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All correspondences and enquiries should be directed to: The Editor-in-Chief
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INFLATION AND AGRICULTURAL OUTPUT IN NIGERIA: AN ARDL RE-EXAMINATION OF MACROECONOMIC INTERACTIONS

Sulaiman Ibrahim¹, Kabiru Labaran², Saheed Baba Salahudeen³

¹Department of Economics and Development Studies,
Federal University Dutse Jigawa State – Nigeria.

²Department of Public Administration, Jigawa State Polytechnic
Dutse, Jigawa State – Nigeria.

³Department of Sociology, Baba-Ahmed University Kano, Kano State – Nigeria.

Correspondence author: sulaimanibrahimabba@gmail.com

Abstract

This study re-examines the impact of inflation on agricultural output in Nigeria (1981–2024), explicitly accounting for interactions with exchange-rate movements, government agricultural expenditure, and interest rates. Using an Autoregressive Distributed Lag (ARDL) approach, we examine both short-run dynamics and long-run equilibrium relationships among natural-log transformed variables. Results indicate a statistically significant negative long-run elasticity of agricultural output with respect to inflation, suggesting inflation raises production costs and reduces farmers' profitability. Government expenditure positively influences output, while exchange rate fluctuations have mixed impacts depending on the lag period. Rising interest rates consistently constrain productivity by limiting access to credit. The findings underscore the importance of inflation control, exchange rate stabilization, targeted government investment, and affordable credit in promoting sustainable agricultural output. This study contributes updated empirical evidence to the literature and offers policy recommendations to enhance agricultural production and support economic growth.

Keywords: Agriculture, Exchange rate, Government expenditure, Inflation, Interest rate, Nigeria

Introduction

Agriculture has historically been a vital component of Nigeria's economic framework, significantly contributing to the nation's GDP and employment. Despite its importance, the agricultural sector is increasingly challenged by inflation, which has been shown to erode consumer purchasing power and elevate input costs for farmers such as seeds, fertilizer, fuel, and labour. The complexities surrounding inflation include its relationship with price instability, which adversely affects agricultural production and broader economic performance. (The National Bureau of Statistics, 2024) reported that all measures of inflation rate rose in June 2024. Headline inflation increased to 34.2 percent in June 2024 from 22.8 percent in June 2023 and 34.0 percent in May 2024 with headline inflation remains dominantly driven by food inflation, which rose to 40.9 percent year-on-year, up from 40.7 percent in May 2024 and significantly higher than 25.3 percent in June 2023. As noted by Adeola and Bolarinwa (2018), inflation can disrupt agricultural output through increased costs of inputs such as seeds, fertilizers, and labor, ultimately leading to reduced output. Furthermore, the interaction between inflation and other macroeconomic factors such as exchange rate fluctuations and government policies—intensifies the need for a nuanced understanding of how these dynamics influence agricultural output.



The theoretical perspectives on inflation vary, with studies indicating both positive and negative effect on economic growth (Ndoricimpa, 2017; Seleteng et al., 2013). Structuralist perspectives posit that inflation can arise from supplyside constraints, particularly in essential sectors like agriculture (Aydin, 2017; Olugbenga & Oluwabunmi, 2020). However, a significant gap exists in the literature regarding the long-term effects of inflation on agricultural output in Nigeria, particularly given the shifts in macroeconomic conditions over the past decade. This research revisits the relationship between inflation and agricultural output 1981 to 2024, and explicitly accounts for exchange movements, government expenditure on agriculture and interest rates, it therefore, contributes to the updated empirical evidence and policy recommendations to enhance agricultural output and support economic growth.

This paper contributes to the literature in three ways. First, it re-examines the inflation–agricultural output relationship in Nigeria using an updated annual dataset covering 1981–2024. Second, it explicitly accounts for interactions with exchange-rate movements, government agricultural expenditure and the policy interest rate, allowing for richer policy inference. Third, it applies the ARDL bounds testing approach to identify both short-run dynamics and long-run elasticities. The paper is organized as follows: Section 1 general introduction consisting specific flow, motivation, problem, contribution and organization of the paper; Section 2 reviews the literature and theoretical framework; Section 3 describes the data and empirical strategy; Section 4 reports the results and diagnostics; and Section 5 concludes with policy recommendations.

Literature Review

This section will briefly clarify conceptual and theoretical issues. However, the large chunk of it will be on the review of empirical studies.

Conceptual Issues

There is a consensus on the definition of inflation as a sustained rise in the general price level, measured commonly with CPI (Mustapha & Kubalu, 2016). Inflation rate is designed to measure the rate of increase of a price index. It is a percentage rate of change in price level over time. The different measures of inflation according to Gathing, (2014) are the Consumer Price Index (CPI) that measures the changes in prices of essential household basket from a consumer perspective; Employment Cost Index (EPI) that tracks changes in the labor market cost hence measuring inflation of wages, and employer-paid benefits; Gross Domestic Product Deflator (SGDP-Deflator) that measures the change in level of prices of all new domestically produced, final goods and services in an economy; and the International Price Program (IPP) that tracks price changes in the foreign trade sector. From among the five measures, CPI the most widely used.

At its simplest level, agricultural output refers to the total quantity or value of crops and livestock produced within a given period, usually measured at the farm-gate or national level (FAO, 2022). Unlike agricultural productivity, which relates output to the amount of inputs used, agricultural output emphasizes the absolute volume or value of production, making it more suitable for macroeconomic analysis (World Bank, 2023). Common indicators of agricultural output include total crop production, livestock production, and aggregate agricultural GDP. According to the Central Bank of Nigeria (CBN, 2023) and the National Bureau of Statistics (NBS, 2024), agricultural output data for Nigeria is generally measured in monetary terms, capturing the sector's direct contribution to national income. This distinction is important because the present study examines the effect of inflation on agricultural output, not on productivity, ensuring consistency between the conceptual framework, data, and empirical model.

Empirical Literature Review**Inflation and Sectoral Output:**

The relationship between inflation, agricultural output, and macroeconomic variables in Nigeria has been extensively examined. Adeola and Bolarinwa (2018) investigated the impact of inflation and government expenditure on agricultural output, employing an Autoregressive Distributed Lag (ARDL) model and the Johansen cointegration test, grounded in the Monetary Policy Theory where they reported a significant **negative** effect of inflation on agricultural output. Similarly, Olalekan and Ogunbiyi (2023) examined the impact of inflation on agricultural output, using the Supply and Demand Theory and reported negative effect of inflation on agricultural output; magnitude and significance vary across periods. Owoh (2024) examined the impact of inflation on agricultural output, employing an ARDL model, underpinned by the Quantity Theory of Money and finds a **negative** impact of inflation on agricultural output short-run and long-run; recommends macro stability to protect agriculture. Adebayo and Abiodun (2018) explored the relationship between inflation, government expenditure, and agricultural growth, using a Vector Error Correction Model (VECM), based on the Fiscal Policy Theory. Their analysis shows inflation exerts **adverse** effects on sectoral growth; government spending has mixed/positive roles depending on composition. Akpan (2022) analyzed the effects of inflation on agricultural investment, using the Investment Demand Theory, and reports that inflation reduces agricultural investment and hence output/investment decisions. Nwosu and Ugwueze (2023) investigated the relationship between inflation and agricultural productivity, grounded in the Production Function Theory. They examine productivity (TFP/partial measures) and show inflation undermines productivity through higher input costs. While their study measured productivity, the present research focuses on agricultural output, which, although related, captures different aspects of sectoral performance. Eze and Nwankwo (2022) analyzed the effects of inflation on agricultural investment, employing the Portfolio Theory.

Exchange rate volatility has also been identified as a factor affecting agricultural output. Akpan (2019) examined the impact of exchange rate depreciation on agricultural output, using an ARDL model, underpinned by the Purchasing Power Parity (PPP) Theory and report that exchange rate movements significantly affect agricultural output; depreciation tends to have short-run negative effects; long-run effects can be mixed (depends on input import dependence). Owoh (2024) explored the relationship between exchange rates, inflation, and agricultural output, employing a VECM, grounded in the Mundell-Fleming Model. Nnoli et al. (2023) investigated the relationship between exchange rates, inflation, and agricultural export, using the Export-Led Growth Theory. Ugochukwu and Chinyere (2023) analyzed the effects of exchange rate volatility on agricultural exports, based on the Exchange Rate Pass-Through Theory. Musa and Abdullahi (2024) examined the impact of exchange rate depreciation on agricultural output, employing the Marshall-Lerner Condition. Oyinlola and Olowofeso (2023) explored the relationship between exchange rates and agricultural growth, using the Growth Theory. Salami and Olofin (2022) investigated the impact of exchange rate volatility on agricultural productivity, while this study focuses on agricultural output. Akinboade and Kadtke (2022) analyzed the effects of exchange rate depreciation on agricultural output, employing the Supply and Demand Theory.

Interest rates have been found to significantly influence agricultural investment in Nigeria. For instance, Janet (2024) discovered that interest rates impact agricultural investment, grounded in the Investment Demand Theory. Similarly, Adebayo and Abiodun (2018) explored the relationship between interest rates, inflation, and agricultural growth, using the Monetary

Policy Theory. Eze and Nwankwo (2022) analyzed the effects of interest rates on agricultural investment, employing the Portfolio Theory. Akpaeti and Agom (2023) investigated the relationship between interest rates and agricultural investment, utilizing the Capital Asset Pricing Model (CAPM). Their report shows that higher interest rates reduce agricultural investment and output; credit constraints harm growth. Ojo and Olowofeso (2022) analyzed the effects of interest rates on agricultural investment. Adewumi and Adeyemi (2023) explored the relationship between interest rates and agricultural growth.

The agricultural sector's contribution to Nigeria's economic development has been well-documented, but the impact of inflation on agricultural output and economic growth remains a pressing concern. The literature highlights the need for policymakers to address macroeconomic policies and structural challenges to improve agricultural performance. Effective management of inflation, exchange rates, and interest rates, combined with increased government expenditure on agriculture, is crucial for promoting sustainable agricultural output and economic development.

Despite the large body of empirical work on inflation, exchange rates, credit costs and fiscal spending, the literature for Nigeria remains fragmented. Existing studies either focus narrowly on inflation alone, or investigate macroeconomic determinants of agricultural productivity without distinguishing output effects. In addition, most previous papers use short samples, bivariate correlations or techniques that cannot capture both short-run dynamics and long-run equilibria. Evidence is therefore mixed and policy guidance uncertain. This paper fills the gap by simultaneously modelling the joint impact of inflation, exchange rate movements, government agricultural expenditure and interest rates on agricultural output in Nigeria, using an ARDL framework that distinguishes short-run adjustments from long-run elasticities.

Methodology

Sources of Data

Annual data for 1981–2024 were used. Series definitions, units and sources are:

- **AGR:** Agricultural output (value added), annual, Central Bank of Nigeria Statistical Bulletin. If CBN lacked a value for some years we used NBS series (Agriculture value added) and FAO country aggregate for cross-checking.
 - **INFL:** Consumer Price Index (annual % change), National Bureau of Statistics (CPI report), series (All items annual %).
 - **EXCH:** Official average Naira per USD (annual average), Central Bank of Nigeria Statistical Bulletin and IMF data base, annual average.
 - **GE:** Government expenditure on agriculture (total, nominal Naira), Central Bank of Nigeria Annual Reports, annual totals.
 - **INT:** Monetary policy rate (%), Central Bank of Nigeria (MPR), annual (year-end) series.
- All series were converted to natural logs for estimation except GE which is expressed in nominal Naira then logged to stabilize variance and interpret coefficients as elasticities.

Model Specification

This study is grounded on the Cost Push Inflation Theory that links inflation with input costs in agriculture, aligning with the variables selected for the study. The empirical model for this study follows Owoh (2024) and Janet (2024), who examined the impact of inflation on sectoral output using a similar approach. The Auto Regressive Distributed Lag (ARDL) bounds testing model is employed because it allows for the analysis of both short run and long run relationships between the variables.

The general form of the ARDL model used in this study is specified as follows:

$$(1) \ln(AGR_t) = \beta_0 + \beta_1 \ln(INFL_t) + \beta_2 \ln(EXCH_t) + \beta_3 \ln(GE_t) + \beta_4 \ln(INT_t) + \mu_t$$

$$(2) \text{ Short-run (ECM) form: } \Delta \ln(AGR_t) = \alpha_0 + \sum \alpha_i \Delta X_{t-i} + \phi ECM_{t-1} + \varepsilon_t$$

where: $ECM_{t-1} = \ln(AGR_{t-1}) - \theta_1 \ln(INFL_{t-1}) - \theta_2 \ln(EXCH_{t-1}) - \theta_3 \ln(GE_{t-1}) - \theta_4 \ln(INT_{t-1})$

Where:

AGR_t = Agricultural output (value added) at time t.

INFL_t = Inflation rate (CPI, annual %).

EXCH_t = Exchange rate (Naira per USD).

GE_t = Government expenditure on agriculture (nominal Naira).

INT_t = Monetary policy rate (MPR).

β_0 is the intercept and $\beta_1, \beta_2, \beta_3, \beta_4$ are the long-run coefficients (elasticities) associated with $\ln(INFL_t)$, $\ln(EXCH_t)$, $\ln(GE_t)$ and $\ln(INT_t)$ respectively. The ARDL model includes lagged levels and differences; the lag orders for each variable are selected endogenously (AIC) and will be reported in the ARDL selection output.

Estimation procedure:

(i) test stationarity (ADF) at levels and first differences; (ii) ARDL bounds test for cointegration; (iii) estimate long-run coefficients using the ARDL long-run form; (iv) estimate the short-run ECM with Δ variables and $ECM(t-1)$; (v) perform diagnostics (serial correlation, heteroskedasticity, normality, Ramsey RESET) and stability tests (CUSUM, CUSUMSQ); (vi) conduct Granger causality as robustness.

DATA PRESENTATION AND ANALYSIS

The empirical results include Descriptive statistic result, unit root test result, ARDL bound test result, ARDL, Granger causality test, diagnostic tests and the cumulative sum test.

Descriptive Statistics

This shows the descriptive nature of the data set used in the study.

Table 1: Descriptive Statistics

	AGR	INFL	EXCH	GE	INT
Mean	8972.015	18.73791	125.0414	34875.18	22.73785
Maximum	19306.49	72.83550	460.7020	702497.9	36.09000
Minimum	2303.510	5.388000	0.617708	9.640000	10.00000
Std. Dev.	6016.322	16.31539	131.6870	149202.1	6.088664
Skewness	0.423233	1.914109	1.096621	4.304534	-0.306659
Kurtosis	1.604532	5.588786	3.324013	19.53624	2.689044
Jarque-Bera	4.772707	38.26475	8.806568	622.7174	0.847196
Probability	0.091964	0.000000	0.012237	0.000000	0.654687
Observations	44	44	44	44	44

Source: Author's computation using E-views 10 (2024)

Table 1 shows the mean average value for AGR is 8972.015, INFL is 18.73791, EXCH is 125.0414, GE is 34875.18 and INT is 22.7376. GE has a higher mean average and INFL has the lowest mean average in the series. The maximum and minimum value of the variables are 19306.49 and 2303.510 for AGR, 72.83550 and 5.388000 for INFL, 460.7020 and 0.617708 for EXCH, 702497.9 and 9.640000 GE, 36.09000 and 10.00000 INT.

From table 1 AGR shows a skewness of 0.42 indicating a moderately symmetric near normal, INT shows skewness of -0.306 indicating a moderately symmetric near normal but slightly negatively skewed, and the rest of the variables depicting a positive skewness (right-tailed) having values greater than one. This show AGR and INT need no transformation where EXCH, INFL, and GE may require transformation.

For kurtosis, some variables are platykurtic (AGR=1.605, INT=2.689), and the rest are leptokurtic (INFL=5.589, EXCH=3.324, GE=19.536). This is because the values are less than 3 (indicating lower outliers) and greater than 3 (indicating the presence of extreme outliers) respectively as presented in table 1.

For the Jarque Bera, table 1 reports the summary statistics for the five variables. AGR has a mean of 8,972.02 and INT has a mean of 22.74. The Jarque-Bera test shows that AGR ($p = 0.09196$) and INT ($p = 0.65469$) do not reject the null of normality at the 5% level, so we fail to reject normality for these two series. However, INFL ($p < 0.001$), EXCH ($p = 0.01224$) and GE ($p < 0.001$) reject the null of normality, indicating skewness/outliers in those series. Skewness and kurtosis values (Table 1) support these findings.

Unit Root Test Results

It is very vital to begin with the pre-test of the variables for unit root in order to know the best technique for the data analysis. The results of this test are presented in the Table below

Table 2: Unit Root Test Result (ADF)

Variables	At level	At 1st Difference	Order
AGR	- 2.127900	- 5.510741*	I (1)
INFL	- 3.844169	- 5.980331*	I (1)
EXCH	- 0.189641	- 6.501022*	I (1)
GE	- 3.759160*	-----	I (0)
INT	- 3.418733	- 7.226969*	I (1)

Source: Author's computation using E-views 10, (2024)

Table 2 shows that GE is stationary at level I(0) while AGR, INFL, EXCH and INT are stationary at first difference that is I(1) using ADF criteria. It is obvious that there is no variable that became stationary at I (2). Since the series are a mix of I(0) and I(1), the ARDL approach is appropriate.

Bounds Cointegration Tests Results

The inference here is, if the computed F-statistic is greater than the upper bound critical value of the bounds test, there is said to be cointegration. If the computed F-statistic is less than the lower bound critical value, there is no cointegration. However, if the value of the computed F-statistic lies between the upper and the lower critical values, then the inference is said to be inconclusive.

Table 3: Bound Tests for Cointegration Results

Statistics	Values	Critical Bound (k=4)		
	I (1)	4.37	3.49	3.09

Source: Author's computation using E-views 10 (2024)

F-statistics	11.472474	1%	5%	10%
	I (0)	3.29	2.56	2.2

As shown in table 3 computed bound test results indicate that the F-statistic value is 11.472474, exceeding the critical bounds at all significance levels, specifically 3.29 for I (0) at 1%, 2.56 for I (0) at 5%, and 2.2 for I (0) at 10%. Additionally, the F-statistic surpasses the I (1) critical values of 4.37 at 1%, 3.49 at 5%, and 3.09 at 10%. This suggests that the null hypothesis of no co-integration can be rejected, confirming the presence of co-integration among the variables. In other words, there exists a long-run equilibrium relationship between agricultural output and its determinants.

Auto Regressive Distributed Lag Result (long-run)

The long-run relationship between the dependent and the independent variables specified. The decision rule for the rejection of the null hypothesis is for the probability of the variable to be below 0.05.

Table 4: Estimated Long-Run Coefficients (ARDL)

Variable	Coefficient	Std. Error	t-Statistic	p-Value
ln(INFL)	-0.156586	0.032665	-4.793714	0.0002*
ln(EXCH)	-0.029489	0.029375	-1.003886	0.3314
ln(GE)	0.063653	0.023243	2.738612	0.0152*
ln(INT)	0.083843	0.069955	1.198529	0.2493
C	2.018819	0.387308	5.212441	0.0001*

Note: (*) indicates significance at the 5% level. Coefficients are elasticities because variables are in natural logs.

Source: Author's computation using E-views 10 (2024)

The long-run coefficients provide valuable insights into the equilibrium relationships between the variables. In this analysis, the constant term (C) is highly significant, with a value of 2.018819 and a p-value of 0.0001. Furthermore, the long-run coefficients of ln(INFL), and ln(GE) are significant, indicating that inflation and government expenditure have lasting impacts on agricultural output. Specifically, 1% increase in inflation leads to a 0.16% decrease and 1% increase in government expenditure lead to a 0.064% increase in the lung-run values.

Auto Regressive Distributed Lag Result (Short Run)

We present the findings on the short-run relationship between the dependent and the independent variables specified. The criteria used for the selection of the model are the Akaike Info Criterion. The decision rule for the rejection of the null hypothesis is for the probability of the variable to be below 0.05, or the t-statistic to be greater than or equal to 2.

Table 5: Short-Run Error Correction Model (ECM)

Variable	Coefficient	Std. Error	t-Statistic	p-Value
$\Delta \ln(\text{AGR})^*$	-0.232875	0.046903	-4.943742	0.0002*
$\Delta \ln(\text{AGR}(-1))^*$	-0.202730	0.062451	-3.246234	0.0054*
$\Delta \ln(\text{INFL})$	-0.033838	0.008840	-3.828036	0.0016*
$\Delta \ln(\text{INFL}(-1))$	-0.089739	0.013236	-6.779755	0.0000*
$\Delta \ln(\text{EXCH}(-1))$	-0.059221	0.017027	-3.478009	0.0036*
$\Delta \ln(\text{GE}(-1))$	0.068073	0.007575	8.986693	0.0000*
$\Delta \ln(\text{INT}(-1))$	-0.067026	0.027006	-2.481864	0.0254*
ECM (t-1)*	-0.231875	0.024204	-9.580177	0.0000*

Note: (*) indicates significance at the 5% level. Coefficients are elasticities because variables are in natural logs.

Source: Author's computation using E-views 10 (2024)

The ECM results (Table 5) show several economically meaningful short-run effects. The lagged change in agricultural output, $\Delta \ln(\text{AGR})$ and $\Delta \ln(\text{AGR}(-1))$, has a negative coefficient (-0.2329, $p = 0.0002$ and -0.2027, $p = 0.0054$) respectively, indicating short-run mean reversion. Both contemporaneous and lagged changes in inflation are negative and significant ($\Delta \ln(\text{INFL})$: -0.03384, $p = 0.0016$; $\Delta \ln(\text{INFL}(-1))$: -0.08974, $p < 0.001$), implying that rising inflation reduces agricultural output in the short run. Exchange-rate depreciation at lag one ($\Delta \ln(\text{EXCH}(-1)) = -0.05922$, $p = 0.0036$) also reduces output. Government expenditure at lag one has a positive short-run effect ($\Delta \ln(\text{GE}(-1)) = 0.06807$, $p < 0.001$), and higher interest rates at lag one reduce output ($\Delta \ln(\text{INT}(-1)) = -0.06703$, $p = 0.0254$). The ECM term (-0.2319, $p < 0.001$) indicates the model corrects about 23.2% of disequilibrium per year. Note on interpretation: Because the model uses natural logs for most variables, the coefficients on log variables are elasticities. A coefficient of -0.0338 on $\Delta \ln(\text{INFL})$ means that **a 1% rise in inflation is associated with a 0.0338% fall in agricultural output in the short run** (i.e. $\Delta \ln(\text{AGR}) \approx -0.033838 \times \Delta \ln(\text{INFL})$). For clarity, we report results to **three decimal places** and explain the elasticity interpretation consistently in text. Overall, these results provide valuable insights into the factors influencing agricultural output and can inform policy decisions to promote sustainable agricultural growth.

Table 6: Diagnostic Tests Table

	Test statistics	f-statistics	Probability
1.	Serial correlation	F (4,11) =0.265091	0.8943
2.	Normality	J-B=1.408506	0.494478
3.	Heteroscedasticity	F (23,15) =0.480950	0.9446
4.	Functional form	4.427	0.142

Source: Author's computation using E-views 10 (2024)

Table 6 shows the diagnostic test results which indicate that the residuals are well-behaved and the model is adequate. Specifically, the serial correlation test yields an F-statistic of 0.265091 with a probability value of 0.8943, suggesting no significant autocorrelation in the residuals. Additionally, the Jarque-Bera test for normality produces a statistic of 1.408506 with a probability value of 0.494478, indicating that the residuals are normally distributed. Furthermore, the heteroscedasticity test yields an F-statistic of 0.480950 with a probability value of 0.9446, suggesting no significant heteroscedasticity in the residuals. Lastly, the functional form test produces a statistic of 4.427 with a probability value of 0.142, indicating no significant misspecification in the model's functional form. The Ramsey RESET test shows that the model has been correctly specified. This means that the model is free from serial

correlation, heteroscedasticity, functional form and normality problems. As such, this model could produce reliable results.

Cusum Test Results

The cumulative sum plots when placed should be within the 5% critical lines, which proves that the residual variance is stable. If the cumulative sum plots go outside the area of the two critical lines, the model exhibits instability.

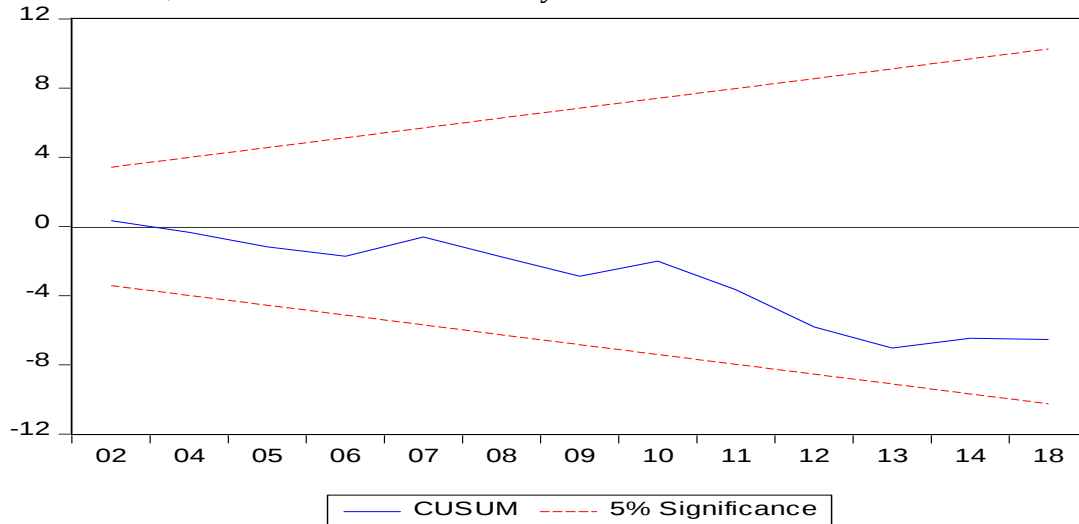


Figure 1: COSUM Stability Test 1981 - 2024

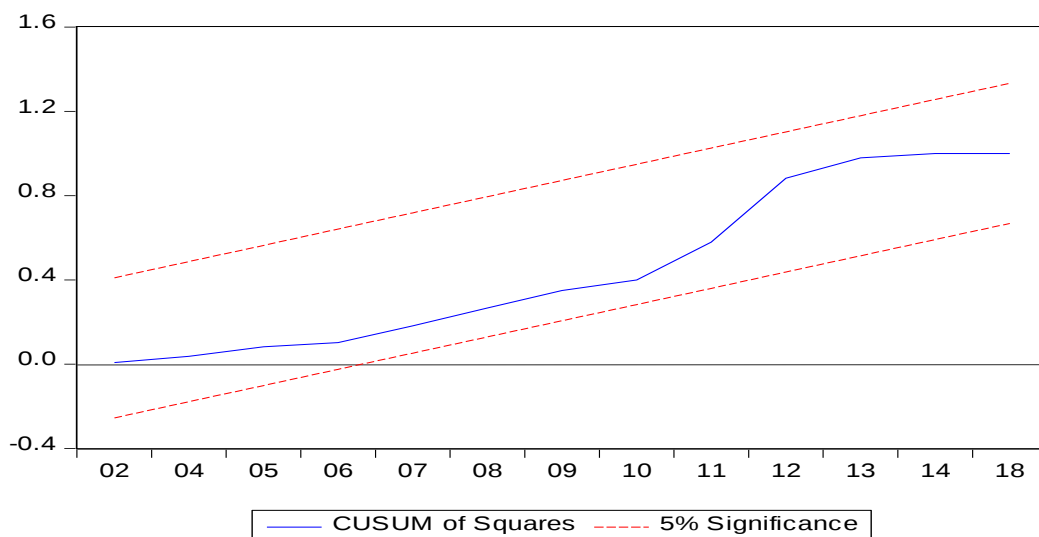


Figure 2: COSUMSQ Stability Test 1981 - 2024

As suggested by Chindo *et. al* (2018), cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests for stability of the model along the studied periods were conducted. From figure 1 and figure 2 respectively, CUSUM and CUSUMQ test was applied to assess the stability of the relationship between agricultural output (AGR) and the key macroeconomic variables: inflation (INFL), exchange rate (EXCH), government expenditure (GE), and interest rate (INT) over the period 1981 to 2024. The results of the CUSUM test indicate that the model is stable, as the CUSUM plot stays within the 5% critical bounds throughout the period analyzed. This implies that the parameters in the model, particularly those relating to the impact of inflation, exchange rates, government expenditure, and interest rates on agricultural output,

remained stable over the long term, without any structural breaks that would invalidate the findings.

This stability confirms the robustness of the model and supports the reliability of the estimated coefficients in explaining how these macroeconomic factors influence agricultural output in Nigeria. Therefore, policymakers can rely on these results to inform long-term decisions regarding agricultural growth and economic policy.

Discussion of Findings

The findings from this study indicate a significant relationship between agricultural output and macroeconomic variables, particularly inflation, exchange rate, government expenditure, and interest rates. Consistent with Adeola and Bolarinwa (2018), the ARDL results confirm that inflation negatively impacts agricultural output both in the short and long run. This aligns with the cost-push inflation theory, which posits that rising input costs due to inflation hinder agricultural productivity by increasing operational expenses for farmers. Furthermore, government expenditure on agriculture plays a vital role in boosting agricultural output, as indicated by the positive coefficients found in this study. This finding is in line with Akinsola and Omotesho (2022), who also reported that sustained government investment in agriculture can mitigate some of the adverse effects of inflation.

In addition, the study's error correction model (ECM) results support the hypothesis of a long-run equilibrium relationship between the variables. The speed of adjustment term shows that agricultural output adjusts to macroeconomic shocks at a moderate pace, aligning with the findings of Owoh (2024), who employed similar econometric techniques. Exchange rate fluctuations, particularly in the long run, demonstrate mixed effects on agricultural output, with both positive and negative impacts observed depending on the lag period. This complexity reflects the dynamic nature of exchange rate pass-through on agricultural inputs, which Akpan (2019) also highlighted as a critical factor in agricultural performance.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary of the Findings

This study employed an Auto Regressive Distributed Lag (ARDL) approach to analyze the short-run and long-run relationship between inflation and agricultural output, as well as the influence of exchange rates, government expenditure, and interest rates on agricultural output. The results from the empirical analysis indicated that inflation exerts a significant negative impact on agricultural output, both in the short and long run. This finding aligns with previous studies suggesting that inflation increases input costs for farmers, reducing the overall output. The ARDL model revealed that 1% increase in inflation led to 0.034% reduction in agricultural output in the short run, demonstrating the immediate adverse effects of rising prices on the sector.

Exchange rate fluctuations had mixed impacts on agricultural output. In the short run, the exchange rate exerted both positive and negative effects at different lag periods. Notably, a depreciation in the exchange rate had a positive effect on agricultural output after three periods, while it had a negative impact after four periods. In the long run, however, the exchange rate did not significantly influence agricultural output.

Government expenditure on agriculture emerged as a crucial determinant of agricultural output. In the long run, 1% increase in government expenditure led to a 0.064% increase in agricultural

output. This underscores the importance of public investment in enhancing agricultural output through infrastructure development and subsidies.

Interest rates negatively influenced agricultural output, especially in the short run. Higher borrowing costs deter farmers from accessing credit for investment, thus reducing agricultural output. The results showed that rising interest rates consistently had a negative impact on output, with significant coefficients in both the short and long run.

Conclusion

This paper provides insights into the relationship between inflation and agricultural output in Nigeria, as well as the role of other macroeconomic variables such as exchange rates, government expenditure, and interest rates. The findings confirm that inflation poses a significant challenge to the agricultural sector, as it raises production costs and reduces profitability for farmers. The negative impact of inflation, both in the short and long run, highlights the importance of implementing effective inflation control measures to stabilize the agricultural sector.

Government expenditure was identified as a positive driver of agricultural output, suggesting that increased public investment in agriculture can significantly enhance output and contribute to economic growth. The exchange rate's mixed effects in the short run indicate the complexity of managing currency fluctuations, while the negative impact of interest rates underscores the need for more accessible credit facilities for farmers.

In conclusion, this study despite the changes in the time frame, theory and methodology employed it still re-affirms the critical importance of managing inflation, stabilizing exchange rates, increasing government support for agriculture, and reducing interest rates to boost agricultural output. The findings align with economic theories on inflation and agricultural output, emphasizing the need for comprehensive macroeconomic policies that address the unique challenges faced by the agricultural sector as it follows with the a-priori expectations, confirming the critical role of sound macroeconomic management in promoting agricultural growth.

Based on the findings, the study recommends that the Federal Government of Nigeria should embark on a well-structured agricultural policy that integrates inflation control, exchange rate stability, government support, and financial accessibility. Such a policy framework should be dynamic, capable of responding to both domestic and international economic changes, ensuring the long-term sustainability and growth of the agricultural sector in Nigeria.



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