

## **Determinants of Agricultural Exports in Oil Exporting Economy: Empirical Evidence from Nigeria**

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**Abstract:** Nigeria was one of the largest exporters of agricultural commodities in the world before the oil shock of 1970 and early 1980's. In view of Nigeria's significant contribution and export capacity to the world volume before the oil shock, the study examined the determinants of agricultural exports in Nigeria. The Parsimonious error correction model was estimated utilizing Ordinary Least Square (OLS) as analytical tool using data set from various institutional sources that ranged from 1970-2007. The outcome of the analyses revealed that world price for Nigeria major agricultural commodities, world income and Nigeria past agricultural output were determinants of agricultural exports. As such, the study recommended that priority should be accorded to the boosting of the current level of agricultural output which may involve rehabilitation of abandoned farms, establishment of new ones and providing appropriate incentives as a means of sustaining output level.

**Key words:** Agricultural export, agricultural output, oil shock, Parsimonious error correction model

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### **INTRODUCTION**

Agricultural export was the mainstay of the Nigerian economy prior to the discovery, exploitation and exportation of crude petroleum and the resulting total dependence on its revenue for economic sustenance. This was the situation prior to the oil boom of the early 1970's when the contribution of agricultural exports (cocoa, rubber, palm oil, palm kernel, cotton, etc.) fell to 35% of the GDP from an average of 72% between 1955 and 1969 (CBN). Agriculture has been the most important single activity in the Nigeria economy with about 70% of the total working population engaged in it (Abolagba *et al.*, 2010). Nigeria also ranked very high in the production and exportation of some major crops in the world in the 1940 and 1950s. Available statistics indicate that in 1960, agricultural export commodities contributed well over 75% of total annual merchandise exports (Ekpo and Egwaikhide, 1994).

Nigeria's contemporary development has been sustained by extreme dependence on one single primary commodity that is oil and it accounts for >95% of the export earnings in recent times. Crude oil also contributes >95% of government revenue in the recent years and <25% of the RGDP. Extreme dependence of the Nigerian economy on crude oil has rendered it most vulnerable to the instability of market forces with grave implications to the nation's economic growth and development. Also, the adverse impact of volatility of the international oil market

with the attendant volatility of government revenue gives credence to any argument for diversification of exports (Okoh, 2004).

Furthermore, a much more important consideration regarding oil is the fact that crude oil is an exhaustible asset which makes it unreliable for sustainable development of the Nigerian economy. Also, there is need to penetrate dynamic markets in the developed and emerging economies with traditional and non-traditional agricultural crops which may provide the best avenue to attract high, productive and accelerated development in the Nigerian economy.

The export of primary products particularly agricultural products accounts for a large proportion of Nigeria's non-oil export earnings. According to Thirlwall, (1999) the demand for developing countries' traditional export is inelastic relative to the demand for industrial goods. Internationally, traded cash crops in Nigeria are cocoa, palm produce, rubber, timber, cotton, groundnuts and beniseed (Olukosi and Isitor, 1990). Among the non-oil export merchandise, however the elasticity of demand may defer.

For instance, agricultural export commodities have been said to tend to be characterized by a low price elasticity of demand while mineral export commodities are said to have high price elasticity of demand. Agricultural exports are therefore likely to generate less income than mineral exports during an export boom (Ogun, 1995). The implication of this is that policies such as exchange rate

devaluation may reduce the price of Nigerian exports but may not raise the export volume of agricultural export merchandise which is Nigeria's major export product group in the non-oil sub sector.

The overall success of any export promotion strategy to increase and sustain growth in agricultural exports will depend among others on the knowledge of what factors determines export growth. According to Gbetnkom and Khan (2002), there are two main, largely opposing, schools of thought explaining the decline in agricultural exports. One stresses factors that are external to the individual country: the slow volume of growth of world primary commodity markets and the deteriorating terms of trade. The other line of thought emphasizes factors that are internal to the country that is the domestic policies that have affected export supply adversely. The considerations in this study will go in line with the both school of thoughts.

In view of the foregoing regarding the need for non-oil diversification of the Nigerian economy and coupled with the facts that Nigeria have a great comparative advantage in production of primary goods (agricultural commodities) given its level of technology. It is important to consolidate the non-oil diversification strategies by identifying feasible ways through which growth in agricultural output can be stimulated which other things being equal will stimulate export. The role of the agricultural sector in the overall response of the Nigerian economy to reform and adjustment policies is important because given its relatively large size, a large positive response to adjustment policies was expected as a means of improving the overall performance of the economy (Kwanashie *et al.*, 1998).

It is thus imperative to examine the factors determining the level of agricultural exports in Nigeria oil-dependent economy. The study therefore sets out to assess, empirically what factors determine export of agricultural products in Nigeria between 1970 and 2007.

**An overview of agricultural sector performance in Nigeria:** Agricultural goods are considered the major export commodities before the advent of oil in Nigeria.

Apart from being the major export earning in Nigeria before oil discovery, their importance can be measured in terms of their contribution to total export and total non-oil exports earning. Table 1 showed an overview of the performance of agriculture given the selected indicators of performance.

From Table 1, the average annual growth of agricultural output in Nigeria fell continuously during and after the pre-SAP period. Despite this fall in the output, agriculture still contribute up to 41% of the aggregate Real Gross Domestic Product (RGDP) in Nigeria between 2001-2007. Figure 1 shows that agricultural output growth has not been consistent in Nigeria, reaching its pick in 1984 and fall drastically only to pick up again during the SAP and becomes inconsistent since then. The sector does not show any significant increase in its contribution to RGDP during the SAP period. This indicate that the sectors has not witnessed any significant improvement which is a clear indication that the structure of agriculture under trade liberalization was still tied as in the pre trade liberalization era.

Official statistics from the Central Bank of Nigeria indicate that an average of about 55,140,000 ton of agricultural were produced per annum between 1986 and 1990 (i.e., the first decade of economic deregulation) as against an average 29,523,200 ton in the 1976-1985 period.

The other fact that is obvious in Nigeria is the increase in the value of the exchange rate after 1986 due to devaluation of naira. Also, farmers have received higher prices for their produce in the world market. The average world price for major Nigeria agricultural commodities in Nigeria reached the pick of 9684.6 in 2002 as against 1985 prices (1985 = 100).

Further, contribution of agricultural sector to both total export and non-oil export earning has been decreasing continuously after the SAP period with its contribution to total export earning not significant before and after SAP.

Agricultural sector as the major employer of labour in Nigeria has been showing a declining trend in its contribution to total employment generation in Nigeria.

**Table 1: Agricultural sector performance in Nigeria from 1970-2007**

Periods	AOA	Average output growth (%)	Contribution to RGDP (%)	Average exports (N-Mill)	Average export growth (%)	CTE	CNE	CAEE
1970-1975	31002.1	-3.5	35.0	239.5	0.3	13.5	64.9	57.8
1976-1980	24428.4	-3.7	21.8	374.1	10.4	4.5	66.6	68.0
1981-1985	29523.2	14.3	30.6	226.7	1.1	2.5	78.3	64.1
1986-1990	55140.0	11.2	33.9	1667.3	78.5	4.2	69.9	60.8
1991-1995	89147.6	7.4	33.6	5849.7	72.0	1.7	64.1	59.7
1996-2000	108384.8	4.3	35.3	14978.0	-8.1	1.1	45.4	55.2
2001-2007	122820.1	2.7	41.0	36443.5	49.7	0.6	25.6	53.0

Computed from Central Bank of Nigeria (CBN, 2007), Central Bank of Nigeria (CBN, 2000); Annual report and statement of account, various issues; National Bureau of Statistics National Accounts of Nigeria, various issues (Daramola *et al.*, 2007). AOA = Average Output of major Agricultural Goods ('000 Ton); CTE = Contribution to Total Export (%); CNE = Contribution to Non-oil Export (%); CAEE = Contribution of Agricultural Sector Employment to Total Employment (%)

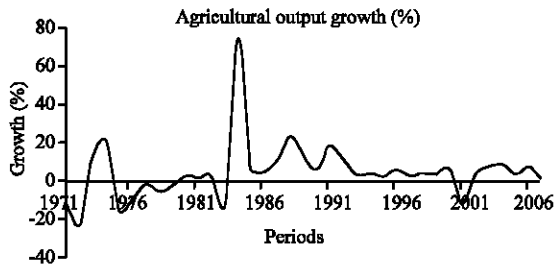


Fig. 1: Agricultural output growth performance in Nigeria. Computed from Central Bank of Nigeria (CBN, 2007)

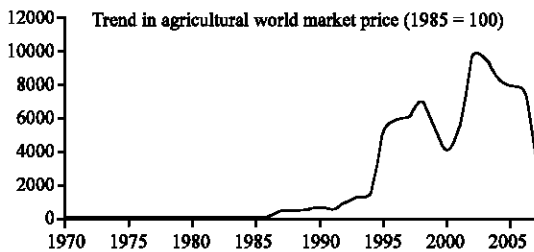


Fig. 2: Trend in world market price for Nigeria major agricultural commodities: computed from Central Bank of Nigeria (CBN, 2007)

Reaching a pick of 64.1% between 1981-1985 fell to 60.8% during the SAP period and further fell to 53% in 2001-2007 period. This declining trend could be due to labour formally employed in agricultural sector getting employment in other sector and/or displacement of agricultural sector workers due to neglect of the sector.

Finally, the noticeable increase in average agricultural export between 1996-2000 and 2001-2007 could be attributed to agricultural price increase and exchange rate depreciation as shown in Fig. 2 and not necessarily reflecting increase in output (Fig. 3).

**Policies and programmes for improving agricultural production in Nigeria:** In Nigeria, four different policy regimes have been identified and categorized for this study. The pre-1970 period (1961-1969), pre-SAP period (1970-1985), SAP period (1986-1994) and the post-SAP period (1995-1999) and current democratic regime 1999 to date.

**The pre-1970 period (1961-1969):** In the period 1960-69, there was minimal direct government involvement in agriculture. The federal government played a supportive role while regional and state governments were left to take major initiatives (Daramola *et al.*, 2007). During the early

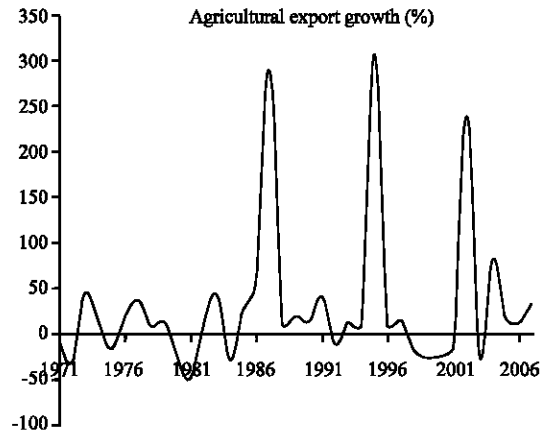


Fig. 3: Agricultural export growth performance in Nigeria: computed from Central Bank of Nigeria (CBN, 2000) annual report and statement of account, various issues

period of Nigeria's history, different regions specialized in producing various agricultural exports. Crude oil was discovered in Nigeria in commercial quantities and the Shell Petroleum company constructed the first oil well at Oloibiri in 1958. However, it was not earning as much foreign exchange as agriculture was fetching for the regional governments.

Nigeria could be described as having a very robust agricultural sector during the period. The country was self-sufficient in food production with minimal imports of processed food for elites. Farmers produced enough food crops to feed the population and export crops to finance government expenditure. In fact, agriculture was being taxed to develop the other sectors of the economy such as education, health, construction and finance imports through the foreign exchange being earned from agriculture.

The northern region (including the middle belt) was largely exporting cotton, hides and groundnuts; the South West region specialized in cocoa while the South East region was a major exporter of rubber and palm produce. Smallholder farmers produced the bulk of agricultural output for both local and export markets. Government focused on research, extension services, marketing and pricing of export crops. However, it is important to mention here that the export crops sub-sector of the Nigerian economy was then stronger than the food crop sub-sector because of the desire of the pre-independence colonial government to feed their domestic industries with raw materials. Nigeria was a very small importer of food crops.

**Pre-SAP period (1970-1985):** The problem of agricultural exports in Nigeria started around 1970. This was the era that launched the oil boom in Nigeria. The windfall from the oil wealth was not invested in agriculture but rather in commerce, construction and manufacturing, leading to neglect of the agricultural sector. These sectors conspired by attracting factors of production away from agriculture, leading to a serious problem of Dutch disease. Another serious consequence of the oil boom was currency overvaluation which led to Nigerian agricultural exports being uncompetitive. The major factor responsible for the decline in agriculture was the discrimination against agriculture in favour of the urban real sectors (i.e., manufacturing and services sector). Factors of production such as land and labour migrated out of the rural agricultural sector to the urban industrial sector because of booms in the construction, manufacturing and service sectors that were paying higher returns on those factors. The period 1970-85 witnessed more direct government intervention in agriculture in the face of the noticeable decline in agriculture performance.

The period witnessed the establishment of many new agricultural institutions and programmes. Example were the Nigerian Agricultural and Co-operative Bank (NACB) in 1973 and the Agricultural Credit Guarantee Scheme Fund (ACGSF) in 1978, established to provide agricultural finance. During this period, World Bank (2010) assisted ADPs were introduced in a number of states. The programmes were designed to provide an integrated approach to agricultural and rural development. River Basin Development Authorities were also established to provide all year round water through irrigation to farmers. In anticipation of the increased agricultural output arising from these projects, there was a reorganization of marketing boards which gave rise to the grain boards.

**SAP period (1986-1994):** The SAP period began the era of liberalization economy, policies to boost agricultural output include the scrapping of the commodity boards and deregulation of the entire economy. During the period 1986-99 which combines the SAP and post-SAP era, market-oriented and not so market-oriented agricultural development policies and programmes were introduced. River Basin Authorities were restructured from 21-11; the National Agricultural Insurance Corporation and Peoples' Bank were established. Farm input supply policy was actively pursued during this period. Trade liberalization was an important aspect of SAP. Abolition of import and export licensing and exchange control measures took place. With these reforms, export earners became entitled to 100% of their foreign exchange earnings provided these

were kept in a domiciliary account. Thus, agricultural producers had an incentive to boost their exports. The Export Incentive and Miscellaneous Provisions Decree of 1986 was enacted, through which the CBN could provide refinancing and discounting facilities to commercial and merchant banks to encourage them to provide credit and risk-bearing facilities in support of exports. This subsequently led to the establishment of the Nigerian Export Credit Guarantee and Insurance Corporation in 1988 which was subsequently renamed the Nigerian Export-Import Bank (NEXIM). The institution actually commenced operations in 1991. Perhaps the most visible and pervasive policy under SAP is the naira exchange rate devaluation. The rate which was 0.639 naira to the US dollar in 1981 and 0.9996 naira in 1985, averaged 3.32 naira in 1986. By 1992, it had fallen to 19.66 naira and to 91.83 naira in 1999. There is no doubt that the tremendous boost in producer prices was due to naira devaluation. For example, the naira value of the world market prices of major agricultural commodities increase which was translated into increases in producer prices (Fig. 2). The position outlined here is that growth in agricultural export earnings in recent decades has merely been a price effect with little output effect even when allowance is made for time lags in output changes relative to price changes.

**Post SAP period 1995-1999:** In terms of economic policies and agricultural exports, the period was uneventful as the successive governments were just trying to find solutions to the political crises in the country. The period coincided with various economic sanctions from Western nations that happened to be the importing nations such as Canada, the UK and the USA.

**Current democratic regime (1999 to date):** Three documents that clearly spell out Nigeria's vision for agricultural development are the National Economic Empowerment Development Strategy (NEEDS), National Agricultural Policy (NAP) and Rural Sector Strategy (RSS) in 2004.

The overall strategic objective of the NEEDS and NAP is to diversify the productive base from oil and to promote market-oriented and private sector-driven economic development with strong local participation. According to Daramola *et al.* (2007), NEEDS provides the overall framework of nationally coordinated sectors' strategies while NAP aims at laying a solid foundation for sustainable growth in agricultural productivity. The latter is a well thought-out document that provides a road map for the transformation of both agricultural productivity and exports.

**MATERIALS AND METHODS**

This study covers the theoretical framework of the research, the specification of the model utilized in the study as well as the methodologies that will be adopted.

**Theoretical framework:** Among all the theories explaining the determinants of exports reviewed in the literatures, variant of the centre periphery models used by Okoh (2004) developed by Prebisch in 1950, become useful. This framework is thus chosen based on the plausibility of its assumptions and direct applicability of its features to Nigeria. The model forms the theoretical background for analyzing the determinants of Agricultural exports in Nigeria.

The Prebisch model is a two-country and two-commodity model in which the industrialized country (centre) produces and exports manufactures goods with an income elasticity ( $E_m$ ) of demand greater than unity, while the developing (periphery) nation produces and exports primary commodities which have income Elasticity ( $E_p$ ) of demand less than unity. The model assumes that the two trading countries' starting rates of income growth are equal. The growth ( $g$ ) rate of exports ( $x$ ) and imports ( $m$ ) in the centre ( $c$ ) and periphery ( $p$ ) will be:

- For the centre:

$$X_c = G_p * E_m \tag{1}$$

$$M_c = G_c * E_p \tag{2}$$

Where:

- $X_c$  = Export of the centre
- $M_c$  = Import of the centre
- $G_p$  = Growth rate of export of the periphery
- $G_c$  = Growth rate of export of the centre
- $E_m$  = Income elasticity of demand for the centre
- $E_p$  = Income elasticity of demand for the periphery

- For the periphery:

$$X_p = G_c * E_p \tag{3}$$

$$M_p = G_p * E_m \tag{4}$$

With imports growing faster in most developing nations such as Nigeria, growth will not be sustainable unless the periphery can finance an ever growing balance of payments deficit on the current account by capital flows. If not to maintain the balance of payment equilibrium there must be some adjustment to raise the rate of growth of exports to reduce the rate of imports.

From the model, the necessary growth rate of the periphery to maintain the balance can be obtained. From the assumptions:

$$M_p = X_p \tag{5}$$

$$G_p * E_m = X_p \tag{6}$$

and therefore:

$$G_p = \frac{X_p}{E_m} \tag{7}$$

The growth rate will be constrained at a rate lower than the centre. In these circumstances, the gap (absolute and relative) between the periphery and centre will widen Thirwall (1999) in Okoh (2004). Since, the growth of periphery exports:

$$X_p = G_c * E_p \tag{8}$$

$G_p$  can be written as:

$$G_p = G_c * \frac{E_p}{E_m} \tag{9}$$

Dividing through with  $G_c$ , we obtain the result that the relative growth rates of the periphery and centre will equal the ratio of the income elasticity of demand for the two countries commodities:

$$\frac{G_p}{G_c} = \frac{E_p}{E_m} \tag{10}$$

This condition will hold as long as current account equilibrium on the balance of payments is a requirement and relative price adjustment in international trade is either ruled out as adjustment mechanism to rectify balance of payments disequilibrium or does not work (Thirwall, 1999). Prebisch however noted that the consequences of this model could be avoided by recourse to protectionism which would be a policy to reduce  $E_m$ . The  $E_m$  is equivalent to the propensity to import manufactured goods for the periphery. This model as simple as it is seems to be the most appropriate for explanation of the Nigerian agricultural exports scenario at this point in her history.

**Conceptual framework:** The conventional way of specifying the export demand function is in the form of a multiplicative or constant elasticity function of relative prices measured in a common currency and foreign income as follows (Okoh, 2004; Thirlwall, 1999):

$$AX_t = (RP_t)^\alpha W_t^\beta \quad (11)$$

Where:

- $Ax_t$  = Value of Agricultural exports in time t
- $Rp_t$  =  $Pd/pf_t$
- $Pf_t$  = The foreign price in time t
- $Pd_t$  = The domestic price in time t
- $W_t$  = The foreign income (Gross domestic product of the world) in time t
- $\alpha$  = The price elasticity of demand for exports (<0)
- $\beta$  = The income elasticity of world demand for agric export (>0)

The outward oriented hypothesis sees export as being foreign demand dependent and not supply constrained. Also, the supply of agricultural goods is also being determined by its price and output with the expectation that if the price increase the supply (export supply) for agricultural goods increases and if output increase the exports is expected to increase because a satisfactory home consumption is expected to motivate, all other things being equal, exports. Equation 11 may thus be expanded to include other variables of interest as follows:

$$AX_t = f(AQ_t, AP_t, RP_t, W_t) \quad (12)$$

Therefore, the empirical model specification follows the autoregressive over parameterized error correction lag model stated as follows:

$$\Delta \log(x_t) = \beta_0 + \beta_1 \log(y_t) + \beta_j \Delta \log(y_{t-j}) + \beta_i \Delta \log(x_{t-i}) + \beta_d \text{Dummy} + \beta_k \mu_{t-1} + v_t \quad (13)$$

Where:

- $\beta_0$  = The constant and the coefficient
- $\beta_i$  = Referred to the elasticities to be estimated
- $\beta_j$  = The elasticity of past values of both dependent and independent variables
- $\beta_d$  = The coefficient of dummy variable
- $\beta_k$  = The error correction coefficient
- $x$  = The dependent variable (i.e., agricultural export)
- $y$  = The vector of explanatory variables
- $v_t$  = The stochastic error term

Note that all the variables were log-transformed, j is lags difference of both dependent and independent variables and Dummy variable captures the effect of trade liberalization on agricultural export with Dummy value zero representing Pre-SAP (i.e., 1970-1985) period and 1 representing SAP and Post SAP period (i.e., 1986-2007).

The justification for the model specification above is that time series variables are always non-stationary. Since, they are used in this model as we shall see later estimating them at level may yield a spurious regression.

Parsimonious error correction model utilizing Ordinary Least Square (OLS) will be employ in evaluating the determinant of agricultural export. In addition to estimating the OLS equation, the study equally looks in to the time series properties of the variables used and carry out the diagnostic test by utilizing Augmented Dickey Fuller test of stationarity (ADF). Also, unit root test on residuals would be carried out to show the long run relationship (cointegration) between agricultural export and all other explanatory variables. This is based on the assumption that if the residual is stationary at level it means there is a long run relationship between dependent and explanatory variables. Hence, they are cointegrated.

## RESULTS AND DISCUSSION

The first step in the estimation of the Agricultural export model is the examination of the nature of the data series. Consequently, a test of time series properties of the variables of the model is performed. This is followed by a conintegration test and Parsimonious model estimation. The results of these various test are presented in what follows.

**Unit root test result:** The unit root test results shows that using 5% critical value criterion, all the variables exhibit trend and noise in the behaviour over time are of integration of order one. This implies that all the variables are stable at their first difference and therefore non stationary (Table 2).

**Cointegration test result:** From the unit root test results, it is shown that all the variables of the Agricultural export model are not stable at levels. Consequently, there arise the question of whether these variables could be combined together to make prediction by carrying out a test on the error terms. If the residual is stationary, co-integration is said to exist and therefore, there is a long run relationship between the variables. After running the OLS estimation of the variables at level, the residual of the equation was tested for unit root utilizing ADF and was discovered to be stationary at both 1 and 5% levels as shown in the result below:

$$\begin{array}{l} \Delta \epsilon = -0.701 \epsilon(-1) - 0.123 \Delta \epsilon(-1) \\ (\tau) \quad -3.283 \quad -0.674 \\ (\text{prob.}) \quad 0.002 \quad 0.505 \end{array}$$

The result revealed that there is existence of cointegration in the agricultural export equation. The 5%

Table 2: Unit root test results

Variables	Augmented Dickey Fuller (ADF) test with drift and trend	Order of stationarity
LOG (AP)		
Level	-1.318657	I (1)
First difference	-3.784346**	
LOG (AQ)		
Level	-2.410489	I (1)
First difference	-4.919439**	
LOG (AX)		
Level	-2.444426	I (1)
First difference	-4.063380**	
LOG (RP)		
Level	-3.485337*	I (1)
First difference	-5.972570**	
LOG (WGDP)		
Level	-3.184712	I (1)
First difference	-5.229823**	
LOG (OILX)		
Level	-2.114822	I (1)
First difference	-4.861256**	
Critical values	5%	10%
Auxiliary ADF regression with drift and trend at level	-3.5386	-3.2009
Auxiliary ADF regression with drift and trend at first difference	-3.5426	-3.2032

Researcher's computation using E-views 4.0; AP = World price for Nigeria major agricultural commodities; AQ = Agricultural output (tonnes); AX = Agricultural export value (million naira); RP = Relative Price level; WGDP = World GDP; OilX = Nigeria Oil export value (million naira). \*\*5% significance Level; \*10% significance level

critical value is -1.9504. The unit root tau-value of -3.283 is <-1.9504. We therefore, reject the null hypothesis of no cointegration and we conclude that agricultural export and all other explanatory variables are cointegrated, meaning that they share a similar stochastic trend. Note that cointegrating relationship does not contain an intercept term because the mean of regression residuals is zero (Hill *et al.*, 2008) and we base the test upon estimate values of the residuals. The implication of the result is that the variables of the model could be used to make long-run prediction about agricultural export in Nigeria.

**Parsimonious error correction model result:** The result of the estimation of the Parsimonious model shown in Table 3 represents some basic determinants of agricultural export in Nigeria. Interpreting across the row, the result shows that change in agricultural export is influenced by its 2 years lag and this influence is insignificant at 0.05 level. The result shows that a 100% increase in 2 years lag of agricultural export would lead to 22% change increase in current agricultural export. This means that past agricultural exports does not determine its current export. Further, the coefficient of agricultural price is positive indicating that increase in agricultural price leads to increase in its exports. Given this, a 100% change increase in current price will lead to approximately 62% change increase in agricultural export. This follows aprori

Table 3: Parsimonious error correction agricultural export equation

Variables	Coefficient	t-statistic
C	-0.267	-1.971*
$\Delta$ LOGAX (-2)	0.221	1.235
$\Delta$ LOGAP	0.616	3.187**
$\Delta$ LOGAP (-2)	-0.159	-0.686
$\Delta$ LOGAQ	0.105	0.416
$\Delta$ LOGAQ(-2)	0.255	2.212**
$\Delta$ LOGRP	0.095	1.291
$\Delta$ LOGWGDP	2.479	2.297**
$\Delta$ LOGOILX	-0.102	-0.586
DUMMY	0.182	1.336
ECM (-1)	-0.523	-2.493**
R <sup>2</sup>	0.660	-
R <sup>2</sup> Adjusted	0.518	-
SER	0.308	-
SSR	2.270	-
F-statistic	4.652**	-
Durbin-Watson statistic	2.109	-

Researcher's computation using E-views 4.0; \*\*5% significance level and \*10% significance level

expectation since price increase is expected to lead to increase in agricultural export supply. This result, therefore shows that current agricultural export in Nigeria is being positively influenced, significantly by its current price. However, the change in 2 years lag of agricultural price shows a negative insignificant relationship with the change in current agricultural export. This result is a clear indication that price increase is a motivation for agricultural export in Nigeria (Fig. 2) and a world price increase than what is obtain at home will motivate agricultural export significantly in Nigeria.

Moreover, agricultural output coefficient is positive indication a positive relationship between change in current agricultural output and change in its current export. This relationship is found to be insignificant at 0.05 level. The result indicates that if current agricultural output change by 100% its export will change only by approximately 11%. However, change in 2 years lag of agricultural output significantly positively influence change in its current export. It, therefore means that agricultural export is being determined by its past output which may imply that farmers concentrated more on maintenance of existing farms with new farms produce yielding at a decreasing rate.

It is also observed that relative price has a positive sign indicating that if relative price increase agricultural exports will decrease. An 100% change increase in relative price will lead to 10% change increase in agricultural exports. Given this result if Purchasing Power Parity (PPP) holds for Nigeria, a depreciation of naira against dollars will as expected, improve agricultural exports. This outcome is consistent with the fact that if the naira is devaluated there will a be positive impact on the export. However, the relative price coefficient did not pass 5% significance level test meaning that it does not determine

agricultural export in Nigeria. The economic implication of this result is that a devaluation of naira will not significantly improve agricultural export. This outcome is therefore consistent with the fact that agricultural export is not determined by the devaluation of naira and devaluation without a corresponding ability to produce enough to generate export will not lead to significant export increase.

Also, the coefficient of world income as expected has a positive sign which indicate that an 100% change increase in world income will generate 248% change increase in agricultural export. This relationship is found to be significant at 0.05 level of significance. This means that world income determines agricultural exports in Nigeria and the world income elasticity of cocoa export in Nigeria is elastic.

As showed in the Table 3, the coefficient of change in current oil export value has a negative relationship with change in current agricultural export. The relationship shows that a 100% change increase in current oil export will generate 10% change decrease in agricultural export. However this negative influence does not pass 5% significance level test. This means that though, oil export has a negative influence on agricultural export in Nigeria but this does not determine agricultural export.

Finally, the coefficient of the dummy variable which captures the effect of trade liberalization on agricultural export shows that there is 18% increase in agricultural export between the pre-liberalization and liberalization period. In particular, the result shows that agricultural export tends to rise as policy shifts from non-liberalization to liberalization in Nigeria. The coefficient of dummy variable is not significant indicating that trade liberalization does not determine agricultural export in Nigeria. It only has a positive insignificant influence on it. To check for the speed of adjustment of the model from the short run to the long run equilibrium state, we consider the error correcting term ECM (-1). The greater the coefficient of the error correcting term, the faster the speed of adjustment of the model from the short run to the long run. In the results obtained from the model, the coefficient of ECM (-1) as shown in Table 3 is approximately -0.52. Considering its absolute value, it is notice that the speed of adjustment from short run to long run is 52%. This shows that the ECM (-1) has a relatively high speed of adjustment. This outcome is consistent with the fact that agricultural export is likely to respond to the condition of the explanatory variables.

The agricultural export model is of a good fit. This is shown by the coefficient of determination that is  $R^2$  value of 0.66. This means that 66% variation in the dependent variable (agricultural export) is explained by the independent variables. The F-value calculated is 4.652 and

this shows that it is statistically significant at 5% level. This basically means that the explanatory variables simultaneously explain the variations in the dependent variable. The Durbin Watson value of 2.1 against the  $R^2$  value of 0.66 means that the model is reliable in explaining agricultural export in Nigeria.

## CONCLUSION

The study should be seen as one of the ways in assessing the determinants of agricultural export. Econometrics techniques have been applied in order to assess these determinants. The literatures show that different arguments have been advanced on the determinant of primary goods export and particular agricultural export in any open economy. Although, the determinants of agricultural export varies by studies, this study found out that the major determinants of agricultural export in Nigeria are its world price, its past output and world income with the past output being an endogenous determinant while world price for Nigeria major agricultural commodities and world income an exogenous determinants. Among the findings of the study is that trade liberalization will not lead to improvement in the quantity of agricultural exports and relative price increase and oil export will also not have any significant effect on agricultural export. However, all these variables have a positive relationship with agricultural exports in Nigeria except oil export.

The foregoing discussion clearly shows that the present agricultural export have high demand elasticity of world income and relatively low price elasticity of demand. In other words, a sharp increase in price may not lead to sharp decline in demand. On the other hand when world income increases demand will increase appreciably. The agricultural export seem to exhibit characteristics of normal goods.

## RECOMMENDATIONS

Several policy lessons can be drawn from the findings of this study. Nothing in the foregoing analyses negated the proposition that agricultural export in Nigeria cannot be hinged on endogenous factors alone, it is also being determined by exogenous factors.

It is important that appropriate measures should be put in place to encourage the production of cocoa in Nigeria which has long been neglected due to the discovery of crude oil in Nigeria. More importantly, trade liberalization is found not to be significant in this study this means that trade liberalization needs to be embedded within a coherent set of macroeconomic, structural and social policies in order to be successful in terms of increasing agricultural output which is expected to lead to



improvement in the agricultural export. Nigeria needs to be committed to development of efficient technology in agricultural production since present agricultural output is found to insignificantly influence its export. It will involve some level of sacrifice on the part of Nigerians and their political leaders. This study however, examine and shed some light on the determinants of agricultural export in Nigeria.

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