EFFECTS OF CROP AND LIVESTOCK PRODUCTION ON NIGERIA ECONOMIC GROWTH

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Abstract

This study employs the Autoregressive Distributed Lag (ARDL) model and Bound tests to examine the short- and long-run relationships between crop and livestock production and economic growth. In the Central Bank of Nigeria bulletin, the research examines statistics on crop and livestock production as well as Gross Domestic Product (GDP) as a measure of economic development in Nigeria from 1981 to 2022. According to the findings of the ARDL and Error Correction (EC) models, crop and livestock production significantly contribute to economic growth in Nigeria in the short-run and long-run. In the long term, crop production has 41% effect on economic growth that is positive and more important than that of 16% effect of livestock production. Therefore, policymakers should focus on policies that promote investment in agricultural infrastructure and technology for farmers. Such policies would not only boost crop and livestock production but also spur economic growth in Nigeria.

Keywords: *Crop production, Livestock production, Economic growth, Agricultural Output.*

Introduction

The agricultural sector, which continues to be the foundation of the Nigerian economy despite the oil boom, was the major industry that made a significant contribution to the country's economy before crude oil was discovered (Ogunkola, et al., 2008; Sekunmade, 2009). Crop production, livestock, fisheries, and forestry are the agricultural industry's subsectors in Nigeria. The largest of agriculture's four sub-sectors is crop production. Crop production contributed 83.5% on average to the GDP of agriculture between 1960 and 2011 (CBN, 2012). The second-largest subsector is the production of livestock. Through dairy and poultry products, the greatest amount of animal protein is produced. Odetola et al. (2013) stated that the contribution of livestock production to the agricultural sector's GDP ranged from 19% on average between 1983 and 1984 to 6% in 2004 and 2005. Therefore, this study uses the ARDL model, which incorporates the regression equation with lags of the dependent and independent variables, to examine the short- and long-term effects of crop and livestock production on Nigeria's economic growth.

Authors have used ARDL and EC models in examining the effects of some economic variables on Nigeria's economic growth. Amusa et al. (2019) studied the relationship between fiscal policy and economic growth in Nigeria using ARDL and EC models. They found that fiscal policy has both short- and long- term effects on economic growth. ECM term predicts 39% of previous year's disequilibrium will be corrected in the current year. Oumarou (2020) used time series econometric tests to investigate the connection between governmental debt and economic development in Niger. Results indicate no long-term association, but strong short-term causal impacts of public debt and budget balance on economic growth are found. Using ARDL and EC models, Onwubuariri et al. (2021) investigated the effect of inflation on Nigeria's economic development. They discovered that rising inflation has a detrimental effect on Nigeria's development through lowering competitiveness and buying power. The study also discovered a long-term decline in the pace of economic. Using time series data with ARDL bounds testing, Panan et al. (2021) investigated the effect of the capital market on Nigeria's economic development. They discovered unidirectional causation and strong beneficial impacts on economic growth.

Methodology

This study examines data from the Central Bank of Nigeria bulletin from 1981 to 2022 on crop and livestock production as well as GDP using ARDL model. The ARDL (p, q) model introduced by Pesaran et al. (2001) measures the effects of changes in one variable at some point on the response over several subsequent periods. When the variables are stationary at I(0) or integrated in order I(1), the model is taken into account. The general form of the ARDL (p, q) model is given by:

$$y_t = \alpha + \theta_1 y_{t-1} + \ldots + \theta_p y_{t-p} + \delta_0 x_t + \delta_1 x_{t-1} + \ldots + \delta_q x_{t-q} + \varepsilon_t \quad (1)$$

The model in (1) may be changed into an infinite distributed lag model via iterative replacement, which only contains explanatory variables and no lags of the response. The changed model is shown in (2).

$$y_t = \delta + \beta_0 x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2} + \beta_3 x_{t-3} + \ldots + \varepsilon_t \quad (2)$$

The Coefficient βs in equation (2) is known as the *s-period delay multiplier*; the sum of the $\beta's$ from the present to the period s in the past is known as the *interim multiplier*, and the total multiplier is the sum of all periods up to infinity.

Results

Unit root test

The stationarity of the data and the sequence of integration were examined using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests.

Table 1: Augmented Dickey-Fuller and Phillips-Perron Unit Root Tests

	ADF		PP		Order of Integration
Variable	Levels	1st Diff.	Levels	1st Diff.	
GDP	-1.0064	-2.8627	-1.5463	-16.967*	I (1)
CROP	-0.7527	-3.6364**	-1.0882	-26.3**	I (1)
LSTOCK	-1.007	-4.3334**	-2.0446	-21.856**	I (1)

Source: Author

Table 1 presents the ADF and PP at levels and at the first difference and also the order of integration.

Lag selection criteria

Table 2: Suggested Lags and their AIC

	GDP	CROP	LSTOCK	AIC
1	1	0	1	-107.8660
2	1	1	1	-106.2668
3	2	0	3	-104.1108
4	2	1	3	-103.6018
5	2	1	2	-103.5821
6	1	0	2	-102.6843
7	2	2	2	-102.1045
8	3	3	3	-98.9271

Source: Author

Table 2 suggests the lags of GDP, Crop and livestock production, and their corresponding AIC to determine the best order of ARDL model.

Long- and short-run estimation of parameters

Table 3: Bounds F-test (Wald) and Bounds t-test for no cointegration

	Statistic	Lower-bound I(0)	Upper-bound I(1)	alpha	p-value
F	12.18107	3.083123	3.830838	0.05	1e-06
T	-5.510266	-2.86012	-3.507306	0.05	0.0001882

Source: Author

Table 3 presents the Bounds F-test (Wald) and Bounds t-test for no cointegration alongside with their p-values.

Table 4: Coefficients of Parameters from EC model

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.04833	0.01079	4.480	6.94e-05 ***
d(LSTOCK)	0.38925	0.07953	4.894	1.95e-05 ***
Ect	-0.66025	0.09226	-7.157	1.75e-08 ***

Source: Author

Table 4 gives the coefficients of parameters from the EC model, the standard error, t-values and the p-values.

Table 5: Short-run Multipliers with Standard errors, t-Statistics and p-values.

	Term	Estimate	Std. Error	t value	Pr(>|t|)
1	(Intercept)	0.04832579	0.01897054	2.547412	0.0154024084
2	CROP	0.27341770	0.06883395	3.972135	0.0003383864
3	LSTOCK	0.38925364	0.11176055	3.482925	0.0013512274

Source: Author

Table 6: Long-run Multipliers with Standard errors, t-Statistics and p-values.

	Term	Estimate	Std. Error	t value	Pr(>|t|)
1	(Intercept)	0.07319274	0.02498372	2.9296172	0.005937961
2	CROP	0.41410994	0.13074428	3.1673273	0.003184896
3	LSTOCK	0.16635686	0.16839458	0.9878991	0.329982729

Source: Author

Tables 5 and 6 include the short- and long-run multipliers as well as their standard errors, t-statistics, and p-values.

Discussion

Table 1 shows the data are steady at the first difference. As a result, the ARDL model may be used to calculate their cointegration. The lag order of the ARDL model was established using the Akaike information criterion (AIC). Some recommended orders are shown in Table 2 along with their AIC. The model with the lowest AIC is the optimal one. ARDL (1, 0, 1) is the optimal model as a result. Table 3 shows the Bounds F-test (Wald) and Bounds t-test assuming no cointegration. At the 5% level of significance, the p-values for the bound F- and t-tests both reject the null hypothesis of no cointegration. Because of this, there is cointegration between the variables and a distinct long-run connection between the variables. The EC value of -0.66 in Table 4 shows there is a significant long-run relationship. After a short-term shock, the long-term equilibrium adjusts quickly. In the long run, crop production contributes 41.4% to Nigeria's economic growth, while livestock production contributes only 16.6% as shown in Table 6.

Conclusion

Using data from the Central Bank of Nigeria bulletin (1981–2022), the study explores the short- and long-term effects of crop and livestock production on Nigeria's economic growth (using GDP as a proxy). Based on the AIC results, it was determined that ARDL (1,0,1) was the best model. The results of ARDL and Error Correction (EC) models indicate that crop and livestock production significantly contribute to economic growth in Nigeria, both in the short-run and long-run. These results imply that crop production is more crucial to Nigeria's economic growth than livestock production. Therefore, policymakers should focus on policies that promote investment in agricultural infrastructure and technology, which in turn would impact economic growth in Nigeria.

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