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**ARAŞTIRMA MAKALESİ** **RESEARCH ARTICLE**

# Does Rice Importation Affect Production? Evidence from Nigeria

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## Abstract

Rice is an important staple food in Nigeria, playing a critical role in the country's food security, agricultural development, and economic growth. This research investigated how rice importation affected rice production and Nigeria's economic growth from 1990 to 2020 using time series data. The study aimed to understand the dynamics between rice importation, local production, and economic performance to inform policy decisions that promote agricultural sustainability. The data were analyzed with various econometrics models such as the trend model, Augmented Dickey-Fuller (ADF) test, Johansen Cointegration technique, Granger causality test, and simultaneous equation model. The results showed a significant gap between rice demand and supply in Nigeria and a long-run relationship between rice production, rice importation, and economic growth. While the gap indicated a high dependence on foreign rice to meet the rising domestic demand, the long-run relationship indicated that rice importation had a negative impact on the economy. The results also revealed causal relationships between rice production, rice importation, and GDP, and that rice importation had a negative and significant effect on Nigeria's economic growth and domestic rice production potential. Rice production in Nigeria was influenced by rice importation and population growth, while rice importation was affected by exchange rates and population growth. The study concluded that a sustained overdependence on rice importation has adverse consequences on Nigeria's economy and thereby suggested that the adoption of a multifaceted policy measure or strategy that emphasizes reducing rice importation, increasing domestic production of rice, and enhancing the standard of living for domestic rice producers is a key policy objective.

**Keywords:** Economic growth, GDP, Nigerian rice economy, Rice importation, Rice production

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## 1. Introduction

Despite the protracted state of economic stagnation, increasing poverty level, and deteriorating public infrastructure, Nigeria's economy remains the largest in Africa (Okonjo-Iweala and Osafo-Kwaako, 2007; Gyimah-Brempong et al., 2016). Nigeria's domestic economy is dominated by agriculture contributing about 40% of the GDP and employing two-thirds of the labour force (Onu et al. 2015; Gyimah-Brempong et al., 2016). Therefore, agricultural development is crucial for ensuring food security and reducing rural poverty in the country. The significance of agricultural development has long been acknowledged by the government of Nigeria as essential to achieving food self-sufficiency in the country. However, Nigeria's position as a net exporter of crude oil has been a major obstacle to the country's capacity to manage its agricultural development agenda, especially the growth of the rice subsector (Gyimah-Brempong et al., 2016).

Nigeria has the largest rice production in West Africa and the second-largest in Africa, with an average annual growth rate of 6.5% in the past few decades, surpassing other major producers in the region (Ogazi, 2010; KPMG, 2019). Nigeria also had more than half of the potential land area for rice cultivation and over 40% of the total rice output in West Africa in 2002 (FAOSTAT, 2011). However, Nigeria remains one of the top rice importers in the world, despite the abundant resources and the long history of government efforts to support the rice sector.

Nigeria's domestic rice demand significantly exceeds local production, with an average yearly shortfall of 2.4MMT recorded between 2007 and 2018 (KPMG, 2019). To keep up with the ever-growing domestic demand for rice, Nigeria resorts to importing rice from major rice-exporting countries to expand its total supply. However, the prospect for domestic rice production may be significantly impacted by the continued demand for imported rice. Over the past few decades, Nigeria has experienced sustained growth in rice consumption, resulting from an exponential population growth rate, increasing income level, and rapid urbanization (Ogazi, 2010; Ayanwale et al., 2011). Therefore, addressing the issue of how sustained demand will be met becomes a major concern. The only two ways to meet the increasing demand for rice are — boosting domestic production or importing more rice, but each option has a different impact on the economy. Continued growth in rice import in the country will not undermine local production, but will also override the agenda of attaining a self-sufficient state. A major contending issue is that Nigeria has a comparative advantage in rice production to at least meet its domestic consumption, but over-reliance on imports in recent years remains a great concern, particularly how the demand-supply for rice in the country may evolve in the future. Given the strategic position of the rice subsector in the economy of Nigeria, it is necessary to carry out this study to examine how rice importation influences rice production and economic growth in the country. The objectives of this research are to:

1. analyze the trend of Nigeria's rice output and imports;
2. estimate the rate of growth of Nigeria's rice output and rice imports;
3. identify the causal relationship among Nigeria's rice output, rice imports, and economic growth; and
4. examine the variables that affect Nigeria's rice output and rice imports.

## 2. Materials and Methods

### *2.1 Data Source*

A 30-year period, from 1990 to 2020, was covered by the research using time-series data from secondary sources that were selected based on their validity and dependability. The data sources included the United States Department of Agriculture (USDA), World Bank, United Nations World Population Prospects, and World Bank, respectively, with data on rice output and importation, GDP, and population inflation in Nigeria.

### *2.2 Analytical Techniques and Model Specifications*

Descriptive and inferential methods were employed in the research to analyze the collected data. The trend of Nigeria's rice importation and output was displayed using descriptive techniques like trend graphs and trend models. The study employed inferential methods such as the simultaneous equation model, unit root test, causality test, and co-integration test.

### *2.3 Trend Model*

The trend model utilized in Gujarati and Porter (2009, as cited by Oyakhilomen et al., 2013; Biam and Adejo, 2017; Ukpe et al., 2018) was used to determine the growth rate and the direction of growth of Nigeria's rice production and rice importation from 1990 – 2020. The adopted model is specified as follows:

$$\gamma t = \gamma 0\,(1 + g)t \quad \text{(Eq.1)}$$

Where, $\gamma_t$ = Quantity of rice produced and imported in year t measured in metric tonnes;

$\gamma_0$ = Quantity of rice produced and imported in the base year measured in metric tonnes;

$g$ = Compound rate of growth of rice production and rice imports;

t = Time trend measured in years.

A semi-log trend model (equation 2) is obtained by taking the natural logarithm of equation (1)

$$ln\,\gamma t = ln\,\gamma 0 + tln(1 + g) \quad \text{(Eq.2)}$$

Given that, $ln\,\gamma_0 = \beta_0$, and $tln(1+g) = \beta_1$

Hence, equation (2) can be rewritten as:

$$ln\,\gamma t = \beta_0 + \beta 1_t + \varepsilon_t \quad \text{(Eq.3)}$$

Where, $\beta_0$ = Intercept;

$\beta_1$ =slope or time trend coefficient;

$\varepsilon_t$ = random error term.

The growth rate models as specified by Akpaeti et al. (2013) obtained from parameters in equation (3) are expressed as:

$$r = \beta_1\ x\ 100 \quad \text{(Eq.4)}$$

$$g = (e^{\beta_1} - 1)\ x\ 100 \quad \text{(Eq.5)}$$

Where, r = instantaneous growth rate

g = compounded rate of growth

e = Euler's number (2.71828)

The coefficient β1 shows the direction of growth. A positive or negative coefficient of β1 that is statistically significant means an increase or a decrease respectively in the growth rate of rice output and rice importation. A coefficient of β1 that is not significant statistically means no change in the rate of growth of rice output and rice importation.

### *2.4 Unit Root Test*

For the model to be considered valid and reliable, the series must exhibit stationarity or unit root property (Maddala, 2002; Kong et al., 2014; Ghosh, 2021). The sequence of integration in the series was checked using the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1979; Dickey and Fuller, 1981) to ensure that all of the model's variables were stationary. If a variable remains stationary at its level, it can be considered integrated of order zero, or $I(0)$. On the other hand, a variable is said to be integrated of order one or $I(1)$ if it is steady at the first difference but not at its level. The following regression equation forms the basis of the ADF test:

$$\Delta S_t = \alpha + \beta_{1_t} + \beta_2\, S_{t_{-1}} + \sum_{j=1}^{n} \rho_i\, \Delta S_{t-1} + \varepsilon_t \quad \text{(Eq.6)}$$

Where, $S_t$ = series under consideration;

$\alpha$ = intercept or constant;

$\beta_1$ = time trend coefficient;

$n$ = number of lagged differences in the response variable;

$\Delta$ = operator for the first differencing;

Such that, the null hypothesis for unit root is given by $H0: \beta 2 = 0$

***Co-integration Test***

The long-run equilibrium relationship among rice production, rice imports, and GDP was tested using the Johansen co-integration technique (Johansen, 1988; Johansen and Joselius, 1990) based on the Vector Autoregressive (VAR) model. The co-integration test procedure is valid only if all the variables in the series are non-stationary and have the same order of integration at first differencing, I(1).

Johansen and Joselius (1990) suggested two test statistics based on probability to determine the number of co-integrating vectors in the non-stationary series. These tests are called trace statistics and maximum eigenvalue statistics, and they are given by the following equation:

Based on the Vector Autoregressive (VAR) model, the Johansen co-integration technique (Johansen 1988; Johansen and Joselius, 1990) was used to investigate the long-run equilibrium relationship among rice output, rice imports, and GDP. Only when every variable in the series is non-stationary and has the same order of integration at initial differencing, or I(1), is the co-integration test procedure valid.

Two test statistics based on probability were developed by Johansen and Joselius (1990) to find the number of co-integrating vectors in the non-stationary series. The following equation provides the results of these tests, which are known as trace statistics and maximum eigenvalue statistics, respectively.

$$\chi_{trace} = -K \sum_{j=r+1}^{n} \ln(1 - \chi_i) \quad \text{(Eq.7)}$$

$$\chi_{max} = - K (1 - \chi_{r+1}) \quad \text{(Eq.8)}$$

Where, $\chi_i$ = estimated eigenvalue;

K = number of observations usable;

r = number of co-integrating vectors

***2.5 Causality Test***

The cointegration test does not indicate the direction of the relationship; it just identifies the presence of a long-run equilibrium relationship among the variables. The Granger causality test, developed by Granger (1988), was employed in the study to ascertain the direction of causality between two variables. In the Vector Error Correction (VEC) model, the Granger causality test indicates the direction of causality between GDP, rice imports, and rice production. There is a distinction between the long-run and short-run causality parameters in the VEC model. Using the VEC model, the causality between these three variables is estimated using the following functional forms:

$$\Delta Y_t = \alpha_1 + \sum_{d=1}^{e} \alpha_{1i} \Delta Y_{t-1} + \sum_{d=1}^{e} \beta_{1i} \Delta P_{t-1} + \sum_{d=1}^{e} \gamma_{1i} \Delta M_{t-1} + \alpha \mu_{t-1} + \varepsilon_{1t} \quad \text{(Eq.9)}$$

$$\Delta M_t = \alpha_2 + \sum_{d=1}^{e} \alpha_{2i} \Delta Y_{t-1} + \sum_{d=1}^{e} \beta_{2i} \Delta P_{t-1} + \sum_{d=1}^{e} \gamma_{2i} \Delta M_{t-1} + \gamma \mu_{t-1} \varepsilon_{2t} \quad \text{(Eq.10)}$$

$$\Delta P_t = \alpha_3 + \sum_{d=1}^{e} \alpha_{3i} \Delta Y_{t-1} + \sum_{d=1}^{e} \beta_{3i} \Delta P_{t-1} + \sum_{d=1}^{e} \gamma_{3i} \Delta M_{t-1} + \beta \mu_{t-1} + \varepsilon_{3t} \quad \text{(Eq.11)}$$

Where, $Y, M, P$ = GDP, rice production, and rice imports respectively;

$\Delta Y, \Delta P, \Delta M$ = differential time series of GDP, rice production, and rice imports respectively;

$\mu_{t-1}$ = series' error correction term trailed by a period; and

$\varepsilon_t$ = random error term.

Note that the independent or explanatory variable is said to "Granger cause" the dependent variable if the coefficient of the error correction term or any of the lagged independent variables are significant. A long-term causal relationship between the independent and dependent variables is shown by a statistically significant and negative coefficient of the error correction terms.

### *2.6 Simultaneous Equation Model*

The study adopted a simultaneous equation model to evaluate the determinants of rice production and rice imports in Nigeria. The simultaneous equation model was used because it allows the specification of more than one equation (Syahnur, 2012). The model us

$$M = \alpha_5 + \alpha_6 P + \alpha_7 INFL + \alpha_8 ER + \alpha_9 \quad \text{(Eq.12)}$$

Apriori expectation: $\alpha_6 < 0$, $\alpha_7 < 0$, $\alpha_8 < 0$, $\alpha_9 > 0$

$$P = \alpha_0 + \alpha_1 M + \alpha_2 INFL + \alpha_3 ER + \alpha_4 POP + \mu \quad \text{(Eq.13)}$$

Apriori expectation: $\alpha_1 < 0$, $\alpha_2 < 0$, $\alpha_3 < 0$, $\alpha_4 > 0$

Where M = Rice imports;

P = Rice production;

INFL = Domestic inflation;

POP = Population growth.

## 3. Results and Discussion

### *3.1 Trend in Nigeria's Rice Production and Importation (1990 – 2020)*

The trend in Nigeria's rice production and importation is largely impacted by Nigeria's rice trade policies. These policies, according to Boansi (2013) and Abbas et al. (2018) are characterized by inconsistency resulting from the change of government. Nigeria in time has witnessed three significant trade policy epochs – the pre-ban period (1971 – 1984), the ban period (1985 – 1995), and the post-ban period (1996 – 2015). The pre-ban epoch is the period before the importation of rice into the country was completely prohibited. During the ban period, rice imports into the nation was completely restricted and any form of importation through the borders was considered illegal. This epoch was followed by the post-ban period during which the quantitative restriction on the importation of rice into the country was removed with the adoption of liberal trade policies to regulate rice imports. Nigeria's rice production and importation trend from 1990 to 2020 is represented in *Figure 1*. The figure shows an undulating uptrend in rice production between 1990 and 2020. The undulating characteristics of the trend line, however, can be attributed to inconsistent government policies. Rice production showed an increase from 1500000MT in 1990 to 1752000MT in 1995. This increase in production may be as a result of the Structural Adjustment Programme (SAP) which was introduced during the ban epoch to strengthen the restriction on rice importation. The increase in rice production continued into the post-ban period. Production also showed an increase in 1996 – 2000, followed by a decline in 2001. Following this decline in 2001, was an increase in production between 2002 and 2006. This rise in rice production could be attributed to the Presidential Initiative, which was launched within this period with the overarching goal of bridging the demand-supply gap in rice production. Nigeria's rice output, peculiarly, demonstrated an upward since the embargo period, growing from 1500000MT in 1990 to 4890000MT in 2020. However, this upward trend could be explained by the trade policy tools such as tariffs and import restrictions imposed during the period under study. The quantity of rice imported into the country during the period under investigation follows an uptrend pattern between 1990 – 2011 and a downtrend between 2011 – 2020. On the other hand, the quantity of rice imported into the country during the period under investigation follows an upward trend between 1990 – 2011 and a downward trend between 2011 – 2020 (Figure 1). Despite the embargo on rice imports into the nation from 1990 to 1995, there was still a noticeable upward trend in rice imports during this period which could be due to the significant quantity of rice smuggled through the country borders from neighboring countries (Munonye, 2016; Biam and Adejo, 2017). The figure also shows a notable increase in the quantity of rice imported in 2011. This might be as a result of the double levy expected to be imposed on rice imports in 2012 (USDA-FAS, 2013). The country, however, witnessed a significant drop in the quantity of rice imported between, 2011 – 2019 decreasing from 3200000MT in 2011 to 1400000MT in 2019. This could be as a result of the stringent

tariffs, outright ban, and restrictions imposed on rice imports within this period.

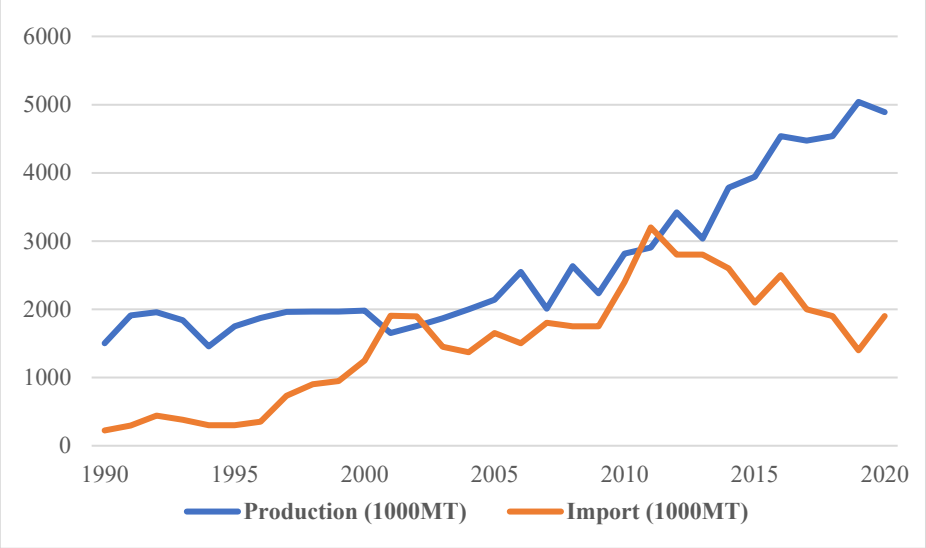


*Figure.1. Trend in Nigeria's Rice Production and Rice imports*

### *3.2 Growth Rate of Nigeria's Rice Output and Imports (1990 – 2020)*

*Table 1* displays the estimated growth model of Nigeria's rice imports and output for the period under investigation. At the 1% significance level, both rice production and rice imports had positive relationships with time trend. The result is consistent with Onu et al. (2015), who found that time trend was a key factor influencing Nigeria's domestic rice production and rice imports. According to the coefficient of multiple determination (R2) values in Table 2, time explains roughly 79% and 67%, respectively, of the variation in the growth trend of Nigeria's rice output and imports. This finding is consistent with that of Onu et al. (2015) who reported a high dependence of the growth in rice production and imports on time.

***Table 1. Result Estimate for Growth Model of Nigeria's Rice Production and Rice Imports***

| Variables | Constant ($\beta_0$) | Trend coefficient ($\beta_1$) | $R^2$ | F-ratio |
|---|---|---|---|---|
| **Rice Production** | – 152.351*** | 0.048*** | 0.792 | 74.802*** |
| | (– 7.339) | (0.022) | | |
| **Rice Imports** | – 213.504 *** | 0.084*** | 0.671 | 102.396*** |
| | (–12.414) | (0.041) | | |

### *3.3 Instantaneous and Compound Growth Rate for Nigeria's Rice Production and Rice Imports*

*Table 2* shows the instantaneous and compound growth rate of rice output and rice imports in Nigeria. Both rates are positive and significant at 1% probability level foe both output and imports, which means that rice production and rice imports are increasing every year. However, the rates are higher for imports than output, which indicates that rice demand is outpacing domestic supply in Nigeria. This is consistent with Oyakhilomen et al. (2013) who found that rice consumption is growing at a faster rate than rice production in Nigeria. This implies that Nigeria has to rely on imports to meet the rising demand for rice in the country. Therefore, the higher growth rate of rice imports reflects the gap between rice demand and supply in Nigeria.

***Table 2. Estimated Instantaneous and Compound Growth Rate for Domestic Rice Output and Rice Imports in Nigeria***

| Variables | $\beta_1$ | Instantaneous growth rate (%) | Compound growth rate (%) |
|---|---|---|---|
| Rice Production | 0.048*** | 4.8 | 4.91 |
| Rice Imports | 0.084*** | 8.4 | 8.76 |

### *3.4 Direction of causality in rice production and rice importation in Nigeria (1990 – 2020)*

#### *Unit Root Test*

According to the unit root test result (*Table 3*), the variables of rice output, rice imports, and GDP are not stationary at their level, but they become stationary at their first difference. This means that the variables have a unit root and they are integrated of order one. The next step is to test whether the variables have a long-run relationship or not. This can be done by using the co-integration test.

***Table 3. Unit Root Test Result***

| Variables | ADF Statistics | p-value | Order of Integration | Status |
|---|---|---|---|---|
| Rice production | -9.180818*** | 0.0000 | I(1) | Stationary |
| Rice imports | -5.190477*** | 0.0002 | I(1) | Stationary |
| GDP | -5.557947*** | 0.0001 | I(1) | Stationary |

*Note: *** represents significance at 1% level*

### *3.5 Johansen Co-integration Test*

The results of the Johansen co-integration test are displayed in *Table 4*. The 5% critical values are used to compare the maximum Eigenvalue statistics and the trace statistics in the test. Since both the maximum Eigenvalue statistics and the trace statistics are greater than the 5% critical values, the test rejects the null hypothesis that there is no co-integrating equation. Nonetheless, because both the maximum Eigenvalue statistics and the trace statistics are less than the 5% critical values, the test accepts the null hypothesis that there is only one co-integrating equation. As a result, the test shows that there is a long-term relationship between GDP, rice imports, and output as well as one co-integrating equation at the 5% level. The long-run relationship can be expressed as follows:

$$\log(GDP) = 1.0686 \log(Rice\ Production) - 1.7676 \log(Rice\ imports) \quad \text{(Eq. 14)}$$

This equation shows that in the long run, a 1% increase in rice output leads to about 1.1% increase in GDP, while a 1% increase in rice imports leads to about 1.8% decrease in GDP.

Since there is at least one co-integrating relationship among the variables, a granger-causality test can be performed to check if there is any causal relationship among rice output, rice imports, and GDP.

***Table 4. Results of Johansen Co-integration Test***

| **Unrestricted Co-Integration Rank Test (Trace Statistics)** | | | | |
|---|---|---|---|---|
| **Hypothesized No. of CE(s)** | **Eigen Value** | **Trace Statistics** | **0.05 Critical Value** | **p-value** |
| None * | 0.482221 | 20.55629 | 15.49471 | 0.0079 |
| At most 1 | 0.049371 | 1.468320 | 3.841466 | 0.2256 |
| **Unrestricted Co-integration Rank Test (Maximum Eigenvalue)** | | | | |
| **Hypothesized No. of CE(s)** | **Eigen Value** | **Max. Eigenvalue** | **0.05 Critical Value** | **p-value** |
| None *** | 0.482221 | 19.08797 | 14.26460 | 0.0080 |
| At most 1 | 0.049371 | 1.468320 | 3.841466 | 0.2256 |
| **Co-integrating Equation** | | | | |
| **Log(GDP)** | **Log(Rice Production)** | | **Log (Rice Imports)** | |
| 1.0000 | - 1.0686 | | 1.7576 | |
| | (0.4275) | | (0.4138) | |

*Note: *** denotes hypothesis rejection at the 5% level; Values in parenthesis represent standard error*

### *3.6 Pairwise Granger Causality Test*

The pairwise Granger causality test result between rice production, rice imports, and GDP is shown in *Table 5*. The result revealed a significant bidirectional causality between rice production and GDP. This implies that the level of rice production and GDP can be used to predict each other. The result also showed a significant unidirectional relationship ($p < 0.05$) from imports to GDP. This relationship rejects the null hypothesis and thus

implies that rice imports granger cause GDP. This is indicative that GDP of Nigeria is dependent on the level of rice imports. The implication of this is that a reduction in the level of rice imports may improve the GDP of the country. The result further revealed a significant unidirectional relationship ($p < 0.05$) from rice imports to production. Similarly, this relationship rejects the null hypothesis and thus implies that rice imports granger cause rice production. This suggests that rice production in Nigeria is dependent on the level of rice imports. The implication of this is that a reduction in the level of rice imports may increase the rice production level in the country.

***Table 5. Result of Pairwise Granger Causality Test***

| Null hypothesis | F-statistics | p-value |
|---|---|---|
| Production "does not granger cause" GDP | 3.0492** | 0.0211 |
| GDP "does not granger cause" production | 4.1748** | 0.0183 |
| Imports "does not granger cause" GDP | 2.8576** | -0.0118 |
| GDP "does not granger cause" imports | 2.0031 | 0.7105 |
| Production "does not granger cause" Imports | 0.5565 | 0.6495 |
| Imports "does not granger cause" production | 4.5859** | 0.0128 |

### *3.7 Determinants of Rice Production and Rice Importation in Nigeria*

The result of the simultaneous equation model for factors determining rice production and rice importation in Nigeria is presented in *Table 6*. The $R^2$ value of 0.5864 indicates that about the explanatory variables account for about 59% variation in the quantity of rice produced in Nigeria. The result showed that rice imports has a negative and significant association ($p < 0.1$) with rice production in Nigeria. This is indicative that a higher rate of rice importation undermines the quantity of rice produced in the country. Population showed a positive and significant association ($p < 0.05$) with the quantity of rice produced in the country. This implies that as population growth increases, rice production also increases. Giyamah-Brempong et al. (2016) in their study identified increasing population growth in Nigeria as one of the major factors stimulating the demand for rice. Schneider et al. (2011) and Ghosh (2021) also opined that population growth increases diversification and food demand, and therefore the demand for agricultural land. Hence, this finding suggests that the increasing population in Nigeria stimulates rice production in the country. On the other hand, the $R^2$ value of 0.5015 indicates the explanatory variables account for about 50% variation in the quantity of rice imported in Nigeria. Inflation showed a positive and significant association ($p < 0.1$) with rice imports. This implies that as domestic inflation increases, rice importation increases. Inflation increases the price of domestic rice against imported rice which is asserted to be of better quality (Lançon et al., 2004; Onu, 2018), thus stimulating the demand for imported rice in Nigeria. Population also showed a positive and significant association ($p < 0.1$) with rice imports. This result confirms the growing demand for rice imports to offset the increasing rice consumption resulting from increasing population growth rate in Nigeria (Ogazi, 2010; Ayanwale et al., 2011).

***Table 6. Estimates of the Simultaneous Equation Model***

* *and ** indicates significance level of 10% and 5% respectively*

| Dependent Variables | Explanatory Variables | Coefficients | Std. Error | |
|---|---|---|---|---|
| Rice production | Constant | – 2.5224** | 7.6873 | |
| | Inflation | – 0.952821 | 3.475315 | |
| | Rice imports | – 0.169448* | 0.103632 | |
| | Exchange rate | – 0.004099 | 2.064459 | $R^2 = 0.5864$ |
| | Population | 5.9095** | 2.328186 | |
| | | | | |
| Rice imports | Constant | 3.0092 | 8.2290 | $R^2 = 0.5015$ |
| | Inflation | 1.4388 * | 5.8189 | |
| | Rice production | -0.172906 | 0.1823 | |
| | Exchange rate | -5.168259 | 3.5883 | |
| | *Population* | *3.1152** | *7.6133* | |

## 4. Conclusions

The research aimed to investigate the effect of rice importation on rice production and Nigeria's economic growth. The study established that the growth rate of rice imports during the period under investigation is significantly higher than the growth rate of domestic rice production. The government imported rice to meet the increasing demand for rice in Nigeria, which exceeded the domestic production. The significant gap between the growth rate of rice imports and domestic rice production shows over-reliance on rice importation. The magnitude of the long-run relationship between rice importation and GDP revealed that a sustained demand for imported rice has negative financial implications on the economy. The study established a negative and significant unidirectional relationship from imports to GDP, which means that a rise in the level of rice imports may reduce the GDP of the country. Rice importation has a negative and significant relationship with domestic rice production, suggesting that increasing rate rice importation undermines the domestic potential of the Nigerian rice sector. Population growth has a significant and positive relationship with both rice production and rice imports. The increasing population growth of Nigeria suggests a corresponding increase in the demand for imported rice in the near future if no proactive measures are put in place to revamp the Nigerian rice economy. Not only does the growing dependence on rice importation poses a threat to the foreign exchange reserves, a deficit trade account and a negative balance of payments are also possible implications. Adopting a multifaceted policy measure or strategy that emphasizes reducing rice importation, increasing domestic production of rice, and enhancing the standard of living for domestic rice producers is a key policy objective.

### Ethical Statement

There was no need to obtain permission from the ethics committee for this study.

### Conflicts of Interest

We declare that there is no conflict of interest between us as the article authors.

### Authorship Contribution Statement

Concept: Akinsola, G. O., Bello, M. A., Bello, W. O; Design: Akinsola, G. O., Osasona, K. K., Bello, M. A.; Data Collection or Processing: Bello, M. A., Bello, W. O; Statistical Analysis: Osasona, K. K., Bello, M. A; Literature Search: Osasona, K.K., Bello, M. A., Bello, W. O; Writing, Review and Editing: Akinsola, G. O., Osasona, K. K., Bello, M. A.

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