Original paper

Effects of Policy Instruments on Wheat Importation in Nigeria, 1980-2017

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ABSTRACT: This study analyzed the effects of policy instruments on wheat importation in Nigeria. Secondary data covering a period of 37 years (1980-2017) were analyzed using the vector error correction model (VECM). Results revealed that public investment, money supply, and interest rate in the previous year were negative and significant at 1% and 10% respectively on wheat importation and decreased wheat importation by 0.22%, 0.02%, and 2.02%, exchange rate and inflation rate in the previous year were positive and increased wheat importation by 0.24% and 1.16% respectively. In the short run, the results further showed that the exchange rate in the previous year was negative and significant at 1% on wheat importation and deceased wheat importation by 0.71% while the inflation rate was positive and significant at 1% on wheat importation and increased wheat importation by 0.33%. This study shows that, policy instruments contributed to wheat importation sub-optimally during the period under review. The study therefore concludes that policy instruments played significant roles in food importation in Nigeria.

Keywords: VECM, Money supply, Exchange rate, Inflation rate, Interest rate and public investment in agriculture

INTRODUCTION

In West Africa, and specifically Nigeria agriculture is the backbone of overall growth and development for most of the countries in this region and necessary for poverty reduction and food security (Food and Agriculture Organization (FAO), 2009). Even though agriculture accounts for about a fifth of the country are Gross Domestic Product (GDP), the sector's opportunities have remained largely untapped. Nigeria has large area of arable land, but there has been significant lack of investment in the agricultural sector as well as specific challenges such as the low yielding variety of wheat available in Nigeria (KPMG Nigeria, 2016; Honeywell Flourmill, 2014 and 2015 Annual Reports).

Nigeria currently imports foods to and as such for the domestic consumption of its citizens, this is in effort to bridge the gap between demand and supply.

This is disturbing because a greater percentage of Nigerians is engaged in agriculture. The Northern region was known 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. Nigeria continued to import stable food for its growing population. Today, self-sufficient in food production has eluded the country's large and exploding population (ASTI, 2010; Onwuka, 2017). According to Onwuka, (2017), in 2011, Nigeria spent over N600 billion importing wheat to the detriment of its domestic agricultural development. The Agricultural Service of the United States Department for Agriculture

(USDA) estimated Nigeria's wheat milling capacity, at put it to about 8 million metric tons (MMT) in 2012/2013 (Flour Sector 2014 Report). The USDA report estimated Nigeria's annual wheat consumption to be 4.1 MMT, as at July 2015, wheat consumption accounts for about 14% of total Sub-Saharan Africa's consumption of 28.3 MMT. The annual import was estimated at 4 MMT on average that cost about $3.2 billion. Domestic wheat production was estimated at 70,000MT in 2013 and 60,000 metric tons in 2015.

According to the USDA, Nigeria is currently occupied 13th position and seen as one of the largest importer of wheat in the world. Domestic importation in 2014 increased to a record 4.75 MMT, at CAGR of 4.7%, between 2004 and 2014. However, as a result of the scarcity in foreign exchange sourcing, wheat importation declined from 4.75MMT to 4.4 MMT in 2015 (Issues in Business Management and Economics). As a result of import dependency in the nation a large amount of the country's foreign exchange earnings is leaving the country's treasury daily for this purpose (ASTI, 2019: Onwuka, 2017).

Monetary policy is specific actions taken by the monetary authority (Central Bank) to regulate the value; supply and cost of money in the economy with the overall objectives of achieving predetermined macroeconomic goals (Central Bank of Nigeria (CBN), 2011). In Nigeria presently the monetary policy has focused on the targeted framework, and price stability to bring about envisaged changes.

This is a clear departure from the past where the major objective of the monetary policy was purely rapid economic growth and employment (Babatunde and Olufemi, 2014). The highest monetary authority in Nigeria is the central bank of Nigeria (CBN). CBN has continued to play its role as a financial regulatory body that regulates the stock of money in such a way as to promote social welfare as well as fine-tuning economic parameters needed to place the economy on the right path of prevailing policy frameworks (Ajayi, 1999; Babatunde and Olufemi, 2014).

The CBN has been achieving these roles via the portfolio behavior of the monetary authority in terms of the control of its credit and management of reserves. The bank uses credit control to check movement in domestic price level concerning global competitiveness prevailing policy frameworks. The monetary policy instruments such exchange rate serves help in determining the competitiveness and current account performance as well as foreign reserve (Folawewo and Osinubi, 2006). This CBN role of credit control is anchored on the use of monetary policies that are usually targeted towards the achievement of full employment equilibrium, rapid economic growth, price stability, and external balance of payment (Ajayi, 1999).

This paper intends to answer the following questions, what are the effects of policy instruments and implications on wheat importation in Nigeria over the period under review? These are the questions that our attention is focused on in this paper.

Literature review

Uma (2007) examined Population, Agriculture, Food, and Poverty in Nigeria and their result showed that food importation control the total non-oil import which has been rising due to the increase in money supply in Nigeria's economy. However, it is worthy to note that the inflationary trend experienced in the economy affected food supply in no small ways. The continuous rise in the consumer price index for food in both rural and urban areas, coupled with a decline in agriculture (crops) contribution to the gross domestic product, fluctuating inflationary trend, and annual population growth are good testimonies to poverty impact in Nigeria. She further stated that the poor peasants in the rural areas with very little or no income are the most disappointed by the blow of the situation, which reduced purchasing power and raised the poverty level of the nation.

Availability and affordability of food should be one of the key objectives of any economy as survival of human beings, who in turn pilots every other aspect of the economy even in the face of increasing automation, depends on food availability. It would appear that Nigeria's trade policy is driven more by events in the international oil market. A critical analysis shows that liberal trade policies prevail whenever there is an oil boom with attendant increases in oil prices and growth in government revenue (Lionel and Bassey,2021;Iganiga and Unemhilin, 2011).

Agriculture as the main foreign exchange earnings for Nigeria stopped since the 1970's, when the country suddenly experienced a tremendous increase in the influx of petrol dollars arising from the quadruple increase in the price of oil in the world market, from 1972 onwards, oil gained ascendancy over all other commodities as the largest contributor to the GDP, and also as a major foreign exchange earner. The agricultural sector was negatively impacted as boom in the oil sector lured labour away from rural sectors to urban centers (Afolabi, 2011; Olawamiwa, and Busola,2014).

According to World Bank report on the issue of resolving farming and food security, posits that 75% of the world poor reside in rural areas and are mainly involved in agriculture. Hence, financing agriculture remains the basic instrument for achieving economic growth, poverty reduction and food security especially in Africa (World Bank, 2012). Majority of the developing countries have sufficient and fertile arable land as well as

favourable environment for the production of foods, yet they rank lowest in food availability and affordability for their teeming population (Nathaniel, and Yuni, 2018).

Barro (1990) examined Government Spending in a Simple Model of Endogenous Growth result shows that some components of government expenditure are productive and some are unproductive. Health and education expenditure increases the productivity of labour as well as the growth of national output. A good investment in the agriculture sector; especially in the form of food security, is important for human existence.

METHODOLOGY

Study area

The study area is Nigeria. Nigeria lies between latitude and longitude of 4^0S to 14^0N and 2^0 to 15^0E, respectively.

Method of data collection

The data were obtained from secondary sources such as the CBN Statistical Bulletin, and National Bureau of Statistics (NBS), and USDA. Variables for which data were collected include public investment in agriculture, exchange rate, interest rate, inflation, money supply and wheat importation. The data for all variables covers the period of 37years (1980-2017).

Data analysis techniques

Vector Error Correction Model (VECM) was used to analyze. The vector Error Correction (VEC) model is just a special case of the VAR for variables that are stationary in their differences (i.e., I(1). The VECM can also take into account any cointegrating relationships among the variables. This was applied to investigate on short run interaction of the effects of policy instruments on wheat importation and the ability to correct long run deviation in the variables of interest in the short run. The model is specified thus for the variables of interest.

Model specification

To capture the effects of policy instruments on wheat importation in Nigeria, 1990-2017 the study adopted these models form;

$$\nabla lnY_{t-1} = a_0 + \sum_{i=1}^{p} a_1 \nabla lnX1_{t-1} + \sum_{i=1}^{p} a_2 \nabla lnX2_{t-1} + \sum_{i=1}^{p} a_3 \nabla lnX3_{t-1} + \sum_{i=1}^{p} + a_4 \nabla lnX4n_{t-1} + \sum_{i=1}^{p} a_5 \nabla lnX5_{t-1} + ECT_{t-1}$$

Where
$Y_{t=}$ Wheat importation (LNWHTIMP)
$X1_{t=}$ public investment in agriculture (LNPUBINV) (Naira)
$X2_{t=}$ exchange rate (LNEXRT) (Naira)
$X3_{t=}$ inflation rate (LNINFRT) (percentage)
$X4_{t=}$ interest rate (LNINTRT) (percentage)
$X5_{t=}$ money supply (LNMNS)(Naira)
ECT_{t-1} = Error correction ter

RESULTS AND DISCUSSION

Unit root test

The Phillips-Perron test for stationarity conducted at level and 1st difference showed that observed t-statistics were greater than the critical values. Therefore, we conclude that there is no unit root problem with the data (Table 1).

Co-integration test

Table 2 shows the result of Johansen co-integration tests. The tests are based on the Maximum Eigen value of the stochastic matrix as well as the trace statistic of the stochastic matrix. From the results, it is evident that maximum eigen value test indicated one unit of co-integrating equation between effect of policy instruments on wheat as the maximum eigen value and trace statistic denoted by one asterisk (*). This implies the rejection of the hypothesis that states that there is no long-run relationship among the variables. Thus, we concluded that there is a long-run equilibrium relationship between effects of policy instruments on wheat in Nigeria.

Growth rate and direction of growth on selected import substitution crops

The result of the growth rate and direction of growth is presented in (Tables 3 and 4.) The result of the direction of growth showed that the coefficient of wheat importation (0.0025) and (t=3.151) was positive and significant at 1% level of probability. This implies that wheat importation accelerated over the period under review. The result is in tandem 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).

Effects of policy instruments on wheat importation

The result of the effect of public investment in agriculture and monetary policy instruments on wheat importation is presented in (Table 4). The result showed one unit of the co-integrating equation. The coefficient of the determinant (R2) of the equation was 0.414586 indicating that 41.46% of the variation in wheat importation (LNWHTIMP) was explained by public investment in

Table1: Summary of Unit root tests for effects of policy instruments for selected import substitution food crops.

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

Source: Author's computation (Eview), 2021.

Table 2: Co-integration test between effects of policy instruments on wheat importation.

Hypothesized		Trace	0.05
No. of CE(s)	Eigen value	Statistic	Critical Value
None *	0.683350	101.4414	83.93712
At most 1	0.511644	60.04280	60.06141
At most 2	0.361834	34.24125	40.17493
At most 3	0.347299	18.07160	24.27596
At most 4	0.071808	2.712720	12.32090
At most 5	0.000836	0.030110	4.129906

*Existence of one cointegrating equation, Source: Author's computation (Eview), 2021

agriculture (LNPUBINV (-1)), money supply (MNSUP (-1)), interest rate (INTRT (-1)), the exchange rate (EXCRT (-1)) and inflation rate (LNINFRT (-1)) in the previous year. Therefore, the null hypothesis that stated that policy instruments have no significant effects on wheat importation in Nigeria was rejected. Specifically, the coefficient of public investment in agriculture in the previous year was negative and significant at a 1% level of probability, implying that a unit increase in the coefficient of public investment in agriculture in the previous year decreases wheat importation by -6.45089. This may be due to the ban placed on wheat importation. This result is in agreement with the findings of (Magaji et al., 2012: United States Department of Agriculture, (USDA) (2014) and Haruna et al. (2017) that decline in wheat importation was as a result of an outright ban of wheat importation in May 1986 as fallout of Structural Adjustment Programme (SAP). Similarly, the coefficient of money supply in the previous year was negative and significant at a 10% level of probability, implying that a unit increase in the coefficient of money supply in the previous year decreases wheat importation by -1.95045. This may be due to the wheat transformation agenda aimed at reducing wheat consumption in the country. This result also agrees with the findings of Klynveld, Peat, Marwick, and Goerdeler (KPMG) Nigeria, (2016) that given the restrictions on access to foreign currency, wheat importation declined by 5% from 4.3MMT to 4.1MMT in 2016. In addition, the coefficient of interest

rate in the previous year was negative and significant at a 1% level of probability, implying that a unit increase in the coefficient of interest rate in the previous year decreases wheat importation by -6.48399. This may be due to deliberate measures to repatriate funds into the domestic economy. This result agrees with Akingunla, (2012) who argued that SAP introduced reforms, which focused on structural changes, monetary policy, interest rate, and foreign exchange management under financial liberalization and institutional framework. On the other hand, the coefficient of the exchange rate in the previous year was positive and significant at a 1% level of probability, implying that a unit increase in the coefficient of the exchange rate in the previous year increases wheat importation by 5.32333. This result is against the findings of Afshan and Batul (2014) who opined that a smaller amount of imports leads to more money exchange rates and vice versa. Furthermore, the coefficient of inflation rate in the previous year was positive and significant at a 1% level of probability, implying that a unit increase in the coefficient of inflation rate in the previous year increases wheat importation by 8.64758. This result agrees with the findings of Mika and Johannes (2017) who examined the impact of imports on inflation in Namibia using quarterly data from the period 1991Q1 to 2013Q4. The error correction model showed that imports have a positive effect on inflation in the long run while in the short run the effect was insignificant.

In the short run, the result showed that LNEXCRT (-1)

Table 3: Direction of Growth on Selected Import Substitution Crops in Nigeria.

Variables	Lnwhtimp	Lnpubinv	Lnexcrt	Lninflrt	Inintrt	Inmsup
Constant	6.8584	19.3469	2.6711	-0.6256	2.1746	19.1813
@Trend	-0.0356	0.2255	0.0317	0.3142	0.0888	1.1276
@Trend^2	0.0025	-0.0017	-0.0013	-0.0040	-0.0018	-0.0326
t-Value	(3.151)***	(-1.640)*	(-1.201)	(-4.803)***	(-4.343)***	(-4.801)***
R-squared	0.651486	0.872982	0.924050	0.090865	0.573639	0.411572
Adjusted R-squared	0.631571	0.865724	0.919711	0.038914	0.549276	0.377947
S.E. of regression	0.540501	0.705722	0.555942	0.690097	0.276380	4.501819
Sum squared resid	10.22495	17.43151	10.81752	16.66821	2.673511	709.3232
Log likelihood	-28.97732	-39.11284	-30.04770	-38.26209	-3.489988	-109.5274
F-statistic	32.71316	120.2756	212.9162	1.749057	23.54507	12.24024
Prob(F-statistic)	0.000000	0.000000	0.000000	0.188799	0.000000	0.000093
Mean dependent var	7.389515	22.71275	3.322759	2.678055	2.978777	24.95027
S.D. dependent var	0.890471	1.925901	1.962007	0.703930	0.411672	5.707874
Akaike info criterion	1.683017	2.216465	1.739353	2.171689	0.341578	5.922497
Schwarz criterion	1.812300	2.345748	1.868636	2.300972	0.470861	6.051780
Hannan-Quinn criter.	1.729015	2.262463	1.785351	2.217687	0.387576	5.968495
Durbin-Watson stat	0.410940	0.980162	0.858869	1.077672	0.840528	0.572245
Decision	Accelerated	Decelerated	Stagnated	Decelerated	Decelerated	Decelerated

***, ** and * are significant at 1% and 5% level of significance respectively.
Source: Author's computation, (Eviews) 2021.

Table 4: Effect of wheat importation on public investment in agriculture and monetary policy instruments.

Co-integrating Eq:	CointEq1					
LNWHTIMP(-1)	1.000000					
LNPUBINV(-1)	-0.220064***					
	(-6.45089)					
LNMNSUP(-1)	-0.025285*					
	(-1.95045)					
LNINTRT(-1)	-2.024365***					
	(-6.48399)					
LNEXCRT(-1)	0.245029***					
	(5.32333)					
LNINFRT(-1)	1.164280***					
	(8.64758)					
C	-24.93395					
Variables	D(LNWHTIP)	D(LNPUBINV)	D(LNMNSUP)	D(LNINTRT)	D(LNEXCRT)	D(LNINFRT)
ECM	-0.375764	-0.488619	-0.165196	-0.045368	-0.114207	-0.561200
	(-3.09925)	(-2.15646)	(-0.10476)	(-0.83833)	(-1.03850)	(-3.12546)
D(LNWHTIMP(-1))	0.053019	0.310690	-0.520294	0.068641	0.084114	-0.614285
	(0.30593)	(0.95929)	(-0.23084)	(0.88737)	(0.53510)	(-2.39341)
D(LNWHTIMP(-2))	0.118886	-0.558905	0.080053	-0.173636	-0.139894	-0.137480

Table 4: Contd.

	[0.63485]	(-1.59700)	(0.03287)	(-2.07734)	(-0.823590	(-0.49571)
D(LNPUBINV(-1))	-0.065721	-0.370847	-0.185149	0.029489	0.040460	-0.077851
	[-0.69271]	(-2.09159)	(-0.15005)	(0.69638)	(0.47017)	(-0.55408)
D(LNPUBINV(-2))	-0.029121	-0.412536	0.444037	-0.004777	-0.082015	-0.089441
	(-0.32952)	(-2.49786)	(0.38634)	(-0.12110)	(-1.02317)	(-0.68339)
D(LNMNSUP(-1))	-0.004496	-0.022447	-0.004427	-0.000727	0.007421	0.001619
	(-0.27175)	(-0.72602)	(-0.02057)	(-0.09847)	(0.49452)	(0.06610)
D(LNMNSUP(-2))	-0.001217	-0.011120	-0.004007	0.000320	0.010534	-0.020538
	(-0.07432)	(-0.36351)	(-0.018820	(0.04373)	(0.70950)	(-0.84720)
D(LNINTRT(-1))	-0.514593	-1.908435	-0.956183	-0.224840	0.017596	-0.217628
	(-1.13881)	(-2.25994)	(-0.16271)	(-1.11479)	(0.04293)	(-0.32521)
D(LNINTRT(-2))	-0.428179	-0.415500	-0.994088	-0.232889	0.067387	0.233046
	(-1.303560	(-0.67687)	(-0.23270)	(-1.58850)	(0.22618)	(0.47908)
D(LNEXCRT(-1))	-0.716078**	0.382559	-0.100227	0.174294	0.138159	-0.778418
	(-3.07856)	(0.88007)	(-0.03313)	(1.67881)	(0.65485)	(-2.25973)
D(LNEXCRT(-2))	-0.299417	-0.380198	-0.601081	-0.170822	0.038339	-0.597281
	(-1.596110	(-1.08450)	(-0.24637)	(-2.04015)	(0.22532)	(-2.14992)
D(LNINFRT(-1))	0.339451**	0.194110	0.597221	0.093942	-0.086621	0.383816
	(2.86724)	(0.87733)	(0.38788)	(1.77778)	(-0.80665)	(2.18910)
D(LNINFRT(-2))	0.120466	0.355118	-0.032148	-0.069534	-0.093920	-0.246138

Table 4: Contd.

	(1.00793)	(1.58989)	(-0.02068)	(-1.30344)	(-0.86636)	(-1.39059)
C	0.148393	0.283953	-0.376582	0.060349	0.112751	-0.084498
	(1.50661)	(2.25045)	(-0.34942)	(1.59476)	(1.38326)	(-0.56501)
R-squared	0.414586	0.484185	0.009600	0.621716	0.253790	0.666641
Adj. R-squared	0.095270	0.202831	-0.530618	0.415379	-0.153233	0.484809
Sum sq. resids	2.492253	8.704260	421.5459	0.496514	2.050414	5.466145
S.E. equation	0.336577	0.629006	4.377348	0.150229	0.305288	0.498459
F-statistic	1.298356	1.720911	0.017771	3.013114	0.623528	3.666247
Log likelihood	-3.425034	-25.31098	-93.21301	24.80827	-0.009992	-17.16930
Akaike AIC	0.938573	2.189199	6.069315	-0.674758	0.743428	1.723960
Schwarz SC	1.516274	2.766899	6.647016	-0.097058	1.321129	2.301661
Mean dependent	0.033944	0.120855	-0.388229	0.023094	0.141788	0.021775
S.D. dependent	0.353855	0.704497	3.538162	0.196479	0.284283	0.694457

Source: Data analysis ***, **, * significant at 1%, 5% and 10% respectively
Source: Field Survey, 2021.

and LNINFRT (-1) in the previous year were significant on wheat importation. Specifically, the coefficient of LNEXCRT (-1) in the previous year was negative and significant at a 1% level of probability, implying that a unit increase in the exchange rate in the previous year decreases wheat importation by -3.07856. This result is against Djomo et al. (2017), who assessed the determinants of food importation in Cameroon (l

995-2015). The results showed that agricultural production significantly decreased food importation while the exchange rate increased food importation in the long run and short run. On the other hand, the coefficient of LNINFRT (-1) in the previous year was positive and significant at a 1% level of probability, implying that a unit increase in inflation rate in the previous year increases wheat importation by 2.86724. This result agrees with the result of Narayan and Narayan (2005) that empirically assessed Fiji's import demand function using the data for the period 1970 to 2000. Their result revealed that there was a long-run relationship between import and independent variables, and all variables were significant to the model. The findings implied that inflation influenced import prices. However, wheat importation in the previous year and two years ago, public investment in agriculture in the previous year and two years ago, the money supply in the previous year and two years ago, the interest rate in the previous year and two years ago, inflation rate two years ago and exchange rate two years ago do not have a significant effect on wheat importation in the short run.

Conclusion

The study revealed that wheat importation in Nigeria accelerated (t=3.151)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 positive predictable effects on wheat 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, most especially take advantage of vast arable land in the northern Nigeria with favorable weather to produce more than enough quantities of wheat to feed her citizens and export. 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 programs and policies:

Recommendations

i.Nigerian government as a matter of urgency must look away from "Dutch disease" a situation where the discovery of a natural resource and its subsequent exploitation leads to a decline in productivity and growth in other sectors of the economy.
ii.Government through various security agencies should tackle security challenges ravaging the nation by this agricultural activities will be boosted leading to increase

in domestic production.
iii.Productivity gains in agriculture can only come through its value addition if government would increase its agricultural spending and this can majorly be done through government implementing Maputo 2003 of at least 10% of national budgetary resources to agriculture and Comprehensive Africa Agriculture Development Program agreement.
iv.Wheat flour substitute should be used as an alternative in the production of biscuits, bread, and other confectionary product pending when the country can produce sufficient wheat.

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