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Trade Restriction and its Implications on Domestic Production of Rice in Nigeria

Ahmed Muhammed SALIK *

Osman Nuri ARAS **

Abstract

This study ascertained whether rice trade restriction policies embarked upon by Nigerian government between 2007 and 2019 as a way of boosting domestic rice production has any empirical justification. To achieve this objective, the study utilised time series data on domestic rice production (DP), border closure (BC), Rice import tariff (Tariff), Volume of rice imported (Imp) and Food price deflator for crop production sub-sector (Def). These data were analysed using descriptive and bivariate tools as well as the OLS regression models. The study found that trade restriction (proxied rice import tariff and border closure) alone was not effective in stimulating domestic rice production. A combination of other non-trade factors (e.g. measures to enhance local productive) also matter.

Keywords: Nigeria, non-tariff barriers, policy impact, rice production, tariff, trade restriction

JEL: F13, F14, F19

Introduction

Rice is among the three leading food crops globally, with maize and wheat being the other two. In Nigeria, rice is an important staple crop, produced in over 18 of the 36 states and one of the most consumed staples in the country with a consumption per capita of 35kg (NBS, 2019). According to the Food and Agriculture Organisation (FAO, 2018), Nigeria is the largest producer of rice in Africa and the top 14 producers globally with China, India and Bangladesh as the leading producers in that order.

The country is the leading consumer of rice in Africa and the high demand for the product in the country has created deficit between the domestic demand and supply of rice. In order to meet the deficit in the supply of milled rice, Nigeria resorted to importing milled rice from India, Thailand, Vietnam, among other countries. In 2017, the total amount of rice imported into Nigeria was 2 million MT which ranked the country as the third largest importer of rice in the world after China and the Philippines while in 2019 local rice production was 4.7 million MT with 2.4 million MT importation (US Department of Agriculture, 2019). Nigeria remains the largest rice importing country in Africa followed by Côte d'Ivoire. Besides the existing demand and supply gap, Nigerians have a preference for imported rice based on the perception that it is of high quality and better taste.

* *Nile University of Nigeria, Abuja, Nigeria. Email: ahmedmsalik@gmail.com*

** *Nile University of Nigeria, Abuja, Nigeria. Email: osmannuriaras@nileuniversity.edu.ng*

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In a bid to address the increasing gap between domestic demand and supply of rice as well as the associated foreign exchange problems, the Nigerian government has embarked on a number of policy initiatives. These range from credit support (Agricultural Credit Guarantee Scheme Funds, Anchor Borrowers Programme) to trade restriction (increased tariff on imported rice and closure of land border).

With the rapid rise in government interventions and trade restriction in Nigeria, there was an expectation that domestic rice production will expand, which will reduce prices of rice in the country. It was also expected that rice importation will decline. The extent to which these objectives have been achieved is uncertain judging by the rising food inflation since the implementation of the policy in August 2019. The National Bureau of Statistics (NBS) reported that food inflation rate rose from 13.2% in the month of August 2019 to 14.09% in October 2019.

In view of the above and given the fact that no empirical study has been conducted to ascertain the extent to which the recent border closures among other policy measures have impacted on domestic rice production, this study becomes a significant undertaking. The paper is subdivided into five sections. The introduction, reviews both theoretical and empirical literatures are captured in the first and second sections. The methodology and data discussion/analysis were contained in the third and fourth sections while the fifth section concludes and provides recommendations.

The specific objectives of the study include the following:

i. Characterise the patterns of domestic rice production and rice importation in Nigeria between 2007 and 2019.

ii. Assess the impact of rice trade policy (border closure and increase in rice import tariff) on domestic rice production in Nigeria.

iii. Examine if rice trade policy fuels food inflation in the country.

Literature Review

The World Bank (2013) reported that share of rice production traded globally is insignificant when compared to other food crops. This is in spite of being among the three leading food crops globally. This, according to the Bank is due to highly protectionist policies embarked upon by most governments with a view to supporting domestic producers of price, and price stability (World Bank, 2013). These policies have however, led to higher domestic price fluctuations (USDA, 2019). While the production of rice is higher in high-income Asian countries such as Japan, Taiwan, the Republic of Korea, and China, many low-income countries such as Nigeria have huge deficit in the supply of milled rice, and high import tariffs occur in many of these countries.

In Nigeria, rice has become one leading food staple, the third-most consumed after maize and cassava. The growing demand for the product has been attributed to a number of factors. These factors range from rapid population growth (currently estimated to be over 200 million people), to income growth. With an annual population growth rate of 2.6%, the trend of rice demand will maintain an upward push. Although the crop is cultivated in most parts of the country, the North West produces over 72% of Nigeria's total domestic production (NBS, 2019). Over the years, Nigeria has remained the second largest producer of the product in Africa after Egypt. The country's production level stood at a CAGR of 6.5% over the last 10 years, reaching 8.44 million metric tonnes in 2019 (FAO, 2020).

The annual deficit in rice production averaged 3.4 million tonnes between 2007 and 2019 (NBS, 2019). To meet this deficit, the country has continued to import the product from a number of countries (Thailand, India and the USA), importing about 2million tonnes of the product in 2017 (USDA, 2019). It is worthy of note that this figure excluded those imported through informal cross-border channels. According to KPMG (2018), Nigeria incurred about $5 million daily for rice importation. The trend in rice import has declined in recent times, decreasing by 1% between 2007 and 2019. This is in spite of the continuous growth in rice demand, averaging 5.3% between 2007 and 2019.

Interventions in rice production/trade in Nigeria have focused on protecting local rice producers through the use of

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protectionist trade policy. Liberalized trade policy is only used whenever the goal is to improve consumers' welfare. Thus, trade policies in the food crop subsector (rice) have continued to focus on quantity restrictions, bans and adjustment to rice import tariffs. These policies can have varying effects on the nation's economy. Empirical evidence by Balié & Valera (2020) suggests that trade restrictions have positive effects on domestic production, incomes and employments. This finding is consistent with the theoretical postulation of the Protectionists which emphasizes that government should promote exports by placing restrictions on imports. The basic idea of this school of thought is that restricting import of goods and services stimulates domestic production and creates employment, thus providing extra income and jobs in the country.

The theoretical arguments against trade restriction have been centred around consumers. Salvatore (2004) and Cohen (2019) argue that trade restriction can hurt the economic agents (households and business entities) it is intended to protect in the long-term. Trade restriction, according to the authors, slows economic growth and increases price inflation and this portends danger for consumers. Thus, increased prices due to trade restriction would fall disproportionately on the low income and fixed income earners. Other arguments against trade restriction relate to the long-term benefits from international trade which include capacity utilisation, economies of scale, technology sharing.

Notwithstanding the criticism, it must be acknowledged that trade restriction gives shelter to infant domestic industries. However, its effectiveness depends on the development of local productive base, elasticity of demand for imported goods among others. A number of empirical studies has laid credence to this fact. For instance, Odularu (2010) investigated how trade liberalization policy impacted on the Nigeria's rice sector performance. The study employs descriptive tools and the Ordinary Least Squared Regression model. The study found that the impact of trade liberalization policy in rice development was not sustainable. This, according to the study was due to government's inability to address the pre-existing problems in the nation's agricultural sector which include non-trade factors (lack of infrastructures, and low productivity). The study argued that liberalizing the sector without recourse to these issues could worsen (rather than boost) the rice trade situation.

In a related study, Igberi & Amadi (2017) investigated how restricting rice import affects domestic production of rice in Nigeria. More specifically, the study ascertains whether import restrictions boost rice domestic production in Nigeria and to determine the factors that drive Gross Domestic Rice Product (GDRP) in Nigeria. Consequently, data on Gross Fixed Capital Formation (GFCF), GDRP, domestic producer's prices (PPN), average foreign rice producer's prices (PPF), and the labour force (LABF), import restriction dummy variable (POL1) were obtained. The Cointegration, VECM (Vector Error Correction Model), Impulse Response Function (IRF) and the Granger Causality Test (GCT) were utilised. The study found that restricting rice importation had an insignificant effect on domestic rice production. Its impact is only significant on the PPF and LABF. The study recognises that though import restriction is a veritable tool, policies that seek to drive both public and private investment should be prioritised.

Okodua (2018) investigated how tariff barriers on imported rice have impacted on income and employment of rural Nigerian households. The study utilised the static Computable General Equilibrium (CGE) framework. The study found that the series of tariff barriers in Nigeria have boosted employment and income generation for households.

It should be noted that all of the empirical evidence we discuss above were conducted in Nigeria. Several others are carried out outside Nigeria and they yielded similar results, suggesting that there may be no location differences in the impact of trade restriction on a nation's economy. For instance, Gebru (2016) analysed the impact of trade restrictions on the economic growth of developing countries. Trade openness measures, government efficiency indicator, market size, physical capital, level of human capital, and economic growth proxied by GDP were considered as study variable. Fixed effects estimation technique was employed and the study found that trade restrictions could have positive impact on economic growth of developing countries. However, government effectiveness and the level of economic development were shown to be more important factors in evaluating the effect of trade restrictions on economic growth. It was shown that countries with high levels of government effectiveness and countries with low levels of income benefited more from trade restrictions than others.

Similarly, Zahonogo (2016) assessed the impact of trade openness on economic growth in sub-Saharan Africa (SSA). Panel data between 1980 and 2012 were gathered from 42 SSA countries. The Pooled Mean Group estimation technique was employed. The study found that the impact of trade openness on economic growth is beneficial only within certain threshold, suggesting nonlinear relationship between the variables in SSA countries.

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Methodology

The study relies solely on secondary data. Domestic rice production and food inflation proxied food price deflator are classified as the dependent variables while the independent variables are land border closure (measured using dummy variable) and rice import tariff. The data on these variables were obtained from the Nigerian Customs Service, Food and Agriculture Organisation and the US Department of Agriculture.

To empirically assess how the border closure among other trade policies has impacted on domestic production of rice and food prices, the study utilizes the Ordinary Least Squares regression model due to its efficiency (minimum variance unbiased estimator) (Koutsoyiannis, 1977; Goksel & Ozden 2009). Two models are employed in order to validate the impact of Nigeria's border closure on domestic production of rice and on prices of food items. The first model tests the relationship between border closure and domestic rice production while the second assesses the impact of trade restriction (ban on rice importation/increased rice tariff) and prices of food items in Nigeria.

The models are specified in implicit form as follows:

$RP = f(BC, Tariff, Imp)$ (1)

$Def = f(BC, Tariff, Imp)$ (2)

Where:

RP = domestic rice production (measured in volume,Tones)

BC = border closure (measured using dummy,1 is assigned if total ban, 0 if otherwise)

Tariff = Rice import tariff

Imp = Volume of rice imported

Def = Food price deflator (crop production)

The models are specified in explicit form as follows:

$LnRP_t = \beta_0 + \beta 1LnBCt + \beta_2 LnTariff_t + \beta_3 LnImp_t + \mu_t$ (3)

$LnDef_t = \beta_0 + \beta_1 LnBC_t + \beta_2 LnTariff_t + \beta_3 LnImp_t + \mu_t$ (4)

Where:

RP, BC, Tariff, Imp, and Def are as previously defined

β's = coefficients

μ_t = random term

β_i (i = 1-3) = vector of parameters to be estimated

Ln = Natural logarithm

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Results and Discussions

This section presents and analyses data on domestic rice production (DP), border closure (BC), Rice import tariff (Tariff), Volume of rice imported (Imp) and Food price deflator for crop production sub-sector (Def). The summary statistics for these variables are presented in Table 4.1

Table 4.1. Summary Statistics

	TARIFF	RP	IMP	DEF
Mean	65.69231	5749221.	2223077.	116.1942
Median	70.00000	5432930.	2100000.	112.1871
Maximum	110.0000	8435000.	3200000.	174.8668
Minimum	15.00000	3186000.	1300000.	77.89152
Std. Dev.	30.96338	1824655.	541454.6	26.89074
Skewness	0.077896	0.247969	0.150824	0.731377
Kurtosis	2.082014	1.702368	2.133557	2.967239
Jarque-Bera	0.469609	1.045311	0.455930	1.159557
Probability	0.790725	0.592944	0.796152	0.560022
Sum	854.0000	74739873	28900000	1510.525
Sum Sq. Dev.	11504.77	4.00E+13	3.52E+12	8677.345
Observations	13	13	13	13

Figure 4.1 contains descriptive statistics of the study variables. As shown in the figure and Appendix I, the average tariff on rice import in Nigeria was 65.69%; while the tariff was 15% imposed in 2008 and the highest, 110% imposed in 2013 and 2014. The highest volume of domestic rice production and importation were 8435000 tonnes and 3200000 tonnes respectively. While their minimum volumes were 3186000 metric tonnes and 1300000 tonnes recorded in 2007 and 2019 respectively.

Concerning food inflation rate, the table reveals that, even though domestic rice production has been increasing, the CPI for crop production has been rising, averaging 116.19%

The pattern of movements among volume of rice importation, domestic production and tariff between 2007 and 2019 are cast in Figure 4.1.

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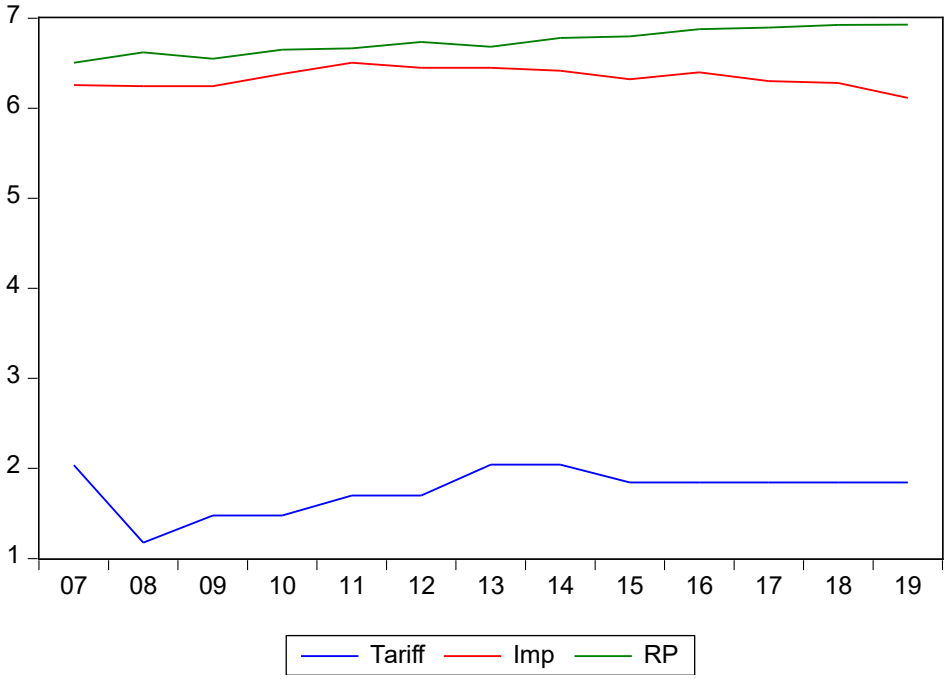

Figure 4.1. Trend of Rice Importation, Domestic Production and Tariff

From Figure 4.1 and appendix I, it can be seen that tariff on imported milled rice has generally followed an upward. A closer look reveals that tariff recorded its lowest value in 2008 with 15%. During this period, volume of rice importation and domestic production stood at 1,750,000 and 4,179,000 metric tonnes respectively. In 2019, the tariff was raised to 70% and this led to reduction of imported rice mill 1,300,000 metric tonnes while the domestic production rose to 8,435,000 metric tonnes.

The logical import of this trend is that at such periods, tariff on rice could be identified as partly explaining the character of changes rice importation and domestic production. Also, the graph shows that while domestic production has been stable, assuming an increasing trend between 2007 and 2019, rice importation has generally followed a downward trend since 2011.

The pattern of dependencies among the study variables was investigated using Bivariate tool (Pearson Correlation) as presented in Table 4.2.

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Table 4.2: Spearman Rho Correlation

	Volume of rice imported	Rice import tariff	border closure	domestic rice production
Volume of rice imported	1			
Rice import tariff	.141 .645	1		
border closure	-.606* .028	.315 .294	1	
domestic rice production	-.206 .499	.188 .538	.461 .112	
Food price deflator	-.285 .346	.183 .550	.503 .080	.939** .000

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
Source: Extract from Appendix II

Table 4.2 contains the pattern of dependencies among the study variables. The results in the table reveal the following dependencies:

i. Volume of milled rice imported has positive correlation with import tariff (rs = .141) but negative correlation with border closure, domestic rice production and food inflation in Nigeria. Exception of border closure (which has a strong correlation at 95% level of significance), the other correlations are considered negligible.

ii. Trade restriction policy proxied by tariff and border closure has positive but weak correlations with domestic rice production and food inflation

iii. Food inflation has positive and strong correlations with domestic rice production

To evaluate trade restriction among other control variables' impacts on domestic rice production and food inflation in Nigeria, the multivariate Ordinary Least Squares (OLS) regression models specified in the preceding section were estimated using Eviews 9.0. The choice of the OLS regression model is informed by its efficient property (minimum variance unbiased estimator). The results are presented in Table 4.3 and Table 4.4.

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Table 4.3: Regression Estimates (Model One)

Dependent Variable = Domestic Rice production

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BC	0.019621	0.052385	0.374562	0.7177
DEF	1.412900	0.180767	7.816153	0.0001
IMP	0.197634	0.216491	0.912898	0.3880
TARIFF	-0.034232	0.080420	-0.425663	0.6816
C	2.637623	1.388926	1.899038	0.0941

R-squared	0.904590	Mean dependent var	6.738804
Adjusted R-squared	0.856885	S.D. dependent var	0.141274
S.E. of regression	0.053445	Akaike info criterion	-2.736618
Sum squared resid	0.022851	Schwarz criterion	-2.519330
Log likelihood	22.78802	Hannan-Quinn criter.	-2.781281
F-statistic	18.96222	Durbin-Watson stat	1.610417
Prob(F-statistic)	0.000383		

Table 4.3 contains estimates on how trade restriction among other regressors (independent variables) affects domestic rice production (RP) in Nigeria. As shown in the table, the probability of F-score is less 0.05, indicating that all the regressors are significantly related to RP. This implies that the identified variables explained 90.45% of the variations in RP as evidenced by the R-Squared statistics.

Furthermore, Table 4.3 reveals that rice tariff (Tariff), volume of rice imported (Imp) and border closure do not have any significant impact on domestic rice production given their respective probability values which are substantially higher than the cut-off value of 0.05. In sum, the table shows that only food inflation that directly and strongly influences domestic rice production in Nigeria. Put differently, the results in the table suggest that, the impact of trade restriction on domestic rice production, though positive, is statistically insignificant. This finding corroborated those of Odularu (2010) and Igberi & Amadi (2017) who argued that rice trade policy should be preceded with government programmes (investment) that aimed at boosting domestic rice production.

Similarly, to ascertain whether trade restriction fuels food inflation in Nigeria between 2007 and 2019, the study estimated equation (2) from the preceding section. The estimated results are shown in Table 4.4.

Table 4.4: Regression Estimates (Model Two)

Dependent Variable = Food Inflation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BC	0.006945	0.035082	0.197960	0.8480
IMP	-0.137962	0.143328	-0.962563	0.3640
RP	0.625814	0.080067	7.816153	0.0001
TARIFF	0.034439	0.052737	0.653033	0.5320
C	-1.346815	1.006433	-1.338207	0.2176

R-squared	0.910935	Mean dependent var	2.054951
Adjusted R-squared	0.866403	S.D. dependent var	0.097313
S.E. of regression	0.035569	Akaike info criterion	-3.550964
Sum squared resid	0.010121	Schwarz criterion	-3.333676
Log likelihood	28.08127	Hannan-Quinn criter.	-3.595627
F-statistic	20.45551	Durbin-Watson stat	1.328229
Prob(F-statistic)	0.000292		

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As shown in Table 4.4, trade policy proxied by border closure and tariff with estimated coefficients of 0.006945 and 0.034439 respectively directly influence food inflation in Nigeria but these influences are not statistically significant. The volume of rice importation on the one hand, reduces food inflation. This influence is also not very significant.

Juxtaposing the results in Table 4.3 and 4.4, it can be noted that:

i. Increasing tariff on rice importation without addressing the deficient local productive base will only depress domestic rice production while fueling food inflation; and

ii. Border closure boosts domestic rice production to a little extent. This positive gain, however, is offset by soaring food prices as the domestic productive base could not support the deficit created by the border closure.

Conclusion and Recommendations

Between the years 2007-2019, Nigeria pursued a policy of restricting rice importation through heightened tariff and boarder closures, with the aim to protect local rice producers, stimulate increased rice production and cut the rice import bill. In spite of the vigour with which the policy was implemented, the outcomes have not met with the expectations of policy makers and the consumers at large. This study empirically assessed the impact of the policy on domestic rice production and on food price inflation in Nigeria. The study found that restrictive trade policies like increment in tariff and boarder closures, without a set of complementary policies to broaden local productive base, rather than stimulate local production actually depressed domestic rice production and fuelled food price inflation.

Similarly, the study found that boarder closures impacted domestic rice production only minimally during the period under review. The boarder closure also created rice deficit which domestic rice producers were not quick to meet up with and hence the little positive gain on rice production was offset by the soaring food prices.

Following from the study's findings and conclusions, it is recommended as follows: i) both the boarder closure and the total ban on the importation of rice should be lifted forthwith. ii) attention should be focused on expanding the local rice production base, iii) a phased programme of 5-years should be introduced during which incentives would be given to rice farmers to acquire, prepare and bring more hectares of land under cultivation, iv) suitable rice cultivation implements, insecticides and fertilizers etc. should be provided in abundance to both existing and new rice farmers, v) rice millers should be incentivised to invest in the expansion of existing and new capacities through the provision of credit facilities at below commercial interest rates, vi) the government should encourage local design and manufacture of rice mills as well as the importation of plant and equipment of "appropriate technology" suitable for a developing economy, all geared towards a massive expansion of the rice productive base.

The foregoing would be minimum essential requisites for a successful programme of expanding rice production to reach self-sufficiency. With an expansion of the rice productive base, local rice output levels would be boosted and rice would be available to consumers at lower prices. Thus, it would be unnecessary to impose any trade restrictions on rice import because local rice would be cheaper than imported one and the consumers would ceteris paribus adjust their preferences towards cheaper local rice. Trade restrictions generally inhibit welfare, are antithetical to growth and are against the spirit of free-trade as enshrined in world Trade Organisation's (WTO) policies. Such restrictions should have no place in the economy of a developing country like Nigeria.

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References

Balié, J., & Valera, H. G. (2020). Domestic and international impacts of the rice trade policy reform in the Philippines. *Food Policy*, *92*. https://doi.org/10.1016/j.foodpol.2020.101876

Cohen, S. D. (2019). *Fundamentals of US foreign trade policy: economics, politics, laws, and issues*. Routledge.
FAO (2018). State of World Crop, Fisheries and Aquaculture 2018. Retrieved from http://www.fao.org/documents/card/en/c/I9540EN/

FAO (2020). The State of World Fisheries and Aquaculture 2020. Sustainability in action. Rome. https://doi.org/10.4060/ca9229en

Gebru, D. (2016). Trade Restrictions Impact on the Economic Growth of Developing Countries (Dissertation). Retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-189438

Goksel, A., & Ozden, G. (2009). Determination of total factor productivity Cobb-Douglas production function in agriculture: The case of Aydin - Turkey. *Journal of Applied Sciences*, *7* (4), 499-502.

Igberi, C.O. & Amadi, M.U. (2017). Impact of import restriction on rice production in Nigeria, *J Food Process Technol,* 2017, 8(8), 70. DOI: 10.4172/2157-7110-C1-066

Koutsoyiannis, A. (1977). *Theory of Econometrics. An Introductory Exposition of Econometric Methods*. The Macmillan Press Ltd, London, UK.

KPMG (2019). Rice Industry Review. Retrieved from https://home.kpmg/ng/en/home.html

National Bureau of Statistics-NBS (2019). Statistical Bulletin, Abuja, Nigeria.

Nigeria Costumes Services-NCS (2021), CET Tariff – Act No.4. Retrieved from https://customs.gov.ng/?s=rice

Odularu, G. O. (2010). Rice trade policy options in an open developing economy: The Nigerian case study. *Journal of Development and Agricultural Economics*, *2*(5), 166-177. https://doi.org/10.5897/JDAE.9000112

Okodua, H. (2018). Assessing the impact of rice sector policy reforms on the income mobility of rural households in Nigeria. *The Open Agriculture Journal*, *12*(1), 174-184. doi: 10.2174/1874331501812010174

Salvatore, D. (2004). *International Economics*, 8th ed.

US Department of Agriculture-USDA (2019). Agricultural Research Service, Food Data Central. Retrieved from fdc.nal.usda.gov

Yeo, A. D., & Deng, A. (2019). The trade policy effect in international trade: case of Pakistan. *Journal of Economic Structures*, *8*(1), 1-17. https://doi.org/10.1186/s40008-019-0169-8

Zahonogo, P. (2016). Trade and economic growth in developing countries: Evidence from sub-Saharan Africa. *Journal of African Trade*, *3*(1-2), 41-56. https://doi.org/10.1016/j.joat.2017.02.001

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Appendix I: Raw Data

Year	Imp	Tariff	BC	RP	Def
2007	1,800,000	109	1	3,186,000	77.89152357
2008	1,750,000	15	0	4,179,000	86.60317203
2009	1,750,000	30	0	3,546,250	94.32787019
2010	2,400,000	30	0	4,472,520	100
2011	3,200,000	50	0	4,612,614	103.8915679
2012	2,800,000	50	0	5,432,930	108.9143517
2013	2,800,000	110	0	4,823,330	112.1871017
2014	2,600,000	110	0	6,002,831	114.6382565
2015	2,100,000	70	0	6,256,228	120.4206601
2016	2,500,000	70	0	7,564,050	126.7793323
2017	2,000,000	70	1	7,826,120	136.658919
2018	1,900,000	70	1	8,403,000	153.3455389
2019	1,300,000	70	1	8,435,000	174.8667609

Sources: USDA, 2019; NBS, 2019; FAO, 2020; NCS, 2021.

Appendix II: Correlation

Correlations

		Volume of rice imported	Rice import tariff	border closure	domestic rice production	Food price deflator
Volume of rice imported	Pearson Correlation	1	.141	-.606*	-.206	-.285
	Sig. (2-tailed)		.645	.028	.499	.346
	N	13	13	13	13	13
Rice import tariff	Pearson Correlation	.141	1	.315	.188	.183
	Sig. (2-tailed)	.645		.294	.538	.550
	N	13	13	13	13	13
border closure	Pearson Correlation	-.606*	.315	1	.461	.503
	Sig. (2-tailed)	.028	.294		.112	.080
	N	13	13	13	13	13
domestic rice production	Pearson Correlation	-.206	.188	.461	1	.939**
	Sig. (2-tailed)	.499	.538	.112		.000
	N	13	13	13	13	13
Food price deflator	Pearson Correlation	-.285	.183	.503	.939**	1
	Sig. (2-tailed)	.346	.550	.080	.000	
	N	13	13	13	13	13

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

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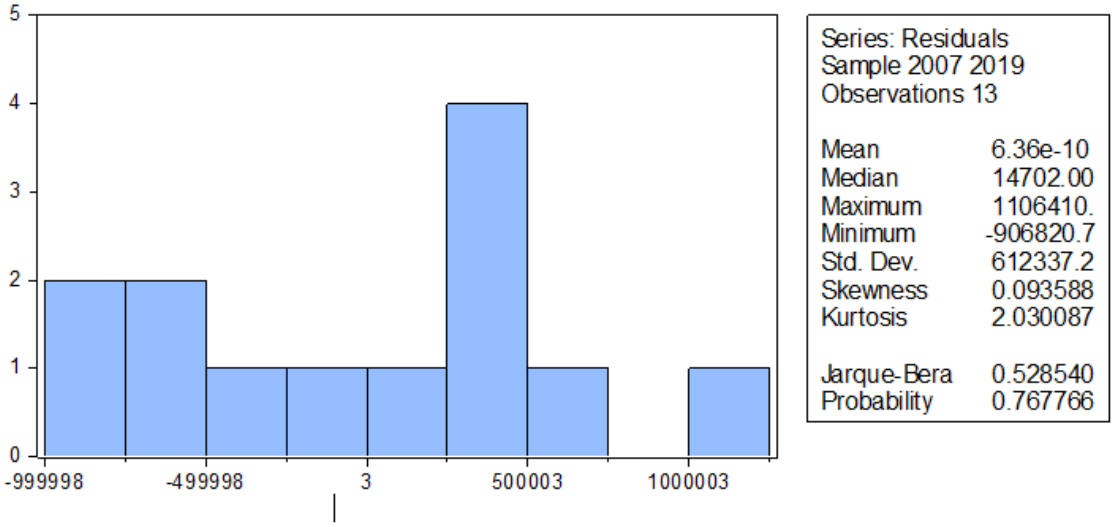
Appendix IIIA: Model One

Dependent Variable: RP
Method: Least Squares
Date: 02/15/21 Time: 15:24
Sample: 2007 2019
Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BC	0.019621	0.052385	0.374562	0.7177
DEF	1.412900	0.180767	7.816153	0.0001
IMP	0.197634	0.216491	0.912898	0.3880
TARIFF	-0.034232	0.080420	-0.425663	0.6816
C	2.637623	1.388926	1.899038	0.0941

R-squared	0.904590	Mean dependent var	6.738804
Adjusted R-squared	0.856885	S.D. dependent var	0.141274
S.E. of regression	0.053445	Akaike info criterion	-2.736618
Sum squared resid	0.022851	Schwarz criterion	-2.519330
Log likelihood	22.78802	Hannan-Quinn criter.	-2.781281
F-statistic	18.96222	Durbin-Watson stat	1.610417
Prob(F-statistic)	0.000383		



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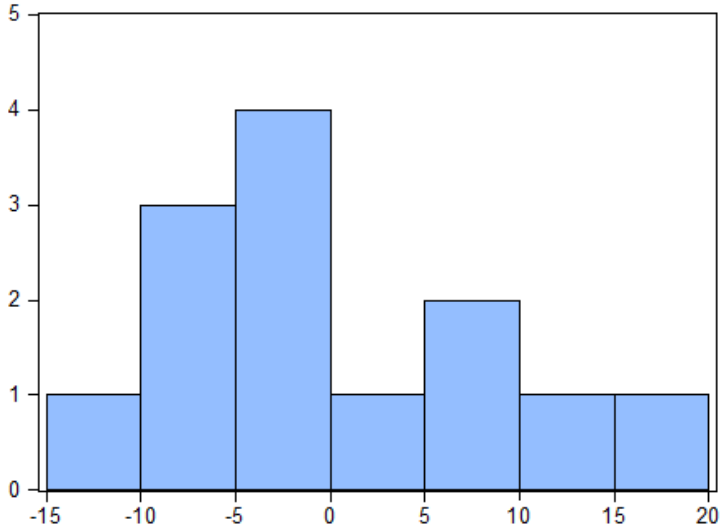
Appendix IIIB: Model Two

Dependent Variable: DEF
Method: Least Squares
Date: 02/15/21 Time: 15:26
Sample: 2007 2019
Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BC	0.006945	0.035082	-0.197960	0.8480
IMP	-0.137962	0.143328	-0.962563	0.3640
RP	0.625814	0.080067	7.816153	0.0001
TARIFF	0.034439	0.052737	0.653033	0.5320
C	-1.346815	1.006433	-1.338207	0.2176

R-squared	0.910935	Mean dependent var	2.054951
Adjusted R-squared	0.866403	S.D. dependent var	0.097313
S.E. of regression	0.035569	Akaike info criterion	-3.550964
Sum squared resid	0.010121	Schwarz criterion	-3.333676
Log likelihood	28.08127	Hannan-Quinn criter.	-3.595627
F-statistic	20.45551	Durbin-Watson stat	1.328229
Prob(F-statistic)	0.000292		



Series: Residuals
Sample 2007 2019
Observations 13

Mean	-2.02e-14
Median	-0.860150
Maximum	17.86001
Minimum	-12.01226
Std. Dev.	8.833430
Skewness	0.472916
Kurtosis	2.370502
Jarque-Bera	0.699219
Probability	0.704963