agreed at lag 3. Hence, the study adopted 3 lag as the maximum for the model.

4.3 JOHANSEN COINTEGRATION TEST

Table 3 Johansen Cointegration Rank Test Result

Trace Statistic				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.775666	191.2952	95.75366	0.0000
At most 1 *	0.705781	125.5320	69.81889	0.0000
At most 2 *	0.545431	71.70099	47.85613	0.0001
At most 3 *	0.466179	37.01114	29.79707	0.0062
At most 4	0.188314	9.392560	15.49471	0.3303
At most 5	0.004813	0.212302	3.841466	0.6450
Max-Eigen Statistic				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.775666	65.76317	40.07757	0.0000
At most 1 *	0.705781	53.83101	33.87687	0.0001
At most 2 *	0.545431	34.68986	27.58434	0.0052
At most 3 *	0.466179	27.61858	21.13162	0.0053
At most 4	0.188314	9.180259	14.26460	0.2715
At most 5	0.004813	0.212302	3.841466	0.6450

MacKinnon-Haug-Michelis (1999) p-values, Trace test indicates 4 cointegrating eqn(s) at the 0.05 level, Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level. denotes rejection of the hypothesis at the 0.05 level

Source: Author's Computation

The major aim of this test is to ascertain whether a linear combination of the integrated variable is becoming stationary over the long-run, if this hold, then it means cointegration exists among the variables, this further implies that there is existence of long run relationship among the variables. Table 3 indicates the presence of a long-run economic relationship among all the variables as both trace and Max-Eigen statistics indicated 4 cointegrating equation among the variables.

4.4 Vector Error Correction Model Result

Table 4 Vector Error Correction Model Result

Variables	Coefficient	
	Δ(-1) Short-Run	Long-Run
ECM	-0.313163**	
	(0.06508)	
	[-4.81220]	
ASE	0.922473*	13.05260*
	(0.89049)	(2.16017)
	[1.03592]	[6.04238]
ASP	44.29663***	1670.780***
	(952.653)	(4459.68)
	[-0.04650]	[0.37464]

MSE	3815.964**	8266.514**
	(951.081)	(1276.91)
	[-4.01224]	[6.47385]
MSP	3498.393**	5993.529**
	(1179.91)	(1702.12)
	[2.96497]	[3.52121]
EXCHR	-85.09531	943.4240
	(345.197)	(777.811)
	[-0.24651]	[1.21292]
C	2597.651	14996.77
	(11875.7)	
	[0.21874]	

R-squared	0.899027
Adj. R-squared	0.861163
F-statistic	23.74313
Prob (F-statistic)	0.013528

Note that ***, ** and * indicate level of significant at 1%, 5% and 10% respectively
ECM = size of the error correction terms Δ = indicate changes in the first difference
Source: Author's Computation

Table 4 accounts for an error correction of -0.31. Having a negative sign attached to this term explains how the disequilibrium gradually disappears between the short to the long-run. As a result of this, the short run values of output will gradually converge to the long run path by 31% level of adjustment yearly. However, the result further reveal agricultural sector productivity, agricultural sector export, mining sector productivity, mining sector export and exchange rate to be positively related to real GDP for both short run and long run. All the variables were found to be statistically significant in both the periods at 1%, 10%, 5% and 5% respectively except for exchange rate which is insignificant in both the periods. Furthermore, R^2 measures the joint statistical influence of explanatory variables in explaining the dependent variable as shown by the coefficient of determination value of 0.899027, which account for 90% of the variation in GDP between the year 1970 to 2016 are explained by the variables controlled in the model, while the remaining 10% percent is explaining by other variables not captured in the model i.e. error term. The F-statistic determine the overall goodness of the model. The F-statistic value of 23.74313 found to be statistically significant at 5% level, shows that the explanatory variables are important determinants of Nigeria economic performance during the study period.

4.5 VEC GRANGER CAUSALITY/BLOCK EXOGENEITY WALD TEST

Table 5 VEC Granger Causality/Block Exogeneity Wald Test Result

Dependent Variable	X^2-statistics of lagged 1st different term [p-value]					
	Independent Variables					
	$RGDP\phi_{t-}$	$\Delta(ASE)_{t-1}$	$\Delta(ASP)_{t-1}$	$\Delta(MSE)_{i-1}$	$\Delta(MSP)_{i-1}$	$\Delta(EXCHR)_{i-1}$
$\Delta RGDP$	-	9.82*** [0.0074]	1.12 [0.5753]	16.14*** [0.0003]	8.79 [0.1023]	0.07 [0.9677]

Δ*ASE*	11.67*** [0.0029]	-	3.70 [0.1572]	3.41 [01877]	2.59 [0.2739]	2.92 [0.2319]
Δ*ASP*	7.19* [0.0981]	9.36* [0.0833]	-	0.03 [0.9833]	0.07 [0.9677]	0.40 [0.8178]
Δ*MSE*	6.28* [0.0684]	0.07 [0.9648]	0.27 [0.8696]	-	7.68 [0.0146]	0.61 [0.7366]
Δ*MSP*	6.14** [0.0212]	016 [0.9255]	0.52 [0.7708]	0.10* [0.0699]	-	0.25 [0.8815]
Δ*EXCHR*	4.54 [0.1032]	41.7*** [0.0000]	0.92 [0.6299]	9.09** [0.346]	1.41 [0.4930]	-
Joint Test Causality	69.69*** [0.0012]	28.41*** [0.0030]	56.12*** [0.0421]	20.88** [0.0126]	11.14 [0.2328]	5.62 [0.4295]

Note that ***, **and * indicate 1%, 5% and 10% significant
Source: Author's Computation

4.6 DIAGNOSTIC TEST

As presented in table 6 below, VEC residual serial correlation LM test shows the absence of serial correlation of residual among the selected lag. Given the insignificant provability chi-squre value of 0.5571. VEC residual normalty test statistics result shows residual to have a normal and identical distribution given the insignificant joint statistics Jarque-bera probability value of 0.8464. lastly, heteroscedasticity test indicates the model to be homoscedastic and not serially correlated given the insignificant probability of LM statistic from lag one to lag three at 0.8995, 0.7318 and 0.5660 respectively.

Table 6: Diagnostic test result

VEC Residual Serial Correlation LM Tests Joint test:	Chi-sq	df	Prob.
	833.4653	840	0.5571

	Lags	LM-Stat	Prob
VEC Residual Heteroskedasticity Tests	1	36.84347	0.8995
	2	42.51413	0.7318
Probs from chi-square with 49 df.	3	46.72178	0.5660

VEC Residual Normality Tests	Component	Jarque-Bera	Df	Prob.
	Joint	336.1127	14	0.8464

Source: Author's Computation

5. CONCLUSION AND RECOMMENDATIONS
5.1 CONCLUSION

The goal for diversification of the economy give importance involved to reduce the dominance of crude oil in the export structure of the Nigerian economy has led to give more emphasis on non-oil sector. From this work, it was revealed a lot of menaces had contributed to the nonperformance of non-oil sectors in Nigeria under the period studied, even though all the sectors contribute positively to economic growth in term of their productivity and source of foreign

exchange earnings. The findings of the study reveal RGDP to be positively relate to agricultural sector productivity, agricultural sector export, mining sector productivity, mining sector export and exchange rate. More so, the study shows bidirectional causal relationship between RGDP and ASE, RGDP and MSE. It further reveals unidirectional relationship between RGDP, ASP and MSP i.e. both ASP and MSP granger cause RGDP in Nigeria. So base on these outcomes, study conclude that non-oil sectors trade are friendly and contribute positively to Nigeria economy within the study period.

5.2 RECOMMENDATIONS

In line with the research findings, the following recommendations were offered; the government should redesign and improve the existing policies so as to optimize the growth of non-oil sector with special focus on agriculture and mining, this will fascinate investment from private and foreign investors These will in turn improve productivity and exports in non-oil sector, so as to provide alternative source of government revenue and employment opportunities in order to withstand fluctuations of oil price shocks in the future. Furthermore, by building local technical, managerial skills and capacity to ensure steady supply in mining sector. More so by boosting agricultural productivity through facilitating access to inputs, extension services, integrate value-chain and improving market access to local farmers.

REFERENCES

[1]   Adeniyi, I. O., Adeleke, M.O., & Olabode, O. A. (2013). Legal Regime For Exploring Solid Minerals For Economic Growth In Nigeria. Journal Of Canadian Social Science. 9 (5): 67-77.

[2]   Ahungwa, G.T., Haruna, U. & Rakiya, Y. A. (2014). Trend Analysis Of The Contribution Of Agriculture To The Gross Domestic Product Of Nigeria (1960 - 2012). Journal Of Agriculture And Veterinary Science. 7(1): 50-55 Http://Www.Iosrjournals.Org

[3]   Akongwale, S., Olumide, S. A., And Udefuna, P. N. (2013): Economic Diversification In Nigeria: Any Role For Solid Mineral Development? Published By MCSER-CEMAS Sapienza University Of Rome. 4 (6): 691-703

[4]   CBN, (2016). Central Bank Of Nigeria Statistical Bulletin. Edition.

[5]   Comfort, M. A., Arigbede T. O., (2016). The Effect Of Agricultural Productivity On Economic Growth In Nigeria, Journal Of Advance Social Sciences And Humanities 2(4): 26-33.

[6]   David, O. O., Noah, O. A. And Agbalajobi, S. A. (2016). An Empirical Analysis Of The Contribution Of Mining Sector To Economic Development In Nigeria. Khazar Journal Of Humanities And Social Sciences. 19(1): 88-106

[7]   Dickey, D. A. And Fuller, W. A. (1981). Likelihood Ratio Statistics For Autoregressive Time Series With A Unit Root. Econometrica, 49 (2) :1057-1072.

[8]   Engel, R.F. And Granger C.W. (1987). "Cointegration And Error Correction: Representation Estimation And Testing". Econometrica, 55(2): 251-276

[9]   Faridi, M. (2012). Contribution Of Agricultural Exports To Economic Growth In Pakistan. Pakistan Journal Of Commerce & Social Sciences. 6(1): 133-146.

[10] Granger, C. W. J. (1986), "Developments In The Study Of Co-Integrated Economic Variables", Oxford Bulletin Of Economics And Statistics. 68: 213-228.

[11] Gujarati, D. N. (2007). Basic Econometrics, 4th Edition, Tata Mcgraw – Hill Publishing Company Limited, New Delhi.

[12] Henneberry, D. M. & Khan, C. (2010). Agricultural Import Demand In Large Markets: An Aggregate Analysis With High And Low Growth Subgroups. Journal Of Food Production Mark.. 2(3): 67-87.

[13] 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 (2): 169–210.

[14] Johansen, S. (1988). Statistical Analysis Of Cointegration Vectors. Journal Of Economic Dynamics And Control, 12: 231-54.

[15] Kamil S., Sevin U., & Festus, V. B., (2017). The Contribution Of Agricultural Sector On Economic Growth Of Nigeria. International Journal Of Economics And Financial Issues, 7(1):547-552. Http: Www.Econjournals.Com

[16] Mohsen, M. And Javad, B. (2016). The Contribution Of Industry And Agriculture Exports To Economic Growth: The Case Of Developing Countries, Tehran, Iran World Scientific News (46) Pp 100-111. Www.Worldscientificnews.Com

[17] Mudasser A. K. (2014). International Trade As An Engine Of Growth In Developing Countries: A Case Study Of Pakistan (1973-2011) Journal Of Economics And Sustainable Development Vol.5(27), 2014 Pp 122-128 Www.Iiste.Org

[18] Muhammad L. A. And Atte, O. A. (2006). An Analysis Of Agricultural Production In Nigeria. African Journal Of General Agriculture. Vol.2(1) Pp. 1-6. Http://Www.Asopah.Org

[19] Nageri, K. I., Ajayi, O., Olodo H. B. & Abina B. M. (2013). An Empirical Study Of Growth Through Trade: Nigeria Evidence. Arabian Journal Of Business And Management Review Vol. 3(5): 31-42

[20] Nirodha, D. S., Jaime, M., & Jeff, J. (2013). Trade Liberalization Effects On Agricultural Production Growth: The Case Of Sri Lanka Selected Paper Prepared For Presentation At The Southern Agricultural Economics Association Annual (SAEA) Meeting, Orlando, Florida, 2-5 February 2013. Pp 1-23

[21] NMSIPB, (2016.) Nigeria's Mining Sector Investment Promotion Brochure August 2016 Department Of Planning, Research And Statistics Federal Ministry Of Mines And Steel Development Ministry Of Solid Minerals Development Federal Republic Of Nigeria.

[22] Olagunju, K. Oguninyi, A. & Oguntegbe, K. (2015). The Impact Of Foreign Trade On Growth Of Agricultural Output In Nigeria," International Journal Of Innovation And Scientific Research, 15(1): 207–216 Http://Www.Ijisr.Issr-Journals.Org/

[23] Olure, B., Adeyinka M., & Salako G. (2016) Economic Gift Source Of Diversifying Nigerian Economy For, Economic Growth And Economic Development Sustainability. Journal Of Economics And Sustainable Development, 7 (11): 34-42 Www.Iiste.Org

[24] Oluwaseun G., Adeyemi, O., & Evans, O. (2013). Agricultural Exports And Economic Growth In Nigeria (1980 – 2010) Journal Of Economics And Sustainable Development Vol.4 (16) 111-124. Www.Iiste.Org

[25] Phillips, P. C. B. And Perron, P. (1988) "Testing For A Unit Root In Time Series Regression" Biometrika, Vol. 75(2), Pp. 335–346.

[26] Udah, S. C., & Nwachukwu, I.N. (2015). Determinants Of Agricultural GDP Growth In Nigerian. International Journal Of Agricultural Research And Review: Vol. 3(3): Pp 184-190, Http://Ijebf.Com

[27] Ugwuegbe, S. U., & Uruakpa P. C. (2013). The Impact Of Export Trading On Economic Growth In Nigeria. International Journal Of Economics, Business And Finance Vol. 1, No. 10, PP: 327 - 341, ISSN: 2327-8188 Http://Ijebf.Com

[28] Victor, U. I. (2015). The Empirical Analysis Of Agricultural Exports And Economic Growth In Nigeria. Journal Of Development And Agricultural Economics. Vol. 7(3) Pp 113-122. Http:Www.Academicjournal,Org/JDAE

[29] World Bank (2015), "World Bank Development Indicators 2014", The World Bank Washington D.C