INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 5, Issue 12, (2015) E-ISSN: 2222-6990

An Empirical Analysis on the Relationship between Non-Oil Exports and Economic Growth in Nigeria

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DOI Link: http://dx.doi.org/10.6007/IJARBSS/v5-i12/1931

Published Date: 06 December 2015

Abstract

The study analyzed the relationship between non-oil sector and economic growth from 1980-2012 and data was derived from Central Bank of Nigeria's statistical bulletin (CBN) and World Development Indicators (2013). Variables of interest were GDP as proxy for economic growth, non-oil exports, openness as proxy for technological advancement, oil exports and exchange rate variables. The theoretical framework was the Neoclassical growth model and model specification followed Ondigo *et al.,*(2013) in conformity to theoretical framework.

Unit root test of stationarity was carried out using Augmented Dickey Fuller test and Phillips Peron test and once data was proved stationary, we carried out co integration test; which shows four co-integrating relationships, an indication of long run relationship among variables. Thus, we proceeded to Error Correction Model (ECM)

ECM was significant however; non oil export variable was significant but negative. This is an indication of the dismal performance of the sector.

The paper concludes that there is need for the government to focus on reviving the sector to improve its performance and ensure that the sector is repositioned to meet international standards.

1.0 Introduction

Prior to the oil boom of the 1970's, Nigeria's export trade was largely dominated by non-oil products such as groundnuts, palm kernel, palm oil,cocoa, rubber, cotton, coffee, amongst others. Other non-oil exports of significant value then were tin ore, columbite, hides, skin and cattle. Over 66% of total exports on the average were accounted for by these commodities, and this continued into the early 1970s. Agriculture through export of non-oil products had a high record contribution up to 80% of the gross domestic product and providing employment for over 70% of the work population(Ogunkola,2008). However since the oil boom of the 1970's, the Nigerian economy has become a monocultural one with oil being the major source of income. Despite having the largest economy in Africa, the country still experiences

an increasing rate of unemployment and poverty(WDI,2013) and this could attributed to the over-reliance of the country on oil earnings from the oil sector and negligence of other sectors(agriculture, manufacturing, sevices etc). The oil boom has not translated into increase in the standard of living of Nigerians. The history of oil in Nigeria has been characterized by almost an equal measure of progress and retardation, blessings and curse, hope and hopelessness, wealth and poverty(Adenikinju,2008).

Exports in the Nigerian economy could be viewed from the oil and non-oil exports as these are the major sources of foreign exchange earnings for the country, with oil been the dominant sector(Enoma and Isedu, 2011).The non-oil sector includes agriculture, manufacturing and service sectors. The contributions of these sectors to economic growth has been dismal over the years. Non -oil exports constituted 33% of total exports in 2010, while oil exports constituted 67% in the same year as against non-oil export's contribution of 67% and oil sector export's contribution of 33% in 1970(CBN,2010).

The agricultural sector which should be the mainstay of the economy and the bane of non-oil exports in Nigeria is largely characterized by low productivity(Abogan et al, 2014). This is due to factors such as small farm size, crude and outdated farm implements, inadequate access to credit facilities among others. The decline of the sector has a gross impact on industry that relied heavily on the sector for raw material. Thus, the decline comes with surge of revenue from oil export as well as the poor implementation of the various policies, strategies and reform programmes in the sector. Several policies have emerged over time for the development of the non-oil sector over the years with these policies having varying degree of success owing largely to poor implementation. These inlcude the protectionism policy in the light of import substitution policy of industrialization in the 1960s(Pre-SAP Era); trade liberalization policy(Structural Adjustment Programme Era) of the mid 1980s and export promotion policy of 1990s(Post SAP) which was executed through intensified policy support to Small and Medium Scale Enterprises (SMEs) to enhance productivity and subsequently, export of local products(Onodugu et al,2013; Abogan et al,2014).

It is against this background that this study will examine the relationship between non-oil exports and economic growth in Nigeria between 1980 and 2013; while addressing the following issues:

1. What is the trend and pattern of non-oil exports and economic growth in Nigeria?
2. Is there any significant relationship between economic growth and non oil exports
3. What is the effect of non-oil exports on economic growth in Nigeria?

2.0 Literature Review And Theoretical Framework.

Several authors have studied the relationship between exports (oil and non-oil) and economic growth(Iyola ,1995;Obadan ,2000; Subasat, 2002; Okoh, 2004; Asanebi, 2007;Odularu, 2008; Onayemi and Ishola ,2009; Ogbonna ,2010; Ozoudo, 2010; Opara ,2010; Usman, 2010).In examining the nexus between non-oil exports and economic growth in Nigeria, most authors have posited a negative relationship(Obadan, 2000; Asanebi, 2007; Onayemi and Ishola ,2009; Ogbonna 2010; Ozoudo, 2010; Opara,2010;) while a few have established otherwise(Iyola, 1995;Okoro, 2009).

Onayemi *et al.,* (2009) revealed that non-oil export have performed below expectation under export promotion policy thereby supporting the argument that export promotion does not have any significant impact on economic growth of low income countries.

Usman (2010) discovered that an insignificant non-oil export and exchange rate would slow down economic growth given that non-oil export for previous year positively affects growth.
Asanebi (2007) in his study on the relationship between non-oil exports and economic growth in Nigeria using linear correlation co – efficient analysis, observed that the performance of non – oil sectors exports was below expectation in aggregate terms and has therefore no significant impact on the GNP of the country.
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Ogbonna (2010) using ordinary least square (OLS) regression technique emphasized that the contributions of the non – oil sector export to the GDP in Nigeria is still marginal and almost insignificant. What this implies is that all the export promotion strategies adopted failed to achieve the desired results, which is to improve the performance of the sector.
Ozoudo (2010) also discovered using econometric method in his research for Nigeria covering the period from 1991 – 2008 recorded that the inefficient performance of the non – oil marketing of board deterred progress of the non – oil sector.
Abogan *et al.,* (2014) examined the significant role of non-oil export on economic growth in Nigeria using the Ordinary Least Square Methods involving Error correction mechanism, revealed that the impact of non-oil export on economic growth was moderate as a unit increase in non-oil export impacted positively by 26% on the productive capacity of goods and services in Nigeria during the period.
Onodugo *et al.,* (2013) investigated the specific impact of the non-oil exports on the growth of Nigerian economy using data between 1981 and 2012 while adopting the Augmented Production
Function (APF), employing the Endogenous Growth Model (EGM) in its analysis. They discovered a very weak impact of non-oil export on economic growth in Nigeria.
Adenugba *et al.,* (2013) analysed the effectiveness of Nigeria's export promotion strategies in diversifying the productive base of the Nigerian Economy from Crude oil as the major source of foreign exchange. Time series data ranging from 1981 to 2010 and regression analysis was adopted. Findings from the study reveal that non – oil exports have performed weakly.

2.1. Theoretical Framework

The model used in this study is based on the neoclassical growth model, otherwise referred to as the growth accounting framework to explain the source of growth in an economy. The national accounts form the basis of the economies to be analyzed and it is used in conjunction with the aggregate production function. Using a production function approach, it states that the growth rate of output (GDP) is principally determined by the rate of growth of gross labour and/or the rate of growth of its quality, multiplied by the labour income share; the rate of growth of gross capital input and/or the rate of growth of its quality, multiplied by the capital income share; and change in technology or total factor productivity (TFP).
Following Ondugo et al (2013) as adopted by Egwaikhide (2012) in modeling the impact of FDI on economic growth in Nigeria, we therefore specify the country's aggregate production function thus:
$Y = F(L, K, A)$ ---------- (i)
Where Y = Gross domestic product (GDP),
L = labour force,
K = capital stock, and
A = total factor productivity (TFP) of growth in output.

Total factor productivity (i.e. A) is a function of private investment (PN) and trade policy measured by index of trade openness (OP).
Therefore,
A = g (PN, OP) ---------- (ii)
The substitution of (ii) into (i) becomes:
Y = f(L, K, PN, OP)---------- (iii)
It is expected that private investment will affect growth through export trade and exchange rate and in Nigeria export trade is categorized into oil and non-oil export trade. We therefore substitute oil export (OE) and non-oil export (NOE) for PN in the model.
Thus, we have,
PN = h(OE, NOE,EXC) ---------- (iv)
Equation (iii) translates into:
Y = f(L, K, OE NOE, EXC, OP)---------- (v)
Taking natural log of equation (5), and specifying it in dynamic econometric form, we transform it to:
$lnY = \beta_0 + \beta_1 lnL_t + \beta_2 lnK_t + \beta_3 lnOX_t + \beta_4 lnNOX_t + \beta_5 lnEXC_t + \beta_6 lnOP_t + \mu_t$ --------- (vi)
Where ln = natural logarithms,
L= labour
K= capital
OX = oil export,
NOX = non oil export,
EXC= Exchange rate
OP = the index of trade openness,
μ = the error term,
β_1- β_6 are the elasticities of labour force, capital stock, oil export, non-oil export, exchange rate and index of trade openness respectively.

3.0 Data And Methodology

The data set for this study consists of annual time series for years ranging from 1980-2012. Data is generated in line with the period covered by the study. The choice of this period is based on data availability. Data sources are GDP, Labour, capital, oil export, non-oil exports, Exchange rate and Trade openness data from CBN Statistical Bulletin and World Bank Indicators(WDI).

3.1 Apriori Expectation:

Ordinarily, a priori expectation is that all parameters will be positive,but considering the fact that the Nigerian non-oil sector is at its infant stage of development; openness and exchange rate here can have positive or negative impact on growth.

3.2 Methodology:

This study adopts unit root test, co-integration test and error correction model. Unit root test was carried out to avoid the problem of spurious regression.

3.2.1: Co-integration and Error Correction Model

We examined the time series properties of the logged series using the standard Augmented Dickey Fuller test by Dickey and Fuller (1979; 1981). The tests are conducted with intercept and trend in each of the series. This can be determined as:

$$\Delta Y_t = \alpha + \beta\tau + \delta Y_{t-1} + \sum_{t=1}^{m} \Delta Y_{t-1} + \varepsilon_t \quad \text{..... (2)}$$

Equation 1 above represent intercept and trend, α represent the drift, t represent deterministic trend and m is a lag length large enough to ensure that ε is a white noise Process. The co-efficient of interest in equation above is δ. If δ is less than one (1) i.e.δ<1, the series does not have unit root. The estimated t-statistic of the variable of interest is compared with the Dickey and Fuller critical values to determine if the null hypothesis is valid. If the variables are integrated, we test for the possibility of a co-integrated relationship using the Johansen Co-integration test by Johansen 1988; Johansen and Juselius1990.

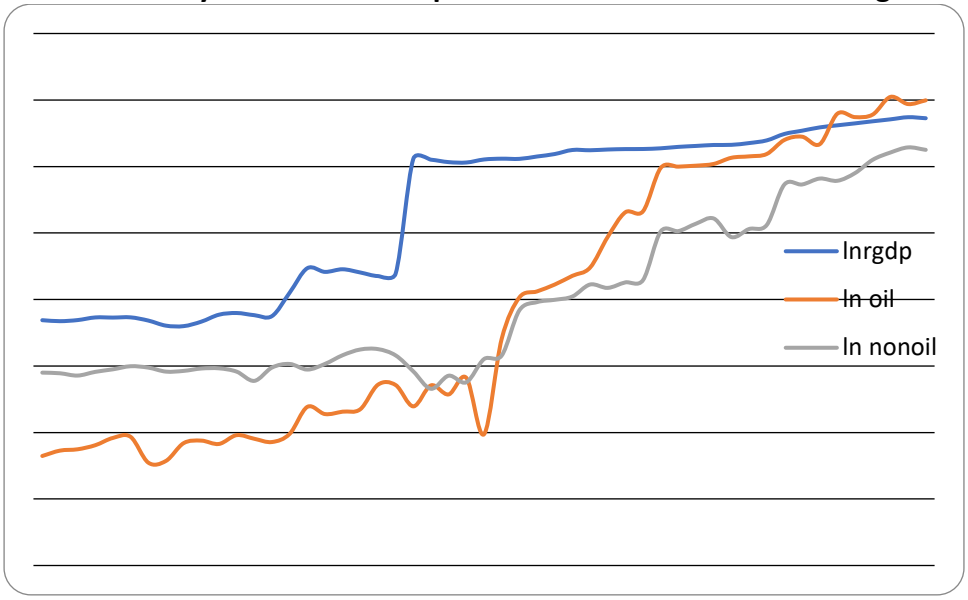
Where result shows variables are stationary at first difference, we proceed to conduct co-integration test where the error correction model is expressed as:

$\ln Y_{t-1} = \beta_0 + \beta_1 \sum \ln L_{t-1} + \beta_2 \sum \ln K_{t-1} + \beta_3 \sum \ln OX_{t-1} + \beta_4 \sum \ln NOX_{t-1} + \beta_5 \sum \ln EXC_{t-1} + \beta_6 \sum \ln OP_{t-1} + \beta_7 ECM_{t-1} + \mu_t$ ----------(3)

where lnL= log of labour, lnK= log of capital, lnOX = log of oil export, lnNOX =log of non- oil export, lnEXC= log of Exchange rate, lnOP = the index of trade openness, ECM is the error correction model and μ = the error term.

4.0 Results And Findings

4.1 Trend Analysis Of Non-Oil Exports And Economic Growth In Nigeria



Source: Central Bank of Nigeria Statistical Bulletin (2010)

Trend analysis shows that 1960-1981 periods witnessed higher performance of the non oil export even though unstable than the oil export; a sharp decline in oil performance was noticeable in 1985. However, the oil sector picked up in the 1988 period to 2008 even though unstable. Real GDP seems stable from 1983-2002 periods.

4.2 Empirical Analysis

Due to the nature of data, we began our analysis by examining the time series properties of the variables in the model. This is done using the Augmented Dickey Fuller (ADF) and Phillip Perron test. The result is summarized in table 1 below:

Table 1:
Unit Root Test

Variable	*ADF (Trend& Intercept)*	*5% CV*	*PHILLIP PERRON*	*5%*	*ORDER OF INTEGRATION*
GDP	-6.290610	-3.520787	-6.541391	-3.520787	I(1)
OPENESS	-6.272197	-3.520787	-6.518208	-3.520787	I(1)
CAPITAL	-5.121472	-3.523623	-5.489808	-3.520787	I(1)
LABOUR	-5.087191	-3.520787	-5.098198	-3.520787	I(1)
OIL	-6.927874	-3.520787	-6.930536	-3.520787	I(1)
NOIL	-6.440469	-3.520787	-6.464029	-3.520787	I(1)

Source: Authors' computation 2014 using EVIEWS 7

Table 1 reports the results of the stationarity tests at first difference for all the variables. We estimate intercept & trend term in these tests. At first difference of the logged variables, each series became stationary. This is because the ADF and Phillip Perron calculated statistics for all the variables is more negative than the ADF and Phillip Perron critical values. Thus we accept the hypothesis that the series contain a unit root at first difference or the variables are integrated of order one I(1).We therefore proceed to carrying out the co-integration test

Table 2:
Johansen Co-integration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.839147	194.3372	125.6154	0.0000
At most 1 *	0.618270	117.5920	95.75366	0.0007
At most 2 *	0.487173	77.14430	69.81889	0.0116
At most 3 *	0.384133	49.09602	47.85613	0.0380
At most 4	0.272546	28.73760	29.79707	0.0659
At most 5	0.193684	15.37301	15.49471	0.0521
At most 6 *	0.139932	6.331250	3.841466	0.0119

Trace test indicates 4 co integrating equation(s) at the 0.05 level

Source: Authors' Computation 2014 using EVIEWS 7

The Johansen Co-integration test by Johansen 1988; Johansen and Juselius1990 was used to carry out the co-integration test. The result is displayed in table 2 above. The trace test indicates four co-integrating relationships. The implication of this is that there exists a long-run relationship between economic growth proxy with GDP, trade openess, oil exports, non-oil exports, labor, and capital which could be given some Error Correction representations (Engle and Granger, 1987).

Table 3: Error Correction Model
OVER-PARAMETISED

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000842	0.001197	0.703545	0.4902
D(GDP(-1))	0.052271	0.322975	0.161843	0.8731
D(GDP(-2))	-0.211276	0.229074	-0.922305	0.3679
D(LABOUR)	0.031858	0.035695	0.892520	0.3833
D(LABOUR(-1))	-0.089532	0.041271	-2.169387	0.0429
D(LABOUR(-2))	0.051813	0.046766	1.107919	0.2817
D(OPENESS)	0.999104	0.001335	748.3965	0.0000
D(OPENESS(-1))	-0.053642	0.322280	-0.166446	0.8696
D(OPENESS(-2))	0.211325	0.228950	0.923019	0.3676
D(CAPITAL)	0.004100	0.002236	1.833085	0.0825
D(CAPITAL(-1))	0.001084	0.002022	0.536171	0.5981
D(CAPITAL(-2))	-0.000752	0.001644	-0.457588	0.6524
D(OIL)	0.001071	0.001120	0.956993	0.3506
D(OIL(-1))	-0.001405	0.001332	-1.055422	0.3045
D(OIL(-2))	-0.000181	0.001141	-0.158800	0.8755
D(NOIL)	-0.000110	0.001443	-0.076485	0.9398
D(NOIL(-1))	0.001524	0.001480	1.029735	0.3161
D(NOIL(-2))	-0.002624	0.001358	-1.932197	0.0684
D(EXCH)	-6.32E-05	3.97E-05	-1.591309	0.1280
D(EXCH(-1))	-6.05E-05	3.82E-05	-1.584977	0.1295
D(EXCH(-2))	4.95E-05	3.83E-05	1.292827	0.2116
ECM(-1)	-1.034861	0.459059	-2.254309	0.0362

R-squared	0.999978	Mean dependent var	0.134146
Adjusted R-squared	0.999953	S.D. dependent var	0.338725
S.E. of regression	0.002323	Akaike info criterion	-8.987567
Sum squared resid	0.000103	Schwarz criterion	-8.068090
Log likelihood	206.2451	Hannan-Quinn criter.	-8.652744
F-statistic	40484.95	Durbin-Watson stat	1.990526
Prob(F-statistic)	0.000000		

The over-parametized result reveals that only the current value of trade openness and one lagged value of labour are significant at 5% and therefore we proceed to the parsimonious error correction result.

Table 4:
Parsimonious Error Correction

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000661	0.001017	0.650532	0.5215
D(GDP(-2))	-0.234918	0.133175	-1.763979	0.0905
D(LABOUR)	0.030832	0.030232	1.019856	0.3180
D(LABOUR(-1))	-0.096679	0.035156	-2.750037	0.0111
D(LABOUR(-2))	0.067666	0.031469	2.150260	0.0418
D(OPENESS)	0.999176	0.001169	854.4666	0.0000
D(OPENESS(-1))	-0.001424	0.001129	-1.260822	0.2195
D(OPENESS(-2))	0.234916	0.133419	1.760738	0.0910
D(CAPITAL)	0.004733	0.001715	2.759527	0.0109
D(OIL)	0.000929	0.000893	1.040619	0.3084
D(OIL(-1))	-0.001608	0.001022	-1.573463	0.1287
D(NOIL(-1))	0.001636	0.001307	1.251139	0.2229
D(NOIL(-2))	-0.002726	0.001007	-2.706335	0.0123
D(EXCH)	-6.89E-05	2.94E-05	-2.344278	0.0277
D(EXCH(-1))	-5.74E-05	3.21E-05	-1.787020	0.0866
D(EXCH(-2))	5.18E-05	3.11E-05	1.667781	0.1084
ECM(-1)	-0.974094	0.159002	-6.126292	0.0000
R-squared	0.999977	Mean dependent var		0.134146
Adjusted R-squared	0.999962	S.D. dependent var		0.338725
S.E. of regression	0.002093	Akaike info criterion		-9.207113
Sum squared resid	0.000105	Schwarz criterion		-8.496608
Log likelihood	205.7458	Hannan-Quinn criter.		-8.948386
F-statistic	65504.69	Durbin-Watson stat		1.961181
Prob(F-statistic)	0.000000			

Source: Authors' Computation (2014)

The parsimonious result above shows that two lagged value of labour has a positive and significant relationship with economic growth conforming to a priori expectation. This means that a 1% increase in labour will increase economic growth by 3%. In the same vein, current year period of trade openness is statistically significant at 5% revealing that a 1% change in trade openness will increase economic growth by 99% in the current year.

The current year value of capital has a positive relationship with economic growth and is statistically significant at 5% meaning that a 1% increase in capital will increase economic growth by 0.47%

Two lagged value of non-oil exports on the other hand has a negative but significant relationship with economic growth, an indication that a 1% increase in non oil exports lead to 0.3% decrease in economic growth. This may be attributable to the inability of Nigeria's non oil export products to meet up with international specifications.

Exchange rate in the current period has a negative and significant relationship with economic growth at 5%, indicating that a 1% increase in exchange rate will reduce economic growth by 689% thus conforming to a priori expectation. This can be attributed to the fact that an increase in exchange rate will lead to a devaluation of domestic currency.
The coefficient of the error correction term is negative, less than one and significant while the speed of adjustment is 97% in case of any disequilibrium.

5.0 Conclusion And Recommendation

In this study, we set out to empirically investigate the impact of non-oil exports on economic growth in Nigeria using co-integration and an Error Correction Mechanism (ECM) technique with annual time series covering the period from 1980 to 2012. Some statistical tools were employed to explore the relationship between these variables. The analysis starts with examining stochastic characteristics of each time series by testing their stationarity using Augmented Dickey Fuller (ADF) and Phillips Perron tests, Co-integration test and the error correction mechanism model. From the error correction model, several interesting conclusions are drawn.
All variables were integrated of order one while long run relationship was established among variables. However, the ECM revealed interesting results:
Findings from the analysis revealed that non-oil export is statistically significant but negative; the result does not conform to a priori expectation, an indication that non oil exports has an insignificant effect on economic growth. We infer that the non oil export may be deficient in meeting international standards and the dominance of non oil exports by primary products do not command higher price than finished goods.
Openness a proxy for technological progress was significant and positive there by, conforming to a priori expectation.
Lagged value of labour was significant but negative hence does not conform to a priori expectation however, two lagged value of labour was significant and positive, there by, conforming to a priori expectation
Oil export was not significant therefore; we infer that the export of crude oil does not have any impact on economic growth in Nigeria. Oil export at its crude form does not command more price than its finished product.
From the foregoing, we recommend that there is a necessity for both the non oil and oil exports to be repositioned via ensuring the economy exports finished products as opposed to export of crude oil and raw products.
This necessitates a concerted effort from the government at all levels to be dedicated to the challenges of the non oil exports of the economy.
An area for further research would be to discover empirically what really drives growth in Nigeria.

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