



TREND ANALYSIS OF EFFECTS OF POLICY INSTRUMENTS ON IMPORTATION OF SELECTED FOOD ITEMS IN NIGERIA: 1980-2017

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Abstract

This study analyzed the trends of effects of policy instruments on importation of selected food items in Nigeria, from 1980 to 2017. The objective of the study is to compare the trends the effects of policy instruments on importation of selected food items in Nigeria between 1980 and 2017. The study used annual time series data obtained from Central Bank of Nigeria (CBN) Statistical Bulletin, National Bureau of Statistics (NBS), United State Department of Agriculture (USDA) on quantity of rice, sugar and wheat imported during the period under review. Growth model was employed for this study. Augmented Dickey Fuller test was used for stationarity test for all the variables. The result revealed that rice (**2.355**); sugar (**5.644**) and wheat (**3.151**) importations accelerated and grossly depleted the Federal Reserve's over the period under review. The foreign reserves which would have been used for importation of capital goods for the improvement of infrastructure were critically diminished. The study concludes that local production of rice, sugar and wheat should be boosted in order to keep pace with local demand. Federal Government of Nigeria (FGN) through Federal Ministry of Agriculture and Rural Development (FMARD), public private partnership (PPP) and nongovernmental organization, (NGOs) should put appropriate policy in place to provide improved seeds/seedlings, agro-chemicals, materials and technologies critically needed to cultivate over 34 million hectares of agrarian lands in Nigeria for improved crop yields and increased production. This will lead to import substitution and, thus, the freeing of critically needed foreign reserves for capital accumulation resulting in infrastructural development. The latter is very much needed for the inflow of Foreign Direct Investment (FDI) which will result in job recreation and intensified fight against youth criminality and general poverty alleviation.

Keywords: Policy, instruments, importation, , importation, monetary policy, Public investment andTrend.

1.0. Introduction

Agricultural sector acts as the catalyst that accelerates the pace of structural transformation and diversification of the economy, enabling the country to fully utilize its factor endowment, depending less on foreign supply of agricultural product or raw materials for its economic growth and development and sustainability (Ishola, Olaleye, Ajayi and Femi, 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). Government spending

on agricultural research and development improves agricultural productivity the most and has the second largest impact on rural poverty reduction. Analysis by Tewodaj *et al.* (2012) shows the importance of public investment in Agricultural Research and Development (R&D), irrigation and extension. The result established that R&D investment returns in terms of poverty reduction are more stable 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 was 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 N468 billion (about 20 percent of Sub-Saharan Africa's total rice imports); and over N600 billion 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). Import dependency has crept in 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 (Ebajemito, Bamidele, Enendu, Abdullahi, 2004; CBN, 2006 and Victoria, 2014). Babatunde, Salisu and Oseni (2012) 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 veritable tools for increased rate of economic growth as noted by earlier researchers. It becomes necessary to assess how these tools facilitate economy growth. Therefore, this study intends to analyze the trends of effects of

policy instruments on importation of selected food items (rice, sugar and wheat) in Nigeria, from 1980 to 2017

2.1.Theory of Public Expenditure

The Keynesian theory is adopted as the framework for this study. Keynes regards public expenditures as an exogenous factor that can be utilized as policy instruments to enhance output. According to the Keynesian school of thought, an increase in government spending leads to multiple rises in the total productivity of an economy (Jhingan, 2012; Abula and Ben, 2016). This theory posited by Keynes is the multiplier effect of government expenditure on improving and developing the economy.

$$Y = C + I + G(X-M) \dots \dots \dots (1)$$

Where; Y = Output,

C = Consumption,

I = Investment,

G = Government Expenditure,

X-M = Net Export (Export minus Import). The change in output will be equal to the multiplier times the change in government expenditure.

$$\Delta Y = 1 \dots \dots \dots (2)$$

Where K= (K is the factor by which the return deriving from an expenditure exceeds the expenditure itself)

$$\Delta Y = K \Delta G$$

Therefore, change in output all over the change in government expenditure is equal to the multiplier.

$$= K \dots \dots \dots (3)$$

Hence, expansionary fiscal policies are used to influence macroeconomic performance, and this increases output growth. This theory suggests that government spending can contribute positively to sectorial growth (like the agricultural sector) in an economy. In this theory, we assume that the agricultural sector output comprises four sub-sectors (crops, fisheries, forestry, and livestock) as a function of the consumption of the sector (agricultural) output, investment in agriculture, government expenditure on agriculture, and net export of the sector output.

$$YA = CA + IA + GA + (XA - MA) \dots \dots \dots (4)$$

Where; CA = Consumption of Agricultural Output,

IA = Investment in Agriculture,

GA = Government Expenditure on Agriculture and

XA - MA = Net Export of Agricultural Output.

Thus, an increase in government expenditure on agriculture may lead to manifold increases in agricultural output. The relevance of this theory to the Nigerian economy is that it describes how the government of a country can help bring about growth in the farming sector through its expenditure on the sector.

3.0. Methodology

The study area: The study area is Nigeria. Nigeria is situated in the Western part of Africa. Its coastal boundary is delimited by the Gulf of Guinea to the south and the land boundary is

shared by Cameroon and Chad to the east, Niger to the north, and Benin to the west. Abuja is Nigeria's capital city and Lagos is its largest commercial city. Nigeria covers a total area of 923,768 sq. km. making it the thirty-second largest country in the world. It has a small coastline of 853 km in comparison to its total land boundary of 4047 km. The latitudinal and longitudinal extent of the country is 4° to 14°N and 2° to 15°E, respectively. Economically, Nigeria has one of the strongest economies in Africa; in 2014 it became the largest economy of Africa. The presence of the oil reserves in the country has contributed to its growing economy. Major food crops are cassava, yam, maize, millet, sorghum, rice, sesame, and soybeans. The country's agricultural products fall into two main groups: food crops produced for home consumption, and exports. Yam, cassava, and sweet potatoes are produced in the South while millet and sorghum are produced in the north. Cocoa is the leading non-oil foreign exchange earner while rubber is the second-largest non-export earner. Rice as a major staple food crop is produced both in the south and northern parts of Nigeria. Federal Republic of Nigeria Centenary Diary (FRNCD, 2014).

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. Growth model was used to capture the effects of policy instruments on importation of selected food items in Nigeria.

Model Specification

Augmented Dickey Fuller (ADF) equation:

$$\Delta Y_t = \beta_2 ricimt + \beta_3 sugimt + \beta_4 whtimpt + \beta_5 pubinvt + \beta_6 excrtt + \beta_7 inftrt + \beta_8 inttt + \beta_9 mnsupt$$

$$\delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \epsilon_t \quad (5)$$

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.

Trend analysis and growth rates

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

$$Y_t = Y_0(1+r)^t \quad (6)$$

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 (6) to make it linear, it is stated thus

$$\ln Y_t = \ln Y_0 + t \ln (1 + r) \quad (7)$$

Substituting $\ln Y_0$ with β_1 and $\ln (1 + r)$ with β_2 equation (7) is re-written as

$$\ln Y_t = \beta_1 + \beta_2 t \quad (8)$$

Add the disturbance term to equation (8) we obtain;

$$\ln Y_t = \beta_1 + \beta_2 t + \mu_t \quad (9)$$

Equation (8) is the growth rate model developed for the study. The growth model can therefore be stated for the variables of interest in equation (8):

$$\ln Y_t = \beta_1 + \beta_2 \text{ricimpt} + \beta_3 \text{sugimpt} + \beta_4 \text{whtimpt} + \beta_5 \text{pubinvt} + \beta_6 \text{excrtt} + \beta_7 \text{infrtt} + \beta_8 \text{intrtt} + \beta_9 \text{mnsupt} + \mu_t \quad (8)$$

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.

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

$$\text{IGR} = \beta_2 - \beta_9 \times 100 \quad (10)$$

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.

$$\text{CGR} = (\text{antilog } \beta_2 - \beta_9 - 1) \times 100 \quad (11)$$

Finally, if $\beta_2 - \beta_9$ is positive and statistically significant there is acceleration in growth, if $\beta_2 - \beta_9$ is negative and statistically significant there is deceleration in growth, if $\beta_2 - \beta_9$ 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

$$\nabla \ln Y_{t-1} = \alpha_0 + \sum_{i=1}^p \alpha_1 \nabla \ln \text{pubinv}_{t-1} + \sum_{i=1}^p \alpha_2 \nabla \ln \text{excrt}_{t-1} + \sum_{i=1}^p \alpha_3 \nabla \ln \text{infrt}_{t-1} + \sum_{i=1}^p \alpha_4 \nabla \ln \text{intrt}_{t-1} + \alpha_5 \nabla \ln \text{mnsup}_{t-1} + \text{ECT}_{t-1} \quad (9)$$

Where:

Y_t = Quantity of food items imported (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, National Bureau of Statistics (NBS) and United State Department of Agriculture (USDA).

4.0 Result and Discussion

Stationarity Test

The results of the unit root tests in Table 4.1 show the presence of a unit root (non-stationarity) tested against the alternative hypothesis of the absence of a unit root (stationarity), ricimp (rice importation), sugimp (sugar importation), whimp (wheat importation) Pubinv (public investment in agriculture), excrt (exchange rate), infrt (inflation rate) and mnsup (money supply) were not stationary at their levels. Thus, they were differences 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) 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 4.1: Results of Augmented Dickey-Fuller (ADF) Unit root tests

Level	t-statistic	Level Probability	1 st Diff t-statistic	Probability	Decision
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)
LNMNNSUP	-0.814672	0.3562	-5.944937	0.0000	I(1)

4.2. Trends in importation of selected food items in Nigeria

Figure 4.1 shows that between 1980 and 1984 there was a steady increase in importation of selected food items 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, Jayeola and Owolabi, (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 importation of selected food items 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 rice, sugar and wheat continued to experience 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). This result is in line with that of 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. This result is also 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.

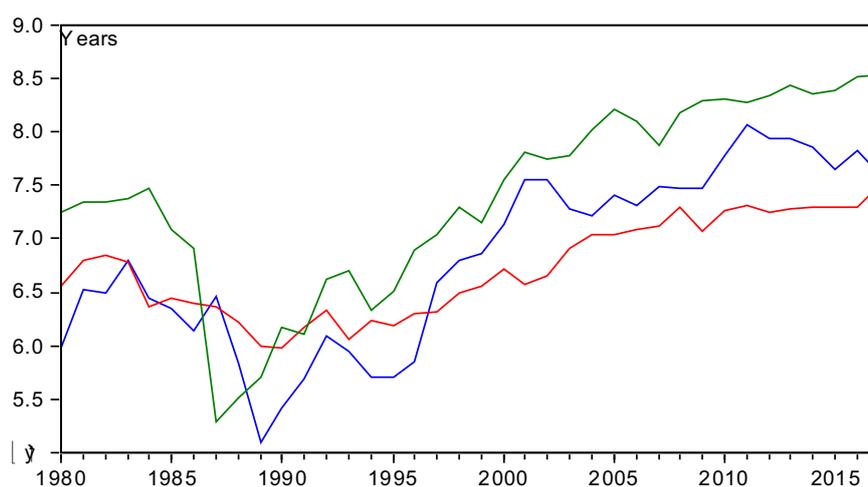


Figure 1: Trends in selected importation of food items Nigeria

Growth rate and direction of growth

The result of the growth rate and direction of growth for importation of selected food items in Nigeria is presented in Tables 2 and 3. The result of the 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, Damisa, andRekwot, 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 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.

The result further showed that inflation rate decelerated during the period under review. This may be due to government effort to reduce importation of goods and services in the country. This result is in line with the findings of Ulke & 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 money supply decelerated during the period under review. This may be attributed to CBN contractionary policy attempt to slow aggregate demand growth (i.e to discourage private consumption of certain goods and services). On the other hand, the result finally revealed that exchange rate stagnated during the period under review this may be attribute to low value of Naira as this promote importation of goods and services and reduce exportation.

In addition, the result showed that 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 while compound growth rate 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.

Table 2: Instantaneous and Compound Growth Rate

Variables	Instantaneous (%)	Compound (%)
Lnricimp	1.001691	-98.9983
Lnsugimp	1.001846	-98.9982
lnwh timp	1.002574	-98.9974
Lnpubinv	0.998259	-99.0017
Lnexert	0.995977	-99.004
Lninflrt	0.99875	-99.0013
Lnintrt	0.99819	-99.0018
Lnmsup	0.967896	-99.0321

Table 3: Direction of Growth

Variables	Lnricimp	Lnsugimp	Lnwh tim	Lnpubinv	Lnexert	Lninflrt	Lnintrt	Lnmsup
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

4.4. Conclusions and Recommendations

The study analyzed the trend of effects of policy instruments on selected food importation in Nigeria from 1980 to 2017.

The study Concluded that importation of selected food items 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 have not yielded any positive result over the period under review.

The result further revealed that policy instruments do not have positive effects on importation of selected food items in Nigeria.

The study recommends the need for government and its agencies to go into public private partnership to boost agricultural productivity in the country.

Secondly, government through Federal Ministry of Agriculture (FMARD) and Non-Governmental Organizations (NGOs) should promote local content in agriculture and stop playing lip services to laudable programmes and policies

Government through Federal Ministry of Agriculture (FMARD) and non-governmental organizations (NGOs) should put policies in place to prevent farm inputs racketeering.

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

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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