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Food Prices And Household Welfare In Nigeria: An Empirical Analysis

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ABSTRACT
The increasing costs of essential foods have become a nightmare to many households' and decision-makers in Nigerian and across the world. Food prices are vital factors which influence the standard of living and wellbeing of an average household. On this ground, the study is aimed to scrutinize the effect of food prices on household welfare in Nigeria The study employed econometrics analytical method rooted on Autoregressive Distributed Lag (ARDL) using time series data from 1990-2022. The results from ARDL disclosed that food prices have negative effect on household wellbeing. Revealing that increase in food price is capable of reducing living standard of household. Meanwhile average producer price and unemployment rate have significant positive and negative effect on household welfare respectively. The study recommended that government and critical stakeholders should make policies that will enhance agricultural production, reduce cost of agricultural inputs and provide storage facilities that will enhance food supply eventually minimise food price hike. Also government and should embark on policies that will create jobs for the unemployed million Nigerians so as to reduce the negative effect of unemployment on households.
Keywords: food, price, household, welfare and effect.

INTRODUCTION

Food prices are vital factors which influence household's welfare in Nigeria and across the world. The increasing costs of essential foods have become a nightmare to many households' and decision-makers in Nigerian. In fact, food prices are one of the determinants of household welfare which measures her standard of living and wellbeing. Higher food prices adversely affects purchasing power of individual consumer that decreases the value of per capita income (Abdulaziz, Rahim & Adamu, 2016). According to Abdulaziz et al. (2016), a significant portion of the income of a huge number of people mostly in Nigeria are spent on the most fundamental consumables, while savings and investment suffer as a consequence of the daily rise in the costs of food. According to the Food and Agriculture Organisation (FAO, 2017) over 850 million population are living in extreme poverty due to increase in food prices and disruption in food supply chain across nations. Some of the factors affecting food prices are insecurity, COVI-19 pandemic, climate variability and extreme economic slowdowns and downturns in the world today (FAO, 2022).

In Nigerian perspectives, the increase in food prices, causes economic uncertainty and weaken the level of investment especially in micro and small scales business as a result of insufficient credit facilities and

poor purchasing power (IMF, 2020). According to research compiled by *Picodi* an international e-commerce organisation in august 2023, the report shows that an average Nigerian household spend over 59 percent of its disposable income on food. The study analysed statistical data from 105 nations and Nigeria ranked 105th among nations that spent huge money on groceries worldwide. It's obvious that Nigeria has a high food price inflation rate compared to other nations. This is due to nature of import dependence that Nigeria finds herself with, accompanying by inflation, insecurity and high rate of unproductive population (World Bank, 2020).

In addition, Obi, Oniore, and Nnadi (2016) noted that exchange rate has a crucial role in influencing global food prices and economic growth. The impact of exchange rates on several macroeconomic indicators, such as food inflation and prices, may be attributed to the relatively inelastic demand for consumable goods and the inflow of products and money into the nation (NBS, 2020; Abdulaziz et al., 2016). Exchange rate fluctuations may strain a country's balance of payments as well as food costs, given that the economy depends on imported items and certain raw resources, which compete with domestically produced goods and services, exchange rate volatility fosters speculation (Adetiloye, 2010).

Currently, the global food supply and demand chain is experiencing disruption caused by several factors such as insecurity, war, conflicts, the COVID-19 epidemic, and other forms of societal unrest. Consequently, this has led to significant escalations in food prices within both international and national markets. From 2016 to the present, Nigeria has seen notable fluctuations in food costs, surpassing a 20.32% increase due to the persistently rising inflation rate, which has reached double digits. Thus, there has been a substantial rise of 73% in the proportion of families' expenditure allocated to basic foods and consumable products inside the nation (Onwusiribe, Nto, Oteh, and Agwu, 2020). The shortage of economic products and services in Nigeria inevitably impacts the wellbeing of customers in the country. From the forgoing, this study is out to examine the effect of food prices on household welfare in Nigeria. It becomes necessary due to the rising food prices and its impact on household welfare in Nigeria.

LITERATURE REVIEW

Food prices are rates at which basic food items are being exchange for by individual consumer and producer in the society. It is an important instrument (variable) in which consumption decision and household income would be determined in an economy (Daiz-Bonilla, 2016). Household welfare refers to the amount of satisfaction derived from the utilization of goods and services by individual consumers or society per time (Onwusiribe et al, 2020). It can be proxy by income per head, per capita income and final household consumption expenditure. It is amount of disposal income of individual consumer that is left for consumption in the economy.

The capacity of a household to pay for a product and services is directly related to the wellbeing of households. According to Bada, Olufemi, Tata, Peters, Bawa, Onwubiko, and Onyowo, (2016) one of the fundamental presumptions behind hike in food price is trade barriers and the cost of transportation, both of which have the potential to drive up the cost of goods and services. They submitted that when there is a trade barrier and the cost of transport, product price can be influenced, which would then cause an overall rise in the amount of products and services in the economy. Nigeria being an import dependent nation, the cost of exchange rate and trade as well as transportation has a huge influence in the prices of food and consumable products. The aforementioned have contributed tremendously in the rise of food prices in Nigeria.

Studies conducted by various scholars revealed that a food price has adverse consequences on household wellbeing (Onwusiribe et al, 2020; Khan, & Ahmed, 2014; Abdulaziz et al, 2016 & Daiz-Bonilla, 2016). For example, Onwusiribe et al, (2020) employed annual time series data within 1998 and 2018 to investigate the effect of food price on household welfare in Nigeria using the ARDL as well as Structural Vector Auto regression (SVAR) approach. The outcome revealed that food price adversely influenced household welfare. Conversely Oyinbo and Rekwot (2014) conducted a research on the correlation between food cost and household income using ARDL technique. The result established a positive correlation between food costs and family income in Nigeria. This implies that fluctuations in food costs

within Nigeria might have either beneficial or detrimental consequences on the overall well-being of households within the nation.

Similarly, Abdulaziz, Abdullahi, and Nasiru (2019) used data spanning the years 2010 to 2017 in order to explore the asymmetric effect that oil shocks have on food prices in Nigeria using the nonlinear autoregressive distributive lag (NARDL), which studies both the asymmetric short run and long run effect of oil price shocks on food prices, reveals that oil price shocks have a positive and large influence on food price in Nigeria.

In addition, Alom (2010) investigated the effect of oil and food price in Asia and Pacific countries on family welfare using SVAR method and found that disadvantaged people were negatively affected. Although the spending impacts of rising food prices were observed to be big, negative, and noticeably regressive everywhere, the income effect was reported to be positive and progressive.

Furthermore, Adebayo (2020) conducted research to determine how various aspects of Nigeria's monetary policy influenced the price of food produced inside the nation. This study employed a methodology to estimate the compensating variation, which serves as an indicator of the welfare effects on farm households. This estimation was conducted by utilizing estimates of policy-induced price fluctuations, which were derived from estimated co-integrating relationships between commodity prices and policy variables. Additionally, the study incorporated demand elasticity derived from a system of household demand equations. The total was determined by combining these figures with estimates of demand elasticity obtained from a set of home demand equations. Based on the findings, the primary factor contributing to the escalating expenses of food inside the country may be attributed to the government's regulation of exchange rates and money circulation, along with the discontinuation of subsidies on products associated with petroleum.

Also, Adekunle, Akinbode, Shittu and Momoh (2020) examine the effect of food price changes on Farm Households' Welfare in Nigeria using data that span between 2010 and 2016 applying the direct and indirect method. The farm households were categories in net food buyers and net food sellers farm households. The estimated result revealed that net food buyer household experienced welfare loss while net food farm household enjoyed welfare gain. Cereal products were identified as food which majorities of households were susceptible to price shocks.

In the same way, Adebayo, Akerele , and Mekbib (2018) examine the effect of food price spikes among household welfare in Nigeria employing the 2012/2013 and 2015/2016 household survey panel data. The study applied the linear individual fixed effect techniques , findings revealed that higher price spike in cereal always has negative effect on food quantity and economic welfare of household, prickle of price of other staples, vegetables and fruit as well as animal protein exhibits heterogeneous influence on household welfare.

Moreover, Digvijay (2022) looked at the impact of soaring global prices of rice and wheat on household welfare in India using the 2007–2008 gush in global food prices and household welfare. The study revealed that wheat and rice producing households gain from high prices and were able to maintain their per capita expenditure and consumption of rice and wheat by adjusting their consumption from market purchased rice and wheat to consumption of government-subsidized rice and wheat. Conversely, net consumers experienced a decrease in their total per capita consumption of grains whether they substituted their market purchases with government subsidized grains or not.

Matz, Kalkuhl and Abegaz (2015) examined the short term impact of price shocks on food security in rural and urban area of Ethiopia using the panel data. They found that an increase in food prices might potentially lead to an increase in farm revenues. This, in turn, is anticipated to have a positive impact on buying power and household food security subsequently leads to persistent state of food insecurity and poverty, creating a challenging situation that is difficult to overcome.

Likewise, Burchi and De Muro (2016) in their work, "from food availability to capability" adopting the ARDL model and revealed a positive and negative effect of food prices on the welfare of producers and consumers respectively. They maintained that empirical data suggests that the escalation in food prices have negative implications for consumer welfare and tends to have a favourable impact on producers.

Obayelu (2010) examine global food price increases and nutritional status of Nigerians: Its determinants, coping strategies, policy responses and implications in Nigeria. The study employed the ordinary least square (OLS) method and observed that a significant increase in food prices may have a substantial adverse effect on food security and can hinder individuals' capacity to get sufficient food that is both nutritious and varied in its composition. The escalation of food prices in Nigeria has had a widespread impact on various agricultural commodities, but the corresponding rise in disposable income among households and certain demographic segments, particularly those who are vulnerable, has not been commensurate.

In the same vein, Shittu, Obayelu and Salman (2015) in their study "Welfare Effects of Policy-Induced Rising Food Prices on Farm Households in Nigeria" The study used the ANOVA test to test the hypothesis of the study. The study observed that the majority of farm families in Nigeria benefited from the increase in food prices, resulting in improved wellbeing. However, a significant proportion of households, ranging from 44% to 56%, witnessed a decline in welfare as a result of rise in food prices.

In Brazil, Francisco, Ferreira, Phillippe, and Leonardo (2011) examined the effect of rising food prices on household welfare using geographically disaggregated monthly data on consumer prices and two household surveys to assess the welfare and distributional implications of food price escalations in Brazil. The impact on household spending was substantial, adverse, and exhibited a notable regressive pattern among families experiencing higher levels of poverty, both in terms of incidence and severity.

METHODOLOGY

The study employed the Autoregressive Distribution Lag (ARDL) model developed by Pesaran, Shin and Smith in 2001. Augmented Dickey-Fuller (ADF) unit root test was used to test for stationarity of the data. Also the bounds test was utilized to determine the presence of long-run relationship among the variables.

The model for this study is specified in line with Consumption theory of Keynesian hypothesis. It also follows the format of Van-Wyk, and Dlamini, (2018) model for South-African economy and Onwusiribe et al, (2020) model specified for Nigerian economy with little modifications to suit the current research work.

Meanwhile, Keynes (1936) states the equation as: $C = \beta_0 + Y_{dt} + A$…… (1)

Where C = Consumption, β_0 = constant, Y_{dt} = Disposable income, A = other factors to be added in any prevailing situation of the economy.

The model's functional form may be described as follows:

HHW = f (CPI, APP, UNR, EXC)……...…….……..…..……...(2)

The aforementioned equation (2) is presented in its econometric form as:

$\text{Ln } HHW_t = \beta_0 + \beta_1 CPI + \beta_2 APP + \beta_3 UNR + \beta_4 EXC + \mu t$……. .(3)

Where:

Household Welfare (HHW) proxy of final household consumption expenditure, Consumer Prices Index (CPI) specifically referring to Food indices, Average Producer Price (APP) denoted in Nigerian Naira (₦) for selected essential food commodities including beans, cassava, cocoyam, cowpea, millet, palm oil, rice, vegetables, wheat, and yam, Unemployment Rate (UNR), and Exchange Rate (EXC). Moreover, β_0 is the intercept of the equation, β_1-β_3 are the coefficients of the explanatory variables to be estimated, μt is disturbance errors term.

The ARDL model is specified thus:

$$\Delta LnHHW_t = \beta_0 + \beta_1 LnHHW_{t-1} + \beta_2 LnCPI_{t-1} + \beta_3 LnAVP_{t-1} + \beta_4 UNR_{t-1} + \beta_5 EXC_{t-1} + \sum_{n=0}^{q} \alpha \Delta LnHHW + \sum_{m=0}^{p} \lambda \Delta LnCPI_{t-1} + \sum_{m=0}^{p} \Psi \Delta LnAVP_{t-1} + \sum_{m=0}^{q} \phi \Delta Ln UNR_{t-1} + + \sum_{m=0}^{q} \Pi \Delta LnEXC_{t-1} + \theta ECM_{ti} + \varepsilon_t \quad (4)$$

Estimation Procedure

The study used the Auto-regressive distribution lag (ARDL) method to estimate the model. The bond test was employed to test the existence of co-integration among variables. This procedure is recommended over co-integration methods developed by Engle and Granger in 1987 and Johansson in 1988 which require a large sample time series and all variables to be stationary at first difference that is l(1). The method has the gain of reducing the task of determining the order of integration among variables because variables are presumed to be stationary at level and first difference. According to Ewetan & Urhie (2014) as cited in Amadi and Agya (2023) testing for unit roots to determine l(0) and l(1) are not necessary for ARDL technique. But to Rahman and Islam (2020)) as also cited in Amadi and Agya (2023) it is necessary to conduct unit root test to ensure that no l(2) variable(s) is /are included in the model because it is assume that l(2) variable(s) may cause the system to collapse.

RESULTS AND DISCUSSION

Stationarity Test

The study employed Augmented Dickey- Fuller (ADF) unit root test to test for the stationarity of the data. The results are displayed below

Table 1: Summary of Unit Root Test (ADF)

Variables	ADF Test Statistical Value	Mackinnon Critical Value (5% Level)	Prob.*	Order of Integration	Remark
HHW	-7.728100	-2.951125	0.0000**	I(1)	Stationary
CPI	-4.159691	-2.954021	0.0000**	I(0)	"
APP	-5.443702	-2.960411	0.0001**	I(1)	"
UNR	-10.64382	-2.963972	0.0000**	I(0)	"
EXR	-3.212973	-2.951125	0.0279**	I(0)	"

Source*: Authors' Estimation Using E-views Version 10, 2023.*

** denoted significant @ 5% level of significance and Null hypotheses were strongly rejected.

The unit root result in table 1 above shows that HHW and APP variables are stationary at first difference 1(1) while, CPI, UNR and EXC are stationary at level 1(0). The varied order of integration by the variables supports the use of Autoregressive Distributed lag (ARDL) model.

ARDL Bounds Test for Co-integration

To confirm the existence of a long run relationship among the variables, the study engaged bounds test.

Table 2: ARDL F-Bound Test Result for Long-run Equilibrium

F-Bound TEST:		**Null Hypothesis: No levels relationships**			
Test statistic	Val. of F-Statistic	K	Sign. %	I(0)	I(1)
Sample size (n) = 35	3.567700	4	10%	2.45	3.52
			5%	2.86	3.42
			2.5%	3.25	4.49
			1%	3.74	5.06

Source*: Extracted from Authors Estimation Using E-views Version 10, 2023.*

Table 2 displays the results of a test of co-integration. The result disclosed that the calculated F-statistic of 3.567700 is greater than the upper critical limits of 3.42 at the 5% level. This proves that there is a long-run relationship among the variables under investigation.

Table 3: ARDL Long-run Result

Levels Equation
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPI	-0.303850	0.210539	-1.443197	0.0114
APP	0.465182	0.243785	1.908167	0.0179
UNR	-2.179145	2.829869	-0.770052	0.0022
EXR	0.062395	0.083103	0.750812	0.4598

R-squared	0.781123	F-statistic	9.021876	Adjusted
R-squared	0.752154	Prob. (F- Stat.)	0.000000	
Durbin-Watson stat	1.81872			

Source*:* *Extracted from Authors Estimation Using E-views Version 10, 2023.*

In Table 3, the result reveals the long-run effect of food prices on household welfare in Nigeria. It shows that consumer price index has significant negative effect on household welfare in Nigeria. This outcome agreed with economic theory that established a negative relationship between inflation rate (Consumer price index) and household consumption expenditure in the economy. This revealed that consumer price index has a negative effect on the welfare of the household in Nigeria. Its coefficient of 0.303850, implied that 1unit or 1% increase in CPI will trigger a 30% decrease in satisfaction that consumer would derive from consuming basic food items (such as rice, beans, soya beans, yams, cassava, cowpea, vegetable oil and other crops) in this country assuming that all other factors are held constant. The finding is in agreement with the study by Adebayo el at (2018) and Francisco el at (2011). The negative effect of food price hike on household welfare could be associated with frequent diversions of household budget/income to food consumption rendering other basic need that give satisfactions to household unattended. On the other hand, average producer price (APP) has coefficient of 0.465182, which indicated that it has positive and significant effect on household welfare in Nigeria. The implication is that, 1unit or 1% increase in average producer prices would result to 0.465182 units or 47% increase in household welfare in this country. Furthermore, the coefficient of unemployment rate of -2.179145, it reveals that there was negative and significant effect of unemployment rate on household welfare in Nigeria. That is, 1unit or 1% increase in UNR would result to 2.179145 units or 2.179145% reduction in household welfare in Nigeria. The negative effect of unemployment on household is unquantifiable because it brings pain, anguish, lack of focus as well as economic imbalance to households. The result is in agreement with work of Khan (2020).

The R^2 is 0.78, showing that about 78 percent changes in the dependent variable is accountable by changes in the independent variables. The F-statistic of about 9.021 disclosed that variables in the model are jointly significant. Durbin-Watson stat. of 1.8 revealed the absence of autocorrelation.

Table 4: Result of VAR for Optimal lag length.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-689.4023	NA	3.78e+11	40.84719	41.07166	40.92374
1	-481.0221	343.2144*	7955758.*	30.06012*	31.40691*	30.51942*
2	-461.1031	26.94925	11877622	30.35900	32.82812	31.20104

Source*: Authors' Estimation Using E-views Version 10, 2023.*
* indicates lag order selected by the criterion

LR= sequential modified LR test statistic (each test at 5% level)
FPE = Final prediction error
AIC= Akaike information criterion
SC= Schwarz information criterion
HQ = Hannan-Quinn information criterion

According to the Aikaike Information criteria (AIC), as shown in Table 4, the appropriate lag length to use was Lag one (1). This lag 1 was chosen because it has the minimum values of 30.06012 based on AIC criteria when compared to other criteria in that row 2 which were 343.2144* of sequential modified LR test, 7955758* of FPE, and 31.40691* of Schwarz information criterion, 30.51942 of HQ respectively. This lag 1 was selected because it has the minimum values of AIC criteria. As a consequence, the best choice for the lag length was 1, and this was chosen so that it could be used to estimate the ARDL short-run results.

ARDL Short-run Result

Table 5: Short-run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob
Δ(CPI(-1))	-0.121505	0.103931	-3.868695	0.0002**
Δ(AVP(-1))	0.554905	12.22943	-1.161290	0.0132**
Δ(UNR(-1))	-0.359360	0.425476	-1.844606	0.0063**
Δ(EXC(-1))	-0.190019	1.972627	-1.520318	0.1410
ECM(-1)	-0.608473	0.157672	-3.859101	0.0007**

R^2 = 0.609674 R^{-2} = 0.578250 F-stat = 5.031355 D-W = 2.170423
Source*: Authors' Estimation Using E-views Version 10, 2023.*
** denote significance at 5% level of statistical significance

Table 5 shows the results of error correction mechanism (ECM) which represents speed of adjustment. The ECM is significant and appropriately signed. The coefficient of ECM which is -0.608473 revealed that about 61 percent of the deviations from the long run are caused by preceding years shock; converge back to long run equilibrium in the present year. The negative value of the coefficient of ECM implies that there is long run equilibrium among food prices, consumer price index, average producer prices, unemployment, exchange rate and household welfare Nigeria. The result revealed that the lagged value of CPI (Food prices) is positively related with household welfare (HHW). Suggesting that one percent rise in food price, household welfare will rise approximately by 0.12 percent. The result is in agreement with the work of Shittu, et al (2015) and Matz (2015). The result could be linked to the fact that majority of farming household benefit from increase food price which impact positively on their buying power and wellbeing. Similarly, average producer price (APP) on household welfare was also positive and

significant. Meaning that, a percent rise in average producer price increase wellbeing. The result is in conformity with Burchi and De Muro (2016) and Digyijay (2022) work. However, the coefficient of unemployment rate (UNR) of -0.359360 indicates that unemployment rate exert negative effect on household welfare in Nigeria. The implication of this result is that, increase in unemployment rate affected standard of living negatively in Nigeria.

RECOMMENDATIONS

The study makes the following policy recommendations:

1. Government and critical stakeholders should make policies that will enhance agricultural production, reduce cost of agricultural inputs and provide storage facilities that will enhance producer's prices index in Nigeria
2. Government should put in place policies that will increase productions and supply food which will reduce food prices and minimise the negative influence of Consumer Price Index on the household welfare of citizenry.
3. Government and critical stakeholders in the country should embark on policies that will create jobs for the unemployed million Nigerians so as to reduce the negative effect of unemployment on households.

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