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Effect of Agriculture and Health Expenditures on Economic Growth in Nigeria

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Abstract
The study employed autoregressive distributed lag (ARDL) model to describe the relationship that exists among economic growth, agriculture and health expenditures in Nigeria using time series data of 32 years' period (1982 – 2012). The result showed that there exists a long-run equilibrium relationship between economic growth and government expenditures on agriculture and health in Nigeria. At the long run, the coefficient of agriculture was positive and statistically significant in influencing economic growth in Nigeria. On the other hand, health coefficient was negative and not statistically significant in affecting economic growth. The short-run dynamics adjusts to the long-run equilibrium at the rate of 28% per annum. The policy implication statistically is that both the short-run and long-run expenditure on agriculture has significant effect on economic growth in Nigeria for these periods of the analysis. It is therefore recommended that government should increase expenditure on agriculture so as to increase economic growth. If agriculture and health sectors can be given a priority in Nigeria by properly managing the available funds in the sectors, it will boost employment and as well improve the standard living of the Nigerians.
Keywords: agriculture, ARDL model, economic growth, health

1. Introduction

The sustainable development of any country dwells greatly on her economic growth which is the robustness of her Gross Domestic Product (GDP). This economic growth has been argued by scholars in the literature to have relationships with public expenditure (Al-Yusuf and Couray, 2009; Abdullah, 2000; Ranjan and Sharma, 2008; Cooray, 2009 cited in Okoro, 2013). Public expenditure has remained a crucial issue in economic development, most especially in the less developed countries of Sub-Saharan Africa (SSA), where their economies are characterized by poor infrastructural service delivery, declining productivity, high level of corruption and policy instability (Edame, 2014). According to Okoro (2013), the size of government expenditures and its effect on economic growth, and vice versa, has been an issue of sustained interest for over decades now. The relationship between government expenditure and economic growth has continued to generate series of debate among scholars. Despite this, there are some facts about public expenditure that need to be established. Public expenditure plays an important role in aggregate economy in multiple dimensions. Usually, it is used to produce various public goods and services, to build and upgrade various types of infrastructure, the benefits of which are derived over subsequent years. It is also used by government to adopt various fiscal measures, such as transfer payments, to stimulate economic activities particularly during recessions. Government capital expenditure refers to government spending on investment goods. This means spending on things that last for a period of time. This may include investment in Health, Agriculture, Industries, Security, education, equipment and roads (Njoku et al., 2014). Furthermore, public expenditure means the value of goods and services provided through the public sector, and this can be categorized into capital and recurrent expenditure. The recurrent expenditure are government expenses on administration such as wages, salaries, interest on loans, maintenance etc., whereas expenses on capital projects like roads, airports, health, education, telecommunication, electricity generation etc., are referred to as capital expenditure (Okoro, 2013). Again, public expenditure is found to be increasing overtime continuously. This continuous increase in public expenditure is as a result of some fiscal operations which are recognized as major tools for the management of the economy and stimulation of economic growth

and development (Agenor and Moreno, 2006; Edame, 2012; Edame, 2014).

Agriculture and health sectors are very vital in Nigeria's economy. They are key tools in attaining sustainable development and economic growth in Nigeria if properly managed and developed. Agriculture is economic service while health is social and community service, meaning that both are crucial as factors in explaining socio-economic impacts of economic growth. Mkpado (2013) opined that Nigeria's domestic capacity to provide these services will not only improve welfare of her citizens but also in the long run became assets for attraction of foreign exchange. Thus, the government knew the potentials of investing on agriculture and health sectors to create wealth and alleviate poverty.

According to Okoro (2011) and Olajide et al. (2013), the relevance of agricultural sector in bringing about economic growth and sustainable development of a nation cannot be underestimated. Agriculture contributes to the growth of the economy by providing employment opportunities for the teaming population; earnings from export revenue; supplying food; and eradication of poverty in the economy. A strong and efficient agricultural sector would enable a country to feed its growing population, generate employment, earn foreign exchange and provide raw materials for industries. The agricultural sector has a multiplier effect on any nation's socio-economic and industrial fabric because of the multifunctional nature of agriculture (Ogen, 2007; Olajide et al., 2013). Again, it has also been reported that stagnation in agriculture is the principal explanation for poor economic performance, while rising agricultural productivity has been the most important concomitant of successful industrialization (Abayomi, 1997).

Health sector on the other hand, plays a significant role in contributing to economic growth of any nation because it is the main determinant of human capital development. Provision of health is seen as a key element of a policy to promote broad-based economic growth (Yaqub et al., 2013). Therefore, Imoughele and Ismaila (2013) opined that human resources constitute the ultimate basis for the wealth of a nation, capital and natural resources are passive factors of production, human beings are the active agents who accumulate capital, exploit natural resources, build social economic and political organization and carry forwards national development. More so, good health is intrinsically valuable input for productivity. In conventional measures of productivity, health contribution is measured essentially by the costs of producing the outcomes i.e. expenditure on medical facilities (Adelowokan, 2012). A country which is unable to develop the skills and knowledge of its people and to utilize them effectively in the national economy will be unable to develop any things else. Most countries strive to attract good health because of its acknowledged advantages as a basic component of economic growth and development (Imoughele and Ismaila, 2013). Nigerian governments through policies intervention do make serious efforts in budgeting allocation to health sector so as to enhance the nation's economic output. The linkage among the variables in question is depicted in figure 1. In summary, *ceteris paribus*, agriculture and economic growth have bidirectional effects. The same goes for agriculture and health but health and economic growth have unidirectional effect i.e. economic growth has direct effect on health while health through the building of human resources and among others affects economic growth. Therefore, health is identified as input rather than output because it cannot be directly purchased like materials, goods and services (Adelowokan, 2012). How healthier a population is will determine their ability to contribute immensely to economic performance.

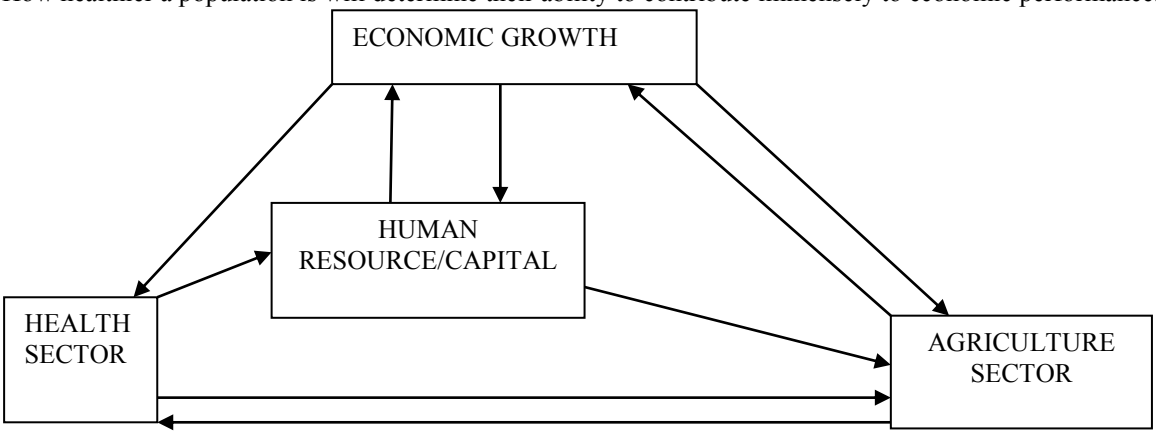

Figure 1: Agriculture, Health and Economic Growth Nexus
Source: Authors, 2015

1.1 Research Problem Statement

Agricultural production decreases as a result of several factors such as diseases, climate change which invariably affects human health and thereby deepens poverty in Nigeria. This also causes the impairment of physical and intellectual development of the people, which is a big threat to economic growth. Furthermore, majority (over 70%) of Nigerians depend on agriculture for their means of livelihood; and there has been cases of food

insecurity which has led to malnutrition and again affects human health. Poor health as a result of ailments and diseases diminish economic opportunities for a large number of the farming households who form majority in the study area. The loss of human capital and low productivity results in a lower economic growth rate. This in turn negatively affects the poor who are stuck in a vicious circle of poverty and diseases. The link of poor health to low productivity is ultimately a link to lower economic growth since poor health exacerbates low productivity, which is a contributing factor to lower economic growth (Kwadwo et al., 2009).

Again, since economic growth must go along with food security and sound health, the study looked at how expenditures on health and agriculture have influenced economic growth (GDP) over the years.

1.2 Objective of the Study

The objective of this study is to examine the long-run relationship between economic growth (GDP) and expenditures on agriculture and health as well as the short run dynamics.

2. Review of Related Literature in Nigeria and Model Employed

The relationship between government expenditure and economic growth has been of interest and debatable discourse in the literature by scholars. According to Oni et al. (2014), empirical researches on the effect of government expenditure on economic growth reported results such as: positive effect, negative effect, and those who observed mixed results and those who could not establish any relationship between them. Likewise, in singling out agriculture and health expenditure from public expenditure as regard the relationship with economic growth, it is expected to have a mixed result as well. The fact that this study, to the best of the author's knowledge, is the first to consider agriculture and health expenditure - economic growth nexus do not find the literature that looks at the relationships among the two exogenous variables and the endogenous variable. But so many studies have been carried out on the relationship between the individual variable and economic variable (i.e. agriculture – economic growth and health-economic growth) by using different models.

Oni et al. (2014) investigated the joint effects of capital and recurrent expenditures of government on the economic growth of Nigeria using the ordinary least square method for estimating multiple regression models covering 1980-2011 time periods. The author discovered that both capital and recurrent expenditures impacted positively on economic growth during the period of study. The recurrent expenditure had a stronger and more accelerating effect on growth than capital expenditure.

Okoro (2013) posited that there was a long-run equilibrium relationship between governments spending on the Nigeria economic growth using Johansen co-integration test for a data set of 32years period (1980-2011).

Oluwatobi and Ogunrinola (2011) also found out that recurrent expenditure was positively related to GDP while capital expenditure is negative using augmented Solow model by examining the relationship between human capital development efforts of the Government and economic growth in Nigeria.

A study carried out by Olajide et al. (2013) examined the relationship between Agricultural resource and economic growth in Nigeria using the Ordinary Least Square regression method. The authors found out a positive cause and effect relationship between gross domestic product (GDP) and agricultural output in Nigeria using a time series data between 1970 and 2010. Again, Abdulraheem (2010) examined the sectoral contribution to GDP in Nigeria between 1977 – 2005 using vector autoregression (VAR) model. The author found out that transport, education and health sector statistically increased GDP while agricultural sector had a negative effect on the GDP.

Oyinbo and Rekwot (2014a) found out a unidirectional causality from agricultural productivity to economic growth in a study that examined the relationships among inflationary trend, agricultural productivity and economic growth in Nigeria spanning from 1970 to 2011 using multivariate vector autoregressive (VAR) model.

Oyinbo and Rekwot (2014b) conducted a study on the relationship between agricultural production and the growth of Nigerian economy with focus on poverty reduction by using the bounds testing approach co-integration (autoregressive distributed lag (ARDL)) spanning from 1970 to 2011. The result of the data analysis indicated that agricultural production was significant in influencing the favourable trend of economic growth in Nigeria.

According to Imoughele and Ismaila (2013), error correction techniques and time series data from 1986 to 2010 were used to evaluate the factors that influenced public health expenditure in Nigeria, the results showed that demand for health in Nigeria was price inelastic. They went further to show that health expenditure share in gross domestic product is one of the major determinants of health expenditure in Nigeria while gross domestic product per capital, unemployment rate, Population per Physician, consumer price index and political instability were insignificant.

Adelowokan (2012) in a study on the effect of education and health expenditures on economic growth in Nigeria between 1970 and 2010 using a static regression model (the Engle-Granger two-step co-integration

procedure), revealed that public investment and public consumption (in education and health) exerted positive influence on economic growth, while, private investment and public capital investment exerted negative effect on economic growth in Nigeria.

Most of the studies on Nigeria examined the impact of health expenditure or health status on economic growth. Such studies include Dauda (2004) who analyzed the impact of healthcare spending on economic growth in Nigeria, by adopting the neo-classical growth model. She used the ordinary least square methods of estimation and found a positive relationship between health care expenditure and economic growth.

Das and Martin (2010) cited in Imoughele and Ismaila (2013) quantitatively examined the determinants of aggregate health care expenditure using a co-integration procedure. The evidence in the study supported co-integration. The results also indicated that per capita income contributed significantly to the explanation of the health care expenditure.

Nasiru and Usman (2012) examined the dynamic relationship between health expenditure and economic growth from 1980-2010 in Nigeria using the newly developed ARDL Bounds testing procedure and Granger causality test. The authors established a long-run relationship between health expenditure and economic growth, indicating that there is causality relationship in at least one direction.

As cited in Nasiru and Usman (2012), Odior (2011) conducted a study on the relationship between health and economic growth by using an integrated sequential dynamic computable general equilibrium (CGE) model over the period 2004-2015 to investigate the impact of government expenditure on health on economic growth. The findings suggested that the re-allocation of government expenditure to health sector is significant in explaining economic growth in Nigeria. Similarly, Dauda (2011) examined the relationship between health expenditure and economic growth for Nigeria spanning from 1970-2009 by employing descriptive statistics, Johansen cointegration technique and error correction model (ECM), the author suggested that health expenditure is positive and statistically significant but the coefficients of the second and third lags were negative and statistically significant. The results of error correction model was statistically significant and had expected negative sign with the coefficient of 0.4 implying that the speed of adjustment is 40%. In addition, Adeniyi and Abiodun (2011) used ordinary least square (OLS) to examine the impact of health expenditure on economic growth over the period 1985-2009. The authors suggested that if funds are properly channeled and appropriately expended to both the recurrent and capital projects in health, the existence of a positive relationship between economic growth and health will be more widened. Arguing in the same line, Bakare and Sanmi (2011) also used ordinary least square (OLS) multiple regression for annual time series data for Nigeria covering 1974-2008, the results showed a significant and positive relationship between health expenditure and economic growth.

3. Research Methodology

The Study Area: Nigeria is located in the Western part of Africa between latitudes $4^0$16'N and $13^0$52'N and between longitudes $2^0$49'E and $14^0$37'E. She is one of the largest countries in Africa, with a total geographical area of 923,768 square kilometers and an estimated population of over 140 million people (NPC, 2006). Over 70% of the population derives their means of livelihood from agriculture, and the economy is characterized by a large rural based traditional sector and local technology (Akor, 2012). The country is endowed with both human and natural resources with a rich biodiversity. Again, health sector has given a priority by the Nigeria government by ensuring that a tangible percentage of the budget goes to health sector.

Data Source and Description: This study employed annual time series data spanning the period of 1982 to 2012 in Nigeria. The choice of this time period is justified by the available data that could be accessed. The data were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin. The variables were real Gross Domestic Product (GDP) which is the proxy to economic growth; agriculture recurrent expenditure (AGR) which is the proxy to Agriculture expenditure and health recurrent expenditure (HET) which is the proxy to health expenditure. The variables were transformed and measured in their natural logarithm (L) for easy interpretation of coefficients in standardized form of percentage as equally observed by Alhassan and Fiador (2014).

Analytical Tool: This study employed the autoregressive distributed lag (ARDL) bounds testing approach to cointegration proposed by Pesaran et al. (2001). Despite the fact that this technique can avoid unit root test, it is also germane to perform stationarity test to make sure that the assumption of ARDL (i.e. regressors are integrated of I(1), I(0) or mutually) is not violated. This is because the model will crash in the presence of I(2) series. Therefore, the stationarity status of all the variables was determined by Augmented Dickey Fuller (ADF) test. Furthermore, unrestricted vector autoregression (VAR) by lag selection criteria was used to determine the optimal lag for the model. Finally, ARDL procedure was run to examine the cointegration (long run) association between economic growth (GDP) and its determinants (agriculture, AGR and health, HET expenditures) as well as the short run dynamics. The bound test is basically computed based on an estimated error correction version of autoregressive distributed lag (ARDL) model, by Ordinary Least Square (OLS) estimator (Pesaran et al., 2001). The bound testing procedure is chosen over other approaches to traditional cointegration due to the

following:
(i) It solves the endogeneity problems and the inability to test hypotheses on the estimated coefficients in the long-run associated with the Engle-Granger method (Engle and Granger, 1987 cited in Mohamed *et al*., 2014).
(ii) The bounds testing procedure does not require that the variables under study must be integrated of the same order unlike other techniques such as the Johansen cointegration approach. The ARDL bounds testing approach is applicable whether the variables (regressors in the model) are purely *I*(0), purely *I*(1), or fractionally integrated.
(iii) It is found that the small sample properties of the bounds testing approach are far superior to that of multivariate cointegration (Narayan, 2005 and Mohamed et al., 2014)
(iv) The bounds test is a simple technique because it allows the co-integration relationship to be estimated by OLS once the lag order of the model is identified unlike other multivariate co-integration methods.
(v) It also estimates long as well as short run parameters separately in single model.
(vi) Different variables can be assigned different lag-lengths as they enter the model.

The presence of cointegration among the variables was conducted based on the F-statistic of the joint significance of the coefficients at specified lagged levels of the variables. The null hypothesis of no cointegration among economic growth, agriculture expenditure and health expenditure was given as:

$H_0: \gamma_1 = \gamma_2 = \gamma_3 = 0$ No cointegration

The alternative hypothesis was given as

$H_a: \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq 0$ Presence of cointegration

Under ARDL approach, the asymptotic distribution for the F-statistic is non-standard under the null hypothesis of no level relationship between the variables (Alhassan and Fiador, 2014).

Therefore, the computed F-statistic was compared with two critical values (lower and upper) bounds pounded by Pesaran et al. (2001). A lower value assumes the variables are I(0) and an upper value assumes the variables are purely I(1). If the computed F-statistic is above the upper bound critical value, the null hypothesis of no cointegration is rejected irrespective of the orders of integration for the time series. Likewise, if the F-statistic falls below the lower bound critical value, then the null hypothesis of no cointegration is accepted. Finally, if F-statistic is between the lower and upper bound critical values, the result is inconclusive which implies that other alternative cointegration tests such as Engle and Granger (1987), Johansen (1988), Johansen and Juselius (1990) should be considered. The optimal lag length for the specified ARDL model was determined based on the Schwarz Bayesian Information Criterion (SBIC).

Model Specification

The relationship between economic growth, agriculture expenditure and health expenditure is expressed implicitly as:

$$LGDP = f(LAGR, LHET) \quad \text{.....Equ.1}$$

Where: LGDP is the log of economic growth (real GDP), LAGR is the log of agriculture expenditure and LHET is the log of health expenditure.

Following Pesaran et al. (2001), the ARDL model specification of equation (1) is expressed as unrestricted error correction model (UECM) to test for cointegration between the variables under study:

$$\Delta LGDP_t = \propto_0 + \sum_{i=1}^{p} \beta_1 \Delta LGDP_{t-i} + \sum_{i=0}^{q1} \beta_2 \Delta LAGR_{t-i} + \sum_{i=0}^{q2} \beta_3 \Delta LHET_{t-i} + \gamma_1 LGDP_{t-1} + \gamma_2 LAGR_{t-1} + \gamma_3 LHET_{t-1} + u_t \quad \dots\dots\dots\dots\dots\dots (2)$$

Where, all the variables are previously defined. α_0 is the intercept, Δ = first difference operator, $\beta_1 - \beta_3$ are the short-run dynamic coefficients, $\gamma_1 - \gamma_3$ are the long run coefficients and u_t is the error term.

Once cointegration is established, the long run relationship is estimated using the conditional ARDL (p, q_1, q_2) model in the three (3) variables using SBIC and it is specified as:

$$LGDP_t = \propto_0 + \gamma_1 LGDP_{t-1} + \gamma_2 LAGR_{t-1} + \gamma_3 LHET_{t-1} + u_t \dots\dots\dots\dots\dots\dots\dots (3)$$

The short-run dynamic relationship is estimated using an error correction model specified as:

$$\Delta LGDP_t = \propto_0 + \sum_{i=1}^{p} \beta_1 \Delta LGDP_{t-i} + \sum_{i=0}^{q1} \beta_2 \Delta LAGR_{t-i} + \sum_{i=0}^{q2} \beta_3 \Delta LHET_{t-i} + \delta ecm_{t-1} + u_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$

Here, δ represents the coefficient of the error correction model, ECM_{t-1} which is measuring the speed of adjustment. The analysis of the data was carried out using Eviews8 and Microfit 4.1 statistical packages.

4. Results and Discussion

Unit Root Tests Analysis

The standard Augmented Dickey-Fuller (ADF) unit root test was employed to check the order of integration of these variables. Based on the ADF test statistic in Table 1, it was observed that all the variables were not stationary at level except expenditure on health (LHET) but stationary when first difference, *I(1)*. This gives justification for using ARDL model, which was proposed by Pesaran et al. (2001). The ARDL technique to co-integration analysis as advanced by Pesaran et al. (2001) was applicable irrespective of whether the underlying series are I(0), I(1) or a mixture of both.

Table1: Results of unit root (ADF) test

Variables	Level [I(0)]	First Differences [I(1)]
	Constant and Trend	Constant and Trend
LGDP	-1.172063 (0)	-4.459214 (0)***
LAGR	-2.720948 (0)	-5.836023 (1)***
LHET	-5.063283 (0)***	-4.989620 (3)***

Notes:

1. ***, **, * imply significance at the 1%, 5%, 10% level respectively.
2. The numbers within parentheses for the ADF (Dickey-Fuller, 1979) statistic represents the lag length of the dependent variable used to obtain white noise residuals.
3. The lag length for the ADF was selected using Automatic-based on SIC, max lag = 7
4. The value in parenthesis ( ) is the lag value

Lag Order Selection Criteria Analysis

Unrestricted Vector Autoregression (VAR) by lag selection criteria was modeled to the time series data in order to determine the optimal number of lags for the model. As shown in Table 2, the lowest value for each estimator falls under lags one (1). Based on the result, SBIC criterion was chosen for the determination of optimum lag length of ARDL model in this study. ARDL (1,1,0) model was selected as a common consequence of the SBIC criterion.

Tables 2: VAR Lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	12.07016	NA	0.032004	-0.604677	-0.464557	-0.559852
1	40.12446	48.62746*	0.005276*	-2.408297*	-2.221471*	-2.348530*
2	40.81498	1.150872	0.005394	-2.387665	-2.154133	-2.312956

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5%level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Cointegration Test Based on ARDL Bounds Testing Approach

In the first step of the ARDL analysis, the presence of long-run relationships was tested. The F-statistic tests the joint null hypothesis that the coefficients of the lagged level variables are zero. The F-statistic is estimated using Wald Test of coefficients in the ARDL-OLS regressions. Table 3 showed that the value of calculated F-statistic for F_{LGDP}(LGDP | LAGR, LHET) to be 3.71 which is higher than the upper bound critical value of 3.63 at the 10% level. Thus, the null hypothesis of no cointegration was rejected. This result was in line with the findings of Olajide et al. (2012), and Nasiru and Usman (2012) who reported a long run relationship between agricultural resource and economic growth, and health expenditure and economic growth respectively in Nigeria.

Table 3: Results of Cointegration Test Based on ARDL Bounds Test Approach

Critical Value Bounds of the F-statistic		
Critical value	**lower bound I(0)**	**Upper bound I(1)**
1% 3.96	4.53	
5%	3.41	3.95
10%	3.13	3.63

Computed F – Statistic : F_{LGDP}(LGDP | LAGR, LHET) = 3.71

Note: Critical Values are cited from Pesaran *et al.* (2001), Table CII (v), Case V: Unrestricted intercept and unrestricted trend, Number of regressors (K) = 2.

Analysis of ARDL Diagnostic Tests

At 5% significant level, the F-test accepts the null hypotheses of no serial correlation, homoscedasticity and functional form misspecification as depicted in Table 4. In the same vein, stability tests using the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMq) plots showed that the model coefficients are stable in both the short run and long run respectively as shown in Figure 1.

Table 4: Results of Diagnostic Tests

Test statistics (F-version)	χ^2 statistic	Probability
A:Serial Correlation	1.5832	0.220
B:Functional Form	4.0806	0.055
C:Heteroscedasticity	0.0019	0.966

Note: A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on the regression of squared residuals on squared fitted values

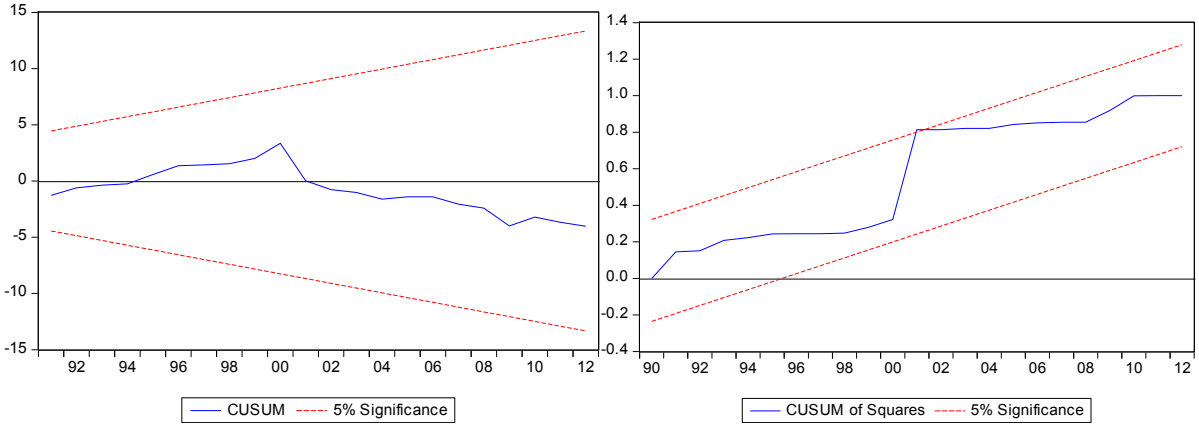

Figure 1: Plot of the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Recursive Residuals of Square (CUSUMq) Tests for ARDL Model.

Analysis of Long Run Estimates

The long run coefficients of ARDL (1,1,0) were presented in Table 5. The results indicated that expenditure on health (LHET) had a negative coefficient but not statistically significant in influencing GDP in the long run, while expenditure on agriculture (LAGR) had a positive relationship with GDP in the study area. Statistically, the empirical findings demonstrated that 1% increase in LAGR will lead to 54.5% change in GDP in the long run according to the model of this study. This implies that agricultural sector for the period of analysis has significant contribution to economic growth. The finding was similar to Olajide et al. (2013) who reported that agricultural sector contributes over 30% to the economy in their study on the agricultural resource and economic growth in Nigeria. The probable reason for negative relationship between GDP and expenditure on health might be as a result of corruption, lack of political will by government and political actors, rickety and malfunctioning of healthcare facilities, improper investment in the health sector, and inadequate and non-functional surveillance systems which have invariably led to deplorable health condition in Nigeria. Similar findings were reported by Menizibeya (2011) that Nigerian health care system is poorly developed and has suffered several backdrops, especially at the Local Government Levels which might be responsible for the negative relationship between economic growth and expenditure on health.

Table 5: Estimated Long Run Coefficients using the ARDL Approach
ARDL(1,1,0) selected based on Schwarz Bayesian Criterion

****

Dependent variable is LGDP
31 observations used for estimation from 1982 to 2012

****

Regressor	Coefficient	Standard Error	T-atio[Prob]
LAGR	0.54475	0.20687	2.6332[.014]
LHET	-0.25493	0.22500	-0.1330[.268]
INPUT	4.2866	0.32810	3.0646[.000]
T	0.05468	0.02173	2.5166[.019]

****

Analysis of Short Run Estimates

The short run dynamic coefficients associated with the long-run cointegration relationships were obtained from the analysis of Error Correction Model (ECM) based on ARDL bounds test approach. The results of the short run

coefficients of ARDL (1,1,0) model are presented in Table 6. The statistically significant negative coefficient of ECM(-1) verified the long run relationship among the variables. Therefore, ECM in this study was statistically significant at 5% level and had a value of -0.287. This implies that an approximately 28% of disequilibria from the previous year's shock converge to the long-run equilibrium in the current year. The results were similar to the long run equation in terms of coefficient signs. This implies that the same reasons given above might be responsible for the short run outcomes.

Table 6: Error Correction Representation for the Selected ARDL Model

ARDL(1,1,0) selected based on Schwarz Bayesian Criterion

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**********************************************************************
Dependent variable is dLGDP
31 observations used for estimation from 1982 to 2012
**********************************************************************
Regressor          Coefficient      Standard Error      T-ratio[Prob]
dLAGR                .076219          .040232          .8945[.069]
dLHET               -.073056          .050499         -.4467[.160]
dINPUT               1.2284           .45759          .6846[.012]
dT                  .015671         .0092842          .6879[.103]
ecm(-1)              -.28658           .12057         -.3769[.025]
**********************************************************************
List of additional temporary variables created:
dLGDP = LGDP-LGDP(-1)
dLAGR = LAGR-LAGR(-1)
dLHET = LHET-LHET(-1)
dINPUT = INPUT-INPUT(-1)
dT = T-T(-1)
ecm = LGDP   -.54475*LAGR +   .25493*LHET   -4.2866*INPUT  -.054682*T
**********************************************************************
R-Squared                    .32482   R-Bar-Squared          .18979
S.E. of Regression           .063095  F-stat.   F( 4,  26)  3.0068[.036]
Mean of Dependent Variable   .084945  S.D. of Dependent Variable   .070096
Residual Sum of Squares      .099524  Equation Log-likelihood      45.0037
Akaike Info. Criterion       39.0037  Schwarz Bayesian Criterion   34.7017
DW-statistic                 1.5898
**********************************************************************
R-Squared and R-Bar-Squared measures refer to the dependent variable
dLGDP and in cases where the error correction model is highly
restricted, these measures could become negative.
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5. Conclusion and Recommendations

The positive and significant relationship between economic growth and expenditure on agriculture reiterated the vital role agriculture plays in the economic growth of Nigeria. Despite a negative association between economic growth and expenditure on health, the importance of health sector cannot be undermined in Nigerian economy. Therefore, to sustain social and economic development, Nigeria needs to ensure that she is committed to improving the health of her citizens by proper investment in the health sector, ability to link health with development, and develop policies that will address all the health problems and weak health systems. This would make government expenditures on health to have significant impact on the Nigerian economic growth. Again, government should increase expenditure on agriculture so as to increase economic growth. Giving priority to agriculture in Nigeria in the area of funding and proper management of the available funds will generate more employment opportunities most especially for the youths and thereby improve standard of living in Nigeria as a whole.

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