IMPACT OF OIL PRICE SHOCK ON FOOD PRICES IN NIGERIA

Silas Birat, PhD, Halima Aliyu Jaafar, Elisha Yari Dangiwa, PhD, Ahmadu Ezekiel, Aishatu Lawal Saidu
Department of Economics, Faculty of Social Science, Kaduna State University.
Email: silasbirat@gmail.com

Abstract

The main objective of this study is to investigate the asymmetry effect of oil price on food prices in Nigeria. The study utilized monthly data over the period of 252 months (January 2000 to December 2021) and applied Non-linear Autoregressive Distributed Lag Model (NARDL) for the analysis. The results reveal that oil price has asymmetric effect on food prices in Nigeria both in the short run and long run. The short run asymmetries reveal that an increase in oil price insignificantly increase food price while a reduction in oil price significantly reduce food price in Nigeria. Based on the results, the study recommends that government should explore the implementation of price stabilization mechanisms for essential food items, particularly during periods of oil price shocks. This can include the establishment of strategic food reserves, as well as the implementation of targeted subsidies to cushion the impact on consumers.

Keywords: Food Price, Oil Price, Shock, Nigeria

1. Introduction

The impact of oil price shocks on food prices globally is a topic of significant importance in the field of economics. The interconnectedness of global markets means that oil price shocks in one country can have spillover effects on food prices in other countries (Mohaddes, & Raissi, 2018). The impact of oil price shocks on food prices is a complex and multifaceted issue, with divergent perspectives and analyses (Nixon, 2018). Some studies argued that higher oil prices can lead to increased production costs and higher transportation expenses, thereby driving up food prices (Coleman, 2020; Taghizadeh-Hesary, & Rasoulinezhad, 2019). This can have detrimental effects on low-income households, particularly in developing countries where a large portion of income is spent on food. On the other hand, some experts argue that the relationship between oil prices and food prices is not linear, as other factors such as exchange

rates, government policies, and market competition also play a significant role (Gouel, & Jean, 2021; Mitchell, & Rausser, 2019).

In the case of Nigeria, the impact of oil price shocks on food prices has become an increasingly important area of study due to the significant role that both oil and food play in the country's economy. Nigeria is a significant player in the global oil market, with the oil industry being the mainstay of the country's economy (Oseni, & Kinbode). According to the International Monetary Fund (IMF) (2021), oil export revenues account for approximately 90% of Nigeria's total export earnings and about 70% of government revenues. As a result, changes in global oil prices have a direct impact on Nigeria's economy, this includes food prices.

One of the key channels through which oil price shocks affect the Nigerian economy is through their impact on food prices (Umar & Muhammad, 2019). As a net food-importing country, Nigeria is particularly susceptible to changes in the prices of food commodities in the international market, which are influenced by oil price shocks. Rising oil prices can lead to higher production costs for food items. Agriculture relies heavily on fuel for machinery, transportation, and the production of inputs such as fertilizers and pesticides. As the cost of oil increases, so does the cost of these inputs, which in turn raises the overall production. Furthermore, the impact of oil price shocks on food prices can also be seen in the distribution and transportation of food items (Oseni & Kinbode, 2018). As the cost of fuel rises, the transportation costs of food items also increase, which can lead to higher retail prices for consumers. This can particularly affect the availability and accessibility of food in remote or rural areas, where transportation costs are already high. In addition, oil price shocks can also contribute to overall inflation in the economy, which can further drive-up food prices. When oil prices rise, the cost of energy and other goods and services also increase, leading to higher overall inflation. As a result, the purchasing power of consumers diminishes, and they may have to spend a larger portion of their income on food, leading to food insecurity and poverty (Gouel, & Jean, 2021).

The impact of oil price shocks on food prices is not limited to just the cost of production and transportation. Oil price shocks can also lead to changes in exchange rates, as Nigeria is a net importer of food (Ijeoma, et al., 2016). As the naira depreciates against major foreign currencies due to oil price shocks, the cost of imported food items rises, further contributing to inflation in the food sector. This was evident during the 2014 and 2020 oil price crash when the naira depreciated significantly, leading to a surge in food prices in Nigeria.

Therefore, this study seeks to investigate the impact of oil price shock on food prices in Nigeria. The significance of this study lies in its potential to inform policy decisions aimed at mitigating the effects of oil price shocks on food prices and promoting food security in Nigeria, which is particularly important given the country's reliance on oil exports and its vulnerability to changes in global oil prices.

2. Literature Review

According to Smith (2019), oil price refers to the cost of a barrel of oil in the global market. This price is determined by a variety of factors such as supply and demand, geopolitical events, and economic conditions (Chen et al., 2019). The price of oil has a significant impact on the global economy, as it affects the cost of energy, transportation, and food price (Waldie, 2021). Food price on the other hand, refers to the cost of essential food items such as grains, vegetables, fruits, and meats in the market (FAO, 2021).

One of the key theories that seek to explain the relationship between oil prices shock and food prices is the theory of price transmission. This theory suggests that changes in oil prices are transmitted to food prices through various channels, such as transportation costs, energy costs for food production, and the cost of fertilizers and pesticides. For example, when oil prices increase, the cost of transporting food from farms to markets increases, which in turn leads to higher food prices for consumers.

A number of empirical studies have been conducted on the impact of oil price shock on food prices both in Nigeria and outside Nigeria. Köse & Ünal (2024) examined the impacts of oil prices and temperature on food inflation in Latin America, utilizing a structural vector autoregression model and panel Granger causality test. The study employed monthly data from January 2003 to December 2020 for Latin American countries. The empirical findings revealed that oil prices and temperature can be significant factors in reducing food inflation. Variance decomposition analysis showed that the exchange rate explained a considerable part of food inflation, while the impacts of oil prices and temperature increased over time.

Similary, Samarasinghe et al. (2024) examined the relationship between petroleum prices and food commodity prices in Sri Lanka, focusing on coconut and Samba prices. Using data from January 2008 to November 2022, the study employed Vector Auto Regressive (VAR) models and Granger causality for the analysis of data. The results showed that VAR models with

different lags were optimal for identifying price variations. Further analysis using Granger causality and cointegration tests yielded no conclusive evidence of causation

Adil et al. (2021) focused their study in Pakistan by investigating the indirect effect of oil prices on food prices through exchange rate over the period January 2001 to December 2016. The data were analyzed using Seemingly Unrelated Regression (SUR) model. Findings revealed that exchange rate and oil prices have positive relationship. The results also revealed that oil price have positive effect on price of food with respect to exchange rate.

In a study conducted in Turkey by Ziya, et al. (2020) tried to investigate the effect of oil priceand exchange rate on the prices of agricultural product over a period of 1969 to 2019. The variables used for the analysis include oil price, exchange rate, price of barley, wheat, corn, rye and corn. The data were analyzed using Johansen cointegration test and Granger causality test. The Johansen cointegration test results revealed that there is long-run relationship among the variables. Specifically, it was observed that exchange rate and oil price have significant positive relationship with food prices

In a study conducted in fourteen (14) high and low-income oil exporting countries, Chen, et al. (2020) focused on analyzing the effect of oil price changes and food price fluctuations over a period of 2000 Q1 to 2013Q1. The analysis of data was carried out using Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS). Both the FMOLS and DOLS estimates revealed that in the long run, there is significant positive effect of oil price on food price for the whole of high and low-income oil exporting countries.

Similarly, Chen, et al. (2019) focused their study in the analysis of the relationship between oil price and food price in high and low-income oil exporting countries. The study applied a qualitative content analysis where concepts and theories were critically analyzed based on the past empirical evidences. It was observed that inconsistency exist on generalized submission on the direction of the relationship between oil price and agricultural commodity prices, as against the popular notion of co-movement between food and oil prices among researchers.

In the case of Nigeria, Akidi, et al. (2024) examining the impact of retail energy prices and exchange rates on food price inflation from 2015 to 2024. The study employed the Structural Vector Autoregressive (SVAR) model, utilizing monthly data. The results revealed that energy price increases significantly raise food production and transportation costs, leading to food

inflation within a 3-6 month period. Additionally, a depreciating Naira was found to exacerbate inflation by increasing import costs, with a 2-4 month pass-through period. Umar & Muhammad (2019) investigates whether oil price have effect on the prices of food over a period of 1972 to 2016. The variables used for the analysis had food prices as a dependent variable while oil price exchange rate and inflation rate were the regressors considered. The data were analyzed using Autoregressive Distributed Lag (ARDL) model. The ARDL Bounds test to cointegration revealed that the variables have long run relationship. The ARDL estimates revealed that oil price and exchange rate have significant impact on food prices over the study period.

In a similar study conducted in Nigeria, Abdulaziz et al. (2019) examined the asymmetric oil price on the prices of food over a period of January 2010 to December, 2017. The data were analyzed using Non Linear Autoregressive Distributed Lags Model (NARDL). The variable food prices served as a regressor while oil prices and monetary policy rate were the regressors. The short run and long run estimates revealed that asymmetric relation exist between oil price and food price. Specifically, the results showed that increase in oil price significantly increase food prices while reduction in oil price insignificantly increase food price.

Ismail, et al. (2018) also focused their study in Nigeria by analyzing the impact of oil price and the prices of agricultural commodity covering a period of January 1997 to December 2016. The variables considered for the analysis were; crude oil price, prices of groundnut, rice, maize, wheat, palm oil and soybeans. The data were analyzed using both linear and non-linear autoregressive distributed lag model (ARDL). The linear ARDL estimates revealed oil price has significant positive impact on the prices of agricultural commodity. The non-linear ARDL estimates revealed that crude oil price has asymmetries impact on the price of agricultural commodities except for the price of groundnut.

Having reviewed the literature, most of the studies in Nigeria measured food price using food price inflation which does not take into account the variation in food prices across different regions and types of food. To address this gap, this study measured food price using food price index computed by FAO (2020). According to FAO (2020), food price index provides a reliable indicator of whether inflation is accelerating or decelerating and also shows any turning points in the rate of inflation while food price inflation will only show an increase in the prices of food over time.

3. Methodology

3.1 Nature and Source of Data

The study used monthly data for the analysis over the period January 2000 to December 2021. This study considered January 2000 as its base year because economic data on some key variables (food prices index) are only available as of that month. Data on food price was sourced from FAO (2020) while data on oil price was sourced from OPEC (2020) as shown in Table 1

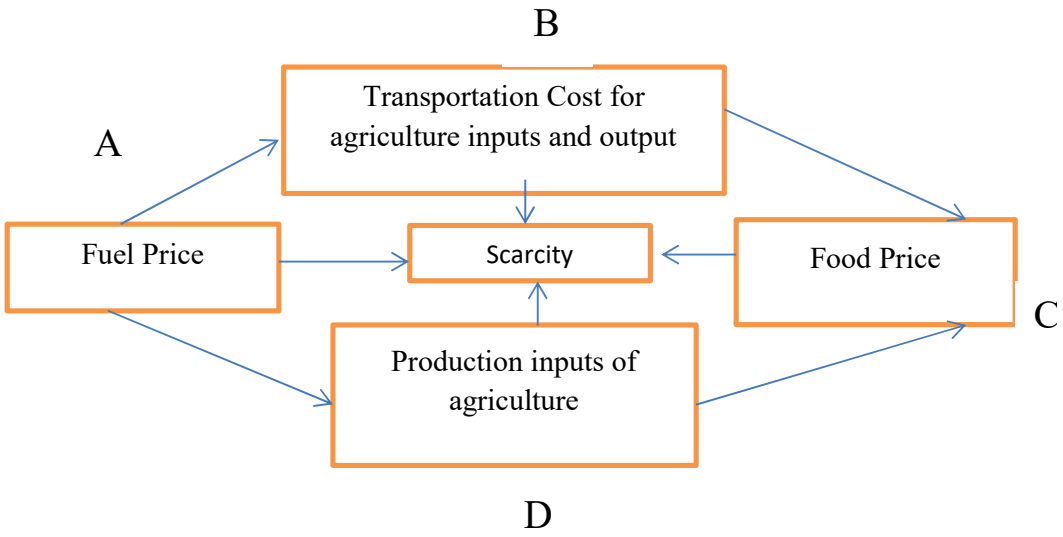
Table 1 On Summary of variables

Variables	Description	Measurement	Data Sources	Expected Sign
		Dependent Variable		
FDP	Price change between the current and the reference periods of the average baskets of goods and services purchase by household. Reference period is year 2015		FAO	
		Independent Variables		
OIL		Dollar per barrel	OPEC	Ambiguous
INF	This reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.	Percentage	WDI	Positive
TRP	This is the sum of exports and imports of goods and services measured as a share of gross domestic product.	Percentage of GDP	WDI	Ambiguous

3.2 Theoretical Framework

This study used the Oswald's Transmission Channels of Oil Price Shock as its theoretical framework which was adopted from the study of Oswald (2016). The framework is based on the assumption that oil prices affect food prices via transport costs and production inputs of agriculture. The framework is well presented in figure 1 .

Figure 1: Transmission channels of oil price on food price



Source: Adapted from the study of Oswald (2016)

The above Figure1 presented the channels through which oil price can influence food price in Nigeria. Firstly, oil is required to fuel farm machineries and trucks that are required to convey farm inputs to the farm and output to the market for sale which implied that any increase or decrease in the price of oil will be reflected in the price of food in Nigeria represented by point A, B to C in Figure 1. Secondly, any decrease or increase in the price of oil will affect the size of the government revenue and the capacity to invest in the agriculture sector in terms of buying of Production inputs of agriculture and which will subsequently affect food production and price of food represented by point A, D to C in Figure 1

The figure also showed how each of the variables taken into account in the diagram were impacted by oil scarcity, which is depicted in the centre of the diagram. When there is scarcity of oil, the price of oil may respond by going up represented by point 'A', and because oil is used in the production of farm inputs such as; fertilizers and other chemicals, hence scarcity of crude oil may increase the cost of oil which may add to the production cost of farm or agricultural input represented by point 'B'. In the same manner, oil scarcity leads to increase in transportation cost of agricultural output and input represented by point 'D' which will definitely affect the cost of market commodities (food price) represented by point 'C'.

3.3 Model Specification

The model used for the study was adopted from the empirical study of Meyer, Sanusi &Hassan (2018) as follows:

FDP=f(OIP,INF,TRP)...1

Where: FDP=Food Price (measured by consumer food price index), OIL=Oil Price, INF=Inflation Rate, TRP=Trade openness

The econometric form of the model in equation 1 is expresses as follows:

$$FDP_t = \theta_0 + \theta_1 OIP_t^- + \theta_2 OIP_t^+ + \theta_3 INF_t + \theta_4 TPR_t + \mathcal{E}_t ...2$$

Where; OIP_t^- =Negative shock in oil price, OIP_t^+ = Positive shock in oil price, INF=Inflation Rate, TRP=Trade Openness, $Ø_0$- $Ø_6$= parameters to be estimated, others as stated in equation 1.

3.4 Technique of Data Analysis

Unit Root Test: The first estimation technique to be used is unit root test. This test assesses whether a unit root is present in a time series by estimating a regression model where the dependent variable is the change in the time series variable (i.e., the first difference) and the lagged level of the variable is included as an independent variable(Gujarati et al, 2009).

Cointegration Test: The study would use the Autoregressive Distributed Lag (ARDL) bounds method. One of the major advantages of the ARDL bounds test is its flexibility. Unlike other cointegration tests, the ARDL bounds test does not require the time series to have the same order of integration (Pesaran & Shin, 2001).

Non Linear Autoregressive Distribution Lag (NARDL) Model: The non-linear ARDL model allows for non-linear relationships between the variables, providing a more flexible and accurate representation of the underlying economic processes. The non-linear ARDL model allows for the testing of non-linear hypotheses, which is often not possible with the traditional linear ARDL model

4. Data Presentation and Analysis

4.1 Descriptive Statistics of the Variables

The study provides descriptive statistics on the variables for mean, standard deviation, minimum value, maximum value, skewness, kurtosis and Jarque Bera and presented the results in Table 2.

Table 2: On Descriptive Statistics of the Variables

	FDP	OIP	INF	TRP

Mean	85.11064	59.79337	11.8891	35.87223
Maximum	273.3148	133.88	19.44489	54.06084
Minimum	18.02912	16.55	0.92004	14.68958
Std. Dev.	64.14818	25.83494	3.829599	10.32111
Skewness	1.169935	0.501004	-0.25299	-0.17897
Kurtosis	3.529404	2.37741	3.019928	2.194394
Jarque-Bera	63.30783	15.30801	2.820564	8.548316
Probability	0.00000	0.000474	0.244074	0.013924

Source: Author's Computation, (2023) using EVIEW 9. Where:FDP=Food Price (measured by consumer food price index), OIL=Oil Price, INF=Inflation Rate, TRP=Trade openness,

The findings revealed that food price has a mean value of 85.11064, a minimum value of 18.02912, a maximum value of 273.3148, and a standard deviation of 64.14818, suggesting that the data is centered around the mean because the standard deviation is less than the mean value. Similar to this, the average, lowest, maximum, and standard deviation for oil prices were 59.79337, 16.55, 133.88, and 25.83494, respectively. The fact that the standard deviation is lower than the mean value indicates that the data is centered around the mean**.**

The mean value of inflation rate is 11.8891, with a minimum of 0.92004, and a maximum of 19.44489, and a standard deviation of 3.829599, implying that the data is centred around the mean because the standard deviation is lower than the mean value. In the same manner, the mean value of trade openness is 35.87223; with a minimum value of 14.68958 and a maximum value of 54.06084, and a standard deviation of 10.32111, indicating that the data is clustered around the mean because the standard deviation is less than the mean value.

Furthermore, food price and oil price have positive skewness values, indicating that their data are skewed to the right of the normal curve. The skewness value for the trade openness and inflation rate, however, exhibited a negative sign, indicating that their data are skewed to the left of the normal curve. The food price and inflation rate have kurtosis values larger than 3, indicating that their curves have more peaks. On the other hand, oil price and trade openness have kurtosis values that are less than 3, which indicate that their curves are less peaked. Lastly, the p values of the Jarque-Bera statistic for food price, oil price and inflation rate are less than 5 percent, indicating that their residuals are not normally distributed. However, the Jarque-Bera statistic's p value for trade openness is more than 5 per cent, indicating that it residual is normally distributed.

4.2 Unit Root Test

The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) methods were used for the unit root test of the variables, with the results shown in Table.

Table 3: On Summary of Unit Root Test

	Augmented Dickey-Fuller Unit Root Test at Trend and Intercept						
Variables	Test Statistics at Level	5% Critical Value at Level	P Value at Level (5%)	Test Statistics at First Difference	5% Critical Value at First Difference	P Value at First Difference (5%)	Order of Integration
FDP	-2.171051	-3.427070	0.5033	-10.89069*	-3.427070	0.0000	I(1)
OIP	-2.336929	-3.427004	0.4121	-14.43423*	-3.427070	0.0000	I(1)
INF	-2.841531	-3.427758	0.1839	-6.560117*	-3.427758	0.0000	I(1)
TRP	-2.307095	-3.427830	0.4281	-6.558572*	-3.427830	0.0000	I(1)
	Phillips-Perron Unit Root Test at Trend and Intercept						
FDP	-1.555881	-3.427004	0.8076	-10.19585*	-3.427070	0.0000	I(1)
OIP	-2.145714	-3.427004	0.5174	-14.98402*	-3.427070	0.0000	I(1)
INF	-3.158097	-3.427004	0.0953	-6.258880*	-3.427070	0.0000	I(1)
TRP	-2.769062	-3.427004	0.2102	-11.28762*	-3.427070	0.0000	I(1)

Source: Author's Computation, (2023) using EVIEW 9. Where: FDP=Food Price (measured by consumer food price index), OIP=Oil Price, INF=Inflation Rate, TRP=Trade openness.*, ** and *** indicate 1% , 5% and 10% significance levels respectively

The ADF and PP unit root tests' results shows that none of the variables employed in the analysis are stationary at level with a 1%, 5% and 10% level of significance since their P values at level are less than 1%, 5% and 10%. However, all the variables became stationary at first difference because their P values at first difference are less than 1% and 5%. Hence, all of the variables considered in the analysis are integrated of order one (1).

4.3 Non Linear Autoregressive Distributed Lags (NARDL) Bounds Test to Cointegration

The study applied the NARDL Bounds testing approach to test for the presence of a long-run relationship between the variables and presented the results in Table4.

Table 4: On NARDL Bounds Test to Cointegration

Computed F- Statistic	K	5% critical Bound Test value	
		Lower Bound	Upper Bound
17.45971	4	2.86	4.01

Source: Author's Computation, (2023) using EVIEWS 9. See EVIEWS main output in Appendix 1

From the results, the F-statistic value of 14.27045 exceeds both the lower and upper bound critical values at 5 percent level, suggesting that there is a long-term relationship between the variables used for the analysis such as: food price, the oil price, inflation rate, and the degree of trade openness. The next segment presents the results of the Non-Linear Autoregressive Distributed Lags estimates.

4.4 NARDL Short-Run Estimate

The study employed the Akaike Information Criterion (AIC) to find the ideal lag for the NARDL short run model estimation before selecting the ARDL (2, 0, 1, 0, 0), and Table 5 showed the results.

Table 5: On NARDL Short-Run Estimates for Objective One

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Δ(FDP(-1))	0.210038	0.062379	3.367125*	0.0009
OIP+	0.040307	0.333919	0.120709	0.9040
Δ(OIP-	-0.023105	0.007748	-2.981996**	0.0338
Δ(INF)	0.051213	0.638065	0.080263	0.9361
Δ(TRP)	-0.014458	0.005133	-2.816711**	0.0404
ECT(-1)	-0.414407	0.086680	-4.780894*	0.0000
R-squared=0.89				
Prob(F-statistic)=0.00				

Source: Author's Computation, (2023) using EVIEWS 9. Where: Δ =Difference operator, OIP=Oil Price, OIP^{+}=Positive oil price shock, OIP^{-}= Negative oil price shock, INF=Inflation Rate, TRP=Trade openness, ECT=Error Correction Term. * , ** and *** indicate 1% , 5% and 10% significance levels respectively. See EVIEWS main Output in Appendix 2,

The results showed that the model is well-fitted because it has R Square value that is close to one (0.89). The R Square value explained that the variables such as; oil price, inflation rate and trade openness account for about 89 percent of food prices changes, with other factors outside the model accounting for the remaining 11 percent. The F statistic also showed a significant value, indicating that all the explanatory factors are jointly significant in explaining food price. The Error Correction Term (ECT) coefficient also displayed a significant negative value (-0.414407), indicating that the factors taken into consideration for the analysis such as food prices, oil prices, inflation rates, and trade openness have a long-term relationship. ECT coefficient explained that approximately 41 percent of the long-term disequilibrium will be corrected each year.

The results also revealed that the coefficient of food price at Lag 1 (FDP(-1)) is positive and significant at the 1% level, suggesting that past information about food price significantly predicted the current level of food price in the short-run. The results also revealed that a positive shock in oil price has insignificant positive relationship with food price at 5 percent level. According to the coefficient, a unit increase in oil price will bring about 0.040307percent insignificant increase in food prices in Nigeria. On the other hand, a negative shock in oil price has significant negative relationship with food price. Precisely, a unit decrease in oil price will bring about 0.023105percent significant reduction in food prices. The short-run results suggested that oil prices has asymmetric effect on food prices in Nigeria because both the positive and negative change in oil price showed different effects on food prices.

Furthermore, the results also revealed that inflation rate has insignificant positive relationship with food prices. According to the coefficient, a unit change in inflation rate will bring about 0.051213percent insignificant increases in food price in Nigeria. Findings also revealed that trade openness has significant negative relationship with food prices in the short-run. According to the results, a unit change in trade openness will bring about 0.014458percent significant reduction in food prices.

4.5 NARDL Long-Run Estimate

The estimated the NARDL long run model is presented in Table 6.

Table 6: On NARDL Long-Run Estimate

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OIP+	0.021312	0.178270	0.119549	0.9049
OIP-	-0.100797**	0.033917	-2.971872	0.0374
INF	0.084189**	0.036921	2.280273	0.0461
TRP	1.003560***	0.563967	1.779466	0.0764
C	-35.487601	29.775607	-1.191835	0.2344

Source: Author's Computation, (2023) using EVIEWS 9. Where: OIP=Oil Price, OIP^{+}=Positive oil price shock, OIP^{-}= Negative oil price shock, INF=Inflation Rate, TRP=Trade openness, ECT=Error Correction Term. * , ** and *** indicate 1% , 5% and 10% significance levels respectively. See EVIEWS main Output in Appendix 2,

The long-run estimates showed that a positive shock in oil price has insignificant positive relationship with food price. The coefficient explained that a unit increase in oil price will insignificantly increase food price by 0.021312percent. However, a negative shock in oil price showed a significant negative relationship with food price at 5 percent level. The coefficient explained that a unit decrease in oil price will significantly increase food price by 0.100797percent. The result suggests that in the long-run, oil price shock also has asymmetric

effect on prices in Nigeria because both the positive and negative change in oil price revealed different effect on food price

The results also showed that inflation rate has significant positive relationship with food prices in the long-run at 5 percent level. Specifically, the coefficient revealed that a unit change in inflation rate will bring about 0.084189percent significant increases in food price in the lon-run. Similarly, trade openness showed significant positive relationship with food price at 10 percent level of significant. According to the coefficient, a unit rise in trade openness will bring about 1.003560 percent increase in food price in the long-run.

4.6 Diagnostic Test for the NARDL Model Estimate

The study performs diagnostic tests on the estimated NARDL Model and presents the results in Table 7.

Table 7: On Diagnostic Test

Test	P-Values
Breusch-Godfrey Serial Correlation LM	0.5712
Heteroskedasticity: Breusch-Pagan-Godfrey	0.0902

Source: Author's Computation, (2023) using EVIEW 9. See EVIEWS main Output in Appendix 3 and 4

The results suggested that the model is free from heteroscedastic and serial correlation issues because the p values of the observed R square for both Breusch-Pagan-Godfrey heteroscedasticity test and the Breusch-Godfrey Serial Correlation LM Test are more than 5 percent.

4.7 Discussion of Findings

Theoretically, it is expected that an increase in oil price may lead to an increase in food prices while a decrease in oil price may lead to a fall in food prices. The NARDL short run and long run estimates presented in Table 4.4 and Table 4.5 supported this assertion because the results of the two models showed that a positive shock in oil price insignificantly increase food prices in Nigeria while a negative shock in oil price significantly reduce food prices which implied that asymmetric relationship exist between oil price and food price in Nigeria. Our result of asymmetric is consistent with the findings of Oseni and Kinbode (2018) who found that

increase in oil price significantly increase agricultural commodities prices while a reduction in oil price significantly reduce agricultural commodities prices. Similarly, Abdulaziz et al. (2019) and Ismail et al. (2018) found that crude oil price has an asymmetric impact on the price of agricultural commodities in Nigeria.

Furthermore, an increase in inflation rate is expected to increase food prices. The estimated ARDL short run and long model shown in Table 5 and Table 6 agreed with this assertion. This is because an increase in inflation rate insignificantly increase food prices in the short run, while in the long run, an increase in inflation rate significantly increase food prices. The result is in line with the findings of Meyer et al. (2018) on the effect of oil price on food prices in oil-exporting developing countries. Trade openness is theoretically expected to reduce food prices, as increased competition and imports can lead to lower prices. This theoretical assertion is consistent with the ARDL short-run estimates presented in Table 4.4, which revealed that an increase in trade openness significantly reduces food prices in Nigeria. However, the long-run ARDL estimates presented in Table 4.5 showed that an increase in trade openness insignificantly increases food prices in Nigeria. This finding is supported by Chen et al. (2020), who found that trade openness has a negative effect on food prices in the short run, but a positive effect in the long run. Similarly, a study by Ziya et al. (2020) found that trade openness has a significant negative impact on food prices in Turkey, but the effect becomes insignificant in the long run. These findings suggest that the relationship between trade openness and food prices is complex and may vary depending on the specific country context.

5. Conclusion and Recommendations

5.1 Conclusion

This study provides compelling evidence of the impact of oil price shocks on food prices in Nigeria. The findings underscore the vulnerability of the Nigerian economy to fluctuations in global oil markets and highlight the challenges faced by consumers in accessing affordable and nutritious food. The implications of these findings are far-reaching, as they have important policy implications for the Nigerian government in terms of mitigating the effects of oil price shocks on food prices, ensuring food security, and promoting sustainable economic development. Overall, this study makes a valuable contribution to the understanding of the relationship between oil prices and food prices, and offers insights that can inform future research and policy initiatives in Nigeria and beyond.

5.2 Recommendations

Based on the findings, the study recommended that Nigeria government needs to reduce its heavy reliance on oil and focus on diversifying its economy by investing in and promoting the development of other sectors, such as agriculture, manufacturing, and services. Similarly, Nigerian government should prioritize fiscal and monetary policies that promote stability in the exchange rate during the time of oil shock. Fiscal policies such as prudent budget management, reducing government deficits, and boosting non-oil revenue can help to strengthen the Naira and reduce its vulnerability to oil price shocks. More so, the government should explore the implementation of price stabilization mechanisms for essential food items, particularly during periods of oil price shocks. This can include the establishment of strategic food reserves, as well as the implementation of targeted subsidies to cushion the impact on consumers.

References

Abdulaziz, S., Abdullahi, S. S. and Nasiru, A. Y. (2019).asymmetric effect of oil shocks on food prices in Nigeria: A Non Linear Autoregressive Distributed Lags. *International Journal of Energy Economics and Policy,* 9(3):128-134.

Adil S, Bhatti, A.A, Waqar S and Amin, S. (2021). Unleashing the indirect influence of oil prices on food prices via exchange rate: New evidence from Pakistan. *Journal of Public Affairs,* 4(2):34-41

Akidi, V., Ikue, N. J., & Ewubare, D. B. (2024, September). Energy prices, exchange rate and food price inflation in Nigeria. In *A Presentation at the 65th Annual Conference of the Nigerian Economic Society with the theme:"Socio-Economic Development in Nigeria: Imperatives, Implications and Impacts" September 3rd–5th*.

Chen, D., Gummi,U.M. and Umar, A.S. (2019) The Review on the Link between food and oil markets in the view of price dynamics. *American Journal of Industrial and Business Management, 9:1890-1900*

Chen, H., and Sun, Z. (2021). International crude oil price, regulation and asymmetric response of China's gasoline price. *Energy economics, Elsevier 94(C)*

Coleman, W. (2020). The Impact of Oil Prices on Food Inflation in Developing Countries. *International Journal of Economics and Finance*, 9(12), 94-102.

Food and Agriculture Organization (2021). Corporate Statistic Database

Food and Agriculture Organization of the United Nations (FAO). (2021). The state of food insecurity in the world. Retrieved from http://www.fao.org/3/I9553EN/i9553en.pdf

Gouel, C., & Jean, S. (2021). Optimal food price stabilisation in a small open developing country. *Journal of Development Economics*, 108, 215-232.

Ijeoma, C. N., Goodness, C. A. and Benjamin, C. A. (2016). Oil price and food price volatility dynamics: The case of Nigeria. *Cogent Food & Agriculture* 2: 1142413

International Monetary Fund. (2021). Nigeria: Staff Report for the 2021 Article IV Consultation. IMF Country Report No. 21/153, Washington, D.C.: International Monetary Fund.

Ismail, O. F., Temitope, F. O and Oluwasegun, A. (2018). Oil and agricultural commodity prices in Nigeria: New evidence from asymmetry and structural breaks. *International Journal of Energy Sector Management, https://doi.org/10.1108/IJESM-07-2018-0004*

Köse, N., & Ünal, E. (2024). The effects of the oil price and temperature on food inflation in Latin America. *Environment, Development and Sustainability*, *26*(2), 3269-3295.

Mitchell, D., & Rausser, G. (2019). The Impact of higher oil prices on agriculture and food Markets. American Journal of Agricultural Economics, 94(2), 444-449.

Mohaddes, K. & Raissi, M. (2018). Oil Price Shocks and the Macroeconomy: What Has Been Learned Since 1996. *Energy Journal*, 34(3).

Nixon, K. (2018). The Complex Relationship Between Oil and Food Prices. *Journal of Economic Perspectives,* 25(1), 45-58.

Oseni, I. O. and Kinbode, S. O. (2018). Oil price shock and agricultural commodity prices in Nigeria: A Non-Linear Autoregressive Distributed Lag (NARDL) Approach. *African Journal of Economic Review,* 6(2)

Samarasinghe, D. G. S. P., Subasinghe, G. K., Pathirana, G. P. N. M., & Chandrasekara, N. V. (2024, February). Impact of the Price of Petroleum on the Price of Food Items in Sri Lanka. In *2024 4th International Conference on Advanced Research in Computing (ICARC)* (pp. 103-108). IEEE.

Smith, J. (2019). The role of OPEC in controlling oil prices. *Journal of Energy Economics,* 25(3), 45-60.

Taghizadeh-Hesary, F., & Rasoulinezhad, E. (2019). Oil Prices and Food Prices: A Comparative Analysis. *Environmental and Resource Economics*, 40, 75-88.

Umar, B. and Muhammad, M. A. (2019). The impacts of oil price and exchange rate on food prices in Nigeria. *Journal of Economics and Sustainable Development 10(8)*

Waldie, P. (2021). Understanding the Dynamics of Oil Prices. Journal of Energy Economics, 45(2), 123-135.

Ziya, C. Y., Almabrok, F. A., Turan, O. and Reşat, K. (2020). The impact of oil price and exchange rate on agricultural commodity prices: evidence from turkey. *GSI Journals serie b: advancements in business and economics,* 3(1):1-15