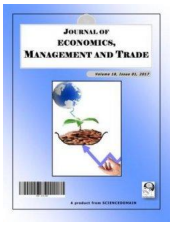

Journal of Economics, Management and Trade

21(6): 1-11, 2018; Article no.JEMT.37345
ISSN: 2456-9216
(Past name: British Journal of Economics, Management & Trade, Past ISSN: 2278-098X)

Public Health Expenditure and Economic Growth in Nigeria: An Error Correction Model

Oladele O. Aluko[1] and Aigbedion, I. Marvelous[1*]

[1]Department of Economics, Faculty of Social Science, University of Abuja, FCT, Nigeria.

Authors' contributions

This work was carried out in collaboration between both authors. Author OOA designed the study, managed the literature searches, wrote the protocol, and wrote the first draft of the manuscript. Author AIM performed the statistical analysis and managed the analyses of the study. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JEMT/2018/37345
Editor(s):
(1) Chiang-Ming Chen, Department of Economics, National Chi Nan University, Taiwan.
(2) LI, Hui, Professor, School of Economics and Management, Zhejiang Normal University, China.
(3) John M. Polimeni, Associate Professor of Economics, Albany College of Pharmacy & Health Sciences, New York, USA.
Reviewers:
(1) Chiao-Lee Chu, National Quemoy University, Kinmen.
(2) Zuzana Janko, San Francisco State University, USA.
(3) Cosimo Magazzino, Roma Tre University, Italy.
(4) Ernest Mensah Abraham, University of Professional Studies, Ghana.
(5) Adriana Ilha da Silva, Universidade Federal do Espírito Santo, Brasil.
Complete Peer review History: http://www.sciencedomain.org/review-history/24999

Original Research Article

Received 11th October 2017
Accepted 22nd May 2018
Published 5th June 2018

ABSTRACT

This study examines the impact of public health expenditure on economic growth in Nigeria from 1995-2016. Time series data and econometrics tools were used to test for the stationarity, causality and co-integration while Ordinary Least Squares (OLS) and Error Correction Model (ECM) were adopted to estimate the long-run and short run impact of public health expenditure on economic growth in Nigeria The OLS regression result shows that there is a positive relationship between public health expenditure and economic growth in Nigeria at the long run. Similarly, the Error Correction Model (ECM) result shows that public health expenditure has short run impact on economic growth in Nigeria. This implies that public health expenditure has that potency to faster economic growth in Nigeria but government health expenditure and Corruption Perception Index have little or no significant impact of economic growth in Nigeria this may be due to inequitable availability of health care services, poor public and private partnership, poor physical infrastructure and equipment; poor human resources availability and management, inadequate drug supplies, high

**Corresponding author: E-mail: oladele.aluko@uniabuja.edu.ng;*

level of political interference, financial constraints and funds mismanagement, resource allocation and lack of effective regulation or legislation to mention few. Therefore, government should put in place monitoring and evaluation mechanism to ensure that the money released is utilised for the right projects in the health sector for effective health service delivery and for sustainable economic growth in Nigeria.

Keywords: Public; health; expenditure; economic growth; corruption perception index.

1. INTRODUCTION

Good health care system is a primary and essential part of human need in any country. According to the World Health Organization [1], fifty percent of economic growth gaps between developed and developing is attributable to ill-health and low life expectancy. Developed countries spend a high proportion of their Gross Domestic Product (GDP) on health care because they believe that their resident health can serve as a major driver for economic activities and development. Health just like education plays a vital role in the development of human capital [2]. Thus, for the manpower and resources of a nation to be utilised to harness other resources of a nation, the population must be healthy.

Without good health, productivity will be low and to ensure adequate productivity, the majority of the population needs to be protected from illnesses. A strong and healthy labour force is an essential factor in development; it signifies not only absence of disease, but also a high life expectancy and absence of disability and discomfort. In an effort to increase their share of public resources spent on health, In April 2001, heads of state of African Union countries met in Abuja and pledged to prioritise the development of the health sector by allocating at least 15 per cent of their annual budgets to improve the sector as increase in health investment generates increase in health delivery which provides basis for human capital development as an essential ingredient for economic growth.

In spite of this commitment and goals of the current national policy on health, a preview of the trends of budgetary allocations over the years shows that the federal government has been allocating between 5 per cent and 6 per cent of the budget to health, and it has never exceeded that at any point in time while Rwanda, Swaziland, Ethiopia, Malawi, the Central African Republic and Togo have since kept to the promise of the Abuja declaration [3]. To this end, governments in Nigeria, over the years have been making frantic efforts at ensuring that there is an increase in the level of public expenditure on health. In 1970, recurrent expenditure on health was N12.48 million. This figure rose astronomically to N52.78 million and N132.02 million in 1980 and 1985 respectively. This trend continues as the expenditure rose steadily form N 575.3 million in 1989 to N68.20millions 1991 and further to N 72290.07 million and N 98.200 million in 2007 and 2008 respectively (National Bureau of Statistics) [4]. While the average total expenditure on health is about 194.4 billion between 2010 and 2015 (CBN) [4]. The aforementioned scenario clearly underscores the fact that health care expenditure in Nigeria has been on the increase over the years.

However, in the midst of all these increase, much impact has not been made in the area of reduction of infant, under five and maternal mortalities since 1970. For instance, the Nigeria's rate of infant mortality (91 per 1000 live births) is among the highest in the world, and the immunisation coverage has dropped below thirty percent while the mortality rate for children under age five is 192 deaths per one thousand (National Bureau of Statistics) [5]. By year 2016, it was reported that more than one hundred and thirty four thousand women died from pregnancy complications. In addition, the life expectancy ratio on the average has been on the decline over the study period. It should however be noted that despite the increase in government expenditure in health care in Nigeria, the contribution of this to health is still marginally low whereas the extent and magnitude of its impact on economic growth is undetermined. Therefore, this study is to examine the impact public health expenditure on economic growth in Nigeria.

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Conceptual Review on Health Care and Economic Growth

Health is a multifaceted concept and thus it is very difficult to define it precisely. General notion about health is the absence of illness due to

physiological and organic deficiencies. It is mainly concerned with an individual body's mechanical ability and functioning of basic parts and organs of human body. The broad definition of health, however, does not mean mere absence of disease but it encompasses the whole range of personal, physiological, mental, social and even moral well-being of a person [6]. The World Health Organization [1] recently defines health as *"*a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity*"*. Therefore, health in actual sense is the adequacy of physical and mental capacity of a person to enjoy life to the fullest possible extent and to reach his maximum level of productive capacity.

Health as human capital affects growth directly through, for example, its impact on labour productivity and the economic burden of illness. Bloom, Canning and Sevilla [7] describe how healthy populations tend to have higher productivity due to their greater physical energy and mental clearness. According to them, healthier individuals might affect the economy in four ways: (a) they might be more productive at work and so earn higher incomes; (b) they may spend more time in the labour force, as less healthy people take sickness absence or retire early; (c) they may invest more in their own education, which will increase their productivity; and (d) they may save more in expectation of a longer life, for example, for retirement increasing the funds available for investment in the economy. Health is so important as both a source of human welfare and a determinant of overall economic growth.

According to Haller [8] economic growth is the process of increasing the sizes of national economies (the macro-economic indications), especially the GDP per capita, in an ascendant but not necessarily linear direction, with positive effects on the economic-social sector, while development shows how growth impacts on the society by increasing the standard of life. To him economic growth can be positive, zero or negative. Positive economic growth is recorded when the annual average rhythms of the macro-indicators are higher than the average rhythms of growth of the population. When the annual average rhythms of growth of the macro-economic indicators, particularly GDP, are equal to those of the population growth, zero economic growth is attained. Negative economic growth appears when the rhythms of population growth are higher than those of the macro-economic indicators.

2.2 Empirical Review

Bhargava, Jamison, and Murray [9]; Bloom, Canning and Sevilla [7]; Gupta and Mitra [10]; Baldacci [11] and Martins [6]; Philips [12]; Aguayo-Rico and Iris [13]; Greiner [14], Lustig, [15]; Agenor [16] conducted for other countries all emphasised that health expenditure is positively related to economic growth.

Moreover, some empirical evidence also emerged from Nigeria. For example, Olaniyi and Adams [17] descriptively analysed the adequacy of the levels and composition of public expenditures and conclude that education and health expenditures have faced lesser cuts than external debt services and defence, but allocations to education and health sectors are inadequate when related to the benchmark and the performance of other countries. Also, Chete and Adeoye [18], studied the empirical mechanics through which human capital influences economic growth in Nigeria. They attempted to achieve this objectives using Vector Auto Regression analysis (VAR) and Ordinary Least Square (OLS) to capture these influences. They however concluded that there is an unanticipated positive impact of human capital on growth which the various Nigerian governments since the post-independence have appreciated by prodigious expansion of educational infrastructure across the country.

Similarly, Dauda [19] examines the relationship between health expenditure and economic growth for Nigeria spanning from 1970-2009 by employing descriptive statistics, Johansen Co-integration technique and Error Correction Model (ECM), the author suggest that health expenditure is positive and statistically significant but the coefficients of the second and third lags are negative and statistically significant. The results of ECM is statistically significant and has the expected negative sign with the coefficient of 40 per cent implying that the speed of adjustment from short run to long run is 40 per cent. Arguing in same line, Ogundipe and Lawal [3] also examined the impact of health expenditure on economic growth in Nigeria. Using the OLS technique, they found a negative effect of total health expenditure on growth.

Aigbedion, Anyanwu and Aiyedogbon [2] examined the impact of public and private

partnership on health care delivery on economic growth in Nigeria from 1986 to 2014. The study used Ordinary Least Squares and Error Correction Model in the analysis. Their results shows that there is a positive relationship between health care delivery and economic growth and the study also shows that both public and private health expenditure have positive impact on economic growth in Nigeria.

In another study, Aluko and Aluko [20] analysed the determinants of health outcomes between the high and the low income families in the Nigeria society and their impact on economic growth. With the use of panel data, the study used the one-way error component panel modelling technique. The result of this study shows the existence of a correlation between income inequality and mortality rates across income quintiles.

2.3 Theoretical Framework

The theoretical framework of this study is the endogenous growth model developed by Romer [21]. Romer [21] played an important role in the development of an endogenous growth model of human capital development. In the endogenous growth model capital is not limited to physical capital, but also includes knowledge, skills and experience owned by the labour input as well. Thus growth is considered as a function of human capital and not only of physical capital. The component of the human capital, knowledge, skills, abilities and experience are developing through health and education. In this respect, endogenous growth model was formulated to include the contribution of human capital in terms of health as a determinant of growth.

The endogenous model assumes human capital to be an important input in a neoclassical production function. Along this line, human capital (e.g., health and education) can be seen as separate input or labour augmenting in the production process. Thus, growth in output is due to improvement in capital accumulation (both physical and human) given the level of technology in the economy.

By adding human capital accumulation to the endogenous growth model, Mankiw et al. [22] stressed that human capital in the form of health investment/expenditure is important in explaining growth.

The endogenous growth model can be giving as:

$$Y(H_Y, L, x) = {H_Y}^{\alpha} L^{\beta} \sum_{i=1}^{\infty} x_i 1\text{-}\alpha\text{-}\beta \qquad (2.1)$$

Where H is the human capital acquired by workers, often as the result of specific investment in education. The model also incorporated a new concept of human capital, the skills and knowledge that make workers productive. Unlike physical capital, human capital has increasing rates of return. There are constant returns to capital, and economies never reach a steady state. Since human capital in form of physical and intellectual capital involves investment, it also depreciates.

And $\alpha + \beta + 1 - \alpha - \beta$=1 indicates constant returns to capital.

3. METHODOLOGY

3.1 Sources of Data and Methods of Data Analysis

This study utilised the annual time series data spanning 34 years from 1980 to 2014. The data was obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin Publication (2015) [4], National Bureau of Statistics (NBS) [5] Annual Abstract of Statistics for various years and World Bank online Databank. The data were for the following variables Real Gross Domestic Product (RGDP), Government Expenditure on Health (GEH), Life Expectancy at Birth (LEB), Corruption Perception Index (CPI). (See, Appendix 1 for detail of the data). This study used the Ordinary Least Squares multiple regression model to examine the long-run impact of the health sector on economic growth in Nigeria. While the Error Correction Model was used to examine the short-run impact of health sector on economic growth in Nigeria.

3.2 Model Specification

The study adopted the public health expenditure model of Basairini and Scarpetta (2001) [23]. In order to determine the impact of public health expenditure on economic growth and they have their model as:

$$Yt = f(HEX, LEB) \qquad (3.1)$$

Where Yt is the output (GDP), HEX is the public health expenditure and LEB is Life Expectancy at

Birth. Based on the objective of the study the model was modified by adding a variable (Corruption Perception Index) therefore, the model for the study is stated as:

$$\mathrm{RGDP} = f(\mathrm{GEH},\mathrm{LEB},\mathrm{CPI}) \quad (3.2)$$

Equation 2 shows the impact and functional relationship between the dependent variable Real Gross Domestic Product (RGDP) and the independent variables that is Government Expenditure Health (GEH), Life Expectancy in Nigeria (LEB) and Corruption Perception Index (CPI). The model shows the mathematical functions of the economic variables. To express the equation as an econometric equation there is the need for a constant (α), Parameters $(\beta_1, \beta_2, \beta_3)$ and the error term (ε_t) in the equation. Therefore, the equation 3.2 can be expressed as an econometric model as follows:

$$\mathrm{RGDP} = \alpha + \beta_1 \mathrm{GEH} + \beta_2 \mathrm{LEB} + \beta_3 \mathrm{CPI} + \varepsilon_t \quad (3.3)$$

Equation 3 expressed the multiple regression model with different economic variables and with different economic units or values. In regression analysis the logs of variables are routinely taken, not necessarily for achieving a normal distribution of the predictors and/or the dependent variable but for interpretability. The standard interpretation of coefficients in a regression analysis is that a one unit change in the independent variable results in the respective regression coefficient change in the expected value of the dependent variable while all the predictors are held constant. Interpreting a log transformed variable can be done in such a manner; however, such coefficients are routinely interpreted in terms of percent change.Therefore, the model can be expressed by taking the natural log of the economic variables (independent and dependent variables) and adding the log to each variables as given below.

$$\log\mathrm{RGDP} = \alpha + \beta_1 \log\mathrm{GEH} + \beta_2 \log\mathrm{LEB} + \beta_3 \log\mathrm{CPI} + \varepsilon_t \quad (3.4)$$

The equation 3.4 is the econometric model for aggregate regression analysis for this study and this is estimated using econometric tool (Ordinary Least Squares) and Statistical package (E-views). The a-prior expectation for the independent variables is given as $\beta_1, \beta_2, \beta_3 > 0$ which means all independent variables are expected to be positive signed.

3.3 The Error Correction Model Specification

The building of Error Correction Model (ECM) starts with the basic structure of Error Correction Model (ECM) which is stated as:

$$\Delta Y_t = \alpha + \Delta X_{t-1} + EC_{t-1} + \varepsilon_t \quad (3.5)$$

Where EC is the error correction component of the model and measures the speed at which prior deviations from equilibrium are corrected. ΔY is the National Income that is Gross Domestic Product which is used as a proxy for economic growth in Nigeria. The X present the ten endogenous variables i.e $(\mathrm{GEH}, \mathrm{LEN}, \mathrm{CPI})$ which are Government Expenditure on Health (GEH), Life Expectancy in Nigeria (LEN), Corruption Perception Index (CPI), and ΔX_{t-1} this present the lag (period one) of the variables,

To formulate Error Correction Model (ECM) it will begins with the Ordinary Least Squares (OLS), the Ordinary Least Squares for multiple model is formulated as follows:

$$\mathrm{RGDP} = \alpha + \beta_1 \mathrm{GEH} + \beta_2 \mathrm{LEN} + \beta_3 \mathrm{CPI} + \varepsilon_t \quad (3.6)$$

From the equation above the Error Correction Model (ECM) is formulated as follows:

$$RGDP = \alpha 0 + \beta_2 GEH + \beta_3 LEN + \beta_4 CPI + \sum_{i=1}^{n-1} \beta t \Delta\, GEH_{t-1} + \sum_{i=1}^{n-1} \beta t \Delta\, LEN_{t-1} + \sum_{i=1}^{n-1} \beta t \Delta\, CPI_{t-1} + X_{t-2} + \ldots\ldots\ldots\ldots\ldots + X_{t-n} - ECM_{t-1} + \varepsilon_t \quad (3.7)$$

The model above is used to adjust the estimation until the ECM turned negative. The negative sign of coefficient of the error correction term ECM (-1) shows the statistical significance of the equation in terms of its associated t-value and probability value.

4. PRESENTATION AND DISCUSSION OF RESULTS

4.1 Descriptive Analysis of Variables

The analysis continued in this section with the descriptive statistic of the variables. In this section, the descriptive statistic for all the variables are presented and analyzed. The results for the Mean, a measure of central tendency, Standard Deviation, a measure of dispersion or variability, maximum or peak value and minimum or lowest value is as presented in Table 1.

From the Table 1, the highest value for Real Gross Domestic Product (RGDP) during the period of study is N1102738billion this occurred in 2015 as shown in the table of data presentation. Also, peak value for Government Expenditure Health (GEH), Life Expectancy in Nigeria (LEN) and Corruption Perception Index in Nigeria (CPI) are N231800; 52.7percent and 28.0 unit respectively. However, the lowest value for Gross Domestic Product (GDP) during the period of study is N31546.8 billion. Also, lowest value for Government Expenditure Health (GEH), Life Expectancy in Nigeria (LEN) and Corruption Perception Index in Nigeria (CPI) 1 unit; 45.5percent and N153.1 respectively. On the average the values of the variables; RGDP is N432653.8billion. Government Expenditure Health (GEH), Life Expectancy in Nigeria (LEN) and Corruption Perception Index in Nigeria (CPI) also have average value of N47229.58; 47.8 percent and 8.45 unit respectively as indicated by their mean values.

4.2 Trend Analysis

From Fig. 1, all the variable fluctuates over the period under study (1995-2016). For GEH the peak was recorded in 2011 and trough is 1998. For GDP its peak is at 2015 and its trough is at 1995. For LEN its peak is at 2015 and its trough at 1995. CPI fluctuate widely from 1995-2016 has its peak around 2011 and its lowest point in 1999.

4.3 Unit Root Test

Table 2 shows the stationarity test of the variables used in the study and from the table both Augmented Dickey-Fuller and Philips-Perron test results revealed that the variables are stationary at first order at 5 percent level of significance.

4.4 Co-integration Test

From Table 3 we observe that both the trace test and maximum Eigenvalue statistics indicate 1 co-integrating equation at the 5% level of significance. Based on the these evidence, we can safely reject the null hypothesis of no co-integrating vectors and conveniently accept the alternative hypothesis of the presence of co-integrating vectors among all the variables in our model of study. This implies that long-run relationships exist among the variables that have entered the specified model of study.

Table 1. Descriptive Analysis of Variables

Description	CPI	GEH	LEN	RGDP
Mean	8.452273	85256.64	49.14091	603101.6
Median	2.425000	57174.05	49.25000	578876.5
Maximum	28.00000	231800.0	52.70000	1102738.
Minimum	1.000000	3891.100	46.10000	281407.4
Std. Dev.	10.86986	78397.22	2.453503	262889.2
Skewness	1.052636	0.675800	0.107804	0.311589
Kurtosis	2.166820	1.897636	1.457432	1.804082
Jarque-Bera	4.699160	2.788528	2.223835	1.667022
Probability	0.095409	0.248016	0.328928	0.434521
Sum	185.9500	1875646.	1081.100	13268236
Sum Sq. Dev.	2481.232	1.29E+11	126.4132	1.45E+12
Observations	22	22	22	22

Source: Authors' computation from E-views, 2018

Table 2. Augmented Dickey-Fuller and Philips-Perron test results

Variables	ADF statistic	Order	Philips-perron test	Order
RGDP	-6.821653	(1)1	-6.053365	(1)1
GEH	-5.694410	(1)1	-6.949803	(1)1
LEN	-6.214226	(1)1	-4.264826	(1)1
CPI	-4.837242	(1)1	-4.283724	(1)1
5% Critical Value (1)1	(3.0199)		5% Critical Value (1)1	(-3.0114)

Source: Authors' E-views 7.0 Computation (2018)

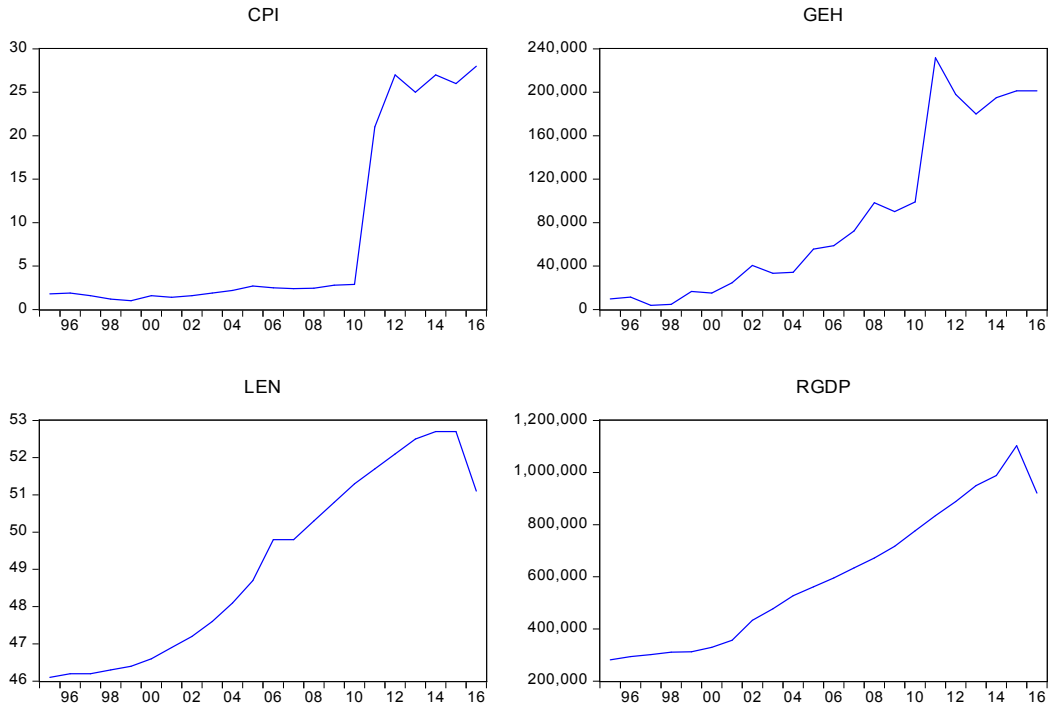

Fig. 1. Trend analysis

4.5 Ordinary Least Squares Model

From the result obtained in Table 4 the following interpretation can be inferred; a percentage. increase in Government Expenditure on Health (GEH) on the average holding other independent variables constant will lead to 0.095432 percent increase in Gross Domestic Product. This shows that Government Expenditure on Health (GEH) has a positive impact on Gross Domestic Product. This result fulfils a priori expectation and is consistent with other results on Health and Productivity in Nigeria. In the same vein suggest that a unit increase in a percentage increase in Life Expectancy (LEN) on the average will lead to 6.700871 percent increase Gross Domestic Product respectively. This result fulfils the a priori expectation and consistent with other result on Health Expenditure and Economic Growth in Nigeria.

Finally, a percentage increase in Corruption Perception Index (CPI) on the average holding other independent variables constant will lead to 0.004814 percent decrease in Gross Domestic Product.

The R^2 of 0.87 percent indicates that 87 percent of the variations in the dependent variable are explained by variations in the independent variables and the Durbin Watson statistic of 1.8 suggests that the model is free from serial auto correlation. The F-statistics of 81.2 shows that the model has a good fit in explaining variation in

Table 3. Co-integration rank test (Trace) for all the variables

Eigenvalue	Likelihood Ratio	5 percent Critical value	1 percent Critical value	Hypothesized No. of CE(s)
0.839631	91.03301	53.21	64.42	None **
0.493131	39.73231	30.28	32.63	At most 1 *
0.163983	11.23286	15.41	20.21	At most 2
0.083902	3.071311	3.76	6.42	At most 3

*Notes: Superscript * denotes rejection of the null hypothesis of no co-integration at the 5% level of significance, while ** indicates MacKinnon-Haug-Michelis (1999) p-values. Maximum Eigenvalue test indicates 2 co-integrating equation(s) at 5% level of significance.*
Source: Authors' E-views 7.0 Computation (2018)

Table 4. Long run regression results

Variable	Coefficient	Std. error	t-statistics	Prob.
Intercept	-13.91131	3.864145	-3.600101	0.0020
LOG(GEH)	0.095432	0.037680	2.532683	0.0208
LOG(LEN)	6.700871	1.080138	6.203719	0.0000
LOG(CPI)	-0.004814	0.025753	-0.186933	0.8538
R-Squared	0.87757			
Adjusted R^2	0.85175			
F-statistics	81.226			
DW	1.8			

Author's E-views 7.0 Computation (2018)

Table 5. The error correction model results

Variable	Coefficient	Std. error	t-statistics	Prob.
C	-13.66043	1.672464	-8.167844	0.0000
LOG(GEH)	0.101046	0.009428	10.71755	0.0000
LOG(LEN)	6.615649	0.448523	14.74984	0.0000
LOG(CPI)	-0.135147	0.058676	-1.301552	0.1229
ECM(-1)	-0.313778	0.121736	1.621832	0.0089
R-Squared	0.553			
Adjusted R^2	0.511			
F-statistics	216.19			
DW	2.1			

Author's E-views 7.0 Computation (2017)

real gross domestic product in Nigeria and meaning that health sectors has good fit in determining the variation in economic growth in Nigeria.

The result shows that government expenditure on health and life expectancy in Nigeria are positively related to real gross domestic product in Nigeria and they were statistically significant at 5 percent level of significance. While Corruption Perception Index in Nigeria is negatively related to real gross domestic product in Nigeria and it is statistically significant at 5 percent level of significance.

4.6 The Error Correction Model

From Table 5, the coefficient of the error correction term is 0.31 which implies that the speed of adjustment is approximately 31 percent per quarter that is there is short run relationship between the dependent and independent variables. The negative sign and significant coefficient is an indication that co-integrating relationship exists among the variables. The size of the coefficient on the error correction term (ECT) denotes that 13 percent of the disequilibrium caused previous year's shock converges back to the long run equilibrium in the current year.

In the result, the government expenditure on health and life expectancy in Nigeria in Nigeria were positively related to real gross domestic product in Nigeria but Corruption Perception Index have a negative impact on GDP in the short-run. Government expenditure on health and life expectancy in Nigeria were all statistically significant at 5 percent level of significance except Corruption Perception Index. This means that the variables are fit in explaining variations in real gross domestic product in Nigeria.

Also, from the error correction model in Table 5, the coefficient determination (R^2) is 0.55, which indicates that about 55 percent of the systematic variation in real gross domestic product growth rate in Nigeria is accounted for by the variables taken together. The F-value of 216.19 is significant at 1 per cent level of significance, which further suggests a linear relationship between the government expenditure on health, life expectancy in Nigeria, Corruption Perception Index in Nigeria and real gross domestic product in Nigeria. While the D.W. statistics of 2.1 shows absence of auto-correlation.

5. CONCLUSION AND SUMMARY OF MAJOR FINDINGS

The result revealed that there is short and long run linear relationship between government health expenditure and economic growth in Nigeria and the result shows that government health expenditure has positive impact on economic growth in Nigeria. This agreed with the works of Bloom, Canning and Sevilla [7] and Ogundipe and Lawal [3] that show positive impact of health expenditure on economic growth in Nigeria. This implies that government health expenditure is a tool to faster economic growth in Nigeria. The result also shows that life expectancy in Nigeria has a positive impact on economic growth in Nigeria and this result agreed with the work of Aigbedion, Anyanwu & Aiyedogbon [2]. Therefore, life expectancy in Nigeria is a determinant of economic growth in Nigeria.

Furthermore, the result shows that Corruption Perception Index in Nigeria has negative impact on economic growth in Nigeria and this agreed with the work of Philips [12] which said that Corruption Perception Index can constrained economic growth. This implies that Corruption Perception Index has a negative impact on economic growth. Finally, the result revealed that Corruption Perception Index in Nigeria limit economic growth in Nigeria and that life expectancy in Nigeria and health expenditure in Nigeria though positive and significant cannot be justified from what is on ground in reality therefore, the study recommends some policy measures to improve the impact of health sector expenditure on economic growth in Nigeria.

6. RECOMMENDATIONS

The following policy recommendations were raised from the study findings and discussion which are:

i. Government should increase the health sector annual budget to enable the sector provide the needed physical facilities and human resources for effective health delivery in Nigeria.
ii. Government should design a mechanism for feedback as a mean of evaluation to make sure monies released for health care services are used for what it is meant for. This will help to improve the impact of public health expenditure on economic growth.
iii. Government should create employment and business opportunities in the country in order to improve the Corruption Perception Index in Nigeria and this will further enable individuals to have access to quality health care services in the country.
iv. The government should ensure transparency in the disbursement of health finances and also in execution of health projects and policies.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. World Health Organization. Monitoring health for the Sustainable Development Goals (SDGs) and 2016 World Health Statistics; 2016.
2. Aigbedion IM, Anyanwu OA, Aiyedogbon A. Impact of Health Sector Public-Private Partnership on Effective Health Care Delivery for Economic Growth in Nigeria: An Error Correction Model. International Journal of Advanced Research in Social Engineering and Development Strategies. ISSN Hard Print: 2315-8379 ISSN Online: 2354-161X. 2015;31-41.
3. Ogundipe MA, Lawal NA. Health expenditure and Nigerian economic growth. European Journal of Economics, Finance and Administrative Sciences. 2011;30.
4. Central Bank of Nigeria (CBN). Statistical Bulletin. Central Bank of Nigeria. Abuja; 2016.
5. National Bureau of Statistics. National and Annual Statistics Report; 2016.
6. Martins GM. On the concept of Health Capital and the demand for Health. Journal Political Economy. 2005;80(2):223-255.
7. Bloom DE, Canning D, Sevilla J. The effect of health on economic growth: A production function approach. World Development. 2003;32(1):1-13. Central Bank of Nigeria (CBN), (Various years), Statistical Bulletin. Central Bank of Nigeria. Abuja.
8. Haller AP. Concepts of Economic Growth and Development. Challenges of Crisis

and of Knowledge, Economy Trans-disciplinary Cognition. 2012;15:66-71.
9. Bhargava ADT, Jamison LJ, Murray CJL. Modelling the effects of health on economic growth. Journal of Health Economics. 2001;20:423-440.
10. Gupta I, Mitra A. Economic growth, health, and poverty: An exploratory study on India. In: Misra R, Chatterjee R, Rao S (Eds). India Health Report. New Delhi: Oxford University Press; 2003.
11. Baldacci EB. The impact of poor health on total factor productivity. The Journal of Development Studies. 2004;42(6):918-938.
12. Philips K. Life expectancy and infant mortality declined continuously in all parts of the world, except sub-Saharan African in the 1990s; 2005.
13. Aguayo-Rico V, Iris HB. The impact of health on economic growth for many countries; 2010.
14. Greiner A. Fiscal policy in an Endogenous Growth Model with Public capital and Pollution, Japanese Economic Review. 2005;56:67-84.
15. Lustig R. The study on the direct relationship between health and growth in Mexico uses 1970-1995 data and uses life expectancy and mortality rates for different age groups as health indicators; 2006.
16. Agenor PR. Health and infrastructure in a model of Endogenous Growth. Journal of Macroeconomics. 2007;28:768-774.
17. Olaniyi OO, Adam JA. Public expenditure and human development in Nigeria, In: Human Resource Development in Africa. Selected Papers for 2002 NES Annual Conference. 2003;53-78.
18. Chete, Adeoye. Human Resources Development in Africa. The Nigerian Economic Society Selected Papers for the 2002 Annual Conference. 2002;79-102.
19. Dauda RO. Health as a component of human capital formation: Does it matter for the growth of the Nigerian Economy? 2011.
20. Aluko OO, Aluko WO. Income Disparity and Family Health Outcomes in the FCT: Implication for Economic Growth in Nigeria. (1985-2015) International Journal of Management Sciences and Business Research, U.K. ISSN (2226-8235). 2017;6:2.
21. Romer PM. Endogenous technological change. Journal of Political Economy. 1990;98:S71-S102.
22. Knowles S, Owen DP. Health capital and cross-country variation in per capita in the Mankiw-Romer-Weil model, economics Letters. 1995;48(223):99-106
23. Bassanmi A, Scarpetta S. Does human capital matter for growth in OECD countries? Evidence from pooled mean-group estimates, OECD Department of Economics Department Working (Paris: OECD). 2001;282.

APPENDIX

Table 1. Data for regression

Year	RGDP	GEH	LEN	CPI
1995	281407.4	9746.4	46.1	1.8
1996	293745.4	11496.1	46.2	1.9
1997	302022.5	3891.1	46.2	1.6
1998	310890.1	4742.2	46.3	1.2
1999	312183.5	16638.7	46.4	1
2000	329178.7	15218.0	46.6	1.6
2001	356994.3	24522.2	46.9	1.4
2002	433203.5	40621.4	47.2	1.6
2003	477533.0	33267.9	47.6	1.9
2004	527576.0	34197.1	48.1	2.2
2005	561931.4	55661.6	48.7	2.7
2006	595821.6	58686.5	49.8	2.5
2007	634251.1	72290.0	49.8	2.4
2008	672202.6	98200.0	50.3	2.45
2009	716949.7	90202.6	50.8	2.8
2010	776330.0	99100.0	51.3	2.9
2011	834400.0	231800.0	51.7	21
2012	888890.0	197900.0	52.1	27
2013	950110.0	179990.0	52.5	25
2014	988564.0	194960.0	52.7	27
2015	1102738.0	201283.0	52.7	26
2016	921313.3	201231.3	51.1	28

Sources: 1 NBS. Educational reports 2010-2016
2. CBN, Annual Report and Statement of Account Online version (2016).
3. Word Bank Databank Online version (2016).
4. Transparency International Report (2016).

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sciencedomain.org/review-history/24999