Food Inflation and the Nigerian Economy: An Empirical Investigation

Dr Kwode E. Israel & Gad Charity

Department of Accounting, Business Administration and Economics Admiralty University of Nigeria

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ABSTRACT

The persistent rise in food price inflation has negative implications on the growth of the Nigerian economy-standard of living, purchasing power of households and the general wellbeing of the citizens. Food Inflation in Nigeria averaged 13.72 percent from 1996 until 2024, reaching an all-time high of 40.87 percent in June of 2024 (NBS 2024) despite government's effort and necessary steps to reduce price hike of foods and minimize the effects of higher prices on the citizen. Therefore, the study main objective is to evaluate the impact of food inflation on Nigeria's economy. This study conducted an in-depth investigation using multiple regression analysis (E-View 10) to analyze data from CBN and NBS covering 1990 to 2023. The result revealed that Food Inflation had negative impact on the Nigerian Economic Growth in the period of 1990-2023. This is because GDP (0.2817), Exchange Rate (0.3684), Interest Rate (0.0000) and as well as Inflation (0.0733) cumulatively accounted for about 63.4% of the variation in the Food Price Inflation (FPI) that further impacted negatively the Nigerian Economy. Based on findings, the study recommended government should embark on mechanized production of local food, reduction of post-harvest losses, food price stabilization and robust monetary and fiscal policies target at food inflation.

Keywords: Food inflation, Hyperinflation, Economy and Interest rate

JEL Classification: C 58 E62, E63, H62,

INTRODUCTION

Food inflation is a major challenge in developing and emerging economies, Nigeria being one of the largest economies in Africa, is exposed to unique dynamics of food price trends and its impact on Nigeria's economy. Data obtained from National Bureau of Statistics, Nigeria (NBS) revealed a drastic increase in food price with cost of food in Nigeria increased 37.77 percent in September of 2024 over the same month in the previous year. Food Inflation in Nigeria averaged 13.72 percent from 1996 until 2024, reaching an all-time high of 40.87 percent in June of 2024 and a record low of -17.50 percent in January of 2000. (NBS -2024).

The adverse effect of food price inflation leads to reduction in the purchasing power of household which may lead to lowering of standard of living and general welfare. This is in addition to the worsening of the country's term of trade and making the domestic goods more expensive. Food price inflation is an upsurge in average price level for food across regions of a country on a global scale due to global supply and demands, exchange rates, worsening higher cost of production problems of country transportation, weather and natural disaster (Uko, 2012)

Nigeria, being a populous country with a significant agricultural sector, has experienced fluctuations in food prices over the years. Food price inflation, which refers to the increase in the average price of food over time, can have a profound impact on the overall economy.

After a historic low level in the early 2000s, global food prices surged upwards to bring about a general increase in prices of food. This reduced the standard of living by increased cost of living. The global food

increase can generate an immediate threat to the security of household's food supply, thereby undermining population health. The food we eat gives our bodies the ''information'' and materials they need to function properly. In short what we eat is central to our health, but in a case whereby food are expensive, it reduces productivity in the economy because people will not have strength to work which will lead to decrease in the country's GDP, this may also lead to poverty. Increase in food prices implies buying less for more money or a situation in which food becomes expensive. For many families around the world, the global upsurge in the prices of food has been a cause of worry and given rise to uncomfortable changes in their dinning rooms. Food items that once were taken for granted since they were almost readily available, have now become luxury items.

The food and Agriculture Organization FAO (2021), noted that food commodity prices in May 2021 rose at the fastest monthly rate in more than a decade. The World Bank estimated that Nigeria's soaring inflation and food prices had push another seven million people into poverty in 2020. Higher food prices may make it difficult to achieve most MDGs. Food price increase affects food consumption, quality of one's diet, access to social services, and sometimes the quality of care for infant and young children. Hence this study adopts a survey research to examine the impact of food price inflation on the Nigerian economy. The impact of food price inflation in Nigeria extends beyond the realm of consumer affordability and food security. Escalating food prices have the potential to erode household purchasing power, exacerbate poverty levels, and highten income inequalities (Adegboye, F. B., Adekunjo, F. O., & Adesina, A. O. (2020). Additionally, persistently high food prices can hinder foreign investment, dampen business sentiment, hinder job creation, and impede sustainable economic growth (Igbatayo et al., 2020; Olaniyan et al., 2021). Consequently, understanding and effectively addressing the implications of food price inflation are crucial for Nigeria's socio-economic development and realization of sustainable development Goals. To date, limited empirical studies have provided a comprehensive analysis covering an extensive period, including both pre and post transition years, to comprehend the long term effects of food price inflation on the Nigerian economy. Thus, this research aims to fill this critical gap in the literature by conducting an in-depth investigation using robust economic models and statistical techniques. By analyzing data spanning from 1990 to 2023. We aim to determine the extent to which food price inflation has affected the Nigeria's economic growth, Consumers, and overall welfare.

Statement of problem

Nigeria's persistent food price inflation, above 30% in 2023, is not merely an economic concern; it's a silent crises threatening the very foundation of national well-being. Despite being Africa's largest producer of key staples, millions of Nigerians grapple with food price inflation. For over two decades, Nigeria has been locked in a relentless battle against rising food prices, a battle that cripples individual lives, stifles economic progress, and threatens national stability.

As far as Nigeria is concern regarding food price inflation, it has experienced worst consequences reflected by poverty, food crises, price hikes etc. Shodimu (2023) concluded that the prices of food stuffs especially rice and noodles that are kids favourite has increased. The quantity in noodles has reduced despite the increase in price. Although some researcher have looked at the area of inflation on the Nigerian economy but this research will focus on the impact of food price inflation on the Nigerian economy from 1990 to 2023.

Objectives of Study

The main objective of this study is to investigate the impact of food price inflation in the Nigerian economy between 1990 and 2023. The specific objectives are to:

- analyze the historical trends and patterns of food price inflation in Nigeria.

*evaluate the impact of food price inflation on Nigeria's economic growth, particularly in terms of GDP.

- identify the factors that have contributed to food price inflation in Nigeria over the years.

Research questions

The following research questions would guide the study:

- What is the historical trend and pattern of food inflation in Nigeria?
- What are the impact of food price inflation on the Nigerian economy growth?
- What factors have contributed to food price inflation in Nigeria over the years?

Hypothesis

To carry out the study effectively, the following propose hypotheses have been formulated and will be tested:

Hypothesis 1

H0: Food price inflation has no significant impact on the historical trends and patterns of food price inflation in Nigeria.

H1: Food price inflation has a significant impact on the historical trends and patterns of food price inflation in Nigeria.

LITERATURE REVIEW

Conceptual Framework

Inflation refers to a substantial rise in prices of goods and services over a long period of time. While Food inflation a key component of general inflation, is the rate at which food prices increase over a period of time. It is measured by the Consumer Price Index (CPI) for food, which shows how much the cost of a standard basket of food has risen. In Nigeria, food inflation at June 2024 stood at an all-time high of 40.87%. (NBS 2024) This driven primarily by high foreign exchange rates, insecurity and infrastructural constraints

Economic growth is an increase in the value of goods and services in one period of time compared with a previous period. Economic growth is measured in terms of the increase in aggregate market value of additional goods and services produced, using estimates such as GDP is calculated by adding up all of the money spent by consumers, businesses, and the government in a given period.

Theoretical Framework

Theoretically, this study builds its foundation from the ‘cost-push’’ theory of inflation, propounded by Sir James Stuart 1767. The cost-push theory builds on the assumption that prices of goods are principally determined by their costs while money supply acts in response to demand. Under these circumstances, inflationary pressure is likely to result from increasing costs. The inflationary pressure becomes unceasing through the action of the price-wage corkscrew.

The theoretical underpinning of this study is also adopted from Leoning (2009) who developed a model of food prices in an agrarian economy. He presented an experimental model of inflations against imposing limitations on the model. At its core the cost-push theory proposes that inflation originate from the supply side of the economy. When businesses faces rising cost of factors of production like Labor, raw materials, and energy, they are incentivized to pass on these cost increase to consumers by raising prices. This price hike then ripples through the economy, pushing up the overall price level as well as food price-inflation.

Loening (2009), hypothesized that changes in the price level of goods is caused by movements away ‘from the long-run equilibrium in the money market and the external sector, represented by food and non-food products’’.

These theoretical underpinnings, therefore, suggest that agricultural productivity influences food costs, which in turn affect food prices. Nigeria, heavily reliant on agriculture, is particularly vulnerable to food price

inflation based on the cost-push theory. Rising global food prices, coupled with domestic factors like limited storage facilities, fuel price fluctuations, and insufficient investment in agricultural infrastructure, can all contribute to higher food production costs and ultimately

Empirical Review

Studies have been carried out on the determinants of food inflation in both developed and developing economies. Such studies have been able to identify different determinants of food price inflation and have arrived at different opinions regards the significance of some of the determinant variables.

Sasmal (2015) stated that India was experiencing high rate of economic growth but the growth has been occurring with high rate of food price inflation. The study reported that increase in per capita income has caused increase in demand for food which agricultural production has been unable to keep up with the increased demand.

Ahmed and Singla (2015) reported that the major determinant of food inflation in India were rainfall, broad money, effective exchange rate, interest rate and crude oil prices.

Sthanumoorthy (2008) reported that manufactured food products were leading factors responsible for increasing food prices due to high importation of edible oil from 2006 - 2007 in India.

Chand (2010) attributed the rise of food price inflation to drought, which resulted to slow growth of production of food items and rise in the cost of the production.

Effiong, J.A and Eze,E.U (2002) investigated the Food product prices and its implications for food security in Nigeria. Data for this study was obtained from National Bureau of Statistics and was analyze using histogram and index number (Laspyres index). Supplementary data obtained from journals, and other publications relevant to the study. The study show that food price inflation is caused by frequent hike in the prices of petroleum products coupled with poor performance of agricultural sector. The study concluded that the impact of food price increases on those poor farmers who derive their income from food production.

Ambachew (2012) assessed the general and intermediate driving food dynamics in Ethiopia. The methodology used in this study is a monthly data from January, 2001 to September 2012. The study revealed that real income, money supply and international food and oil price hikes increases domestic inflation.

Zhang (2014) examined the link between consumer price inflation and food price inflation and the determinants of consumer price inflation using co-integration and error correction model. The study reported that food price inflation, especially cereal price inflation, remains a significant driving force for overall consumer price inflation.

Hassan and Mashi (2018) investigated the determinant of food price inflation in Malaysia. The study used the Nonlinear ARDL technique to determine the linearity and symmetry of the focused variables. The study concluded that adjustment and control of food price should be made through the reduction of the food import in other to minimize the exchange pass through effect on the food price inflation.

Akpan & Udoh (2009) estimated the movement of relative food prices, and the inflation rate trends under various agricultural policies in Nigeria. They used data from 1961 to 2009. The data were evaluated using the GARCH (1.1) model and ANOVA based on OLS estimation technique. The study discovered that “the impact of inflation on the relative price variability of food was positive and significant’’.

Fang and Zibo (2019) used data from 1964 to 2013 and analyzed the factors influencing world food prices. They found that the world food price is negatively and significantly affected by the world food production and exchange rate. Qayyum and Sultan (2018) analyzed factors affecting the food price inflation in Pakistan covering from 1970 to 2017. The study reported that GDP, food export, food imports and taxes significantly increased inflation while money supply reduced inflation.

Eguma (2017) examined the intrinsic relationship between key demand and supply variables, GDP, price of crude oil, food import and food price inflation in Nigeria covering the of 1988 to 2017 in a co-integration and error correction modeling framework. The study reported that price of crude oil, food import and real GDP have long run positive relationship with food price inflation.

Gap in Literature Review

This study investigated the trend, pattern and impact of food price inflation on Nigeria's economy giving the unprecedented rise in food price and its implication on macroeconomic variables.

RESEARCH METHODOLOGY

This study adopted survey research design and collected cross-sectional data from World Bank (WB), Central Bank Nigeria (CBN) and National Bureau of Statistics (NBS).to describe and interpret the current situation of the impact of food price inflation on the Nigerian economy. Data for this study were sourced using secondary data. The major instrument used for the secondary data collection was based on the review of relevant literature on the subject matter. The research adopted an analytical approach. The study utilized data from the World Bank Database and the database of macro trends 1990 to 2023 to analyses trends and pattern of food inflation.

Model Specification

Following the several empirical literature reviewed, the model specification is formalized as follows;

FPINF= (GDP, INF, INR, EXR). Where GDP= gross domestic product, INF= Inflation, INTR= Interest rate, EXR= exchange rate and FPINF= Food price inflation

The model is expressed in multiple regression as -

FPI = f (GDP, INF, INTR, EXCR).

$FPI = \beta_0 + \beta_1 X_1 GDP + \beta_2 X_2 INF + \beta_3 X_3 INF + \beta_4 X_4 EXCR + \mu$

B_0 = intercept; β_1, β_2, $\beta 3$, β_4, are the parameters estimate.

μ = Measurement error.

DATA ANALYSIS AND DISCUSSION

Descriptive Analysis of Historical Trends and Patterns of Food Price Inflation in Nigeria

The descriptive historical and of Food Price Inflation (FPI), Inflation, GDP, Exchange Rate and Interest Rate in Nigeria for the period of 1990-2023 displays an inconsistent downwards, upwards trends and fluctuating patterns that are very difficult to track this further established by the graphs below.

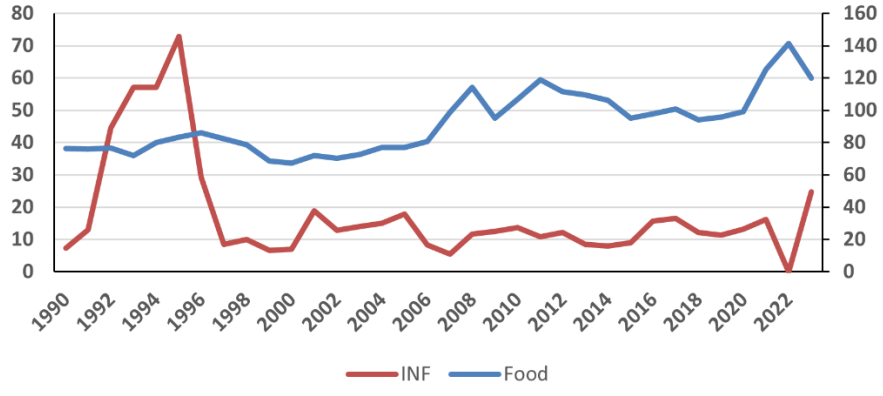

Figure 4.1: Line Graph Showing Trends & Patterns of FPI & INF in Nigeria for 1990-2023

Figure 4.1 above shows the graphical trends and patterns between FPI and INF in Nigeria for 1990-2023. It can be gathered from the graph above that FPI and INF exhibited an inverse and direct relationships at different years such that as FPI increases INF tends decrease and vice versa. This inverse relationship visible in the following years 1991 (75.8; 13.0069731), 1992 (76.7; 44.5888427), 1995 (83.4; 72.835502), 1999 (68.5; 6.61837339), 2007 (98.8; 5.38860797), 2008 (114.3; 11.5810751), 2009 (95.1; 12.5378277), 2011 (118.8; 10.8261371), 2013 (109.5; 8.49551838), and 2023 (120.0; 24.6595502) respectively.

These years happen to coincide with periods when Nigerian economy experienced challenges such as depression, political instability and change in government regime.

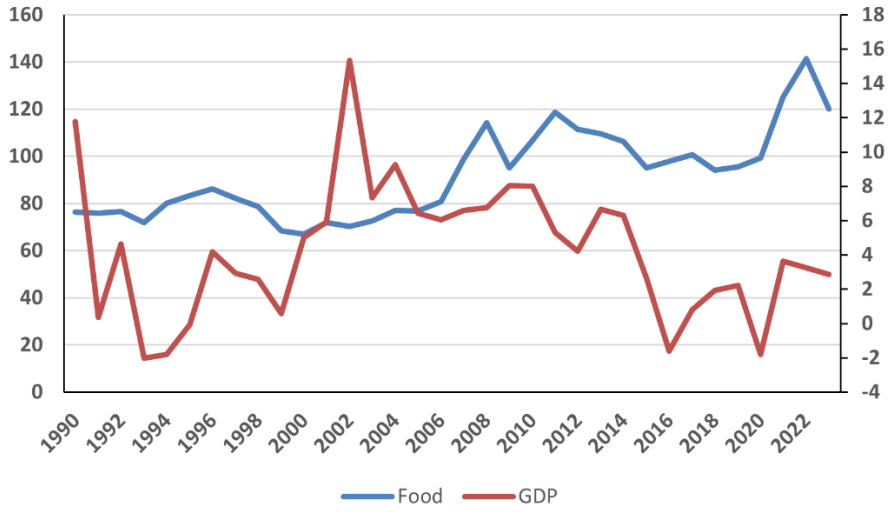

Figure 4.2: Line Graph Showing Trends & Patterns of FPI & GDP in Nigeria for 1990-2023

Figure 4.2 above depicts the trends and patterns exhibited between FPI and GDP in Nigeria for 1990-2023. It can be deduced from the graph above there exists a fluctuating relationship between FPI and GDP as can be seen notably in the following years 1991 (75.8; 0.35835), 1992 (76.7; 4.63119), 1993 (71.8; -2.0351), 1994 (80.0; -1.8149), 1995 (83.4; -0.0727), 2008 (114.3; 6.76447), 2016 (97.8; -1.6169), 2017 (100.8; 0.80589), 2020 (99.2; -1.7943) and 2023 (120.0; 2.86021).

Again these trends and patterns tend to coincide with periods when Nigerian economy experienced challenges such as depression, political instability and uncertainty from change in government regime.

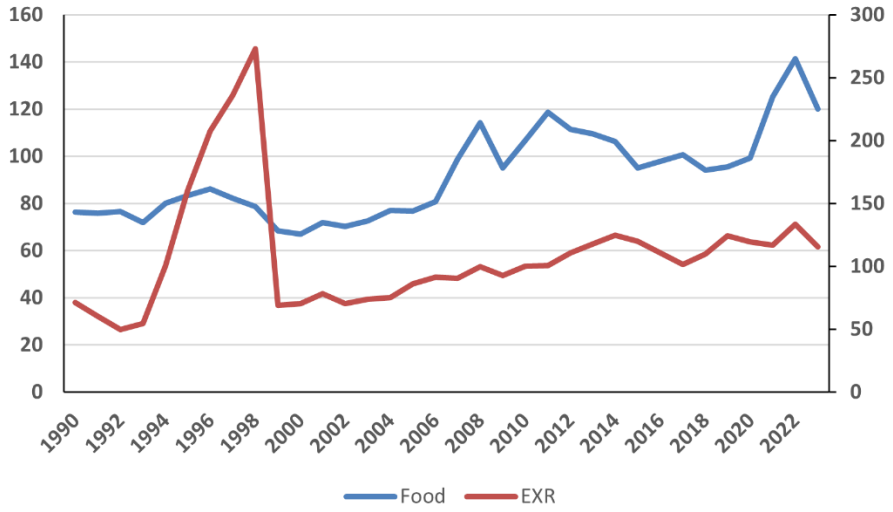

Figure 4.3: Line Graph Showing Trends & Patterns of FPI & in Nigeria for the period of 1990-2023

Figure 4.3 above indicates the trends and patterns observed between FPI and EXR in Nigeria for the period of 1990-2023. The graph above reveals that there exists a consistent and direct relationship between FPI and EXR, as FPI tends to increase EXR also increases only in few years that this relationship is not observed. This direct relationship in notably visible in the following years 1996 (86.1; 207.51), 1997 (82.2; 236.031), 1998 (78.7; 273.01), 1999 (68.5; 69.1972), 2002 (70.2, 70.4194), 2003 (72.6; 73.6719), 2004 (77.1; 75.3177), 2009 (95.1; 92.6421), 2012 (111.5; 110.498), 2017 (100.8; 101.447) respectively.

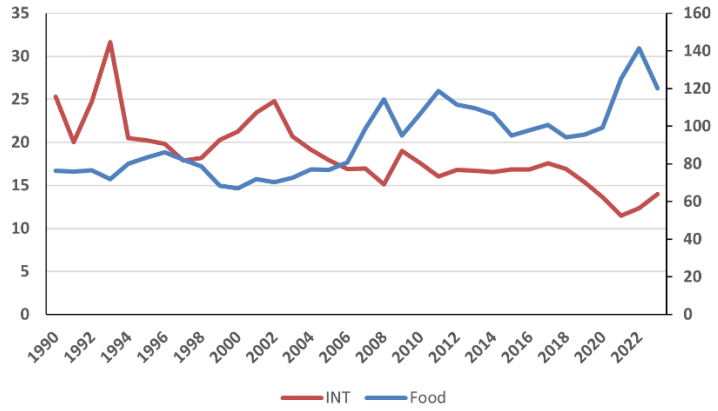

Fig 4.4: Line Graph Showing Trends & Patterns of FPI & INT in Nigeria for 1990-2023

Source: Researcher's Plot (2024)

The Graph 4.4 shows the trends and patterns detected between FPI and INT in Nigeria for the period of 1990-2023. The graphs divulges an inverse relationship between FPI and INT, as FPI tends to increase INT tends to decreases in most of the years with very few years of difference.

Multiple Regression Analysis

The Multiple Regression Analysis was conducted using EViews version 12.0 as stated in three under the model specification. The summary of the Multiple Regression Analysis is presented in table 4.2 below for further discussion. It is worth noting that the Multiple Regression Analysis will discuss the Probability, R-squared, Adjusted R-squared and Durbin-Waston stat columns on based on their importance and significance in explaining the regression model specification better.

Table 4.2: Multiple Regression Results

Dependent Variable FPI

Method: Panel Least Sqaure

Date: 08/07/24 Time: 11:07am

Sample: 1990 2023

Periods included: 34

Cross-sections included: 1

Total panel (balanced) observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	169.2148	13.74807	12.30826	0.0000
INF	0.320711	0.172603	1.858091	**0.0733***

GDP	0.711548	0.648641	1.096982	**0.2817****
EXR	-0.043502	0.047610	-0.913725	**0.3684****
INT	-4.373795	0.659657	-6.630409	**0.0000****
R-squared	**0.634724****	Mean dependent var		91.95294
Adjusted-R-squared	**0.584341****	S.D. dependent var.		18.74431
S.E. of regression	12.08476	Akaike infor		7.95682
Sum squared resid	4235.201	Schwarz criterion		8.181285
Log likelihood	-130.2659	Hannan-Quinn criter.		8.033369
F-statistic	12.59801	Durbin-Waston stat		**1.082554****
Prob (F-statistic)	0.000005			

Source: Researcher's EViews Computation (2024)

Decision Rule for Interpreting Probability Figures

If the probability figures of the independent variables (inflation, GDP, exchange rate & interest rate) is less than 0.05 (<0.05), then the respective independent variables are important or significant in determining or explaining the variation in the dependent variable (FPI). In other words, the respective independent variables explain the dependent variable in a good way.

If the probability figures of the independent variables (inflation, GDP, exchange rate & interest rate) is greater than 0.05 (>0.05), then the respective independent variables are not important or significant in determining or explaining the variation in the dependent variable (FPI). In other words, the respective independent variables do not explain the dependent variable in a good way or they are insignificant in determining the dependent variable (FPI).

It can be deduced from Table 4.2 above that Inflation, GDP, Exchange and Interest Rates have 0.0733, 0.2817, 0.3684 and 0.0000 figures respectively. Based on the decision rule, only GDP (0.2817), Exchange Rate (0.3684) and Interest Rate (0.0000) are the only dependent variables that are significant in explaining the dependent variable (FPI) while Inflation (0.0733) is in an insignificant independent variable in explaining the variation in the dependent variable (FPI).

The R-squared and Adjusted R-squared figures explains the extent or degree to which the independent variables jointly affect the variation in the dependent variable. The R-squared and Adjusted R-squared figures explain the same results of interpretation but there is some kind of explanation effect that the Adjusted R-squared gives that is greater extent than the R-squared to some extent. The interpretation is that the more the figure of Adjusted R-squared or R-squared the more fit the regression model.

According to Table 4.2 above the R-squared figure is 0.634724 which is converted to 63.4724 percent. It therefore means that the independent variables GDP (0.2817), Exchange Rate (0.3684), Interest Rate (0.0000) and Inflation (0.0733) cumulatively explain 63.4724% of the variation of the dependent variable (FPI) while the remaining 36.5276% variation is explained by other independent variables such as insecurity, political stability, weather, etc.

The Adjusted R-squared figure of 0.584341 which is converted to 58.4341 percent, indicates that the independent variables GDP (0.2817), Exchange Rate (0.3684), Interest Rate (0.0000) and Inflation (0.0733) cumulatively explain to 58.4341% while the remaining 41.5659% is explained by other independent variables such as insecurity, political stability, weather, etc.

Decision Rule for interpretation of Durbin-Waston stat

The Durbin-Waston stat is used to determine whether the data set used for regression model specification has auto-regression or not. The decision rule or guideline is that, if the figure of the Durbin-Waston stat is less

than 2 (<2) then there is a positive auto-regression. On the other hand, if the Dubin-Waston stat figure is greater than 2 (>2), then there is a negative auto-regression and finally, if the figure of the Durbin-Waston stat is exactly 2, then there is no auto-regression which indicates that the data set used for the regression model specification has a good regression model. It therefore means that for a good regression model, the Durbin-Waston stat has to be exactly 2 only.

In this model specification as shown in Table 4.2 above, the Durbin-Waston stat figure is 1.082554, indicating that there is a positive auto-regression because the Durbin-Waston stat is less than 2. Therefore, this result implies that the data set used for the model specification is good based on the R-squared (0.634724), Adjusted R-sqaured (0.584341) which is further established by the Durbin-Waston stat figure of 1.082554. Overall, the model specification for the data set used for the regression of FPI with INF, GDP, EXR and INT is a good fit as shown in Table 4.3 below.

Table 4.3: Regression Model Specification

Estimation Command:
==========
LS FPI C INF GDP EXR INT
Estimation Equation:
==========
FPI = C(1) + C(2)*INF + C(3)*GDP + C(4)*EXR + C(5)*INT
Substituted Coefficients:
==========
FPI = 169.214837731 + 0.320711281753*INF + 0.711547914292*GDP - 0.0435024651807*EXR - 4.37379548345*INT

Source: Researcher's EViews Computation (2024)

Test of Hypothesis

To test for strength of association between the independent variables (Inflation, GDP, Exchange Rate & Interest Rate) and the dependent variable (Food Price Inflation), Chi-square Test of Independence was used. The research hypothesis used for the study is stated below:

1. H0: Inflation, GDP, Exchange Rate and Interest Rate has no significant on the historical trends and patterns of FPI in Nigeria.
2. H0: Inflation, GDP, Exchange Rate and Interest Rate has significant on the historical trends and patterns of FPI in Nigeria.

Discussion of Results

From the descriptive and quantitative results presented and discussed above on the FPI with INF, GDP, EXR and INT, it is obvious that variations in FPI affected by INF, GDP, EXR and INT in Nigeria for the period of 1990 – 2023. The descriptive and quantitative results reveal that GDP, Exchange Rate and Interest Rate have significant impact on Food Price Inflation which in turn affects the Nigerian economy as observed with the period under study (1990-2023).

The results of the study conform to previous studies such as Ahmed and Singla (2015) who reported that the major determinant of food inflation in India were rainfall, broad money, effective exchange rate, interest rate and crude oil prices, Eguma et al. (2017) who examined the intrinsic relationship between key demand and supply variables, GDP, price of crude oil, food import and food price inflation in Nigeria covering the of 1988 to 2017 in a co-integration and error correction modeling framework. The study reported that price of crude oil, food import and real GDP have long run positive relationship with food price inflation and Akpan & Udoh

(2009) who estimated the movement of relative food prices, and the inflation rate trends under various agricultural policies in Nigeria. They used data from 1961 to 2009. The data were evaluated using the GARCH (1.1) model and ANOVA based on OLS estimation technique. The study discovered that "the impact of inflation on the relative price variability of food was positive and significant''.

CONCLUSION

The historical and of Food Price Inflation (FPI), Inflation, GDP, Exchange Rate and Interest Rate in Nigeria for the period of 1990-2023 under study displayed an inconsistent downwards, upwards trends and fluctuating patterns that are very difficult to track. The key economic indicators include GDP (0.2817), Exchange Rate (0.3684), Interest Rate (0.0000) and Inflation (0.0733) cumulatively has negative impacted of 63.4% in the variation of the Food Price Inflation (FPI) in Nigeria.

Based on the Durbin-Waston stat figure of 1.082554, which indicates that there is a positive auto-regression because the Durbin-Waston stat is less than 2. Therefore, this result implies that the data set (Inflation, GDP, Exchange Rate & Interest Rate) used for the model specification is good based on the R-squared (0.634724), Adjusted R-sqaured (0.584341) which is further established by the Durbin-Waston figure of 1.082554. Overall, the model specification for the data set used for the regression of FPI with INF, GDP, EXR and INT is a good fit. Thus the result implies that the impact of Food Price Inflation on the Nigerian Economy Growth the period 1990-2023 under study was statistically significantly negative.

Statistically and quantitatively speaking, GDP (0.2817), Exchange Rate (0.3684), Interest Rate (0.0000) were the only significant factors that contributed to food price inflation in Nigeria in the period of 1990 – 2023 while Inflation (0.0733) had a statistically insignificant impact on food price inflation in Nigeria in the period of 1990 – 2023.

RECOMMENDATIONS

Based on the findings, the study recommended policies that promotes mechanized production of local food, reduction of postharvest losses, food price stabilization and robust monetary and fiscal policies target at food inflation.

* Importantly, government should expand Social Protection Programmes (SPG)**,** especially for the poor households in both rural and urban.

* Also to increase medium term and long-term investments in agricultural research and extension, rural infrastructure, and market access for small farmers.

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