

Monetary Policy Rate and Food Inflation in Nigeria

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ABSTRACT

Food inflation poses a significant and multifaceted challenges in Nigeria, with widespread and severe implications for the population. In response, this study examines the influence of the monetary policy rate on food inflation, considering the numerous policy changes from 1990 to 2023. Food inflation serves as the dependent variable, while the independent variables include the monetary policy rate, broad money supply, exchange rate, treasury bills, and agricultural productivity. Utilizing the Autoregressive Distributed Lag (ARDL) technique, the short-run analysis reveals that the monetary policy rate has a significant negative impact on food inflation. In contrast, the exchange rate and broad money supply exhibit a positive but insignificant impact, whereas treasury bills have a significant positive impact on food inflation. In the long run, the ARDL results show that both the monetary policy rate and broad money supply have a negative but insignificant impact, while agricultural productivity exerts a significant negative influence on food inflation. Conversely, the exchange rate has a significant positive impact, and treasury bills, though positive, remain insignificant in their effect on long-run food inflation.

Based on these findings, the study recommends that the Central Bank of Nigeria (CBN) utilize the monetary policy rate as an effective short-term tool to manage food inflation. Simultaneously, it is imperative for the federal government to enhance agricultural productivity by improving security in key food-producing regions and reducing dependence on food imports through the promotion of local production.

Keywords: Food inflation, monetary policy rate, agricultural productivity, autoregressive distributed lag technique.

BACKGROUND TO THE STUDY

Inflation raises great concern among policy makers, countries and even individuals, and tackling it has become a core macroeconomic objective in an economy. However, specific concerns on food inflation has become a global issue in recent times following series of notable disruption such as COVID-19 and the conflict between Russia and Ukraine, etc. This issue has always been particularly acute in many developing countries characterized by large populations and limited income levels (Ali, Ullah, Ahmed, Baig, Iqbal & Masood, 2022). Nigeria, sharing these attributes and experiencing a population growth rate of approximately 2.6% annually (World Bank, 2019), faces similar struggles of persistent food inflation. According to Ezebilo, Benedict and Yakubu (2023), the state of food inflation in Nigeria has increased substantially over the past decade. This notion can be depicted in a wide array of instances, the bulk of which includes the persistent hike in the prices of food items in Nigeria currently. Similarly, Central Bank of Nigeria [CBN] (2022) statistics postulates that food inflation increased from 28.5% in 2000 to 108.3% in 2010 and, a whopping 560% in 2022. This report depicts the heightened increase in food inflation, by both double and triple digits commencing from the start of the decade.

Food inflation in Nigeria is linked to various internal and external factors. Odoh and Chigozie (2012) highlighted that insecurity, particularly from insurgent groups like Boko Haram and bandits in food-

producing regions such as Northeast has significantly reduced agricultural productivity. Hence causing food insecurity in the economy. Additionally, climate change-related issues, such as increased flooding in Southern Nigeria and changing weather patterns, have disrupted food production, leading to food scarcity and food inflation (Ertuğrul & Seven, 2021). Moreover, the country's reliance on food imports exacerbates general inflation in the economy as well as food inflation by devaluing or depreciating the Nigerian Naira (Astou, 2015). Ezebilo et al. (2023) further stressed on the influence of imported inflation in exacerbating food inflation in Nigeria. Given these conditions, the likelihood of rising food inflation poses threat to Nigeria's current and future populations (Catão & Chang, 2015).

In this regard, empirical studies have investigated the effectiveness of monetary policy in controlling food inflation in Nigeria, identifying it as a key strategy for maintaining price stability. Monetary policy encompasses central bank actions aimed at achieving objectives such as price stability and full employment, which are crucial for macroeconomic conditions affecting food security and inflation (Ameji, Elisha, Adofu & Gimba, 2023). Despite this importance, the efficacy of monetary policy in controlling food inflation is debateable. Bhattacharya and Jain (2020) argued that while monetary tightening reduce output and income, it does not significantly affect food inflation in developing countries like Nigeria due to Engel's law. This indicates that food demand and prices remain unchanged by monetary policy because food constitutes a significant portion of spending, especially with limited income. Contrarily, Catão and Chang (2015), and Pourroy et al., (2016) pointed out that developing countries can manage food inflation through inflation targeting policies.

Given these mixed evidences above, it has become imperative to investigate monetary policy's impact on food inflation in Nigeria, focusing on the monetary policy rate as the economy's baseline interest rate. This study will compare Nigeria's approach, which has not yet adopted inflation targeting, with other developing countries that have, to determine the necessity and urgency of adopting such inflation-targeting policies for controlling food inflation in Nigeria.

Statement of the Problem.

Despite the abundant natural and human resources, including extensive lands and waterways, Nigeria is yet to fully leverage these resources for food security and price stability. The country faces ongoing food inflation, raising concerns about its impact on basic necessities for Nigerians, who spend a significant portion of their income on food. Food inflation has notably diminished the purchasing power of the average Nigerian, reducing how much food they can afford (Egwuma et al., 2017). Rwanyamugabo and Mugabi (2018) highlight that rising food prices compromise national food security, exacerbate malnutrition and hunger, and threaten the livelihoods of low-income families by diminishing their limited purchasing power.

Monetary policy appears to offer a strategy for managing food inflation and stabilizing food prices. In response to the fluctuating food prices, the Nigerian government, through the Central Bank of Nigeria (CBN), has launched several monetary policies, campaigns, and intervention programs aimed at advancing agricultural mechanization for self-reliance (Emami, Almassi, & Bakhoda, 2018). For example, the CBN has periodically adjusted monetary policy rates, regulated the exchange rate, and supported the Agricultural Credit Guarantee Scheme Fund (ACGSF) to bolster food production, thereby improving food security and stabilizing food prices in the country (Emami et al., 2018). While these monetary policy efforts have led to short-term improvements in food inflation, they have been inadequate for sustaining long-term food price stability. The situation has exacerbated to the point of significantly lowering the living standards of Nigerian citizens, corroborating a recent World Bank report that an additional six million Nigerians could fall into poverty due to escalating food prices (World Bank, 2022).

Research Questions

Following this statement of the problem, these questions became paramount in this study.

1. What is the impact of monetary policy rate on food inflation in Nigeria?
2. How does exchange rate impact food inflation in Nigeria?
3. What role does agricultural productivity play in food inflation in Nigeria?

Research Objectives

1. To determine the impact of monetary policy rate on food inflation in Nigeria.
2. To investigate the impact of exchange rate on food inflation in Nigeria.
3. To evaluate the role of agricultural productivity in food inflation in Nigeria.

Research Hypotheses

The null hypotheses of this study include

H₀: Monetary policy rate has no significant impact on food inflation in Nigeria.

H₀: Exchange rate has no significant impact on food inflation in Nigeria.

H₀: Agricultural productivity has no significant impact on food inflation in Nigeria.

LITERATURE REVIEW

Conceptual Review

Monetary policy refers to a macroeconomic policy that uses monetary variables such as money supply and interest rates to regulate an economy in order to achieve macroeconomic goals such as price stability, full employment, external balance, economic growth and development (Imandojemu, Adeleye & Aina (2023). According to Ufoeze, Odimgbe, Ezeabalisi and Alajekwu (2018), it is a significant instrument with which policy makers can maintain a stable domestic price level. The monetary policy is based on the monetary policy rate of an economy. This explains monetary policy rate as the base line interest rate in which all other forms of interest rate are gotten in an economy. For monetary policy rate to be effective in influencing the general economy (aggregate demand and price level), its dependent on transmission channels of interest rate, exchange rate and credit (Lawernce, 2023). In this study, monetary policy rate is conceptualised as the central monetary rate which determines all other monetary policies variables including cash reserve ratio, money supply, lending rate etc.

Food inflation refers to the increase in the price of food items over time. It's distinct from general inflation, which encompasses the rising cost of all goods and services. De Gregorio (2012) stated that food prices have a destructive subsequent impact on the consumer price index (CPI) and general inflation. Food inflation is actually the increase in the prices of basic food commodities in an economy like bread, rice etc. When food inflation occurs, it means that the prices of food items are rising, making it more expensive for consumers to purchase groceries and other edible goods. This can happen due to a variety of factors including increased production costs (like raw materials, labour and transportation), supply chain disruptions, high demand, changes in agricultural yields due to weather conditions, and economic policies affecting import and export tariffs or subsidies. In this study, food inflation is viewed as composite consumer price index for food.

Theoretical Review

a). The Keynesian Theory of Money and Prices

The Keynesian theory of money and prices, formulated by Keynes (1936), reformulated the traditional quantity theory of money by arguing for an indirect and non-proportional impact of money supply changes

on prices via interest rates (Apere & Karimo, 2014). Therefore, the theory challenged the classical view of money's neutrality in the economy. The theory assumed that factors of production have perfectly elastic supply, indicating unemployment, and that factors are homogeneous and interchangeable, with constant returns to scale and a proportional change in effective demand and money supply amid unemployed resources (Lawrence, 2023). The implication is that a money supply increase lowers interest rates, boosting investment and impacting the overall economy, including price levels, income, output, and employment (Humphrey, 1974 as cited in Lawrence, 2023). Critics argue that Keynes's assumption of constant prices and his narrow view of money's role, focusing on bond exchanges and neglecting the adjustment in money demand, miss the true nature of money. Despite this criticism, the Keynesian theory remains relevant for illustrating the connection between interest rates and price levels.

Empirical Literature Review

Ali, Ullah, Ahmed, Rehman, Mehmood, Yasin and Raza (2023) investigate the short and long run effects of monetary policy on food inflation in Pakistan from September 2005 to October 2020 using the Autoregressive Distributed Lag (ARDL) model. The variables used in this study included food consumer price index, SBP's reverse repo rate; FAO's world food price index (WFPI); real effective exchange rate, quantum index of manufacturing and transport consumer price index. The findings indicate that food inflation can become stable by restrictive monetary policy in both the short and long run. The results show that the short-run shocks can be adjusted at the speed of 13.9% per month.

Ezebilo, Benedict and Yakubu (2023) examined the effect of monetary policy on food inflation in Nigeria between the periods of 1980 and 2021 using the non-linear autoregressive distributed lag technique (NARDL). The variables of interest were food inflation, treasury bills rate, exchange rate, monetary policy rate and broad money supply. The result showed that the exchange rate significantly and negatively affects the price of food in Nigeria. Similar to this, empirical data demonstrates a long-run association between Nigeria's monetary policy rates and food inflation. Both the money supply and the monetary policy rate have a favourable impact on food inflation in Nigeria, which is both positive and significant.

Lawrence (2023) investigated the impact of monetary policy on disaggregate inflation in Nigeria from January 2002 to June 2020 using the structural var approach. The result from the study showed evidence that a decline of the monetary policy rate does not reduce inflation. In addition, a shock to exchange rate decreases core inflation in the long-run, although there is no impact in the short-run. However, in the case of food inflation, an exchange rate shock increases food inflation in the long-run, likely due to the impact on food import. The study further establishes that oil price shock is key in explaining fluctuations in macroeconomic variables in Nigeria.

Mishra, Dash and Agarwal (2023) studied the dynamic linkages between monetary factors and food inflation in India from 1991 to 2022. The outcome of the investigation revealed that narrow and broad money supply have a significant impact on food inflation. Furthermore, the result of causality analysis revealed that narrow money supply does not cause food prices to rise in the short run. However, the broad money does. Finally, the relevant outcome indicated that both narrow and broad money supplies jointly cause food inflation in India.

AlaviRad, Hatami and Totonchi (2022) studied the effect of monetary policy on food inflation in Iran using seasonal data from 2001 to 2021. Utilising Quantile Regression Framework as method of analysis, the result showed that in all quantiles interest rates and legal reserve rate had a positive and significant effect on food inflation. Also, there is a positive and significant effect of the exchange rate and a negative and significant effect of economic growth on food inflation in Iran.

Ali, Ullah, Ahmed, Baig, Iqbal and Masood (2022) researched on the role of monetary policy rate in

stabilising food inflation for monthly observation from September 2005 to October 2020. Employing the Quantile Regression Approach, the study found that monetary policy and transportation prices remain highly significant across all quantiles, exhibiting a positive impact on food inflation. Thus, restrictive monetary policy leads to higher food inflation in the country.

Samal and Goyari, P. (2022) investigated the role of monetary policy in stabilising food inflation in India from January 2009 to December 2019 using the Quantile Regression Analysis. The study found that contractionary monetary policy stabilises food inflation across the quantiles. However, exchange rate and transportation cost play a substantial role in promoting food inflation in lower, middle and all quantiles. Their study also reveals that monetary policy transmission through exchange rate and asset price channels increases food inflation across all quantiles. In contrast, bank credit and interest rate channels reduce it in lower and median quantiles, that is, at lower rates of inflation.

Bhattacharya and Jain (2020) examined the role of monetary policy in stabilising food inflation in advanced and emerging economies using a panel analysis from period 2006 Q1 to 2016 Q2. They found that an unexpected monetary tightening has a positive and significant effect on food inflation in both advanced and emerging economies.

Wagan, Chen, Seelro and Shah (2018) assessed the effect of monetary policy on agricultural growth and food prices in Pakistan and India respectively from 1995 and 1996 to 2016. By applying a factor-augmented vector autoregressive model proposed by Bernanke et al. (2005), the study found that tight monetary policy significantly reduced food inflation and agricultural production while increasing the rural unemployment rate. Short-term and 10-year interest rates increased owing to the contractionary monetary policies pursued by both countries.

Research Gap

Previous studies, as summarized in this study, have attempted to elucidate the impact of monetary policy rate on food inflation in Nigeria. However, most studies focused on monetary policies in general without specifically concentrating on monetary policy rate. Therefore, there exists a research gap in comprehensively understanding the intricate relationship between monetary policy rate and food inflation within the Nigerian economy. This gap becomes more pertinent given the recent Central Bank of Nigeria contractionary monetary policy decision, however, food price hikes have remained massive and persistent. The existing empirical literature suggests that Ezebilo et al. (2023) study provided a foundational framework for this current research, establishing connections between monetary policy rate and food inflation through the non-linear autoregressive distributed lag (NARDL) model. However, this present study uses a linear methodological approach by employing the autoregressive distributed lag (ARDL) to explore both the short-term and long-term impacts of monetary policy rate on food inflation in Nigeria. Additionally, this study introduced agricultural productivity as a control variable in this study to examine its role in taming food inflation in Nigeria. This addresses a relatively underexplored aspect within the existing literature in Nigeria.

RESEARCH METHODOLOGY

Theoretical Framework.

The study adopts the Keynesian theory of money as a theoretical framework for this study due to their emphasis on interest rate as a measure through which money affects price level in an economy. This theory is relatable to this study which focuses on the impact of monetary policy rate but on food inflation specifically.

Model Specification

To meet the core objective of this study, the task of this section is to construct a model relating to the

monetary policy rate to food inflation. Hence, for this purpose, we adopt the model used by Ezebilo et al. (2023) which is specified thus:

$$FIN = (MPR, TB, EXG, M2) \tag{3.1}$$

The above model represent food inflation (FIN) is a function of monetary policy rate (MPR), treasury bill (TB), exchange rate (EXG) and broad money supply (M2). In relating this to the study, equation 3.1 is modified to include an additional variable of agricultural productivity which has not been given proper attention as a variable affecting food inflation. Equation 3.1 is specified as

$$FIN = (MPR, EXR, M2, TB, AGP) \tag{3.2}$$

The mathematical model is stated as

$$FIN = MPR + EXR + M2 + TB + AGP \tag{3.3}$$

The econometric form will be

$$FIN_t = \beta_0 + \beta_1MPR_t + \beta_2EXR_t + \beta_3M2_t + \beta_4TB_t + \beta_5AGP_t + \mu_t \tag{3.4}$$

To illustrate the ARDL modelling approach adopted for the study, equation 3.3 will be restated as follows

$$\Delta FIN_t = \alpha + \sum_{i=1} \beta_i \Delta FI_{t-1} + \sum_{j=1} \delta_j \Delta MPR_{t-1} + \sum_{k=1} \phi_k \Delta EXCHR_{t-1} + \sum_{l=1} \lambda_l \Delta M2_{t-1} + \sum_{m=1} \psi_m \Delta TB_{t-1} + \sum_{p=1} \zeta_p \Delta LnAGP + \eta_1 MPR_{t-1} + \eta_2 EXCHR_{t-1} + \eta_3 M2_{t-1} + \eta_4 TB_{t-1} + \eta_5 LNAGP_{t-1} + \mu_t$$

In the above ARDL equation, the terms with the summation signs (\sum) represent the Error Correction Model (ECM) dynamics. The coefficients η are the long-run multipliers corresponding to the long-run relationship. α and μ_t represent the constant and the white noise or disturbance term respectively while β_i , δ_j , ϕ_k , λ_l , and ψ_m represent the short-run effects. α is Constant/intercept term. Δ is the first difference operator. The reason for taking the variables log is to smooth out the data series and make sure that it is not negatively or positively skewed. Where FIN is food inflation, MPR is monetary policy rate, EXR is exchange rate, M2 is broad money supply, TB is Treasury bill and AGP is Agricultural productivity. μ is error or disturbance term and t is time period. Finally, to test for significance of the parameters included in the model, t-test statistic was used to know the statistical significance of the individual parameters. Two-tailed tests at a 5% significance level were conducted. Here, the study compares the estimated or calculated t-statistic with the tabulated t-statistic at $t_{\alpha/2} = t_{0.05} = t_{0.025}$ (two-tailed test).

$$\text{Degree of freedom (df)} = n - k = 34 - 6 = 28$$

So, the study has $T_{0.05} (28) = 2.048 \dots \dots$ Tabulated t-statistic.

The decision rule is to reject the null hypothesis if the calculated t-value is greater than the tabulated t-value, otherwise accept the alternative hypothesis.

Data Sources and Explanation of Variables.

The study used secondary data obtained from the publications of the Central Bank of Nigeria (CBN). The data span from 1990 to 2023. The major variables for which data is collected are defined as follows. Food inflation is the increase in prices of local and domestic product in an economy, monetary policy rate is the base interest rate at which commercial banks can borrow money from the central bank, exchange rate is the

value of a domestic currency in terms of a foreign currency, broad money supply is the amount of money in circulation including savings accounts and time deposits. Treasury bills are bills issued by the government to the citizens as a form of investment while agricultural productivity is the economic contribution of the agricultural sector which is measured by the gross domestic product from agriculture.

DATA PRESENTATION, ANALYSIS AND RESULT

The study employed the use of econometric tools in the analyses of the variables as shown in the model. The E-views package was used in the estimation process and results are presented in tables.

Data Analysis and Presentation.

Descriptive Statistics: The time series data were analysed starting with the descriptive statistics. Which can be seen in Table 4.1. The descriptive statistics showed that exchange rate, broad money supply and treasury bills are normally distributed while food inflation, monetary policy rate and agricultural productivity are not normally distributed given that their probability values are less than 0.05.

Table 4.1: Summary of Descriptive Statistics.

	FIN	MPR	EXCHR	M2	TB	AGP
Mean	137.1266	13.69853	155.5588	23.54189	1468.381	13027.93
Median	73.23020	13.50000	130.7518	18.59735	811.2650	8032.640
Maximum	570.7210	26.00000	449.5079	57.78157	4526.930	47944.06
Minimum	13.75000	6.000000	8.037808	-2.010000	25.48000	106.6300
Std. Dev.	155.7065	3.697245	125.9893	15.56993	1386.876	14199.70
Skewness	1.578658	0.779898	0.854414	0.571322	0.785850	1.117891
Kurtosis	4.540901	5.559570	2.847813	2.470050	2.274581	3.201945
Jarque-Bera	17.48595	12.72784	4.169607	2.247516	4.245002	7.139298
Probability	0.000160	0.001723	0.124332	0.325056	0.119732	0.028166
Sum	4662.305	465.7500	5288.999	800.4244	49924.96	442949.5
Sum Sq. Dev.	800069.4	451.0974	523819.1	7999.947	63472982	6.65E+09

Source: Authors' Computation from EViews 13

Unit Root Test: The Augmented Dickey-Fuller (ADF) unit root was used to determine the stationarity of all the variables as seen in Table 4.2.

Table 4.2: Summary of ADF Unit root test.

Variable	ADF Critical value @ 5%	ADF Statistic	Order of Integration
FIN	-2.960411	4.11686	I (0)
MPR	-2.954021	-3.113085	I (0)
EXCHR	-2.95711	-3.958762	I (1)
M2	2.954021	-3.028516	I (0)
TB	-2.95711	-3.942642	I (1)
AGP	2.954021	4.250816	I (0)

Source: Authors' Computation from EViews 13

Table 4.2 shows that all the variables are stationary at level except from exchange rate and treasury bills which were stationary at first order. Given this mixed order of stationarity, this study employed the Autoregressive distributed Lag.

Co-Integration Test

To begin estimation using the Autoregressive distributed lag technique, the F-bound test is used to check the existence of a long run relationship between food inflation and monetary policy rate which is displayed in Table 4.3.

Table 4.3: Summary of ARDL F-bound Test

F-statistic	8.110637	
5% level of Significance		
Sample Size	I(0)	I(1)
30	3.125	4.608
35	3.037	4.443
Asymptotic	2.620	3.790

Source: Authors' Computation from EViews 13

Evidence from Table 4.3 shows that since the F- statistics is greater than the F- tabular at 5% level of significant levels. Thus, there is a long-run relationship between the independent variables and food inflation.

Evaluation of Long Run and Short Run Estimates.

This evaluation is based on the economic, statistical and econometric criteria.

a). Panel A: Short run estimates: This shows the short-run impact of the independent variables on food inflation and the speed of adjustment to equilibrium in the long run which is seen in Table 4.4.

Table 4.4: Summary of short-run estimate.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ*	-0.138706	0.017948	-7.728116	0.0000
D(MPR)	-1.772009	0.673313	-2.631776	0.0139
D(EXCHR)	0.215791	0.115445	1.869216	0.0725
D(M2)	0.119266	0.169104	0.705283	0.4867
D(TB)	0.025092	0.008210	3.056287	0.0050
C	163.2280	20.14081	8.104340	0.0000
R-squared	0.773937	Durbin-Watson stat		1.935961
Adjusted R-squared	0.732074	F-statistic		18.48716
S.E. of regression	12.24956	Prob(F-statistic)		0.000000

Source: Authors' Computation from EViews 13.

From table 4.4, it is presented that the speed of adjustment is 0.1387, indicating that it would take the rate of 13.87% for the short-run disequilibrium to adjust back to the long-run. Monetary policy rate with a coefficient of -1.772, had a negative impact on food inflation which conforms to economic expectations

(Ezebilo, Benedict & Yakubu, 2023). Thus, 1% increase in monetary policy on average decreases food inflation by 1.77% in the short run.

On the other hand, exchange rate, broad money supply and treasury bill all had a positive impact on food inflation with their respective coefficient as 0.215, 0.119 and 0.025. This implies that 1% increase in exchange rate, broad money supply and treasury bill increases food inflation by 0.215%, 0.119% and 0.025%, which all conforms to economic expectations. The constant with a coefficient of 163.228 indicates that when all the independent variables are 0, food inflation increases by 163.22% on average. This aligned with the study of Ezebilo, Benedict and Yakubu (2023) who showed that monetary policy tools have multiplying effects on food inflation in Nigeria.

b). Panel B: Long run estimates: Table 4.5 presents the estimated long-run coefficients for the specified model.

Table 4.5: Summary of ARDL Long Run Result

Variables	Coefficient	Std. Error	t-Statistic	Prob.
MPR(-1)	-22.90734	13.73562	-1.667732	0.1065
EXCHR(-1)	3.126533	1.261178	2.479057	0.0195
M2(-1)	-1.754028	2.485733	-0.705638	0.4862
LNAGP	-131.0830	62.41443	-2.100203	0.0448
TB(-1)	0.034422	0.049193	0.699737	0.4899

Source: Authors' Computation from EViews 13.

Based on the economic a prior expectation, it is evident from Table 4.5 that monetary policy rate has a negative impact on food inflation in the long run. Thus, a percentage increase in monetary policy rate, on average, leads to a 22.91% decrease in food inflation in the long run which conform to economic expectations and reality (Bhattacharya & Jain, 2020). Similarly, broad money supply and agricultural productivity which are control variables in this study have a negative impact on food inflation. Such that, a 1% increase in broad money supply and agricultural productivity reduces food inflation by 1.754% and 131.08% on average.

Contrary, exchange rate exhibits a positive impact on food inflation given that a percentage increase in exchange rate, on average, increases food inflation by 3.126% in the long run ceteris paribus. This also conform to economic expectation and the study of Umar and Umar (2022).

The statistical criterion is tested using the R^2 , adjusted R^2 and F- statistics which can be seen in Table 4.4. The R^2 of 0.77 shows that the model is a good fit and the independent variables account for the variations in the dependent variable at 77%. While other possible variables not captured in the model explain about 23% of the variation in food inflation in Nigeria. The adjusted R^2 supports the R^2 given that it has a value of 0.73 showing that the independent variables (the regressors) explain food inflation in Nigeria. The F- statistics having the F calculated as 18.487 is greater than the F- tabulated at a 5% level of significance which is 2.56. This shows the overall significant impact of the independent variables on food inflation.

Table 4.6: Summary of econometric test results.

Heteroscedasticity Test			
F-statistic	1.991404	Prob. F(10,22)	0.0856

Ramsey RESET test			
	Value	Df	Probability
t-statistic	1.546320	21	0.1370
F-statistic	2.391106	(1, 21)	0.1370
Autocorrelation Test			
Durbin-Watson stat	1.935961		

Source: Authors' Computation from EViews 13.

The econometric criteria involve testing this model for autocorrelation, heteroscedasticity and model specification. The results of these three tests are given in Table 4.6. The Harvey heteroscedasticity test returned a p-value of 0.0856, exceeding the 0.5 significance level. This result means we cannot reject the null hypothesis at the 5% level. Indicating that the variables are homoscedastic, and there is no concern regarding heteroscedasticity. Similarly, the Ramsey RESET test yielded a p-value of 0.137, which is above 0.05, affirming that the model is well specified. Furthermore, the Durbin-Watson statistic, which is 1.93 (approximately 2), suggests that autocorrelation is not an issue in this study.

Evaluation of Research Hypotheses.

This section shows the evaluation of this paper's three research hypotheses.

Hypothesis One

H₀: Monetary policy rate has no significant impact on food inflation.

H₁: Monetary policy rate a significant impact on food inflation.

Decision Rule: From the regression result in 4.4, the t-statistics for monetary policy is -1.67 which is less than 2.048. Hence, the null hypothesis that monetary policy has no significant impact on food inflation in the long run is accepted while the alternative hypothesis is rejected.

Hypothesis Two

H₀: Exchange rate has no significant impact on food inflation.

H₁: Exchange rate a significant impact on food inflation.

Decision Rule: From the regression result in 4.4, the t-statistics for exchange rate is 2.479 which is greater than 2.048. Hence, the null hypothesis is rejected in acceptance of the alternative hypothesis that exchange rate has a significant impact on food inflation in the long run.

Hypothesis Three

H₀: Agricultural productivity has no significant impact on food inflation.

H₁: Agricultural productivity a significant impact on food inflation.

Decision Rule: From the regression result in 4.4, the t-statistics for agricultural productivity is -2.1 which is greater than 2.048. Hence, the null hypothesis is rejected in acceptance of the alternative hypothesis that agricultural productivity has a significant impact on food inflation in the long run.

Discussion of Findings and Policy Implication

Based on the first research question on the impact of monetary policy rate on food inflation in Nigeria, it was

found that monetary policy rate has an insignificant impact in controlling food inflation in Nigeria in the long run. This conforms the fact that monetary policies are short term intervention in the economy. Hence, changes in monetary policy rate are not expected to yield a great impact on food inflation in the long run. This finding aligns with the work of Ali et al. (2023) who specifically stated that monetary policy rate insignificantly affects food inflation. However, monetary policy in general is significant in influencing food inflation which aligns with works of Lawrence (2023) and Ezebilo et al. (2023).

Furthermore, a major finding from the second research question on the impact of exchange rate on food inflation in Nigeria showed that exchange rate has a significant impact on Nigeria's food inflation. This reveals that exchange rate impact on food inflation is more profound than that of monetary policy rate. This is due to the fact that Nigeria is import dependent even for food items. Hence imported inflation from the recent Russia-Ukraine war could be a major factor driving food inflation in Nigeria given that Nigeria still imports some amount of wheat from Ukraine. This paper's findings align with the findings of Ezebilo et al. (2023) and Lawrence (2023) who all stressed that an exchange rate shock increases food inflation in the long-run, likely due to the impact on food import. AlaviRad et al. (2022) also align with this study's finding as their study found a positive impact of exchange rate on food inflation in Iran.

Another major finding from the third research objective and research question on the impact of agricultural productivity on food inflation in Nigeria is that agricultural productivity has a significant and negative impact on food inflation. This reveals that the agricultural sector in Nigeria is not performing at a bare optimum level to aid food inflation in Nigeria. Possible explanation can be due to insecurity especially in the Northern region of Nigeria which has disable farmers the freedom to farm and issues of herdsmen. These above findings provide reasons why food inflation in Nigeria may not be tamed using monetary policy rate but strategizing and improving indigenous agriculture.

CONCLUSION, POLICY IMPLICATION AND RECOMMENDATION

The general conclusion of this study is that for the government to tame food inflation in Nigeria in the long run, the government should focus on variables such as exchange rate and agricultural productivity while monetary policy rate should be used as short-term interventions to tame food inflation. Hence, the policy implication from these findings is that that policy shifts on the significant variables of exchange rate and agricultural productivity should be expected to bring about significant changes in the food inflation in Nigeria. Based on the conclusions of this study, the following recommendations are hereby made:

The Central Bank of Nigeria (CBN) should continue to use the monetary policy rate as a measure to curb food inflation, however, only for the short run and as well make policy adjustment towards inflationary targeting as a way forward for food inflation. The federal government in the light should take measures to promote agricultural productivity through improving security, especially in food producing states. This would help with reducing food inflation as well reducing food import which explains the measure through which exchange rate affects food inflation. This can be achieved through banning the importation of certain food items that can be produced in Nigeria, and the government should put up measures to ensure the sustainability of the production and availability of such food items in Nigeria.

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