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Policy Instruments and Food Importation in Nigeria: An Overview from 1980-2017

Abolarin, S. S.*, Ater, P. I., Ezihe, J. A. C., and Umeh, J. C.

Department of Agricultural Economics, University of Agriculture Makurdi, Benue State, Nigeria.

*Corresponding Author E-mail: abolarin.samuelsesan@gmail.com +2348037405958

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ABSTRACT: This study examines the trends in policy instruments and food importation in Nigeria: an overview from 1980 to 2017. The study relied on annual time series data on the amount of rice, sugar, and wheat imported throughout the study period. For this work, the growth model and the vector error correction model (VECM) were used. All variables were tested for stationarity using the Augmented Dickey Fuller test. The result demonstrated that rice, sugar, and wheat importation surged and significantly drained the Federal Reserve's during the time under consideration. The foreign funds that would have been utilized to import capital goods for infrastructure improvement were severely depleted. The Federal Government of Nigeria (FGN), through the Federal Ministry of Agriculture and Rural Development (FMARD), public-private partnerships (PPPs), and non-governmental organizations (NGOs), should put in place policies to provide improved seeds/seedlings, agro-chemicals, technique, and material technologies, which are critical for cultivating over 34 million hectares of agrarian lands in Nigeria for improved crop yields and increased production. As a result, import substitution will occur, freeing up much-needed foreign funds for capital accumulation and infrastructure development. The latter is critical for attracting Foreign Direct Investment (FDI), which will result in increased job creation, a more aggressive fight against youth delinquency, and overall poverty reduction.

Keywords: Policy instruments, selected food importation, monetary policy, Public investment in agriculture, trend

INTRODUCTION

The agricultural sector is well-known to be a fuel that fast-tracks the pace of structural transformation and diversification of the economy, empowering the country to fully utilize its factor endowment, depending less on foreign supply of agricultural product or raw materials for its economic growth, development and sustainability (Ishola et al., 2013). Public investment in agriculture has significant and observable effects on agricultural productivity which improves health and nutrition, through access to own-produced food, by lowering food prices, and raising incomes with which to buy more and more nutritious food and health services (Tewodaj, Bingxin, Shenggen and Linden, 2012). Increasing government expenditure on agricultural research and development has proof to improve agricultural productivity and has the

second largest impact on rural poverty reduction (Tewodaj, et al, 2012). Analysis by Tewodaj et al. (2012) shows the importance of public investment in Agricultural Research and Development (R&D), irrigation and extension as the growth of production. The result established that R&D investment returns in terms of poverty reduction are steadier than that of other types of public agricultural spending (Tewodaj et al., 2012).

In Sub-Saharan Africa, and Nigeria in particular agriculture is the backbone of overall growth for most of the countries in this region and essential for poverty reduction and food security (Food and agriculture Organization (FAO), 2009). Nigeria currently imports foods for domestic consumption of her citizens (Onwuka, 2017). This is puzzling because a greater percentage of

her population is engaged in agriculture. The Northern region was noted for the groundnut pyramids that dotted the various parts of the region; the Western region for cocoa and the Eastern region were renowned for palm plantations. This success story was not sustained with the discovery of oil in exportable quantities, as agriculture was abandoned and neglected by successive governments in the country (Onwuka, 2017). Nigeria continued to import staple food for her growing population (ASTI, 2010; Onwuka, 2017). Today, Nigeria no longer produces sufficient food for the country's large and exploding population (Onwuka, 2017).

In 2011, the country imported about 3 million metric tons (MMT) of rice valued at N468billion (about 20 percent of Sub-Saharan Africa's total rice imports); and over N600billion of wheat to the detriment of its domestic agricultural development (ASTI, 2010; Onwuka, 2017) while sugar is the 2nd highest agricultural import in Nigeria in terms of quantity. The average share of imports of raw sugar in the domestic supply is about 96% (2005-2009) (MAFAP SPAAA, 2013; FAOSTAT, 2012). Nigeria today is ranked as global second largest importer of rice after the Philippines (Croser and Anderson, 2010; Onwuka, 2017). Today, Nigeria is known to be import reliance and a large chunk of the country's foreign exchange earnings is leaving the country's coffers daily for this purpose (Onwuka, 2017).

A report by the World Bank (2012) on the issue of supporting agriculture and food security, posits that 75% of the world poor live in rural areas and are mainly involved in farming. Hence, supporting agriculture remains the fundamental instrument for achieving economic growth, poverty reduction and food security especially in Africa (World Bank, 2012). Also, public investment in agriculture contributes to economic development by increasing output, productivity and provides amenities which enhance the quality of life. However, one major challenge facing Nigeria in recent time is the chronic feature of under development of agricultural potentials that it exhibits which could be ascribed to the fact that four-fifths of its national output is spent on consumption expenditure (Ebjemito et al., 2004; CBN, 2006 and Victoria, 2014) observed that the services generated as a result of an adequate public investment which could have earned handsome foreign exchange with increase in economic growth and aggregate output is then used for supporting consumption of imported products. Both public agricultural investments and monetary policy instruments are more than just contributing factors to production and reduction in food importation. Rather they are genuine tools for increased rate of economic growth as noted by earlier researchers (Babatunde et al., 2012). It becomes necessary to assess how these tools facilitate economy growth. Therefore, this study seeks to examine policy

instruments and food importation in Nigeria; an overview from 1980 to 2017.

METHODOLOGY

The study area

The study area is Nigeria. Nigeria lies between latitude and longitude of 4° to 14°N and 2° to 15°E, respectively

Methods of data collection techniques

Secondary data were used to carry out this study. Augmented Dickey Fuller was used to determine the stationarity of variables of interest. Johansen co-integration test was used to assess the existence of the long run relationship between policy instruments on selected import substitution food crops; Growth model was used in order to capture the effects of policy instruments on selected import substitution food crops in Nigeria.

Augmented Dickey Fuller (ADF) equation

$$\Delta Y_t = \beta_2 \text{ricimpt} + \beta_3 \text{sugimpt} + \beta_4 \text{whtimpt} + \beta_5 \text{pubinv} + \beta_6 \text{excr} + \beta_7 \text{infr} + \beta_8 \text{intr} + \beta_9 \text{mnsupt} + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \epsilon_t \quad (1)$$

Where, ϵ_t denotes Gaussians white noise that is assumed to have a mean value of zero, and possible auto correlation represents series to be regressed on the time t . The ADF has two hypotheses. Where, the null states series has unit root and the alternative states stationary. The study also engages an alternative test for unit root propounded by Philip Peron (PP) in 1988. The PP test is a semi-parametric test and has similar hypotheses to the ADF. This study for validity of the stationarity properties of the series uses the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test to confirm the outcome of ADF and PP test. In order to capture the effects of policy instruments on selected import substitution food crops in Nigeria: 1990-2017 the study adopted this models form;

Trend analysis and growth rates

Following Gujarati (2003) the trend model can be specified as follow:

$$Y_t = Y_0(1 + r)^t \quad (2)$$

Where:

Y_t = rice importation, sugar importation wheat importation, public investment in agriculture, exchange rate, inflation rate, interest rate and money supply in year t

Y_0 = rice importation, sugar importation wheat importation, public investment in agriculture, exchange rate, inflation rate, interest rate and money supply in year t

r = Compound rate of growth of Y

t = time in chronological years

Taking the natural log of equation (2) to make it linear, it is stated thus

$$\ln Y_t = \ln Y_0 + t \ln(1 + r) \quad (3)$$

Substituting $\ln Y_0$ with β_1 and $\ln(1 + r)$ with β_2 equation (3) is re-written as

$$\ln Y_t = \beta_1 + \beta_2 t \quad (4)$$

Add the disturbance term to equation (4) we obtain;

$$\ln Y_t = \beta_1 + \beta_2 t + \mu_t \quad (5)$$

Equation (5) is the growth rate model developed for the study. The growth model can therefore be stated for the variables of interest in equation (6):

$$\ln Y_t = \beta_1 + \beta_2 \text{ricimp} + \beta_3 \text{sugimp} + \beta_4 \text{whtimp} + \beta_5 \text{pubinv} + \beta_6 \text{excrt} + \beta_7 \text{infrt} + \beta_8 \text{intrt} + \beta_9 \text{mnsup} + \mu_t \quad (6)$$

Where:

Y_t = the variable of interest (rice importation, sugar importation wheat importation, public investment in agriculture, exchange rate, inflation rate, interest rate and money supply in year t). β_1 ricimp, β_2 sugimp, β_3 whtimp, β_4 pubinv, β_5 excrt, β_6 infrt, β_7 intrt, and β_8 mnsup are coefficients of the trend variables for rice importation, sugar importation wheat importation, and public investment in agriculture, exchange rate, inflation rate, interest rate and money supply respectively. A semi-log growth rate model was developed for this study instead of

a linear trend model because the study is interested in both the absolute and relative change in the parameters of interest for this study. The parameter of utmost interest in all equations is coefficient of β_2 - β_9 which is the slope coefficient which measures the constant proportional or relative change in Y for a given absolute change in the value of the regressor t .

Multiplying β_2 - β_9 by 100, gives the instantaneous growth rates (IGR) at a point in time

$$\text{IGR} = \beta_2 - \beta_9 \times 100 \quad (7)$$

Where IGR = Instantaneous growth rate and β_2 - β_9 = the least-square estimate of the slope coefficients. Secondly, taking the antilogs of β_2 - β_9 subtracting 1 from it and then multiplying the difference by 100 will give the compound growth rate (CGR) over a period of time.

$$\text{CGR} = (\text{antilog } \beta_2 - \beta_9 - 1) \times 100 \quad (8)$$

Finally, if β_2 - β_9 is positive and statistically significant there is acceleration in growth, if β_2 - β_9 is negative and statistically significant there is deceleration in growth, if β_2 - β_9 is not statistically significant there is stagnation in the growth process.

Specifying the model with the variables of Interest

To determine the effects of policy instruments on selected import substitution food crops

$$\nabla \ln Y_{t-1} = \alpha_0 + \sum_{i=1}^p a_1 \nabla \ln \text{pubinv}_{t-1} + \sum_{i=1}^p a_2 \nabla \ln \text{excrt}_{t-1} + \sum_{i=1}^p a_3 \nabla \ln \text{infrt}_{t-1} + \sum_{i=1}^p a_4 \nabla \ln \text{intrt}_{t-1} + a_5 \nabla \ln \text{mnsup}_{t-1} + ECT_{t-1} \quad (9)$$

Where:

Y_t = import substitution (rice, sugar and wheat) importation (tons)

Pubinv_{t-1} = public investment in agriculture (Naira)

excrt_{t-1} = exchange rate (Naira)

infrt_{t-1} = inflation rate (percentage)

intrt_{t-1} = interest rate (percentage)

mnsup_{t-1} = money supply (Naira)

ECT_{t-1} = Error correction term

A priori expectation

The coefficients of pubinv, excrt, infrt, intrt and mnsup are expected to be positive.

The data

The study made use of secondary time series data. The data were sourced from Central Bank of Nigeria (CBN) Statistical Bulletin, and National Bureau of Statistics (NBS) and United State Department of Agriculture (USDA).

RESULTS AND DISCUSSION

Stationarity test

The results of the unit root tests show the presence of a unit root (non-stationarity) tested against the alternative hypothesis of the absence of a unit root (stationarity), Riceimp (rice importation), sugimp (sugar importation), whtmp (wheat importation) Pubinv (public investment in agriculture), exrt (exchange rate), infrt (inflation rate) and mnsup (money supply) were not stationary at their levels. Thus, they were differenced once each to make them stationary. On application of the ADF test on their first differences, they all became stationary at first difference that is, they are cointegrated of order one (1(1)) as indicated by the value of their respective ADF statistic which are both larger (in absolute terms) than the standard critical values, thus leading to the rejection of the null hypothesis (Table 1). Figure 1 shows that between 1980 and 1984 there was a steady increase in selected food importation in Nigeria (0-7.5MT). This may be attributed to economic growths in the second phase of Nigeria post-independence economy, which was largely propelled by increasing oil export. This result is in agreement with the findings of Adedeji et al. (2016) who opined that, this period induced huge public investment which was also accompanied by expansion of general public consumption and over importation of foreign-made goods. This result is also in line with earlier authors like (All Africa, 2013; Chimaobi and Chizoba, 2015) that Nigeria spends N1.3trillion on the importation of four specific food items annually (rice, N1bn, sugar, N217bn, fish, N97bn and wheat, N635bn).

On the other hand, between 1984 and 1989 selected food importation in Nigeria experienced a steady decline (7.5-5.1MT). This may be attributed to recession in Nigeria economy as this period coincided with the period of structural adjustment program (SAP). This result is in line with and Adedeji *et al.*, (2016) who opined that, aggregate expenditure exceeded domestic output by a large margin so agriculture took a back seat compared to the oil sector contributing only 1% to export trade.

Between 1989 and 2017 importation of selected food continue to experienced increase although with few fluctuations in between. This may be due to short fall in domestic supply, failure of government program and

policies and poor government actions as they pay lip services to agricultural sector. This result agrees with the findings of earlier authors such as All Africa, (2013) that Nigeria spends N1.3trillion on the importation of four specific food items annually (rice, N1bn per day, N217bn on sugar, N97bn on fish and wheat, N635bn). Biyi, (2005) who found that domestic supply has not kept pace with demand as imports have steadily increased faster than domestic supply, accounting for close to 60% of total supply. Yusuf, (2017) that it is unfortunate that these programmes (FSP and FEAP) died as soon as the administration that initiated them was dethroned thereby limiting their impact on the masses. This result is in line with USDASGRAIN, (2013). That with increasing demand for wheat products (flour and flour-based foods), wheat has arguably become one of the most important agricultural commodities in higher demand in Nigeria.

Growth rate and direction of growth

The result of the growth rate and direction of growth for selected food importation in Nigeria is presented in (Tables 2 and 3). The result of direction of growth showed that the coefficient of; rice importation (0.0017), sugar importation 0.0018) and wheat importation (0.0025), were positive and significant at 5% and 1% level respectively. This implies that rice, sugar and wheat importation accelerated over the period under review. This may be due to the fact that rice production has not kept pace with demand in Nigeria. Other reasons may also include corruption and lip-service paid to the implementation of laudable agricultural policies by successive administrations (Ogen, 2003). The result is consistent with the findings of (All Africa, 2013; Chimaobi and Chizoba, 2015) that Nigeria spends N1.3trillion on the importation of four specific food items annually (rice, N1bn, sugar, N217bn, fish, N97bn and wheat, N635bn). This result is also in agreement with (Umeh and Atarboh, 2007; Ayanwale and Amusan, 2012; Oyakhilomen et al., 2015) who found that Self-sufficiency in rice production has eluded Nigeria for a long time despite over 36years of efforts by the Government of Nigeria towards its realization and that the importation of rice to bridge the demand-supply gap is worth N365 billion which is a loss of considerable foreign exchange for the country.

The result further showed that the direction of growth of public investment in agriculture (-0.0017), inflation rate (-0.0040), interest rate (-0.0018) and money supply (-0.0326) was negative and significant at 10% and 1% level respectively. This implies that the direction of growth of public investment in agriculture decelerated during the period. This may be due to low budgetary allocation in agricultural sector. This result is in line with the findings of Ujah and Dom, (2009), who found that the total federal

Table 1: Results of Augmented Dickey-Fuller (ADF) unit root tests.

Level	Level		1 st Diff		Decision
	t-statistic	Probability	t-statistic	Probability	
LNRICIMP	0.734561	0.8690	-5.433021	0.0000	I(1)
LNSUGIMP	1.012681	0.9149	-6.437751	0.0000	I(1)
LNWHTIMP	0.516384	0.8226	-5.700382	0.0000	I(1)
LNPUBEXP	1.833935	0.9820	-6.436616	0.0000	I(1)
LNEXCRT	0.516384	0.8226	-9.359395	0.0000	I(1)
LNINFRT	-3.399628	0.1740	-6.155599	0.0000	I(1)
LNINTRT	0.977556	0.9097	-6.516288	0.0000	I(1)
LNMNUSUP	-0.814672	0.3562	-5.944937	0.0000	I(1)

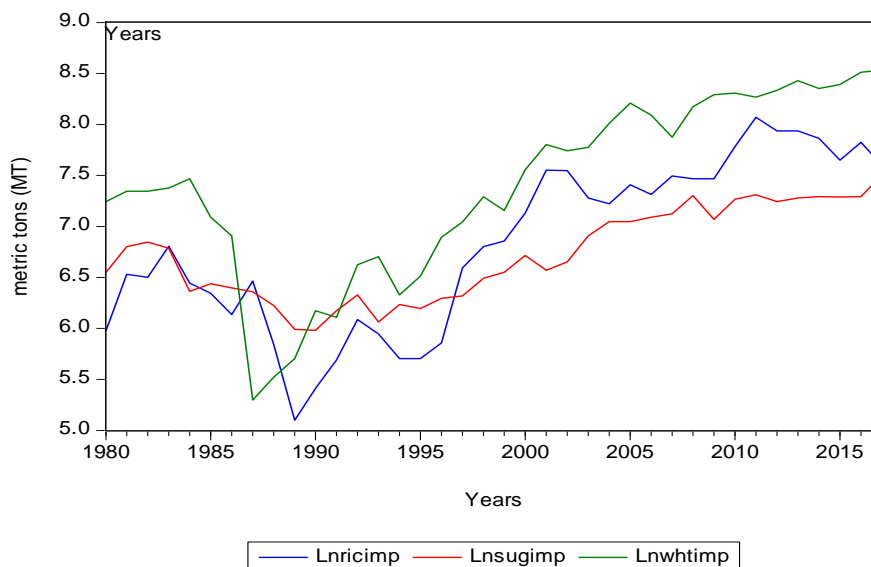


Figure 1: Trends in selected import substitution food crops in Nigeria.

Table 2: Instantaneous and Compound Growth Rate.

Variables	Instantaneous (%)	Compound (%)
Lnrincip	1.001691	-98.9983
Lnsugimp	1.001846	-98.9982
Lnwh timp	1.002574	-98.9974
Lnpubinv	0.998259	-99.0017
Lnexcr t	0.995977	-99.004
Lninflr t	0.99875	-99.0013
Lnintr t	0.99819	-99.0018
Lnmnsup	0.967896	-99.0321

agriculture budget (recurrent plus capital) in 2008 represented only 4.6% of total federal budget. This is below the CAADP’s (Comprehensive Africa Agriculture Development Programme) recommended thresh hold of 10% of budgetary spending on agriculture. In the same vein, the result showed that inflation rate decelerated during the period under review. This may be due to the

fact that inflation rate has significant effects on international trade. This result is in line with the findings of Ulke and Ergun (2011) who examined the link between inflation and import for Turkey economy for the period 1995-2010, the results indicated that 1% increase in import leads to about 36.79% decrease in inflation. Furthermore, the result revealed that interest rate and

Table 3: Direction of growth.

Variables	Inricimp	Inslugimp	Lnwh timp	Inpubinv	Lnexcr t	Lninflr t	Inintr t	Inmsup
Constant	6.0897	6.5582	6.8584	19.3469	2.6711	-0.6256	2.1746	19.1813
@Trend	-0.0025	-0.0373	-0.0356	0.2255	0.0317	0.3142	0.0888	1.1276
@Trend ²	0.0017	0.0018	0.0025	-0.0017	-0.0013	-0.0040	-0.0018	-0.0326
t-Value	(2.355)**	(5.644)***	(3.151)***	(-1.640)*	(-1.201)	(-4.803)***	(-4.343)***	(-4.801)***
R-squared	0.691411	0.781569	0.651486	0.872982	0.924050	0.090865	0.573639	0.411572
Adjusted R-squared	0.673778	0.769087	0.631571	0.865724	0.919711	0.038914	0.549276	0.377947
S.E. of regression	0.475204	0.216417	0.540501	0.705722	0.555942	0.690097	0.276380	4.501819
Sum squared resid	7.903658	1.639264	10.22495	17.43151	10.81752	16.66821	2.673511	709.3232
Log likelihood	-24.08472	5.803775	-28.97732	-39.11284	-30.04770	-38.26209	-3.489988	-109.5274
F-statistic	39.20982	62.61675	32.71316	120.2756	212.9162	1.749057	23.54507	12.24024
Prob(F-statistic)	0.000000	0.000000	0.000000	0.000000	0.000000	0.188799	0.000000	0.000093
Mean dependent var	6.824899	6.721086	7.389515	22.71275	3.322759	2.678055	2.978777	24.95027
S.D. dependent var	0.832000	0.450367	0.890471	1.925901	1.962007	0.703930	0.411672	5.707874
Akaike info criterion	1.425511	-0.147567	1.683017	2.216465	1.739353	2.171689	0.341578	5.922497
Schwarz criterion	1.554794	-0.018284	1.812300	2.345748	1.868636	2.300972	0.470861	6.051780
Hannan-Quinn criter.	1.471509	-0.101569	1.729015	2.262463	1.785351	2.217687	0.387576	5.968495
Durbin-Watson stat	0.428800	0.490102	0.410940	0.980162	0.858869	1.077672	0.840528	0.572245
Decision	Accelerated	Accelerated	Accelerated	Decelerated	Stagnated	Decelerated	Decelerated	Decelerated

money supply decelerated during the period under review. On the other hand, the result finally revealed that exchange rate stagnated during the period under review.

In addition, the result showed the growth rate were positive for rice, sugar, wheat importation, public investment in agriculture, exchange rate, inflation rate, interest rate and money supply with their corresponding values were 1.0016%, 1.0018%, 1.0026%, 0.9983%, 0.9959%, 0.9988%, 0.9982% and 0.9679% respectively for instantaneous growth rate and the result showed that growth rate for compound growth were negative for variables of interest during the period under review -98.9983%, -98.9982%, -98.9974%, -99.0017%, -99.004%, -99.0013%, -99.0018%

and -99.0321% respectively for compound growth rate respectively.

Conclusion and recommendations

One interesting thing about this study is that it attempts to compare methodological empirical studies conducted by early researchers to the present one, which made use of growth model and vector error correction model. The study analyzed the trend of effects of policy instruments on selected food importation in Nigeria from 1980 to 2017. The study has shown that selected food importation in Nigeria accelerated during the period under review. This result is very significant and informative as it clearly shows the weakness

in our policy instruments on variables of interest, which did not, yielded any positive results over the period under review. The analysis further revealed that policy instrument does not have predictable effects on selected food importation in Nigeria. The study recommends the need for government and it agencies to go into public private partnership to boost agricultural productivities in the country. Secondly, government through the federal ministry of agriculture (FMARD) and non-governmental organizations (NGOs) should promote local content in agriculture and stop playing lips services to laudable programmes and policies:

(1) Government through federal ministry of

agriculture (FMARD) and non-governmental organizations (NGOs) should put policies in place to prevent farm inputs racketeering.

(2) Government should implement Maputo 2003 of at least 10% of national budgetary resources to agriculture and Comprehensive Africa Agriculture Development Programme agreement.

(3) Government through national assembly and central bank of Nigeria should put appropriate policy in place that will promote agricultural activities in the country.

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