



THE AGRICULTURAL SECTOR AND NIGERIA'S ECONOMIC GROWTH: A VECTOR ERROR CORRECTION MODEL APPROACH

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ABSTRACT

The study examined the impact of agriculture on Nigeria's economic growth, using the vector error correction model approach. Secondary data were obtained from the Central Bank of Nigeria, FAOSTAT and National Bureau of Statistics between 1981 and 2019. Descriptive statistics, Augmented Dickey Fuller test for unit roots, Johansen test for co-integration test and vector error correction model were used. Pre-estimation test showed that variables were I(1); foreign direct investment to the agricultural sector had the highest coefficient of variation (2.50), with the least mean (N18,797.33) and gross domestic product had the least coefficient of variation (0.54). Both trace and maximum statistics of Johansen's co-integration test showed that the variables had long-run relationship. Of the four optimal lag selection criteria used, the FPE, HQIC and SBIC recommended one lag. The chi-square statistics (1674.845, $p < 0.01$) for the overall co-integrating equations confirmed long-run relationship. Findings also showed that the z-statistics (-15.19) of $\ln agdp$ was statistically significant ($p < 0.01$) implying it would increase economic growth in the long-run. Similarly, the z statistic (-4.33) of $\ln noe$ was statistically significant ($p < 0.01$) and would increase economic growth in the long-run. Also, the z-statistic (-5.89) of $\ln fdia$ was statistically significant ($p < 0.01$), and would increase economic growth in the long-run. However, the z-statistics (5.56) of $\ln noi$ (3.3) was positive and statistically significant ($p < 0.01$) implying that it would reduce economic growth in the long-run. The error correction term (-0.2361) suggested that the long run equilibrium would be normalized back if there was any shock to the economic system; and that the speed of adjustment would be 23.61% annually towards equilibrium if the system is distorted. The study concluded that agriculture would be relevant to Nigeria's economy in the long run. Consequently, efforts to attract foreign direct investment to the agricultural sector, increase growth in agricultural GDP and non-oil export and cut in non-oil import, should be sustained by the federal government.

Keywords: Agricultural financing, Error correction term, GDP, Long-run, Co-integration.

INTRODUCTION

Economic growth is an increase in the production of economic goods and services, compared from one period of time to another (Alina-Petronela, 2012; Munichiello and Potters, 2021). In economics, growth is commonly modeled as a function of physical capital, human capital, labor force, and technology. Simply put, increasing the quantity or quality of the working age population, the tools that they have to work with, and the recipes that they have available to combine labour, capital, and raw materials, will lead to increased economic output (Acemoglu, 2012). Ivic (2015) noted that to meet the constantly growing needs of the population, human society is forced into a process of renewal of production of various material goods and services at all times. Thus, Cornwall (2021) viewed economic growth as the process by which a nation's wealth increases over time. Economic growth is also an increase or improvement in the inflation-adjusted market value of the goods and services produced by an economy over time (IMF, 2012).



Different growth models have been utilized to examine the transition from stagnant living standard to a modern era of economic growth. According to Akinkunmi (2017), virtually all of these models incorporate the Malthusian model. In the classical (Ricardian) economics, the theory of production and the theory of growth are based on the theory or law of variable proportions, whereby increasing either of the factors of production (labor or capital), while holding the other constant and assuming no technological change, will increase output, but at a diminishing rate that eventually will approach zero. These concepts have their origins in Thomas Malthus's theorizing about agriculture. Malthus's examples included the number of seeds harvested relative to the number of seeds planted (capital) on a plot of land and the size of the harvest from a plot of land versus the number of workers employed (Bjork, 1999; Emmanuel, 2016).

Statisticians conventionally measure such growth as the percent rate of increase in the real gross domestic product, or real GDP. It is commonly measured in terms of the increase in aggregated market value of additional goods and services produced, using estimates such as GDP (Ivic, 2015). In Nigeria, the Central Bank computes the overall GDP as a derivate of three key components namely, agriculture, industry and services. Basically, these components define the structure of Nigeria's economy and could cause economic acceleration or deceleration. To put this doubt in perspective, Ajide (2014) stated that one of the most fundamental economic issues that have received extensive attention in the economic literature to date centers on what causes economic growth. Hence, following the growing concern among researchers in the field of macroeconomics over evidence-based answers to the determinants of economic growth as enunciated by Akinkunmi (2017), the extent to which agriculture contributes to economic growth in Nigeria constitutes the central theme for this paper. This was based on the conviction that the growth of the agricultural sector is synonymous to that of the entire economy. Anifowose (2017) affirmed that in contemporary Africa, agriculture and industry can be identified as the key sectors whose roles are and would remain crucial to development fortunes. Anwana and Affia (2020) indicated that there is a close link between institutions and economic performance.

There is no gainsaying that agriculture provides food for man, feed for livestock and raw materials for the agro-industry. According to Adeshina *et al.* (2020), agriculture provides food (crop, livestock, fishery and forestry products) for the ever-increasing Nigeria's population; agriculture is the source of raw for other sectors of the economy; it is the largest employer of labour force in Nigeria. Coupled with the vast production potentials and large market, agriculture is imperative to the process of growth and development of an economy (Ehui and Tsigas, 2014). It is the value of the goods and services of the sector that constitute agricultural gross domestic product. The agricultural gross domestic product, itself, comprises broad subsectors like crop production, livestock, forestry and fishing. Production in these subsectors is indirectly connected with the growth of overall economy. To this extent, Evbuomwan *et al.* (2018) stated that increased agrarian productivity in an agrarian economy is certainly, a vital pre-requisite for rapid economic growth and development.

To ensure that agriculture maintains its pride of place in the comity of other sectors, financing is *sine qua non*. In fact, poor financing has been the bane of the development of the agricultural sector along the value chains. In 1972, the Federal Government established the compulsory sectoral allocation to agriculture. According to Afolabi *et al.* (2021), it was the FGN premeditated efforts in providing funds through deposit money banks (DMBs) to the agrarian sector. Through the instrument, the DMBs were instructed to give a precise proportion of their total annual lending as loans to the agrarian sector at concessional rate of interest so as to increase agricultural yield and grow the economy. Udoka *et al.* (2016) confirmed that



inadequate funding of the agriculture sector has been recognized as a leading setback for the agricultural sector in Nigeria. According to Enilolobo and Ode-Omenka (2018), finance is essential for any economy seeking to achieve growth and consequently economic progress. This is possible if finance is invested in a strategic sector where a given country has comparative advantage. Enilolobo and Ode-Omenka (2018) also noted that the lack of credit supply to the agriculture sector is particularly of concern as agricultural credit is an integral part of the process of modernization of agriculture and commercialization of the rural economy. Apart from the domestic arena, there exist palpable international agricultural financing. This is exemplified through the instrumentality of the foreign direct investment (FDI).

Anichebe (2016) indicated that the FDI is the net inflows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in the host country economy. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. Foreign direct investment (FDI) not only provides developing countries (including Nigeria) with the much-needed capital for investment, it also enhances job creation, managerial skills as well as transfer of technology, thereby contributing to economic growth and development. According to Ajide (2014), the FDI inflows have been one of the major development (agricultural) financing options often relied upon by the developing countries, especially of the Africa sub-Saharan region to drive their stunted economies towards a sustainable growth trajectory. Nigeria, like many other Africa countries, has been enjoying the torrent of foreign direct investment inflows to the agricultural sector from the developed countries. (Aminu, 2020) added that most countries strive to attract foreign direct investment (FDI) because of its acknowledged advantages as a tool of economic development. This is the major reason behind the formation of the New Partnership for Africa's Development (NEPAD). The FDI is channeled into specific sectors of the destination economy. However, the role of FDI on economic growth has been vigorously debated in empirical literature (Aminu, 2020).

It was in order to redress this constraint that the Central Bank, through its development finance department, designed and implement several direct credit intervention instruments like the ACGSF of 1977, ABP of 2015, CACS of 2009, Agricultural Credit Support Scheme (ACSS) of 2006, AGSMEISS and others. These facilities, which are routed through the commercial banks, have such mandates which range from food crops, cash crops, livestock, mechanization and commercial agriculture. The underlying assumption of these financial instruments is that they would spur the growth of the agricultural sector and eventually, the overall economy.

The economic growth process encompasses some channels. An important example of such mediating channel is the absorptive capacity of a country in terms of domestic economy's trade policy (Ajide, 2014). Suffice to note that trade policy regulates import and export of oil and non-oil commodities. In Nigeria, agricultural commodities, it can be argued, hold sway in the import and export of non-oil commodities. This argument underscores agricultural marketing as impetus to agricultural development and that of the country. On one hand at the global level, import addresses short-terms shocks in food supply, although it increases trade imbalance which impacts on the overall economy. To this end, Bakari and Mabrouki (2018) stated that agricultural imports have not any effect on economic growth. On the other hand, export affords the originating economy the privilege of foreign exchange earnings, which improves trade balance thereby increasing economic growth. Bakari and Mabrouki (2018) also noted agricultural exports are a fountain of economic growth. Thus, agricultural import and export, which dominate non-oil import and export in Nigeria, also define the structure of an economy. For Nigeria, Anwana and Affia (2020) pointed out that the economy is mostly



primary product oriented, highly import dependent, consumption-driven and undiversified. Obviously, both export and import may play a crucial role in economic development.

The study used key components of the agricultural sector as the explanatory variables of changes of economic growth in Nigeria. In doing so from macroeconomic standpoint, the GDP was conceptualized as a function of agricultural gross domestic product, agricultural financing from FDI and the commercial banks, and agricultural marketing from international trade perspectives. The central model was Vector Error Correction Model (VECM). Technically speaking, in a VEC model, all variables are endogenous (Ajayi *et al.*, 2017).

Economic growth study lends itself to different models. For instance, Lucas (1988) emphasized on the role of human capital accumulation. On the other hand, Hansen and Prescott (2002) focused on a neoclassical model that considers a structural transformation from agriculture to manufacturing. Furthermore, a robust sectoral performance in the country suggested the shift of economic growth determinant from agriculture to the internally directed modern domestic sectors; and also reflected the significant contribution of the private sector to the development process (Akinkunmi, 2017). This is because the financial institutions prefer to give funds to other sectors where payback period is short, return rate is high and the agricultural sector is inadequately funded by the government due to low budgetary allocation to the agricultural sector over the years (Adeshina *et al.*, 2020). Nevertheless, this is the consensus among researchers.

From a general standpoint, Ajide (2014) noted that what can be inferred from the diverse causative factors as highlighted in the literature aptly accentuates lack of consensus and general inconclusiveness of growth causal factors. This background forms the critical research question for this paper. Two similar works have attempted to explain economic growth (proxied by GDP) from the agricultural standpoint. One is Anifowose (2017) whose agricultural sector variables employed were output of agricultural sector, share of agriculture in the GDP, index of agricultural production, and ratio of agricultural output to GDP. Two is Ismail and Kabuga (2016) who used agricultural output, gross capital formation, labour force as the explanatory variables. The current study adds to the renewed interest in agricultural sector-economic growth nexus by adopting agricultural gross domestic product, foreign direct investment to agricultural sector, commercial banks' loan to agricultural sector, non-oil import and export. Therefore, the specific objectives are to examine the trends of overall gross domestic product, agricultural gross domestic product, foreign direct investment to agricultural sector, commercial banks' loan to agricultural sector, non-oil import and export in Nigeria.

MATERIALS AND METHODS

The Study Area

The study focused on the entire Nigerian economy. Nigeria is African most populous country and has emerged as African largest economy as a result of recent “rebasing” exercise (Ismail and Kabuga, 2016). Agriculture remains the mainstay of the Nigerian economy providing employment for 60 to 70% of the labour force. Agricultural holding is generally small and scattered, farming is often subsistence mostly characterized by simple tools and shifting cultivation. Agricultural farming activities are largely in the hands of smallholder farmers (Ismail and Kabuga, 2016).

Sampling Procedure

The design was *ex post facto*. Secondary and macroeconomic data were obtained from the statistical bulletin of the Central Bank of Nigeria. The time series data were subjected to Augmented Dickey Fuller test for unit roots. Other preliminary test includes Johansen test for co-integration and optimal lag selection. The Johansen test for co-integration test permits more

than one co-integrating relationship so is more generally applicable than the Engle–Granger test which is based on the Dickey–Fuller (or the augmented) test for unit roots in the residuals from a single (estimated) co-integrating relationship. The ADF model is specified as in equation 1:

$$\Delta Y_t = \alpha_0 + \alpha_{it} + \delta_{t-1} + \alpha_i \sum_{i=1}^P \Delta y_{t-1} + v_t \quad \dots (1)$$

ΔY_t denotes lag differences of the variable under consideration with p lag

α implies parameters of the model

δ_t and v_t are assumed to be a white noise

The pair of hypotheses for stationarity is stated as follows:

Null hypothesis $H_0: \delta_1 = 0$, where $\delta_1 = p - 1 = 0$; Alternative hypothesis $H_a: \delta_1 < 0$. In other words, where the z-statistics is less than the critical value, fail to reject the null hypothesis. Conversely, if the z-statistics is greater than the critical value, reject the null hypothesis.

Method of Data Collection

Secondary data were used for the study. Annual time series data on economic growth proxied by GDP, agricultural gross domestic product, commercial banks loans to agricultural sector, non-oil import, non-oil export were obtained from the Statistical Bulletin between 1981 and 2019, while data on FDI to agricultural sector were obtained from FAOSTAT and National Bureau of Statistics. All variables were transformed into natural logarithm to reduce the problem of heteroskedasticity.

Model Specification

The Vector Error Correction model was used to investigate the impact of the agricultural output on economic growth in the long run. From Johansen's co-integration model, the VEC model was specified/estimated by differencing a VAR as in equation 2 – equation 7:

$$\begin{aligned} \Delta \ln gdp_t = & \sigma + \sum_{i=1}^{k-1} \beta_1 \Delta \ln gdp_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln agdp_{t-j} + \sum_{m=1}^{k-1} \phi_m \Delta \ln fdia_{t-m} \\ & + \sum_{n=1}^{k-1} \phi_j \Delta \ln cbla_{t-n} + \sum_{o=1}^{k-1} \phi_j \Delta \ln noi_{t-o} + \sum_{p=1}^{k-1} \phi_j \Delta \ln noe_{t-p} + \lambda_1 ECT_{t-1} \\ & + \mu_{1t} \quad \dots (2) \end{aligned}$$

$$\begin{aligned} \Delta \ln agdp_t = & \sigma \\ & + \sum_{i=1}^{k-1} \beta_1 \Delta \ln gdp_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln agdp_{t-j} + \sum_{m=1}^{k-1} \phi_m \Delta \ln fdia_{t-m} \\ & + \sum_{n=1}^{k-1} \phi_j \Delta \ln cbla_{t-n} + \sum_{o=1}^{k-1} \phi_j \Delta \ln noi_{t-o} + \sum_{p=1}^{k-1} \phi_j \Delta \ln noe_{t-p} + \lambda_1 ECT_{t-1} \\ & + \mu_{1t} \quad \dots (3) \end{aligned}$$

$$\begin{aligned} \Delta \ln fdia_t = & \sigma + \sum_{i=1}^{k-1} \beta_1 \Delta \ln gdp_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln agdp_{t-j} + \sum_{m=1}^{k-1} \varphi_m \Delta \ln fdia_{t-m} \\ & + \sum_{n=1}^{k-1} \phi_j \Delta \ln cbla_{t-n} + \sum_{o=1}^{k-1} \phi_j \Delta \ln noi_{t-o} + \sum_{p=1}^{k-1} \phi_j \Delta \ln noe_{t-p} + \lambda_1 ECT_{t-1} \\ & + \mu_{1t} \end{aligned} \quad \dots (4)$$

$$\begin{aligned} \Delta \ln cbla_t = & \sigma + \sum_{i=1}^{k-1} \beta_1 \Delta \ln gdp_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln agdp_{t-j} + \sum_{m=1}^{k-1} \varphi_m \Delta \ln fdia_{t-m} \\ & + \sum_{n=1}^{k-1} \phi_j \Delta \ln cbla_{t-n} + \sum_{o=1}^{k-1} \phi_j \Delta \ln noi_{t-o} + \sum_{p=1}^{k-1} \phi_j \Delta \ln noe_{t-p} + \lambda_1 ECT_{t-1} \\ & + \mu_{1t} \end{aligned} \quad \dots (5)$$

$$\begin{aligned} \Delta \ln noi_t = & \sigma + \sum_{i=1}^{k-1} \beta_1 \Delta \ln gdp_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln agdp_{t-j} + \sum_{m=1}^{k-1} \varphi_m \Delta \ln fdia_{t-m} \\ & + \sum_{n=1}^{k-1} \phi_j \Delta \ln cbla_{t-n} + \sum_{o=1}^{k-1} \phi_j \Delta \ln noi_{t-o} + \sum_{p=1}^{k-1} \phi_j \Delta \ln noe_{t-p} + \lambda_1 ECT_{t-1} \\ & + \mu_{1t} \end{aligned} \quad \dots (6)$$

$$\begin{aligned} \Delta \ln noe_t = & \sigma + \sum_{i=1}^{k-1} \beta_1 \Delta \ln gdp_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln agdp_{t-j} + \sum_{m=1}^{k-1} \varphi_m \Delta \ln fdia_{t-m} \\ & + \sum_{n=1}^{k-1} \phi_j \Delta \ln cbla_{t-n} + \sum_{o=1}^{k-1} \phi_j \Delta \ln noi_{t-o} + \sum_{p=1}^{k-1} \phi_j \Delta \ln noe_{t-p} + \lambda_1 ECT_{t-1} \\ & + \mu_{1t} \end{aligned} \quad \dots (7)$$

where;

GDP = Gross Domestic Product at Constant Market Prices (₦ million)

AGDP = Agricultural Gross Domestic Product at Constant Market Prices (₦ million)

CBLA = Commercial Banks Loan to Agricultural Sector (₦ million)

FDIA = Foreign Direct Investment to Agricultural Sector (₦ million)

NOI = Non-oil import (₦ million)

NOE = Non-oil export (₦ million)

K – 1 = Lag length

β, ϕ, φ , = Short-run dynamic coefficients of the model's adjustment to long-run equilibrium

λ_1 = Speed of adjustment parameter which comes negative sign to ensure convergence to long-run

ECT_{t-1} = Error correction term which is the lagged value of the residuals obtained from the long-run

U_{it} = Stochastic error term called impulses or innovations or shocks in VAR



RESULTS AND DISCUSSION

Summary Statistics of Variables

In Table 1, the summary statistics of the variables in the equation show that foreign direct investment to the agricultural sector (Nm) had the highest coefficient of variation (2.50), even though it had the least mean (N18,797.33). The variable with the least coefficient of variation was gross domestic product (0.54). Large coefficient of variation indicates fluctuation and instability, making future projections difficult. On the other hand, low coefficient of variation shows slow growth rate, which may not be commiserate with the demands that are associated with economic development.

Table 1: Summary Statistics of Variables

Statistics	Sum	Mean	Standard deviation	Coefficient of variation
Gross Domestic Product (Nm)	1,419,000,000.00	36,383,008.00	19,513,498.00	0.54
Commercial Banks' loan to agricultural sector (Nm)	5,389,666.90	138,196.59	204,505.28	1.48
Foreign direct investment to agricultural sector (Nm)	733,095.94	18,797.33	47,014.75	2.50
Agricultural sector GDP (Nm)	310,300,000.00	7,956,730.70	5,349,728.00	0.67
Non-oil import (Nm)	112,100,000.00	2,874,267.10	4,072,084.10	1.42
Non-oil export (Nm)	14,654,573.00	375,758.28	709,791.95	1.89

Source: Computed from CBN Statistical Bulletin and FAOSTAT, 2020

Stationarity Test

The result of the stationarity test is presented in Table 2. It shows that the variables had unit roots at level [I(0)], using 5% critical level. However, they became stationary after first difference [I(1)]. The model for stationarity was trend for all the variables, except FDIA, which was drift. The models were dictated by their line graphs.

Table 2: Stationarity test

Variable	At level I(0)			At first difference I(1)			Model
	Test (Z(t))	statistics	5% value	test (Z(t))	statistics	5% value	
LNGDP	-2.490		-3.552	-3.652		-3.556	Trend
LNCBLA	-2.096		-3.552	-4.791		-3.556	Trend
LNFDIA	-1.364		-1.691	-7.679		-1.692	Drift
LNAGDP	-2.003		-3.552	-4.378		-3.556	Trend
LNNOI	-1.370		-3.552	-4.188		-3.556	Trend
LNNOE	-2.807		-3.552	-3.771		-3.556	Trend

Johansen's Test of C-integration

Following the absence of unit roots at I(1), Johansen's test of co-integration was conducted and the result presented in Table 3. The result shows that the first two null hypotheses could not be rejected because, at 5%, the trace statistic was greater than the critical

value, indicating that there was, at least, one co-integrating equation. The study failed to reject the third null hypothesis, indicating that there are two co-integrating equations in the system. These results were corroborated by the maximum statistics. The confirmation of co-integration implies that there is a long-run relationship among the variables in the system equation. The long-run relationship was estimated with the aid of vector error-correction model (VECM) as used by Ajayi *et al.* (2017) and Oparinde *et al.* (2017).

Table 3: Johansen's test of co-integration

Rank	Trace statistic	5% Critical value	Maximum statistic	5% critical value
0	124.173	94.15	53.4313	39.37
1	70.7417	68.52	31.6967	33.46
2	39.0450*	47.21	18.0917*	27.07
3	20.9533	29.68	16.4319	20.97
4	4.5214	15.41	3.6437	14.07
5	0.8777	3.76	0.8777	3.76

Optimal Lag Selection

In Table 4, four optimal lag selection criteria were used namely, LL, LR, FPE, AIC, HQIC, and SBIC. The result shows that FPE, HQIC and SBIC recommended one lag. Hence, the estimation of vector error-correction model will use one lag.

Table 4: Optimal Lag Selection

Lag	LL	LR	Df	P	FPE	AIC	HQIC	SBIC
0	-							
1	105.638				0.000024	6.37933	6.47137	6.64596
2	76.2592	363.8	36	0.000	5.9e-09*	-1.95767	-1.31338*	-.091251*
3	110.191	67.864	36	0.001	8.00E-09	-1.8395	-0.64296	1.62671
4	140.825	61.267	36	0.005	1.90E-08	-1.53283	0.21595	3.53316
5	195.194	108.74*	36	0.000	2.70E-08	-2.58252*	-0.2815	4.08326

Note: Endogenous: lngdp lncbla lnfdia lnagdp lnnoi lnnoe; Exogenous: _cons

Long-run Equation with Johansen Normalization Restriction Imposed

The result of vector error-correction model is presented in Table 5, with Johansen normalization restriction imposed. The restriction was imposed on the target variable, *lngdp* (economic growth). The chi-square statistics (1674.845) for the overall co-integrating equations was statistically significant ($p < 0.01$). This is final confirmation of the presence of long-run relationship in the systems equation.

Specifically, the z-statistics (-15.19) of *lnagdp* was statistically significant ($p < 0.01$). As a rule of thumb and since all the variables are endogenous, the result implied that lag 1 on *lnagdp* had positive impact and would increase economic growth in the long-run. Similarly, the z-statistics (-4.33) of *lnnoe* was statistically significant ($p < 0.01$), implying that lag 1 of *lnnoe* had positive impact and would increase economic growth in the long-run. In addition, the z-statistics (-5.89) of *lnfdia* was negative and statistically significant ($p < 0.01$), implying that *FDIA* had positive impact and would increase economic growth in the long-run. However, the z-statistics (5.56) of *lnnoi* (3.3) was positive and statistically significant ($p < 0.01$) implying that lag 1 of *lnnoi* would reduce economic growth in the long-run.



Table 5: Long-run equation with Johansen normalization restriction imposed

Beta	Coefficient	Std. Err.	z	P> z	[95% Conf. Interval]
_ce1					
Lngdp	1	.	.	.	.
Lncbla	-0.01364	0.024488	-0.56	0.578	-0.06164 0.034356
Lnfda	-0.05107	0.008676	(-5.89)*	0.000	-0.06808 -0.03407
Lnagdp	-0.74043	0.048751	-15.19*	0.000	-0.83597 -0.64488
Lnoi	0.097937	0.017606	5.56*	0.000	0.063431 0.132444
Lnoe	-0.05015	0.02638	-1.9*	0.057	-0.10185 0.001554
_cons	-5.97769	.	.	.	.

Estimated Error-Correction Model of GDP (Short-run Dynamics)

Following the establishment of long-run impact in the systems equation, the error correction model (ECM) was estimated to determine the short-run adjustments to long-run equilibrium as well as the short-run behaviour between GDP and the other endogenous variables. The short-run dynamics of the system equation is presented in Table 6. The result shows that the error correction term conformed to *a priori* expectation with a negative sign and lies between 0 and 1. It was statistically significant ($p < 0.01$). The negative sign (-0.2361) suggested that the long run equilibrium would be normalized back if there is any shock to the economic system. The result of the short-run dynamics also showed that the value of the coefficient of the error correction term was very low. According to (Akinkunmi, 2017), the implication is that it would take a very long time to restore the equilibrium if the system is disturbed. Precisely, the speed of adjustment was 23.61% every year.

Table 6: Vector error-correction model (short-run dynamics)

Variable	Coefficient	Std Err	Z	P> z	95% Confidence Interval
D_LNGDP ECT (-1)	-0.2361049	0.094115	-2.51*	0.012	-0.42057 -0.05164
Constant	0.0142459	0.010545	1.35	0.177	-0.00642 0.034913
LNGDP	0.3986865	0.171385	2.33**	0.020	0.062779 0.734594
LNCBLA	0.0058948	0.024831	0.24	0.812	-0.04277 0.054563
LNFDIA	-0.0057274	0.005243	-1.09	0.275	-0.016 0.004548
LNAGDP	-0.1396182	0.118352	-1.18	0.238	-0.37158 0.092348
LNNOI	0.0233498	0.025368	0.92	0.357	-0.02637 0.073071
LNNOE	-0.0033798	0.022815	-0.15	0.882	-0.0481 0.041336

Note: *, ** statistical significance at 1% and 5%, respectively.

CONCLUSION AND RECOMMENDATIONS

The study concluded that agriculture would be relevant to Nigeria's economy in the long run. Specifically, foreign direct investment to agricultural sector, the value of agricultural goods and services and non-oil export earnings (dominated by agricultural commodities) would enhance the growth of the economy in the long run. On the other hand, non-oil import would retard economic growth in the long run. These conclusions have policy implications for the economy. Consequently, the study recommended that:

1. Efforts to attract foreign direct investment to the agricultural sector should be sustained by the federal government. This would supplement domestic public agricultural financing in the bid to remain the mainstay of the economy.



2. In addition, policy makers should ensure that there is sustainable growth in agricultural GDP as this would translate to economic growth in Nigeria.
3. Furthermore, the exportation of non-oil export should be encouraged. In particular, the production of cash crop for export should be encouraged by the CBN. This way, Nigeria's trade deficit can be mitigated for economic growth to be enhanced in the long run.
4. Finally, the importation of non-oil commodities should be discouraged so that it does not hurt the economy in the long run.

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