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Agricultural Development and Food Importation in Nigeria: An Insight towards Achieving Food Security

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ABSTRACT
Achieving food sufficiency is paramount for any economy. In this paper, we examined the effect of agricultural productivity on food importation in Nigeria for the period 1981 to 2019. The study utilized the augmented Dickey-Fuller (ADF) and the Philip-Peron (PP) unit root test to ascertain the stationarity property of the time series variable; Phillips-Ouliaris Cointegration Test for long-run relationship; and the Fully Modified Ordinary Least Squares (FMOLS). The FMOLS was utilized because its estimate introduces appropriate correction to the coefficients and the validity of the t-test for long-run estimates is guaranteed. The result of the unit root test revealed that all the variables are stationary at first difference. Meanwhile, the Phillips-Ouliaris Cointegration Test validated that there is a long run relationship between food importation and agricultural productivity in Nigeria. From the result, derived from the FMOLS, agricultural productivity exerted a negative and significant impact on food importation in Nigeria. The implication of the findings is that as the country boost its agricultural production, the rate of food importation will be drastically reduced. Therefore, policies should be geared towards stimulating the agricultural sector so as to achieve food sufficiency in the country.
KEYWORDS: *Food Security; Food Importation; Agricultural Productivity; FMOLS.*

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I. INTRODUCTION

It is a universally accepted fact that food security entails the totality of the population having "access to adequate diet at any point in time to live an active and healthy life" (Christiansen, Boisvert & Hodinott, 2000; Abdullateef & Ijaiya, 2010). It follows that achievement of food security entails not only availability of food, but also on the access and utilization of available food (Chung, Haddad, Ramakrishna & Riley, 1997). As a result, the food-insecure economy is at risk of losing availability, which is determined by total food supply, access to food, which is determined by farm-gate pricing, and utilization, which is determined by nutritional content. Apart from natural reasons, the most major limiting factors to food security are excessive inflation, exchange rate mismatch decreasing terms of trade, and the withdrawal of subsidies on agro-allied inputs, which have not only hampered availability but also restricted access (Garrett, 2000). Other reasons may include agricultural resource availability, insufficient infrastructure, and population considerations (Ayres and McCalla, 1996).

The agriculture sector is critical to increasing food supply and achieving food stability (Smutka, Steininger & Miffek, 2009; Otsuka, 2013; Smutka, et al., 2015; Wegren & Elvestad, 2018). Although there is widespread consensus on the increased global demand for food anticipated in the coming decades, there is doubt on global agriculture's ability to meet this demand through increased food production (Cook, et al., 2011). Better food provision assured by rising farm production and broadening the spectrum of agricultural land use seems to be a viable means of eradicating hunger (Stocking, 2003; Smyth & Phillips, 2015).

It has been reported that by 2050, demand for food will rise 70 percent; Meanwhile, Nigeria's capacity to increase food production is declining (Hobbes, 2011). Climate change, high oil prices and increasing world population, among others things, are changing the world food system and could provoke major food crisis as happened in 2008. In 2007 and early 2008, increased demand on food supply caused the price of food to rise (Astou, 2015).

Between February 2007 and February 2008, the world market price of wheat more than quadrupled, reaching a peak of more than US $10 a bushel (World Crisis, 2015). Rice prices have also risen to ten-year highs. In 2007, the cost of food imports for developing nations increased by an estimated 25% (Astou, 2015). Many nations experienced huge social and political problems when food prices surged to record heights between 2007 and 2008. Food riots and uprisings in Africa have put governments and societal stability at jeopardy.

Massive public protests erupted in a variety of nations, including Burkina Faso, Cameroon, Egypt, Guinea, Haiti, Indonesia, and Senegal, in reaction to rising food prices. One of the most serious concerns threatening Africa's food security is population increase. This is because the amount of food necessary to effectively feed Africa, particularly Sub-Saharan Africa, has grown dramatically as a result of population expansion (Astou, 2015). Even if couples have substantially fewer families in the future decades, Sub-Saharan Africa's population is expected to more than quadruple from 856 million in 2010 to almost 2 billion in 2050. (United Nations Population Division, 2011).

Unfortunately, population increase is not proportionate to the amount of food produced to feed the same population, therefore countries must rely on food imports to meet their needs. Africa as a continent is now somewhat dependent on food imports, although a growth in food imports sufficient to compensate seems doubtful (Astou, 2015). This is due to global population increase as well as more strained contemporary agriculture systems that rely heavily on non-renewable resources. Because of the growing global population, country governments will reduce food exports in order to fulfil domestic food demand. Declining non-renewable resources, on which the agricultural sector is dependent, will raise food costs and diminish yields, both of which will contribute to lower global food production and less options for food imports to Africa in general and Nigeria in particular (Seileir, 2011).

Increasing reliance on imports for food consumption is not only wasteful, but also damaging to the overall growth and future of the nation's agricultural industry (Vaughan, Afolami, Oyekale & Ayegbokiki, 2014). When food items that a country has a competitive advantage in producing are imported, the situation deteriorates. Furthermore, food importation is more harmful in a country with a high comparative corruption perception score (Vaughan, et al., 2014). This is because the invoices paid might be routed into the wrong accounts, resulting in no commodity being supplied at the conclusion of the process. In this regards, a new policy of agriculture was set up in the country to achieve set objectives.

These are: achieving sufficiency in basic food supply and food security; increasing export crop production and processing via enhanced production and processing technology; increasing agricultural raw materials for industries; creating meaningful agricultural employment; to achieve rational agricultural resource usage, enhanced agricultural resource protection against drought, desert encroachment, soil erosion, and flood, and general environmental preservation for the sustainability of agricultural production; to promote expanded application of modern technology to agricultural production; and to improve the quality of life of the citizens in the rural areas (Vaughan, et al., 2014).

The policy objectives outlined above suggest that the agricultural sector should be vibrant enough to support the food security aim. This cannot be true of the sector that has resulted in massive food importation. Various derogatory terms have been used to disparage food imports. As pointed out by Vaughan et al. (2014), "a country that cannot feed its population is not as independent as it believes". Furthermore, food importation is an impediment to sustainable agricultural productivity and food security and if uncontrolled, are harmful to the economy.

Nigeria is a net importer of several staple foods like ice, sugar, wheat flour, fish, milk, and other goods fall into this category. A casual examination of the many agricultural production-targeted strategies and programs of governments reveals that food imports should be decreasing. Meanwhile, food importation has been on the rise. This has made the United States Department of Agriculture in 2012 to posit that "Africa has evolved from being an exporter of agricultural produce to becoming a net importer of food" (Akanle, Yusuff, Busari & Adedeji, 2013). The breakdown of the various components of the value of food imports is presented in Table 1A.

Table 1A: Average Volume of Food Imports by Categories (₦' billion)

Year	Food and Live Animal	Beverages and Tobacco	Animal and Vegetable Oils and Fats	Total
1981 - 1985	1.55434	0.01534	0.1315	1.70118
1986 -1990	2.03014	0.09918	0.1223	2.25162
1991 - 1995	26.405	0.99958	2.53154	29.93612
1996 - 2000	99.0811	4.33738	11.2996	114.71808
2001 - 2005	175.632	18.372	37.032	231.036
2006 - 2010	387.19	37.8338	71.1239	496.1477
2011 - 2015	1,110.63	796.659	77.4744	1,984.7634
2016 - 2019	639.594	1872.17	139.895	2,651.659

Source: Central Bank of Nigeria Statistical Bulletin, 2019.

From Table 1A, it can be observed that the value of food import in the 1980s and early 1990s were not as much as in the late 1990s and 2000s. In the 1980s and 1990s, the value of food imports averaged ₦1.70 billion between 1981 and 1985; ₦2.25 billion between 1986 and 1990; ₦29.94 billion between 1991 and 1995; and ₦114.72 billion between 1996 and 2000. In the 2000s, the value of food imports averaged ₦231.04 billion between 2001 and 2005; ₦496.15 billion between 2006 and 2010; ₦1984.76 billion between 2011 and 2015; and ₦2651.66 billion between 2016 and 2019.

Meanwhile, the value of food production in the 1980s and 1990s averaged ₦2446.80 billion between 1981 to 1985; ₦3168.75 billion between 1986 to 1990; ₦3765.27 billion between 1991 to 1995; and ₦4491.82 billion between 1996 to 2000. In the 2000s, the value of food production averaged ₦7922.40 between 2001 and 2005; ₦11641.11 between 2006 and 2010; ₦14768.44 between 2011 and 2015; and then ₦17322.39 between 2016 and 2019. The details of the various food production by categories is presented in Table 1B.

Table 1B: Average Food Production by Categories (₦' billion)

Year	Crop Production	Livestock	Fishing	Total
1981 - 1985	1906.91	384.69	78.82	2446.80
1986 -1990	2575.59	442.94	69.61	3168.75
1991 - 1995	3139.33	465.51	82.18	3765.27
1996 - 2000	3769.00	526.65	112.05	4491.82
2001 - 2005	7034.84	632.21	162.52	7922.40
2006 - 2010	10431.49	865.97	222.21	11641.11
2011 - 2015	13250.58	1048.25	315.31	14768.44
2016 - 2019	15574.98	1201.88	365.73	17322.39

Source: Central Bank of Nigeria Statistical Bulletin, 2019.

However, the agricultural sector has been receiving some degree of financing over the years. The commercial bank advances some loans to the sector in order to promote productivity. For instance, total commercial bank loans and advances to the agricultural sector increased from ₦0.59 billion in 1981 to ₦4.22 billion in 1990. Meanwhile, the trend in agricultural loans and advances increased to a record high of ₦4.03 billion in 2000; with a further rise to ₦128.41 billion in 2010. As at 2019, total commercial bank loans and advances to the agricultural sector was ₦680.03 billion (CBN, 2019). The average commercial bank loans and advances to the agricultural sector is presented in Table 2.

Table 1B: Average Food Production by Categories (₦' billion) and Agricultural Loans

Year	Commercial Bank Loans and Advances to Agricultural Sector	Value of Total Food Production
1981 - 1985	0.94	2446.80
1986 -1990	3.00	3168.75
1991 - 1995	13.16	3765.27
1996 - 2000	32.09	4491.82
2001 - 2005	58.82	7922.40
2006 - 2010	113.89	11641.11
2011 - 2015	368.70	14768.44
2016 - 2019	572.72	17322.39

Source: Central Bank of Nigeria Statistical Bulletin, 2019.

Another key issue that should be considered is the rising population of the country. Based on World Bank database on world development indicators, the Nigerian population over the years have been growing at a two-points basis. In 1981, the population grew by 2.71% and since then, the population has maintained the two-points range up till 2019 where the population grew by 2.62%. This trend is portrayed in Figure 1.

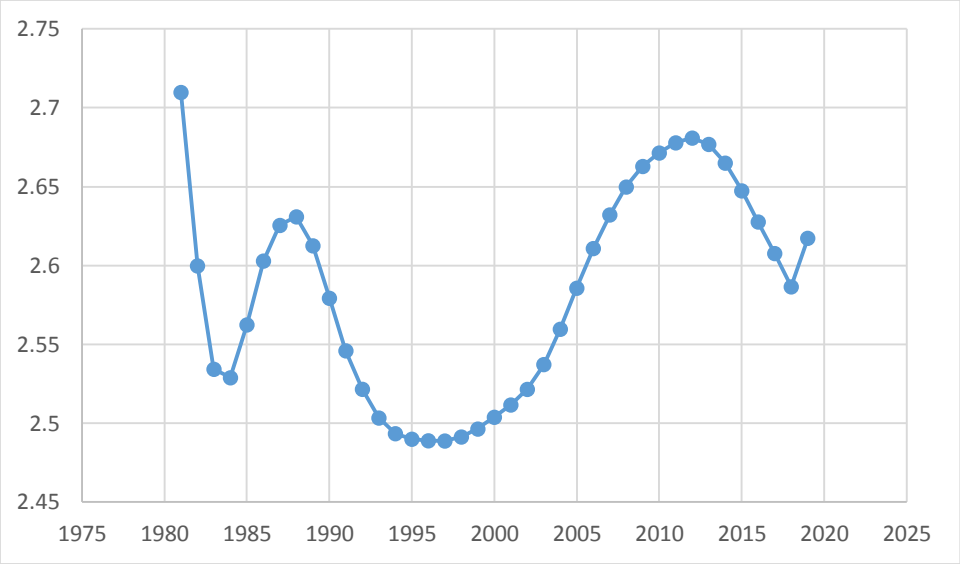

Figure 1: Growth Rate of Nigerian Population (1981 to 2019)

Figure 1 portrays the growth rate of the Nigerian population over the period of 1981 to 2019. It is observed that the growth rate of the population declined in the early 1980s (1981 to 1984) but took an upward trend in the late 1980s (1985 to 1989). Thereafter, a decline in the growth rate of population was experienced between 1990 to 1997 but further increased up to the period of 2012. The growth rate of the Nigerian population declined between 2013 to 2018. Then, a slight increase was observed in 2019. Following the pattern in the diagram, it can be adduced that this upward trend will continue for some time.

Key questions that may arise from the above include: does agricultural productivity influence food importation in Nigeria? Is agricultural financing having any influence on food importation in Nigeria? What is the effect of population growth on food importation in Nigeria? It is on this ground that this paper seeks to examine the effect of agricultural productivity on food importation in Nigeria. The specific objectives are:

i. To examine the effect of agricultural productivity on food importation in Nigeria.
ii. To ascertain the effect of agricultural financing on food importation in Nigeria.
iii. To investigate the effect of population growth on food importation in Nigeria.

Based on the specific objectives, the following null hypothesis will be tested:

i. There is no significant effect of agricultural productivity on food importation in Nigeria.
ii. There is no significant effect of agricultural financing on food importation in Nigeria.
iii. Population growth do not exert any significant effect on food importation in Nigeria.

The paper is structured in five sections. Introductory part of the paper is followed with section 2 which is the literature review. In this section, both the theoretical and empirical literature are duly reviewed. In section 3, the methodology of the research is captured; while in section 4, the empirical findings of the study are presented. Finally, section 5 of the research portrays the conclusion and recommendation of the research.

II. REVIEW OF RELATED LITERATURE

The theoretical basis of this study centres on the Malthusian Population Theory as it relates to the world's hunger problem and the challenge to feed the world sustainably. Maslow (1954) noted that the need to relieve hunger and thirst is among the fundamental needs and is necessary for human survival in his 'classification of needs by urgency and intensity'. Malthus argued in "An Essay on the Principle of Population, as It Affects the Future Improvement of Society", that population growth increases geometrically, beyond measure, although food production increases only in arithmetic terms (Malthus, 1798). 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).

Despite its fit with the reality of the industrial revolution, the Malthusian hypothesis was faced with harsh criticism. The primary weakness of the Malthusian solution was a failure to recognize technical advancement that enabled food production growth without the need for new land resources (Pawlak & Kołodziejczak, 2020). This problem was resolved by Boserup, who discovered that, due to inventions and

technical advancement, food supply was increasing faster than population size (this phenomenon is known as the Boserupian model), avoiding the 'Malthusian catastrophe' (Boserup, 1981).

The 'Malthusian population theory', established at the end of the 18th century, has been shown to be completely incorrect (see Smith, 1951; Foster & Leathers, 1999). Furthermore, since the 18th century, food production has almost always grown faster than population growth (Dowd, 2009). Nonetheless, there are currently over 800 million people who are malnourished (FAO, 2020). As a result, the issue of the root causes emerges. Poleman (1981) claims that food production has been increasing much faster than the global population, but only in developing countries. In developed countries, this was not the case. Though food production volume grew in these countries, the growth rate was usually similar to population growth (Pawlak & Kołodziejczak, 2020).

Furthermore, it has become increasingly volatile. Poleman (1981) believes that low wealth is one of the primary causes of malnutrition. Numerous research on the relationship between income and food intake show a promising relationship (Cirera & Masset, 2010; Rask & Rask, 2011; Skoufias, Di Maro, González-Cosso, & Ramirez, 2011). Several scholars, like Sen (1999), have stressed the importance of increasing the buying power of households in developing countries in order to reduce hunger and boost food security. Engel's rule, which established that household demand for food rises less than proportionally to income rise, laid the groundwork for this debate (Pawlak & Kołodziejczak, 2020). As a result, shifts in income distribution are critical when forecasting food demand growth. Faster income growth in developing countries and households could be matched by faster growth in food demand in the short and medium term, because as poorer households' income increases, greater portions of their expenditure become available for food consumption (Cirera & Masset, 2010).

Abdullateef & Ijaiya (2010) studied the effect of agricultural liberalization on Nigeria's food security using the Computable General Equilibrium Model. The paper pointed out that irrespective of the fact that several policy actions to boost food production has been put in place, there have been disequilibrium in the demand and supply of food, with demand surpassing the supply. Their paper revealed that domestic food supply accounted for approximately 95 percent of aggregate food need and only 9 percent of the overall changes in aggregate domestic food need is accounted for by the imported food components. Meanwhile, approximately 4.5 percent of the overall changes in the domestic food requirement is explained by the lagged domestic food supply. The result pointed out that within the study period, domestic food production did not give room for food insecurity. Measures to guard against the detrimental effects of trade liberalization on domestic food security, such as "recognition and empowerment of large target farmers as strategic food growers", were proposed.

Vaughan, et al. (2014) embarked on the analysis of food imports and bills under the Nigerian situation. The study employed secondary data which spans through 1990 to 2010. The study utilized trend analysis and simple linear regression model. Findings of the study showcased that though the country had positive aggregate balance of trade, annual food import bill was five times that of the export. The study also revealed that average value of imports has a positive and significant effect on value of total food imports over the years. Introducing a time trend variable into the model, it was also observed that time is not a major determinant of imports. It was further observed that the country's foreign reserves have a positive and significant linear relationship with food importation.

Just of recent, Pawlak & 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.

III. METHODOLOGY

3.1. Basic Research Design

This study employs an econometric approach of multiple regression analysis to examine the effect of agricultural productivity on food importation in Nigeria. the data were obtained from secondary sources and were analysed using an econometric software package.

3.2. Model Specification

In examining the effect of agricultural productivity on food importation in Nigeria, the model for the study is specified as follows:

FIMP = *f*(AGRQ, PCIN, POPG, AGRL, EXCR) - - - - - (1)

Where:

FIMP = food importation

AGRQ = agricultural output (a proxy for agricultural productivity)

PCIN = per capita income (representing the income per head of the total population)
POPG = the growth rate of total population
AGRL = agricultural loans (representing agricultural financing)
EXCR = exchange rate
Linearizing Equation (1) and transforming it into an estimable form,

$$logFIMP_t = \beta_0 + \beta_1 logAGRQ_t + \beta_2 logPCIN_t + \beta_3 POPG_t + \beta_4 logAGRL_t + \beta_5 EXCR_t + \varepsilon_t ---------------------(2)$$

Where the β's are the parameters to be estimated; log represents the natural logarithm; t represents time; and ε is the random error term.

3.3. A Priori Expectation

The a priori expectation of the parameters is discussed as follows:

i. The β_1 is expected to be negative ($\beta_1 < 0$). This is because as agricultural productivity is boosted, domestic food production is increase thereby reducing the incentive to import food into the country.

ii. The β_2 is expected to be positive ($\beta_2 > 0$). This is because increased per capita income may propel greater demand for foreign food.

iii. The β_3 is expected to be positive as well. This can be linked to the Malthusian population theory, where he asserted that "population can grow beyond the means of subsistence" (Malthus, 1798). As such, rising population may pose the challenge of domestic food sufficiency which therefore prompts the need for food importation to augment domestic production.

iv. The β_4 is also expected to be negative. This is because financing agriculture will boost food production, which tantamount to food sufficiency, leads to reduction in the volume of food importation.

v. The β_5 captures the ratio of the domestic currency with the foreign currency. If this ratio is high, it implies that more of the domestic currency will be required to purchase good in the foreign country. Thus, importation will be low when the ratio is high; but will be high if the ratio is low.

3.4. Technique of Analysis

The technique of analysis employed in this study include the unit root test, cointegration test, and the Fully Modified Ordinary Least Squares (FMOLS) technique.

3.4.1. Unit root test

The unit root test is carried out using the augmented Dickey-Fuller and the Phillip-Peron unit root test. The test equation is specified for the variables as follows using the constant assumption.

$$FIMP_t = \varphi_0 + \delta_1 FIMP_{t-1} + \sum_{j=1}^{j} \beta_j \Delta FIMP_{t-j} + \varepsilon_{1t} ----------(3)$$

$$AGRQ_t = \varphi_0 + \delta_1 AGRQ_{t-1} + \sum_{j=1}^{j} \beta_j \Delta AGRQ_{t-J} + \varepsilon_{2t} ---------- (4)$$

$$PCIN_t = \varphi_0 + \delta_1 PCIN_{t-1} + \sum_{j=1}^{j} \beta_j \Delta PCIN_{t-J} + \varepsilon_{3t} ----------(5)$$

$$POPG_t = \varphi_0 + \delta_1 POPG_{t-1} + \sum_{j=1}^{j} \beta_j \Delta POPG_{t-J} + \varepsilon_{4t} ---------- (6)$$

$$AGRL_t = \varphi_0 + \delta_1 AGRL_{t-1} + \sum_{j=1}^{j} \beta_j \Delta AGRL_{t-J} + \varepsilon_{5t} ---------- (7)$$

$$EXCR_t = \varphi_0 + \delta_1 EXCR_{t-1} + \sum_{j=1}^{j} \beta_j \Delta EXCR_{t-J} + \varepsilon_{6t} ---------- (8)$$

Equation (3) to Equation (8) are the model of the unit root test for food import, agricultural output, per capita income, population growth rate, agricultural loans, and exchange rate, respectively. The null hypothesis is that each of the variables contains a unit root. The δ_1 is subjected to a τau test (τ-statistic) which is based on the null hypothesis that $\delta_1 = 1$ against the alternative that $\delta_1 \neq 0$. If the test statistic is statistically significant at the 5% level, then we can conclude that there is no unit root test otherwise, unit root exists.

3.4.2. Cointegration Test

Since we have observed from the pre-estimation diagnostic test that the variables are stationary at first difference, I(I), it is deemed fit to ascertain if at least a linear combination of these variables exists. That is, to ascertain if a stable and non-spurious linkages exist among the variables of interest (Miguel, 2000). In examining such a long run relationship between agricultural productivity and food importation in Nigeria, this study employs the Phillips-Ouliaris Cointegration test developed by Philip and Ouliaris (1990). The test is conducted based on tau-statistic and the z-statistic. The significance of these statistics implies that there is cointegration otherwise, cointegration does not exist. Normally, it is expected that the ADF distribution would apply under the Engel-Granger approach but Phillips and Ouliaris (1990) posited that the ADF and PP unit root tests applied to the estimated cointegrating residual do not have the usual DF distributions under no cointegration.

3.4.3. Fully Modified Ordinary Least Square (FMOLS)

The FMOLS approach generates accurate predictions for small sample sizes and checks the effects for robustness. Philips and Hansen (1990) proposed the original FMOLS procedure for estimating a single co-integrating relationship involving variables that are stationary at first difference. The FMOLS method has an advantage over Engel-Granger techniques in that it incorporates appropriate corrections to avoid the inference problem that plagues the Engel-Granger method, and thus the t-test for long-run estimates is valid (Himansu, 2007). The Fully Modified Ordinary Least Squares (FMOLS) method employs "Kernal estimators of the Nuisance parameters that influence the OLS estimator's asymptotic distribution" (Himansu, 2007). This methodology modifies least squares to allow for serial correlation effects and tests for endogeneity in the regressors that results from the presence of "Cointegrating Relationships in order to achieve asymptotic efficiency" (Rukhsana and Shahbaz, 2008).

IV. EMPIRICAL RESULTS

4.1. Descriptive Statistics

The descriptive statistic of the variables is presented in Table 3.

Table 3: Descriptive Statistics

	logFIMP	logAGRQ	logPCIN	POPG	logAGRL	EXCR
Mean	4.386	8.746	10.549	2.583	3.399	102.59
Median	4.903	8.484	10.735	2.586	3.714	109.55
Maximum	8.256	9.795	13.398	2.709	6.522	306.96
Minimum	-0.060	7.742	6.528	2.488	-0.526	0.630
Standard Deviation	2.727	0.705	2.146	0.067	2.135	92.59
Skewness	-0.296	0.138	-0.243	0.049	-0.273	0.783
Kurtosis	1.673	1.468	1.640	1.725	1.925	3.000
Jarque-Bera	3.428	3.935	3.3886	2.657	2.361	3.990
Probability	0.180	0.139	0.183	0.264	0.307	0.130
Observations	39	39	39	39	39	39

Source: Authors' Computation

Form Table 3, the descriptive statistic of the variables in their transformed forms are presented. The mean of the log of food importation, representing the percentage change in food importation, averaged 4.389% with a standard deviation of 2.727. The distribution is negatively skewed (-0.296) and normally distributed since the probability of the Jarque-Bera statistic (0.180) is not statistically significant. Similarly, the percentage change in agricultural output is 8.746% with a standard deviation of 0.705%. the Jarque-Bera statistic is not statistically significant, implying that the distribution is normally distributed; while the distribution is positively skewed with a skewness coefficient of +138.

4.2. Unit Root Test

The result of the Augmented-Dickey Fuller unit root test and the Philip-Peron (PP) test is presented in Table 4. The estimation is done based on the constant assumption, and the optimal lag length is selected based on the Schwarz Information Criterion (SIC).

Table 4: The Augmented Dickey-Fuller (ADF) and Philip-Peron (PP) Unit Root Test Result

	Level			First Difference		
Variable	ADF	1% Critical Value	Lag Length	ADF	1% Critical Value	Lag Length
logFIMP	-0.479	-3.621	1	-8.05**	-3.621	0
logAGRQ	-0.079	-3.615	0	-5.907**	-3.621	0
logPCIN	-2.158	-3.615	0	-8.094**	-3.621	0
POPG	-2.207	-3.615	1	-4.674**	-3.621	0
logAGRL	-1.272	-3.615	0	-7.001**	-3.621	0
EXCR	0.745	-3.615	0	-5.442**	-3.621	0
Philip-Peron (PP) Test						
Variable	PP	1% Critical Value	Lag Length	PP	1% Critical Value	Lag Length
logFIMP	-0.363	-3.615	3	-7.961**	-3.621	3
logAGRQ	-0.08	-3.615	1	-5.906**	-3.621	1
logPCIN	-2.158	-3.615	0	-7.114**	-3.621	3
POPG	-2.33	-3.615	3	-4.379**	-3.621	3
logAGRL	-2.351	-3.615	14	-7.338**	-3.621	7
EXCR	1.228	-3.615	6	-5.417**	-3.621	3

** denotes significance at the 1% level

Given the unit root result, both the ADF and the PP test agree with each other that the all the variables are stationary at first difference. This is detected given the significance of the respective test statistic at the 1% level of significance. None of the variables are stationary at level and as such, there is need to ascertain whether a linear combination of the variables will yield can yield a stable result. This necessitate the execution of the cointegration test.

4.3. Phillips-Ouliaris Cointegration Test

Given that the series are all stationary at first difference, the Phillips-Ouliaris cointegration test is employed to ascertain the existence of any long-run equilibrium relationship in the model. The result is presented in Table 5.

Table 5: Cointegration Test Result

Phillips-Ouliaris tau-statistic	-5.96458	0.0099*
Phillips-Ouliaris z-statistic	-34.28584	0.0220*

* denotes significance at the 5% level

From the result of the cointegration test, both the Phillips- Ouliaris and Phillips-Ouliaris z-statistic are statistically significant at the 5% level. It follows that there exist some degree of long-run relationship between food importation and agricultural productivity in Nigeria within the study period. Thus, since cointegration exist, it follows that regressing the series which were all stationary at first difference will yield meaningful result. Meanwhile, to account for the stationarity of the variables at first difference, the study utilizes the Fully Modified Ordinary Least Squares (FMOLS).

4.4. Fully Modified Ordinary Least Squares (FMOLS)

The FMOLS approach is utilized because it will generate a valid t-statistic and the coefficients are duly adjusted to make them suitable for inferences. The result is presented in Table 6.

Table 6: FMOLS Result

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	0.0969	3.0300	0.0320	0.9747

logAGRQ	-2.0131	0.8000	-2.5162	0.0171*
logPCIN	1.3697	0.2648	5.1711	0.0000**
POPG	2.1624	2.2193	0.9743	0.3372
logAGRL	0.4699	0.2008	2.3403	0.0257*
EXCR	0.0022	0.0021	1.0201	0.3153
R-squared	0.9850	Adjusted R-squared		0.9827

* and ** denotes significance at the 5% and 1% level respectively

From the result presented in Table 6, it is observed that agricultural productivity has a negative and significant effect on food importation in Nigeria. The coefficient being negative tallies with a priori expectation that it should be negative. Going by its coefficient (-2.0131), it follows that a unit percentage increase in agricultural productivity will on the average reduce food importation by 2.0131% and vice versa. This finding implies that to curb food importation, there is need for domestic food production to be stimulated. This policy stance has been employed by the present General Buhari's led administration in rice production, especially. There have been ban on the importation of foreign rice while stimulating domestic production have received tremendous attention over the period.

Per capita income is observed to have a positive and significant effect on food importation. This also is in line with the a priori expectation. The coefficient (1.3697) implies that a unit percentage increase in per capita income would cause food importation to increase on the average by 1.3697% *ceteris paribus*. As income rises, the demand for foreign food may also increase, which is as a result of the desire for a higher standard of living emanating from a change in income level. It has been pointed out that faster income growth in developing countries and households could be matched by faster growth in food demand in the short and medium term, because as poorer households' income increases, greater portions of their expenditure become available for food consumption (Cirera & Masset, 2010).

Population growth and exchange rate exert positive, though an insignificant effect, on food importation in Nigeria. the positive effect of population growth on food importation is derived from the argument that as population grows, the domestic food demand would outrun the supply. The short-run action would be to import so as to augment domestic food production and bridge the gap between the demand and supply of food from the teaming population.

Agricultural loan (agricultural financing) is observed to exert a positive and significant effect on food importation in Nigeria. This finding has not met the a priori expectation that agricultural loans should have a negative effect on food importation. Agricultural financing could lead to improvement in agricultural production, which would in turn boost domestic food production. Meanwhile, the positive effect of agricultural financing and food importation can be linked to the argument that loans to farmers may not get to the farmers at the right time for them to finance their farming operations effectively. It can also be linked to the fact that agricultural production is subject to the vagaries of whether and climate (like flood and drought). As such, the desired output level may not be achieved in some period, irrespective of the volume of money that is pumped into the sector.

V. CONCLUSION AND RECOMMENDATION

It has been observed in this study that food security entails both the availability of food along with access and utilization of available food. Stimulating domestic food production is therefore pertinent in ensuring food security in any nation otherwise, the resort to food importation is inevitable. With growing population coupled with less proportionate increase in food supply, the issue of food sufficiency is eminent. This paper therefore studied the effect of agricultural productivity on food importation in Nigeria. It is a common sense that stimulating domestic food production will curtail the volume of food importation in any economy.

In our paper, we employed the unit root test, cointegration and Fully Modified Ordinary Least Squares (FMOLS) analysis. It was observed that the variables were all stationary at first difference. The Phillips-Ouliaris cointegration test revealed evidence of long-run relationship between agricultural productivity and food importation in Nigeria. The result from the FMOLS revealed key interesting findings. The first is that agricultural productivity exerts negative and significant effect on food importation in Nigeria. This finding is realistic being that if agricultural activities are stimulated, domestic food sufficiency will be achieved hence, food importation will be drastically reduced. The second finding is that population growth exerts positive, though insignificant effect, on food import in Nigeria. This is because, as projected by the Malthusian

population theory, as the population grows beyond the available food, the option of food importation is sacrosanct. The third key finding is that income generates positive and significant effect on food important in Nigeria. A rise in income level, in as much as there is money illusion, can drive up the demand for imported food. Meanwhile, agricultural loans (measuring agricultural financing) is observed to yield a positive and significant effect on food importation over the study period. This is contradictory to the normal situation where agricultural loans should stimulate agricultural productivity, which in turn should reduce food importation. Exchange rate was also observed to exert a positive and insignificant effect on food importation in Nigeria. Thus, the paper concludes that agricultural productivity is paramount towards achieving food security, and curtailing food importation in the Nigerian economy. Going this way, it conforms to the fact that "agriculture has a much greater impact on reducing poverty and improving food security than the other sectors of the economy" (Irz, Lin, Thirtle & Wiggins, 2001; Majid, 2004).

Based on the findings of the study, the paper recommends that there is need to effectively engage stakeholders towards enhancing domestic food production in the country. Policies should be geared towards stimulating the agricultural sector so as to achieve food sufficiency in the country. There is need to effectively monitor agricultural loans so as to generate the desired benefits to the agricultural sector. Timely provision of the loans for farmers to utilize them to access farm inputs at the right time is of great importance since agricultural activities are subjected to the vagaries of weather and climate along with seasonal changes.

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