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EVALUATION OF IMPORTATION POLICIES' EFFECT ON SUSTAINABLE FOOD SECURITY IN NIGERIA (2015-2021)

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Abstract
This study deepened the understanding of the relationship between import policy and food security in Nigeria. In accordance with the four pillars of food security, food imports (an integral aspect of food stability) formed the basis for measuring food security while import tariff, exchange rate and trade openness were used as the proxies for import policy. The data sets used for the analysis were obtained from the World Development Indicators and Food and Agriculture Organization Statistics. Descriptive statistics, unit root test, cointegration test and autoregressive distributed lag (ARDL) were utilized for the data analysis. Evidence of mixed integration and long run relationship were established from the unit root and bounds cointegration respectively. The results showed that import tariff does not significantly affect food imports. It was also found that exchange rate exerts significant positive effect on food imports in the short run. The results further showed that trade openness has a positive and significant effect on food imports in both long and short run. As evidenced in the results, a percentage increase in trade openness is associated with 0.238 percent increase in food imports in the short run. Similarly, 1 percent increase in trade openness will lead to 0.3567 percent in food imports. Owing to the findings, it is recommended, among others, that Government should strengthen the tariff on the importation of food which Nigeria enjoys comparative advantage to boost self-sufficient in production and foster food security.
Keywords: Food security, import policy, tariff, exchange rate, trade openness and food imports

Introduction

Food security constitutes a challenge for most developing countries including Nigeria. Over the past three decades, agricultural production in Nigeria has been insufficient to match the growing population which has increased from 122 million in 2000 to 211 million in 2020

(UNCTAD, 2020). This imbalance between agricultural production and the needs of the population could be due to the age long culprit of crude oil. The progress made in the Nigerian agricultural sector was thwarted in the 1960s as crude oil was discovered in large and exportable quantities. The sector that was once a foreign exchange earner and employer of labour was overshadowed by activities in the oil industry, as the latter became the driver of the Nigerian economy, a major source of revenue and foreign exchange.

With the rate at which population grows exceeding that of domestic production and domestic agricultural production is unable to meet local demand, the gap has been filled through import. Over the past decades, food imports into Nigeria have increased tremendously from N890,935.90 million to N1,405,868.33 million and with export fluctuating, the payment for import is threatened, thereby creating food insecurity. The result of food insecurity is devastating as it has been found to contribute to chronic diseases, malnutrition and an instigator of political and social instability as people would take to the street to register their displeasure with the situation (Mabrouk and Mekni, 2018; Deaton and Lipka, 2015).

The Nigerian government, in order to ensure availability of food, has embarked on various intervention schemes and programmes, geared towards boosting agricultural production. The intervention mainly driven by the development finance mission of the Central Bank of Nigeria (CBN) include Agricultural Credit Guarantee Scheme Fund (ACGSF), Agricultural Credit Support Scheme (ACSS), Commercial Agricultural Credit Scheme (CACS), Anchor Borrowers Programme, among others. With the thrust of these programmes aiming to boost local agricultural production, the second goal of food security on the Sustainable Development Goals (SDGs) is far from being attained (Sulemana, Bugri Anarfo and Quartey (2019).

Accessibility to food has become a challenge to many Nigerians. Data from WDI (2020) shows that per capita income has witnessed marginal increase in Nigeria. In 2014, income per capita stood as US $2487.598. This rose to US $2961.549 in 2013 and US $3098.986 in 2014. The ability of Nigerians to access food dropped as per capita income declined to US $1968.565 in 2017, only increasing to US $2097.092 in 2020. Real income has deteriorated over the years as inflation remains at double digits rising from 9.55 percent in December, 2015 to 18.17 percent in March 2021, then declined to 15.63 percent in December, 2021 (CBN, 2021).

Several factors have been identified in determining food insecurity. This include agricultural production, foreign direct investment, quality of governance and climatic factors (Mahmah and Amar, 2021; Oke, 2015; Ogunniyi, Mavrotas, Olagunju, Fadare and Adedoyin,

2020;Dithmer and Abdulai, 2017; Shuaibu, 2021; Wardhani and Haryanto, 2020; Sulemana, Bugri Anarfo andQuartey, 2019). This study deviates from previous studies as it analyses the effect of import policies on food security in Nigeria. The focus on this was strengthened by the events of global coronavirus pandemic where countries invoke protectionist measures and restrict imports in order to ensure her citizens have access to sufficient food.

Methodology

Study area

The study was carried out in Nigeria. Nigeria is located in the western part of Africa in the Gulf of Guinea and situated between Longitudes 2 2 and 14 30 east and between Latitudes 4 and 14 north. Nigeria is blessed with land mass spanning over an area of 924,000km sqr. The country has over 200 ethnic groups and 774 Local Government Areas (LGAs), it has six Geopolitical zones and is an Oil-driven economy. It is one of the largest oil exporting countries in Africa. As at 2020, the Nigerian population was over 206 million and currently over 214 million (worldometer, 2022). Nigeria has over 70 million hectares of agricultural land area with maize, cassava, guinea corn, yam, beans, millets and rice being the major crops.(FAO 2022). Between January and March 2021, the Nigerian agricultural sector contributed to 22.35% of the total Gross Domestic Product. (FAO 2022). Nigeria is covered by three types of vegetation: forest (where there is significant tree cover), savannahs (insignificant tree cover, with grasses and flowers located between trees) and montane land (least common and mainly found in the mountains near the Cameroon border. (Wikipedia 2022).

Research design

This study adopted the ex post facto research design. The rationale for this type of research design is premised on the fact that the data required for this study are already in existence, which is devoid of manipulation.

Data collection

The data sets required for this study are secondary time series data. They were obtained from the World Development Indicators (WDI) and Food and Agriculture Organization (FAO) Statistics for the period 2015-2021.

Data analysis

In this study, Autoregressive Distributed Lag (ARDL) method proposed by Pesaran and Shin (1999) was applied for the estimation of the long run and short run relationship between food

imports and import policy measures. The choice of this method was based on the fact that the variables used for the analysis are mixed integrated. In addition, the ARDL was also considered appropriate given the relatively small study period (2015-2021) as it tends to produce robust estimates in this regard compared to other techniques. The descriptive statistics for mean distribution, standard deviation and normality tests were equally utilized in this study, in addition Augmented Dickey Fuller (1981) unit root test approach and Pesaran, Shin & Smith (2001) bounds cointegration test for long run equilibrium relationship were also used.

Model specification

This study employed a symmetric Autoregressive Distributed Lag (ARDL) model linking food imports to import policy indicators such as import tariff, exchange rate and trade openness. The function specification of the model is as follows:

FOS = f(TRF, EXR, TOP) ……Equation 1

Where: FOS = food security measured by the stability component of food imports, TRF = import tariff, EXR = exchange rate and TOP = trade openness.

The formal specification of the ARDL model is as follows:

$$FOS_t = \alpha_0 + \sum_{i=1}^{m} \psi_{1i} \Delta FOS_{t-1} + \sum_{i=1}^{p} \psi_{2i} \Delta TRF_{t-1} + \sum_{i=1}^{p} \psi_{3i} \Delta EXR_{t-1} + \sum_{i=1}^{p} \psi_{4i} \Delta TOP_{t-1} + \beta_1 FOS_{t-} +$$

$$\beta_{2i} TRF_{t-1} + \beta_{3i} EXR_{t-1} + \beta_{4i} TOP_{t-1} + U_t \text{.....Equation 2}$$

Where: α_0 = constant parameter

ψ_1 - ψ_4 = short run parameters

$\beta_1 - \beta_4$ = long run multipliers

U= error term

Δ= first difference operator

m and p = Lag orders for the forecast and explanatory variables

Results and Discussion

Descriptive statistics

The descriptive statistics for the variables are presented in Table 1.The descriptive statistics showed that food imports in Nigeria averaged 16.22 percent of the merchandise imports during the study period. It was also found that tariff and trade openness averaged 20.29 and 37.08 percent respectively while the average value of exchange rate at 129.32 naira per dollar.

The standard deviation for all the variables are less than their corresponding mean values, which implies that the observations for each of the variables clustered around their respective mean values. The probability values of the Jarque-Bera statistics for food imports, exchange rate and trade openness are greater than 0.05, meaning that these variables are normally distributed at 5 percent level. On the other hand, tariff is not normally distributed given that the associated probability value of the Jarque-Bera statistic is less than 0.05. The absence of normal distribution in the tariff could be attributed to the large outliers in the data distribution over the study period.

Table 1: Summary of the descriptive statistics

	FOS	TRF	EXR	TOP
Mean	16.22452	20.29774	129.3245	37.08032
Median	17.03000	15.27000	128.6500	37.02000
Maximum	30.56000	87.19000	358.8000	53.28000
Minimum	6.360000	9.940000	8.040000	20.72000
Std. Dev.	5.377297	14.38314	97.16463	8.474197
Jarque-Bera	1.364420	283.0812	2.463471	0.312018
Probability	0.505499	0.000000	0.291786	0.855552
Observations	31	31	31	31

Note: Food Security (FOS),Tariff(TRF), Exchange Rate(EXR), Trade Openness(TOP),

Source: Author's computation using E-views software

Unit root test

The results of the Augmented Dickey-Fuller (ADF) unit root test for each of the variables are presented in Table 2. The ADF unit root test results showed that only tariff is stationary at levels given that the thr probability value (0.0008) of the ADF statistic at levels is greater than 0.05. Thus, the null hypothesis of unit root is rejected in this regard. This implies that import tariff is integrated of order zero [I(0)]. On the other hand, the other three variables were not stationary at levels, but evidence of stationary was established for them at first difference. This implies that they are all integrated of order one [I(1)]. Overall, the levels and first difference unit root tests results showed that the variables are mixed integrated, which provided the basis for the choice of ARDL bounds cointegration test method.

Table 2: ADF unit root test results

variable	ADF Statistics at levels	ADF statistics at first difference	Order of integrations
FOS	-3.290	-7.887	I (1)
	(0.0872)	(0.0000)	I(0)
TRF	-5.334	NA	
		(0.0008)	
EXR	-0.7700	-4.075	I(1)
	(0.9575)	(0.0170)	
TOP	-3.3322	-5.067	I(1)
	(0.0804)	(0.0018)	

Note: Figures in parenthesis are probability values of the corresponding ADF statistics while NA implies not applicable given the series do not have unit root

Source: Author's computation using E-views software

Cointegration test

The ARDL bounds cointegration test method was applied in this study and the results are presented in Table 3.As observed from Table 3, the computed F-statistic (6.425) is greater than the upper bound [I(1)] critical value (4.35) at 5 percent level of significance. This implies that the variables are cointegrated. Consequently, the null hypothesis that no long-run relationships exist is rejected. Thus, food import has long-run relationship with all the underlying indicators of import policy. This finding is in accordance with the results of Nsabimana and Habimana (2017). It also provided the empirical basis for estimating the dynamic long and short run parameters.

Table 3: ARDL bounds cointegration test results

Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	6.425	3
Critical Value Bounds		
Significance	I(0) Bound	I(1) Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Source: Author's computation using E-views software
Note: K denotes number of explanatory variables

Model estimation

The ARDL method was followed in estimating the dynamic long and short-run parameters. The results are presented in Table 4.The results showed that import tariff has a negative value, but insignificant effect on food imports in both long and short run. This finding could be attributed to the inconsistency in the import policy and poor control mechanism in the implementation of tariff by the relevant authorities, especially the Nigerian Customs, which undermine the expected significant effect of tariff on food importation. The study showed that exchange rate exerts significant positive effect on food imports in the short run. This implies that1 percent increase in exchange rate is associated with 0.1046 percent increase in food imports. Although this finding is contrary to the a priori expectations, it explained the consumption complex syndrome which prevalent in the Nigerian economy. In addition, the results showed that trade openness has a positive and significant effect on food imports in both long and short run. As evidenced in the results, a percentage increase in trade openness is associated with 0.238 percent increase in food imports in the short run. Similarly, 1 percent increase in trade openness will lead to 0.3567 percent in food imports. This finding is impressive as it showed that openness to trade create opportunities for increased inflows of foods to enhance food security. The error correction coefficient (-0.6659) is negative and highly significant, which implies that the model can adjusts to long run equilibrium position at a speed of 66.59 percent. The R-squared (0.598) showed that 60% of the variations in food importation is influenced or explained by the explanatory variables while 40% can be accounted for by other endogenous variables or error terms. This provided evidence for the statistical reliability of the estimated model.

Table 4: ARDL long and short run results

Dependent Variable: FOS
Selected Model: ARDL(1, 0, 3, 0)

		Short run results		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TRF)	-0.085631	0.069457	-1.232856	0.2319
D(EXR)	0.104698	0.044254	2.365821	0.0282
D(EXR(-1))	-0.151151	0.075226	-2.009287	0.0582
D(EXR(-2))	0.083045	0.050834	1.633662	0.1180
D(TOP)	0.237581	0.113020	2.102119	0.0484
CointEq(-1)	-0.665962	0.175097	-3.803386	0.0011
		Long run results		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
TRF	-0.128582	0.100123	-1.284235	0.2137
EXR	-0.029048	0.022212	-1.307745	0.2058
TOP	0.356749	0.171892	2.075422	0.0511
C	7.710180	8.318453	0.926877	0.3650
R-squared	0.598127		Prob.(F-stat.)	0.031701

Source: Author's computation using E-views software
Note: Food Security (FOS),Tariff(TRF), Exchange Rate(EXR), Trade Openness(TOP), Cointegration (C).

The post-estimation test results showed that that there is no evidence of serial correlation and heteroscedasticity in the model at 5 per cent level given that the associated probability values of the Chi-square statistics for the Breusch-Godfrey serial correlation LM test and White's heteroscedasticity test results are greater at 0.05%. In addition, evidence of normal distribution for the residuals was also established. This is because the probability values of the Jarque-Bera statistic exceeds 0.05. To this end, the empirical evidence for the reliability of the model for long term prediction and policy purposes was established.

Table 5: Post-estimation tests results

Test type	Test statistic	Prob.
Breusch-Godfrey serial correlation LM Tests	Chi-square (0.5275)	0.7682
White's Heteroskedasticity Tests	Chi-square (8.614)	0.2815
Normality Test	Jarque-Bera (1.563)	0.4575

Source: Author's computation using E-views software

Conclusion and Recommendations

The thrust of this study is the empirical investigation of the relationship between import policies and food security in Nigeria. This is because adequate access of the population to food at all times is essential for healthy living. In accordance with the four pillars of food security, food imports (an integral aspect of food stability) formed the basis for measuring food security while import tariff, exchange rate and trade openness were used as the proxies for import policies. The findings showed that import tariff does not significantly affect food imports whereas trade openness contributed positively to food imports. Evidence of a significant positive effect of exchange rate on food imports was also established from the results. Based on these findings, the following recommendations are proffered:

I. Government should strengthen the tariff on the importation of food which Nigeria enjoys comparative advantage. This will help to boost self-sufficiency in production and foster food security.
II. Policy makers should move towards achieving stable and realistic exchange rate to promote adequate access to food at all times.

Government should enhance openness to trade by gradually relaxing restrictions on food imports which Nigeria lacks comparative advantage. This will promote a sustainable path in consumption and boost food security.

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