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IMPACT OF POPULATION GROWTH ON THE IMPORTATION OF CONSUMABLE GOODS IN NIGERIA

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Abstract

The paper studied the impact of population growth on importation of consumables in Nigeria using time series data for the period of 1982 to 2022. The study adopted the Malthusian population theory and the dependency theory as the theoretical framework. The data were analysed using the Vector error correction model (VECM) and the results revealed that population growth had a negative but significant effect on importation of consumables in Nigeria. The test also showed a unidirectional relationship between population growth and food importation as well as negative effect of population shock on food importation over the period studied. Based on the findings of the results, the government is advised to increase budget allocation to agriculture to boost food output through mechanization of farming process. There should be establishment of agricultural institute to help educate and equip the population with modern knowledge on food and livestock production. Stabilization of the exchange rate level by the government, to control import and export levels, as well as prices of imported foods. The government should intensify efforts to reduce insurgency especially in the North and resolve herders and farmers conflicts to help encourage people interested in undertaking farming and livestock production in Nigeria.

Keywords: Consumable importation, dependency theory, Malthus theory, population growth.
JEL Classification Codes: F14, Q1

1. Introduction

Macroeconomic activity like international trade through the medium of import and export of goods and services has become an increasingly important and prominent economic activity among countries. The exchange of goods and services across borders is an avenue through which countries are able to achieve and promote economic self-sustainability and transform natural resources such as crude oil, gold, diamond, etc into economic wealth (Owolabi, Inuk, & Odediran, 2015). International trade affects the economy of developing countries especially in Africa as it presents opportunities for local industries to internationally broaden their market reach. This results to potential increase of market size and increased profit turnover which in

turn leads to the encouragement and growth of the local industries and creation of employment opportunities for the teaming populace.

Furthermore, international trade to some extent creates competition in the world market thereby providing consumers with a variety of products and an avenue for the importing and exporting countries to discriminate in terms of prices and choices. Imports being a component of international trade transactions can boost economic progress when it is carried out on productive commodities (Nteegah & Mansi 2016). It follows that excessive importation of non-productive commodities can generate an undesired effect on the domestic economy as long as such commodities can be locally produced. But it has been noted that excessive importation is likely to exert pressure on the external reserves of the country, thereby creating a negative impact on the economy. However, the positive impact of imports has been that it increases the varieties of goods available to domestic consumers, generate positive competitive pressures on the domestic economy, promote standardization, and could be used to bridge the gap in domestic supplies of essential commodities to poor households (Alex & Ebipuamere 2020).

However, population in Nigeria is growing at a historical unprecedented rate. In the world, the possible differences between number of people and world food production brings to resurrect the Malthusian hypothesis that long-run equilibrium consumption lies on higher than at the subsistence level. For individual countries or regions, the arithmetic observation that greater number of mouths to feed means lower consumption for each has won some supporters. More advanced views of the impacts of population growth on the age structures, labour force, investment levels and social needs have also been formulated. Numbers of people and their rates of growth are said also to affect the military strength, world influence, territorial security, and mostly on the importation of consumable goods. Conversely, a large population supports greater specialization and a large increase in market return to human capital and knowledge.

Hence, the link between greater population and economic growth depends on whether the incentives to human capital and expansion of knowledge are stronger than diminishing return to natural resources. The large population implies a large market for imported consumable goods and services as well as large pool of human resources for development. Although, the impact of population on development depends on the absolute size but also on its quality. However, from the stand point of international trade, it is said that exports enriches a nation, while

imports impoverish a nation and that for any nation to improve its well-being, it has to specialize in and export the relatively less expensive domestic goods. This inter-dependency of nations in the international trade is a vital factor for economic progress of nations.

Importation is likely to be influenced by various factors, such as the availability of the required external reserves, exchange rate, relative price level, terms of trade, trade openness, real income, level of output, market size etc. Different countries of the world today engage in importation and exportation of goods and services on various scales depending on their comparative advantage. This has led to most countries to produce and export goods and services which they enjoy comparative advantage over and import other consumable goods. This is not the case for sub-Saharan economies, especially for Nigeria where excessive importation without corresponding increase in export as evident has precipitated balance of payments problems (Nwogwugwu, Madichie, & Maduka, 2015) and shallow domestic production. However, instead of Nigeria to import those goods that it cannot produce, it opts for what it has a comparative advantage such as food and other agricultural commodities. Across many regions of the world, local food production and supply are limited compared to the quantity and compositions demanded. Estimate shows that 72-78 percent of the world populations could not meet their food demand for basic grains, locally (Kinnunen, Guillaume, Taka, D'Odorico, Siebert, Puma & Kummu, 2020). It is also argued that by 2050 the number of people to rely on food import globally will be between 1.5 and 1.6 billion (Prajal, Matthias, Dominik & Juergen, 2014). In fact, the World food demand is expected to grow by 60% towards 2050 (FAO, 2015). There is therefore the tendency for the earth's population to outgrow the capacity to feed it.

Food and agricultural consumable commodities constitute a chunk of Nigeria's import volume, due to the fact that Nigeria's domestic food production cannot meet the demand of her growing teaming population. The problem of population and population growth has worried economists and other social scientists for a very long time. The question has always been what the population of a country is likely to be in the future and the economic and social consequence of a change in population, whether upwards or downwards. A rapid growth in population can lower per capita incomes through three key channels. Firstly, increased pressure by population on natural resources; especially land. Secondly, it can lead to a scarcity of goods and services which often leads to an increase in price (consumption cost). Finally, it leads to a decline in capital accumulation

and savings because the larger a family, the higher their expenses, and the lower their propensity to save (World Population Review, 2019). A steady growing population as that of Nigeria implies that there's an increasing need for expansion of shelter, clothing, education, health facilities and food production; in a case where such are not adequately provided the growing population puts a strain on the already existing facilities and resources. As we are witnessing today, a wild growth in real estate in the country as lands formally used for agricultural purposes are used for housing purposes, the implication is that there is a decline of available lands for agricultural purposes, hence a drop in our domestic food production.

Although as predicted by the Malthusian theory, the population of Nigeria has not grown geometrically over time, the growth has been however remarkable, while the envisaged "misery" or "vice" by the theory have continued to manifest in Nigerian economy (Ewugi & Yakubu, 2012). Due to the decline in the agricultural sector which was previously the leading sector in the 1960s, as a result of fall in investment and low technology in the industry, domestic food production has continued to fall behind the consumption requirement of the growing population which thus necessitate importation of food. The importation of food to complement local food production shows the inability of Nigeria to feed their growing population.

Over the decades, there have been evolution of various economic reform in the likes of the import substitution industrialization (ISI) strategy, export promotion program (export free zones), Structural Adjustment Programme (SAP) to mention but a few; geared towards stimulating domestic production, promoting exportation, discouraging importation of locally produced goods, and propelling economic growth, had hitherto been matched with increasing import demand in the country over the years. In the pre-SAP era of 1981 to 1985, total imports averaged ₦9.35 billion. With the introduction of SAP, imports declined to ₦5.98 billion in 1986 but rose up to ₦30.86 billion in 1989, averaging ₦23.39 billion between 1987 to 1989. The period 1990 – 1999 was characterized by the significant rise in total imports demand in the country. Total import was put at ₦165.63 as at 1993 with a record high of ₦862.52 billion as at 1999. Meanwhile, total imports from 1990 to 1999 averaged ₦447.02 billion, which is very high when compared to just an average of ₦13.66 billion from 1981 to 1989. Within 2000 and 2009, the Nigerian economy was characterized by a tremendous upsurge in import demand even more than that experienced in the 1980s and 1990s. Total imports within the period averaged ₦3362.03

billion with a maximum value of ₦8,163.97 billion as of 2010. Meanwhile, imports averaged ₦11,777.35 billion between 2011 and 2019, with the highest total import within the period being put at ₦20,448.92 billion as of 2019 (CBN, 2019). One thing to note is that Nigeria's imports have maintained a continuous rise over the review period.

Despite various economic reforms together with the continuous rise in importation in the Nigerian economy, it is worth noting the direction of movement of the country's population. In Nigeria, the 1952/1953 census puts its total population at 30.4 million with a growth rate of 2.1%, while the 1963 and 1991 census put Nigeria's population at 55.6 million and 88.5 million with growth rates of 5.6% and 2.6% respectively (Nyangito, 2017). Although the 2006 census put the total population at 140 million, Nigeria's population is estimated to be over 200 million people as at 2021 with a growth rate of 2.56% and is the largest in Africa and seventh largest in the world. It is observed from the foregoing analysis that consumable imports has been rising along with the country's population, which makes it unclear whether population influences importation of consumables in Nigeria.

Surprisingly, only a limited number of studies have looked into the effect of population growth on importation of goods specifically on consumable goods but have focused more on the impact of population on economic growth, especially in Nigeria. Most of the studies focused more on the population growth and economic growth or importation generally. Overall, the impact of population growth on imported consumable goods is far from clear to the best knowledge of the researcher, and the impact varies across countries under different economic conditions. Also, from a cursory look at the Nigerian data, on population growth and importation of consumable goods, respectively, it appears that the recent economic trends and the policies and establishments made specifically to harmonize importation of consumable goods into the country might have projected a new set of empirical observations that might render the previous findings obsolete. Again, the utilization of socioeconomic and proximate variables as well as the use of shock impact analytical technique in the study is to contribute to the existing literature, as virtually reviewed previous studies ignored the estimation of these shocks of population growth for achieving its related objective of the national government in terms increasing demand for consumable goods produced outside the country. This therefore calls to mind pertinent questions such as, how has population growth affected importation of consumable goods in Nigeria.

2. Literature Review

Malthusian Population Theory

Malthusian Population Theory as it relates to the world's hunger problem and the challenge to feed the world sustainably. The need to relieve hunger and thirst is among the fundamental needs and is necessary for human survival. Malthus argued that population growth increases geometrically, beyond measure, although food production increases only in arithmetic terms (Malthus, 1998). According to Malthus, if the population increases while the availability of natural resources (particularly land) remains constant, agricultural productivity tends to fall. As a result, food productivity is unable to keep up with the increasing population, and starvation ensues as a result of the supply shortage (Pawlak & Kołodziejczak, 2020). Malthus concluded that given the above scenario, if population is left unchecked, a time will come when population will outgrow food supply. To averse this ugly trend he recommended both positive and preventive checks on population.

This theory is relevant to this work despite its criticisms because according to Ahlburg (1998) an increase in population growth leads to an increase the need for goods and services through the "technology-pushed" and the "demand-pulled" channels. Becker et al. (1999) argued that high population growth rate induces high labour force which is the source of real wealth.

The Heckscher-Ohlin theory

The Heckscher-Ohlin theory, also known as the Heckscher-Ohlin-Samuelson model (HOS model), is a fundamental theory in international trade developed by Swedish economist Eli Heckscher and Bertil Ohlin, in the 20th century. This theory builds upon the principles of comparative advantage, but it differs by emphasizing the role of factor endowments in shaping a country's trade patterns. The theory laid the foundation for understanding international trade patterns based on factor endowments. The theory is based on the assumption of trade between two countries and is simplified by focusing on the production and exchange of two goods. The theory mainly deals with labor and capital as the factors of production. Factors of production are assumed to be immobile between countries but can move freely within a country. The production functions for each good exhibit constant returns to scale. The markets for goods and factors are perfectly competitive.

The Heckscher-Ohlin theory posits that countries will specialize in and export goods that utilize their abundant factor of production and import goods that use their scarce factor of production. This specialization arises due to differences in factor endowments, particularly differences in labor and capital

across countries. The theory identifies differences in factor endowments (e.g., abundant labor or capital) as the primary driver of trade patterns. A country with abundant capital relative to labor will tend to specialize in and export capital-intensive goods, while a country with abundant labor relative to capital will specialize in and export labor-intensive goods. However, it is essential to consider other factors such as technological advancements, infrastructure development, and government policies in analyzing the impact of population growth on trade patterns in Nigeria

2.1 Empirical Literature

A number of empirical studies have been carried out on the relationship between population growth and importable consumable goods and some of them are reviewed. For instance, Mwangi (2021) analysed analysed the determinants of food import demand using panel data set of 37 sub-Saharan African countries, which was estimated using augmented gravity model. The study found that, GDP, membership to regional trade agreement, inflation and quality of governance encourage agricultural imports in these countries. On the other hand, population growth and transport cost affect imports negatively. Hyuha, Williams and Grace (2017) examined the determinants of import demand in Uganda using multiple regression models. Their findings indicate that domestic production of rice; population growth and price are significant factors that influence rice import in the country. The study also recommends that policy action should be geared towards supporting rice farmers in order to increase its supply and stabilize prices.

Abdullahi (2021) examined the determinants of food import demand in Africa using Nigeria as a case study. The study employed ARDL bound testing approach to cointegration. Results from the study showed that population growth and domestic food production influence food import demand in both short run and long run, while exchange rate appeared to be insignificant factor. Vaughan, Afolami, Oyekale and Ayegbokiki (2014) examined the structure and trends of Nigeria's food import bills, secondary data was analysed using descriptive statistics and time series regression. Evidence shows that based on current price an average of ₦1.923 trillion worth food is imported per anum, which translate in to about ₦1.0 billion worth of food per day for the period 1990-2011. Further estimation revealed that the country had overall positive trade balance within the period, but annual food import bill was in multiples of five times of the export.

Abdulmalik and Njiforti (2018) investigated the determinants of demand for agricultural import in Nigeria 1981-2015. An ARDL

model was developed and estimated. Results show that both in the long run and short-run, growth in real gross domestic products and external reserves accretion increased demand for agricultural import. Conversely, depreciation of exchange rates and improved capacity of agricultural products processing decreased demand for agricultural import. Metu, Okeyika, and Maduka (2016) evaluated food security situation in Nigeria from 1991 to 2015 using descriptive statistics. Findings show that Nigerian population growth at the rate of 3.2% while the growth in food production has been less than one. Thus, domestically produced food in Nigeria falls short the growth in the population, this shows that demand for food (population) is greater than the domestic production and supply and Nigeria has to depends on food importation to augment domestic food production.

Pawlak and Kołodziejczak (2020) examined the role of agriculture in ensuring food security. The study was conducted to cover one-hundred developing countries using data that covers 2016 – 2018. The method of comparative analysis was utilized in the course of executing the study. The paper pointed out that increased investments in agricultural infrastructure and extension services coupled with employing measures geared towards increasing the purchasing power of households, those in rural areas principally, seems to be the major stimulants for improvement in the quantity of food available and the access to food. Furthermore, Adeniyi and Adeyemo (2014) conducted a quantitative analysis of some selected food imports to Nigeria: rice, wheat and sugar; using descriptive statistics, regression and correlation analysis. Evidence indicates that variation in the quantity of the selected food items are explained by exchange rate, population, domestic food production index, national income and external reserves. Peters (2015) examined the relationship among population dynamics, savings and agricultural output in Nigeria from 1980 to 2014. The study adopted ordinary least square technique. He found that population dynamics affects savings negatively, and this affects investment in the agricultural sector, leading to low agricultural output. It is this poor yield in agricultural produced, emanating from the dynamic nature of the population that resulted into food insecurity that characterized the Nigerian economy. This partly explained the rise in food import bill in the country.

Okwori, Ajegi, Ochinyabo, and Abu (2015) examine the validation of the theory of Malthus within the period between 1982 and 2012. The study found out that population growth had no significant impact on economic development in Nigeria within the study period. Limiting the structure of the model to the tendencies of the Malthusian theory by using only agricultural production

and population growth. Okoh, Ojiya, & Chukwu (2017), researched on the impact of a growing population on agricultural output in Nigeria using annual time series data from 1986 to 2016. Employing the Johansen co-integration test, the study discovered a long-run relationship between agricultural production and population growth in Nigeria. The study also discovered an indirect relationship between agricultural output which was used as the dependent variable, and population growth rate.

To validate the Malthusian postulation in Nigeria; Sakanko and David (2018) used time series data covering the period from 1960 to 2016. The study used food production, agricultural land, population growth rate and growth in the agricultural sector of the economy as its variables. Employing the Bounds test for the long-run relationship among the variables, and ARDL to estimate the long and short run dynamics of the variables, it was discovered that in the long-run, population growth and food production move proportionately while population growth poses a depleting effect on food production in the short-run, thus validating the incidence of Malthusian impact in Nigerian economy in the short-run. The Granger causality test further indicates the unidirectional relationship of causality moving from population growth rate to agricultural land.

Methodology

Theoretical Framework

This theoretical framework provides a basis for empirical research to investigate the relationship between population growth and importation of consumable goods in Nigeria within the contexts of Malthusian theory and dependency theory. Thus, Malthusian theory was specified as

$$P_t = P_o * e^{rt} \qquad (3.1)$$

Where P_t is the population at time t, P_o is the initial population, r is the population growth rate, and e is the base of the natural logarithm. This exponential growth model illustrates how population increases over time.

$$I_t = \alpha * P_t + \beta \qquad (3.2)$$

Where I_t is the level of importation of consumable goods at time t, P_t is the population at time t, and α and β are parameters representing the elasticity of imports with respect to population growth and a constant term, respectively. This equation suggests that importation of consumable goods increases with population growth, assuming a positive relationship.

Incorporating dependency theory to have equations two as import dependency:

$$D_t = y * X_t * \delta \qquad (3.3)$$

Where D_t is the import dependency index at time t, X_t is the level of exports (e.g., oil

exports) at time t, and y and δ are parameters representing the elasticity of import dependency with respect to exports and a constant term, respectively. This equation indicates that import dependency increases with exports, reflecting the structural dependence of Nigeria's economy on external markets.

Thus, Combining the Malthusian and dependency theories, we propose the following hypothesis:

$$I_t = P_t + y * X_t + \delta \qquad (3.4)$$

Where ϵtrepresents the error term capturing unexplained factors affecting importation of consumable goods.

Empirical Model Specification

Equation (3.4) is augmented to accommodate population growth and some other control variables so as to capture its effect on import demand. The functional form of the model is given below as:

$$FIMP = f(PG, GEXPA, RGDP, EXCH, INFL) \qquad (3.5)$$

Equation (3.5) implies that import demand is a function of population growth, government expenditure on agriculture, real GDP as well as exchange rate. By building an econometric model of the functional model above, the model is specified thus:

$$FIMP = \beta_0 + \beta_1 PG + \beta_2 GEXPA + \beta_3 RGDP + \beta_4 EXCH + \beta_5 INFL + \mu_1 \qquad (3.6)$$

Where, FIMP = Food importation; PG = Population growth; GEXPA = Government expenditure on agriculture (proxy for Nigerian domestic food importation); RGDP = Real gross domestic product; EXCH = Exchange rate; INFL = Inflation rate; μ = Disturbance term/error term; β_0 = Constant term and β_1 - β_5 are parameters to be estimated.

Apriori Expectation

FIMP/PG > 0, FIMP/GFCF > 0, FIMP/RGDP > 0, F IMP/EXCH < 0, FIMP/INFL< 0.

The above signifies a positive and negative relationship and movement of exogenous variables on importation of consumable goods

Estimation Technique and Procedures

A vector error correction model (VECM) model is designed for use with non-stationary series that are known to be cointegrated. Given the nature of the relationship of the variables, vector error correction model autoregressive and impulse response functions were adopted to explain the reaction of an endogenous variable to one of the innovations. Also, it describes the evolution of the variable of interest along a specific time horizon aftershocks in a given moment the cointegration term is known as the error correction term since the deviation from long-

run equilibrium is corrected gradually through a series of partial short-run adjustments.

3. Result Presentation and Discussions

The data used in the study are attached in the appendix section. For a better understanding of the nature of the series, we presented the descriptive statistics of the variables used for the analysis. This section also includes unit root test, co-integration test and error correction test results.

Stationarity Test

The ADF results comprising of the t- statistics and 5% critical value are represented in Table 4.1

Table 4.1: Unit Root Result

Variable	Adf test at level	Adf test at 1st Difference	5% critical values	Order of integration	Remarks
FIMP	-2.849099	-4.410522	-3.552973	1(1)	Stationary
PG	-1.215939	-11.04759	-3.529758	1(1)	Stationary
GEXPA	-1.440683	-5.735623	-3.526609	1(1)	Stationary
RGDP	-3.197465	-9.879882	-3.526609	1(1)	Stationary
EXCH	0.985092	-4.438754	-3.526609	1(1)	Stationary
INFL	-3.130094	-6.537386	-3.529758	1(1)	Stationary

Source: Authors' Computation Using Eviews 12

Decision Rule: Reject H_0 if ADF test value is greater than 5% critical value, otherwise accept. From Table 4.1, at first difference, the ADF test result shows that the value of food importation (FIMP); population growth (PG), government expenditure on agriculture (GEXPA), real GDP, exchange rate (EXCH) and inflation (INFL) are greater than their critical values at 5% respectively. Therefore, we reject H_0 of food importation, population growth, and government expenditure on agriculture, real GDP, exchange rate and inflation and then conclude that they are stationary at first difference. This implies that the variables of the model are integrated of order one.

Result of Co-integration test

Given that the series are integrated of order one, that is 1(1), Johansen co-integration approach is found worthy in ascertaining if there is a long run relationship existing between the variables of the model. According to the Johansen test of co-integration, the residuals of the supposed co-integrating regression is expected to be stationary at levels.

Table 4.2: Co-integration Results

Variables	Level of significance	Trace stat	Critical value	Prob
ECM	5%	151.8931	95.75366	0.0000

Source: Authors' Computation Using E views 12

From Table 4.2, the evidence that residuals are not stationary since the trace statistics (151.8931) is greater than the critical value at 5% (95.75366) or probability values less than 0.05, thus, our variables are co-integrated indicating long run relationship. We proceed to estimate the vector error correction model to ascertain the long run dynamics of the variables of the model.

Lag selection Criteria

Akaike information criterion and Schwarz criterion was used to ascertain the optimal autoregressive lag length that is suitable for the best model to adopt. It was stipulated that the best model to choose is the one with lowest Akaike information criterion and Schwarz criterion. The result shows model with auto redistributive lag length of one was selected; hence the variables are taken to their fourth lag in ascertaining if they have long run relationships. The result is shown on the appendix index.

Vector error correction model result

The satisfactory results obtained from the unit root and co integration tests motivated the estimation. The vector error correction model result of this study is presented in Table 4.3.

Table 4.3: VECM Long Run Result

Dependent Variable: D(FIMP)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
COINTI-EQU(ECT)	-0.215339	0.070117	-2.351261	0.0034
D(PG(-1))	-5.020394	1.555881	-3.064617	0.0005
D(GEXPA(-2))	3.185902	5.226085	2.328234	0.0037
D(RGDP(-2))	8.741072	3.205509	2.737327	0.0078
D(EXCH(-1))	-2.536825	0.552266	-2.759367	0.0407
D(INF(-2))	-6.176323	2.683228	-2.368493	0.0033
C	87.33164	52.99854	1.751531	0.0821
R-squared	0.892833	Mean dependent var		76.85923
Adjusted R-squared	0.729106	S.D. dependent var		258.6875
S.E. of regression	227.1292	Akaike info criterion		13.96218
Sum squared resid	1289692.	Schwarz criterion		14.55935
Durbin-Watson stat	2.088564			

Source: Authors' Computation Using Eviews 12

From Table 4.3, the coefficient of the constant is 87.33 which implies that if population growth, government expenditure on agriculture, real GDP, exchange rate and inflation are set equals to zero, food importation will increase by about 87.33%. The coefficient of population growth (PG) is -5.02, which implies that if all other variables are held constant, an increase in the population growth rate by one percent on the average, will lead to a decrease in food importation by about 5.02% point. The coefficient of government expenditure on agriculture (GEXPA) is 3.185, this suggest that all things being equal, as government expenditure on agriculture increases by one percent on the average, food importation will increase by about 3.18% point.

The coefficient of real GDP (RGDP) is 8.74, which implies that if all the other variables are held constant, an increase in the RGDP by one percent on the average leads to an increase in food importation by about 8.74% point. The coefficient of exchange rate (EXCH) is -2.53, this suggest that all things being equal, as exchange rate increases by one percent on the average, food importation will decrease by about 2.53%. More so, the coefficient of inflation rate (INFL) is -6.17, which implies that with the influence of all other variables held constant, an increase in inflation rate by one percent on the average, will lead to a decrease in food importation by about 6.17%.

The values of R^2 and adjusted R^2 from displayed in the regression table. It can be observed that multiple coefficient of determination (R^2) is given as 0.892. This means that about 89.2% of the variation in food importation is explained by changes in population growth, government expenditure on agriculture, real GDP, exchange rate and inflation. The remaining 10.8% is explained by other variables not included in the model. The adjusted R^2 is reported as the multiple coefficient of determination adjusted to take into account the degrees of freedom associated with the sum of squares. The adjusted R^2 is given as 0.729. This implies that about 72.9% of the fluctuations in the dependent variable food importation are jointly explained by the fluctuations in the explanatory variables.

Table 4.3 also shows that the Durbin-Watson (D-W) for the model is 2.08. While the result from Durbin-Watson (D-W) tabulated lower case (d_L) is equals to 1.160 and 1.222, Durbin-Watson (D-W) tabulated upper case (d_u) is equals to 1.803 and 1.726 respectively. Given the Durbin-Watson value shows that there is no evidence of autocorrelation or no autocorrelation with a first order scheme in the specified models.

Discussion of Findings

The negative impact of population growth on food importation is a suggestive of food

insecurity in Nigeria as earlier envisaged by Peters (2015); Oguntegbe et al. (2018); Owoo (2021). As population grows, there is often an increase in the capacity for domestic production of goods and services. This can lead to a reduced reliance on imports for certain products, as the country becomes more self-sufficient in meeting its own demands. However, these findings are essential because they stress the need to have population growth that will keep pace with food productivity. For instance, in the last few years in Nigeria, the level of hunger has increased as many families cannot feed themselves as a result of the hike in food prices. Several factors were responsible for the increase in prices, but two of these were notably more pronounced. This included scarcity of food occasioned by rising insecurity that scared away farmers, as well as the fact that most of the foods consumed in Nigeria were imported at exorbitant prices, thereby making them above the reach of the common person. The result is hunger and malnutrition. For example, the fear of Boko Haram Terrorists and banditry has become the beginning of wisdom in the northeast and northwest. High levels of violence have been reported throughout the areas, resulting in reduced agricultural activity, reduced displacement, and humanitarian access, with many people being relocated many times. This, along with much higher-than-average basic food costs, limits family buying power and access to food. As a consequence, most of the northwest and northeast experienced crises and emergencies.

Furthermore, since humanitarian access has deteriorated in recent years due to increasing violence and displacement, many families in hard to-reach locations face huge food consumption gaps, indicating excess mortality and acute malnutrition. The danger of famine will continue to exist as these people struggle to satisfy their food demands. According to current data, about 690,000 individuals have been relocated in the country's North-central and Northwest regions, interrupting family participation in traditional subsistence activities (FAO, 2021). The increase in the level of insecurity has been responsible for disruption in agricultural farming seasons in Nigeria as most farmers are prevented from being engaged in land preparation, planting, weeding, and harvesting. High input prices for products like better seeds, herbicides, and fertilizers have added to the insecurity issue, limiting agricultural development to a level that is now below average. Similarly, most families displaced in the northeast relied on host communities that are vulnerable to their basic needs as a result of insurgency. Thus, host communities became even more impoverished, exposing them to food insecurity and malnutrition. In addition, many farmers have been unable to carry out their

farming activities due to incessant attacks and constant looting, resulting in the loss of farm products, low harvests, productive assets, and low purchasing power. Between March and May 2020, at least 9.2 million people in the country have been confronted by various crises or worsened levels of food insecurity due to armed conflicts, Covid-19's effects, and climate change (FAO, 2021). Approximately 3.2 million of the total live in Yobe, Borno, and Adamawa states. Except for the adoption and implementation of strict humanitarian actions, the figure is expected to rise to over 12.8 million between June and August 2021, with 4.4 million living in the three northeastern states.

The relationship between government expenditure on agriculture and food importation was characterized as a complex interplay with both positive effects as demonstrated by the estimated results point an increased government expenditure on agriculture often leads to economic growth. When businesses invest in new capital, infrastructure, or technology, it can enhance productivity, create jobs, and stimulate overall economic activity. As the economy grows, there is typically an increased demand for goods and services, including imported ones. A thriving economy with increased investment tends to result in higher levels of consumer spending. This can lead to increased demand for both domestically-produced and imported goods. Consumers with higher incomes are more likely to have the means to purchase imported products. In many cases, domestic investment and import demand are complementary. For example, if a company invests in advanced manufacturing technology, it may need to import certain components or raw materials that are not readily available domestically. This relationship supports a globalized supply chain and allows for specialization and efficiency gains.

The negative and significant relation between exchange rate and food importation reflect on a country's currency depreciates (i.e., its value falls relative to other currencies), it makes imported goods more expensive for domestic consumers. This is because, with a weaker currency, it takes more of the domestic currency to buy the same amount of foreign currency needed to purchase imported goods. As a result, the prices of imported goods rise. Higher prices for imported goods tend to reduce the quantity demanded by domestic consumers. This is because consumers either switch to domestically produced alternatives (if available) or reduce their overall consumption of the imported goods. A weaker currency can lead to an increase in demand for domestically produced goods and services, as they become relatively cheaper compared to imports. This is known as the substitution effect. If the demand for imported goods is

inelastic (meaning that changes in price have a relatively small impact on quantity demanded), a depreciation of the currency may lead to a decrease in the value of imports but not a proportionate decrease in the quantity imported. This is because consumers may continue to buy some quantity of the imported goods despite the higher prices. A negative relationship between exchange rates and food importation can influence a country's trade balance. A depreciation of the currency, by reducing food importation and potentially increasing export demand (since domestic goods become cheaper for foreign buyers), can improve a country's trade balance. This is because exports may increase while imports decrease, leading to a reduction in the trade deficit. This finding is in line with the findings of Oluyemi and Isaac (2017) who found the magnitude of the impact of exchange rate changes on food importation depends on the price elasticity of demand for imported goods. If demand is very elastic (sensitive to price changes), a change in exchange rates will have a relatively large impact on the quantity demanded. Conversely, if demand is inelastic, the impact will be smaller.

The negative relationship between the inflation rate and food importation implies that as inflation rises, import demand tends to decrease. When inflation is high, the purchasing power of a country's currency decreases. This means that people can buy fewer goods and services with the same amount of money. As a result, consumers may reduce their spending on imported goods, which are likely to become more expensive due to the weaker currency. High inflation can erode the competitiveness of domestic products in the global market. A country's inflation rate is significantly higher than that of its trading partners; its goods become relatively more expensive compared to similar products produced in countries with lower inflation rates. This can lead to a decrease in demand for imports as consumers and businesses opt for cheaper domestic alternatives.

4. Conclusion and Recommendations

This study examined the impact of population on importation of consumables in Nigeria and concludes that population growth had a negative and significant impact on food importation in Nigeria. Specifically, government expenditure on agriculture had a positive impact on food importation. Real GDP also has a positive impact on food importation. Exchange as well as inflation impacted negatively to food importation in Nigeria. These findings are essential because they stress the need to have population growth that will keep pace with food productivity. Sequel to the findings of the study, the study recommends the following:

i. The government should consider an increase in budget allocation to the agricultural sector to boost food output. In addition, rewarding incentives should be given to all those willing to take up a career in agriculture, particularly the youth, thereby fast-tracking the current diversification drive of the government.
ii. Government should implement policies that foster economic growth, such as tax incentives for businesses, investment in infrastructure, and support for innovation. This will lead to an increase in real GDP, which in turn is likely to drive up import demand.
iii. Stimulate consumer spending by building policies that boost consumer confidence and increase disposable income, such as targeted tax cuts or direct stimulus payments, can lead to higher consumer spending. This increased demand for goods and services may be met through imports.
iv. Policy measures towards the stabilization of the exchange rates are highly recommended so that level of imports can be controlled and exports encouraged. Exports capacity should be enhanced through acquisition of improved technology and means of production; this will in turn further reduce the demand for imports. Deliberate policies targeted at diversifying foreign earnings should be introduced.

References

Abdullahi, S. A. (2021). Estimating the determinants of food import demand in Africa. Izvestiya *Journal of Varna University of Economics*, 2(65), 238-252

Abdulmalik, A., & Njiforti, P. P. (2018). Determinants of demand for agricultural import in Nigeria (1981-2015). *Dutse Journal of Economics and Development Studies* (Dujeds), 6(1), 144-153.

Abdulrahaman, S. (2013). Population growth and food security in Nigeria. *Arabian Journal of Business and Management Review,* 1(3):41-5

Adeniyi, O. R., & Adeyemo, B. A. (2014). A review of trends in import of some selected foods in Nigeria (1981-2010): Matters arising. *Natural Resources, 5*, 367-374.

Adetiloye, K.A. (2012). Agricultural financing in Nigeria: An assessment of the Agricultural Credit Guarantee

Scheme and Food Security in Nigeria. *Journal of International Economic Review, 3(1):39-48.*

Adofu I., Abula M., & Agama J. E. (2012). The effects of government budgetary allocation to agricultural output in Nigeria. *Sky Journal of Agricultural Research, 1,* pp 1 – 5

Ahlburg, D. A. (1996). Population growth and poverty. In D. A. Ahlburg, A. C. Kelley & K. O. Mason (eds.). *The impact of population growth on well-being in developing countries* (pp. 219–58). Berlin: Springer-Verlag.

Akinleye, S. O. (2009). Food demand in Northern Nigeria: Implications for food policy, *Journal of Social Sciences*, *18*(3), 209-215.

Akpan, E. O. (2009). *Oil resources management and food insecurity in Nigeria.* A Paper Presented at the European Report on Development Conference in Accra Ghana, 21st -23rd May.

Alberto, V. (1981). Food security for developing countries. A Westview Special Study. Westview Press, Colorado. Page 9-11, 25.

Alexandratos, N. & Jelle, B. (2012). World agriculture towards 2030/2050: The 2012 Revision. *ESA Working Paper.* Rome, Food and Agriculture Organization.

Amen, K. (2015). Population growth and food security in developing countries: *International Journal of Developing Economics, 15*(3), 180-1989.

Ayodotun, A. O., & Farayibi, A. (2016). *Modelling the determinants of import demand in Sub-Sahara Africa.* Retrieved from SSRN: https://ssrn.com/abstract=2828351 or http://dx.doi.org/10.2139/ssrn.2828351

Babatunde, R. O., Omotesho, O. A. & Shototan, O. S. (2007). Socio-economic characteristics and food security status of farming households in Kwara State, North-Central Nigeria. *Pakistan Journal of Nutrition*, 6(1), 49-58. DOI:10.3923/pjn.2007.49.58

Babatunde, B. O. & Ajayi, S. O. (2010). Food crisis and population growth in Nigeria. *Manager Journal, Faculty of Business and Administration, University of Bucharest, 11*(1), 180-187

Baiyegunhi, L. J. S., & Sikhosana, A.M. (2012), An estimation of import demand function for wheat in South

Africa: 1971-2007. *African Journal of Agricultural Research, 7*(37), 5175-5180. https://doi.org/10.5897/AJAR11.2053

Boussard, J. Daviron, B. & Volturiez, T. (2006). Food security and agricultural development in sub-Saharan Africa. *Working Paper No. 01/E* International Corporation Centre of Agricultural and Development (CIRAD).

Central Bank of Nigeria (2019). *Annual Statistical Bulletin*. Retrieved from https://www.cbn.gov.ng/documents/Statbulletin.asp

Christiaensen, L., Demery, L., & Kuhl, J. (2010). The evolving role of agriculture in poverty reduction: An empirical perspective. *WIDER Working Paper 2010/36.* http://www.wider.unu.edu/publications/workingpapers/

Clover, J. (2003). Food security in sub-Saharan Africa. *African Security Review, 12*(1), 5-15.

Conway, G. (2012). *One billion hungry: Can we feed the world?* New York, Cornell University Press.

D'Odorico, P., Carr, J. A, Laio, F., Ridolfi, L., & Vandoni, S. (2014). Feeding humanity through global food trade. *Earth's Future, 2,* 458–469. doi: 10.1002/2014EF000250

Eastwood, R. & M. Lipton (2001). Demographic transition and poverty: Effects via economic growth, distribution and conversion. In N. Birdsall, C. Kelley & S. W. Sinding (eds.), *Population matters: Demographic change, economic growth and poverty in the Developing World (*pp. 213–59). Oxford: Oxford University Press.

Ewugi, M. S. (2012). Malthusian population theory and the Nigerian economy: A political economy approach. *International Journal of Human Resources Studies*, 2(4), 197-206.

FAO (2008). The state of food insecurity in the world: High food prices and food security threats and opportunities. Rome.

FAO (2009). *How to feed the World in 2050.* Rome, Italy: Food and Agriculture Organization

Fayeye, T. R. & Ola, D. J. (2007). Strategies for food security and health improvement in the sub-Saharan Africa. *World Journal of Agricultural Sciences*, *3*(6), 808-814.

Harvey, A., & Sedegah, D. (2011). Import demand in Ghana: Structure, behaviour and stability. *African Economic Research Consortium, Research Department (AERC) Paper.* Nairobi, 233, 1-27.

Hemphill, W. L. (1974). The effects of foreign exchange receipts on imports of less developed countries. *IMF Staff Papers.*

Hungale, L. S. & Sherman, R (1979). Food and economics. Avi Publishers. https://www.econbiz.de/Record/food-and-economics-hungate-lois-simonds/10004713572

Hyuha, T. S., William, E. & Grace, B. K. (2017). Determinants of import demand of rice in Uganda. *International Journal of Applied and Pure Science and Agriculture* (IJAPSA), 3(3), 75-81.

Iwuchuku, J. C. & Igbokwe, E. M. (2012). Lessons from agricultural policies and programmes in Nigeria. *Journal of law,Policy and Globalization*, 5.

Iyoha, M. (2002), Macroeconomics: Theory and practice. Benin: Mareh Publishers, pg:42, 221

Lipsey R. G. etal. (1993). *Economics, Tenth Edition*. United Kingdom: Harper Collins College Publishers.

Malthus, T. (1998). *An easy on the principle of population.6th ed.* London: John Mury.

Mapfumo, A. (2012). Agricultural expenditure for economic growth and poverty reduction in Zimbabwe. *Unpublished Thesis*, University of Fort Hare, Zimbabwe.

Maxwell, D. & K. Wiebe, (1998). Land tenure and food security: A review of concepts, evidence, and methods. *Land Tenure Center Research Paper No. 129.* Madison: LTC.

Metu, A. G., Okeyika, K. O., & Maduka, O. D. (2016). *Achieving sustainable food security in Nigeria: Challenges and way forward.* Third International Conference on African Development Issues (CU-ICADI 2016)

Moran, C. (1989). Imports under a foreign exchange constraint. The World Bank Economic Review, 3(2), 279-295. *Lafia Journal of Economics and Management Sciences*: Volume 6, Issue 2; 2021

Ogundele, F. (2007). Trade liberalization and import demand for rice in Nigeria: A

dynamic modelling. *Journal of Rural Economics and Development,* 16(1), 34-45.

Oluyemi, O., & Isaac, E. D. (2017). The effect of exchange rate on imports and exports in Nigeria from January 1996 to June 2015. *International Journal of Economics and Business Management*, *3*(2), 66-77.

Onime, B. E. (2017). Insecurity and economic growth in Nigeria: A diagnostic review. *European Scientific Journal, 14*(4), 377-391.

Onu, D. O., Simonyan, J. B., & Onyenweaku, C. E. (2017). Determinants of rice production and import in Nigeria (1970-2016): An application of co-Integration and error correction model. *FUTO Journal Series (FUTOJNLS)*, 3(2), 16-34.

Organization of Petroleum Exporting Countries (2016). Annual Statistical Bulletin, Helferstorferstrasse 17, A-1010, Vienna, Austria.

Oriole, E. D. (2009). A Framework for food security and poverty reduction in Nigeria. *European Journal of Social Sciences, 8*(1),132-139.

Pesaran, M., & Shin, Y. (1999). *An autoregressive distributed lag modelling approach to cointegration analysis*. London: Cambridge University Press

Peters, N. (2015). Population dynamics, savings and agricultural output in Nigeria. *Social Science Journal*, 8(2):98-107

Porkka, M., Guillaume, J. H. A., Siebert, S., Schaphoff, S., & Kummu, M. (2017). The use of food imports to overcome local limits to growth. *Earth's Future, 5*, 393–407, doi:10.1002/2016EF000477

Prajal, P., Matthias K. B., Dominik E., & Juergen, P. (2014). Food self-sufficiency across scales: How local can we go? *Environmental Science and Technology, 48*, 9463−9470 dx.doi.org/10.1021/es5005939

Rahji, M. Y., & Adewumi, M. O. (2008). Market supply response and demand for local rice in Nigeria: Implications for self-sufficiency policy. *Journal of Central European Agriculture, 9*(3), 567-573.

Rijsberman, F. (2012). Forsight in the action plan to update the strategies and results framework of CGIAR. *CGIAR Consortium.* Retrieved from https://cgspace.cgiar.org/server/api/c

ore/bitstreams/6dbd5d67-f3ac-4eca-9cf1-83dc0281fc1d/content

Safoulanitou, L. N., & Ndinga, M. M. (2010) An empirical analysis of the determinants of food import in Congo. *African Economic Research Consortium, Nairobi. AERC Paper* Nairobi, 233, 1-27

Wilson, G. & Wilson, K. (2010). Food security in Nigeria: Trend, constraint and prospects. *Journal of Social Science and Development*, *1*(2), 133-140.

Wilson, G. & Wilson, K. (2013). Food security and national development. *Journal of Social Sciences and Development, 1*(4): 316-325.

World Bank, (2000). *Can Africa claim the 21st Century?* Washington D.C: World Bank.

Yusuf, W. A., Yusuf, S. A., Adesope, A. A. A., & Adebayo, O. Z. (2020). Determinants of rice import demand in Nigeria. *Journal of Applied Sciences and Environmental Management,* 24(5), 923-931.

Zakaree, S. (2014). Domestic food supply in Nigeria: Effectiveness of government spending. *JORIND, 12*(2), pp 1596-8308.