



EFFECTS OF TRADE POLICY ON RICE IMPORTATION IN NIGERIA (1970-2020): A DISAGGREGATED APPROACH

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ABSTRACT

The study examined the effects of trade policy on rice importation in Nigeria (1970-2020). The short run and the long run estimates of the fitted model were examined with the use of Vector Error Correction Model. The empirical results showed all the variables failed stationarity test at level, but were stationary at first differencing. The order of integration was one (1) and the lag order is 1 based on the minimum value of SBIC. The coefficient of Error Correction term (ECT) in the short run showed a speed of adjustment of -1.02 which is relatively normal. The long run result showed that local rice production ($t = -2.2876$) and price of local rice ($t = -3.7676$) were statistically significant at 1% and had negative relationship with rice importation while exchange rate and inflation rate had positive relationship with rice importation. On the other hand, tariff on rice importation, per capita income and external reserves were found not to be statistically significant and so had little or no effects on rice importation in Nigeria. It is inferred from the research that rice importation is driven by factors beyond import tariff, the insignificance of the variable attest to this claim. As both local rice production and price significantly influence rice importation, it is evident from the study that increasing local rice production could pivot reduction of rice importation. Therefore, Nigeria government should enhance local production of rice which could be achieved by intensifying efforts in rice production technologies by putting in place credit, improved rice varieties and good agronomic practices.

Keywords Importation, Policy, Production, Rice and Trade

INTRODUCTION

Nigerian economy is mainly agriculturally based before and after Independence in 1960, crops such as cereal (sorghum, maize, rice), legume (cowpea and groundnut), tubers (yams, cassava) as well as vegetables are grown by Nigeria rural people (Ademiluyi, *et al.* 2021). Rice is an important cereal because it is a major food for over half of the world population and it is third most produced and consumed cereal after maize and wheat world over (Familusi and Oranu, 2020). Consumption of rice has been observed in Nigeria to have no religious, ethnic, cultural or geographical boundary. For this reason, couple with increasing population of Nigeria, demand for rice has always been on increase (Yussuf *et al.*, 2020).

Ajoma *et al.* (2016) found out that, rice is cultivated in nearly all the agro-ecological zones in Nigeria, because Nigeria has a perfect climatic condition which are similar to that of South East Asia where rice is grown for export. The study also asserted that the major producing states in the country include Kebbi, Sokoto, Ogun, Ebonyi, Enugu, Anambra, Niger and Kogi. Rice demand by Nigerians is estimated to be around 5 million tons annually whereas local production is about 2.2 million tons and the supply gap of 2.8 million tons is met by importation (USDA, 2019). There are different factors which bring about the surge in rice consumption, these include increase rural urban migration and ease of preparation which fits easily in to the lifestyle of urban workers.



Rice importation in Nigeria gulps billions of naira annually which depletes the country's foreign reserves. For example, from January 2012 to May 2015, the Nigeria government spent about \$2.41 billion on rice importation (CBN, 2015). Also, Nigeria imported about 10.8 million tons of rice between 2010 and 2014. The Nigeria self-insufficiency in rice production has led to the increase in rice importation (in order to bridge the gap of 3 million tons' deficit of rice demand) which left a huge drain on foreign reserves. Also, Rice being a staple food that is produced and consumed in Nigeria irrespective of religion and tribe, and given the huge amount of foreign exchange spent on rice importation in Nigeria. It is imperative to examine the effect of government trade policy (import tariff) on the importation of rice in Nigeria.

Literature Review

Nigeria history of rice trade policy has either been protectionist or liberalized in nature. As reported by Obi-Egbedi *et al.* (2021) a tariff as high as 66% was placed on rice imports around 1970 till 1973. From 1974 to 1978 was a period of more liberalized trade policy where there was neither tariff nor ban imposition. But in October 1978, outright ban was placed on rice importation into the country till September 1979. Quantitative restriction was replaced with ban by the end of 1980 and the issuance of quotas was done through the Presidential Task Force (PTF) on rice from December 1980 to 1984. This was followed by another outright ban on rice importation from 1985 through 1994. Ban on rice importation was lifted in 1995 which was replaced by tariff levies of different percentages till 2008 when there was a full liberalization in which tariff went from 0% to 30% the same year. Nigeria rice trade policy continue to oscillate between protectionist and liberalization stance, for example a new levy of 50% was put on imported rice in 2012 which was increased to 100% in 2013 whereas outright ban on rice importation was put in place in 2015 with a 70% tariff levy on importation through the port. With the oscillation between protectionist and liberalized rice policies measures, coupled with different programs to boost domestic rice production and consequently reduce rice importation in Nigeria, domestic rice production has not improved much and rice importation continue to rise year in year out to bridge the wide gap between rice demand and supply.

There are different opinions on the part of researchers when it comes to trade restriction. Balie and Valera (2020) opined that trade restriction impact positively on domestic production, income and employments. This is in line with the Protectionist theory which emphasize that government should discourage import through restriction and promote export. On the other hand, Cohen (2019) argued that trade restriction can harm the economic agents (like household and business entities) that it is supposed to protect in the long run. The author postulated that trade restriction hinders economic growth and increase price inflation. Igberi and Amadi (2017), studied the effects of rice import restriction on domestic production of rice in Nigeria. The study found out that rice importation restriction had an insignificant effect on domestic rice production and suggested that policies that drive public and private investment should be prioritized. In another related study, Onu *et al.* (2017), examined the determinants of Rice production and import in Nigeria. It was found out from the study that rice import (dependent variable) was positively related to the one-year lag of quantity consumed of rice, nominal exchange rate, domestic price of rice, imported quantity of rice and population (independent variables). The implication of this was that increase in previous year values of independent variables brought about increase in the dependent variable. The study concluded that policies that are aimed to increase rice production and reduce rice import should not only focus on reducing total import but should look at other

alternatives like trade agreement and import restriction to a certain level. Yusuf *et al.* (2020), studied the determinants of rice import demand in Nigeria, the result showed long run model had positive relationship in that increase in rice consumption, price of meat, price of maize and demographic development resulted in increased rice import demand.

Theoretical Framework

The effect of rice import restriction on rice importation in Nigeria can be explained with the traditional import demand theory which is based on the consumer theory of demand which states that the main aim of a consumer is to maximize satisfaction and this is extended to the demand for imports in such a way that the consumers demand for imports is influenced by income and import prices as well as prices of other commodity (Alam and Ahmed, 2010). The driving force for a country to import goods and services differ from one country to another. These forces include: to bridge demand supply gap for locally produced good that is not in sufficient quantity, it might also be for fiscal reasons to boost government revenue for developmental purposes and country imports for industrial purpose.

When tariffs were introduced, as presented in Figure 1, quantity demanded reduced to Q_d' from Q_d and increases domestic supply to Q_s' from Q_s . The quantity of imported rice reduces to $Q_d' - Q_s'$. Local rice producers gain the area "a" simply because they are protected and this will allow them to earn more per unit sold which represent the difference between increased domestic price and the world market price. Contrarily, the consumer of rice loose since they have to pay more per unit bought and they now consume less quantity of rice.

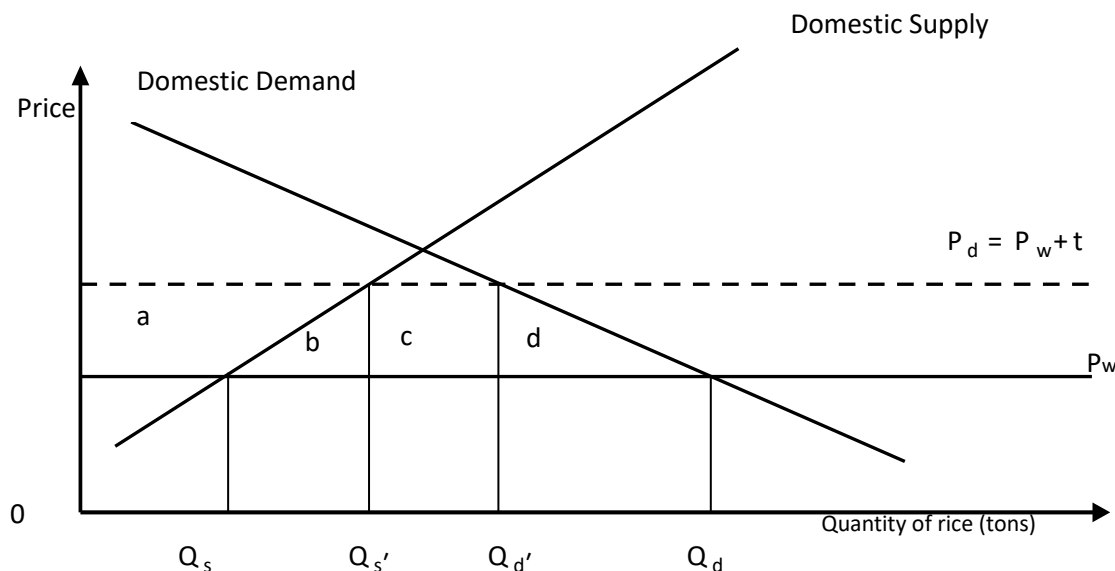


Figure 1: Market for rice with Tariff model (adapted from Oyejide *et al.*, 2013)

MATERIALS AND METHODS

Data source

We seek to analyse the effect of trade on rice importation in Nigeria. Nigeria is situated in the West African region and lies between longitude 3^0 and 14^0 , and latitude 4^0 and 14^0 . The

country borders Cameroon and Chad to the East, Niger to the North and Republic of Benin to the West. The total land area of Nigeria is approximately 923,768 square kilometers. Nigeria is the most populous country in Africa with an estimated population of 227,163,781 million (as of Sunday, February, 2024) (Worldometer) and the population density of 226 per km² (586 people per m²). In this study, secondary data was used which spanned between 1970 - 2020 (about 50 years). The years were categorized into two periods namely the protectionist years (years when there was import bans, import quota and increase tariff) and the liberalized years (years when there was reduced tariff or complete removal of import tariff). Data on Nigeria population was sourced from World Bank database while inflation rate, exchange rate and GDP per capita were obtained from Central Bank of Nigeria Statistical Bulletin of various years and data on rice importation and rice production volume were sourced from the Food and Agriculture Organization database.

Estimation

Exploring the dynamics in the rice imports in Nigeria and to determine the speed of adjustments which serve as a response to deviation from long run equilibrium, the study used the vector error correction model. The fundamental relationship of the predictors are presented in the equation as:

$$IM = f(TP, RP, PCI, P, INF, EXR, ER) \quad \dots(i)$$

Where, IM = Rice Imports; TP = Trade Policy (dummy variable) (1= protectionist, 0= liberalized); RP = Quantity of rice produced locally; PCI = Per Capita Income; P = Price of Locally produced Rice; INF = Inflation Rate; EXR = Exchange Rate; ER = External Reserve.

We expressed equation (i) in log linear form and introduced U_t (error term) to take care of variables not included in the model but also have effects on rice imports, the equation therefore specified thus:

$$IM = \beta_0 + \beta_1 \log TP + \beta_2 \log RP + \beta_3 \log PCI + \beta_4 \log P + \beta_5 \log INF + \beta_6 \log EXR + \beta_7 \log ER + U_t \quad \dots(ii)$$

\log is the natural logarithms of the variables

β 's are the unknown parameters to be estimated.

U_t error term.

In the event of long run relationship among the variables, the equation above transform to error correction models and this is specified thus:

$$\log IM = \beta_0 + \beta_1 \log TP + \beta_2 \log RP + \beta_3 \log PCI + \beta_4 \log P + \beta_5 \log INF + \beta_6 \log EXR + \beta_7 \log ER - \lambda ECT + U_t \quad \dots(iii)$$

Where λ is the adjustment parameter which shows the extent to which the disequilibrium in the dependent variable is being corrected each period and it is expected to be significant.

It is expected that protectionist trade policy represented by dummy variable should discourage rice importation because when an economy protects its local producers through imposition of tariff on imported rice or ban on importation, consumption of locally produced rice is expected to increase.

Steps in Error Correction Model

Application of error correction model require performing unit root test on the data set to ascertain the stationarity properties of the data in order to avoid spurious regression result. Phillip Peron unit root test was used and this was followed by formulation of optimal lag length in order to proceed to perform Johansen Cointegration Test (this was performed to establish long run relationship among the variables). Error Correction Model (ECM) can then be applied to establish

relationship between independent variables and rice importation (dependent variable). ECM has the advantage of including both long run and short run relationship.

RESULTS AND DISCUSSION

The graph of rice importation was presented on Figure 2. The graph showed the trends of rice importation during the liberal era, before Structural Adjustment Program (SAP), and post SAP era. During the liberal era of 1970 -1975, rice importation was not prominent because the production then was enough to cater for the demand (Ajala and Gana, 2015). A sharp increase was observed between 1976 - 1979 which could be due to reduction in rice tariff from 66.6% to 10% (Biam and Adejo, 2017). The first ban period was 1984 -1995 and as can be seen from the graph there was reduction in rice importation and this period also culminated into SAP period when the emphasis was on domestic production over expensive imports and lesser dependence on oil revenue. There was gradual increase in rice importation after the removal of rice importation ban in 1994 and this continue to fluctuate up and down which was assumed to be due to the different tariff regime that was put on rice importation.

The fluctuation witness in rice importation in Nigeria could be largely attributed to inconsistencies in Nigeria's trade policy instruments. Both protectionist policies (such as outright ban, import quotas, tariffs as high as 120%) and liberalized policies (low tariffs as low as 10%, including six-month tariff elimination in 2008) has been profoundly used during this period (Obi-Egbedi 2014). In 2016, rice importation experienced sharp decrease when another ban was placed on rice importation coupled with government rice production promotion policy which saw the establishment of Anchor Borrowers Program (ABP). The program was introduced in 2015 to provide loans (in kind and cash to small holder farmers) to boost agricultural production, create job and reduce food import bills in order to conserve foreign reserves.

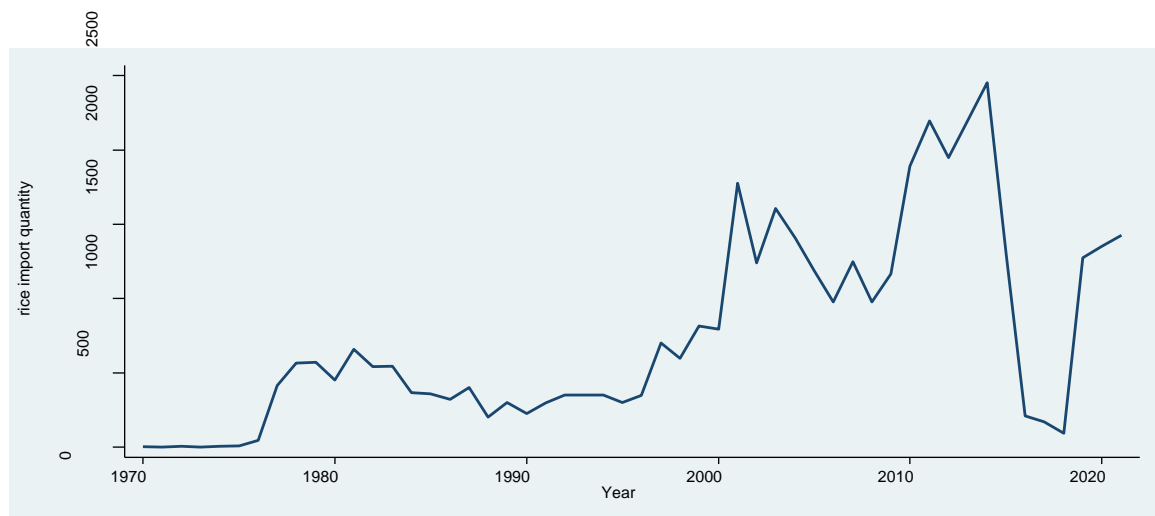


Figure 2: *Graph of rice import in Nigeria (1970-2020)* Source: Authors' computation (2023)

Summary Statistics of Variable used for the analysis

Table 1 showed the summary statistics of data used. The variables showed high variation which was reflected in the value of mean and standard deviation. Rice is one of the main staple foods that is daily consumed by most households. The table showed importation with mean of

7.50E+08, this is an indication of higher bills on only rice importation in the country. The reflection of the increasing bill could hamper the growth of rice production in the country if some policy restriction is not actually enforced. Also, the average value of locally produced rice stood at 3.19E+09; it is an indication of considerable rice production. But this might not be sufficient due to the increasing population and exportation. Average per capita income was ₦164,284.5 and the mean value of the price of the commodity for the period of this study was ₦1,840,173/ ton.

Table 1: Summary Statistics of Variable used for the analysis

Variables	Minimum	Maximum	Mean	Std. Dev.
Rice import value (IM)	0.0000	2.45E+09	7.50E+08	6.6E+08
Trade Policy (protectionist & liberalization) TP	0.0000	1.00		
RP(Qty produced locally)	2.2E+08	8.5E+09	3.19E+09	2.37E+09
PCI (Per Capita Income)	115.1575	848404.3	164284.5	239260.4
P (Price of Locally produced Rice)	13600.00	7513800	1840173	2271234
INF (Inflation Rate)	3.4576	72.8355	18.1720	15.3252
EXR (Exchange Rate)	0.5467	410.7006	89.8729	105.9011
ER (External Reserve)	5.02E+18	1.92E+31	8.9E+29	3.19E+30

Source: Data Analysis (2023)

Philip Peron unit root test

The test was performed to ascertain the stability of variables used for the analysis. The result of the test revealed that all the variables were not stationary at level but become stationary at first difference which affirmed that the variables exhibited short run stability and confirmed that all the variables used in this analysis were of the same order and characteristics. The null hypothesis underlying unit root test is that the variable under investigation has a unit root while the alternative proposes that it does not. Stationarity of the variable is an indication of deviation from running a spurious or misleading regression.

Table 2: Phillip Peron Unit Root Test Results

Variables	At Level		First difference		Order of integration
	t- values	5%Critical values	t-values	5%Critical values	
Rice import value (IM)	-2.2877	-2.9199	-7.1187	-2.9211	I(1)
Trade Policy (protectionist & liberalization) TP	-1.7509	-2.9199	-8.5685	-2.9211	I(1)
RP(Qty produced locally)	-1.4527	-2.9199	-8.8681	-2.9211	I(1)
PCI (Per Capita Income)	-0.6950	-2.9199	-6.9681	-2.9211	I(1)
P (Price of Locally produced Rice)	-1.6508	-2.9199	-7.0087	-2.9211	I(1)
INF (Inflation Rate)	-0.5737	-2.9199	-17.6466	-2.9211	I(1)
EXR (Exchange Rate)	-0.4611	-2.9199	-3.8858	-2.9211	I(1)
ER (External Reserve)	-0.9872	-2.9199	-17.1442	-2.9211	I(1)

Source: Data Analysis (2023)

Lag Selection Criteria

Table 3 showed the optimal lag used for the Johansen cointegration test. The optimal lag order was selected at 4 based on the Akaike Information Criterion. If the lag is short the model may be inadequately specified.

Table 3: Lag Selection Criteria

Lag	LL	LR	FPE	AIC	HQIC	SBIC
0	-1829.75		6.9e + 24	79.9022	80.0213	80.2202
1	-1554.91	549.67	7.5e + 20	70.7353	71.8075	73.5976*
2	-1503.51	102.81	1.7e + 21	71.2829	73.3082	76.6894
3	-1394.44	218.14	5.0e + 20	69.3234	72.3017	77.274
4	-1236.91	315.05*	5.8e + 19*	65.2571*	69.1886*	69.1886

Note: * indicates lag order selected. Source: Data Analysis (2023)

Johansen Cointegration Tests Results

The results of Johansen cointegration test was presented in Table 4. Comparing the results of the Trace statistics value and Max-Eigen value with the critical values it was confirmed from the results 5 cointegrating equations with Trace statistics and 2 cointegrating equations with Max-Eigen statistics which is an indication of long run relationship among the variables.

Table 4: Johansen Cointegration Tests Results

Hypothesis	Eigen value	Max-Eigen Statistics	CV (5%)	Prob**	Trace Stat	CV (5%)	Prob**
Null							
$r = 0$	0.7198	62.3459*	52.3626	0.0035	224.4495*	159.5297	0.0000
$r \leq 1$	0.6388	49.8976*	46.2314	0.0194	162.1035*	125.6154	0.0001
$r \leq 2$	0.4780	31.8595	40.0775	0.3107	112.2059*	95.7536	0.0023
$r \leq 3$	0.4468	29.0086	33.8768	0.1708	80.3463*	69.8188	0.0057
$r \leq 4$	0.3745	23.1439	27.5843	0.1674	51.3377*	47.8561	0.0227
$r \leq 5$	0.3460	20.8085	21.1316	0.0554	28.1938	29.7970	0.0756
$r \leq 6$	0.1355	7.1332	14.2646	0.4735	7.3853	15.4947	0.5333
$r \leq 7$	0.0051	0.2520	3.8414	0.6156	0.2520	3.8414	0.6156

Source: Data Analysis (2023) Trace test indicates 5 cointegrating equations at 5% level. Max-Eigen test indicates 2 cointegrating equations at 5% level *denotes rejection of the hypothesis at 5% level. ** Mackinnon Haug- Michellis (1999) p-values

Estimates of the Trade Policy effects on Rice Imports in Nigeria (short run)

Table 5 presented the short run estimates of the Trade Policy effects on Rice Imports in Nigeria. The coefficient of Error Correction term (ECT) (which measure the speed of adjustments towards long run equilibrium) being negative follow *a priori* and showed a speed of adjustment of -1.02 which is relatively normal. The Durbin Watson value of 2.055 in the model showed absence of autocorrelation. R- square value of 0.3828 means that 38% of variation in dependent variable is explained by the independent variables.

Table 5: Estimates of the Trade Policy effects on Rice Imports in Nigeria (short run)

Variables	Coefficients	Standard Error	t. statistics	Prob. value
C	0.1019	0.1377	0.7404	0.4634
D(LIM(-1))	0.6925	0.2638	2.6242	0.0122***
D(LTP(-1))	-0.0214	0.0256	-0.8380	0.4070
D(LRP(-1))	-1.0107	0.4549	-2.2217	0.0320**
D(LPCI(-1))	0.2260	0.4321	0.5241	0.6031
D(LP(-1))	0.5671	0.2722	2.0834	0.0436**
D(LINF(-1))	0.2094	0.1507	1.3887	0.1726
D(LEXR(-1))	-0.8279	0.5981	-1.3840	0.1740
D(LER(-1))	0.0949	0.0903	1.0485	0.3007
ECT (-1)	-1.0260	0.2989	-3.4319	0.0014***
R-Square	0.3828	Adjusted R-Square	0.2439	
Log Likelihood	-45.3624			
F- Statistics	2.7579	Prob (F- statistics)	0.0131	
Durbin Watson Statistics	2.055			

Source: Data Analysis, 2023 (Eview 12)

Estimates of the Trade Policy effects on Rice Imports in Nigeria (long run)

Trade policy could largely influence importation of goods. In Nigeria, we had witness different policies which affect transaction and trade between Nigeria and the neighboring countries. The results of the effects of trade policy on rice importation presented in Table 6 showed that local rice production and price of local rice were statistically significant at 1% and had negative relationship with rice importation in Nigeria. And indication that increase in local rice production will leads to reduction in rice importation. Though, the result follows a-priori expectation, but authors have argued the importance of preference of imported rice over locally produced rice. People prefer imported rice to Nigerian rice as a result of taste, brand and absence of stones and debris. Price of local rice is lower than the imported rice base on the quality difference and higher preference of imported rice. So higher premium on Nigerian rice could possibly reduce importation. Furthermore, exchange rate and inflation rate were also significant at 1% but had positive relationship with rice importation in Nigeria, this also signifies increase in rice importation with increase in exchange rate and inflation. Here, we have it that both exchange rate and inflation have no or little influence on rice preference. It seems that the utility derived from consumption of imported rice promote its preference and willingness to pay more for the commodity. This is in contrary to the work of Sunday *et al.* (2015) which found out that the long run import demand of rice had negative relationship with exchange rate. Other variables (tariff on rice importation, per capita income, and external reserve) were found not to be statistically significant and so had little or no effects on rice importation in Nigeria.

Table 6: Estimates of the Trade Policy effects on Rice Imports in Nigeria (long run)

Variables	Coefficients	Standard Error	t. statistics
LIM(-1)	1.000		
LTP(-1)	0.0466	0.1286	0.3623
LRP(-1)	-3.9068	1.7078	-2.2876***
LPCI(-1)	0.0094	0.4302	0.0219
LP(-1)	-0.8431	0.2237	-3.7676***
LINF(-1)	1.2633	0.4866	2.5960**
LEXR(-1)	1.7314	0.5308	3.2616***
LER(-1)	-0.1520	0.2824	-0.5380

Source: Data Analysis, 2023 (Eview 12)

CONCLUSION AND RECOMMENDATIONS

To control the increase in rice importation in Nigeria, government at one time or the other put different tariff regime on rice importation. This study set out to find out the effects of different tariff regime has on rice importation and it was found out that tariffs had no significant effect on rice importation whereas other factors like local rice production, price of rice, inflation rate and exchange rate affects rice import greatly. Border porosity might largely influence this shortfall and or inconsistency in the trade policies enforced. Most of the trade policies changes whenever we have a change in government. However, rice importation is driven by factors beyond import tariff restriction, the insignificance of the variable attest to this claim. As both local rice production and price significantly influence rice importation, it is evident from the study that increasing local rice production could pivot reduction of rice importation. Therefore, the study suggests measures to enhance local production through its commercialization (large scale of local production). Rice importation should be based on equilibrium market price and not on subsidy and to achieve this, market determine exchange rate should prevail in the economy.



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