

An Empirical Analysis of Exchange Rate Dynamics and the Agricultural Sector in Nigeria

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ABSTRACT

This study looks at the dynamic relationship between exchange rate movements, domestic oil prices, monetary policy rates, and agricultural sector performance in Nigeria between January 2012 to January 2025 using the Autoregressive Distributed Lag (ARDL) model and Granger causality methods. The empirical results of the ARDL show that there is a long-run co-integrating relationship between ASP, EXR, DOILP, and MPR, as well as a significant long-run relationship between exchange rate and agricultural performance, with a positive impact. Domestic oil prices, however, and monetary policy rates have a long-term negative impact on agricultural productivity. Only changes in monetary policy have a significant positive effect in the short term. Granger causality analysis reveals that there is no causal relationship between the exchange rate and agricultural sector performance. The findings emphasize the importance of integrating fiscal and monetary policy interventions to protect agricultural productivity from macroeconomic shocks, especially in light of the removal of oil subsidies and exchange rate liberalization of 2024. To ensure long-term agricultural growth, the study recommends stable exchange rate policies, moderate interest rates, and increased farmer support

INTRODUCTION

It is impossible to overstate the role that agriculture plays in the development of any economy; even the most developed nations would never overlook the agricultural sector, which is likely to improve science and technology. The significance of the agricultural sector to national development in a developing economy has long been acknowledged, according to Lewis' theory of development (Todaro & Smith, 1979), with high-productivity modern urban industrial sectors coexisting with surplus labor in the traditional agricultural sector. Food for the hordes, raw materials for industrial production, savings and tax revenue to support the growth of the rest of the economy, earning more foreign exchange (or saving foreign exchange when primary products are imported), providing employment for a larger proportion of a country's population, and creating a growing market for domestic manufacturers are all made possible by the growth of the agricultural sector (Meier, 1998).

The quantity and value of agricultural products produced in a nation for both export and domestic use is referred to as agricultural output. One of the key economic sectors in Nigeria is agriculture, which is particularly important in terms of export income profits, job creation, and GDP value addition. (Okedina and Awolaja, 2017) Despite the fact that agriculture still accounts for the majority of Nigeria's economy, the country has lost billions of dollars in yearly export revenue from cocoa, groundnuts, cotton, and palm oil as a result of a steady drop in productivity brought on by both direct and indirect effects of volatility. "Because Nigeria is the world's largest cassava producer and Africa's largest rice importer, the indirect effects of currency fluctuations far outweigh the direct effects" (IFPRI, (2012)).

Over the past six months, Nigeria's agricultural output has consistently increased as a result of the government's recent coordinated initiatives. The average annual growth rate of agricultural output from 2012 to 2016 was 8.94%. Crop, fishery, forestry, and livestock output grew at average yearly rates of 4.4%, 5.7%, 3.8%, and 3.5% during the same time period (CBN Statistical Bulletins, 2016, 2017). The agricultural industry will surely realize its full potential in terms of creating jobs, raising incomes, and earning foreign cash through enhanced export competitiveness if this trend keeps up. The agriculture value chain has greatly improved, and the advancements in this sector could set the economy on a long-term trajectory of non-oil growth. (Okedina and Awolaja, 2017)

Researchers are interested in examining how exchange rates relate to the performance of the agriculture sector because of the possible influence they may have on actual economic activity. The link is asymmetric, according to a number of research, such as Awolaja and Okedina (2017) and Adekunle and Ndukwe (2018), which suggest that the impact of a decline in the exchange rate on agricultural output performance is very different from that of an increase. The link is linear or symmetric, meaning that the impacts of exchange rate increases and drops on agricultural output performance are equivalent but have opposing signs, according to other researchers including Catherine and Tom (2025), Ayibanua et al. (2020), and Abiola (2019).

The influence of exchange rate swings on the performance of the agriculture sector is still being debated in the literature. Some authors, including Catherine & Tom (2025), Abiola (2029), and Tulasumba et al. (2017), maintained that exchange rate changes have a positive impact on the performance of the agricultural sector, while others, including Abraham & Rekwet (2014), Falana (2019), Ayibanna et al. (2020), and Sylvanus et al. (2023), contended that exchange rate fluctuations have a negative effect on agricultural output performance.

In light of this, this study uses Granger Causality and Autoregressive Distributed Lag to analyze the relationship between Nigeria's agriculture sector performance and exchange rates for monthly data from January 2012 to January 2025 2012. To accomplish the aforementioned objectives, the remainder of the paper is broken up into five sections. After the literature is reviewed in section two of the study, methodology is covered in section three. The findings and discussion are presented in Section 4, and some conclusions and suggestions are presented in Section 5.

LITERATURE REVIEW

Exchange rates and agricultural sector performance have been the subject of numerous research in Nigeria and both developed and developing nations (see, for example, Yebeah et al., 2020; Catherine & Tom, 2025; Sylvanus et al., 2023; Ayibanua et al., 2020; Falana, 2019).

Yebeah et al. (2020) looked into how exchange rates affected the cost of agricultural inputs using quarterly data from 1981 to 2008. The vector Autoregressive (VAR) estimation method was employed. The goal of the study was to ascertain how the exchange rates between the US and Mexico affected the costs of agricultural and non-agricultural inputs such pesticides, fertilizer, feed, and farm equipment. For a maximum of 12 months, the VAR estimation findings showed a positive correlation between the Mexican exchange rate and US feed prices. This indicates that in the first, second, third, and fourth quarters, the feed price increased by 0.13 percent, 0.29 percent, 0.14 percent, and 0.05 percent, respectively, due to a 1% depreciation in the exchange rate.

Fertilizer is positively impacted by depreciation in Mexico during the first and fourth quarters, but negatively during the second and third quarters in the US. Accordingly, in the first and fourth quarters of the United States, a one percent depreciation of the Mexican peso raised fertilizer prices by 0.12% and 0.05%, respectively, while in the second and third quarters, a one percent depreciation of the peso decreased fertilizer prices by 0.05% and 0.04%, respectively. According to Baek and Koo (2009), while U.S. agricultural exports were highly sensitive to bilateral exchange rates and foreign income in the long run, bilateral exchange rates and income in the United States and its trading partners had significant impacts on U.S. agricultural exports and imports in the short run.

Elgali and Mustafa (2012) found that agricultural exports from poor nations were negatively impacted by exchange rate volatility. However, this effect was minimal and quite similar to the effect on total trade. According to Kristine and Anderson's (2002) analysis of the macroeconomic effects of

Sudanese agricultural crop markets, the agriculture trade sector suffered from an overpriced exchange rate. An empirical analysis of the literature on Nigeria's agriculture sector performance and exchange rate dynamics showed that the variables interacted in a complex way. The effect of exchange rate variations on Nigeria's agricultural economy was examined by researchers using a variety of approaches and time periods.

Catherine and Tom (2025) examined the association between exchange rate fluctuation and agricultural performance in Nigeria using annual time series data from 1985 to 2023 and Johansen cointegration and Vector Error Correction models. Three key insights are provided by the research. While raising input costs, exchange rate depreciation has a strong positive correlation (0.866) with agricultural export competitiveness; interest rates set by monetary policy have a strong negative effect (-0.227) on sector performance through channels of credit availability; and trade openness has a doubly sensitive effect, contributing to agricultural growth in the long term while having short-term negative effects. Sylvanus et al. (2023) found that while exchange rate fluctuations significantly impacted capacity utilization, they had a negative impact on agricultural export quantities.

Using annual time series data from 1986 to 2019, Ayibanua et al. (2020) estimated the effect of exchange rate dynamics on agricultural output performance in Nigeria using an autoregressive distributed lag (ARDL) model. The results showed that Nigerian crop production is only negatively impacted by currency rates in the near run. Nigerian agricultural output is significantly impacted in the long term by consumer prices, bank loans to the agricultural sector, and total rainfall; in the near term, only the consumer price index and total rainfall have an effect. Abiola (2019) examined the effect of exchange rate adjustments on Nigerian agricultural output using quarterly time series data from 1981Q1 to 2018Q4 and a structural vector auto regression technique. The findings revealed that the exchange rate has a positive and significant relationship with agricultural output. Falana (2019) found a negative relationship between exchange rate regimes and real sector output, especially in regulated regimes, but a positive relationship in deregulated regimes.

The uneven impact of real exchange rate fluctuations on Nigeria's agricultural output performance between 1981 and 2016 is examined by Adekunle and Ndukwe (2018). The findings indicate that the main factors influencing agricultural output are the real exchange rate (log-levels), real appreciation and depreciation (after some lags), industrial capacity utilization rate, and government spending on agriculture. Awolaja and Okedina (2017) use the nonlinear Auto-Regressive Distributed Lag (ARDL) approach for annual time series data from 1981 to 2017 to investigate the effects of real exchange rate gains (appreciation) and reductions (depreciation) on Nigeria's agricultural output, both overall and by sector.

The results show that the real exchange rate and total and sectoral agriculture output are cointegrated. Additionally, the long-term estimates show that real exchange rate increases have a bigger impact on agricultural output than do real exchange rate declines, suggesting the existence of an asymmetric effect.

The impact of exchange rates on agricultural products intended for export was examined by Tulasomba et al. (2015). Both quantitative and qualitative evaluations were carried out between January 2002 and June 2014. The results showed that Thailand's export volumes of agricultural products were significantly and negatively impacted by currency rates. The findings also showed that total agricultural, rubber, and rice export volumes were all impacted by currency rates.

Oyakhilomen et al. (2014) use pairwise Granger causality and a vector error correction model for time series data covering 26 years (1986-2011) to examine the causal relationship between exchange rate deregulation and the agricultural share of Nigeria's GDP. The results showed a detrimental effect of exchange rate deregulation on Nigeria's agricultural portion of GDP and a one-way causal link between the exchange rate and agricultural GDP share.

Overall, the data from the literature currently in publication seems to point to a dearth of research that examined how exchange rate fluctuations affected the performance of the agricultural sectors in both Nigeria and developed nations. Additionally, there is currently no published empirical study that examines the relationship using fresh data from Nigeria's most recent economic downturn, the elimination of oil subsidies, and the introduction of a flexible exchange rate, which engulfed the nation between 2023 and 2024.

METHODOLOGY

Data Source

Monthly time series data from January 2012 to January 2025 were used in the study. All data were obtained online via the Central Bank of Nigeria's website (www.cbn.gov.ng). This time frame was chosen to capture the independent effects of the foreign exchange rate, domestic oil price, and monetary policy rate on agricultural sector performance in the context of global economic crises, post-global economic crises, the country's recession that began in August 2016, and the removal of oil subsidies in 2024.

Model Specification

The study's model is described in functional form as follows:

$$LASPt = f(\text{EXCRt}, \text{LDOIL Pt}, \text{MPRt}) \dots\dots\dots (3.1)$$

Thus, the model's econometric specification can be expressed as follows:

$$LASPt = \beta_0 + \beta_1 \text{EXCRt} + \beta_2 \text{LDOILPt} + \beta_3 \text{MPRt} + \mu t \dots\dots\dots (3.2)$$

Where;

LASP = Log of Agricultural Sector Performance

EXCR = Real Exchange Rate

LDOIL P = Log of Domestic Oil price

MPR = Monetary Policy Rate

β_0 , is constant while, β_1 , β_2 , β_3 , are Parameters of the variables captured in the model,

μ = Error Term and t represents Time Trend

The study adopts Autoregressive Distributed Lag (ARDL) approach developed by Pesaran et al (2001) to estimate equation (3.2). The choice of the ARDL is based on the following reasons: first, the model can be applied

irrespective of whether the series under investigation are stationary at I (0) or I (1) or mixture of both. Second, it provides robust and high quality result even if sample size is small or large. Finally, it takes into account the error correction model. The analysis of error correction and autoregressive lags fully covers both long-run and short-run relationships of the variable under study (Pesaran et al; 2001 and Villavicencio and Bara; 2008). Following the work of Pesaran et al (2001), the ARDL model of equation (3.3) is given as:

$$\Delta LASP_t = \beta_0 + \sum_{i=1}^m \beta_1 \Delta EXR_{t-i} + \sum_{i=1}^m \beta_2 \Delta LDOILP_{t-1} + \sum_{i=1}^m \beta_3 \Delta MPR_{t-i} + \alpha_1 ECXR_{t-1} + \alpha_2 LDOILP_{t-1} + \alpha_3 MPR_{t-1} + \mu_t \dots \dots \dots (3.3)$$

Where m is the optimum lag length will be determine using Akaike Information Criteria (AIC) and Schwartz Information Criteria (SIC), Δ is difference operator, while β1 to β3 are vectors of the coefficient of the first difference lagged values of the variables captured in the model

Thus the short run equation and error correction model is expressed as follows:

$$\Delta LASP_t = \theta_0 + \sum_{i=1}^m \theta_1 \Delta EXR_{t-i} + \sum_{i=1}^m \theta_2 \Delta LDOILP_{t-1} + \sum_{i=1}^m \theta_3 \Delta MPR_{t-i} + \theta_4 ECM_{t-1} + \mu_t \dots \dots \dots (3.4)$$

Where, θ₀ is the coefficient of constant term, θ₁ to θ₃ is the coefficient of short run variables, ECM is the Error correction model of one period lag estimated from equation.

The ARDL model's first part (β1 to β3) represents short-run dynamics, while coefficients (α1 to α3) represent long-run dynamics. The null hypothesis (H0: α1= α2= α3= 0) implies no long-run relationship among variables, so rejecting H0 indicates evidence of a long-run relationship. The study will begin by conducting co-integration test of a bound testing approach for finding the evidence of long run relationship. To do that, the calculated F- statistics would be compared with two critical values (lower and upper bound); the null hypothesis of no relationship would be rejected if the calculated F- statistics is greater than the upper bound critical value, whereas if it falls below the lower critical values, the null hypothesis of no relationship cannot be rejected.

The inclusion of DOILP and MPR as control variables acknowledges that agricultural sector performance in Nigeria is influenced not only by exchange rate fluctuations, but also by domestic energy prices and monetary policy stance. While the exchange rate primarily influences trade competitiveness and the cost of imported inputs, domestic oil price (DOILP) captures the domestic energy component, whereas monetary policy rate (MPR) reflects the cost of credit. They work together to provide a more complete picture of the macroeconomic conditions that influence agricultural output.

RESULTS AND DISCUSSION

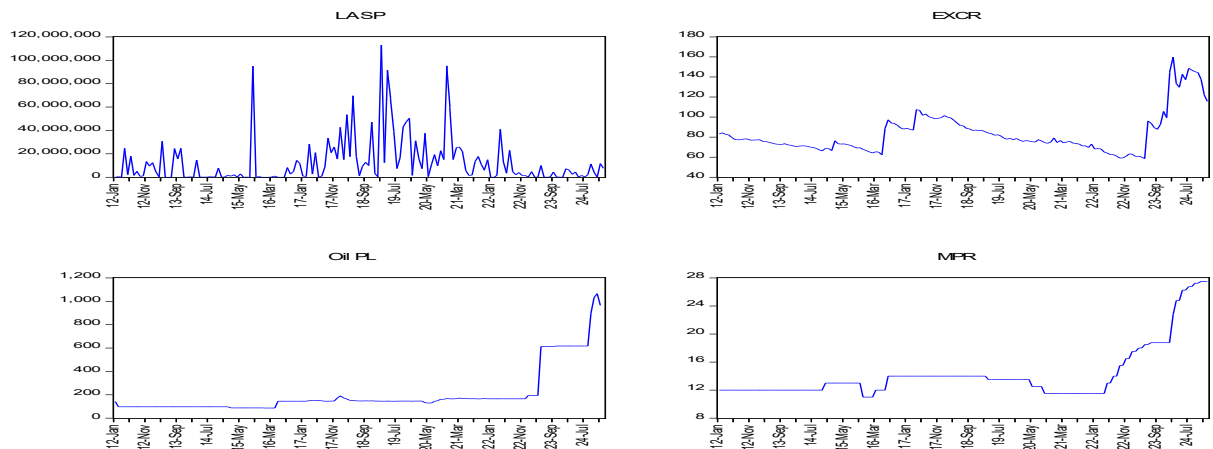


Figure 1. Below Shows a Graphical Representation of the Variables (Agricultural Sector Performance, Exchange Rate, Domestic Oil Price, and Monetary Policy Rate) From 2012 to 2025.

Between 2012 and 2023, ASP steadily declined, mostly as a result of supply chain disruptions, decreased government spending on agriculture, and macroeconomic volatility. But in 2024, there was a notable upturn in the industry. Targeted policy interventions and post-subsidy removal actions that improved market access and productivity are responsible for this improvement. Increased agricultural investment as food demand increases and exchange rates fluctuate is another factor contributing to the recovery. The naira gradually depreciated between 2012 and 2023, according to EXRT, which reflects demand-side imbalances, poor oil export earnings, and ongoing pressures on the foreign exchange market. The steep depreciation in 2024 reflects Nigeria's policy shift to a flexible exchange rate regime and the removal of oil subsidies, which weakened the naira even more due to inflationary expectations and rising import costs.

From 2012 to 2023, the DOILP stayed comparatively steady because to government subsidies and controlled pricing. The graph does, however, show a notable increase in 2024, which corresponds with the end of fuel subsidies and the full liberalization of the oil market. The devaluation of the naira and global market dynamics caused domestic fuel costs to increase. The MPR stayed comparatively steady from 2012 to 2023, suggesting a regulated monetary system. But as the Central Bank of Nigeria (CBN) enacts stricter monetary policies to counteract inflationary pressures brought on by depreciating currency, rising oil costs, and the elimination of subsidies, there is a notable increase in 2024. Although the higher MPR was intended to lower liquidity and stabilize prices, its impact on agricultural credit availability was not entirely uniform.

Table 1. Descriptive Statistics Result

	LASP	EXR	LDOIL_P	MPR
Mean	12573736	83.21231	204.0189	14.21795
Median	4404625.	76.97000	145.4800	13.00000
Maximum	1.13E+08	159.9000	1065.000	27.50000
Minimum	0.000000	58.51000	86.50000	11.00000
Std. Dev.	20084423	20.33904	197.2360	3.812196
Skewness	2.641856	1.797430	2.540670	2.278752
Kurtosis	10.81041	6.171300	8.791458	7.622099
Jarque-Bera	577.9807	149.3711	385.8465	273.8752
Probability	0.000000	0.000000	0.000000	0.000000
Sum	1.96E+09	12981.12	31826.95	2218.000
Sum Sq. Dev.	6.25E+16	64119.89	6029818.	2252.590
Observations	156	156	156	156

Table 1 demonstrates that agricultural sector performance (LASP) appears to have higher mean, and, maximum values, it also have the higher standard deviation than the other variables. This is because the agricultural sector's performance is measured in millions, then followed by domestic oil prices. Furthermore, the positive skewness of all variables indicates that the distribution has a long right tail, implying that the distribution is rightward skewed in the variable distributions. Furthermore, all variables have kurtosis values greater than 3, indicating that their distributions are more peaked than the normal distribution. The Jarque-Bera test results show that all of the series are not normally distributed, implying that they are significant at the 1% probability level, thereby rejecting the null hypothesis for the distribution of LASP, EXC, LDOILP, and MPR. As a result, the variables cannot be described as being normally distributed.

Table 2: Result of Unit Root Test

The result of both Augmented Dickey fuller and Phillip Perron Unit root test are presented in table 2 below.

Variables	ADF Unit root Test				PP Unit root Test			
	Intercept		Intercept & Trend		Intercept		Intercept & Trend	
	Level	1 st diff	Level	1 st diff	Level	1 st diff	level	1 st diff
LASP	-4.531* **	-8.760** *	-4.511 **	-8.732* **	-9.641* **	-35.141* **	-9.491* **	-34.441* **
EXCR	-3.346* **	-2.803	-3.476 **	-3.324	-1.666	-12.322* **	-2.177	-12.335* **

LDOIL	1.912	- 10.736* **	- 0.068	- 8.197* **	1.424	- 17.894* **	-0.682	- 11.094* **
MPR	1.325	- 6.511** *	0.146	- 6.965* **	1.457	- 10.444* **	-0.265	- 11.022* **

Note: ***, ** Denoted the series are stationary at 1% & 5% probability levels.

While domestic oil price (LDOIL) and monetary policy rate (MPR) are stationary at the first difference with trend and intercept under ADF, Table 2 demonstrates that agricultural sector performance (LASP) and exchange rate (EXCR) are stationary at both the level and trend and intercept. Except for LASP, which is stationary at level with intercept/intercept and trend, PP has shown that all variables are stationary at first difference, both with intercept/intercept and trend. Consequently, we have an I(1) combination of variables (EXCR, DOILP, and MPR) and an I(0) variable (ASP). This makes it possible to ascertain the co-integration relationship between series with various integration orders using the ARDL model.

Table 3. Presents the ARDL Bound Test Result

Test statistics	Value	K	Significance level	I (0) Lower Bound	I (1) Upper Bound
F- statistics	6.837	3	10%	3.47	4.45
			5%	4.01	5.07
			1%	5.17	6.36

Source: Authors Computation Using Eviews Version 10 (2024)

Table 3 demonstrates that the calculated F statistic of 6.83 exceeds both the lower and upper critical values at the (1%) significance level, which are 5.17 and 6.36, respectively. This means that in the long run, all of the variables are co integrated.

Table 4. Result of Long Run Coefficients of ARDL

Dependent Variable: LASP			
Variables	Coefficient	t- statistic	P- Value
EXCR	444963.3	2.556	0.012**
LDOIL P	-58609.78	-1.944	0.054**
MPR	-373926.6	0.000	0.000***
C	-21802044	0.000	0.000***

Note: ***, ** &* indicate significance at 1, 5 and 10 percent level respectively.

Source: Authors Computation Using Eviews output Version 10 (2024)

The results in Table 4 above show that there is a positive and significant long-run relationship between domestic oil price (LDOIL P) and agricultural sector performance in Nigeria at the 5% probability level over the study period,

implying that a 1% increase in exchange rate would increase agricultural sector performance by approximately (444963.3%). The findings were consistent with those of Catherine and Tom (2025), Abiola (2019), and Tulasamba et al. (2015), who discovered a positive relationship between exchange rate and Nigerian agricultural sector performance, but contradicted those of Sylvanus et al. (2023), Ayibannua et al. (2020), and Falana (2019), who discovered a negative effect. On the other hand, the coefficient of domestic oil price and monetary policy rate shows a significant negative correlation with agricultural sector performance at the 5% and 1% provability levels, indicating that a (5% and 1%) increase (decrease) in domestic oil price and monetary policy rate will cause agricultural sector performance to decrease by (-58609.78 and -373926.6). The monetary policy outcome supports the expectation of high policy rates, which imply high interest rates, which tend to draw investor attention to the money market.

Table 5. Short Run Coefficients of ARDL and Error Correction Mechanism Result

Variables	Coefficient	t- statistic	P- Value
D(LASP(-1))	-0.204	-1.573	0.118
D(LASP(-2))	-0.030	-0.262	0.794
D(LASP(-3))	0.042	0.487	0.627
D(EXCR)	150536.8	0.551	0.583
D(EXCR(-1))	-645252.7	-1.873	0.063*
D(EXCR(-2))	-431351.0	-1.224	0.223
D(EXCR(-3))	-60040.86	-0.221	0.826
D(OIL_PL)	1728.276	0.045	0.964
D(OIL_PL(-1))	16724.34	0.395	0.693
D(OIL_PL(-2))	47683.08	1.073	0.285
D(OIL_PL(-3))	50526.22	1.078	0.283
D(MPR)	2412143.	0.000	0.000***
D(MPR(-1))	276830.4	0.000	0.000***
D(MPR(-2))	-6911380.	0.000	0.000***
D(MPR(-3))	-5298160.	0.000	0.000***
ECM (-1)	-0.743434	-5.289	0.000***
R ² = 0.49, Adj R ² = 0.42, D.W = 2.00, F statistic= 7.60 (0.000)***,			

Note: ***, ** &* indicate significance at 1, 5 and 10 percent level respectively.

Source: Authors Computation Using Eviews output Version 10 (2024)

Table 5's short-term estimations indicate a negligible positive correlation with agricultural sector performance, meaning that a 1% increase in exchange rates led to an approximate (150536) increase in agriculture sector performance. Conversely, at the 10% significance level, the coefficients of EXCR at lag 1 exhibit a substantial negative link with the performance of the agricultural sector, but lags 2 and 3 also exhibit a negative relationship. DOILP and agricultural sector performance had a negligible positive connection, meaning that a 1% rise in DOILP led to a 1728.276% increase in agricultural sector performance.

Additionally, at the 1 percent probability level, the coefficient of MPR has a significant positive connection with agricultural sector performance, meaning that a 1% rise (reduction) in MPR will lead to a 241214.3 increase in agriculture sector performance. On the other hand, at the 1% probability level, MPR's lags 2 and 3 have demonstrated a substantial negative correlation with ASP. As anticipated, the error correction term has a negative sign (-0.743) and is less than one, making it statistically significant at one percent (0.000). This means that if the performance of the agriculture sector declines, the system might correct itself in a year at a monthly speed of adjustment of roughly 74% for the domestic oil price, monetary policy rate, and currency rate.

Table 6. Diagnostic Test Result

Test	LM version	F. Statistics
Normality (Jarque Bera Test Statistics)	JQ= 694.373 [0.000]	Not applicable
Serial Correlation (Breusch Godfrey LM Test)	CHSQ (2) =0.562 [0.755]	F(2,129) = 0.240 [0.787]
Heteroscedasticity (Breusch pagan Godfrey)	CHSQ (20) =11.919 [0.919]	F (20,131) = 0.557 [0.935]

Source: Authors Computation Using Eviews Version 10 (2024)

Note: values in parenthesis are p-values

The series were discovered to be not normally distributed, as JQ demonstrated statistical significance. As a result, we reject the null hypothesis of normal distribution and accept the alternative hypothesis that the series' frequency distributions are not normal distributed. The Breusch-Godfrey serial correlation test revealed that both the F and LM versions were insignificant, indicating that the series are not serially correlated. This also implies that the error terms are independent, which means that the error term in one period is unaffected by the error term in another. As a result, we can conclude that there is no autocorrelation at the 5% level. The Breusch - Pagan - Godfrey test is a Lagrange multiplier that checks the null hypothesis of no heteroscedasticity. The heteroscedasticity test result produced a high p-value, indicating that it is statistically insignificant. This implies that we accept the null hypothesis and conclude that the residual variance is constant (homoscedasticity).

To check the structural break, a stability analysis was carried out using graphs depicting the cumulative sum of recursive residuals and the cumulative sum of squared residuals (see figures 2a and 2b below).

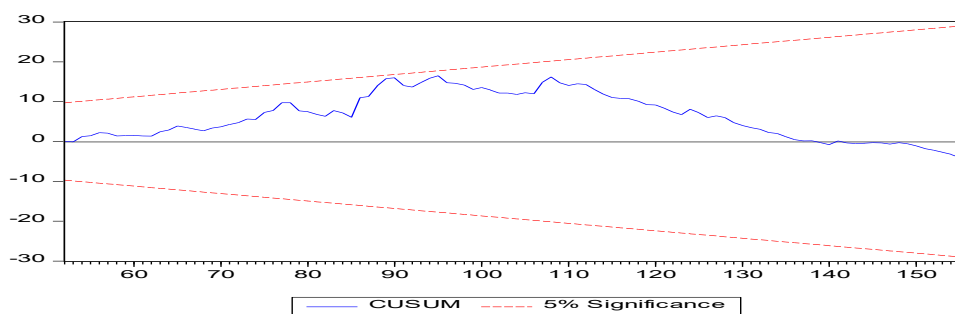


Figure 2

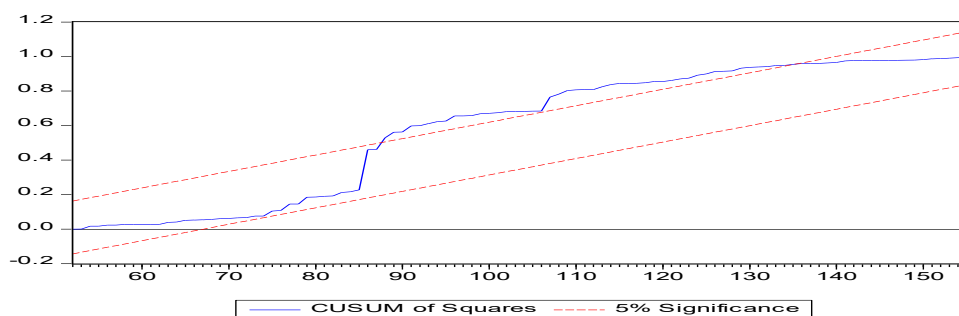


Figure 3

The CUSUM test graph shows that the model is still stable, with the lines staying within the (5%) critical boundaries represented by the blue lines. In contrast, the CUSUMQ graph demonstrates that the model is unstable during the observation period, with the red line occasionally exceeding the (5%) critical upper and lower limits. This instability may be related to periods of global economic crisis, as well as political instability and economic difficulties in the country, such as oil theft, which could influence future exchange rate predictions.

Table 7. Pairwise Granger Causality Test Result

Null hypothesis	F- sta	P- value	Hypothesis Accept/Reject	Causality
EXCR does not granger Cause ASP	0.286	0.752	Accept	No Causality
ASP does not granger Cause EXCR	0.757	0.471	Accept	No Causality
MPR does not granger Cause ASP	0.779	0.461	Accept	No Causality
ASP does not granger Cause MPR	2.551	0.081*	Reject	Unidirectional
DOIL P does not granger Cause ASP	0.502	0.606	Accept	No Causality
ASP does not granger Cause DOIL P	0.454	0.636	Accept	No Causality
MPR does not granger Cause EXCR	7.045	0.001***	Reject	Unidirectional
EXCR does not granger Cause MPR	21.741	5.E-09	Accept	No Causality

DOIL P does not granger Cause EXCR	14.087	2.E-06	Accept	No Causality
EXCR does not granger Cause DOILP	0.131	0.878	Accept	No Causality
DOILP does not granger Cause MPR	2.503	0.085*	Reject	Unidirectional
MPR does not granger Cause DOILP	11.701	2.E-05	Accept	No Causality

Note: *, *** denote significance at 1%, and 10% level
 Source: Authors Computation Using Eviews (10) Output

As shown in Table 7, the Granger causality result indicates that there is no causal relationship between the exchange rate and agricultural sector performance. This is because the F-statistic does not indicate a significant event at the 10% level. As a result, the null hypotheses could not be rejected based on their respective p-values of (0.752 and 0.471), contradicting Oyikhiloment et al. (2014), who discovered unidirectional causality between exchange rate and agricultural sector performance in Nigeria. The p-value of (0.081) indicates that there is a unidirectional causality between agricultural sector performance and monetary policy rate. Furthermore, the p-values of (0.606 and 0.636) indicate that there is no evidence of causality between domestic oil price and agricultural sector performance. At a 1% significance level, the causal relationship between monetary policy rate and exchange rate runs from MPR to EXCR, and not the other way around. However, neither domestic oil price nor exchange rate granger causes the other. This is because EXCR has a direct effect on DOILP. Again, the evidence of unidirectional causality between domestic oil prices and monetary policy rates runs from DOILP to MPR without feedback effect.

CONCLUSIONS AND RECOMMENDATIONS

Using monthly data, this study examined the short- and long-term impacts of exchange rates on the performance of Nigeria's agricultural industry from 2012 to 2025 using the linear ARDL model. The results indicate that agricultural output and the real exchange rate have a positive connection over the long term, suggesting that depreciation may improve agricultural performance and competitiveness. Conversely, domestic oil prices and monetary policy rates have a detrimental long-term effect, most likely as a result of higher production costs and restricted access to credit brought on by high interest rates. MPR had a favorable but unexpected effect in the near term, perhaps as a result of greater government interventions or investment inflows, but none of the other explanatory factors were found to have a substantial impact on agricultural output. By showing unidirectional causality between some variables but no causal relationship between EXRT and ASP, the Granger causality results highlight the complexity of these relationships.

Furthermore, the sector now faces a mixed future due to the recent elimination of fuel subsidies and the shift to a flexible exchange rate regime. Short-term effects of these shifts include increased production and transportation

costs, higher inflation of agricultural inputs, and tighter financial conditions due to rising interest rates. Nonetheless, the devaluation of the naira may increase the export competitiveness of cashew, cocoa, and sesame crops. How swiftly and successfully policymakers can reduce short-term shocks while leveraging long-term trade possibilities will determine the final impact. These macroeconomic changes have the potential to reduce productivity, increase food costs, and undo recent progress in food security if intentional action is not taken.

FURTHER STUDY

The study concludes that exchange rate dynamics have a significant impact on Nigeria's agricultural sector performance, and offers the following recommendations.

1. **Stabilize Exchange Rates:** To protect agriculture from excessive volatility, policymakers should implement stable and flexible exchange rate mechanisms.
2. **Targeted Subsidies:** Following the removal of oil subsidies, farmers should receive direct subsidies to help offset rising energy and transportation costs.
3. **Interest Rate Management:** The Central Bank should strike a balance between containing inflation and ensuring farmers have affordable credit access, possibly through targeted agricultural credit schemes.
4. **Invest in Agricultural Infrastructure:** To reduce the impact of external shocks, the government should increase its investment in irrigation, storage, and logistics infrastructure.
5. **Integrated Policy Framework:** A coordinated policy effort that harmonizes exchange rate, monetary, and agricultural policies will help the sector withstand macroeconomic disruptions.

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