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Agricultural Sector Performance on Growth Using a Bound Test Approach

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Abstract:- This article analyzes the notions behind agricultural sector performance towards achieving better economic outlook. This paper adds to previous empirical studies on agriculture by presenting evidence from time series data spanning 1981 to 2020. The simple regression model was used for estimation in the study, with fishery, food production, forestry index, and livestock index serving as independent variables and GDP serving as the dependent variable. The analysis elaborates on the components of agricultural sector that are crucial for relating performance management concepts to economic growth. Moreover, this paper reflects on the significance of agrarian subdivision management for better performance, by shedding light on the contribution of the agrarian subdivision to the nation's economic growth. As a result of the findings, policy recommendations for the proper management of agricultural sector determinants in Nigeria are made.

Keywords:- *Agricultural performance, Gross domestic product, Forestry, Food production and Fishery.*

I. INTRODUCTION

The Economics of Nature Management examines the global deterioration of the natural environment from a variety of management perspectives. For many developing countries, nature management boils down to the economic decision of investing limited resources in nature, such as agriculture, at the expense of investing in other critical imperatives such as education or infrastructure. This necessitates the role of agriculture in improving a country's economic framework, which cannot be overstated because agriculture provides food for humans and animals as well as raw materials for the industrial sector. In Nigeria, agriculture includes forestry, livestock, fishing, food and cash crop production such as yams, cassava, maize, cocoa, groundnut, and oil palm (Speckbacher, 2003; Oluwatoyese & Applanaidu, 2014; Awokuse & Xie, 2015).

Agriculture is the backbone of many economies and is critical to a nation's socioeconomic development because it is a major component and factor in national development (Alagh, 2011; Mwangi & Kariuki, 2015). As a result, he defined agriculture as the production of food and livestock, as well as the practical tendering of plants and animals. Similarly, Okolo (2004) and Kosti (2016) described the agricultural sector as the most important sector of the Nigerian economy, with significant potential for the nation's future economic development. Agriculture is critical for a nation's economic growth and development, according to Rostow (1960) in his Stages of development and of Economic Growth. The significance of horticulture in the economy of any country can't be over stressed; on the grounds that it assumes a significant part in basically all friendly and financial exercises of nations for instance destitution reduction (Lawal, 2011; Sears, Oehninger, Lim & Lawell, 2017). To this end, this paper examines the determinants of the farming area to the development of Nigeria economy between year 1981 and 2018 for performance management. Moreover, the paper discusses the implications for proper managing of the agricultural determinants on economic growth.

II. LITERATURE REVIEW

Various policies, programs, and studies are being carried out in an attempt to manage and promote the important roles that the agricultural sector can play in the development of countries. Awokuse and Xie (2015), on the other hand, revisited the debate over the role of agriculture in promoting economic growth in a sample of nine developing countries. The causal links between agriculture and GDP growth were investigated using directed a recurrent chart and an algorithm developed for inductive causation. The outcomes suggested that the impact varies across countries on agriculture being an engine of economic growth.

Numerous empirical studies on performance management such as Lebas, (1995), Speckbacher, (2003), Askari, Sadegh and Ameri, M. (2015), Sears, Lim and Lawell, (2018) are being examined. But, Chang, McAleer, and Wong (2016) provided a short survey of the relating writing in administration science, financial matters and conversations on some examination that is connected with the three disciplines. Nonetheless, the paper suggested that scholastics could foster hypothetical and progressive econometric models to gauge the boundaries in the related models. Similarly, examine a few fascinating issues with regards to the three disciplines

Thus, necessitates the investigating for proper management of the components of agriculture performance on nations' economic growth.

III. METHODOLOGY

➢ *Study Area Description*

This exploration entangles quantitative examination of the factors, utilizing econometric measurable strategy. The review was led in a nation situated on the Gulf of Guinea in the western Africa's part and among the sub-Sahara Africa nations (Nigeria). Subsequently, the econometric model to be used to examine this examination is GDP as destitute variable while Fishery, Food creation, Forestry and Livestock are considered as independent factors. The data for this assessment was isolated generally from discretionary sources that is obtained from circulations of the Central Bank of Nigeria (CBN), for instance, Statistical Bulletin and the Central Bank of Nigeria Annual Report and Statement of Accounts 2021.

➢ *Model Specification:*

$Y_t = B_0 + B_1Fi_t + B_2Fp_t + B_3Fo_t + B_4L_t + U_t$

Where:

Y_t = Gross Domestic product for current year

Fi_t = Fishery

Fp_t = Food production

Fo_t = Forestry

L_t = Livestock

B_0, B_1, B_2, B_3 and B_4 = Constants and

U_t = error term

IV. RESULTS AND FINDINGS

The order of integration is determined using the Augmented Dickey Fuller (ADF) and Philips-Perron (PP) tests (stationarity test). The stationarity test revealed that ADF and PP are both at level I (0) and first differences I (1) for the variables studied, as shown in Table 1. According to the ADF and PP unit root tests, all variables remain stationary at the first difference. In summary, using the two unit root test methods (ADF and PP), it was determined that all variables for the countries (GDP and agricultural sector components) are stationary at I (0) and I. (1). As a result, approvals proceed with the ARDL co-integration test, which oblige stationarity of factors at I (0) and I (1) for additional examination.

Variable	ADF		PP		
	Constant	Trend and Constant	Constant	Trend and Constant	Result
GDP	4.949930***	5.027936***	4.943703***	5.027936***	I (0)
Fi	3.277054**	7.330748***	3.283351**	3.806556**	I (1)
Fo	5.004617***	6.174103***	5.039797***	6.288515***	I (1)
Fp	4.940096***	5.761511***	4.983536***	5.761511***	I (1)
L	3.196983**	3.661967**	3.205732**	3.450219*	I (1)

Table 1:- ADF and PP UNIT ROOT TEST

Notes: ***, **, * indicates dismissal of the invalid speculation of a unit root at the 1%, 5%, and 10% centrality level. No reference mark shows that the arrangement is non-stationary

For the model with unadjusted R (97 percent) and adjusted R (97 percent), an Autoregressive distributed lag (ARDL) (4, 3, 3, 3, 2) estimate was chosen (93 percent). As a result, the estimation of 'F' statistics for GDP with agricultural components (livestock, food production, fishery, and forestry) is provided in Table 2 of the appendix. As a result, the invalid hypothesis of no cointegration is rejected, and the existence of a long-run harmony relationship is confirmed. The conclusion of cointegration is derived from Narayan's (2005) basic esteem table for the individual autonomous factors (k = 4) and number of perceptions (n = 34) for lower and upper limits at 1% and 5% centrality dimension. However, it is possible to conclude that GDP is co-integrated with food production and forestry but with fishery and livestock. This suggests that there is no lengthy run connection among GDP and two part of agrarian areas which are food production and forestry.

Computed F-statistic = 17.38644 (lag structure, k=4)		
Bounds Level	Lower I (0)	Upper I (1)
Critical Bounds Value (1%)	3.74	5.06
Critical Bounds Value (5%)	3.275	4.63

Table 3:- ARDL bound test statistics and critical value (unrestricted intercept; no trend)

Narayan (2005) critical value for 5% significance level is I (0) =3.478, I (1) = 4.335 and for 1% significance level is I (0) = 4.948, I (1) = 6.028.

According to Table 3, the results of the error correction model (ECM) estimation for the model revealed that nearly all of the independent variables were significant and adjusting. This is due to the fact that the ECT co-efficient (Cointeq (-1) = -2.382614) has a negative sign and is significant at 1%, indicating the rate of adjustment in the short run.

The Breusch-Godfrey sequential connection LM test shows that the F-measurement is 1.781778 and the prob.F (2, 31) is 0.1851; this shows that the assessed model has no autocorrelation problem. According to the Breusch-Pagan-Godfrey test for heteroscedasticity, F-statistic = 0.602845 and Prob.F (19, 14) = 0.8493. Similarly, Harvey's heteroscedasticity reveals that F-statistic = 1.235904 and Prob.F (19, 14) = 0.3480. The Ramsey Reset test results in an F-statistic of 0.207779 with a probability of 0.6560. Similarly, the co-integration graph, CUSUM, and CUSUMSQ stability tests are referred to as Figures 1, 2, and 3.

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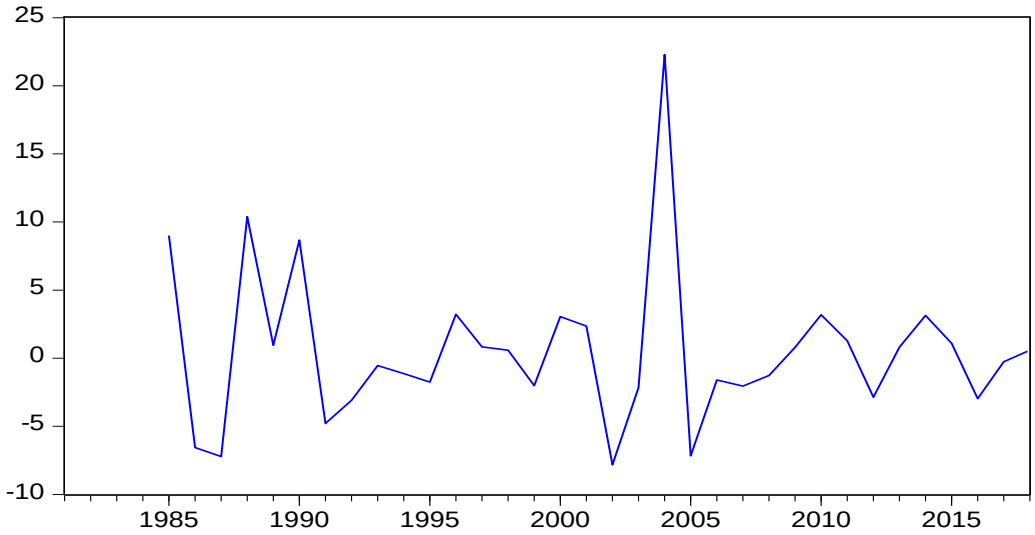

Fig 1:- Co-integration graph

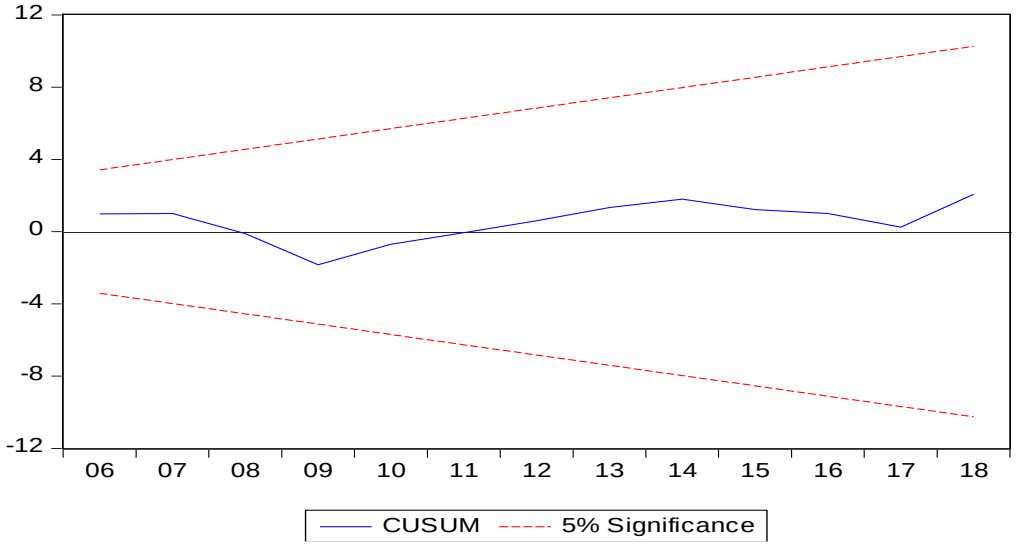

Fig 2:- CUSUM Tests for Stability

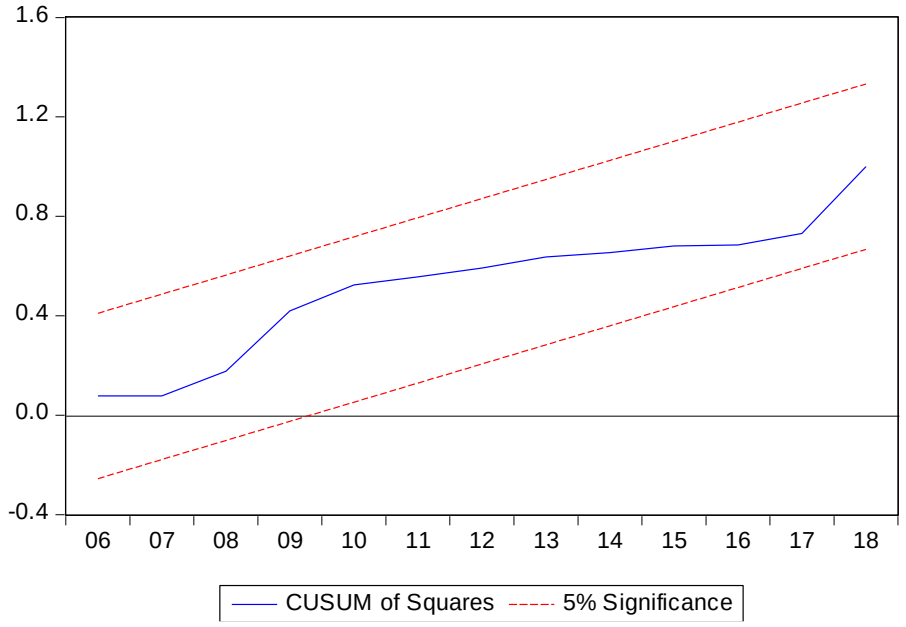

Fig 3:- CUSUMSQ Tests for Stability

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V. CONCLUSION

The research work throw more light on the account of the components of agrarian sector (fishery, food production, forestry and livestock) to the nation's economic growth and development. Thus, highlights the positive and significant components of agricultural sector (food production, livestock and forestry) that can be used to enhance the outlook performance for nation management. The study was able to establish a long-run relationship between agricultural sector components and national economic growth, revealing that the livestock, forestry and food production are significant and active factors for predicting the nation's economic growth. The study strongly suggests that the significant component of agricultural sector should be make economically worthwhile by the nation managing each of the components extensively.

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APPENDIX

Sample (adjusted): 1985 2020
Included observations: 34 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): FI FO FP L
Fixed regressors: C
Number of models evalulated: 2500
Selected Model: ARDL(4, 3, 3, 3, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP(-1)	-0.464613	0.123287	-3.768544	0.0021
GDP(-2)	-0.407832	0.106228	-3.839221	0.0018
GDP(-3)	-0.275899	0.092043	-2.997484	0.0096
GDP(-4)	-0.234271	0.069563	-3.367772	0.0046
FI	0.136558	0.049313	2.769225	0.0151
FI(-1)	-0.209567	0.069984	-2.994507	0.0097
FI(-2)	0.288128	0.066106	4.358548	0.0007
FI(-3)	-0.150959	0.047095	-3.205432	0.0064
FO	-0.578395	0.109490	-5.282634	0.0001
FO(-1)	-0.376102	0.129507	-2.904101	0.0115
FO(-2)	0.436537	0.142783	3.057345	0.0085
FO(-3)	-0.276954	0.113888	-2.431813	0.0290
FP	0.001229	0.000880	1.396647	0.1843
FP(-1)	0.002281	0.001108	2.058471	0.0587
FP(-2)	0.010959	0.001125	9.740733	0.0000
FP(-3)	-0.005536	0.001511	-3.665061	0.0025
L	-0.014451	0.032820	-0.440292	0.6664
L(-1)	-0.018194	0.034790	-0.522974	0.6092
L(-2)	-0.039144	0.029655	-1.320015	0.2080
C	68.89081	14.65350	4.701319	0.0003
R-squared	0.968424	Mean dependent var		4.417355
Adjusted R-squared	0.925570	S.D. dependent var		6.987413
S.E. of regression	1.906297	Akaike info criterion		4.417369
Sum squared resid	50.87554	Schwarz criterion		5.315229
Log likelihood	-55.09528	Hannan-Quinn criter.		4.723565
F-statistic	22.59839	Durbin-Watson stat		2.312888
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model

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ARDL Bounds Test

Sample: 1985 2020
Included observations: 34
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	17.38644	4

Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Test Equation:
Dependent Variable: D(GDP)
Method: Least Squares
Date: 12/08/19 Time: 04:46
Sample: 1985 2018
Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	0.918002	0.219072	4.190407	0.0009
D(GDP(-2))	0.510170	0.134041	3.806073	0.0019
D(GDP(-3))	0.234271	0.069563	3.367772	0.0046
D(FI)	0.136558	0.049313	2.769225	0.0151
D(FI(-1))	-0.137168	0.043798	-3.131853	0.0074
D(FI(-2))	0.150959	0.047095	3.205432	0.0064
D(FO)	-0.578395	0.109490	-5.282634	0.0001
D(FO(-1))	-0.159583	0.143392	-1.112913	0.2845
D(FO(-2))	0.276954	0.113888	2.431813	0.0290
D(FP)	0.001229	0.000880	1.396647	0.1843
D(FP(-1))	-0.005423	0.001788	-3.033110	0.0089
D(FP(-2))	0.005536	0.001511	3.665061	0.0025
D(L)	-0.014451	0.032820	-0.440292	0.6664
D(L(-1))	0.039144	0.029655	1.320015	0.2080
C	68.89081	14.65350	4.701319	0.0003
FI(-1)	0.064159	0.043086	1.489098	0.1586
FO(-1)	-0.794915	0.157976	-5.031882	0.0002
FP(-1)	0.008933	0.002110	4.232988	0.0008
L(-1)	-0.071789	0.033583	-2.137686	0.0507
GDP(-1)	-2.382614	0.319131	-7.465952	0.0000

R-squared	0.980496	Mean dependent var	0.094751
Adjusted R-squared	0.954027	S.D. dependent var	8.890769
S.E. of regression	1.906297	Akaike info criterion	4.417369
Sum squared resid	50.87554	Schwarz criterion	5.315229
Log likelihood	-55.09528	Hannan-Quinn criter.	4.723565
F-statistic	37.04281	Durbin-Watson stat	2.312888
Prob(F-statistic)	0.000000		

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ARDL Cointegrating And Long Run Form
Dependent Variable: GDP
Selected Model: ARDL(4, 3, 3, 3, 2)

Sample: 1981 2020
Included observations: 34

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	0.918002	0.219072	4.190407	0.0009
D(GDP(-2))	0.510170	0.134041	3.806073	0.0019
D(GDP(-3))	0.234271	0.069563	3.367772	0.0046
D(FI)	0.136558	0.049313	2.769225	0.0151
D(FI(-1))	-0.288128	0.066106	-4.358548	0.0007
D(FI(-2))	0.150959	0.047095	3.205432	0.0064
D(FO)	-0.578395	0.109490	-5.282634	0.0001
D(FO(-1))	-0.436537	0.142783	-3.057345	0.0085
D(FO(-2))	0.276954	0.113888	2.431813	0.0290
D(FP)	0.001229	0.000880	1.396647	0.1843
D(FP(-1))	-0.010959	0.001125	-9.740733	0.0000
D(FP(-2))	0.005536	0.001511	3.665061	0.0025
D(L)	-0.014451	0.032820	-0.440292	0.6664
D(L(-1))	0.039144	0.029655	1.320015	0.2080
CointEq(-1)	-2.382614	0.319131	-7.465952	0.0000

Cointeq = GDP - (0.0269*FI -0.3336*FO + 0.0037*FP -0.0301*L + 28.9140)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FI	0.026928	0.016617	1.620466	0.1274
FO	-0.333631	0.039431	-8.461219	0.0000
FP	0.003749	0.000548	6.847397	0.0000
L	-0.030130	0.012136	-2.482798	0.0263
C	28.913959	3.044049	9.498520	0.0000

Table 2