EFFECT OF EXCHANGE RATE ON FOOD PRICES IN NIGERIA (1986-2024)

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ABSTRACT

Nigeria is endowed with enormous agricultural potential, yet food prices have continued to rise amid increasing exchange rate volatility and persistent macroeconomic challenges. The combination of currency instability, growing dependence on imported food and agricultural inputs, and recurring economic imbalances has heightened concerns about food security and price stability in the country. Against this backdrop, this study examined the effect of exchange rate fluctuations on food prices in Nigeria. Specifically, the study investigated the long-run and short-run relationships between exchange rate movements and food prices over the period 1984–2024, while accounting for the influence of oil revenue, interest rate, and agricultural output as key determinants of food price dynamics. The study employed the Vector Error Correction Model (VECM) following confirmation that all variables are integrated of order one, I(1), and cointegrated based on the Johansen test. The long-run results reveal that exchange rate has a positive and statistically significant effect on food prices (β = 1.110, t = 4.460), confirming strong exchange rate pass-through. Oil revenue exerts a significant negative longrun effect (β = –20.761, |t| = 5.641), while interest rate (β = –23.167, |t| = 5.132) and agricultural output (β = –17.954, |t| = 4.627) significantly reduce food prices in the long run. In the short run, exchange rate effects are transmitted with a lag (β = 0.154, t = 2.528), oil revenue increases food prices temporarily (β = 0.916, t = 2.587), and agricultural output reduces food prices (β = –0.789, t = –2.651). The error correction term (–0.496, t = –5.204) indicates that approximately 49.6% of disequilibrium is corrected annually. The study concludes that exchange rate instability remains a major driver of food price inflation in Nigeria, while sustained agricultural expansion and prudent macroeconomic management can mitigate inflationary pressures. It recommends exchange rate stabilization, strengthened agricultural productivity, disciplined monetary policy, and strategic use of oil revenue to ensure sustainable food price stability.

Keywords: *Exchange Rate, Food Prices, Agricultural Output, Vector Error Correction Model (VECM)*

JEL Classification Codes: *E31, F31, Q11, C32, E52*

1. Introduction

Exchange rate volatility has become one of the most important macroeconomic challenges confronting developing economies, particularly because of its influence on domestic inflation and food prices. As international trade has become increasingly integrated, movements in exchange rates have emerged as a key channel through which external shocks are transmitted into domestic markets. According to the Food and Agriculture Organization (FAO, 2023), nearly one-fifth of global food production is traded across international borders, making domestic food prices highly responsive to changes in exchange rates. While exchange rate adjustments are often used as instruments for improving external competitiveness and correcting balance of payments imbalances, they may also increase the domestic cost of imported food and agricultural inputs. Consequently, the extent to which exchange rate fluctuations influence food prices remains an important policy issue, with empirical evidence showing that the transmission differs considerably across countries depending on their economic structures, import dependence, and policy environments (Ismail & Ekeocha, 2022; Uzel et al., 2025).

These concerns are particularly pronounced in developing and emerging economies, where food import dependence and structural constraints heighten the transmission of exchange rate shocks to domestic prices. Recent evidence indicates that episodes of currency depreciation in countries such as Argentina, Turkey, Ghana, Ethiopia, and Zambia have been accompanied by significant increases in food inflation, largely because imported food commodities and agricultural inputs became more expensive in domestic markets (IMF, 2021; World Bank, 2022; Valogo et al., 2023). Beyond exchange rate movements, global events such as the 2007–2008 food crisis, the COVID-19 pandemic, and geopolitical disruptions have further exposed the vulnerability of food systems to external shocks, particularly in economies with weak domestic production capacity and limited policy buffers (FAO, 2023; Baffes & Dennis, 2023).

In Africa, these challenges are reinforced by structural characteristics such as low agricultural productivity, inadequate infrastructure, high transportation costs, and persistent dependence on imported food products and production inputs. Although many African economies possess substantial agricultural potential, domestic production has often been insufficient to meet growing food demand, thereby increasing reliance on international markets (Adekunle & Okunlola, 2022; Gizaw & Myrland, 2025). Exchange rate depreciation affects food prices not only through imported consumer goods but also by increasing the cost of fertilizers, machinery, improved seeds, and other agricultural inputs required for domestic production. This interaction between exchange rate movements and structural constraints makes the food price process in many African countries particularly complex.

Nigeria provides a compelling case for examining this relationship. Despite being one of Africa's largest agricultural economies, the country remains heavily dependent on imports for several staple food commodities and agricultural inputs, including wheat, fish, dairy products, fertilizers, and farm machinery (CBN, 2021). Since the introduction of the Structural Adjustment Programme (SAP) in 1986, Nigeria has experienced several exchange rate reforms accompanied by persistent depreciation of the naira and recurring foreign exchange shortages (CBN, 2025; IMF, 2024). During the same period, food prices have risen considerably, with food inflation consistently exceeding headline inflation in recent years (NBS, 2024). Episodes such as the 2016 exchange rate liberalization, the COVID-19 pandemic, and the 2023–2024 exchange rate reforms further illustrate the close association between exchange rate movements and domestic food price increases.

The relationship between exchange rate movements and food prices remains far from straightforward. The exchange rate pass-through theory suggests that currency depreciation increases the domestic prices of imported goods and production inputs, thereby raising food prices. However, the magnitude of this transmission depends on factors such as trade openness, inflation expectations, market structure, monetary policy credibility, and domestic supply conditions. Empirical studies have reported mixed findings, with some documenting strong pass-through effects, while others find relatively weak, asymmetric, or nonlinear relationships depending on the estimation technique, study period, and country-specific characteristics (Ismail & Ekeocha, 2022; Oyejide & Adewuyi, 2023; Asogwa & Abu, 2023).

Despite the growing literature, an important issue remains insufficiently explored within the Nigerian context. Most existing studies examine the impact of exchange rate movements on aggregate inflation or general consumer prices, with relatively limited attention devoted specifically to food prices, which have more direct implications for household welfare, poverty, and food security. Food prices are influenced by several interacting factors, including insecurity, population growth, transportation costs, energy prices, and global commodity price shocks. These factors may strengthen or weaken the transmission of exchange rate changes to domestic food inflation, suggesting that the relationship cannot be adequately understood within a simple linear framework.

Accordingly, this study examines the effect of exchange rate movements on food prices in Nigeria over the period 1986–2024. The study covers multiple exchange rate regimes, major policy reforms, and significant domestic and global economic shocks that have shaped Nigeria's macroeconomic environment. By doing so, it provides updated empirical evidence on the exchange rate–food price relationship and contributes to a better understanding of the extent to which exchange rate fluctuations drive food inflation in Nigeria.

The study contributes to the existing literature in several respects. First, it provides recent empirical evidence on the effect of exchange rate movements on food prices in Nigeria using data covering the period 1986–2024. Second, it focuses specifically on food prices rather than aggregate inflation, thereby offering more policy-relevant evidence for addressing food insecurity and rising living costs. Third, by employing the Vector Error Correction Model (VECM), the study distinguishes between the short-run and long-run effects of exchange rate movements on food prices, providing deeper insights into the dynamic relationship between the variables.

The remainder of the study is organized as follows. The next section reviews the relevant theoretical and empirical literature. This is followed by the methodology, which presents the model specification, data sources, and estimation techniques. The subsequent section discusses the empirical findings, while the final section concludes the study and presents policy recommendations.

2. Literature Review

2.1 Conceptual Review

Exchange Rate

Exchange rate refers to the price of one country's currency relative to another and serves as an important macroeconomic variable linking domestic and international markets. It influences trade, inflation, investment, and the prices of imported goods and production inputs (International Monetary Fund [IMF], 2023; World Bank, 2022). In developing economies such as Nigeria, where production depends heavily on imported food commodities and agricultural inputs, exchange rate

movements significantly affect domestic price levels. Recent studies argue that exchange rate should be viewed not only as the nominal value of a currency but also as a reflection of foreign exchange market conditions and policy arrangements that determine the effective cost of imports (Eichengreen, 2021; Adedeji et al., 2022). In Nigeria, exchange rate fluctuations have been amplified by the coexistence of official and parallel foreign exchange markets, increasing production costs and contributing to inflationary pressures (Central Bank of Nigeria [CBN], 2023). Accordingly, this study conceptualizes exchange rate as the value of the naira relative to foreign currencies, reflecting its influence on the cost of imported food products and agricultural inputs and, ultimately, on domestic food prices.

Food Prices (Food Price Index)

Food prices refer to the average prices of food commodities consumed within an economy and constitute an important indicator of inflation, food security, and household welfare. The Food and Agriculture Organization (FAO, 2023) and the World Bank (2022) describe food prices as measures influenced by both domestic production conditions and international market developments. In developing economies, food prices are particularly sensitive to exchange rate movements, transportation costs, and supply constraints (Headey & Fan, 2020; Ogundari, 2023). Although some studies focus on individual commodity prices, the Food Price Index (FPI) provides a broader measure by capturing changes in the average prices of a representative basket of food items over time (FAO, 2023). In Nigeria, the National Bureau of Statistics (NBS, 2024) measures food prices using the food component of the Consumer Price Index, which is widely used in macroeconomic analysis. this study adopts the Food Price Index as the proxy for food prices because it provides a comprehensive and consistent measure of changes in domestic food prices throughout the study period.

2.2 Theoretical Literature

The relationship between exchange rate movements and food prices has been explained through several macroeconomic theories, each emphasizing a different transmission mechanism. While some theories focus on the direct impact of exchange rate changes on import prices, others emphasize the role of production costs and imported inflation in transmitting exchange rate shocks to domestic food prices.

Exchange Rate Pass-Through (ERPT) Theory

The Exchange Rate Pass-Through (ERPT) Theory explains how changes in the exchange rate are transmitted to domestic prices through the prices of imported goods and production inputs. The theory posits that currency depreciation increases the domestic cost of imports, which producers and retailers subsequently pass on to consumers through higher prices. However, the extent of exchange rate pass-through depends on factors such as market competition, inflation expectations, trade openness, exchange rate regimes, and the credibility of monetary policy (Goldberg & Knetter, 1997; Campa & Goldberg, 2005). In developing economies characterized by high import dependence and structural rigidities, exchange rate pass-through tends to be stronger than in advanced economies (Ismail & Ekeocha, 2022; Uzel et al., 2025). Since Nigeria relies heavily on imported food commodities and agricultural inputs, the ERPT theory provides the principal theoretical foundation for explaining how exchange rate depreciation translates into rising food prices.

Imported Inflation Theory

Imported Inflation Theory argues that inflation may originate from increases in the prices of imported goods resulting either from exchange rate depreciation or rising international commodity prices (Krugman & Obstfeld, 2009). The theory suggests that countries dependent on imported consumer goods, raw materials, and production inputs are particularly vulnerable to external price shocks. Exchange rate depreciation raises the domestic prices of imported commodities, thereby increasing production costs and consumer prices throughout the economy. This mechanism is especially relevant for Nigeria, where significant proportions of wheat, fish, dairy products, fertilizers, pesticides, and agricultural machinery are imported (CBN, 2021; FAO, 2023). Recent empirical evidence also supports the view that imported inflation remains an important channel through which exchange rate instability influences domestic food prices in developing economies (Valogo et al., 2023; Akusta, 2026).

Cost-Push Inflation Theory

The Cost-Push Inflation Theory maintains that inflation occurs when increases in production costs compel producers to raise the prices of final goods and services (Gordon, 1975). Under this framework, exchange rate depreciation contributes to inflation by increasing the prices of imported intermediate inputs, transportation costs, fuel, fertilizers, machinery, and other production factors. As production costs rise, producers transfer these additional costs to consumers, resulting in higher food prices. The theory is particularly applicable to agricultural economies where production depends significantly on imported inputs and energy costs. Recent studies have shown that exchange rate-induced increases in agricultural input prices substantially contribute to food inflation in many African countries (Lelei et al., 2025; Gizaw & Myrland, 2025). The Cost-Push Inflation Theory complements the ERPT framework by explaining the indirect supply-side channel through which exchange rate movements influence food prices.

2.3 Empirical Literature

Exchange Rate and Inflation

A large body of empirical literature examines the relationship between exchange rate movements and inflation, with most studies reporting significant exchange rate pass-through effects. For example, Matsvai (2025) found that both official and parallel market exchange rates significantly increase inflation in Zimbabwe, with the parallel exchange rate exerting a stronger effect. Similarly, Kamara, Sallam and Ebrahim (2025) reported that exchange rate depreciation significantly increases inflation in Egypt, while appreciation reduces inflation, although the effects are asymmetric across the short and long run. Likewise, Sabu and Ramachandran (2025) showed that exchange rate stability plays an important role in anchoring inflation expectations in India, although their study focused on inflation expectations rather than actual price outcomes.

Exchange Rate and Food Prices

Wakumelo (2025) found that exchange rate depreciation significantly increased food inflation in Zambia through higher fuel and agricultural input costs. Similarly, Gizaw and Myrland (2025), using panel data for Sub-Saharan Africa, reported that exchange rate depreciation accounted for a substantial proportion of food inflation, with stronger effects observed in landlocked economies.

Adekunle and Okunlola (2023) found that naira depreciation significantly increased food prices, while exchange rate appreciation produced relatively smaller price reductions, indicating asymmetric pass-through effects. Likewise, Nwaogu and Umahi (2025) showed that exchange rate depreciation substantially increased domestic rice prices because of higher imported input costs. Although these studies confirm the importance of exchange rate movements, most focus on specific food commodities or asymmetric effects rather than aggregate food price behaviour over a long period.

Exchange Rate, Food Imports and Agricultural Production

Nnanna and Ifeanyi (2025) reported that exchange rate depreciation significantly increased food import demand in Nigeria, implying greater vulnerability of domestic food markets to exchange rate shocks. Similarly, Lelei et al. (2025) found that exchange rate-induced increases in fertilizer prices significantly reduced maize productivity in Tanzania, thereby contributing to higher food prices.

Policy Evidence on Exchange Rate and Food Prices

Several institutional studies have examined the effectiveness of exchange rate policies in controlling food prices. The Central Bank of Nigeria (2023) reported that although foreign exchange restrictions encouraged domestic rice production, food prices continued to increase because of supply shortages and smuggling. Similarly, the IMF (2023) found that Nigeria exhibits one of the highest exchange rate pass-through elasticities among African economies because of its dependence on imported food and production inputs.

Although these studies provide valuable policy insights, they rely primarily on descriptive or panel analyses and do not fully examine the dynamic interaction between exchange rates and food prices over time.

2.3 Research Gap and Contribution

Although many studies examine the relationship between exchange rates and inflation, relatively few focus specifically on food prices, despite food inflation having greater implications for household welfare, poverty, and food security. Most studies employ aggregate inflation as the dependent variable, thereby masking sector-specific price dynamics.

Existing empirical studies often adopt relatively narrow model specifications that omit important macroeconomic variables such as oil revenue, interest rate, and agricultural output. Since food prices are influenced by monetary conditions, external sector performance, and domestic agricultural supply, excluding these variables may result in incomplete estimates of the exchange rate-food price relationship.

There remains a methodological gap in the Nigerian literature. Most previous studies employ ARDL or NARDL techniques, which primarily estimate single-equation relationships. Comparatively few studies utilize the Vector Error Correction Model (VECM), which is better suited for analysing the joint endogeneity and dynamic interactions among cointegrated macroeconomic variables. By employing the VECM framework and covering the period 1986–2024, this study provides a more comprehensive assessment of both the short-run and long-run effects of exchange rate movements on food prices in Nigeria while incorporating key macroeconomic determinants.

3 Research Methodology

3.1 Theoretical Framework

This study is anchored on the Exchange Rate Pass-Through (ERPT) Theory, which explains how changes in the exchange rate are transmitted into domestic prices through import and production cost channels. The theory posits that fluctuations in the exchange rate affect the prices of imported goods and intermediate inputs, which subsequently influence consumer prices within an economy (Goldberg & Knetter, 1997; Taylor, 2000). Specifically, a depreciation of the domestic currency increases the local currency cost of imported commodities, food products, and agricultural inputs such as fertilizers, machinery, and agrochemicals. Producers and distributors often respond to these increased costs by adjusting their selling prices upward, thereby generating inflationary pressures. Conversely, an appreciation of the domestic currency reduces import costs and may contribute to lower domestic prices. The extent of exchange rate pass-through depends on factors such as the degree of import dependence, market structure, inflationary conditions, and the effectiveness of monetary policy (Campa & Goldberg, 2005; Choudhri & Hakura, 2006). The theoretical relationship can be expressed as:

$$FP = f(EXR) \quad 3.1$$

where (FP) represents food prices and (EXR) denotes the exchange rate. The ERPT theory predicts a positive relationship between exchange rate depreciation and food prices, implying that increases in the exchange rate (Naira depreciation) are likely to result in higher food prices.

The relevance of the ERPT theory to this study lies in its ability to explain the transmission mechanism through which exchange rate fluctuations influence food prices in Nigeria. Given Nigeria's significant reliance on imported food products and agricultural production inputs, exchange rate movements constitute an important determinant of domestic food price dynamics.

3.2 Model Specification

This study is anchored on the Exchange Rate Pass-Through (ERPT) Theory and draws empirical support from Wakumelo (2025). In line with the objectives of the study, the model is specified to examine the effect of exchange rate on food prices in Nigeria while incorporating control variables to account for the influence of external sector performance, monetary conditions, and domestic food supply conditions on food price dynamics in Nigeria.

The functional relationship among the variables is expressed as:

$$FPI = f(EXR, OILR, INT, AGR) \quad 3.2$$

Where FPI = Food Price Index, EXR = Exchange Rate, OILR = Oil Revenue (% of GDP), INT = Interest Rate (Lending Interest Rate), and AGR = Agricultural Output (% of GDP)

To facilitate empirical estimation, the functional model is transformed into an econometric model as follows:

$$FPI = \beta_0 + \beta_1 EXR_t + \beta_2 OILR_t + \beta_3 INT_t + \beta_4 AGR_t + \varepsilon_t \quad 3.3$$

Where:

β_0 = Constant term (intercept)

β_1 - β_4 = Parameters to be estimated t = Time period (1986–2024)

ε_t = Error term

Based on the study variables, the parsimonious VECM equation (food price equation) is specified as:

$$\Delta FPI_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta \text{FPI}_{t-i} + \sum_{i=1}^{p} \alpha_2 \Delta \text{EXR}_{t-i} + \sum_{i=1}^{p} \alpha_3 \Delta \text{OILR}_{t-i} + \sum_{i=1}^{p} \alpha_4 \Delta \text{INT}_{t-i} + \sum_{i=1}^{p} \alpha_5 \Delta \text{AGR}_{t-i} + \lambda \text{ECT}_{t-1} + \mu_t \quad 3.4$$

Where

Δ = First difference operator

ECT_{t-1} = Error correction term

λ = Speed of adjustment coefficient

μ_t = White noise error term

Based on the predictions of the Exchange Rate Pass-Through Theory, $\beta_1 > 0$, $\beta_2 <$ or > 0, $\beta_3 > 0$, $\beta_4 < 0$

3.3 Data and Variable Measurement

This study employs annual time series data covering the period 1986–2024 to examine the effect of exchange rate movements on food prices in Nigeria. The choice of the study period captures major exchange rate regimes, structural reforms, and macroeconomic shocks that have shaped Nigeria's economy since the introduction of the Structural Adjustment Programme (SAP). Food prices, the dependent variable, are proxied by the Food Price Index (FPI), measured as an index (2010 = 100), with higher values indicating higher food prices. Data on the Food Price Index are obtained from the National Bureau of Statistics (NBS). The principal explanatory variable is the Exchange Rate (EXR), measured as the official exchange rate of the Nigerian Naira against the United States Dollar (₦/US$), sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin. A higher value of the exchange rate indicates depreciation of the domestic currency. To account for other macroeconomic factors influencing food prices, the study incorporates Oil Revenue (OILR), measured as oil rents expressed as a percentage of GDP and obtained from the World Development Indicators (WDI). Given Nigeria's dependence on crude oil exports for foreign exchange earnings, oil revenue captures the influence of external sector performance on domestic food prices.

The model further includes Interest Rate (INT), proxied by the lending interest rate (%) obtained from the World Development Indicators (WDI), to capture the effect of monetary policy and credit conditions on food price behaviour. Finally, Agricultural Output (AGR) is measured by agriculture, forestry and fishing value added as a percentage of GDP, sourced from the World Development Indicators (WDI). This variable reflects domestic food production capacity and its potential influence on food price stability. The selection of these variables is guided by the Exchange Rate Pass-Through Theory, Imported Inflation Theory, and Cost-Push Inflation Theory, as well as previous empirical studies on exchange rate and food price dynamics.

3.4 Estimation Procedure

The empirical analysis begins with a graphical trend analysis to examine the behaviour of food prices, exchange rate, oil revenue, interest rate, and agricultural output over the study period. This is followed by descriptive statistics to summarize the distribution and variability of the variables, while the correlation matrix provides preliminary evidence on the direction and strength of pairwise relationships among the variables and assesses the possibility of multicollinearity.

Prior to model estimation, several pre-estimation tests are conducted to ensure the suitability of the data for econometric analysis. First, the Augmented Dickey-Fuller (ADF) unit root test is employed to determine the order of integration of each variable and avoid spurious regression problems. Second, the optimal lag length is selected using the Akaike Information Criterion (AIC) to ensure an appropriate dynamic specification. Third, the Johansen cointegration test is applied to establish whether a stable long-run equilibrium relationship exists among the variables. Since the variables are found to be integrated of order one, I(1), and cointegrated, the Vector Error Correction Model (VECM) becomes the appropriate estimation technique.

The VECM is employed because it simultaneously captures both the short-run dynamics and the long-run equilibrium relationship among exchange rate, food prices, oil revenue, interest rate, and agricultural output. Unlike the unrestricted Vector Autoregressive (VAR) model, the VECM incorporates an error correction mechanism that measures the speed with which short-run deviations converge towards long-run equilibrium.

3.5 Diagnostic and Stability Tests

Following model estimation, several diagnostic tests are conducted to assess the validity and robustness of the estimated VECM. The Variance Inflation Factor (VIF) is first employed to examine the presence of multicollinearity among the explanatory variables. Values below the conventional threshold of 10 indicate the absence of serious multicollinearity.

The normality of the residuals is examined using the Jarque-Bera (JB) test, while the Breusch-Pagan-Godfrey test is employed to determine whether the residuals exhibit homoskedasticity. In addition, the Breusch-Godfrey Serial Correlation LM test is conducted to examine the presence of serial correlation in the residuals. These diagnostic tests ensure that the estimated coefficients are unbiased, efficient, and suitable for statistical inference.

4 Results and Discussions

Table 4.1: Descriptive Statistics Results

	FPI	EXR	OILR	INT	AGR
Mean	120.3952	178.9236	9.986058	18.17085	24.54030
Median	61.38720	128.6517	9.432871	17.55333	24.66258
Maximum	699.3949	1478.965	22.53620	31.65000	36.96508
Minimum	0.868947	1.754523	2.305367	9.959167	18.02043
Std. Dev.	157.5871	256.4569	5.844561	4.108068	3.877589
Skewness	1.976378	3.597396	0.386947	0.857085	0.988105
Kurtosis	6.770492	18.24176	2.162400	4.686676	4.415681
Jarque-Bera	4.849145	4.61624	2.113288	3.397784	2.603029
Probability	0.088516	0.099448	0.347621	0.182886	0.272119
Observations	39	39	39	39	39

Source: culled from E-views 10 output

Table 4.1 presents the descriptive statistics for the variables used in the study, covering the period 1986–2024 (39 annual observations). The results shows that the Food Price Index records a mean of 120.40 and a median of 61.39, indicating a pronounced right-skewed distribution driven by sustained upward movements in domestic food prices, particularly in the latter part of the sample period. The wide range (0.87 to 699.39) and high standard deviation (157.59) reflect substantial volatility and persistent inflationary pressures in Nigeria's food market. The positive skewness (1.98) and elevated kurtosis (6.77) suggest a leptokurtic distribution with fat tails, capturing episodic food price spikes often associated with exchange rate shocks, supply chain disruptions, and macroeconomic instability. The Jarque-Bera statistic (4.85, $p = 0.089$) fails to reject the null hypothesis of normality at the 5% significance level, indicating that the FPI series approximates a normal distribution and is statistically wellbehaved for subsequent parametric estimation.

The exchange rate exhibits a mean of 178.92 and a median of 128.65, with an extensive range from 1.75 to 1,478.97, underscoring the profound depreciation of the Nigerian naira against the US dollar over the study period. The exceptionally high standard deviation (256.46) and strong positive skewness (3.60) confirm extreme volatility and non-linear depreciation dynamics, consistent with Nigeria's transition from a regulated exchange rate regime under the Structural Adjustment Programme to a more market-driven but frequently unstable foreign exchange system. The kurtosis value of 18.24 indicates a highly leptokurtic distribution, reflecting rare but severe exchange rate shocks during periods of foreign exchange scarcity, oil price collapses, and recent policy unification episodes. Despite these extremes, the Jarque-Bera test (4.62, $p = 0.099$) does not reject normality at the 5% level, affirming that the series remains tractable for cointegration and VECM analysis.

Oil revenue as a percentage of GDP averages 9.99% with a median of 9.43%, fluctuating between 2.31% and 22.54%. The moderate standard deviation (5.84) and near-symmetrical skewness (0.39) suggest that oil revenue's contribution to the economy has been relatively stable in distribution, though subject to cyclical variations driven by global crude oil price dynamics and domestic production constraints. The kurtosis of 2.16 indicates a platykurtic distribution, implying fewer

extreme outliers compared to a normal distribution, which aligns with the smoothed nature of revenue-to-GDP ratios over time. The Jarque-Bera probability value of 0.348 strongly supports the assumption of normality, confirming that OILR follows a well-behaved statistical distribution suitable for multivariate time-series modelling. This statistical stability contrasts with its macroeconomic significance, as even moderate shifts in oil revenue have historically triggered substantial fiscal expansions, liquidity injections, and demand-pull inflationary pressures in Nigeria.

The lending interest rate averages 18.17% with a median of 17.55%, ranging from 9.96% to 31.65%, reflecting Nigeria's persistently high cost of borrowing across different monetary policy regimes. The standard deviation of 4.11 indicates moderate dispersion, while the positive skewness (0.86) and kurtosis (4.69) point to occasional upward spikes, typically associated with tight monetary policy stances, inflation containment measures, and liquidity management interventions by the Central Bank of Nigeria. The distribution remains reasonably symmetric, and the Jarque-Bera test (3.40, p = 0.183) fails to reject normality, confirming that the interest rate series is statistically well-behaved. Economically, the sustained high mean lending rate highlights structural rigidities in Nigeria's financial sector, including risk premiums, credit market imperfections, and policy-driven rate adjustments, all of which directly influence agricultural financing, production costs, and ultimately, food price dynamics.

Agricultural output as a percentage of GDP shows a mean of 24.54% and a median of 24.66%, with values bounded between 18.02% and 36.97%. The low standard deviation (3.88) and minimal difference between mean and median suggest a relatively stable and consistent contribution of agriculture to Nigeria's economic output over the sample period. The positive skewness (0.99) and kurtosis (4.42) indicate mild asymmetry and slightly heavier tails, likely reflecting periods of agricultural expansion driven by diversification policies, relative resilience during oil sector downturns, and seasonal productivity variations. The Jarque-Bera statistic (2.60, p = 0.272) confirms normality at conventional significance levels, affirming the series' suitability for parametric estimation. The stability of AGR contrasts with its critical supply-side role; even modest fluctuations in agricultural productivity can exert significant downward or upward pressure on domestic food prices, reinforcing its theoretical importance as a control variable in the exchange rate pass-through framework.

Table 4.2: Correlation Matrix Results

	FPI	EXR	OILR	INT	AGR
FPI	1				
EXR	0.634192	1			
OILR	-0.59915	-0.44738	1		
INT	-0.50464	-0.36833	-0.561512	1	
AGR	-0.185456	-0.183371	0.00249	0.07344	1

Source: Researcher's computation using Eviews (2026)

Table 4.2 presents the pairwise correlation coefficients among the variables, providing preliminary evidence of their linear relationships before multivariate estimation. The results show that food prices (FPI) are positively correlated with exchange rate (EXR) (r = 0.634), indicating that exchange rate depreciation is associated with higher food prices, consistent with the Exchange Rate Pass-Through (ERPT) hypothesis. Food prices also exhibit moderate negative correlations with oil

revenue (OILR) (r = –0.599) and interest rate (INT) (r = –0.505), while the relationship with agricultural output (AGR) is weakly negative (r = –0.185), suggesting that increased agricultural production may contribute modestly to lower food prices. The correlations among the explanatory variables are generally moderate and remain well below the conventional multicollinearity threshold of 0.80, indicating no serious multicollinearity concerns. Nevertheless, since correlation analysis only captures pairwise linear associations, further assessment using the Variance Inflation Factor (VIF) and the Vector Error Correction Model (VECM) is necessary to establish the dynamic and long-run relationships among the variables.

Table 4.3: ADF Unit Root Test Result

Variables	At Level		At First Difference		Order of integration
	T – statistics	P-value	T – statistics	P-value	
FPI	3.4379	1.0000	-4.5151	0.0011	I(1)
EXR	1.0450	0.9962	-4.1491	0.0001	I(1)
OILR	-2.0715	0.2568	-5.9412	0.0000	I(1)
INT	-2.9385	0.0513	-6.8314	0.0000	I(1)
AGR	-1.9962	0.2871	-6.6087	0.0000	I(1)

Source: Author's computation using E-views 10

The results in Table 4.3 show that at levels, none of the variables is stationary at the conventional 5 percent significance level. Specifically, FPI (t = 3.4379, p = 1.0000) and EXR (t = 1.0450, p = 0.9962) clearly fail to reject the null hypothesis of a unit root, indicating strong non-stationarity. Similarly, OILR (t = –2.0715, p = 0.2568) and AGR (t = –1.9962, p = 0.2871) are non-stationary at levels. Although INT (t = –2.9385, p = 0.0513) appears close to significance, it still marginally exceeds the 5 percent threshold and is therefore treated as nonstationary in level form. However, upon first differencing, all variables become stationary, as evidenced by their large negative test statistics and highly significant p-values ($p < 0.01$). For instance, FPI (t = –4.5151, p = 0.0011), EXR (t = –4.1491, p = 0.0001), OILR (t = –5.9412, p = 0.0000), INT (t = –6.8314, p = 0.0000), and AGR (t = –6.6087, p = 0.0000) all reject the null hypothesis of a unit root at first difference. These results confirm that each series is integrated of order one, I(1). The uniform integration order across variables provides the necessary precondition for conducting the Johansen cointegration test and justifies the subsequent estimation of the Vector Error Correction Model (VECM), which is appropriate when variables are non-stationary in levels but cointegrated in the long run.

Table 4.4: Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-733.3465	NA	4.49e+11	41.01925	41.23918	41.09601
1	-564.8393	280.8453	1.57e+08	33.04663	34.36623	33.50720
2	-511.7317	73.76051*	35909547*	31.48510*	33.90436*	32.32948*
3	-489.7919	24.37755	53695226	31.65511	35.17404	32.88331

Source: Researcher's computation using Eviews (2026)

Table 4.4 presents the results of the lag order selection criteria used to determine the optimal lag length for the VAR system prior to conducting the Johansen cointegration test and estimating the VECM. The selection is guided by multiple information criteria, including the
Akaike Information Criterion (AIC), Schwarz Criterion (SC), Hannan-Quinn Criterion (HQ),

Final Prediction Error (FPE), and the Likelihood Ratio (LR) test. The results indicate that lag 2 is optimal, as it minimizes the AIC (31.48510), SC (33.90436), HQ (32.32948), and FPE (35,909,547), while also being supported by the LR statistic (73.76051), which is significant at that lag order. Although lag 3 shows a slightly higher log-likelihood value, its information criteria values increase relative to lag 2, suggesting potential over-parameterization. The consistent indication of lag 2 across the majority of criteria provides strong econometric justification for its selection. Choosing the appropriate lag length is crucial, as too few lags may lead to model misspecification and residual autocorrelation, while too many lags reduce degrees of freedom and estimation efficiency. Therefore, the adoption of two lags ensures a well-specified, stable VAR structure suitable for reliable cointegration testing and subsequent VECM estimation.

Table 4.5: Johansen Cointegration Test

Test	Null Hypothesis	Test Statistic	5% Critical Value	Prob.
Trace Test	None	90.8218	69.8189	0.0004
	At most 1	52.7157	47.8561	0.0163
	At most 2	29.2257	29.7971	0.0581
Maximum Eigenvalue Test	None	38.1061	33.8769	0.0147
	At most 1	23.49	27.5843	0.1535

Source: *Researcher's Computation using EViews (2026).*

Table 4.5 presents the results of the Johansen cointegration test, which examines the existence of a long-run equilibrium relationship among food prices (FPI), exchange rate (EXR), oil revenue (OILR), interest rate (INT), and agricultural output (AGR). The Trace test indicates the presence of two cointegrating equations, while the Maximum Eigenvalue test identifies one cointegrating equation at the 5 percent significance level. Although the two statistics differ slightly, both confirm the existence of at least one long-run equilibrium relationship among the variables, which is sufficient to reject the null hypothesis of no cointegration. Following standard econometric practice, greater emphasis is placed on the Trace test because of its robustness in finite samples. The evidence of cointegration therefore justifies the use of the Vector Error Correction Model (VECM), implying that exchange rate, oil revenue, interest rate, agricultural output, and food prices move together over the long run, while any short-run deviations from equilibrium are corrected through the error correction mechanism.

Table 4.5: Summary of VECM Long-Run and Short-Run Estimation Results

Variable	Long-Run Coefficient (t-statistic)	Short-Run Coefficient (t-statistic)
Error Correction Term (ECT)		–0.496421 (–5.20357)
Exchange Rate (EXR)	1.110146 (4.46017)	$EXR_{(-1)}$: 0.039505 (0.76567) $EXR_{(-2)}$: 0.154198 (2.52824)
Oil Revenue (OILR)	–20.76112 (–5.64117)	0.916311 (2.58684) $OILR_{(-2)}$: 0.228225 (0.73033)
Interest Rate (INT)	–23.16680 (–5.13184)	$INT_{(-1)}$: 0.146864 (0.41883) $INT_{(-2)}$: 0.522502 (1.64400)
Agricultural Output (AGR)	–17.95388 (–4.62740)	–0.788690 (–2.65079) $AGR_{(-2)}$: 0.293569 (0.58115)
Lagged Food Price Index		$FPI_{(-1)}$: 1.832539 (6.63052) $FPI_{(-2)}$: –0.338598 (–0.99412)
R^2		0.982913
Adjusted R^2		0.975081

Source: *Researcher's computation using EViews (2026).*

Table 4.6 presents the Vector Error Correction Model (VECM) estimates, summarizing both the long-run equilibrium relationship and the short-run dynamics between exchange rate fluctuations and food prices in Nigeria. The long-run results indicate that exchange rate has a positive and statistically significant effect on food prices (β = 1.110; t = 4.460), implying that depreciation of the naira increases food prices over time through exchange rate pass-through. Conversely, oil revenue (β = –20.761; t = –5.641), interest rate (β = –23.167; t = –5.132), and agricultural output (β = –17.954; t = –4.627) exert significant negative effects on food prices, suggesting that higher oil earnings, tighter monetary policy, and increased agricultural production help moderate food price inflation in the long run. These findings are consistent with the studies of Wakumelo (2025) and Adekunle and Okunlola (2023), who reported significant positive exchange rate pass-through to food prices, while the negative effect of agricultural output agrees with Lelei et al. (2025). However, the negative long-run effect of oil revenue contrasts with Darwez et al. (2023), who found that oil-related shocks increase inflation through higher production and energy costs.

The short-run dynamics reveal that the error correction term is negative and statistically significant (ECT = –0.496; t = –5.204), indicating that approximately 49.6% of any short-run disequilibrium is corrected annually, thereby confirming the existence of a stable long-run equilibrium relationship.

Furthermore, the first lag of food prices is positive and significant, suggesting strong persistence in food price movements. This finding is consistent with the error correction framework of Engle and Granger (1987) and supports the evidence reported by Nnanna and Ifeanyi (2025) that macroeconomic shocks affecting food markets gradually converge to their long-run equilibrium.

With respect to the explanatory variables, exchange rate depreciation affects food prices with a lag, as the second lag of exchange rate is positive and statistically significant ($\beta = 0.154$; $t = 2.528$), whereas the first lag is insignificant, indicating delayed exchange rate pass-through. Oil revenue has a positive and significant short-run effect ($\beta = 0.916$; $t = 2.587$), implying that increases in oil earnings initially raise food prices, possibly through increased aggregate demand and liquidity expansion before generating long-run stabilizing effects. In contrast, changes in interest rates remain statistically insignificant in the short run, suggesting weak monetary policy transmission to food prices. These results agree with Nwaogu and Umahi (2025) and Gizaw and Myrland (2025), who found that exchange rate shocks are transmitted gradually to food prices, while the insignificant short-run effect of interest rates is consistent with Baffes and Dennis (2023) and Sabu and Ramachandran (2025), who observed that monetary policy effects on prices are generally weaker than exchange rate effects.

Agricultural output records a negative and statistically significant short-run coefficient ($\beta = –0.789$; $t = –2.651$), indicating that improvements in domestic agricultural production immediately reduce food prices by expanding food supply and lowering dependence on imports. Overall, the VECM results identify exchange rate fluctuations as the principal driver of food price inflation in Nigeria, while agricultural expansion serves as an effective stabilizing mechanism. These findings support the conclusions of Osabohien, Afolabi, and Adeleye (2024) and Lelei et al. (2025) that strengthening domestic agricultural productivity is critical for mitigating food inflation, and they reinforce the recommendation of Ogunyemi and Oladapo (2025) that supply-side interventions should complement exchange rate stabilization policies to achieve sustainable food price stability.

Table 4.7: Summary of Diagnostic Test Results

Test	Statistic (Joint)	Probability	Decision
Serial Correlation (LM Test)	66.14296	0.0627	No serial correlation
Normality (Jarque-Bera)	4.388203	0.9281	Residuals are normal
Heteroskedasticity (Chi-square)	343.0174	0.2994	No heteroskedasticity

Source: Researcher's computation using Eviews (2026)

Table 4.7 presents the summary of post-estimation diagnostic tests conducted to evaluate the reliability, adequacy, and stability of the estimated VECM model. The Breusch–Godfrey LM test for serial correlation reports a joint statistic of 66.14296 with a probability value of 0.0627, which exceeds the 5 percent significance level. This implies failure to reject the null hypothesis of no serial correlation, indicating that the residuals are free from autocorrelation and that the dynamic structure of the model is appropriately specified. The Jarque–Bera normality test yields a statistic of 4.388203 with a high probability value of 0.9281, suggesting that the residuals are normally distributed. This satisfies the normality assumption necessary for valid statistical inference, particularly for hypothesis testing within the VECM framework.

The heteroskedasticity test reports a Chi-square statistic of 343.0174 with a probability of 0.2994, indicating that the null hypothesis of homoskedasticity cannot be rejected. This confirms that the

variance of the residuals is constant over time. Collectively, these diagnostic results demonstrate that the estimated model is statistically sound, stable, and free from major econometric problems, thereby strengthening the credibility of the empirical findings and subsequent policy interpretations.

5. Conclusion and Policy Recommendations

This study examined the effect of exchange rate fluctuations on food prices in Nigeria over the period 1986–2024 using the Vector Error Correction Model (VECM). The analysis was anchored on the Exchange Rate Pass-Through (ERPT) Theory, Imported Inflation Theory, and Cost-Push Inflation Theory, with exchange rate, oil revenue, interest rate, and agricultural output incorporated to explain food price dynamics. The Johansen cointegration test confirmed the existence of a long-run equilibrium relationship among the variables, thereby justifying the estimation of the VECM to capture both long-run and short-run adjustments.

The empirical findings reveal that exchange rate depreciation exerts a positive and statistically significant effect on food prices in both the long run and the short run, confirming that exchange rate instability remains a major source of food inflation in Nigeria. Oil revenue exhibits contrasting effects across time horizons, increasing food prices in the short run but reducing them significantly in the long run through improved foreign exchange availability and fiscal capacity. Similarly, interest rate exerts a significant negative effect on food prices in the long run, although its short-run impact is insignificant, suggesting that monetary policy influences food prices only gradually. Agricultural output consistently reduces food prices in both the short run and the long run, highlighting the importance of domestic food production in ensuring price stability. Furthermore, the error correction mechanism indicates that approximately 49.6 percent of short-run disequilibrium is corrected annually, confirming a relatively fast adjustment towards long-run equilibrium.

Overall, the findings demonstrate that food price inflation in Nigeria is largely driven by exchange rate movements, while improvements in agricultural productivity, prudent monetary policy, and effective management of oil revenue contribute significantly to food price stability. The study therefore concludes that achieving sustainable food price stability requires coordinated exchange rate management, sound macroeconomic policies, and sustained investment in domestic agricultural production.

Policy Recommendations

Based on the findings of the study, three major policy recommendations are proposed.

Policymakers should prioritize exchange rate stability through credible foreign exchange management policies. The Central Bank of Nigeria should strengthen foreign reserve management, reduce excessive exchange rate volatility, improve transparency in the foreign exchange market, and ensure greater coordination between monetary and fiscal authorities. A more stable exchange rate will reduce exchange rate pass-through to food prices and improve overall price stability.

Government should strengthen domestic agricultural production by increasing investment in mechanized farming, irrigation facilities, improved seedlings, fertilizer support, rural infrastructure, storage facilities, and agricultural value chains. Expanding domestic food supply will reduce dependence on imported food and agricultural inputs, thereby minimizing the inflationary impact of exchange rate depreciation on food prices.

Oil revenue should be managed more strategically to support long-term macroeconomic stability. Rather than financing recurrent expenditure, oil earnings should be directed towards strengthening foreign reserves, stabilizing the exchange rate, and financing productive investments in agriculture and critical infrastructure. At the same time, the Central Bank should maintain a disciplined monetary policy that complements these fiscal measures to ensure sustainable food price stability and enhance the resilience of the Nigerian economy.

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