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Effect of Agriculture Spending on Economic Growth in Nigeria: Empirical Evidence

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Abstract

This paper investigates the effect of agriculture spending on economic growth in Nigeria over a period from 1977 to 2010 with particular focus on sectional expenditure analysis. The broad objective of this study is essentially to examine the effect of agriculture spending on economic growth in Nigeria. The study used *ex-post facto* research design and employs some econometric techniques such as Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root tests, as well as Johansen Cointegration and followed by Error Correction Model (ECM) tests. The empirical results indicate that RGDP was particular influenced by changes in AGR, INF, INT and EXR, these variables as they stand contributes or promotes economic growth in Nigeria. Accordingly, we recommend amongst with others that government should increase spending on agriculture, since most of the poor but active people still reside in the rural areas and their main source of livelihood is agriculture which can provide food security, generate employment for the teeming youths and creates wealth for the citizens in Nigeria. And that as a policy measure, we strongly suggest the reduction of unproductive government consumption spending habit and effectively control inflation, interest and exchange rates in the economy so as to attract investment.

Keywords: Augmented Dickey Fuller, Phillips Perron, Cointegration, Error Correction Model, Entrepreneurs.

1. Introduction

1.2 Background of the Study

Agriculture is the largest sector in many developing countries, Nigeria inclusive. More importantly, most of the world active but poor live in rural areas and are primarily engage in agriculture in economic growth and development and this development cannot be over emphasized as it provides an employment opportunities to its teeming youths in a country. Government intervention in the agricultural sector was primarily informed the need for national food security to ensure sustainable access to and availability and affordability of good quality food for all Nigerians (CBN, 2010).

In Nigeria, due to the importance of agriculture, a policy was initiated by Federal Government asking the Ministry of Agriculture to work with Ministry of communication Technology to provide 5 million women farmers and agricultural entrepreneurs to receive mobile phones so as to access information on agro-inputs through an e-wallet scheme. However, this policy has since been dropped due to the reactions from the public and the National Assembly Members.

In Nigeria, agriculture was contributing nearly 60 percent of the Gross Domestic Product (GDP) and more than 70 percent of foreign exchange earnings, but today agricultural production shows a declining trend in the growth of export crops production and this as a reflection of the weakness in the efforts of government to diversify the export base of the economy to non-oil exports (NISER, 2000).And again inadequate funding of the agricultural sector has been raised by experts as an obstacle to increases agricultural output (CBN, 2001; Bernard 2000).

Indeed this development has led Nigerian government a net importer of all kinds of food items from all over the world. And despite the dominant role of the petroleum sector as the major foreign exchange earner, agriculture remains the bedrock, and the mainstay of Nigerian's economy. It is regarded as the largest employer of labour, and a key contributor to wealth creation and poverty alleviation, as a large percentage of the population derives its income from agriculture (NEEDS, 2004).

The broad objective of this study is essentially to analyze the effect of agriculture spending on economic growth in Nigeria. Thus, this paper is structured as follows; section two as usual provides the empirical review, section three provides the research methodology, section four gives the empirical results and discussions, while section five of the paper concludes the study and offers some recommendations.

2. Review of Related Literature

2.1 Theoretical Framework

This section highlights a theory that has been used to support the study.

2.1.1 The "Big Push" Theory

This theory as propounded by Rosenstein- Rodan (1961) suggested that countries need to move faster from one stage to another stage so as to facilitate the developmental processes of their economies and that moving slowly will not launch such an economy successfully and sufficiently to the development path. The theory further states, that for a developing country to attain development path, she needs to invest large amount of money on infrastructures and education with private investment participation so as to launch the economy to a more productive stage.

2.2 Empirical Review

The issue of rising increase in public expenditure and economic growth has generated a lot of controversy and public debate among academics, economists, policy makers, researchers and as well as public office holders in recent times.

Itodo, Apeh and Adeshina (2012) examined the impact of government expenditure on agriculture and Agricultural output in Nigeria from 1975-2010, using Cob-Douglas production function and OLS econometric technique to estimate a multiple regression of agricultural output against some variables. The results revealed a positive but insignificant relationship between government expenditure to the agricultural sector and agricultural output within the scope of the research.

As notes by Samuelson and Nordhaus (2003), no where can the changes in government's role are seen more clearly than area of government spending. They stressed that a sound public expenditure policy produces food effects both on production and distribution. For many developing countries, agriculture remains the gate way to several desired ends which includes poverty reduction, rural transformation, employment generation, food securing and improved national health profile of the citizenry (Okpanachi, 2004).

Indeed agriculture provides the main stimulus to our national economic growth despite the small farm holdings and primitive productive systems (Ekerefe, 2000; Ogen, 2003).

It has been asserted that agriculture provides the bulk capital required for industrial take off in West African countries, agricultural export provides necessary foreign exchange required for the purchase of necessary raw- materials, manufactured goods and capital equipment for the country (Ogbole, 2006). Also Egbuna (2003) posited that over the past two or three decades, the dominant role of agriculture in the economy, especially in term of enduring food security, has led government to massive importation of same basic food terms especially grains like rice, beans and millet.

As noted by the World Bank (2000) agricultural and rural sector had suffered neglect and under investment in the last twenty years. The World Bank in its report called for greater investment in agriculture in developing countries. They warn that the sector must be placed at the centre of development agenda of the countries, if the goals if reducing poverty and hunger by 2015 are to be realized.

Kormain and Bralimasrene (2000) study the economy of Thailand. They made use of the granger causality tests. Their finding suggests that government expenditure and economic growth are not cointegrated but indicated a unidirectional relationship. This is so because according to them, causality runs from government expenditure to growth, and also detected a significant positive effect of government spending on economic growth.

Fan and Rao (2003) analyzed the impact of different types of government spending on overall GDP growth across 43 developing countries between 1980 and 1998 using OLS method and found mixed results. In Africa, government spending on agriculture and health was particularly strong on promoting economic growth. Among all types of government expenditures, agriculture, education and defense contributed positively to economic growth in Asia. According to them, in Latin American, health spending had a positive growth promoting effect. And that structural adjustment programmes has a positive growth promoting effect in Asia and Latin America, but not in Africa. They averred that the structural adjustment programme hurt economic development in Africa.

Study by Cheminqui (2005) opines that an increase in government expenditure devoted to these three priority areas such as agriculture, education and health will affect the economy through increase in sectoral or economy wide Total Factor Productivity (TFP). He pointed out that good education and health care help the poor, lead more productive lives and increasing the return on investment.

Ekpo (1995) examined government capital expenditure on private investment using OLS approach with an

annual data from 1960-1990. The result indicates that capital expenditures on transport and communication, agriculture, health and education positively influence private investments in Nigeria.

This study therefore, focuses in covering the research gap by investigating the actual relationship between agriculture spending and economic growth in Nigeria.

Loto (2011) investigates the growth effect of government expenditure on economic growth in Nigeria for the period 1980 to 2008, with a particular focus on five sectoral expenditures, including securing, health, education, transportation communication and agriculture. The result indicates that in the short run, expenditure on agriculture was found to be negatively relates to economic growth. The impact on education, through also negative and was not significant. The impact of expenditure on health was found to positively related to economic growth while expenditures on national security transportation and communication were positively related to economic growth, their impact were not statistically significant.

3. Methodology

3.1 Research Design

In this study, we adopted *ex post facto* research design, as a set of regression estimation techniques were applied to further examine the effect of agriculture spending and economic growth in Nigeria.

3.2 Source of Data

The sources of data are completely secondary sources of data and are sourced from the Central Banking of Nigeria (CBN) and those of the National Bureau of Statistics (NBS). And the period under consideration for our empirical analysis starts from 1977-2010.

3.3 Model Specification

In an attempt to determine the effect of agriculture spending on economic growth in Nigeria, a model that justify the relationship between the variables has been adopted. This paper, therefore, adopted the popular growth model as specified below;

$$Q = f(K, L) \quad \ldots\ldots (1)$$

Where;

Q = output of the economy
K = Capital
L = Labour

And in line with the objective of this study, the baseline analytical models are thus derived from equation 1 and thus estimated with augmented Dickey-Fuller and Phillip Perron regression to perform unit root test for the variables of interest as well as Johansen Cointegrating regression model and followed by Error Correction Model. The linear regression model of the form is thus, specified as follows;

$$RGDP = f(AGR, INF, INT \ \& \ EXR) \quad \ldots\ldots..2$$

Our linear function of the above is thus stated as;

$$Y_t = \beta_0 + \beta_1 x_t + \beta_2 x_t + \beta_3 x_t + \beta_4 x_t + \mu_t \quad \ldots\ldots (3)$$

Where;

Y_t = Dependent Variable (RGDP).
X = Independent Variables.
X_t = Agriculture Expenditure (AGR).
X_t = Inflation Rate (INF).
X_t = Interest Rate (INT).
X_t = Exchange Rate (EXR).
t = Time series (Annual) values.
B_0 = Represents the constant term or intercept on y axis.
B_1- B_4 = Are the regression coefficient to be estimated.
μt = error or stochastic term.

The above can be restated to carry their parameters as expressed below:

$$RGDP_t = B_0 + B_1 AGR_t + B_2 INF_t + B_3 INT_t + B_4 EXR_t + \mu_t \quad \ldots\ldots\ldots\ldots 4$$

3.4 Techniques of Data Analysis

The techniques of data analysis employed are descriptive and analytical econometric techniques.

4. Discussion of Empirical Results

4.1 Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) Unit Root Tests

The paper utilizes the augmented Dickey –Fuller and Phillips perron unit root tests for the variables of interest such as Real Gross Domestic Product (RGDP), Agriculture Expenditure (AGR) Inflation Rate (INF), Interest Rate and Exchange Rate (EXR) to ascertain whether the variables are of order one i.e. whether the variables are integrated of the same order; 1(1) so as to avoid the estimation of spurious regression. Thus, the results of the unit root tests are presented in table 1 and 2 respectively.

Table 1 Augmented Dickey Fuller Unit Root Test Results

Series	ADF test Statistics	5% critical Values	10% critical values	Order of integration	Remark
RGDP	-4.947656	-3.5562	-3.2109	1(1)	stationary
AGR	-6.949005	-3.5562	-3.2109	1(1)	stationary
INF	-5.482036	-3.5562	-3.2109	1(1)	stationary
INT	-7.257507	-3.5562	-3.2109	1(1)	stationary
EXR	-5.452868	-3.5562	-3.2109	1(1)	stationary

Source: Eviews output

Table 2. Philips Person Unit Root Tests Result

Series	PP test Statistics	5% critical Values	10% critical values	Order of integration	Remark
RGDP	-4.917323	-3.5562	-3.2109	1(1)	stationary
AGR	-7.310640	-3.5562	-3.2109	1(1)	stationary
INF	-5.773588	-3.5562	-3.2109	1(1)	stationary
INT	-7.381233	-3.5562	-3.2109	1(1)	stationary
EXR	-5.453153	-3.5562	-3.2109	1(1)	stationary

Source: EViews Output

The empirical result from table 1 and 2 indicates that the variables RGDP, AGR, INF, INT and EXR were integrated of order one, meaning that the variables are integrated of the same order 1(1).

The result shows that both ADF and PP tests indicated that series are integrated of the same Order. It was observed that the test statistics of both ADF and PP tests are greater than the critical values of 5% and 10% respectively. Thus, the series are said to be stationary at their levels as indicated above.

4.2 Johansen Cointegration Test

Johansen Cointegration Test result is shown below.

Table 3 Johansen Cointegration Test results.
Trend assumption: Linear deterministic trend series: RGDP, AGR, INF, INT, EXR
Logs interval (in first differences): 1 to 1
Unrestricted Cointegration rank Test (Trace)

Hypothesized No of CE(s)	Eigen value Trace statistics	0.05 critical	prob** Value
None*	0.770386	85.26464	69.81889	0.0018
A_t most 1	0.457112	38.181829	47.85613	0.2942
A_t most 2	0.299169	18.63403	29.79707	0.5194
A_t most 3	0.197538	7.258382	15.49471	0.5478
A_t most 4	0.006731	0.216121	3.841466	0.6420

Trace test indicates 1 Cointegration eqn(s) at the 0.05 level.
* denotes rejection of the hypothesis of the 0.05 level
** Mackinnon – Haug-Michelis (1999) P-values.
Source: EViews Output

From table 3 the Johansen Cointegration trace test result indicates one Cointegrating relationship between RGDP and the explanatory variables AGR, INF, INTand EXR at the 0.05% level of significance.
Consequently, the existence of a long-run relationship also provides for the short term dynamics of the relationship. In attempt to absolve the fluctuations/dynamics an Error Correction Model (ECM) is hereby utilized.

4.3 Error Correction Model (ECM)

Having established the vector Cointegration, we proceeded to estimate an Error Correction Model (ECM) to determine the short run dynamics/fluctuations of the relationship among the variables.

Table 4 below presents the Error Correction Model (ECM) test results.

Dependent variables (RGDP)
Method: Least Squares
Date: 09/08/13Time: 14: 02
Sample (adjusted): 1978-2010
Included Observation: 32 after adjustments.

Variables	coefficient	Std.Error	t-statistic	prob.
C	22.537.36	6910.170	3.261478	0.0030
D (AGR)	0.073846	0.128799	0.573345	0.5712
D (INF)	10.21718	363.5718	0.028102	0.9778
D (INT)	303.2839	1730.765	0.175231	0.8622
D (EXR)	91.01548	501.1549	0.193584	0,08480
ECM (-1)	-0.289212	0.136893	-2.112679	0.0440
R- Squared	0.157087	mean dependent var.	23916.03	
Adj. R.sqrd	0.000992	S.D. dependent var.	36679.12	
S.E of Reg	36660.93	Akaike info criterion	24.01978	
Sum sqrd resid	3.63E+10	Schwarz criterion	24.29187	
Log likelihood	-390.3263	Hannau-Quinu criterion	28.11133	
F-statistic	1.006354	Durbin –Watson Stat.	1.655624	
Prob (F-statistic)	0.433015			

Source: EViews Output.

The coefficient of the Error Correction Model (ECM) test result indicates as expected shows a negative sign and same time statistically significant at 5% level of significance. The coefficient of the Error Correction Model (ECM) is -0.289212, meaning that the system corrects to its previous disequilibrium at a speed of 28.92% approximately at a speed of 29% a year. Also the sign of the Error Correction Model (ECM) is negative and statistically significance further validating our long-run equilibrium relationship between the series.
Furthermore, RGDP can said to be influenced by changes in AGR, INF, INT and EXR. This results support the findings of Itodo, Apeh and Adeshina (2012) and Cheminqui (2005). And again our Error Correction Model (ECM) is not a spurious regression or model as the computed values of 0.157087 is lower than 1.66 (Durbin Watson Statistics) which indicates that there is no evidence of first order serial correlation.
The result from our regression also shows that other variables are significant but has statistically insignificant effect on economic growth in Nigeria.

4.4 Conclusion

This paper essentially examines the effect of agriculture spending on economic growth in Nigeria by exploring some econometric techniques.

We found out that RGDP was particularly influenced by changes in AGR, INF, INT and EXR. These variables as they stand contribute or promote economic growth in Nigeria in the short-run and long-run respectively.

4.5 Recommendations

Based on our analysis and findings, the following recommendations are hereby offered;

That government should increase spending on agriculture, since most of the poor but active people still reside in rural areas and their main source of livelihood is agriculture which can provide food security, generate employment for its teeming youths and creates wealth for its citizens in Nigeria.

As a policy measure, we strongly suggest the reduction of unproductive government consumption spending habit and control inflation, interest and exchange rates in the economy so as to achieve the desired economic growth and development in Nigeria.

That farm inputs should be made available to farmers so as to increase output and productivity in Nigeria.

That interest free loans should be made available to farmers to encourage farming in Nigeria.

That the current reforms in the agricultural sector be sustained.

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