



The Impact of Agricultural Output on Economic Development in Nigeria (1986-2014)

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Authors' contributions

This work was carried out in collaboration between both authors. Author AM designed the study, wrote the introductory part of the paper, the literature review and the theoretical framework. Author DBM designed the model of this paper, tested the formulated model and used E-views 7.1 statistical software to run the econometric analysis which enabled us to draw the recommendations and conclusion from the result findings. Both authors read and approved the final manuscript.

Article Information

DOI:10.9734/ACRI/2016/25489

Editor(s):

(1) Marco Muscettola, Economics, University of Bari, Italy.

Reviewers:

(1) Alejandro Córdova Izquierdo, Universidad Autónoma Metropolitana Unidad Xochimilco, Mexico.

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(3) Sunday Brownson, Akwa Ibom State University, Nigeria.

Complete Peer review History: <http://sciencedomain.org/review-history/14353>

Original Research Article

Received 5th March 2016
Accepted 19th April 2016
Published 27th April 2016

ABSTRACT

This paper empirically examined the impact of agricultural output on economic development in Nigeria using annual time series data spanning 1986 to 2014. Economic development proxied by per capita income (PCI) was explained by agricultural output (AOUT) and public agricultural expenditure (PXA). The study employed the Augmented Dickey-Fuller Unit Root test and the Vector Autoregressive model. The result of the multivariate VAR model indicated that most of the lags of the variables are not significant. However, the high level of the R^2 and F value in the VAR regression estimates for PCI gave convincing results that collectively all the lagged terms are statistically significant, implying that agriculture plays an important role in Nigeria's economic development. The variance decomposition analysis revealed that the greater contribution to shocks in economic development apart from feedback shocks was received from shocks to agriculture. The results of the impulse response function in support of the variance decomposition analysis showed that per capita income responded positively to shocks in agricultural output throughout the ten year period, while the response of PCI to shocks in PXA was negative in the first two year period but became positive throughout the last eight periods. We therefore concluded that

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agriculture is beneficial and plays a significant role in the development process of Nigerian economy. Hence, the government should increase its expenditure on the sector consistently and ensure that Nigerian economy is diversified, in other words, crude oil should not be the mainstay of Nigerian economy. Also, the government of Nigeria should encourage financial institutions to make certain percentage of their total credit facilities available for the agricultural sector in order to enhance food supply, employment generations, poverty reduction, etc.

Keywords: Economic development; agriculture; agricultural output; public expenditure on agriculture; vector autoregression.

1. INTRODUCTION

1.1 Background to the Study

The provision of an equitable standard of living, adequate food, clean water, safe shelter and energy, a healthy and secured environment, an educated public, and satisfying job for this and future generations, is one of the major challenges facing mankind. It is not an overstatement to assert that the growth and development of any nation depend, to a large extent, on the development of agriculture [1]. As a roadmap to attaining development, the Millennium Development Goals (MDGs) was adopted in year 2000, and over 70% of the development target group in Africa live in rural areas and are dependent on agriculture for a living [2]. Invariably, reducing poverty, improving nutrition and general well-being of the population would imply improving the livelihood of this majority and this hinges critically on the performance of the agricultural sector. As argued by advocates of agriculture-led growth (ALG), development of the agricultural sector is a prerequisite for industrialization through increase in rural incomes and provision of industrial raw materials, provision of a domestic market for industry and above all, the release of resources to support the industry [3]. The neglect of the agricultural sector in favour of the industrial sector will only lead to slow economic growth and inequality in income distribution. Therefore, despite the fact that agriculture may be unable to single-handedly transform an economy, it is a necessary and sufficient condition in kick-starting industrialization in the early stages of development [4].

The contributions of agriculture to economic growth can be examined through the roles of the sector in the economy. Generally, the sector contributes to the development of an economy in four major ways- product contribution, factor contribution, market contribution and foreign exchange contribution. Over the years, the

government has embarked on various policies and programmes aimed at strengthening the sector in order to continue performing its roles, as well as measures for combating poverty [1]. Despite the fortunate position of the oil sector being the mainstay of the Nigerian economy over the past three decades, the agricultural sector is arguably the most important sector of the economy. Agriculture's contribution to the Gross Domestic product (GDP) has remained stable at between 30% and 42%, and employs about 75% of the labour force in Nigeria [5].

However, even with Nigeria's rich agricultural resource endowment, there have been fluctuations in Agricultural sector output and gradual declines in agriculture's contributions to the nation's economy [6]. Agricultural sector's share of GDP increased from 28% in 1985 to 32% in 1988, dropped to 31% in 1989, rose again to 37% in 1990 but fell significantly to 24% in 1992 and increased to 37% in 1994. It was 32% in 1996 and rose to 40% in 1998, dropped again to 27% in 2000, increased to 37% and fell to 31% in 2002 and 2006 respectively. The percentage contribution of the agricultural sector to GDP fell persistently from 0.37 in 2009 to 0.22 in 2012 and to 0.20 in 2014 [7]. The decline in the agricultural sector was largely due to rise in crude oil revenue in the early 1970s. Less than 40% of the Nigeria's cultivable agricultural land is under cultivation [8]. Even then, smallholder and traditional farmers who use rudimentary production techniques, with resultant low yields, cultivate most of this land. The smallholder farmers are constrained by many problems including those of poor access to modern inputs and credit, poor infrastructure, inadequate access to markets, land and environmental degradation, and inadequate research and extension services. The inability to capture the financial services requirements of farmers and agribusiness owners who constitute about 70 percent of the population is inclusive [9]. Also, the federal government expenditure on agriculture as a ratio of total federal government

expenditure pictures a gloomy future for the sector's development in the country. Total expenditure on agriculture, as percentages of overall expenditure, fluctuated from 4.57 percent in the 1986-1993 periods through an average of 4.51 percent per annum in 1994-1998 to 3.53 percent in 1999-2005, 1.12 percent in 2006-2010 and 0.76 per cent in 2011-2014 [7]. When compared to other sectors like mining, manufacturing, education, and health, agriculture virtually received the least annual allocations that are often inadequate to put the sector on sustainable grounds. The low level of the allocations to the agricultural sector is in contrast with the recommendation of [2] that African governments should invest up to 10% of their national budget in agriculture and give priority to agricultural policy in order to solve food crisis in their countries. This paper therefore examined the impact of agriculture on economic development in Nigeria.

2. LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Economic development

This refers to increase in the standard of living in a nation's population with sustained growth from a simple, low-income economy to a modern high-income economy.

2.1.2 Agriculture

Conceptually, agriculture is the production of food, feed, fibre and other goods by the systematic growing and harvesting of plants and animals. It is the science of making use of the land to raise plants and animals. It is the simplification of nature's food webs and the rechanneling of energy for human planting and animal consumption [10]. Development economists have focused on how agriculture can best contribute to overall economic growth and modernization. The physiocrats laid more emphasis on agriculture in the development of an economy. In their views, the development of an economy depends on the growth of the agricultural sector. The source of national wealth is essentially agriculture. The physiocrats believe that the fate of the economy is regulated by productivity in agriculture and its surplus is diffused throughout the system in a network of transactions. The agricultural sector to the physiocrats is the only genuinely productive sector of the economy and the generator of

surplus upon which all other sectors depend on [11].

2.2 Empirical Literature Review

There have been a number of valuable studies on the relationship between agriculture and economic development in Nigeria. [12] in his study explored empirically the role of agriculture in development of Nigeria between 1981 and 2012. The quantitative technique was employed in a multivariate study with the adaptation of the Solow Growth model that includes Capital proxy by Gross Capital Formation (GCF), labour proxy by post secondary school enrolment, Agricultural Output and Economic Growth and Development proxy by RGDP. Restricted Error Correction Model is used with the aid of Econometrics View Package (E-view). The study reveals that the Agriculture plays a significant role in economic development of the nation. In addition, the sector has been neglected to the extent that its contribution to the GDP has been dwindling since 90's. Consequently, the barriers to the agricultural sector performances were identified and the necessary policy recommendations were proffered.

Olajide et al. [11] analyzed the relationship between Agricultural resource and economic growth in Nigeria using the Ordinary Least Square regression method. The results reveal a positive cause and effect relationship between gross domestic product (GDP) and agricultural output in Nigeria. Agricultural sector is estimated to contribute 34.4 percent variation in gross domestic product (GDP) between 1970 and 2010 in Nigeria. The Agricultural sector suffered neglect during the hey-days of the oil boom in the 1970s. In order to improve agriculture, government should see that special incentives are given to farmers, provide adequate funding, and also provide infrastructural facilities such as good roads, pipe borne water and electricity.

Ebere and Osundina [13] examined the impact of government expenditure on agriculture on economic growth in Nigeria over the years with time series data of 33 years sourced from the Central bank of Nigeria was used. Ordinary Least Square (OLS) technique of data analysis was used in evaluating the secondary data. GDP was used as a proxy to economic growth, while agricultural output and government expenditure on agriculture were used as indicators of government expenditure on agriculture. From the findings, agricultural output, government

expenditure and GDP are positively related. It was found that a significant relationship exist between government expenditure in the agricultural sector and the economic growth in Nigeria. The findings also revealed that the sector still encounter some problems like inadequate finance, poor infrastructure, and others. Therefore, the study recommended that it is imperative for the country to develop its agricultural sector through sufficient government spending in order to set-up its economic growth.

Ishola et al. [14] explored the average contributions of the agricultural sector to the national earning of Nigeria over the years, using a time series data from 1981 to 2010 sourced from the Central bank of Nigeria. The paper applied the unit root test and co integration, relying on the theoretical backing posited by Solow. It was found that a significant relationship exist between government expenditure in the agricultural sector and the economic growth of Nigeria.

Oji-Okoro [15] employed a multiple regression analysis to examine the contribution of agricultural sector on the Nigerian economic development. They found that a positive relationship between Gross Domestic Product (GDP) vis a vis domestic saving, government expenditure on agriculture and foreign direct investment between the period of 1986-2007. It was also revealed in the study that 81% of the variation in GDP could be explained by Domestic Savings, Government Expenditure and Foreign Direct Investment.

Ogen [16] believed that the agricultural sector has a multiplier effect on any nation's socio-economic and industrial fabric because of the multifunctional nature of agriculture. [17] submitted that in the 1960's, agriculture contributed up to 64% to the total GDP but gradually declined in the 70's to 48% and it continues in 1980 to 20% and 19% in 1985, this was as a result of oil glut of the 1980's.

In their study, [18] aimed at answering the question, 'Does agriculture matter for economic development in Nigeria?' and modelled Life expectancy against agricultural output and agricultural expenditure, amongst other variables. Agricultural output is also modelled against a host of socio-economic, natural and human factors, which influence agricultural productivity. Applying Augmented Dickey-Fuller unit root test, Ordinary Least Squares, and the

Newey-West method on secondary data and dummy variable used in the study, they found that agricultural output has negative and significant impact on life expectancy in Nigeria. The impact of agricultural expenditure was found to be positive but insignificant. Real gross domestic product and industrial output were also found to influence life expectancy. Careful examination of the hypothesized socio-economic factors (political instability and industrial output), natural factor (rainfall), and human factor (carbon emission) showed that only industrial output and rainfall matter for agricultural output in the country: both variables have positive impacts on agricultural output. The study submitted that as much as agriculture may matter for economic development, reliance on the sector alone without corresponding and simultaneous development of other crucial sectors such as education, health, and industry will not yield positive fruits for economic development in Nigeria.

[18,15,11] employed the OLS technique while, [12,14] employed the ECM and co-integration technique respectively. However, this study examined the impact of agricultural output on the development of Nigerian economy for the period 1986-2014 using the VAR method of analysis and would add to the existing knowledge on agriculture and its impact on economic development of the nation.

2.3 Theoretical Framework

The study adopted the Structural Change Theory as framework. The Structural Change Theory was developed by Lewis Arthur in the year 1954 and he called it "development with unlimited supply of labour. According to him an economy is made up of two sectors. One is the traditional (agricultural or subsistence) sector and the other is the modern (capitalist, industrial or manufacturing) sector. This gave rise to the two sector model. The theory posits that the development of an economy is dependent on the growth of the two sectors.

$$Y = f(\text{AGRIC}, \text{IND}) \quad (2.1)$$

Where; Y = Economic development, AGRIC = Agricultural sector and IND = Industrial sector.

The agricultural sector and the industrial sector are interrelated. The agricultural sector employs capital inputs, labour expertise and is also a final consumer of the output of the industrial sector,

while the industrial sector employs labour and output of the agricultural sector.

This theory focuses on the mechanism by which underdeveloped economies can transform their domestic economic structures from a heavy emphasis on traditional subsistence agriculture to a more modern and more advanced agricultural practice through heavy financial support in order to attain industrial breakthrough. The extended version of the theory added that the full benefits of agricultural development cannot be realized unless government support systems are created that provide the necessary incentives, economic opportunities and most importantly access to needed inputs to enable small farmers to expand their output and raise their productivity. Other reforms or strategies are likely to be ineffective and perhaps even counterproductive unless there are corresponding structural changes that control productivity. Examples; bank loans, fertilizer distribution, technical and educational extension service, public credit agencies, finance from various sources, rural transport and feeder roads.

3. METHODOLOGY

3.1 Model Specification

A multiple regression model is used with economic development proxied by Per capita income (PCI) as dependent variable, while agricultural output (AOUT) and public agricultural expenditure (PXA) were taken as the explanatory variables.

The functional form of the model is thus specified as:

$$PCI_t = f(AOUT_t, PXA_t) \quad (3.1)$$

For the purpose of estimation we shall restate the above functional form explicitly as:

$$PCI_t = \beta_0 + \beta_1 AOUT_t + \beta_2 PXA_t + \mu_t \quad (3.2)$$

Where:

PCI = Per capita income
 AOUT = Agricultural Output
 PXA = Public Agricultural Expenditure
 μ = Error term
 t = time period
 β_0 = intercept
 β_1 and β_2 = slope of the regression equation

Our apriori expectations are:

$$\beta_1 \text{ and } \beta_2 > 0.$$

3.2 Justification of Chosen Variables

Per capita income is a measure that reflects the value of goods and services produced per individual in the economy in a given year, measured in N'Billion. It is used to capture economic development in this study because it captures the total output produced by each individual in the country and as such provides a more accurate figure.

Agricultural output reflects the total produce of the agricultural sector in the economy in a given year and is measured in N'Billion. An increase in the level agricultural output would imply an increase in the standard of living of the citizenry, and an increase in the consumption level of the economy leading to an increase in the level of output and employment of the economy. Therefore, agricultural output is expected to have a positive relationship with economic development, i.e. the higher the level of agricultural output, the higher would be the level of economic development.

Public agricultural expenditure is the total amount spent by the public on the agricultural sector over a period of time. It is measured in N'Billion. An increase in the level of agricultural expenditure is expected to bring about an increase in the level of agricultural output leading to an increase in the level of output and employment of the economy. Hence, public agricultural expenditure is expected to have a positive relationship with economic development, i.e. the higher the level of public agricultural expenditure, the higher would be the level of economic development.

3.3 Method of Data Analysis

This study used time series data that covers a period of 29 years (1986-2014). The methods of data analysis include the Augmented Dickey-Fuller (ADF) Unit Root test and the Vector autoregressive model. The stationarity of data must be established and the order of integration determined. This is done by employing the Augmented Dickey-Fuller (ADF) unit root test. Time series data are assumed to be non-stationary; therefore it is necessary to carry out the unit root test because of the problem of non-stationary data producing spurious results [19]. A multivariate Vector Autoregression (VAR)

(Impulse response functions and Variance Decompositions) model is also employed. The VAR model assumes all variables are endogenous and analyze a simultaneity relationship among the variables, such that the direction of causality and exogeneity is clearly shown by the result [19].

Thus, in order to investigate the impact of agricultural output on the development of Nigerian economy, an unrestricted Vector Autoregressive (VAR) model is adopted. Given the functional model above (equation 3.1), the vector of endogenous variables according to Cholesky ordering are economic development (proxied by PCI), agricultural output and public expenditure on agriculture, expressed in a linear equation form as;

$$y_t = (PCI_t, AOUT_t, PXA_t) \quad (3.3)$$

Where y_t is a k vector of endogenous variables, PCI, AOUT and PXA.

Thus, a VAR is a linear equation model in which each variable is in turn explained by its own lagged values, plus current and past values of the other variables. In this case, all variables are presented as dependent, thereby modelling every endogenous variable in the system as a function of lagged values of all the endogenous variables in the system.

Equation (3.3) above can be represented in an unrestricted VAR linear form as:

$$PCI_t = \alpha + \sum_{j=1}^n \beta_{1j} PCI_{t-j} + \sum_{j=1}^n \gamma_{1j} AOUT_{t-j} + \sum_{j=1}^n \theta_{1j} PXA_{t-j} + \varepsilon_{1t} \quad (3.4)$$

$$AOUT_t = \alpha^1 + \sum_{j=1}^n \beta_{2j} PCI_{t-j} + \sum_{j=1}^n \gamma_{2j} AOUT_{t-j} + \sum_{j=1}^n \theta_{2j} PXA_{t-j} + \varepsilon_{1t} \quad (3.5)$$

$$PXA_t = \alpha^{II} + \sum_{j=1}^n \beta_{3j} PCI_{t-j} + \sum_{j=1}^n \gamma_{3j} AOUT_{t-j} + \sum_{j=1}^n \theta_{3j} PXA_{t-j} + \varepsilon_{1t} \quad (3.6)$$

Where the α 's are constant terms, β 's, γ 's and θ 's are matrices of coefficient to be estimated and the ε 's are a vectors of innovation. $j=1, 2, \dots, n$, this is the lag length of each variable.

3.4 Types and Sources of Data

This study used secondary type of data obtained from Statistical Bulletin, and Annual Report and Statement of Accounts of the Central Bank of

Nigeria, [7], and World Bank National Accounts Data [20].

4. PRESENTATION AND ANALYSIS OF RESULTS

4.1 The Unit Root Test Results

Non-stationary data produces spurious regression, hence the result may be misleading. Therefore, it is cognizant to establish the stationarity of data. The test result of the Augmented Dickey-Fuller statistic for the time series variables used in the estimation are presented in Table 1.

Table 1 shows the stationarity test of the variables. The presence of unit root indicates that the variables are non-stationary. All the variables were non-stationary at their own levels (using their raw data) but are made stationary at different orders. The result of the ADF test statistics show that PCI and PXA were not stationary at level form but was made stationary after the first difference while AOUT became stationary after the second difference. The implication of these results is that the lengths of sustained shock are not the same among the variables. Variables integrated of order two will exhibit a more persistent shock than the variables integrated of order one. Simply put, any shock received by such variables will take a very long period before the effect disappears. These results do not favour the required necessary condition for co-integration; therefore a condition for the better alternative, the Vector Autoregression (VAR) is met. The results of the VAR are discussed in subsequent sections.

4.2 Vector Autoregression Analysis

The major objective under this analysis is to determine the impact of agriculture output on economic development in Nigeria. The short-run dynamics of the relationship between agricultural output and economic development was estimated using VAR model. The VAR was estimated in multivariate form.

The VAR was estimated based on 2 lags. The result in Table 2 indicates that most of the lags of the variables are not significant. This is expected possibly because of multicollinearity [19]. An examination of the PCI regression shows that individually, the lags are not significant, but the R^2 (0.968026) and F value (100.9174) are so high that we cannot reject the hypothesis that

collectively all the lagged terms are statistically significant.

4.2.1 Shock transmission among economic development, agricultural output and public agricultural expenditure

The next analysis is the short-run shock transmission among the variables. This analysis is done using the variance decomposition and impulse response which are measures of short-run dynamics of the VAR. The results are presented in Tables 3 and 4 respectively.

The variance decomposition in Table 3 analyzes the decomposition of the shocks received by PCI to its constituent sources. It is another way of describing the causes and sources of variations or shocks to the variable, PCI. The 29 years period under study is summarized into a ten year period.

The largest contribution to shocks in economic development (PCI) was a feedback shock from its own lag. The contribution of agricultural output to shocks in PCI was over 5% for the first three year period and about 49% for the ten year period, while that of PXA was less than 4% for the first three year period and less than 25% for the ten year period. This is also shown in Fig. 1.

Impulse response function is another method of analyzing the short run dynamics of relationships among a set of endogenous variables. It measures the response of a particular endogenous variable to one standard deviation shock or innovation to the other endogenous variables. It is another way of saying how a particular variable does responds to shocks in other variables. Table 4 presents the Impulse Response analysis of the variables.

Table 1. Test for stationarity

Variable	Augmented dickey fuller statistic	Critical value	Probability	Level of significance %	Order of integration
PCI	-4.527302	-2.976263	0.0013	5	1(1)
AOUT	-10.30880	-2.981038	0.0000	5	1(2)
PXA	-6.101152	-2.981038	0.0000	5	1(1)

Source: Author's computation from E-views 7.1

Table 2. Vector autoregression estimates

	PCI	AOUT	PXA
PCI(-1)	0.314526 (0.31291) [1.00516]	-0.008928 (0.00435) [-2.05163]	8.24E-07 (0.00014) [0.00579]
PCI(-2)	0.328250 (0.34724) [0.94530]	0.003575 (0.00483) [0.74020]	-0.000104 (0.00016) [-0.65651]
AOUT(-1)	33.61096 (19.7298) [1.70357]	1.378641 (0.27439) [5.02437]	0.002635 (0.00896) [0.29399]
AOUT(-2)	-21.50939 (23.0653) [-0.93254]	-0.179731 (0.32078) [-0.56030]	0.002419 (0.01048) [0.23084]
PXA(-1)	-547.5918 (495.666) [-1.10476]	-2.585630 (6.89344) [-0.37509]	0.046437 (0.22519) [0.20621]
PXA(-2)	807.2030 (515.542) [1.56574]	22.49968 (7.16987) [3.13809]	-0.045470 (0.23422) [-0.19413]
C	-15096.77 (11266.1) [-1.34002]	-75.19707 (156.682) [-0.47993]	2.536898 (5.11841) [0.49564]
R-squared	0.968026	0.994682	0.475087
Adj. R-squared	0.958434	0.993087	0.317613
F-statistic	100.9174	623.5042	3.016927
Akaike AIC	23.94010	15.38944	8.546686
Schwarz SC	24.27606	15.72540	8.882643

Source: Author's computation from E-views 7.1

Table 3. Variance decomposition of economic development (PCI)

Period	S.E.	PCI	AOUT	PXA
1	34265.84	100.0000	0.000000	0.000000
2	43029.90	90.81443	5.333540	3.852028
3	48153.10	83.34675	10.77528	5.877971
4	53894.79	72.77862	15.86449	11.35689
5	58548.88	63.79785	22.40205	13.80011
6	63475.36	54.56865	29.21467	16.21668
7	69158.05	45.97105	35.29507	18.73389
8	75506.33	38.79073	40.64299	20.56628
9	82612.28	33.06599	45.12160	21.81241
10	90528.77	28.63952	48.67078	22.68970

Source: Author's Computation from E-views 7.1

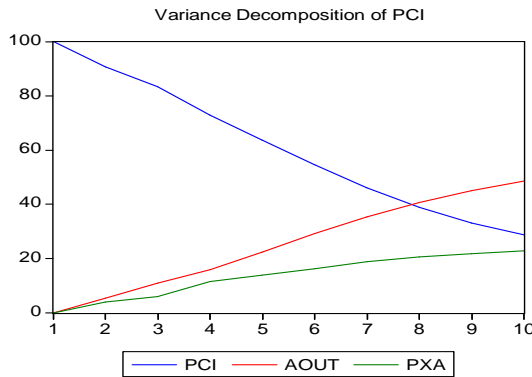


Fig. 1. Variance decomposition of economic development (PCI)

Source: Author's computation from E-views 7.1

It is revealed that per capita income responded positively to shocks in agricultural output throughout the ten year period. Meanwhile, the response of PCI to shocks in PXA was negative in the first two year period but became positive throughout the last eight periods. This trend is also depicted in Fig. 2.

4.3 Policy Implication of the Findings

The implication of the findings of the VAR model is that there exists a significant long-run relationship between agricultural output, public agricultural expenditure and economic development in Nigeria. The result of the multivariate VAR model indicates that most of the lags of the variables are not significant. The high level of the R² and F value in the VAR regression estimates for PCI however, gave convincing results that collectively all the lagged terms are statistically significant, implying that agriculture plays an important role in Nigeria's economic development. This supports the opinion of Yusuf (2014) who opined that Agriculture plays a

significant role in economic development of the nation.

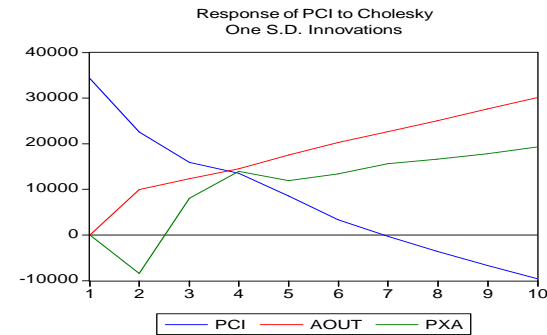


Fig. 2. Impulse response function of economic development (PCI)

Source: Author's computation from E-views 7.1

The variance decomposition analysis revealed that the greater contribution to shocks in economic development apart from feedback shocks was received from shocks to agriculture. Thus, agriculture exerts more pressure on the growth rate of PCI than PXA; generating over 5% for the first three year period and about 49% for the ten year period shock to the high economic development in Nigeria.

The results of the impulse response function in support of the variance decomposition analysis showed that per capita income responded positively to shocks in agricultural output throughout the ten year period, while the response of PCI to shocks in PXA was negative in the first two year period but became positive throughout the last eight periods. This confirms the findings of Ebere and Osundina [13]; and Olajide et al. [11]. Generally, the results as expected conform to our apriori expectations of a positive relationship between agricultural output and economic development in Nigeria.

Table 4. Impulse response function of economic development (PCI)

Period	PCI	AOUT	PXA
1	34265.84	0.000000	0.000000
2	22524.36	9937.523	-8445.299
3	15845.62	12292.04	8060.438
4	13467.92	14524.43	13913.45
5	8544.501	17525.07	11966.03
6	3415.427	20227.67	13428.55
7	-287.3383	22605.54	15576.32
8	-3580.437	25080.57	16628.74
9	-6719.005	27610.04	17779.90
10	-9510.826	30155.25	19258.11

Source: Author's Computation from E-views 7.1

5. SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1 Summary

This paper empirically examined the impact of agricultural output on economic development in Nigeria using annual time series data spanning 1986-2014. Economic development (proxied by PCI) was regressed on agricultural output (AOUT) and public agricultural expenditure (PXA). The study employs the Augmented Dickey-Fuller Unit Root test and the Vector Autoregression model. The result of the multivariate VAR model indicated that most of the lags of the variables are not significant. The high level of the R^2 and F value in the VAR regression estimates for PCI however, gave convincing results that collectively all the lagged terms are statistically significant and implied that agriculture plays an important role in Nigeria's economic development. The variance decomposition analysis revealed that the greater contribution to shocks in economic development apart from feedback shocks was received from shocks to agriculture.

The results of the impulse response function in support of the variance decomposition analysis showed that per capita income responded positively to shocks in agricultural output throughout the ten year period, while the response of PCI to shocks in PXA was negative in the first two year period but became positive throughout the last eight periods.

5.2 Recommendations

The following recommendations were made based on the findings of the study:

- i. Agriculture is of paramount importance to the development process of the nation,

hence, the government should increase its expenditure on the sector consistently in order to increase the output level of the sector.

- ii. Government should ensure that Nigerian economy is diversified, in other words, crude oil should not be the mainstay of Nigerian economy.
- iii. Government should encourage the financial institutions to make certain percentage of their total credit facility available for agricultural sector in order to enhance food supply, employment generations, poverty reduction, etc.
- iv. Government should ensure that credit is made available to farmers (peasants) with relatively low interest rate to enable farmers increase their farm size.

5.3 Conclusion

From the findings of this study, it can be ascertained that agriculture is beneficial and plays a significant role in the development process of Nigerian economy. Therefore, enhancing the pace of the growth of the sector in Nigeria will go a long way in the development process of the Nation.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
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