EXPORT AND GROWTH IN THE NIGERIAN ECONOMY
A CAUSALITY TEST

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ABSTRACT

Using Granger causality test, this paper examines the question of pairwise causal relationships between total export (oil export) and GDP of Nigeria during the period 1960-1985. Both simple and instantaneous causality tests were carried out along the line proposed by Pierce and Haugh (1977).

The tests results show the existence of strict econometric exogeneity between export and GDP and a unidirectional causality from GDP to Oil export. The statistical evidence thus imply a rejection of the export promotion policies as effective development strategies in Nigeria. But in the instantaneous framework a feedback effect is observed and this consolidates the export promotion hypothesis contemporaneously.

1. Introduction

The growth of a dependent, peripheral economy such as that of Nigeria is closely linked to the growth of its exports : the generally known "export-engine-of-growth" hypothesis.

In the pre-independence era, exports of agricultural products : cocoa, groundnut, hides and skin etc., accounted for the sources of Nigeria's foreign exchange earnings which helped in financing the importation of capital, intermediate as well as consumer goods necessary for economic growth. This process tracked well the comparative advantage theoretical framework.

In the immediate post-independence era, export of crude oil became the major foreign exchange earner for the nation. The petro-dollar

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boom of the period represented a favourable development for financing the increasing private and public demand for consumption and ambitious national development plans.

The oil boom that commenced with the 1973/74 sharp increase in oil prices led to the world economic recession. As a result of the latter, export of Nigeria crude oil fell and thus attenuated the boom. The initial effect of the latter is dwindling foreign exchange earnings. The secondary effects were reflected in some key economic indicators such as slow (and even negative) growth of the real Gross Domestic Product, GDP; high domestic inflation, current account deficits, rising public debt and fluctuating terms of trade (See Table 1).

This scenarios of mixed fortune—boom-recession-for the Nigerian economy poses interesting puzzle for economists and decision-makers as well.

A major goal of policy analysis is to trace the path of policy variables not only in terms of comparative static results but also for predictive purposes. It may be argued that one of the major dilemma of policy prescriptions—in the area of trade and growth in the Less Developed Countries. LDCs, and Nigeria in particular is the inability to elucidate the cause and effect between export (the exogenous policy variable) and growth (the endogenous goal variable measured in terms of the GDP).

Table 1

SOME KEY ECONOMIC INDICATORS

Year	GDP Annual Growth Rate (%) (1980 Prices) (a)	Inflation Rate (%) (1980=100) (b)	Current Account Balance NM (c)	Pu lic Debt NM (d)	Terms of Trade (%) (e)
1970	29.8	13.9	−50	1215	28.5
1971	18.4	16.0	−229.4	1253	34.5
1972	7.3	2.5	−322.7	1264	32.6
1973	−2.7	5.6	52.7	1388	42.0
1974	12.1	12.7	3062.4	1589	86.5
1975	−3.0	33.4	42.6	2029	62.5
1976	10.9	22.2	−259.3	3035	72.9
1977	7.3	21.4	−647.5	5001	63.9
1978	−7.9	21.7	−2386.9	7235	64.4
1979	3.9	11	1009.5	8894	100.0
1980	2.9	10.0	2355.3	9786	69.4
1981	−2.9	20.8	−3998.4	13777	68.7
1982	0.0	7.7	−5211.2	21649	59.7
1983	−8.5	23.2	−3137.9	30801	46.4
1984	−5.5	39.6	44.1	57752	56.6
1985			2215.4	41914	47.0

Source :

(i) (a), (b) : International Monetary Fund, International Financial Statistics, 1987.

(ii) (c), (d), (e) : Central Bank of Nigeria, Principal Economic and Financial Indicators 1970-1987.

Various policy strategies have been adopted, notably the Export Promotion Policies, to increase the level of the domestic activities i. e. the growth of the GDP. The underlying assumption is that such policies would boost production in the export industries and thus increase GDP.

Several authors have supported this view that higher export increased the pace of economic growth and development. These include Michealy (1977), Balassa (1978, 1985), Tyler (1981), Fajana (1979) and Feder (1983). Their assertions, rooted in the merchantalist theory, are often

backed up with empirical evidence based on bivariate correlation analysis.

Another method of analysis in the investigation of cause-effect relationship between economic variables, is the technique of analysis of temporal system. This approach popularized by Granger (1969) has been polished by Sims (1972), Sargent (1976) and Pierce (1977). The application of this method have reversed the export—engine-of-growth hypothesis. See Jung et al (1985) and Jeording (1986).

Using the Granger causality framework, this paper examines and test for the existence and direction of causal relationship between the growth rate of Nigeria's total export (and the growth rate of oil export) and the growth rate of the GDP. The paper is arranged as follows : Section 2 deals with the theoretical background. Section 3 presents the causality model used in the study. Section 4 contains the estimations, results and discussions and Sections 5 gives some remarks on the Nigerian economy and section 6 concludes.

2. Theoretical Background

I begin my investigation with a simple macro-economic model of a small open economy. We assume a three-sector economy : Private, Public and external trade sectors.

Suppose the following system of equations summarize the behaviour of economic agents in the economy :

$$C=f_1(Y-T, r) \quad \ldots (2.1)$$

$$T=f_2(Y) \quad \ldots (2.2)$$

$$I=f_3(Y, r) \quad \ldots (2.3)$$

$$M=f_4(Y, e) \quad \ldots (2.4)$$

$$X=f_5(e) \quad \ldots (2.5)$$

$$G=\bar{G} \quad \ldots (2.6)$$

$$Y=C+I+\bar{G}+X-M \quad \ldots (2.7)$$

where C : consumption; T : Tax; I : Investment; M : Imports; X : Exports; G : Public consumption; Y : National Income; r : Interest rate.

If we assume a fixed exchange rate (e) and an administered interest rate (r) over the poriod of study, then equations (2.1)—(2.4) become functions of the national income, Y alone; and

$$X=\bar{X} \quad \ldots (2.8)$$

In order to simplify our notations and cocentrate on the objective of the study, we set the autonomous component of equations (2.1)—(2.3) to zero. The import function is however specified as :

$$M = Mo + f_4(Y) \quad \ldots (2.9)$$

The equilibrium condition for the national income then becomes :

$$Y = f_1(Y - T) + f_3(Y) + \bar{G} + \bar{X} - Mo - f_4(Y) \quad \ldots (2.10)$$

The equilibrium solution of equation 2.10 is given is :

$$dY = \partial Y / \partial H[d\bar{G} + d\bar{X} - dMo] \quad \ldots (2.11)$$

where $H = 1 - f_{1Y}(1 - f_{2Y}) - f_{3Y} + f_{4Y}$

and

f_{1Y} : marginal propensity to consume

f_{2Y} : marginal tax rate

f_{3Y} : marginal propensity to invest

f_{4Y} : marginal propensity to import

These marginal quantities are such that the following inequality is satisfied i. e.

$$0 < f_{1Y}, f_{2Y}, f_{3Y}, f_{4Y} < 1 \quad \ldots (2.12)$$

It follows that

$$0 < H < 1 \quad \ldots (2.13)$$

The open economy multiplier is then obtained by differentiating equation 2.11 and is given by

$$\partial Y / \partial \bar{X} = \partial Y / \partial Mo = 1/H \quad \ldots (2.14)$$

Let us introduce the trade balance, B, into the system :

$$B = \bar{X} - Mo - f_4(Y) \quad \ldots (2.15)$$

combining equation (2.11) and taking the differentials of equation (2.15), we have

$$HdY = d\bar{X} + dG - dMo \quad \ldots (2.16)$$

$$f_{4Y}dY + dB = d\bar{X} - dMo \quad \ldots (2.17)$$

These equations can be rewritten more compactly in matrix notation as :

$$\begin{bmatrix} H & o \\ f_{4Y} & 1 \end{bmatrix} \begin{bmatrix} dY \\ dB \end{bmatrix} = \begin{bmatrix} d\bar{X} + d\bar{G} - dMo \\ d\bar{X} - dMo \end{bmatrix} \quad \ldots (2.18)$$

The solution of the system is then given as :

$$dB=[(1-f_{1Y}(1-f_{2Y})-f_{3Y})(d\bar{X}-dMo)+f_{4Y}d\bar{G}]/H \quad \ldots \quad (2.19)$$

and

$$\partial B/\bar{X}=(1-f_{1G}(1-f_{2Y})-f_{3Y})/H=-\partial B/\partial Mo \quad \ldots \quad (2.20)$$

It could be seen from equation (2.20) that for a surplus trade balance, an increase in the foreign export demand or a reduction in autonomous import demand must outweigh the induced increase in imports i. e.

$$\partial B/\partial \bar{X} > 0 \text{ if } d\bar{X} > dM=f_{4Y}\,dY \quad \ldots \quad (2.21)$$

But from equation (2.13)

$$dY=(1/H)\,d\bar{X} \quad \ldots \quad (2.22)$$

Substituting equation (2.19) into equation (2.21) it follows that :

$$d\bar{X} > dM \text{ if}$$

$$dX > f_{4Y}\,d\bar{X}/H \quad \ldots \quad (2.23)$$

or

$$(1/f_{4Y}) > (1/H) \quad \ldots \quad (2.24)$$

Equation (2.21) shows that an increase in export demand or a reduction in import will improve the balance of trade if the inverse of the marginal propensity to import is greater than the open economy multiplier. Therefore, any policy that tends to improve exports (the export promotion policy) or that reduces imports (import substitution policies) will, through the multiplier effect, increase the national income. This has been the contention and hence the use of correlation analysis to explain how growth in export demand lead to growth of the economy.

We do agree with this synthesis but we take a critical look at the question of causality between export growth and growth of the economy. In effect, if we assert that export growth caused GDP growth, then export growth must have occurred at some time in the past and its effect on the GDP must have occurred at a latter period. Therefore, can we maintain that if export growth has not existed then GDP growth would not have existed ? Is the reverse proposition plausible ? This is the issue to which we now turn.

3. The Causality Model

3.1 *Some Preliminaries*

We begin by illustrating some concepts and definitions relating to the Granger (1964) causality test.

Assuming a bivariate stochastic process : A

Such that $A=[(X, Y)]$.

Suppose $EX_t=EY_t=O$.

In addition, assuming that present and past can predict the future and not the reverse. Then the set of information contained in A can be seen as a set containing past information alone or the set of past and present information. Thus :

$$\bar{A}(t)=\{A(t-j);\ j=1, 2, \ldots\} \quad \ldots (3.1)$$

$$B(t)=A(t-j);\ j=0, 1, \ldots\} \quad \ldots (3.2)$$

The Granger causality thesis stated in terms of predictability says that a variable X causes another variable Y if X contains information in past terms that helps in the prediction of Y and if this information is contained in no other series used in the predictor.

From the above, it follows that :

(i) X causes Y if

$$\text{Var}\,(Y(t)/\bar{A}(t)) < \text{Var}\,(Y(t)/\bar{A}(t)-\bar{X}(t)) \quad \ldots (3.3)$$

i.e $Y(t)$ is better predicted with past values of $X(t)$. The variance is used as a criterion for measuring the closeness of a predictor to the true value. It is appropriate with linear predictors. Hence we generally speak of causality in mean given a set of information. Hansen et al (1980).

(ii) X causes Y instantaneously if

$$\text{Var}\,(Y(t)/\bar{A}(t),\ BX(t)) < \text{Var}\,(Y(t)/\bar{A}(t)) \quad \ldots (3.4)$$

i.e. $Y(t)$ is better predicted if current values of $X(t)$ are included.

(iii) A feedback mechanism exists if $X(t)$ causes $Y(t)$ and $Y(t)$ causes $X(t)$.

(iv) A feedback and instantaneous causality occurs if $X(t)$ causes $Y(t)$ instantaneously and $Y(t)$ causes $X(t)$ instantaneously.

(v) The best linear predictor of $Y(t)$ using past $Y(t)$ and past $X(t)$ is of the form :

$$P(Y(t)/\bar{Y}(t),\bar{X}(t)=\sum_{j=1}^{\infty} a(j)\, Y(t-j) + \sum_{j=1}^{\infty} b(j)\, X(t-j) \quad \ldots (3.5)$$

where a (j)'s and b (j)'s are chosen to minimise

Var $(Y(t)/\bar{Y}(t),\ \bar{Y}(t))$.

Similarly, the best linear predictor of $Y(t)$ giving past $Y(t)$, current and past $X(t)$ is :

$$P(Y(t)/\bar{Y}(t)),\ BX(t))=\sum_{j=1}^{\infty} a(j)\, Y(t-j)+ \sum_{j=1}^{\infty} b(j)\, X(t-j) \quad \ldots (3.6)$$

where a (j)'s and b (j)'s are chosen to minimise

Var $(Y(t)/\bar{Y}(t), BX(t))$.

3.2. *The Model*

Suppose that $X(t)$ and $Y(t)$ are jointly convariance stationary, linearly indeterministic stochastic process i.e. $\{X(t),\ Y(t)\}$ contains no components that can be well predicted, linearly arbitrarily from their past values.

To test whether $X(t)$ causes $Y(t)$ is equivalent to testing for the existence of vector autoregressive representation of the form :

$$\begin{bmatrix} X(t) \\ Y(t) \end{bmatrix} = \begin{bmatrix} 1 & \beta A(L) & B(L) \\ 1 & \beta' C(L) & D(L) \end{bmatrix} \begin{bmatrix} a \\ t \\ X(t) \\ Y(t) \end{bmatrix} + \begin{bmatrix} e(t) \\ u(t) \end{bmatrix} \quad \ldots (3.7)$$

where α is the constant term, β and β' capture the trend, $A(L)$, $B(L)$, $C(L)$ and $D(L)$ are square-summable polynomials in non negative powers of the lag operator L. $(e(t), u(t))$ is what Sargent (1979) called the process of innovations, that is errors in linearly predicting $X(t)$ and $Y(t)$ respectively from past values of $X(t)$ and $Y(t)$ jointly $e(t)$ and $u(t)$ are uncorrelated white noise process i.e. they are least square residuals obeying the orthogonality conditions :

$$EX(t-h)e(t) = EY(t-h)e(t) = 0$$

$$EX(t-h)u(t) = EY(t-h)u(t) = 0$$

for $h=1, 2, \ldots\ldots$, and

$$E\,e(t)e(s) = \sigma^{-2}, \text{ for } s=t$$

From the foregoing, we assume a lag length of two periods and the OLS estimation technique was carried out on the following equations :

$$X(t)=\alpha+\beta t+\sum_{j=1}^{2}a(j)X(t-j)+\sum_{j=1}^{2}b(j)Y(t-j)+e(t) \quad \ldots (3.8)$$

$$Y(t)=\alpha+\beta' t+\sum_{j=1}^{2}c(j)X(t-j)+\sum_{j=1}^{2}d(j)Y(t-j)+u(t) \quad \ldots (3.9)$$

3.3 *The Causality Test*

Suppose :

1. $Ho : b(j) = 0; j = 1, 2$
2. $Ho : c(j) = 0; j = 1, 2$

the null hypothesis that the coefficients of the lagged "cause" variables are zero. We reject Ho if there are some bj's and cj's different from zero and we conclude that $Y(t)$ causes $X(t)$ or $X(t)$ causes $Y(t)$ respectively. If both events occur, then a feedback relationship exists.

Similarly, suppose

3. $Ho : bj=0, \quad j=0, 1, 2.$

4. $Ho : cj=0, \quad j=0, 1, 2.$

the null hypothesis. If there are some bj's and cj's different from zero, we reject Ho. We then conclude that $Y(t)$ causes $X(t)$ instantaneously and $X(t)$ causes $Y(t)$ instantaneously. It then follows that the knowledge of $Y(t)$ or $X(t)$ will improve the "prediction" of $X(t)$ or $Y(t)$. If both events occur, then we have a feedback relationship with instantaneous causality.

4. Empirical Investigation

4.1 *Method of Estimation and Data Sources*

OLS estimation technique is used on all the equations of the model in performing the causality test as proposed by Granger (1969). The period of estimation considered is 1960-1985.

Variables used in the model are the natural logarithm of the total export, the gross domestic product and the oil exports. All variables are expressed in constant 1980 prices; total export and oil export being deflated by the unit export price index, and the GDP by the GDP deflator.

Datas used in the study are annual and are obtained from the International Financial Statistics 1986 and 1987 editions.

4.2 *Empirical Result*

In table 2, the causality test is run in both directions on the "cause" and "effect" variables. In equation 4.2, contemporaneous GDP is regressed on lagged GDP's and lagged exports. This is to test the null hypothesis that X (export) does not Granger cause Y (GDP) i.e. testing if the coefficients of the lagged X's are zero. The procedure is then repeated for the current X (export) regressed on lagged X's and lagged GDP's to test the null hypothesis that GDP does not Granger cause export.

In table 3, the results of regressing contemporaneous values of the "effect" variable Y on the two lagged values of Y's, the current "cause" variable X and two lagged values of X are presented. The exercise is to test for instantaneous causality.

In all the equations, constant term and a linear trend are included. The number of observations used in the study is 26. So, in order to save degrees of freedom, lag length is limited to two for all the variables and in all the regressions.

Table 2

REGRESSIONS TO TEST THE HYPOTHESIS OF PAIRWISE CAUSALITY

	Effect	Cause	a(1)	a(2)	b(1)	b(2)	c	d	adj R^2	S. E.	D-W	F
4.1	GDP	EXP	1.1670 (5.0788)	−0.5632 (2.5952)	0.0199 (0.1517)	0.0726 (0.5431)	3.0442	0.0140 (2.008)	0.9470	0.0896	2.0917	90.3979
4.2	EXP	GDP	1.1395 (4.8711)	−0.2457 (1.0363)	0.1065 (0.2607)	−0.5636 (1.3058)	5.4554	0.0236 (1.9089)	0.3699	0.1590	1.9311	34.4310
4.3	OIL	GDP	0.6447 (2.7190)	0.2301 (1.0918)	1.9300 (2.1993)	−2.7438 (3.0987)	8.9792	0.0409 (1.6239)	0.89435	0.3315	2.91185	84.5425
4.4	GDP	OIL	1.2595 (5.2232)	−0.5995 (2.4639)	−0.0140 (0.2145)	0.0402 (0.6935)	3.1747	0.0099 (1.4332)	0.94535	00.0911	2.1336	87.3420

t—Statistics of estimated coefficients are shown parenthetically

Table 3

REGRESSIONS TO TEST THE HYPOTHESIS OF PAIRWISE CAUSALITY

	Effect	Cause	a(1)	a(2)	b(0)	b(1)	b(2)	c	d	adj R^2	S. E.	D-W	F
4.5	GDP	EXP	1.1389 (5.4600)	−0.4129 (1.7827)	0.2642 (2.3137)	0.2811 (1.5912)	0.1375 (1.1059)	1.6028	0.0078 (1.1296)	0.9565	0.0812	2 .1591	92.6214
4.6	EXP	GDP	1.1229 (5.2938)	−0.3061 (1.4139)	0.8320 (2.3137)	−0.8645 (1.5460)	−0.1000 (0.2258)	2.9226	0.0120 (0.9742)	0.8932	0.1441	1.9986	35.8303
4.7	OIL	GDP	0.6655 (2.9928)	0.1705 (0.8532)	1.4842 (1.9470)	0.0606 (0.0447)	−1.8540 (1.9578)	4.2672	0.0262 (1.0569)	0.9505	0.3106	2.0502	80.9153
4.8	GDP	OIL	1.0432 (4.1443)	−0.2920 (1.0531)	0.1121 (1.9470)	−0.0863 (1.2079)	0.0144 (0.2569)	2.1684	0.0053 (0.7733)	0.9520	0.0853	2.0653	83.5739

t—Statistics of estimated coefficients are shown parenthetically

Summary statistics are provided in tables 2 and 3 to evaluate the potentials of the model presented for predictability.

In all the equations, the adjusted R^2 is very high ranging from 85.35 % to 95.65%. This shows that the total regression lines explained more than 85 % of the variation in the dependent variables.

The standard error of regression, S. E. are equally very small : between 0.0812 and 0.3442. At the level of 5%, the calculated F-statistic shows, very significantly, that the coefficients of all the variables in the equations are jointly different from zero.

The assumption of stationarity in time series data used in the study is hardly tenable for most economic variable are non-stationary. Therefore the datas were rendered stationary by using a logarithmic transformation which preserve causal relationship in terms of linear prediction criteria. (Pierce and Haugh (1977).

In addition, using the Durbin–H statistic, it is found that we cannot reject the null hypothesis of no autocorrelation for all equations. Hence we concluded for all equations. Hence we concluded that prewhitening the residuals may not be necessary. This test of non-autocorrelation is particularly important because we are assured that our estimated coefficients will be consistent and that we can make efficient predictions i. e. predictions with small sample variances (see Guilkey et al, (1982)).

Finally, a word about another economic issue. This is the problem of omission of relevant variables in the model : multicollinearity. The debate on it is not of its existence but of how serve it is. Perfect multicollinearity leads to impossible soultion for the system of equations. It's existence, in the practical sense, leads to biased coefficients and reduced variance. Hence, multicollinearity is a problem for estimated parameters but not a problem for prediction. And this is the case in the present study.

4.3 Discussions

For a lucid discussion, tables of causality interrelationships are presented : tables 4 and 5.

From table 4, we conclude that total export or oil export do not Granger cause GDP nor that the GDP

Table 4

SIMPLE CAUSALITY RELATIONSHSP

Equation	Effect Variable	Cause Variable	Description	Conclusion
4.1	GDP	EXP	EXP—GDP	Independence
4.2	EXP	GDP	GDP–EXP	Independence
4.3	OIL	GDP	GDP—OIL	Unidirectional
4.4	GDP	OIL	OIL—GDP	Independence

Source : From Table 2.

Granger cause total export. However, it is found that GDP Granger cause oil export. It follows then that the knowledge of past values of oil exports and total export may not necessarily help in predicting the growth of the Nigerian economy. But that, past values of GDP can help predict oil export. It thus shows that although GDP and export variables may be correlated (see,Umo, 1987), they are not causally related.

Table 5

INSTANTANEOUS CAUSALITY RELATIONSHIP

Equation	Eeffect Variable	Cause Variable	Description	Conclusion
4.5	GDP	EXP	EXP $=\Rightarrow$ GDP	
4.6	EXP	GDP	GDP $=\Rightarrow$ EXP	EXP$\Longleftrightarrow$GDP
4.7	OIL	GDP	CDP $=\Rightarrow$ DIL	
4.8	GDP	OIL	OIL $=\Rightarrow$ GDP	GDP$\Longleftrightarrow$OIL

Source : From Table 3.
(*) $\Longleftrightarrow$ Signifies feedback with instantaneous causality.

From table 5, we find that feedback relationship exists with instantaneous causality. This means that current values of EXP can help predict GDP and vice-versa.

Hence, the test can help to detect the effect on GDP of a contemporaneous innovation in EXP, and vice-versa. This conclusion tends to imply that information on trade policy in Nigeria are easily disseminated and take their effects within that period.

The F-Test statistic was equally carried out to test whether or not the addition of the cause variable has significantly improved the prediction of the effect variable. This is shown in tables 6 and 7.

From table 6, it can be seen that at the level of 5%, the lagged GDP variables significantly predicts oil; whereas others do not.

Table 6

F-TEST FOR THE SIMPLE CAUSALITY MODEL

Effect	Cause	Calculated F
EXP	GDP	1.9300
GDP	EXP	2.5353
OIL	GDP	4.9605*

Table 7

F-TEST FOR THE SIMPLE CAUSALITY MODEL

Effect	Cause	Calculated F
EXP	GDP	4.8996*
GDP	EXP	4.2391
OIL	GDP	7.9480*

F (J, T—2J—2)=[(RSS—URSS)/J]/URSS/(T—(2J+2)) where RSS is the Constrained Residual Sum of Squares, and URSS is the Unconstrained Residual Sum of Squares. T is the number of observation and J the lag length.

Similarly, in table 7, lagged GDP predicts total export and oil export but lagged total export does not predict GDP significantly. However, it has to be remarked that several studies have established the virture of export and of export promotion strategies in the growth of the developing economy. Even in the face of global economic crisis, in which foreign demand for our export has been falling given a highly competitive setting, it is still believed that we need to export more in order to reverse the trend and redeem the ailing economy.

The results obtained in this paper seem to contradict this generally known thesis : "export more and survive". There are several ways in which the result can be supported. Firstly, most studies on growth and export have used the correlation analysis technique to determine the covariability of bivariate variables. The techniques do not help in the enquiry for the direction of causality. Our study filled that gap. Secondly, Nigeria is essentially an importing economy. In a recent study (see Aglese), it was shown, among other things that income

*Indicates F value that is significant at the level of 5%

elasticity of demand for import is as high as 34% and that export explains, very significantly, the demand for our imports. It may be possible that the correlations between exports and GDP found in other studies were spurious; the bivariate covariation might be due to the effects of other variables, suspiciously : the imports.

4.4 *Test for Exogeneity*

According to Sims (1972), if X (t) is to be strictly exogenous in a behavioural relationship that expresses Y (t) as a one sided distributed lag of X (t), the Y (t) must fail to Granger cause X (t). In other words, failure of Y (t) to Granger cause X (t) is a necessary condition for X (t) to be strictly exogenous.

Consider the simple causality model presented in this paper. Since total export fails to Granger cause GDP then we say that total export obeys the necessary condition for a strict econometric exogeneity (Hansen and Sargent (1980)).

But the test is not a sufficient condition. Therefore, one cannot conclude that total export is exogenous to the GDP or vice-versa (See Tables 3 and 5). It is possible that GDP is an endogenous variable with respect to total export and total export endogenous to GDP, yet our analysis fails to reject the null hypothesis of Granger non-causality from total export to GDP and vice-versa

This exogeneity test result corroborates the common assumption in macro-economic analysis in which export demands are treated as exogenous to the model of national economy.

5. Some Inferences About the Nigerian Economy and ausality Test

Before concluding on the findings of this paper, let us make some remarks about the Nigerian economy. Firstly, that the Nigerian export market sector is structurally dependent. The sector is characterised by export of primary products essentially crude oil and a declining proportion of agricultural products. Export of manufactures is relatively insignificant. The various categories are very sensitive to external factors such as prices labelled in foreign currencies, exchange rate etc.

Secondly, real export growth (and hence of output) does not necessarily lead to an increased demand for export : domestic supply conditions contrast foreign demand factors (See Alege). Of course, we will expect that increased export demand will stimulate domestic activities in the exporting industries and thereby boost real GD ' growth.

may be possible that we have been assuming rather incorrectly that a policy variable (the export promotion) is endogenous to the growth of the national economy whereas the reverse is true.

Hence, a test of the validity of the export promotion hypothesis, as an important development strategy, should not be an assertion of correlation alone, it should also be an assertion of causation.

Nigeria has been involved much more in active Import Substitution Industrialization (ISI) policies than in Export Promotion. The rejection of the latter does not imply an automatic acceptance of the effectiveness of the ISI policies (See Fabayo (1983), on the problematic of the ISI strategy).

To ensure a sustainable growth, Nigeria should embark on using policy variables that are essentially endogeneous which have cause-effect relationship with the domestic economic activities.

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