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IMPACT OF COCOA EXPORT ON NIGERIA'S ECONOMY (1986–2024): AN APPLICATION OF CO-INTEGRATION AND ERROR CORRECTION MECHANISM

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ABSTRACT: *This study assessed the impact of cocoa export on Nigeria's Gross Domestic Product (GDP) from 1986 to 2024 using s time-series data gotten from FAO, CBN, NBS, CRIN, and other relevant sources. Trend analysis was conducted using the exponential growth model, while the long-run and short-run relationships between cocoa export and Nigerian GDP were estimated using the ARDL methodology after confirming mixed co-integration orders through Augmented Dickey Fuller and Philip Peron unit root tests. The results revealed substantial fluctuations in cocoa export volumes across the study period, although cocoa export exhibited a significant annual growth rate of 11.54%, suggesting strong time-dependent expansion. ARDL bounds testing confirmed a long-run equilibrium relationship among economic growth, cocoa export, labor force, exchange rate, and other macroeconomic variables. In the long-run model, cocoa export, labor force, and real exchange rate significantly and positively influenced Nigeria's economic growth, while capital formation and inflation exerted insignificant effects. The short-run ECM result showed a significant adjustment speed of 57% back to equilibrium annually. The findings underscore the importance of cocoa export as a vital non-oil revenue source capable of enhancing GDP growth. Strengthening cocoa production, improving export competitiveness, and stabilizing macroeconomic conditions remain essential for Nigeria's sustainable growth.*

KEYWORDS: *Cocoa, Co-integration, Export, GDP*

INTRODUCTION

Cocoa export has historically played a crucial role in Nigeria's economic development. Cocoa is the leading agricultural export of the country and Nigeria is currently the world's seventh largest producer of Cocoa, after Ivory Coast, Ghana, Indonesia, Ecuador, Cameroon and Brazil, and the third largest

exporter in the world, after Ivory Coast and Ghana (Hütz-Adams *et al*., 2022). From the 1950s to the mid-1960s, the Nigerian economy largely depended upon the export of cocoa (Bello & Mitchell, 2022). By the mid-1950s, Nigeria had become one of the world's leading cocoa exporters, with volumes reaching around 280,000 metric tons (Ajagbe *et al.,* 2021). This resulted in cocoa becoming the country's top foreign export commodity, accounting for approximately 30 percent of its foreign-exchange earnings (Oni, 2020). This trend continued until the 1960s, when agriculture represented an impressive 60 percent of Nigeria's GDP (Oni, 2020).

Before the oil boom of the 1970s, cocoa accounted for nearly 30% of Nigeria's foreign-exchange earnings and contributed significantly to GDP (Abang & Ndifon, 2022). However, the discovery of crude oil resulted in a shift from agriculture to petroleum, leading to a decline in cocoa production and export performance. The introduction of the Structural Adjustment Programme (SAP) in 1986 liberalized the exchange-rate regime and aimed to improve agricultural competitiveness. Yet, despite these reforms, the agricultural export sector, especially cocoa continued to experience fluctuations attributed to exchange-rate volatility, low investment, aging plantations, and declining productivity (Olaiya, 2016).

This paper therefore assesses how cocoa exports have influenced Nigeria's economic growth from 1986–2024; a period marked by major exchange-rate reforms, economic cycles, and global market dynamics.

METHODOLOGY

The study was conducted in Nigeria. Nigeria as a geo-political and sovereign country is made up of thirty-six (36) states and the Federal Capital Territory (FCT) (National Population Commission-NPC, 2023). The country is located in West Africa. It is bounded by the Atlantic Ocean to the south and by the Sahelian countries of Niger and Chad Republic to the North. It also shares borders with Benin to the west, Chad and Cameroon to the east It occupies a landmass area of 923,768 $km^2$and surrounded by 13,000 km^2 of water (National Bureau of Statistics-NBS, 2023), and lies between Latitudes 3°15'N to 13°30' N and Longitudes 2°59'E to 15°00' E of Greenwich Meridian (Federal Ministry of Environment, 2020). The country's population was 140, 431,790 people in 2006with an estimated population of 216,783,381 people in 2022 having an annual population growth rate of 2.5% with a population density of 226 per m^2 (NPC, 2023).

Agriculture is the mainstay of Nigeria's economy accounting for 26.84% to overall GDP in real terms in 2022 (NBS, 2023). The country has an agricultural land area of about 84 million hectares, of which 34 million hectares is under cultivation and 220,000 hectares is actually irrigated. There is also diverse and rich vegetation capable of supporting a heavy population of livestock, 267.7 billion m^3 of water for irrigation, 14 million hectares surface water, 57.9 billion m^3 of underground water. Different kind of crops are grown which include; cereals, root and tubers, legumes, oil seeds, fruits and vegetables etc. The major staple crops grown in Nigeria are maize, yam, cassava, cocoyam, rice (in the humid regions), sorghum, millet, maize, cowpea, rice, soybean, potato, and groundnut (in the sub-humid and semi-arid parts of the country). Major cash crops include cocoa, oil palm, cotton, groundnuts, ginger and sesame (NBS, 2023).

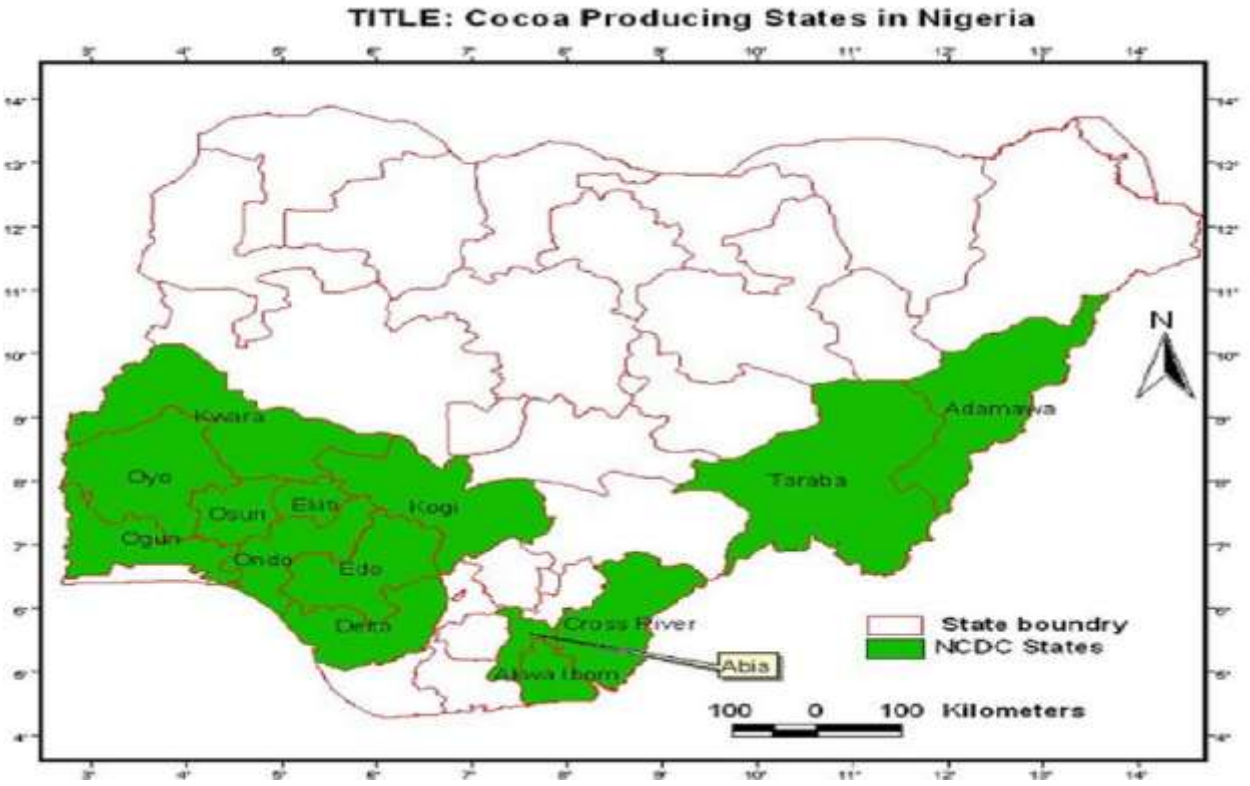

Figure 1: Map of Nigeria showing cocoa producing states

METHODOLOGY

The study made use of secondary data, mostly time series. The data were obtained from the Food and Agriculture Organization (FAO) publications and Global Footprint Network. The secondary data for the research covered a period of 1986-2024 and also covered data on cocoa exports, exchange rates etc. Supplementary data on macro-economic variables were also obtained from the Cocoa

Research Institute of Nigeria (CRIN), International Institute of Tropical Agriculture, (IITA) publications of development finance and research department of the CBN. Also documents of the National Bureau of Statistics (NBS), National Planning Commission (NPC), and other official sources. The supplementary secondary data covered the periods 1986 -2024.

In modeling trend for cocoa export, the exponential trend or log-linear trend was employed in line with Onu *et al*, (2018). The exponential trend or log-linear trend equation for cocoa export and cocoa export value in Nigeria is modeled as follows;

$InCOEX_t = \beta_0 + \beta_1 t + \mu_t$ …………………………………………………………… (1)

Where,

$LNCOEX_t$ = quantity of cocoa export (measured in metric tons) at period t.

β_0 = the constant in the regression line.

β_1 = the trend coefficient.

t = trend variable measured in years (1, 2, 3…43).

μ_t = the error term.

The annual rate of growth of cocoa export was computed in line with Gujarati, Porter (2009) and Onu *et al*, (2018) as;

$r = (e^{\beta} - 1) \times 100$ …………………………………………………………………………… (2)

Where,

e = Euler's exponential constant (2.71828) (Sawant, 1983).

β = parameter to be estimated in equations (1) and (2) respectively.

In determining the influence of cocoa export and other selected macroeconomic variables on Nigeria Economy (GDP), the data were first subjected to a stationarity test and thereafter, ordinary least square (OLS) multiple regression model was employed for the evaluation of the long-run and short-run impact these variables on Nigeria economy. To capture the long-run and short-run response of Nigeria economy to changes in the independent variables of interest, the error correction model (ECM) using the Bounds test methodology was used. The models for these analyses are as follows:

The long- run model that was used to estimate the response of economic growth (RGDP) to changes in the independent variables is implicitly and generally given as

:

$RGDP_t=f(LF_t, CA_t, INFR_t, REXR_t, INTR_t, COEX_t)$ ……... (3)

Where

$RGDP_t$ = the annual real Gross Domestic Product (₦'Billion)

LNF_t = the total labor force (no)

$LNCA_t$ = Gross Domestic Fixed Capital formation (₦'Billion),

$REXR_t$ = Real exchange rate (₦/$)

$INFR_t$ = Inflation rate (%)

$INTR_t$ = Interest rate (%)

$LNCOEX_t$ = quantity of cocoa export (tons),

μ.= error term

From equation 3, equation 4 is derived by taking natural logarithm on both sides of equation 3 in order to discard the differences in the units of measurements for the variables and to minimize the gap between independent variables and dependent variables.

It is then used to analyze the impact/effect of cocoa export on economic growth in Nigeria from 1986 to 2024.

$$LogRGDP_t=\beta 0+\beta_1 LogLF_t+\beta_2 LogCA_t+\beta_3 LogREXR_t+\beta_4 LogINFR_t+\beta_5 LogCOEX_t+\beta_6 LogCOEX_t+E_t \quad ... (4)$$

Where; LGDPt is natural logarithm of real gross domestic product,

$LNLF_t$ is natural logarithm of labor force,

$LNCA_t$ is natural logarithm of gross domestic fixed capital formation,

$LNREXR_t$ is natural logarithm of real exchange rate,

$LNINFR_t$ is natural logarithm of consumer price index proxied by inflation rate,

$LNINTR_t$ is natural logarithm of interest rate

$LNCOEX_t$ is natural logarithm of cocoa export,

E_t is error term

$\beta 0$ is the constant term and

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and β_6 are the parameter estimates

To test for co-integration in order to know the disequilibrium error, equation (4) is rewritten as:

$E_t = LNCOEX_t - \alpha_0 - \alpha_1 LF_t - \alpha_2 CA_t - \alpha_3 INFR_t - \alpha_4 REXR_t - \alpha_5 INTR_t - \alpha_6 COEX_t$ ……. (5)

The presence of co-integration was tested using the Bounds test. The order of integration of the estimated residual, et is tested and if there is a co-integrating regression, then the disequilibrium errors in equation (5) form a stationary time series, and have a zero mean, the et should be stationary, I(0) with E(et) = 0. The longrun equilibrium may be rarely observed but there is a tendency to move towards equilibrium.

Thus, Error Correction Model was used to represent the longrun (static) and short run (dynamic) relationships between RGDP and other variables. Accordingly, Error Correction Model (ECM) is suitable to estimate the effect of determinant variables on RGDP. Thus, equation (6) represents Error Correction Model. Besides, the purpose of ECM model is to indicate the speed of adjustment from the short run equilibrium to the long run equilibrium state. The greater the coefficient of the parameter, the higher the speed of adjustment of the model from short runs to long run. Considering our base equation (3), the ECM model is specified as follows:

$$\Delta RGDP = \alpha_0 + \alpha_1 \sum \Delta LF_{t-1} + \alpha_2 \sum \Delta CAT_{t-1} + \alpha_3 \sum \Delta INFR_{t-1} + \alpha_4 \sum \Delta INTR_{t-1} + + \alpha_4 \sum \Delta REXR_{t-1}$$

$$+ \alpha_4 \sum \Delta COEX_{t-1} + \delta ECM\ (-1) + \varepsilon t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

Where εt is the error term, ECM (-1) is the error correction term, Δ captures the long run impact. The short run effects are captured through the individual coefficients of the differenced terms (α) while the coefficient of the ECM variable contains information about whether the past values of variables affect the current values. The size and statistical significance of the coefficient of the ECM measure the tendency of each variable to return to the equilibrium. A significant coefficient implies that past equilibrium errors play a role in determining the current outcomes.

RESULTS AND DISCUSSION

Trends in Cocoa export and Value (1986 – 2024)

Figure 2 shows the trends in the quantity of cocoa export (Metric tons) in Nigeria from 1986 to 2024

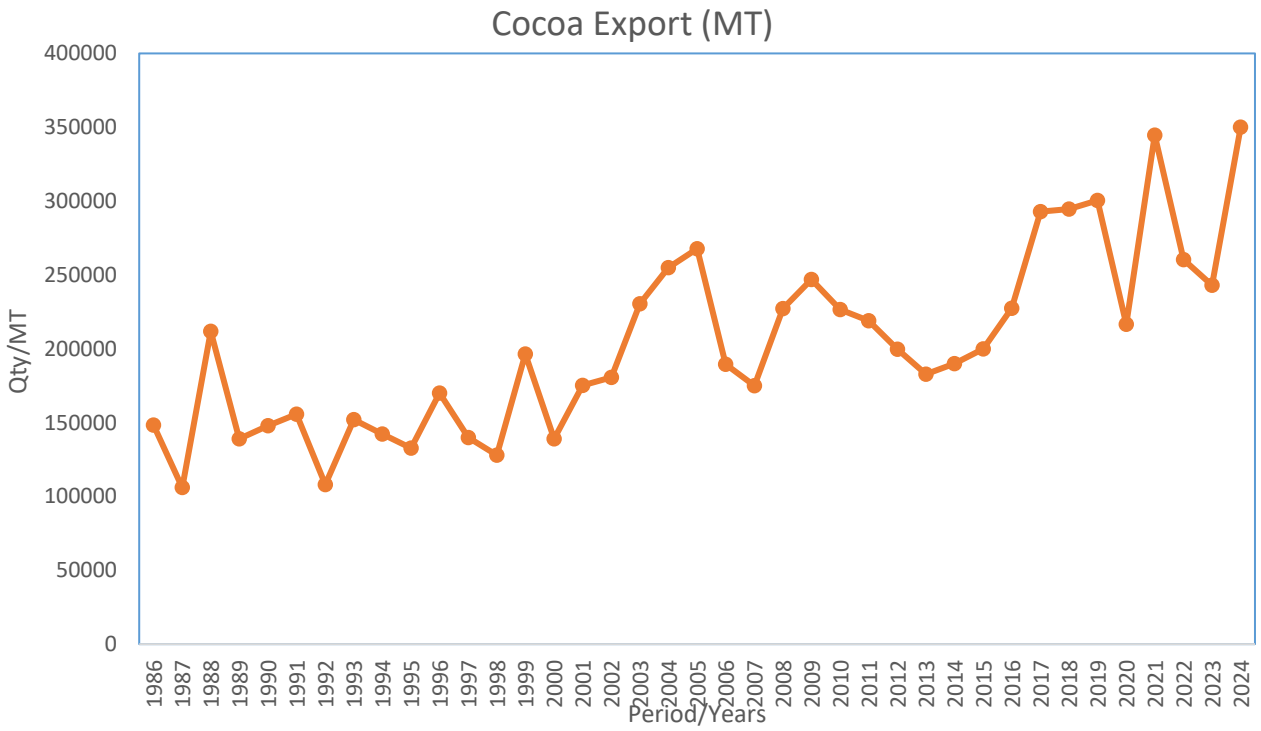

Figure. 2 Trend in cocoa export of Nigeria (1986-2024).

Figure 2 shows the trend of annual cocoa export in Nigeria from 1986 - 2024. It could be seen from Figure 2 that the estimates are not consistent as they do not show steady increasing or decreasing trend over the period. This confirmed that during the study period, the export volume of cocoa in Nigeria increased and decreased severally. Specifically, the result showed a lower level of cocoa from 1980 to 1987 with the least recorded in 1985; this may be as a result of the oil discovery in country in the 1970s and 80s with the effort of the government concentrated more on oil than agriculture as well as the adverse effect of the Cocoa Marketing Board (Idowu, 2017). There was increase in the cocoa beans export 1988 which dropped again in 1989. Cocoa export maintain a decreasing and increasing trend from 1989 to 2000; rose sharply in 2003 and maintained an increasing trend till 2005 , indicating good performance of the Cocoa Re-birth programme launched in 2005 by the federal government This sharp and consistent increasing trend within that period could also be as a result of the success of the Structural Adjustment Programme (SAP), introduced by then-government, on cocoa production which triggered increase in its exportation (Gama *et al*, 2021). This was followed by a sharp decline of annual cocoa export from 2005 to 2007. There was a sharp increase of cocoa export in 2017 which continued through 2019, reaching the maximum export volume of (300518.56 tons) of annual cocoa export of the period under study. It then dropped sharply in 2020, increased again in 2021 and recorded its highest increased in 2024 with an

average export volume of 350000 metric tons per annum. This result agrees with those of Ajagbe et al (2021).

Growth Rate of Cocoa export in Nigeria (1986-2024)

The estimated growth rates of the variables under study are presented in Table 1

Table 1: Estimated Exponential Trend Equations Growth Rate for Cocoa export in Nigeria for the period under study.

Variable	β_0	β_1	r^2	F-ratio	Growth Rates (%)
COEX	3.034134 (15.96108) ***	0.109211 (16.16524) ***	0.881633	129.3510 ***	11.54

Source: Computed from time-series data, 1986 - 2024 Note: * imply statistically significant at 0.01 probability levels respectively. Figures in brackets are t-values**

Table 1 shows that cocoa export (COEX) in Nigeria exhibited significant growth during the period under review (1986 – 2024). The results show that the time variable was significant in influencing the growth of these variables. This is because the coefficient of the time variable was positively signed and statistically significant at 1%. Table 1 shows further that from 1986 – 2024, the coefficients of simple determination were high (r^2= 0.881633) and significant ($p<0.01$).

This Implies that 88% and 91% of the total variations in cocoa export (COEX) and cocoa export value (COEX) respectively were due to time trend variable. This also implies that growth in these variables was highly time dependent. The F –ratio is statistically significant at 1% alpha level indicating that the model gives a good fit, has a sound explanatory power, confirming the overall significance of the regression (trend) model and as such can be used for forecasting purposes.
Furthermore, the significance of the F-ratio at the 1% alpha level underscores the robustness and reliability of the relationship between this variable and the time trend.

The coefficient of the time variable is positively signed and statistically significant at 1%. The positive sign of the coefficient indicate that as time increased, there was a corresponding increase in the variable and vice versa suggesting that over the period studied, there had been a statistically significant and positive trend in cocoa export. In other words, as time progressed, COEX and COEX also increased.

The annual compound growth rate for cocoa export is 11.54%. These growth rate reflects the expansion and development of traditional agricultural exports influenced by a combination of factors such as technological advancements, changes in agricultural practices, shifts in global demand, and government policies. One of the key implication of these growth rates is the positive effect it has had on the economy. Sustained growth rate in cocoa export and economic growth could contribute in facilitating foreign exchange earnings (Onu, 2018).

EFFECT OF COCOA EXPORT AND OTHER MACROECONOMIC VARIABLES ON THE ECONOMIC GROWTH OF NIGERIA

Unit Root Test

The results of the unit root test using the Augmented Dickey-Fuller (ADF) and the Phillips-Peron (PP) tests are presented in Tables 2 and 3.

Table 2: Augmented Dickey Fuller (ADF) test

Variable	**ADF statistics**				
	Level	Critical value at 5% level	1st difference	Critical value at 5% level	Remarks
COEX	-0.942387	-2.921175	-6.977086	-2.922449	I(1)
GDP	-1.576899	-2.933158	-2.438182	-2.925169	I(1)
LF	-1.483177	-2.921175	-7.21391	-2.922449	I(1)
CA	-17.26484	-2.921175	-	-	I(0)
INTR	-2.239542	-2.921175	-7.50709	-2.922449	I(1)
EXR	-0.255813	-2.921175	-5.67399	-2.922449	I(1)
INFR	-3.196474	-2.921175	-	-	I(0)

Source: author's computation, 2025

Table 3: Phillips-Peron (PP) test

Variable	**PP statistics**				
	Level	Critical value at 5% level	1st difference	Critical value at 5% level	Remarks
COEX	-1.671828	-2.921175	-7.00761	-5.844898	I(1)
GDP	-0.970609	-2.921175	-7.39264	-2.922449	I(1)
LF	-1.597721	-2.921175	-7.563448	-2.922449	I(1)
CA	-10.56387	-2.921175	-	-	I(0)
INTR	0.978440	-2.921175	-	-	I(1)
EXR	-0.344891	-2.921175	-5.667251	-5.844898	I(1)
INFR	-3.196474	-2.921175	-	-	I(0)

Source: author's computation, 2025

The result of the Augmented Dickey- Fuller (ADF) test showed that capital formation and inflation rate were stationary at the level, while other variables were stationary after their first difference. On the other hand, result of the Phillips-Peron (PP) test showed that capital formation, and inflation rate were stationary at the level, while the remaining variables were stationary after their first differences. The unit root test results clearly showed that the variables were integrated of mixed integrating order. This permitted the use of the ARDL Bounds testing approach for co-integration test.

Co-integration (Bounds) test

The results of the bounds test for the existence of long run relationship among the variables are presented in Table 4.

Table 4 Bounds test for co-integration

Test Statistic	**Value**	**Sign**	**I(0)**	**I(1)**
F-statistic	4.457260	10%	2.03	3.13
K	7	5%	2.32	3.50
		1%	2.96	4.26

From the result in Table 4, the computed F-statistic value of about 4.46 is greater than the upper critical bound value of 3.50 at the 5% level of significance. This showed that there is long run

equilibrium association among the variables in the estimated equation.

Results of Long run relationship

After determining the order of integration and proving the existence of co-integration among the variables, then the model can be predicted. Therefore, the long run parameters were determined by applying long run model stated in equation four. The result is given in Table 5

Table 5: Long run relationship between agricultural export, selected macroeconomic variables and economic growth

Variable	Coef.	Std. Err.	T-value	P>t
Constant	8.4500	0.2890	29.2010 ***	0.0000
LNLFt	0.1570	0.0420	3.7200 ***	0.0010
LNCAt	0.1900	0.1330	1.4201	0.1640
LNINRt	-0.0610	0.0390	-1.5400	0.1340
LNEXRt	0.1530	0.0320	4.7510 ***	0.0000
LNINFRt	-0.0610	0.0390	-1.5400	0.1340
LNCOEXt	0.0692	0.0240	2.8901***	0.0070
R^2	0.7234			
F-statistic	28.44***			
DW	1.715876			

Computed from time-series data, 1986-2024 Note * represents 1% level of significance**

Results in Table 5, show that the significant variables were LNLF, LNEXR and LNCOEX, at 1% level of significance and LNCA, LNINR and LNINFR are not significant. The R square is high (about 72 percent).This means that the dependent variable was explained by independent variables around 72 percent. There is a positive significant relationship between the dependent variable LNDP and three independent variables (LNLF, LNEXR and LNCOEX). This means that if one of these independent variables increases, the dependent variable will also increase and vice versa.

Impact of cocoa exports on economic growth

The findings in Table 5 show that cocoa export (LNCOEX) has a positive and significant effect on economic growth in Nigeria indicating a 1 percent increase in cocoa export resulted in increase of economic growth by 0.0692 percent and stands less elastic. This result suggests the importance of cocoa for Nigerian economy. Being the principal cash crop, cocoa is the oldest and the most highly marketed agricultural commodities at the international markets. Cocoa has been exported from

Nigeria (the oldest exporter of cocoa as a commodity in the world) for more than 1500 years (Tigist, 2022). Cocoa production overlaps with many biologically richest regions of the world. Given the right conditions, cocoa production can be both economically and ecologically beneficial. Originally, cocoa farming was done in shade of trees, which provided natural habitat for many animals and insects. In Nigeria cocoa produced in 4 ways; forest cocoa, semi-forest cocoa, garden cocoa, and plantation cocoa where forest cocoa accounts for about 10 percent, semi forest cocoa for about 35 percent, garden cocoa for about 35 percent, and plantation for about 20 percent (5 percent government, 15 percent private) of total cocoa production in Nigeria(Tigist, 2022). The government of Nigeria has given high priority for cocoa production and export by providing extension service to advise the small holder farmers on how to increase productivity. Commercial farms are encouraged to participate in the growing of cocoa through provision of different incentives like land, and income tax exemption among others. Likewise exporters of cocoa are given different incentives to encourage them to export high quantity of cocoa on time. These include export trade duty scheme, duty draw-back scheme, voucher scheme, bonded manufacturing warehouse, export credit guarantee scheme and foreign exchange retention scheme. These different measures taken by government have improved the production of cocoa and export level in Nigeria (Olaiya, 2016). According to Paulo *et al*, (2021), during the second half of the nineteenth century up to the world economic crisis of the 1930s, the cocoa sector played an important role in many countries such as Brazil, Colombia, Costa Rica, and a bit later and to a lesser degree in other countries in South and Central America. Similarly, Lauretta (2017) points out the positive and significant effect of cocoa export on economic growth of Nigeria, Ghana and Cameroon.

Impact of Labor force (LNLF) on economic growth

The long-run result showed that, labor force (LNGLF) directly influence economic growth. The relationship is positive and highly significant. The result of the labor force (LNLF) indicates that economic growth increases by about 0.1576 percent in the long run due to an addition of one percent in labor force. This means that labor force expansion and economic growth in this study moves in the same directions. The study reports the less share of capital in economic growth as compared with labor's share in growth. The reason may be that Nigeria is the second densely populated country in Africa and labor force is constantly and consistently growing. Human capital is growing due to expanding education, skill and training facilities and provision of better health facilities even in rural or backward areas of the country. Besides these, investment in education and health has increased in private sector as well as by the government. Therefore, Human capital is considered as the primary

source of economic growth. This is supported by Gemechu (2022) and Abolagba *et al* (2020) who has previously looked at exports and economic growth in Nigeria and the role of diversification in reducing impacts of export instability on Nigerian economic growth by including labor force as independent variable in their model.

Muhammad (2022) used labor as one of the independent variable in his model and found relationship between labor and GDP not only positive but more elastic in Pakistan economy. Noula (2022) who have looked at the relationship between labor force expansion and economic growth in Cameroon confirmed that one of the sources of economic growth in Cameroon is from an active labor force.

Impact of gross domestic fixed capital formation (LNCA) on economic growth

The gross domestic fixed capital formation (LNCA) proxy for investment has positive sign and statistically insignificant in explaining the economic growth in the long run. The positive sign indicate the direct relationship between capital and economic growth. The insignificance condition of the capital is indicating low level of investment and low capital intensive economy of Nigeria. The country follows agricultural led industrialization economic policy where agriculture is bridge to manufacturing sector and the manufacturing sector is also concentrate on labor intensive than capital intensive to avoid unemployment since the country have high level of human resource .This result is in line with Muhammed (2015), Gemechu (2022) and Kagnew (2017) who looked at the Agricultural export and economic growth in Pakistan and export performance and stability in Nigeria.

Impact of Real exchange rate (LNEXR) on economic growth

Real exchange rate has positive sign and is statistically significant in explaining the economic growth in the long run. Increase /appreciation/ of real exchange rate by 1 percent increases economic growth by 0.1535 percent. The finding suggests the need to shift in the structure of both production and trade towards products with demand elastic and high value added products since the relationship found is inelastic. This result is in line with the work of Fentahun (2011) and Kagnew (2007) who has previously looked at the impact of real exchange rate on economic growth of Nigeria and the Export performance and economic growth in Nigeria respectively.

Impact of consumer price Index proxied by inflation (LNINFR) on economic growth

The study has found an inverse relationship between growth and inflation (LNINR).Increases of inflation by 1 percent decreases economic growth by -0.06. The coefficient of LNEXR is negative (-0.06) and insignificant. This result is confirming the negative relation between growth and inflation rate. Therefore economic growth can be facilitated even by lowering moderate inflation. This result is supported by Hang (2022) and Noula (2022) who have previously examined the relationship between inflation and economic growth and found the inverse relationship between them.

Results of the Error Correction Model (Short-run effect)

The error correction coefficient tells us the speed at which our model returns to equilibrium after an exogenous shock. As a result, the error correction term should be negatively signed to indicate a move towards long run equilibrium. The coefficient of error term α means that the system corrects its previous period dis-equilibrium at speed of α present yearly, because our data is yearly data. The sign of α should be negative and significant to indicate the validity of long run equilibrium relationship of the model. A positive sign indicates a move away from equilibrium. The coefficient should lie between 0 and 1, 0 suggests no adjustment one time period later, while 1 indicates full adjustment. The result of the error correction term is presented in Table 7 with corresponding short run coefficients of the variables.

Table 6: Short-run relationship between cocoa export, selected macroeconomic variables and economic growth

Variable	Coef.	Std. Err.	T-value	P>t
Constant	0.0130	0.0170	0.7100	0.4800
Δ(LNLF(-1)	0.1490	0.0380	3.9100 ***	0.0000
Δ(LNCAt (-1)	0.1920	0.3670	0.5200	0.6060
Δ(LNINRt(-1)	0.0012	0.0042	0.2870	0.7840
Δ(LNEXRt(-1)	0.1510	0.0540	2.7710 ***	0.0090
Δ(LNINFRt(-1)	-0.0460	0.0330	-1..4101	0.1680
Δ(LNCOEXt(-1)	0.0610	0.0220	2.7800***	0.0090
ECM(t-1)	-0.5660	0.1510	-3.7400***	0.0010
R^2	0.4849			
F-statistic	5.5900***			
DW	1.6107			

Computed from time-series data, 1986-2024 Note * represents 1% level of significance**

In Table 6, it can be deduced that both dependent and independent variables are stationary at first difference. This is because the coefficient of the error correction term is negative, less than one (-

0.566) and highly significant at 1%. The results of the entire model in the short run reveal that the exogenous variables did not all have the expected signs. The variables of interest, cocoa export, sesame export and cashew nut export have a positive effect on economic growth and significant at 1%, 5% and 1% level respectively. Ginger export has a negative and insignificant effect on economic growth, which contradicts what was expected. Labor force growth and real exchange rate have positive and significant effect on growth which is in line with what is expected. The coefficient of the ECM is, -0.57 and it is highly significant at 1% percent and has the appropriate negative sign. Thus, it will rightly act to correct any shocks from the long-run equilibrium up to the tune of 57 percent. This significant value of the ECM explains the existence of long-run equilibrium relationship between agricultural export and economic growth in Nigeria. This established long-run equilibrium relationship in the result reveals that the findings can be used for forecasting and policy recommendations.

CONCLUSION AND RECOMMENDATIONS

This study examined the impact of cocoa export on Nigeria's economic growth spanning the period 1986–2024. Using secondary time-series data obtained from FAO, CBN, NBS, CRIN, IITA, and other official sources, the study employed trend analysis and the ARDL modelling approach to evaluate both long-run and short-run relationships between cocoa export and key macroeconomic variables. Results from the exponential trend model revealed that cocoa export recorded a significant annual growth rate of 11.54%, although export volumes fluctuated due to policy inconsistencies, exchange-rate volatility, and the historical neglect of agriculture following the oil boom.

Unit root tests indicated a mixed order of integration among variables, justifying the application of ARDL bounds testing, which confirmed a long-run equilibrium relationship between cocoa export and economic growth. The long-run ARDL estimates showed that cocoa export has a positive and significant effect on economic growth, with a 1% rise in cocoa export increasing GDP by 0.0692%. Labor force and real exchange rate were also significant determinants of economic growth, whereas capital formation and inflation were insignificant. The short-run ECM results further revealed that about 57% of disequilibrium is corrected annually, indicating a stable adjustment process. These results reinforce the pivotal role of cocoa export as a major non-oil export capable of fostering sustainable economic growth in Nigeria.

Based on the findings, the following recommendations are made:

1. Government and stakeholders should rehabilitate aging cocoa farms, expand the use of improved hybrid varieties, and provide access to quality inputs to boost productivity.
2. Investment in local cocoa processing should be intensified to increase export value. Policies should be designed to support exporters through credit facilities, reduced levies, and improved logistics.
3. Monetary authorities should adopt policy measures aimed at reducing exchange-rate volatility as this directly improves cocoa export performance and international competitiveness.
4. Funding for CRIN and agricultural research institutions should be enhanced to develop high-yielding, disease-resistant, and climate-resilient cocoa varieties.

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