

ECONOMETRIC ANALYSIS OF EXPORTS AND ECONOMIC GROWTH IN NIGERIA

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Abstract

There is no consensus in the empirical literature on the causal links between exports and economic growth. This paper therefore examines the applicability of the Export-Led Growth hypothesis for Nigeria using annual secondary time series data from 1970-2010. The estimation results obtained from the cointegration test and Granger Causality test within the framework of a VAR model did not support the Export-Led Growth hypothesis for Nigeria. The paper concludes that government must diversify the product base of the economy, promote non-oil exports, and build up an efficient service infrastructure to drive private domestic and foreign investment.

Keywords: Export, Economic Growth, Causality, Nigeria.

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1.0 Introduction

The causality from exports to growth and the causality from growth to exports are referred to in the literature as export-led growth strategy and growth driven export strategy respectively. The achievement of economic growth is an important macroeconomic objective in all countries whether developed or developing. How a country achieves economic growth is an issue that has attracted considerable debate among policy makers, scholars and researchers.

This debate recognizes different strategies for achieving economic growth. One of these strategies is the export-led growth (ELG) hypothesis which states that exports is a major driver of economic growth, as exports provide the needed foreign exchange earnings for easing the balance of payment pressure, and creating job opportunities. The objective of an ELG strategy is to create a mechanism of export incentives driven by modern technology to assist producers to access and compete in the world market. Exports have the potentials to, boost intra-industry trade, integrate the domestic economy into the global economy, and insulate the domestic economy from the impact of external shocks. The successful economic transformation of the Asian and Latin American countries which were export-led validate the important role that exports play in economic growth and development process (About-Stait, 2005).

Numerous studies have examined relevance of the ELG hypothesis and empirical findings are mixed. Silverstovs and Herzer (2005) posit that growth is export led. Their paper also reveals the different impact of manufactured and primary exports on economic growth. On the other hand Arthar et al (2012) findings confirm uni-directional causality running from economic growth to exports. Some studies found evidence of bi-directional causality between export and growth. Thus the literature reveals mixed findings on the direction of causality between exports and growth.

Nigeria in the 1970s adopted the import substitution strategy in her quest to achieve economic growth and development, but the strategy failed to deliver due to a number of factors which include lack of local technical capacity, lack of local manpower to manage the industries, and poorly drafted technical agreement. The export-led economic transformation of the four Asian

Tiger economies (South Korea, Hong Kong, Taiwan and Singapore) and the Latino-American countries in the last three decades made a number of developing countries including Nigeria to embrace an export driven developmental strategy, particularly as Nigeria shares similar socio economic and demographic characteristics with these Asian countries. In Nigeria this led to the establishment of the Nigeria Export Promotion Council by Act No 41 of 1988, and the putting in place of various export incentive schemes to drive non-oil exports in order to diversify the productive base of the economy, and reduce reliance on oil earnings that exposed the Nigerian economy to oil price shocks in the international market. Recent studies that have investigated the causal links between exports and economic growth in Nigeria include; Omisaki (2009), Chimobi (2010), and Alimi (2012), and their findings are mixed.

Within the context of the Nigerian economy this paper explores an important empirical issue by estimating a multivariate VAR model using the Cointegration and Granger causality tests to find the nature of the relationship between exports and economic growth. The goal is to find out if there is the existence of a long-run relationship between GDP, exports and imports, and also determine the direction of causality between exports and economic growth. Evidence on weak exogeneity, which is a necessary (but not sufficient) condition for strong exogeneity is usually provided by Granger causality tests.

The following considerations motivated the study on Nigeria. First, some recent empirical studies reveal mixed results in the relationship between exports and economic growth in Nigeria (Omisakin 2009; Chimobi 2010; Alimi 2012). Second, the huge oil earnings since 1960 put at about \$300 billion has not translated to meaningful economic growth and development but regrettably contributed to the neglect of the agricultural sector which provided the bulk of foreign exchange earnings before oil was discovered, thus making Nigeria a classic illustration of the Dutch Disease phenomenon. Third, the economic problem and difficulties of the early 1980s led to the implementation of the structural adjustment programme in 1986 which aimed at among others to diversify the export base and promote non-oil exports so as to reduce the reliance on oil earnings, an objective that has remained elusive till today. There is no doubt that various governments in Nigeria recognize the strategic role of exports in achieving economic growth and development, and have made conscious effort to create a strong export base for the Nigerian economy.

This paper is another attempt to provide further empirical evidence on the causal links between exports and economic growth in Nigeria from 1970 to 2010 and also find out if the ELG theory is relevant to Nigeria.

Following the introduction the rest of the paper is sectionalized as follows: Section 2 presents the literature review focusing on empirical findings on the causal links between exports and economic growth. Description of the data and methodology is in Section 3, while Section 4 reports and discusses the estimation results and empirical findings. Section 5 presents the conclusion and policy implication of findings.

2.0 Literature Review

According to The classical economic theories by Adam Smith and David Ricardo recognize the important role that international trade plays in economic growth, as it encourages specialization which offers considerable economic benefits (Smith, 1776 and Ricardo, 1817). Also foreign exchange earnings from exports enable a country to finance imports that are not available in the domestic economy. There exists an extensive literature that investigates the relationship and links between exports and economic growth. However the findings overall from the literature are not conclusive and conflicting.

The conclusion from the literature is that the effects of exports on economic growth is transmitted through their impact on economies of scale, including improving allocation of resources, enhancing greater inflows of FDI and technology transfers, improving managerial and workers' skills, enhancing capital formation, enhancing job creation, and enhancing productive capacity of the economy (About-Stait 2005, Arthar et al 2012; Konya, 2004).

Findings from the empirical literature point to the possibility of several types of relationships between exports and economic growth. Depending on the econometric model, data frequency, and the country or region studied, export is causing growth, growth is causing export, there is bidirectional causality, and there is no causality (Konya 2004). The link between export and growth may also depend on the level of the country's economic development (About-Stait 2005). For example, Martin (1992) argues that export causes economic growth for Germany, United Kingdom, Japan, and the United States. On the other hand, Arthar et al (2012), and About-Stait

(2005) find no empirical evidence in support of the export-led hypothesis for Pakistan and Egypt respectively.

Several influential studies explore the link between export and economic growth for developed countries, and find empirical evidence in support of the export-led growth hypothesis (Martin, 1992; Boltho, 1996; Grossman and Helpman, 1990; Rivera-Batiz and Romer, 1991, Subasat, 2002; Awokuse, 2003, Lim, Chia and Man, 2009).

Recent related empirical studies, focusing on the East Asian countries include Chen (2007), Furouka (2007), and Furaoka and Munir (2010) reveal mixed results. Chen (2007) in a study on Taiwan used the Granger causality test, Vector Error Correction (VECM), and the Bounds testing methodology to investigate the link between export and economic growth, and find empirical evidence in support of a bidirectional causality between export and economic growth. On the other hand Furaoka (2007), and Furaoka and Munir (2010) in studies on Malaysia and Singapore respectively did not find empirical evidence in support of the export-led growth hypothesis.

Many empirical studies on developing countries that investigated the link between export and economic growth reported the existence of a positive relationship between export and economic growth, and empirical evidence in support of the export-led growth hypothesis (Onafowaro and Owoeye, 1998; Khalifa Al-Youssif, 1997; Levin and Raut, 1997, Jin, 1995; Bahmani-Oskoe, Mohtadi and Shabsigh, 1991).

Some studies dealt with the issue of export composition and found that cyclical changes in the international market have less impact on exports of manufactured goods compare to exports of raw and intermediate goods. Cyclical changes in the global markets have less impact on countries that depend on the exportation of manufactured goods. However most developing countries face the problem of heavy dependence on the export of primary products whose prices fluctuates in the international market. In addition the global demand for these primary products is affected by changes in the world economy, which impact negatively on the economies of

developing countries (Srinivasan and Bhagwati, 2001; Silverstovs and Herzer, 2005; About-Stait, 2005).

With regard to estimation technique there are significant differences in the empirical literature surveyed. Abou-Stait (2005) observes that Sharma and Panagiotidis (2005) group the estimation technique into three methods: (1) using the correlation between exports and GDP; (2) using the aggregate production function with exports as explanatory variable; and (3) emphasizing the existence of threshold effects. Sharma and Panagiotidis (2005) note that the econometric methods used in most of the empirical investigations are dominated by the work of Granger (1988), Sims (1972), Engle and Granger (1987), Johansen (1988) and Johansen and Juselius (1990). It is evident from the empirical literature that there is no conclusive support for the export-led growth hypothesis from time series studies, whereas there is evidence in support of a positive and strong correlation between export and economic growth from wide ranges of cross sectional studies (Abou-Stait 2005). From the review of the empirical literature it is evident that the relationship between export and economic growth is not conclusive and therefore remain an empirical issue.

3.0 Model Specification and Estimation Technique

Since previous studies indicate mixed results the model for the paper is built on existing models. After Omisakin (2009), Chimobi (2010), and Alimi (2012) there is need to shed an additional light by testing the ELG hypothesis for Nigeria. The variables for this study are: Real gross domestic product (RGDP), Real GDP without exports (NEGDP), Real exports (REXP), Real imports (RIMP), Real gross fixed capital formation (RGCF), and Labour (L).

The paper adopted the Vector Autoregression (VAR) based cointegration methodology by Johansen (1988). This methodology was used to determine the dynamic effect of the impact of unitary shocks on a variety of macroeconomic variables. The VAR model is used to analyze the impact dynamic of random disturbances in the system. The following equation shows the mechanism of the VAR model:

$$\Delta Y_t = \alpha_1 \Delta Y_{t-1} + \dots + \alpha_p \Delta Y_{t-p} + \beta \Delta X_{t-1} + \varepsilon_t \quad (1)$$

Where Y_t is a vector of non-stationary I(1) variables, X_t is a vector of deterministic variables, $\alpha_1, \dots, \alpha_p$ and β are metrics of coefficients to be estimated and ε_t is the vector of innovations that may be contemporaneously correlated but are uncorrelated with their own lagged values and uncorrelated with all of the right hand side variables. Data were obtained from the Central Bank of Nigeria Statistical Bulletin for the period 1970-2010. All data are in real terms. Three hypotheses were tested to determine the validity of the export-led theory for Nigeria; (i) whether export, imports and GDP are cointegrated, using the Johansen approach, (ii) whether export growth Granger causes GDP growth and (iii) whether GDP growth Granger causes export growth

4.0 Estimation and Interpretation

Econometric tools were used for the estimation of the study model. Specifically the paper used the E-views package in the estimation process and results are presented in tables. To bring them to a comparative level the variables were taken in their log form.

4.1 Test of Stationarity.

To ensure a reliable result the stationarity of the chosen variables are usually examined. For the stationary test the paper used both Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests at both intercept with and without trend which is presented in Table 1.

Table 1: Test of stationarity using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP)

Variable	ADF		PP		Remarks
	Intercept no trend	Intercept and trend	Intercept no trend	Intercept and trend	
RGDP	-5.087862	-5.313751	-5.155460	-5.309032	I(1)
NEGDP	-9.722724	-9.709432	-9.775732	-10.037961	I(1)
REXP	-10.821131	-10.894171	-10.821131	-10.810102	I(1)
RGCF	-2.609461	-4.143147	-4.347955	-4.294805	I(1)
RIMP	-5.186781	-3.821993	-5.085126	-4.996386	I(1)
L	-11.468211	-21.601632	-21.428752	-7.798854	I(1)
Critical values (CV) at 5% significant level					
1 st Diff	-2.938987	-3.529758	-2.938987	-3.529758	

Notes: A variable is stationary when ADF and PP values are greater than the CV at a given level.

From Table 1 above it is apparent that all the variables are I(1) series, that is they were stationary at first difference. When variables that are known to be I(1) produce a stationary series, then there is a possibility of cointegration among them, existence of a long-run relationship between them.

4.2 Cointegration test

A cointegration test was performed using Johansen’s multivariate approach to find out the existence (or otherwise) of a long-run relationship among the variables (series).. The choice of GDP, exports and imports were based on two reasons. First, according to Riezmann et al (1996) to determine the causality between exports and growth, imports are an important variable which must not be neglected to avoid biased results. For this reason to test the ELG theory in Nigeria, imports was taken into consideration. The Johansen cointegration test for (LnGDP), (Lnexports) and (Lnimports) are presented in Table 2, and for (LnNEGDP), (Lnexports) and (Lnimports) are presented in Table 3.

Table 2: Cointegration test for Ln GDP, Ln Exports, and Ln Imports (1970-2010)

Hypothesized No. of CE(s)	Eigenvalue	Trace statistic	5% CV	Prob**	Max-Eigen statistic	5% CV	Prob**
None*	0.866860	124.74110	102.7324	0.0000	55.02014	41.14611	0.0001
At most 1*	0.746134	99.61223	75.73211	0.0004	45.38613	32.31432	0.0013
At most 2	0.245892	49.43528	52.0141	0.2300	26.23114	25.26354	0.2432

Trace test and Max-eigenvalue test indicate 2 cointegrating equations at the 5% level

*denotes rejection of the hypothesis at 5%

***MacKinnon-Haug-Michelis (1999)p-values.

Table 3: Cointegration test for Ln NEGDP, Ln Exports, and Ln Imports (1970-2010)

Hypothesized No. of CE(s)	Eigenvalue	Trace statistic	5% CV	Prob**	Max-Eigen statistic	5% CV	Prob**
None*	0.884136	143.6822	102.7324	0.0001	55.02014	41.14611	0.0002
At most 1*	0.678367	87.4265	75.73211	0.0002	45.38613	32.31432	0.0005
At most 2	0.324182	38.7852	52.0141	0.5201	26.23114	25.26354	0.4211

Trace test and Max-eigenvalue test indicate 2 cointegrating equations at the 5% level

*denotes rejection of the hypothesis at 5%

***MacKinnon-Haug-Michelis (1999)p-values.

From Table 2 and Table 3, the trace statistic, Max-eigenvalue and MacKinnon-Haug-Michelis (1999)p values, reveal that the null hypothesis of no cointegration and at most one cointegrating equation among the variables were rejected in favour of the alternative hypothesis at 5 per cent. This is because their values exceed the critical values (CV) at the 0.05 level. The econometric results show that there exist a long-run relationship between GDP, exports and imports, and also between, net GDP, exports and imports. The implication of these findings is that export and economic growth are cointegrated that is they move together in the long run.

4.3 Granger Causality Test

The objective of this section is to determine the direction of causality between export and GDP, and between export and investment in Nigeria for the period 1970 to 2010. The following equation is the basis for the Granger causality test:

$$\Delta Y_t = \eta + \beta_1 \Delta Y_{t-1} + \dots + \beta_2 \Delta Y_{t-1} + \beta_3 \Delta X_{t-1} + \dots + \beta_4 X_{t-1} \quad (2)$$

$$\Delta X_t = \eta + \beta_1 \Delta X_{t-1} + \dots + \beta_2 \Delta X_{t-1} + \beta_3 \Delta Y_{t-1} + \dots + \beta_4 Y_{t-1} \quad (3)$$

The reported F-statistics are the Wald statistics for the joint hypothesis:

$$b_1 = \dots = b_t = 0$$

The first null hypothesis is that exports (X) does not Granger cause GDP (Y). The second null hypothesis is that NEGDP (Y-X) does not Granger cause exports (X). The third null hypothesis is that export (X) does not Granger cause investment (I). The Pair-wise Granger Causality test results are reported in Table 4.

Table 4: Pair-wise Granger Causality Test

Null Hypothesis	Lag	F-Statistic	Probability	Remark
Log(X) does not Granger Cause Log(RGDP)	2	1.44995	0.2487	Accept
Log(RGDP) does not Granger Cause Log (X)	2	13.0780	0.0001	Reject
Log(NEGDP) does not Granger Cause Log(X)	2	13.8780	0.0001	Reject
Log(X) does not Granger Cause Log(NEGDP)	2	4.88397	0.0137	Reject
Log(X) does not Granger Cause Log(GCF)	2	0.17048	0.8440	Reject
Log(GCF) does not Granger Cause Log(X)	2	0.30964	0.7358	Reject

From Table 4 above, the Null hypothesis RGDP does not Granger causes exports (X) is rejected at 5% level of significance. On the contrary, the Null hypothesis exports (X) does not Granger causes RGDP is accepted at 5% level of significance. This result shows evidence of uni-directional causality from economic growth (RGDP) to exports. On the other hand the Null hypothesis NEGDP (GDP excluding exports) does not Granger cause exports and exports does

not Granger NEGDP are rejected at 5% level of significance. This result indicate a bi-directional causality between NEGDP (GDP excluding exports) and exports. Also the study reveals evidence of bi-directional causality between exports (X) and investment (GCF).

5.0 Conclusion

This paper sought to shed additional light on the applicability of the export led growth (ELG) hypothesis for Nigeria using the Granger causality test to determine the causal link between exports and real output growth (RGDP) over the period 1970 to 2010. The study period include the IMF structural adjustment programme Nigeria implemented in 1985. This economic reform programme endorsed an ELG strategy, a reduction in government involvement in the economy, conducive investment climate for private domestic and foreign investors, and policies to promote non oil exports.

Using the Johansson approach the paper tested three hypotheses as follows; whether exports, imports and RGDP are cointegrated, whether exports Granger cause RGDP growth, whether export Granger cause domestic investment. Results from the cointegration test revealed that exports, imports and RGDP are cointegrated, indicating the existence of long run equilibrium relationship between the variables. The Granger causality test revealed a uni-directional causality running from real output growth (RGDP) to exports, and a bi-directional causality between exports and investment (capital formation).

The major finding of this study is the uni-directional causality running from economic growth to exports in Nigeria which does not support the ELG hypothesis. This is not surprising in view of the fact that since 1960 oil accounts for about 80% of total export and foreign exchange earnings, put approximately at about \$300billion dollars, that has not translated to economic growth and development of Nigeria. That the huge earnings from exports have not made significant contribution to economic growth supports the finding of this study that ELG hypothesis is not relevant to Nigeria for the study period 1970 to 2010. This finding agrees with the finding of Arthar et al (2012) in a study on Pakistan using same methodology. However it contradicts previous findings on Nigeria (Alimi, 2012; and Omisakin, 2009). It is worth noting that the study period for this paper and that of Alimi (2012) is almost the same, and the methodology used is the same but the findings in the two studies were quite different. This finding also contradicts the

findings of other studies (Maneschiold, 2008; Siliverstovs and Herzer, 2005; Agosin, 1999; Amin Gutierrez de Pineres and Ferrantino, 1997).

The policy implication of the findings of this study is that government must adopt appropriate policies to diversify the productive base of the economy, promote non oil exports, and build up an efficient service infrastructure to drive private domestic and foreign investment.

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