An Impact Assessment of Public Healthcare Spending and Economic Growth. Empirical Evidence from Nigeria.

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Abstract

The study investigated the impact of public healthcare spending on economic growth in Nigeria. The data were collected from Central Bank of Nigeria (CBN) annual bulletin. To analyze the impact of gross capital formation, total health expenditure, life expectancy rate and mortality rate on economic growth. Quantitative technique of analysis was employed, the method of analysis employed was the Ordinary Least Square (OLS), the Augmented Dickey-Fuller (ADF) unit root test, the Autoregressive Distributed lag model, and the Johansen cointegration test was employed. The findings revealed that public healthcare expenditure has insignificant positive impact on economic growth. The unit root test revealed that all the variables were stationary at first difference, the effect of gross capital formation was found to be mixed in that its two lagged values show significant positive and negative impact on economic growth. The effect of total health expenditure revealed a positive and insignificant impact on economic growth. The Johansen cointegrationtest revealed a long-run relationship between the dependent and independent variables. There is both short-run and long-run relationship between the dependent and independent variable. The R-squared is (0.998600) this implies that 99.8% of variation in GDP was accounted for by the variables and it revealed that the model had a good fit and was supported by the F-statistic value (1506.201). The descriptive statistics revealed that recurrent expenditure on healthcare is greater than capital expenditure on healthcare, thus, it is recommended that Nigeria should double its spending on healthcare; balance both capital and recurrent expenditure. Nevertheless, implementing a public finance system and ensuring the usage of the allocated fund as transparently as possible can improve health status, life expectancy and enhance economic growth.

Keywords: Federal Government, Healthcare Spending and Economic Growth.
JEL Code:

Contribution/Originality
The study provides Empirical evidence by adding to the existing literature that public health care spending has both short and long run relationship with economic growth in Nigeria for the period over review. While other studies shows negative and positive relationships only.

1.0 Introduction

Better healthcare is a primary human need. According to World Health Organization (WHO, 2005) 50% of economic growth differentials between developed and developing nation is attributable to ill-health and low life expectancy. Developed countries spend high proportion of their Gross Domestic Product (GDP) on healthcare because they believe that their resident's health can serve as a driver for economic activities and development. To this end, Governments in Nigeria over the years have been

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making frantic efforts at ensuring that there is an increase in the level of public expenditure on health. Provision of health is seen as a key element of a policy to promote broad-based economic growth. The burden of diseases in the economy is known to slow the economic growth of such economy. Therefore, every country devote huge public fund to healthcare provision believing this will improve the health of the citizenry so that they can contribute meaningfully to economic growth and development.

Increase in budgetary allocation to social services is highly desirable in a developing country like Nigeria, this by itself is not sufficient to guarantee enhancement in service delivery. Bad budget management has been identified as one of the main reason for ineffective public spending. Nigeria's overall health system performance was ranked 187th among the 191 member States by the World Health Organization (2000), (National Health Policy, 2005). The Nigeria's rate of infant mortality (91 per 1000 live births) is among the highest in the world. It therefore becomes imperative to ask if governance has an impact on the effectiveness of health expenditure in Nigeria. Odusola, (1998), Gupta and Mitra (2003), Kaufmann et al. (1999), Ricci and Zachariah (2006) the economic view of human capital encompasses education, health, training, migration and other investment that enhances an individual's productivity. According to the 2009 communiquı of the Nigerian national health conference, health care system remains weak as evidenced by lack of coordination, fragmentation of services, dearth of resources, including drug and supplies, inadequate and decaying infrastructure, inequity in resource distribution, and access to care and very deplorable quality of care.

Developing a sound system for financing healthcare is one of the key mechanisms to show the commitments and political will of leaders and their ability to translate these commitments into results. The desire to develop a strong health financing system is a common objective of all countries but the increasing cost of healthcare accompanied by the poor economic performance of developing countries and African economies in particular makes it difficult to meet this objectives. The majority of African countries falls within the low and middle income range and they face a severe problem of scarcity of funds to provide quality healthcare services with the average total health expenditure in African countries being at US$135 per capita in 2010, which is only 4.2% of the US$3150 spent on health in an average high-income country (Newhouse, 1992). The constraints of financing healthcare in Africa arise principally from the mechanisms and strategies employed in financing healthcare. More than 40% of total health expenditure is characterized by household out-of-pocket payments which is a very regressive method of financing healthcare. This is principally because reliance on this form of payment creates financial barriers to access health services among nations and between rural and urban areas.

2.0 Literature Review

2.1 Conceptual Issues

The word health refers to a state of complete emotional and physical well-being. Health is not just the absence of disease but a state of overall wellbeing. In order words, Health can be defined as physical, mental and social wellbeing and as a resource for living a full life. It refers not only to the absence of disease but the ability to recover and bounce back from illness and other problems, WHO (1948).WHO further clarified that health is a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources as well as physical capacities, in other words, health is a component of human capital. There is a link between macroeconomics and health status. A very important component of economic development of a country is its people's state of health. In fact, there is an argument as to whether it is health that causes development or economic development causes health improvement. Also whether education has more impact economic growth than health. Although both health and education increases labour productivity, health has the additional feature; that is; when the time spent in sickness is reduced, the total amount of time available to produce money earnings and

commodities as well as time for leisure, is increased. More recently, researchers have defined health as the ability of the body to adapt to new threats and infirmities. They based this on the idea that modern science has dramatically increased human awareness of diseases and how they work in the last few decades.

Berger and Messer (2002) view health as a form of capital, such that health is both a consumption good that yields direct satisfaction and an investment good that yields indirect satisfaction and investment good that yields indirect utility through increased productivity, fewer sick days and higher wages. The measurement of health is regarded as health status since health is multi-dimensional; health status is also multi-dimensional and thus has a variety of measures Mwabu (2008). Health status is determined by job productivity, the capacity to learn and the ability to grow intellectually, physical and emotionally. Elimination of diseases and improvement of individual health will enhance income earnings capacity WHO (2004). Arandi (2010) opined that improvement in health expenditure will increase health status and health status is governed by investment in health. The demand for healthcare is derived from the desire to live healthy. A healthy individual all things being equal, will live long and bring about an improved and sustainable growth and development in the economy. Both healthcare spending and improve health status are a means to an end; the end is increased productivity and economic growth. Irwin (2008), is of the view that material circumstances such as housing and neighbourhood quality; an improved environment, consumption strength, intake of balanced diet, and the physical work environment.

According to Clement (2011) health demographic and non-demographic factors affect health expenditure. The demographic factors that affect health expenditure include; changes in age distribution within the population this is so because people's health status decreases as one advances in age. The non-demographic factors includes rising income, health technology innovation, health policies and institutions. Also, Denton and Walters (1999) underlined some genetic factors and Socio-economic conditions (including lifestyle) as the key determinants of health status in Africa. The level of health behaviors can affect health status. Denton (2004) identifies structural, behavioral and psychological factors that determine health. The structural, behavioral and psychological factors that determines health status. The structural factors include age, family characteristics, occupation, education, income and social support. Wilson (2008) outlined 12 social determinant of health as income, social status, social support networks, education/literacy, employment /occupation, social environment, physical environment and personal health practice. Heynes and Borman (2008) supported Wilson by affirming that poverty, physical environment; genetic factors and the socio-economic conditions (including lifestyle) are key determinants of health status in Africa. These shows that even with subsidized rate of medical care, individual's lifestyle can also deteriorate their health status which will lead to backward economic growth. The level of household income, household demography and health behaviours can affect health status.

2.2 Theoretical Framework

The role of health in influencing the nation's economic outcome of the nation has been severally understood at the micro level. For instance, it has been understood that healthier workers are likely to be able to work longer and be generally more productive than their less healthy counterparts and consequently, able to secure higher earnings all things being equal. Health as human capital affects growth directly through, for example, its impact on labour productivity and the economic burden of illness. Bloom and Canning (2000: 2003) 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.

The classical theory of economic growth

The classical theory of economic growth was a combination of economic work done by Adam Smith, David Ricardo, and Robert Malthus in the 18th and 19th centuries. The theory states that every economy has a steady state GDP and any deviation off of that steady state is temporary and will eventually return. This is based on the concept that when there is a growth in GDP, population thus has an adverse effect on GDP due to the higher demand on limited resources from a larger population. The GDP will rise back to its steady state.

Neo-classical theory of economic growth

The theory was a product of the work done by T.W. Swan and Robert Solow. They made important contributions to economic growth theory in developing what is known as the Solow-Swan growth model. The theory focuses on three factors that impact economic growth: labour, capital and technological progress. The output per worker (growth per unit of labour) increases with the output per capita (growth per unit of capital) but at a decreasing rate. This is referred to as diminishing marginal returns. Therefore, there will become a point at which labour and capital can be set to reach an equilibrium state. A nation can theoretically determine the amount of labour and capital necessary to remain at that steady point; it is technological progress that really impacts the economic growth. The theory states that economic growth will not take place unless there are technological progresses, and those progresses happen by chance. Once advancement has been made, then labour and capital should be adjusted accordingly. It also suggests that if all economies have access to the same technology, then the standard of living will all become equal.

Solow-swan theory of public investment and economic growth

The mechanism through which public investments affect economic growth and economic development is inscribed in the endogenous growth models. This model highlights the importance of human capital to economic growth. The Neo Classical endogenous growth models try to explain the engine of growth; economic growth can be achieved through savings and growth of population. Solow-Swan in his model, opined that technological progress leads to an increase in income per capita, which in turn, leads to higher savings and as a consequence to higher investments and to a higher capital stock (per efficient labour unit). He highlighted that countries with higher savings will have higher per capita income, all things being equal. In Solow's model, the rate of savings and population are the principal determinant of per capita income across countries. Buchanan developed a theoretical model in 1965, encouraging public authorities to increase public spending on health independent of demand. This theory highlights that inefficiency in the provision of health care should be observed not by lack of supply of healthcare services but reduced quality such as congestion, infrastructure, unequal distribution of staff.

Musgrave theory of public expenditure

Musgrave in his theory of public expenditure growth found changes in the income elasticity of demand for public services in three ranges of per capita income. He posits that at low levels of per capita income, demand for public services tends to be very low, this is so because according to him, such income is devoted to satisfying primary needs and that when per capita income starts to rise above these levels of low income, the demand for services supplied by the public sector such as health, education and transport starts to rise, thereby forcing government to increase expenditure on them. He observes that at the high levels of per capita income, typical of developed economics, the rate of public sector growth tends to fall as the more basic wants are being satisfied.

2.3 Empirical Review

Hartwig (2010) conducts causality testing for a panel of 21 OECD countries using panel Granger causality test over the period 1970-2005, the author find that health capital formation fosters long term economic growth in all the OECD countries under study. Devlin and Hansen (2001) examine Granger causality between health expenditure and GDP and showed some (mixed) evidence that indeed there might be bi- directional (Granger) causality between health spending and income. Mehrare and Musai (2011) examines the relationship between health expenditure and economic growth for Iran over period (1979-2008) by employing Gregory-Hensen (1996)cointegration techniques which allows the presence of potential structural breaks in data. The authors find the presence of a long run relationship between health expenditure and the income elasticity for health care spending is greater than one during the period under study. The results also suggest one-way causality relationship running from GDP to health expenditure, thereby concluding that health expenditure does not granger caused economic growth.

Baltagi and Moscone (2010) investigate a regression equation for healthcare expenditure as a function of GDP and other control variables using data on 20 OECD countries over the period (1971-2004) by using maximum likelihood estimation (spatial MLE) techniques to estimate and test fixed effects and spatially correlated errors. The authors find that health care expenditure is a necessity rather than a luxury with elasticity much smaller than that estimated in previous studies. Moreover, some empirical evidence also emerged from Nigeria. For example, Odior (2011) conducts 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 suggest that the re-allocation of government expenditure to health sector is significant in explaining economic growth in Nigeria. Dauda (2011) 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 error correction model is statistically significant and has expected negative sign with the coefficient of 40% implying that the speed of adjustment to is 40%.

Baldacci (2004) explores the role played by health expenditures. He constructed a panel data set for one hundred and twenty developing countries from (1975-2000) and found that spending on health within a period of time affects growth within that same period while lagged health expenditures appear to have no effect on growth. He inferred from this result that the direct effect of health expenditure on growth is a flow and not a stock effect. Another study by Aguayo-Rico and Iris (2005) examines the impact of health on economic growth for 13 European countries, 12 African countries, 16 American countries, and 11 Asian countries over the period (1970-1980) and (1980-1990) using ordinary least square (OLS) the authors find that health capital has a significant effect on economic growth, especially with a

variable that captures all the determinants of health. Some other studies on health and economic growth conducted earlier found a positive relationship between the two. Barro (1991) Barro and Sala-i-Martin (1992), Knowles and Owen (1995) and (1997) have investigated the positive effect of health on economic development. They also found a strong effect of health in explaining income per capita differences. Other studies such as Greiner (2005), Agenor (2007), Strauss (1998) and Martins (2005) conducted for other countries all emphasized that health expenditure is positively related to economic growth. What differ from one country to another is the extent and magnitude of its contributions.

3.0 Methodology

This research used a non-experimental approach and involved the use of existing numeric data in analyzing the impact of public healthcare spending on economic growth in Nigeria. The research therefore used secondary data analysis which was mostly numeric in nature; it involved the formulation of a functional model and required the use of statistical and or econometric techniques to arrive at a conclusion. As such, the ordinary least squares method was used because of its superiority over other estimators and it is best linear unbiased estimator (BLUE) properties (Koutsoyiannis, 1977). OLS is unbiased and has the minimum variance within the class of linear estimators (Gujarati, 2004). The study employed the use of econometric software E-Views (Version 9) to aid in the statistical and econometric analysis.

This study benefits from annual time series data for the period 1987-2017; obtained from published records. The major sources of data were the Central Bank of Nigeria (CBN) Statistical Bulletin, National Bureau of Statistics, Journals, Text books and the Internet.

3.1 Model Specification

The model for this study was based on a modified neo classical Solow model of economic growth. Therefore, real gross domestic product was used as a proxy for economic growth; gross capital formation, total health expenditure, life expectancy at birth, and mortality rate were variables considered in this study for the purpose of achieving the objectives of the research and analyzing the impact of public healthcare expenditure on economic growth in Nigeria. The dependent variable is real gross domestic product while the independent variables are the regressors.

Thus, RGDP = f(GCF, THE, LER, MORT)

The behavioral equation is:

$RGDP = b_0 + b_1GCF + b_2THE + b_3LER - b_4MORT + U_t$ …… (1)

b_0 = Model intercept
$b_1 – b_4$ = Coefficients of the independent variables
U_t= Error term.
GDP = Gross Domestic Product
GCF = Gross Capital Formation
THE = Total Health Expenditure
LER = Life Expectancy Rate
MORT = Mortality Rate

4.0 Results and Discussion

The study used annual time series data as presented in appendixes, for econometric analysis. E-views software, version 9.0 was used for the analysis. The results and analysis of the results are presented below.

Preliminary Test

To investigate the presence of random walk in the time series data, unit root test was carried out. This was done to ascertain the stationary nature of the data to avoid a spurious regression model. The natural logarithm of the data was taken to enhance the linearity of the model and bring the variables to a common base. Table 4.1 shows the result of the test on the time series data using the Augmented Dickey-Fuller (ADF) technique.

Unit Root Test

The first step was to carry out unit root test; this was necessary in order to ascertain the time series properties of the data set employed in estimating the equation. The unit root test was carried out to ascertain the stationary nature of the data set to avoid spurious regression model. The study therefore used the Augmented Dickey-Fuller (ADF) techniques to test for unit root. It is reasonable to test for the presence of a unit root in the series using the most general of the model as.

$$\Delta y_t = \alpha_0 + Y_{yti} + \alpha_{2t} + \Sigma\beta_j\Delta y_{t-1} + e_t \text{ .... } (2)$$

Where Δ is the series, t is the trend factor; α_0 is the constant term, e_t is the stochastic error term, β is the lag length

Autoregressive Distributed Lag Model

In order to analyze the long-run relationship as well as the dynamic interactions among the variables of interest empirically, the autoregressive distributed lag (ARDL) cointegration procedure developed by Pesaran, Shin and Smith (2001) was used. This procedure is applicable regardless of whether the regressors in the model are I(0) and I(1) or jointly cointegrated. The ARDL procedure does not require the pretesting of the variables included in the model for unit roots compared with other techniques such as the Johansen approach.

The general form of the ARDL is represented thus:

$$y_t = \alpha + \sum_{i=1}^{P} \gamma_i \Delta_{-1} + \sum_{j=1}^{k} \sum_{i=0}^{q} X_{it-1} \text{'}\beta_{i,I} + \epsilon_t \text{ .... } (3)$$

Autoregressive distributed lag (ARDL) includes the lag of the dependent variable as part of the explanatory variables automatically thereby transforming the behavioral equation (equation 1) to the ARDL form below:

$$\Delta RGDP_t = b_0 + b_0\Delta RGDP_{t-1} + b_1\Delta GCF_{t-1} + b_2\Delta THE_{t-1} + b_3\Delta LER_{t-1} - b_4\Delta MORT_{t-1} \text{ ....} (4)$$

The presence of cointegression was then tested using bounds test which as popularized by Pesaran Shin and Smith (2001) to check for long run relationship in the model. The behavioral equation is further transform to include the long run equation as indicated below:

$$\Delta RGDP_t = b_0 + b_0\Delta RGDP_{t-1} + b_1\Delta GCF_{t-1} + b_2\Delta THE_{t-1} + b_3\Delta LER_{t-1} - b_4\Delta MORT_{t-1} + \lambda_1 GCF_{t-1} + \lambda_2 THE_{t-1} + \lambda_3 LER_{t-1} - \lambda_4 MORT_{t-1} + U_t \text{ .... } (5)$$

Thereafter, diagnostic tests for serial correlation and heteroskedasticity were carried out to determine the reliability of the model.

Table 4.1: Augmented Dickey Fuller (ADF) Unit Root Test Result

Variable	ADF Statistic	P.Value	1%	5%	10%	Order of Integration	Conclusion
LOGRGDP	-4.2253	0.0121	-4.3098	-3.5742	-3.2217	I(1)	Stationary
LOGTHE	-3.5998	0.0481	-4.3239	-3.5806	-3.2253	I(1)	Stationary
LOGGCF	-5.7612	0.0003	-4.3239	-3.5806	-3.2253	I(1)	Stationary
LOGLER	-5.8588	0.0002	-4.3098	-3.5742	-3.2217	I(1)	Stationary
LOGMORT	-8.3774	0.0000	-4.3098	-3.5742	-3.2217	I(1)	Stationary

Source: Author's computation with Eviews 9.

Table 4.1 shows the unit root test result for all the variables in our model. Real Gross domestic product (RGDP), total health expenditure (THE), gross capital formation (GCF) life expectancy rate (LER) and mortality rate (MORT) were found to be stationary at first difference at 5% level of significance (the absolute values of the ADF Statistic were greater than those of the critical values at 5% level of significance).With a unit root result like this where all variables are stationary at first difference it became justifiable to use the autoregressive distributed lag (ARDL) model in estimating the equation. ARDL yields valid results regardless of whether the underlying variables are I(0) or I(1) or a combination of both. (Pesaran and Shin, 1999).

The Autoregressive Distributed Lag Model Estimation

The result of the ARDL estimation is contained in Table 4.2.

Table 4.2: Autoregressive Distributed Lag (ARDL) Model Estimation Result

Variable	Coefficient	Standard Error	t-Statistic	Probability
LOGRGDP(-1)	0.6627	0.1056	6.2749	0.0000
LOGRGDP(-2)	-0.1812	0.0867	-2.0889	0.0504
LOGTHE	0.0033	0.0094	0.3500	0.7301
LOGGCF(-1)	0.0486	0.0248	1.9567	0.0652
LOGLER(-1)	-3.2234	1.3648	-2.3617	0.0290
LOGMORT(-1)	-1.5561	0.2686	-5.7930	0.0000
C	44.0074	6.4915	6.77922	0.0000

Source: Author's computation with Eviews 9.0

R – Squared = 0.99860 Adjusted R – squared = 0.9979 F – statistic = 1506.201 Probability (F - statistic) = 0.000000

The result revealed that there was a positive as well as negative relationship between previous year lagged by one and two real gross domestic product and current real gross domestic product; this is shown by the positive and negative values (0.66272 and -0.18123). The probability values of 0.0000 and 0.05040 revealed that this was statically significant at 5% level of significance. This implies that a unit increase in RGDP will impact positively in the previous year lagged by one while in a two year lagged impact negatively by their values of the coefficients. The coefficient of total health expenditure stood at 0.003312, the implication of this is that total health expenditure affected real gross domestic

product positively; however, this was not statistically significant at 5% level of significance due to its probability value of 0.73010. One year lag of gross capital formation affected real gross domestic product positively indicating that a percentage increase in gross capital formation will lead to 4.86% increase in real gross domestic product; however the probability value of 0.06520 showed that it was not statistically significant at 5% level of significance. One year lag of life expectancy rate and mortality rate affected real gross domestic product negatively; these were both significant at 5% level of significance due to their probability values of 0.0290 and 0.0000 respectively.

The constant term of the equation (C) 44.0074 revealed the value of real gross domestic product when it was not affected by any of the independent variables. This implies that real gross domestic product would be 44.007458498 if all the explanatory variables were zero. The value of R–squared (0.9986) shows the overall goodness of fit of the model; this implies that 99.86% of variation in real gross domestic product was accounted for by joint variation of a combination of the independent variables. Also, the value of Adjusted R-squared (0.9979) depicts an overall goodness of fit of the model of 99.79%; it therefore shows that the model was correctly specified and had a good fit. This is supported by the high value of the F-statistic (1506.201) with a probability value of 0.0000 which is less than 1% level of significance. The F-statistic measures the joint statistical influence of the explanatory variables in explaining the dependent variables, thus the influence of the explanatory variables on the dependent variable was statistically significant.

Bounds Test Result

As popularized by Pesaran et al (2001), bound test was carried out to determine the presence of cointegration and long run relationship in the model. The null hypothesis is : no long run relationship exists. The result is presented in Table 4.3.

Table 4.3: Bound Test Result

Test Statistic	Value	K
F-statistic	22.9834	4

Source: Author's computation with Eviews 9.0.

Table 4.4: Critical Value Bounds

Significance	I(0) Bound	I(1) Bound
10%	2.45	3.52
5%	2.86	4.01
1%	3.74	5.06

Source: Author's computation with Eviews 9.0

As explained in Eviews 9 user guide (2015) and Pesaran and Shin (1999), if the F-statistic value is less than the chosen critical value of I(0) bound, we accept null hypothesis that there is no long run relationship. On the other hand, if the F-statistic value is greater that the chosen critical value of I(1) bound, we reject null hypothesis signifying that there is a long run relationship in the model. However, if the value of the F-statistic is greater than the chosen critical value of I(0) but less than the chosen critical value of I(1), it means that the result is inconclusive.

From the result of the bound test, the value of F-statistic was 22.9834; this value is greater than 2.86 and 4.01 which are the critical values (at 5% level of significance) for I(0) and I(1) bounds respectively. This result therefore implied the existence of cointegration and long run relationship in the model; consequently the cointegrating and long run form of the equation was estimated.

Cointegrating and Long-Run Result

With the establishment of long run relationship as proven by the bound test, the cointegrating and long run form was estimated and the result presented in Table 4.5.

Table 4.5: Cointegrating and Long Run Result

Variable	Coefficient	Standard Error	t-Statistic	Probability
D(LOGRGDP(-1))**	0.1812	0.0867	2.0889	0.0504
D(LOGTHE)**	0.0033	0.0094	0.3500	0.7301
D(LOGGCF)**	-0.0088	0.0283	-0.3125	0.7580
D(LOGLER)**	-3.5290	0.8990	-3.9254	0.0009
D(LOGMORT)**	-0.8958	0.1809	-4.9500	0.0001
CointEq(-1)**	-0.5185	0.0646	-8.0212	0.0000
LOGTHE*	0.0063	0.0180	0.3547	0.7267
LOGGCF*	0.0766	0.0586	1.3073	0.2067
LOGLER*	-13.0226	1.8330	-7.1042	0.0000
LOGMORT*	-4.7288	0.4287	-11.0300	0.0000
C*	84.8719	9.2314	9.1937	0.0000

Source: Author's computation with Eviews 9.0.

Cointeq = LOGRGDP - (0.0064*LOGTHE + 0.0766*LOGGCF -13.0226*LOGLER -4.7289*LOGMORT + 84.8720)

**and* indicates cointegrating form and long run coefficients respectively.

Both the short run and long run estimation results are displayed in Table 4.5, we can therefore observe that the long run coefficient of total health expenditure and its probability values were 0.0063 and 0.7267 respectively, this indicates that there was positive (not significant) relationship between total health expenditure and real gross domestic product. The long run coefficient of gross capital formation stood at 0.0766 and its probability value was 0.2067 indicating a positive (not significant) relationship between gross capital formation and real gross domestic product. The coefficients of life expectancy rate and mortality rate showed that there was negative relationship between them and real gross domestic product; both at 5% level of significance. The long run intercept – C, was found to be 84.8719; this is the value of real gross domestic product if all the explanatory variables were at the value of zero. The coefficient of cointegration – Coint Eq(-1) with the value -0.5185 and a probability value of 0.0000 which is statistically significant indicates that 51.85% of the disequilibrium in the model will be corrected annually. The long run equation is therefore stated below:

RGDP = 84.8719 + 0.0063 THE + 0.0766 GCF - 13.0226 LER - 4.7288 MORT

Breush-Godfrey Serial Correlation Test

H_0 There is no serial correlation in the model

H_1 There is serial correlation in the model

The decision rule is – if probability value is less than 0.05 at 5% level of significance, we reject H_0 and acceptH_1 otherwise accept H_0 (Gujarati, 2004)

Table 4.6: Breush-Godfrey Serial Correlation Test Result

Test statistic	Value		Probability
F-statistic	0.407040	Prob. F(2,17)	0.6719

Source: Author's computation with Eviews 9.0.

Table 4.6 shows the result of the test for the presence of serial correlation in the model. The probability value for the F-statistic was 0.6719, this is above 0.05 (5% level of significance). We therefore accept H_0 and reject $H_1$and conclude that the model did not suffer from first and second order serial correlation.

Heteroskedasticity Test

H_0 There is no heteroskedasticity in the model

H_1 There is heteroskedasticity in the model

Table 4.7: Heteroskedasticity Test Result

Test statistic	Value		Probability
F-statistic	0.656704	Prob. F(9.19)	0.7365

Source: Author's computation with Eviews 9.0.

The decision rule is – if probability value is less than 0.05 at 5% level of significance, we reject H_0 and accept H_1 otherwise accept H_0 (Gujarati, 2004)

From the heteroskedasticity test result in Table 4.7, the probability value for the F-statistic was 0.7365; this value is greater than 0.05 (5% level of significance). We therefore accept H_0 and reject H_1 and conclude that there was no heteroskedasticity as such the error term (U_t) was homoscedastic.

5.0 Conclusion and Policy Recommendations

The impact of public healthcare expenditure on economic growth was investigated and their long-run relationship was examined. It was revealed that there exist a positive long-run relationship between public healthcare spending and economic growth in Nigeria. Government has over the years placed priority on recurrent spending's than capital expenditure on health in the country. However, low life expectancy was reported to have a negative sign which affects the growth of domestic output in Nigeria.

Based on the findings, the study recommends that:

i. Government should pay more attention to the health sector and double it's spending on healthcare.

ii. place emphasis on both capital and recurrent expenditure so that none will be left out so that the sector will benefit from infrastructures and benefit from improved welfare package for health workers in order to reduce the issue of strike in the sector which when it occurs the sick suffers pains and eventual death.

iii. The lingering problem of unemployment should be tackled so that people's standard of living can be improved and their health too will be improve, since a good number of people use the out-of-pocket mode of payment. Only a few number of the population benefits from the National Health Insurance Scheme.

iv. Corruption should be removed out of the system to avoid diversion of funds and health equipment meant for the public to private individuals. Corruption explains why there has not been great impact of government expenditure on health. It also explains why much impact has not been felt by Nigerians.

v. Government should be apt in creating awareness and sensitizing people on disease prevalence so that so that people will be aware of the diseases and know the control measures suitable for such diseases.

References

Agenor, P.R. (2007). Health and infrastructure in a model of endogenous growth .*Journal of Macroeconomics,* 28: 768-774.

Aguayo-Rico, I.A. & Iris (2005). The impact of health on economic growth for many countries. New Delhi: Oxford University Press.

Arandi, P. (2010). The Determinant of Health and the Differences in Healthcare Expenditure among Countries. *Journal of Health Economics.* 15:103-118.

Baldacci, E.B, (2004). The impact of poor Health on Total factor productivity. *The Journal of Development. Studies* 42(6).918-938.

Baltagi, T. & Moscone, B. (2010).*A regression equation for health care expenditure as a function of GDP and other control variables using data on 20 OECD countries over the period 1971-2004 by using maximum likelihood estimation* (spatial MLE) techniques.

Barro, R.J &Sala-i-Martins, X. (1992).Public Finance in models Economic growth. Review of Economic Studies 59:645-661.

Barro, R.J and Romer, O. (1991).'Increasing returns and long-run growth'. *Journal of political economy* pp12-37.

Berger, M.C. and Messer, J. (2002).Public Financing of Health Expenditure, Insurance and Health Outcomes. Applied Economics. 34:2105-2113.

Bloom D.E., Canning D. and Sevlla J. (2003). The Effect of Health on Economic Growth: A production function approach. World Development; 3291):1-13.

Bloom, D.E., & Canning, D. (2000): The health and wealth of nations. *Science, 287: 1207.*

Clement, B. Coady D., Shang B. & Tyson J. (2011).Healthcare Finances; J. Financ. Development. 3(1):15-23.

Dauda, R.O. (2011): Investment in Education and Economic Growth in Nigeria: An Empirical Evidence. *International Research Journal of Finance and Economics*, 55(1), 158-169.

Denton, M. & Walters, V. (1999).Gender Difference in Structural and Behavioural Determinants of Health; An analysis of the social production of Health. J. Soc. Sci. Med. 48:1221-1235.

Gujarati, D.N. (2004). *Basic econometrics* (4thed). New York: Tata McGraw-Hill.

Gupta, I. and Mitra A. (2003): Economic growth, health and poverty: An explanatory study on India. In: Misra R, Chattterjee R, Rao S. (eds). India Health Report. New Delhi: Oxford University press.

Heynes, C.F. and Borman, M.S. (2008).Men's Health in Africa part 2; Non-communicable Diseases, Malignancies and Socio-economic Determinant of Health. J. Manage. Health 15(2): 127-132.

Kaufmann, D., Kraay A. &Mastruzzi M. (1999).*Governance matters III*. New Delhi: Oxford University Press.

Knowles, D. and Owen, E. (1995): Health capital and cross-section Country variation in per capital in the Mankiw-Romer-Weil model. Economics letters vol.48(223), pp, 99-10.

Mehrare, M. and Musai, Y. (2011). Health Expenditure and Economic Growth: An ARDL Approach for the case of Iran. *Journal of Economics and Behavioral Studies, 3(4): 249-256.*

Mwabu, G. (2008). Handbook of Development Economics vol4. Available at D01:10:1016/S1573-447(07)04053-3.

Odusola, A.O. (1998).*Human capital investment and the empirics of economic growth in Nigeria*. Rekindling Investment and Economic Development in Nigeria NES Selected Papers for the 1998 Annual Conference. Office in South-East Asia p.22.

WHO (2000). World Health Report 2000-Health System: Improving Performance-Geneve. World Health Organization.

WHO (2004). 'Regional Macroeconomics and Health Framework' World Health Regional

World Health Organization (2005).World Health Development Indicators. Washington, DC.

APPENDIX I

Public Healthcare Spending and GDP Data in Nigeria (1986-2016)

YEAR	RGDP	GCF	THE	LER
1987	15263.9	15.15	0.8	46
1988	16215	13.61	0.7	46
1989	19306	11.87	2.2	46
1990	19199	11.87	2.4	45.9
1991	19620	14.25	2.6	45.9
1992	19928	13.73	2.1	45.9
1993	19979	12.75	2.3	45.9
1994	20353	13.55	7.5	45.8
1995	21178	11.17	7.1	45.8
1996	21789	7.07	24	45.9
1997	22333	7.29	21	45.9
1998	22449	8.36	25	45.9
1999	23688	8.6	26	46
2000	25268	6.99	29	46.1
2001	28958	7.02	33	46.3
2002	31710	7.58	31	46.5
2003	35021	7.01	26	46.5
2004	35021	9.9	22	46.2
2005	31710	7.39	33	47.7
2006	35021	5.46	29	48.2
2007	37475	8.27	33	48.8
2008	39996	9.25	33	49.4
2009	42922	8.32	37	49.9
2010	46013	12.09	31	50.4
2011	49856	16.56	26	50.8
2012	54612	15.53	31	51.3
2013	57511	14.16	31	51.7
2014	59930	14.17	24	52.5
2015	63219	15.08	25	53
2016	67153	14.83	33	53
2017	69024	12.6	37	54.5

Source: CBN 2017 Annual Report/Statement of Accounts, CBN 2017 Statistical Bulletin, National Bureau of Statistics (NBS) various Issues, World fact Data 2017, World Health Organization (WHO) Various Issues.