



Effects of Trade Liberalization on the Production and Export Performance of Cocoa in Nigeria

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Abstract- The study was carried out to examine the effects of trade liberalization on the production and export performance of cocoa in Nigeria. Secondary data were used to obtain information on cocoa. The data were analysed by trend and the regression analysis model. The data analysed covered a period of about 40 years from 1969 – 2009 which was sub-divided into two sections tagged pre-liberalization period (1969/1970 to 1984/1985) and liberalization period (1985/1986 to 2008/2009). The results from empirical analysis showed that the mean quantity of cocoa produced during the liberalization period was higher than that of the pre-liberalization period by approximately 2,113,690 tonnes. The coefficients of the trend variables for quantity of cocoa export in the pre and during liberalization regime were significant at 1% respectively, which implies that the growth in cocoa output was highly time dependent. There was also a direct relationship between the quantity of Cocoa output and population, which were significant determinants of Cocoa output in Nigeria in the pre and during liberalization. Based on the findings, it was recommended that reassessment of the country's trade liberalization policies and their effectiveness should be considered by the government.

Keywords: *empirical analysis, export performance, output, population, trade liberalization*

1. Introduction

Agriculture is of central economic importance to the Nigerian economy. Nigeria was once heavily dependent on agriculture, with the sector accounting for more than 40 percent of the GDP in the pre-independence and early 1960s, however mid 1970s and early 1980s saw agricultural output in Nigeria decline 1.9% and exports fell 7.9%. Nigeria has been losing about 10 billion dollars annually in export opportunities in the agriculture sector (Adesina, 2011). Cash crops production in Nigeria grew on a faulty foundation in that the British colonial administration who nurtured it had ulterior motives. Their main objective was extraction or exploitation of the country's primary resources and not economic development. In fact, the colonial agricultural policies marked the beginning of food crises in Nigeria, a situation which only worsened onwards (Dibua, 2002). A key feature of the faulty foundation was the dependence on peasant farmers to produce cash crops. For example, Vos *et al.*, (2003), reported that roughly 95% of cocoa production came from smallholder farmers. Cocoa was introduced into Nigeria in 1874 and it has grown in importance in the country's economic life.

Cocoa (*Theobroma cacao*) is important as a foreign exchange earner in Nigeria and some parts of the West African sub regions. The cocoa beans are very useful in the production of cocoa beverage, chocolate candies and cocoa butter which are very rich in proteins, fats, carbohydrates and Vitamin B complex. As the Nigerian cocoa production output witnessed fluctuating trend, so also the producer price of Nigerian cocoa has been fluctuating over the years. Behind Côte d'Ivoire, Indonesia and Ghana, Nigeria is the fourth largest producer of cocoa beans in the world. Cocoa is the country's most important export after petroleum. Before independence, cocoa generated 90% of Nigeria's foreign exchange earnings, eclipsed these days by oil as the country's major export. Cocoa has been a leading agricultural export commodity and major source of foreign exchange earnings and economic development in Nigeria over time (Abang. S. O. and H.M. Ndifon, 2002). As the number one commodity in the agricultural export list in Nigeria, its production, domestic consumption and exports have remained central concerns of government, exporters and importing countries alike.

Agricultural exports decreased in quantity after 1970, partly because of the discouraging effect of low world prices. It also important to note that the agricultural sector has not been the only sector in decline, before the trade liberalization policy in the 1980, the manufacturing sector constituted 17% of total Nigerian GDP, as at 2006 manufacturing had drop to a pitiable 3% contribution to total GDP, productivity in the industrial sector has also continued to fall. The study of trade liberalization which has dominated conventional wisdom in recent

years as far as economic policy has been linked with economic growth by various studies. Trade policy since the 1960s has witnessed extreme policy swings from high protectionism in the first few decades after independence to its current more liberal stance (Adenikinju, 2002). The main thrust of trade policy is therefore the enhancement of competitiveness of domestic industries, with a view to, inter alia, stimulating local value-added and promoting a diversified export base. The Trade liberalization policy in Nigeria was initiated principally to support the agricultural sector in general and agricultural export. Specific trade liberalization measures include: the removal of bureaucratic controls on trade, the import licensing system and the exchange control on all current transactions. Agricultural trade liberalization essentially encompasses reforms in the trade and exchange rate domains and this involved liberalization of the exchange rate, relaxation of import restrictions, trimming of the import prohibition list and reduction of tariffs on imports. These measures were intended to expose local producers to international competition and fair trade in the spirit of the tenets of the World Trade Organisation (WTO). In quantitative terms, the contribution of cocoa subsector to Nigeria's total agricultural export earning averaged of 60.14% between 1971 and 1975, 87.5% between 1976 and 1980, 84.6% between 1981 and 1985, 76.8% between 1986 and 1990 and 45.6% between 1991 and 1996. The contribution of cocoa to Nigeria total commodity export averaged of 5.89% between 1971 and 1975, 3.76% between 1976 and 1980, 1.9% between 1981 and 1985, 3.2 between 1986 and 1990 and 1.1% between 1991 and 1996. Till date, cocoa is the most consistent and relevant export commodity in Nigeria (Amos, 2007). Therefore, this study is specifically aimed to examine the economic performance of cocoa production and its export to boost the Nigerian economy.

2. Methodology

2.1 The Study Area

This study was carried out in Nigeria. Nigeria is a West African country, sub-region of sub-Saharan Africa; between Latitudes 4⁰ to 14⁰ North and Longitudes 2⁰2' and 14⁰30' East. Agricultural holdings are generally small and scattered, farming is often of the subsistence variety characterized by simple tools and shifting cultivation. These small farms produce about 80 percent of the total food. About 30.7 million hectares (76.75 million acres) or 33% of Nigeria's land area are under cultivation. Nigeria's diverse climate from the tropical areas of the coast to the arid zone of the north make it possible to produce virtually all agricultural products that can be grown in the tropical and semitropical areas of the world. The country is well endowed with expansive arable and fertile lands. It is bordered by the sea to the south and has several rivers, streams, lakes, forests and grasslands. The climate and soil types vary across the regions that allow ecological specialization. Five ecological zones influenced by the climate are identifiable namely as mangrove swamp, rain forest, forest savannah, guinea savannah and sudan savannah. Nigeria has an active and vibrant population of over 150 million people. Thus, it is well positioned to be self-sufficient in the production of food and cash crops for local consumption and export as well as raw materials for her industries (CBN, 1995). Cocoa, groundnut and palm oil constitute Nigeria's main cash produce. Cocoa is grown in the South West including Cross River, the principal commercial crops from the North is groundnut while palm oil is produce from the South East and South-Central area of the country. Nigeria is generally endowed with abundant natural resources, numerous all-season rivers and a favourable tropical climate. Rainfall is generally adequate and well distributed throughout the country. Out of the 98.321 million hectares of land available in Nigeria, about 75.30% may be regarded as arable land, 10% is under forest reserves and the remaining 13.02% is assumed to be made up of permanent pastures, built up areas and uncultivable waste. In the light of the foregoing, agriculture is still a major sector as well as remains of the cornerstone of the Nigerian economy.

2.2 Method of Data Collection

The study made use of secondary data. Data on cocoa production and export performance were obtained from various publications of the Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), publications of the Government of Nigeria, Cocoa Research Institute of Nigeria (CRIN) Ibadan, Food and Agricultural Organisation of the United Nation (FAO) and United Nations websites. The secondary data used in the research covered the period 1970 to 1985 for the pre-liberalization period and 1986 to 2009 for the liberalization period.

2.3 Analytical Techniques

Data were analysed through the use trend analysis model. The exponential trend or log linear trend were also employed in line with Onyenweaku and Okoye (2005, 2008) and it is fitted as:

$$\ln Y_{it} = \beta_0 + \beta_1 t + e_{it} \dots\dots\dots (i)$$

$$\ln Q_{it} = \beta_0 + \beta_1 t + e_{it} \dots\dots\dots (ii)$$

Where,

- $\ln Y_{it}$ = output of the selected agricultural cash crop (e.g. Cocoa) measured in tonnes.
- $\ln Q_{it}$ = export of selected agricultural cash crop (Cocoa) measured in tonnes.
- β_0 = the constant in the regression line.

- β_1 = the trend coefficients.
- t = trend measured in years.
- e_{it} = the error term.

In line with Onyenweaku (1993, 2004), the compound growth rate equation was given as:

$$r = (e^\beta - 1) \times 100 \dots\dots\dots (iii)$$

Where,

e = Euler’s exponential constant (2.71828).

β = estimated coefficient in equations (i) and (ii) respectively.

To achieve this, t- distribution was used. A paired sample t-test was employed to test for differences between the mean values and growth rates of output and of cocoa in the pre and during liberalization.

The t- statistic is given as;

$$T = \frac{X_i - X_j}{Sp^2(1/n_i + 1/n_j)} \dots\dots\dots (iv)$$

Where, Sp^2 is pooled variance given as;

$$Sp^2 = \frac{(n_i - 1)S_i^2 + (n_j - 1)S_j^2}{n_i + n_j - 2} \dots\dots\dots (v)$$

- X_i = output and export for cocoa in the pre-liberalization period.
- X_j = output and export for cocoa in the liberalization period.
- n_i = number of output and export for cocoa in the pre-liberalization period.
- n_j = number of output and export for cocoa in the liberalization period.
- S_i^2 = variance of output and export for cocoa in the pre-liberalization period.
- S_j^2 = variance of output and export for cocoa in the liberalization period.
- $n_i + n_j - 2$ = degree of freedom.

Data were also analysed using a regression model for the determinants of cocoa export performance in the pre-liberalization and liberalization periods were specified in its implicit form as;

$$\lambda_t = f(PPQ_t, Q_t, REXR_t, WPQ_t, DUQ_t, TREND_t) + e_i \dots\dots\dots(vi)$$

Where,

- λ_t = export quantity of cocoa in the current period t in (tonnes);
- PPQ_t = average producer price of commodity i (Naira /tonne);
- Q_t = output quantity of cocoa in the current period t in (tonnes);
- $REXR_t$ = real exchange rate (N/\$) in period;
- WPQ_t = world price of commodity i (Naira /tonne);
- DUQ_t = domestic utilization of commodity i (tonne);
- $TREND_t$ = linear trend time (T = 0, 1...15 in the pre-liberalization period and T = 0, 1--23 in the liberalization period), a proxy for technology, which measures productivity effect;
- i = stance for cocoa;
- e_i = error term

3. Results and Discussion

Table 1: Test of significance of mean of cocoa output in the pre-liberalization and during liberalization periods

Samples	Mean	Std. Dev	Std. Error Mean	DF	t-statistic
Production/ Output Quantities of Selected Cash Crops (tonnes)					
Pre-Liberalization Cocoa ^a	127208.333	99508.784	20312.060		
During Liberalization Cocoa ^b	2.2409E6	1.14057E6	2.32816E5	23	-9.159***
(a-b)	-2.11369E6	1.04106E6	2.30785E5		

Note: ***, ** and * represent 1%, 5% and 10% significance levels respectively. a-b represents paired sample differences.

Evidence from the t-test results in the above table shows that the output quantity of cocoa during the liberalization period was higher than that of the pre-liberalization period by approximately 2,113,690 tonnes. There was a significant difference in the mean average growth rate of cocoa production for the two periods. This indicates that the rate of growth of cocoa output has been faster due to liberalization policy, hence quantity of cocoa output shows heterogeneity in growth. Therefore, liberalization policy may have on the average progressively increased cocoa output in Nigeria.

Table 2: Estimated trend equations for exports of cocoa pre-liberalization and during liberalization periods

Variables/Periods	B ₀	B ₁	R ²	Adj.R ²	F-Ratio
Trend in Cocoa Export					
Pre-Liberalization Period	12.456 (251.4)***	0.042 (7.5)***	0.799	0.785	55.608***
During Liberalization Period	12.167 (164.9)***	0.041 (7.5)***	0.720	0.708	56.703***

Note: ***, ** and * represent 1%, 5% and 10% significance levels respectively. Figures in brackets are t-values

Table 2 above shows significant changes in the quantities of cocoa exported within the two periods (pre-liberalization and during liberalization periods). Cocoa exhibited a positive trend in its export growth both in the pre and during the liberalization regime. The coefficients of the trend variables for quantity of cocoa export in the pre and during liberalization regimes were significant at 1% respectively. This implies that the time trend variable was a major factor in determining cocoa exports for both the pre and during liberalization periods and that cocoa export significantly increases from 1970 to 2009. The above table 2 further illustrates, that the coefficient of multiple determination is high (R²=0.72) and significant (p<0.01) during the two periods of significant growth in cocoa export. This implies that growth in cocoa export was highly time dependent.

Table 3: Regression results for the determinants of cocoa output in the pre - Liberalization period

Variable	Linear	Exponential	Semi-log	Double-log ⁺⁺
PPCO _t	-0.003 (-0.583)	-1.16E-05 (-0.438)	-4.831 (4.564)***	-0.027 (-1.075)
RAINFALL _t	-0.133 (-2.778)***	-0.001 (-2.282)*	21.844 (1.547)	0.098 (1.265)
REXR _t	125.035 (5.752)***	0.703 (2.416)*	-81.706 (-1.964)*	-0.398 (-2.148)**
WPCCO _t	-0.638 (-3.389)***	-0.004 (-3.313)**	40.317 (4.393)***	0.210 (4.189)***
GCEA _t	0.062 (3.458)***	0.003 (3.669)***	21.721 (2.945)***	0.116 (2.865)***
AHCOCOA _t	-9.15E-06 (-0.061)	1.19E-07 (0.138)	48.599 (0.591)	0.237 (0.527)
TREND _t	16.140 (1.136)	0.044 (0.537)	85634.94 (1.659)	558.299 (2.216)**
POP _t	-0.004 (-0.602)	-2.43E-06 (-0.060)	1565.121 (1.971)*	10.191 (2.346)**
Constant	-31594.73 (-2.142)**	-86.215 (-0.544)	632810.7 (1.954)*	4120.897 (2.207)**
R ²	0.797	0.771	0.868	0.871
Adj R ²	0.793	0.768	0.863	0.867
F-Statistic	6.506***	5.045**	23.047***	24.729***
DW-statistic	2.291	2.301	2.523	2.460

Note: ***, ** and * represent 1%, 5% and 10% significance levels respectively. Figures in brackets are t- values and variables are as defined in the equation which means lead equation.

The model revealed that the explanatory variables included in the model explained about 87.1% of the observed variations in the quantity of cocoa output in Nigeria in the pre-liberalization period. Real exchange rate, world price of cocoa, Government capital expenditure on agriculture, trend variable and population growth were significant determinants of cocoa output in Nigeria in the pre-liberalization period. There was a direct relationship between the quantity of cocoa output and

population which implies that cocoa output will increase as more people engage in cocoa farming with the increase in population. An increase in population especially in those rural areas where cocoa production is predominant will likely make it possible for cocoa farmers to have more available labourers to hire and use for cocoa production.

Table 4: Regression result for the determinants of cocoa output in the liberalization period

Variable	Linear	Exponential	Semi-log	Double-log++
AHCOCOA _t	0.977 (1.754)	-6.98E-07 (-2.667)**	1416649.0 (1.359)	1.605 (2.374)**
GCEA _t	16.041 (2.746)***	4.16E-06 (1.905)*	-1769.184 (-0.014)	-0.010 (-0.184)
POP _t	70413.71 (2.576)**	0.003 (0.253)	13426055 (2.631)**	5.493 (2.549)**
PPCO _t	0.069 (0.627)	-1.12E-08 (-0.243)	5103861 (2.631)**	1.212 (8.049)***
RAINFALL _t	-587.051 (-1.713)	-0.002 (-1.873)*	62478.71 (9.552)***	0.103 (1.038)
REXR _t	128792.2 (1.901)*	-0.038 (-1.259)	235567.3 (0.775)	0.254 (2.315)**
WPCCO _t	-50.129 (-1.194)	2.80E-05 (2.224)**	209345.9 (1.898)*	-0.029 (-0.635)
TREND _t	141584.2 (7.669)***	0.107 (9.826)***	1640958 (1.867)*	1.315 (3.543)***
Constant	-66777.40 (-0.202)	13.933 (92.984)***	3058348 (2.937)**	2.341 (28.064)***
R ²	0.778	0.780	0.842	0.855
Adj R ²	0.745	0.768	0.807	0.827
F-Statistic	77.078***	79.797***	26.567***	34.494***
DW-statistic	1.702	1.889	2.294	1.996

Note: ***, ** and * represent 1%, 5% and 10% significance levels respectively. Figures in brackets are t- values and variables are as defined in the equation which means lead equation.

The model revealed that the explanatory variables included in the model explained about 85.5% of the observed variations in the quantity of cocoa output in Nigeria in the liberalization period. Area harvested of cocoa, population, producer price of cocoa, real exchange rate and trend variable were significant determinants of cocoa output in Nigeria in the liberalization period. There was a direct relationship between the quantity of cocoa output and population. This implies that cocoa output will increase as more people engage in cocoa farming with an increase in population. An increase in population especially in those rural areas where cocoa production is predominant will likely make it possible for cocoa farmers to have more available labourers to hire and use for cocoa production as earlier observed.

4. Conclusion and Recommendations

In conclusion, it was observed that the Nigeria’s dominance on the agriculture during colonial era provided a recipe for the disaster that followed soon after their exit in the absence of vital structures to sustain focused commercial production of cocoa. The numerous policies of liberalization meant to turn around the fortunes of Nigeria’s cocoa production but due to incompatibility of the policies with Nigeria’s climate, social peculiarities, poor planning and implementation procedures of the government and implementing partner could not sustain its dominance. Liberalization was noted not to alter the course of Nigeria’s cocoa production and export as the growth of both accelerated significantly irrespective of the implementation of liberalization. Also factors such as real exchange rate, the world price of cocoa, government capital expenditure on agriculture, and population growth among other trend variables were found to be major players in determining the production performance and export of cocoa from Nigeria.

The current implementation process of liberalization needs to be reassessed for efficacy and compatibility with policy package restructured to target accelerated growth rates in cocoa production. Similarly, there is need to

advocate the removal or simplification of administrative controls and government interventions in the production and export of cocoa. Finally, efforts should be channeled to privatized commercial cocoa production to boost the output level.

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