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Export-led growth hypothesis: New evidence from Nigeria

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Abstract

This study investigated the export-led growth hypothesis in Nigeria. The study examined the long-run and short-run equilibrium relationships between exports; imports and economic growth over the study period. The study used Johansen co-integration technique, granger causality, and vector error correction mechanism in the analysis of data. The variables used were found to have the same order of integration and the empirical evidence strongly suggested the existence of long-run co-integration relationship among import, export and economic growth in Nigeria. The study also found causality running from export to import and from economic growth to import. However, there was no empirical evidence in support of the export-led growth hypothesis. The study recommended that Nigerian export base should be expanded by given more attention to non-oil sector of the economy to augment the oil sector.

Keywords: export, economic growth, hypothesis, granger causality, co-integration, Nigeria

1. Introduction

Export-led growth is an economic theory that has been practiced by most developing countries in an effort to revamp their economic growth and boost standards of living of their citizens. The export-led growth hypothesis (ELGH) implies that export growth is one of the crucial determining factors of economic growth. The rationale behind this assertion is that overall growth of countries can be enhanced not only by increasing the volumes of labour and capital in the economy, but also by increasing exports. According to its promoters, export can perform as an instrument of growth. It suggests that focusing on export will improve economic growth and development of a country. Due to the significant role that international trade plays in the process of economic growth through the exportation of goods and services across borders, it is paramount to consider the important contribution of exports to the economic growth. A country exports goods or services for which it has a competitive advantage, so as to speed up its industrialisation process. Export-led growth entails opening up of domestic markets to foreign players in exchange for market access in other countries. There have been general references to the connection that subsist between exports and economic growth in the economic growth literature over the years. It has been an imperative argument as to whether nations should promote their export sector to achieve economic growth leading to a series of empirical studies on the export-led growth hypothesis.

Nigeria can be regarded as an important player in the international market, having endowed with natural resources, especially crude oil for which it has a competitive advantage over many other countries. Prior to the advent of petroleum in Nigeria, agricultural production was the most important export sector in the country. Nigeria is the most populated country in Africa with the population of over 150, 000, 000. Nigeria is also the largest producer of crude oil in Africa and a member of the Organisation of Petroleum Exporting Countries (OPEC). The economy of Nigeria heavily relies upon the oil sector, accounting for over 90% of the total export earnings and about 40 percent of the government revenues.

There have been numerous studies on the export-led growth hypothesis including studies on Nigeria where in most cases; the hypothesis has been valid. However, most of the studies employed annual data in their analyses and particularly on Nigeria; there is no research on this topic to the knowledge of the researcher that investigated the validity of export-led growth hypothesis using quarterly data from 1986 to 2013. This study covers a period of 27 years and consists of 112 observations which can be considered substantially large enough sample size for analysing the long-run relationship between the variables.

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This study intends to test the export-led growth hypothesis by analysing the causality between exports and economic growth in Nigeria, as well as the relationship between import, export and economic growth.

2. Literature review

Many studies succeeded in finding different and divergent kind of results depending upon the period under investigation and the countries under consideration. Some studies find unidirectional causality from export to economic growth, from output growth to export growth while others find bidirectional causality running from export to economic growth and vice versa. The idea of competitive advantage considers the direction of the production strength and cost effectiveness of a country. A country specializes in the production of commodities which it can produce with less cost and for which it has the available and required inputs. The country will now have an advantage to export those commodities to other countries at lower costs possible. The concept of export-led growth hypothesis stems from the argument that countries can improve, and accelerate their economic growth by exporting goods either manufactured or raw products to other countries.

Export-led growth hypothesis in general reveals the connection between export growth and output growth. It is fundamentally important to recall that, the promoters of this hypothesis believe that promoting export growth through such mechanisms and policies like export subsidy incentives and, or devaluing exchange rate will enhance and substantially boost the economic growth of a country. The essence of the neo-classical reasons fundamental to the export-led growth hypothesis (ELGH) is the fact that competition at international markets has an essential role to play in promoting economies of scale and accelerating efficiency. Resources have to be in sectors where the country has a comparative advantage which is a cardinal point in the context of international trade. The spillover effect resulting from the international competition may lead to positive externalities that increase economic growth (Ullah *et al.*, 2009) ^[44]. Dritsakis (2006) ^[6] investigated the causal relationship between export growth and economic growth in the EU, USA and Japan using Granger causality test. He discovered that export growth played a significant role in economic development process and that exports have impact on the development of countries in EU and USA.

2.1 Export-led growth

It is sometimes true for some countries at a particular time that it is the growth which leads to export and not the other way round. This assertion can be as a result of so many factors. And the fact that, when a country's local products are efficiently being utilized and given the existing abundant labour force and technology, the economic activities will tend to expand. Consequently, the excess of the produce will then be exported to other countries. Serge (2010) ^[35] re-examined the export-led growth hypothesis in Cote d'Ivoire using annual time series data for the period of 1980 to 2007 by employing bound tests and VAR granger causality test, and found evidence of bidirectional causality running from export to economic growth and vice versa. Srivastava and Kapoor (2007) ^[40] reinvestigated the export-led growth and growth -led export hypothesis in India using time series data from 1951 to 2004 by examining the relationship between export and economic growth. Granger causality

was used to establish the direction of causality where the export-led growth hypothesis was being rejected, but there was evidence in support of the growth led export in India for the period of the study.

A study by Njikam (2003) ^[24] examined the validity of the export-led growth hypothesis in 21 African countries where he tested the direction of causality between export and economic growth. Notably, the author emphasized on the causal relationship between agricultural and manufactured products exports using different econometric methods and found support for the growth led export in 4 of the countries. However, there was also empirical evidence in support of the export-led growth for agricultural commodities in 7 of the countries and for manufactured products in 3 of the countries. Ullah *et al.* (2009) ^[44] equally investigated the existence of export-led growth in Pakistan using data from 1970 to 2008 by applying co-integration technique as well as causality test. The results of the analysis indicated a one-way causality from economic growth to exports for the period of their study.

2.2 Relationship between import, export and economic growth

A study by Serletis (1992) ^[36] is one of the few studies that considered the significance of import in the process of economic growth where he included the lagged values of import in his analysis of the time series for Canada. The study examined the causal relationship between import and economic growth. However, there was no evidence causality either unidirectional or bidirectional between the two variables. Islam and Shahbaz (2012) ^[15] studied the long-term relationship between import and economic growth using error correction mechanism, and granger causality to test the direction of the relationship between imports and output growth for a sample of 40 countries of different income categories. The study found long -run bidirectional causality running from high-income countries with the exception of Japan. Hence, the results confirmed that imports cause economic growth and vice versa. Ramos (2001) ^[32] investigated the relationship between export, import and economic growth in Portugal using granger causality and co-integration approach for the period of 1865 to 1998. Although the results of the study did not show any unidirectional causality between the three economic variables considered, there was a feedback effect between the growth of export and output and that of import and output.

2.3 Oil-export and the Nigerian economy

The crude oil discovery in Nigeria had been and up till now is playing a vital role in the process of economic growth especially through the exportation of the petroleum products for foreign exchange earnings generation. Substantial amount of revenue from the petroleum sector is being generated to the government through the foreign exchange earnings. According to estimates, about 98 percent of the Nigerian export comes from oil and gas sectors of the economy and this formed about 83 percent of the total government revenue in the year 2000. This huge percentage of the revenue that goes to the government led to the substantial balance of payments surplus. The analysis of this revenue revealed that 80% of the total country's revenue goes to the Nigerian government, 16 percent ends up on taking care of the administration while only 4 percent goes

to the investment sector which investors can access for investment purposes. It is very pathetic that 99 percent of the population benefits only an insignificant percentage of the oil revenue with only 1 percent of the population benefitting the most because of corruption and self-centeredness. The Nigerian oil reserve was estimated to have been around 35 billion barrels; natural gas reserve was around 1000 trillion ft, and the crude oil production was about 2.2 million barrels per day (Odularu, 2008). Ogbokor (2001) examined the macroeconomic impact of oil export on the economy of Nigeria using OLS estimation method and observed that export is undeniably an essential source of growth for the economy of Nigeria. The study reached the conclusion that the relevant authority should give export-oriented strategies more practical support.

2.4 Non-oil export and the Nigerian economy

The non-oil export sector which comprises of the agriculture and manufacturing sectors of the economy of Nigeria can contribute immensely and of course, more to the export earnings of Nigeria compared to the oil sector of the economy. However, proper management, attention and above all implementation of various existing programmes and policies geared towards enhancing the non-oil exports by the government are required. Nigeria is known to be popular in the production and export of quality and most demanding produce such as Groundnut, Cocoa, Cotton, Palm produce, Gum Arabic, Ginger, Mangoes, Sesame seed, Rubber Pineapples, Coffee, Bitter Nut, Cola nut, etc. The export markets for most of these commodities are identified to be in the Europe, USA, Gulf States, China, Japan, Singapore, and many countries in the African region. Furthermore, there are also manufactured exports consisting mainly of textiles, beer and beverages, soap and detergents, chemical products, plastic and non-metallic products as well as processed skin products among others. An investigation into the contribution of the agricultural sector to the growth of the Nigerian economy by Oji-Okoro (2011) ^[25] indicated that FDI in the area of agriculture contributes the most to economic growth of Nigeria (Okunnu and Adeyemi, 2013) ^[26]. Similarly, Ogunkola *et al.*, (2008) reported that around 1960s, Nigeria's export trade was mainly dominated by non-oil commodities like cotton, groundnuts, palm kernel, palm oil, cocoa, rubber, coffee, copra, beniseed, tin ore, columbite, hides, skin and cattle among others. These products accounted for over 66 percent of the Nigerian total exports. Cocoa export in particular accounted for about 15% of the total exports in the year 1970. Nigeria was ranked the largest producer and exporter of palm kernel as well as palm oil in some years back, the second largest cocoa exporter and the third largest exporter of groundnut. Ekpo and Egwaikhide (1994) ^[11], document that there is a long run equilibrium relationship between export of agricultural commodities and Nigerian economic growth. Nigeria's agricultural export earnings contributed substantially to the growth of the Gross Domestic Product. Fajana (1979) ^[13], observed a strong positive relationship between economic growth and export in Nigeria whereby the impact of export was observed to be greater on the economic performance of the country. The study revealed that the export, including non-oil export constitutes a greater source of growth for the economy of Nigeria. Alimi and Musa (2012) ^[1] examined the causal relationship between exports and economic

growth in Nigeria from 1970 to 2009 using Granger Causality econometric technique and found the presence of bidirectional causality running from export to economic growth and from economic growth to export. This finding cannot be unconnected to the fact that developing and promoting the local industries through the import substitution strategies, and export promotion industrialisation has been instrumental to the growth of the Nigerian economy. Furthermore, Raheem and Busari (2013) ^[33] when examining the relationship between economic growth and non-oil export tested the export-led growth hypothesis using time series data in Nigeria from 1970 to 2010. Simultaneous equation model and single equation model have been used all together, but the results of the SEM did not support the Export-led growth hypothesis while the single equation model supported the hypothesis. The considerable economic growth of about 6.0% in 2006 and 6.5% in 2007 recorded by the Nigerian economy have been arguably attributed to the fact that during these periods, the performance of non-oil export sector of the economy also significantly improved.

3. Methodology

This study tests the "Export-led Growth Hypothesis" in the context of Nigeria. The empirical data and analysis in this study cover 27-year period using quarterly time series data (1986:Q1 - 2013:Q4) which should be adequate to test the long-run relationship between the independent and dependent variables. The study uses data on the Gross Domestic Product (GDP), Export and Import. The following functional relationship is being established in order to explore the export-led growth hypothesis.

$$RGDP_t = f(EXP_t, IMP_t) \quad (1)$$

Real income, (RGDP) is a function of exports (EXP) and imports (IMP). This relationship in equation (1) can be expressed in logarithm form as most macroeconomic variables exhibit exponential growth. The general econometric model applied takes the following form:

$$LRGDP_t = \beta_0 + \beta_1 LEXP_t + \beta_2 LIMP_t + \varepsilon_t \quad (2)$$

Where $LRGDP_t$ is the natural log of Real Gross Domestic Product at period t, $LEXP_t$ is the natural log of exports at period t, $LIMP_t$ is the natural log of imports; and ε is the error disturbance term. The expected sign of coefficients (β_1 and β_2) are positive in equation (2) suggesting that the export is expected to have a positive impact on economic growth leading to the existence of export-led growth.

3.1 Unit root test

There are many econometric techniques that can be used to make a series stationary. This study employed the most commonly used unit root test which are the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests. Augmented DickeyFuller (ADF) test is being applied when there is autocorrelation in the error term and it is performed by adding the lagged values of the dependent variable. The Augmented Dickey-Fuller (ADF) test has been reported to have a good size. The Philip-Perron (PP) test, on the other hand, is used to control for the higher -order serial correlation. It uses non-parametric statistical procedures and excludes the practice of adding lagged difference terms as is

the case with the ADF test.

3.2 Johansen co-integration tests

The study employs Johansen (1991, 1995) co-integration methodology mainly because the Johansen co-integration method is more robust and has more benefits over the Engle and Granger (1987) [12] method. Johansen technique operates by testing the restrictions imposed via the co-integration upon the unrestricted Vector Autoregressive (VAR) involving the series. The co-integration test based on the co-integration approach in a bivariate framework using matrix notation is being represented as follows:

$$Y_t = |X_t, M_t|, Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_k Y_{t-k} + u_t \quad (4)$$

The vector - error correction model takes the following form:

$$\Delta Y_t = \Gamma_1 \Delta Y_{t-1} + \Gamma_2 \Delta Y_{t-2} + \dots + \Gamma_{k-1} \Delta Y_{t-k} + \Gamma_k \Delta Y_t - \Pi Y_{t-1} + u_t \quad (5)$$

Where $\Gamma_i (1 - A_1 - A_2 - \dots - A_k)$, for $i = 1, 2, \dots, k-1$; and $\Pi = (1 - A_1 - A_2 - A_k) \dots$ (6)

The matrix Π is a 2x2 since there are two variables in $Y_t = |X_t, M_t|$, and contains information about the long-run relationships among the variables. If we assume $K = 2$, we can have the following expression in matrix form:

$$\begin{pmatrix} \Delta X_t \\ \Delta M_t \end{pmatrix} = \Gamma_1 \begin{pmatrix} \Delta X_{t-1} \\ \Delta M_{t-1} \end{pmatrix} + \Pi \begin{pmatrix} \Delta X_{t-1} \\ \Delta M_{t-1} \end{pmatrix} + e_t = \begin{pmatrix} \Delta X_{t-1} \\ \Delta M_{t-1} \end{pmatrix} = \Gamma_1 \begin{pmatrix} \Delta X_{t-1} \\ \Delta M_{t-1} \end{pmatrix} + \begin{pmatrix} \gamma_{11} \gamma_{12} \\ \gamma_{21} \gamma_{22} \end{pmatrix} \begin{pmatrix} \delta_{11} \delta_{21} \\ \delta_{12} \delta_{22} \end{pmatrix} \begin{pmatrix} X_{t-1} \\ M_{t-1} \end{pmatrix} + e_t \dots \quad (7)$$

The error correction model part of

$$\Delta X_t = Y_{t-1} = \gamma_{11} (\delta_{11} X_{t-1} + \delta_{21} M_{t-1}) + \gamma_{12} (\delta_{12} X_{t-1} + \delta_{22} M_{t-1})$$

Which depicts two co-integrating vectors with γ_{11} and γ_{12} representing the speed of adjustment to equilibrium.

The Johansen co-integration approach makes use of two test statistics which are the Trace test (λ_{trace}) and Maximum Eigenvalue (λ_{max}). Considering the hypothesis $H_1: r_0 < r \leq k$, we can test this hypothesis using trace test

$$\lambda_{trace}(r_0) = -T \sum_{j=r_0+1}^k \log(1 - \tilde{\lambda}_j)$$

The name Trace test is so-called because it confirms whether the smallest $k - r_0$ eigenvalues are indeed significantly different from zero. Furthermore, hypothesis $H_0: r \leq r_0$, can equally be tested against a restrictive alternative hypothesis $H_1: r = r_0 + 1$ by using the maximum Eigenvalue test as given by the following formula:

$$\lambda_{max}(r_0, r_0 + 1) = -T \log(1 - \tilde{\lambda}_j)$$

The maximum Eigenvalue test is being given based upon the estimated alternative hypothesis $H_1: r = r_0 + 1$ largest Eigenvalue.

3.3 Granger causality tests

Granger causality tests the causal relationship between two or more variables. For simplicity, the variable Export is represented by X while Real GDP, which is a proxy for economic growth, is represented by Y. In the sense of Granger Causality, a variable X (export) is said to Granger cause Y (RGDP) if variable Y can better be explained or predicted by using both the lagged values of X and lagged values of Y, than just using the lagged values of Y. We can employ bivariate VAR to test for Granger Causality to see if there is causality from export to economic growth in the context of Nigeria for the period of the study. Consider the following bivariate VAR for testing the Granger causality.

$$\begin{aligned} Y_t &= \alpha + \sum_{i=1}^n \beta_i Y_{t-i} + \sum_{j=1}^m \gamma_j X_{t-j} + u_t \\ X_t &= \varphi + \sum_{i=1}^n \delta_i Y_{t-i} + \sum_{j=1}^m \rho_j X_{t-j} + e_t \end{aligned}$$

Where Y is an output growth in the form real gross domestic and X is exports growth; u and e are serially uncorrelated white noise residuals; n and m are lag lengths.

The above specification involves explaining both Y and X by the lagged values of Y and X. For simplicity, assume a bivariate VAR (2) with variables and X are used, and its coefficients are all represented with the use of β and γ . The model becomes:

$$\begin{aligned} y_t &= \beta_{10} + \beta_{11} y_{1,t-1} + \beta_{12} y_{2,t-2} + \gamma_{11} x_{1,t-1} + \gamma_{12} x_{2,t-2} + u_{1t} \\ x_t &= \beta_{20} + \beta_{21} y_{1,t-1} + \beta_{22} y_{2,t-2} + \gamma_{21} x_{1,t-1} + \gamma_{22} x_{2,t-2} + u_{2t} \end{aligned}$$

The null and the alternative hypotheses are being set as follows:

$$\begin{aligned} H_0: & \sum_{i=1}^n \gamma_i \\ H_1: & \sum_{i=1}^n \gamma_i \end{aligned}$$

If the coefficients on γ_{11} and γ_{12} are all non-zero, then the variable x granger causes y and that there is a unidirectional causality running from x to y. Otherwise x does not granger cause y. On the other hand, if the coefficients β_{21} and β_{22} are non-zero, it implies that the variable y granger causes x otherwise y does not granger cause x. If all of these coefficients appear to be non-zero, then there is a bidirectional causality running from x to y and from y to x, and this is called a feedback effect. However, if all of the coefficients appear to be zero, then it can be concluded that there is no causality running from either side.

3.4 Data

In this study, quarterly data on RGDP (Y), exports (X) and

imports (M) for Nigeria for the period of 27 years from 1986Q1 to 2013Q4 are used thereby making 112 observations that can be considered adequate sample for the analysis. Data for the analysis in this study were being collected from the Central Bank of Nigeria from 1986Q1 to 2013Q4. The real gross domestic product represents the output growth which is the measure of economic growth in the economy while exports consist of both oil-exports, as well as non-oil export growth over the sample period. The variables, real gross domestic product, export and import were being measured in millions of naira. However, the variables undergone logarithm transformation because real gross domestic product, export and import are expected to

constant percentage increases.

4. Results and Discussion

4.1 Graphical presentation of data

The first step in time series analysis in particular and econometrics in general is to identify the features in the data being modeled visually because this will influence the approach to modeling. The upward trending of these series means that their means increase over the sample period which is consistent with most of the macroeconomic variables as they grow through time and so are expected to have upward trends.

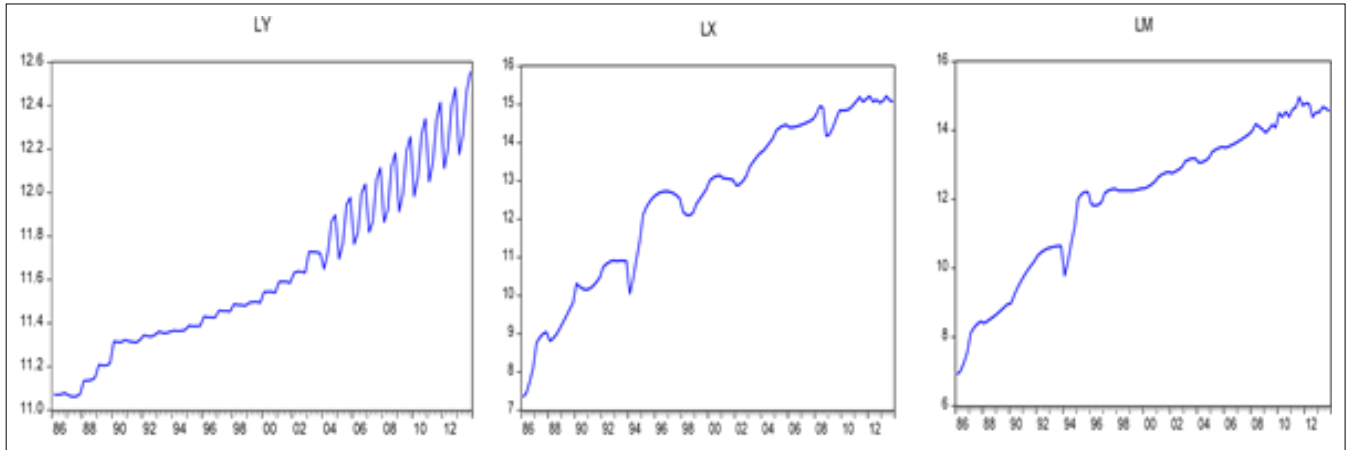


Fig 1: Log of RGDP, export and import in Nigeria from 1986Q1-2013Q4

Figure 1 above is being given for the log of real gross domestic product represented by LY, log of real export represented by LX, and log of import represented by LM. Based on the behaviour. of the above graph it is obvious that these variables are non-stationary. However, there are outliers in imports in 1994Q1 and 1994Q2 for exports. The graph of the log of income exhibits some seasonality from 2004Q1 up to 2013Q4. Seasonality is a feature commonly associated with the quarterly time series.

properties of the variables under investigation before testing for causal relations between import growth, export growth and economic. Hence, to formally confirm that the series under investigation are I (1), unit root test is applied. Augmented Dickey-Fuller and Phillips-Perron tests have been used for the unit root test in order to determine stationarity of the series. Also to determine the order of integration of the variables and to avoid getting spurious regression results. The results of the unit root test are being reported in table 1 below.

4.2 Unit root test

The empirical analysis begins by analysing the stationary

Table 1: Unit root test result

Variables	Model 1 (Constant)		Model 2 (Trend & constant)		Model 3 (None)	
	ADF		ADF		ADF	
	Level	Difference	Level	Difference	Level	Difference
LY	1.449	-4.028*	-0.161	-4.314*	3.807	-1.123
LX	-2.420	-7.526*	-3.327***	-7.762*	2.045	-6.934*
LM	-2.687***	-7.639*	-1.584	-8.137*	3.396	-7.858*
	PPT		PPT		PPT	
	Level	Difference	Level	Difference	Level	Difference
LY	0.696	-17.704*	-6.838*	-17.183*	3.494	-12.728*
LX	-2.794***	-7.147*	-2.871	-7.485*	2.576	-6.890*
LM	-4.541*	-8.563*	-2.448	-9.810*	3.048	-7.929*

*, ** and *** denote rejection of the unit root null with the significance level at 1, 5 and 10% respectively.

Table 1 above contains the results of the unit root test. The results show that all the variables are integrated of order one I (1) because ADF test outputs indicate that the levels of LY, LX and LM are non-stationary at 5% level of significance, whereas the first differences of these variables

are suggested as I (1) by the ADF. PP test also indicates non-stationarity of first differences of LY and LX at their levels at 5% level of significance and stationarity of first differences of LY and LX. However, PP test suggests stationarity of LM at levels, which is contradictory to ADF

test result. Despite this contradiction, the analysis proceeds considering all the variables as I (1) on the ground that the stationarity characteristics of variables would be reflected in co-integration analysis. Moreover, macroeconomic variables such as RGDP are expected to be I (1) and looking at the low power of PP test, all of the variables under investigation are treated as I (1) based on the Augmented Dickey Fuller test.

4.3 Co-integration test

The use of co-integration test is employed to determine the existence of long run relationship between the variables. The co-integration test is being conducted on the level series

which are non-stationary. The co-integration test results are being reported in table 2 below. Co-integration test result for model 1 revealed that the hypothesis of no co-integration was rejected by both the Max-Eigenvalue and Trace tests. The trace test indicates one (1) co-integrating equation at 5% level of significance, which also agreed with the Max-Eigenvalue result indicating one (1) co-integrating equation at 5% level of significance. This result suggests the existence of long-run equilibrium relationship among economic growth (RGDP), exports and imports in Nigeria for the period of the study. The variables appear to move together in the long run.

Table 2: Co-integration test results

	Null	Alternative	Max-Eigenvalue	5% CV	Prob.	Trace test	5% CV	Prob.
1	Income-Exports-Imports (VAR lag 5)							
	H0: r = 0	H1: r = 1	25.181	24.252	0.038	39.197	35.011	0.017
	H0: r ≤ 1	H1: r = 2	13.545	17.148	0.155	14.016	18.398	0.184
	H0: r ≤ 2	H1: r = 3	0.471	3.841	0.493	0.471	3.841	0.493
2	Income-Exports (VAR lag 5)							
	H0: r = 0	H1: r = 1	11.683	17.148	0.261	11.734	18.398	0.329
	H0: r ≤ 1	H1: r = 2	0.051	3.841	0.821	0.051	3.841	0.821
3	Income-Imports (VAR lag 5)							
	H0: r = 0	H1: r = 1	15.468	17.148	0.086	16.033	18.398	0.104
	H0: r ≤ 1	H1: r = 2	0.564	3.841	0.453	0.564	3.841	0.453
4	Export-Imports (VAR lag 5)							
	H0: r = 0	H1: r = 1	17.604	17.148	0.043	20.471	18.398	0.025
	H0: r ≤ 1	H1: r = 2	2.868	3.841	0.090	2.868	3.841	0.090

In an attempt to explore the bivariate relationships between the variables, Johansen co-integration test has also been applied to test for bivariate relations between economic and exports, economic growth and imports and between exports and imports as shown in table 2. In Model 2 and 3, no evidence of co-integration have been found since the hypothesis of no co-integration was not rejected at the conventional 5% level, and both the trace test, as well as the max-Eigenvalue test, indicate no co-integration at 5% level of significance. Nevertheless, one Co-integration equation in model 4 exists which implies that export and import both have a long run equilibrium relationship.

The results of the Johansen co-integration test indicated that exports and imports have long run influence on the economic growth of Nigeria for the period of the study. This means that developing and expanding the export base of the Nigerian economy can sustain the economy in the long run. Importation of commodities such as capital goods for the expansion of the export sector would also have a substantially positive impact on economic growth.

4.4 Vector error correction model

The existence of co-integration between the three variables indicates a long-term relationship among them. VECM is being applied in order to evaluate the short-run properties of the co-integrated variables. The negative and significant coefficient of the error correction mechanism obtained suggest that short-term fluctuations between the export,

import and economic growth give rise to a stable long run equilibrium relationship between them.

The result of vector error correction model is being given in table 3 below. The result indicates that neither exports nor imports cause economic growth in the short run as given by insignificant coefficients of ΔLX and ΔLM with all the coefficients individually insignificant (t-ratios < 2.00). Also, the coefficients restriction tests using Wald test that the lags of each variable are jointly equal to zero was not rejected at 5% level of significance. This result indicates that there is no short run causality either from export or import to economic growth in Nigeria. The result, therefore, suggest that there is no support for the export-led growth hypothesis in this country for the period under consideration. Nevertheless, in the long run, there is some combination of the three variables that moves together. Hence, there is long run equilibrium relationship between economic growth, export and import as the error correction term is negative as expected and statistically significant. The error correction term (-0.008) describes the speed of adjustment back to equilibrium, and it measures the proportion of the equilibrium in the last period that is being corrected. The ECT (-1) estimated coefficient is -0.008 which indicates that about 0.8% of this disequilibrium is corrected between 1 quarter. The macroeconomic implication of this result is that export and import in Nigeria only influence economic growth in the long run but not immediately.

Table 3: Vector error correction result

Lag	Differenced variables		
	ΔLY	ΔLX	ΔLM
1	-0.399 (0.100)	-0.007 (0.019)	0.020 (0.023)
2	-0.721 (0.103)	-0.002 (0.019)	-0.009 (0.020)
3	-0.724 (0.107)	0.012 (0.019)	-0.009 (0.021)
4	0.295 (0.109)	-0.018 (0.019)	0.019 (0.021)
5	-0.308 (0.108)	-0.001 (0.019)	0.009 (0.022)
Intercept	0.018 (0.008)		
ECT (-1)	-0.008 (0.003)		
R^2	0.943		
\bar{R}^2	0.932		
SC	-3.814		
DW	1.931		

Standard errors are being given in parenthesis.

4.5 Granger causality test

It is crucial to establish the direction of causality between the three variables namely, economic growth, exports and imports since the presence of long run relationship does not indicate causality. VAR Granger causality test has been

performed to determine whether there is causality between economic growth, exports and imports for quarterly data during the period of the study in Nigeria. The results of the VAR Granger causality test are being reported in table 4 below.

Table 4: Granger causality result

VAR granger causality/block exogeneity wal			Tests
Sample: 1986Q1 2013Q4			
Included observations: 107			
Dependent variable: DLY			
Excluded	Chi-sq	Df	Prob.
DLX	3.482232	5	0.4806
DLM	5.212284	5	0.2662
All	5.564604	10	0.6959
Dependent variable: DLX			
Excluded	Chi-sq	Df	Prob.
DLY	3.651437	5	0.4552
DLM	0.955604	5	0.9165
All	4.231226	10	0.8357
Dependent variable: DLM			
Excluded	Chi-sq	df	Prob.
DLY	9.861636	5	0.0428
DLX	7.985820	5	0.0921
All	17.87305	10	0.0222

In table 4 above, DLY, DLX and DLM stand for the first difference of log of income or real gross domestic product, first difference of log of exports and first difference of log of imports respectively. The results of VAR Granger causality test revealed that, the hypotheses that export does not Granger Cause economic growth and vice versa are not being rejected. Import does not Granger Cause economic growth; import does not Granger Cause export and vice versa have not all been rejected at either 1%, 5% or 10% because the p-values are greater than 0.01, 0.05, and 0.10 respectively. However, the hypothesis that economic growth does not Granger cause import is rejected at 5% level of significance while the null hypothesis that exports does not Granger cause imports was also rejected at the 10% with the p-values 0.04 and 0.09 respectively. The joint hypothesis that both economic growth and export does not Granger because import was rejected at the 5% level with p-value 0.02. These results show that export does not Granger cause growth and vice versa in Nigeria. This indicates that there is no bivariate causality running from exports to economic growth and from economic growth to exports.

The results of this analysis, therefore, do not provide empirical evidence in support of export-led growth

hypothesis in Nigeria for the period under investigation using quarterly data. It indicates that as the economy grows, imports expand since import is caused by economic growth. It is also clear that export lead to import which explains that as Nigeria exports commodities especially oil, most of the proceeds goes to importation of finished goods including, but not limited to technological equipment. The result is found to be consistent with the findings by Udah (2012), Hadi (2006), Srivastava and Kapool (2007) [40], Shihab *et al.* (2014), Ullah *et al.* (2009) [44] and Omotor (2008) [31] where the export-led growth hypothesis was rejected in each case. However, the result is inconsistency with many studies including studies by Kaberuka *et al.* (2014), Maneschiold (2008) [21], Silverstovs *et al.* (2005), Mohan and Nandwa (2007) [23], Medina-Smith (2001) [22], Bahmani-Oskooee and Alse (1993) [5], Ogbokor (2005) [29], Kwamboka (2003) [20] and Omisakin (2009) [30]. Udah (2012) found significant causality running from import to export with no evidence in support of the export led growth hypothesis in Nigeria.

5. Conclusion

This study examined evidence of export-led growth hypothesis in Nigeria using quarterly time series from

1986Q1 to 2013Q4. The variables used in this study are economic growth as a proxy for real gross domestic product (RGDP), real exports and imports. The study employed the use of Johansen co-integration technique to test for the long run relationship between economic growth, export growth and imports. We use error correction mechanism in order to explore both the long-run and short-run causality between the variables, whereas granger causality test was used to establish the direction of causality between economic growth, exports and imports. The impact of shocks has also been explored using impulse response function and variance decomposition. The result indicates the existence of long run equilibrium relationship between economic growth, exports and imports. The result shows that the variables examined are co-integrated and hence share a common linear trend. In the framework of error correction mechanism, there is a long-run relationship between the variables. However, short-run causality from both exports and imports on economic growth was not found. The evidence shows that exports and imports do explain long term but not short term changes in economic growth in Nigeria.

Granger causality test result indicates no support for the export-led growth hypothesis. However, the result shows that there is unidirectional causality running from economic growth to imports and from exports to imports (at 10% level of significance) in Nigeria for the period of the study. This study indicates that in the process of economic development, Nigeria could be said to rely heavily upon imported inputs including capital and non-capital equipment. Import plays an essential role in the process of development through diverse ways. Raw materials imported can augment the value added of products and the existing technology, enhance production capacity and improve productivity, generate jobs in other sectors particularly the retail sector which subsequently impact positively on the economy of Nigeria. However, importing finished products extremely can have a great negative impact on the economy since this action may result in the displacement of local output, displacement of local workers and create unemployment in the country, and these are detrimental to the economy.

6. Policy recommendations

Having analysed the Nigerian quarterly data, the findings of the study revealed that exports, imports and economic growth have long-run relationship. The following policy recommendations are hereby suggested based on the findings of this research. There should be a proper planning towards diversification of other productive non-oil sectors of the Nigerian economy. The reason is to boost the export base of the country as well as augmenting the oil sector of the Nigerian economy. Policies towards import substitution and export promotion should be given adequate attention, and proper utilisation of oil revenue proceeds should be encouraged. Part of these proceeds should be directed towards developing local infrastructural facilities, providing incentives to local industries, entrepreneurial development and adequate security by providing enabling environment for business entrepreneurs. Policy makers should be mindful of policies that favour foreign direct investment flow into the country, widening the export base of the country, and restrict the importation of commodities that could be produced locally.

7. References

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