Public Expenditure on Health Care and Economic Growth in Nigeria: 1980-2015

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Abstract: This research work is an investigation into the impact of government expenditure on health care on the economic growth of Nigeria from 1980 to 2015. In the process of the study, standard econometric methods of unit root tests, cointegration tests and vector error correction modeling were applied. While real gross domestic product (RGDP), a proxy for economic growth served as the dependent variable, government expenditure on health (GEH) and gross fixed capital formation (GFCF) were the explanatory variables. The empirical results showed that all the variables were integrated of order one. The cointegration test results indicated the existence of longrun equilibrium relationship among the variables. It was also revealed that both government expenditure on health care and gross fixed capital formation were positively and significantly related to economic growth. The speed of adjustment between the shortrun and longrun values was about 74%. The recommendations were that government should increase its budgetary allocation on health care, ensure the accessibility of health care services to all segments of the population, increase the awareness of common communicable diseases and ensure their prevention and treatment, ensure adequate maternal health care and referral facilities for high risk of pregnancies and ensure effective and efficient management of the expenditure on the health care sector.

Key words: Government Expenditure · Economic Growth · Gross fixed Capital Formation · Cointegration & Vector Error Correction

INTRODUCTION

Government investment in health care can be justified on both economic and social considerations. The economic case rests mainly on the fact that health programmes are in one way or the other public goods. Public goods are by their nature non-rival in consumption and it is to high degree impossible to exclude somebody from the benefits arising from them. In other words, a lot of externalities are involved in health care services. Because of the externalities involved, there is market failure in the provision of health care services. This is particularly true of programs for eradicating or controlling major diseases. The rational individual's expressed demand for malaria control services, for example, would be much lower than his or her actual demand, since the risk of contacting the disease is low if a control program exists and person could not be excluded from consuming the benefits. For most health care services, the entire community, not just the direct beneficiaries, stand to gain because a healthier labour force is a more productive one.

Another economic argument for public expenditure in health care is that many persons, out of ignorance, would under-consume these services – in terms of their own self interest, if provided only in the market place [1].

Government involvement in healthcare through it expenditure can also be justified by social considerations. Some individuals, for example, believe that everyone, irrespective of their levels of income, should have an equal opportunity to enjoy good health and access to preventive care and to receive treatment when a deterioration in health status is noticed. This forms the rationale for the comprehensive national health programs in a good number of developing countries[2].

In the recent times, the extent of government involvement in health care has been on the front burner of political manifestoes throughout the world. For developed countries, the rationale for increased government expenditure in the provision of health services include rapidly rising costs, the large number of people who are not still covered by health insurance and the fear of some deadly diseases such as Acquired Immune Deficiency

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Syndrome (AIDS), Ebola, etc. For developing countries, the main reason is based on the understanding that good health improves the productivity of workers and the general output of goods and services. The multiplier effect is increase in economic growth and general standard of living of the people. Health, they say, is wealth.

This paper shall therefore quantitatively determine the impact of government expenditure on health on Nigeria's economic growth performance for the period 1980 to 2015.

Review of Related Literature: Expenditure on health care in Nigeria come from diverse sources, namely, from individual out-of-pocket expenses, the private sector, international donor agencies, non-governmental organizations and the government. In Nigeria, the government is responsible for a greater percentage of health care expenditure, which is always include in her annual budgetary allocations at all tiers of government. As reported by the World Health Organisation (WHO, 2015), 7.05%, 4.22%, 6.41% and 4.4% represented government expenditure on health care as a percentage of total government expenditure for 1995, 2000, 2005 and 2010, respectively. This shows that budgetary allocation to the health sector in Nigeria has not been adequate. This is in line with Bakare and Sanmi's [3] observation that inspite of government's efforts, much impact has not been noticed in the area of infant and material mortalities since the 1970s. Ogunjuyigbe and Laisu [4] have observed that Nigeria is one of the countries lagging behind in healthcare service delivery in all the millennium development goals to which 191 countries including Nigeria signed in 2001.

The Keynesian economic theory postulates the need for the government to stimulate aggregate demand through its expenditure policies. Thus, increase in government expenditure by increasing aggregate demand will increase investment, employment, output and through its multiplier, increase in the standard of living. In the same line of thought, government expenditure on health can play a crucial role in economic growth. The health status of a population to a large extent determines the ability of the work force to contribute to economic performance. As observed by Babatunde [5], better health enhances earning ability for both workers and enterprise which in turn increases the tax base of the government. However, the appropriate nature and extent of government involvement in the healthcare varies from country to country and also on income levels.

The health status of a country determines to a large extent the quality of its human capital which is imperative for increases in economic growth. Developing countries desirous for economic growth have made serious efforts towards increasing their human capital through expenditure on healthcare, education and other social services. As observed by Al-Yusuf (2000) and Lawson [6, 7] education, healthcare, training and investment in social services develops human capacity which can lead to economic growth.

Agbatogun and Taiwo [8] noted that most developing countries suffer from inadequate expenditure on healthcare. A very important component of economic development of a country is a people's health status. There has been a heated controversy as to nature of the causal relationship, if any, between the health status of a nation and its economic growth and by implication, development. With regards to this, Bakare and Olubokun [9] contend that increase in government expenditure on health leads to increase in economic growth and not the other way round. In the same vein, Aranda [10] sees health as a form of capital in such a way that healthcare is both an investment good and a consumption good. It is a consumption good because it yields direct satisfaction and an investment good because of its capacity to increase productivity.

While some researchers like Abu and Abdulahi [2] saw a negative relationship between government expenditure and economic growth, others such as Bakare and Olubokun [9] claim the relationship as unidirectional. Health status determines productivity, capacity to learn at school and the ability to develop intellectually, physically and emotionally. According to Aranda [10] the major reason for health expenditure is the expectation of improved health status.

There is a good number of empirical studies on the determinants of government expenditure on health, both in country specific and cross countries. For instance, Das and Martin [11] in their study on the determinants of aggregate expenditure on healthcare. They made use of econometric techniques of unit roots and cointegration analysis. The result showed that per capita income of countries significantly determines their governments' expenditure on healthcare. Demographic factors such as the age of the population, number of doctors do not seem to have any significant impact on aggregate health expenditure in the US.

Chaabouni & Abednnadher [12] in their study of the determinants of health expenditure in Tunisia during the period 1961 to 2008, using the method of Autoregessive

Distributed Lag (ARDL). The results of the bounds test showed that there is a stable and equilibrium long run relationship between per capita health expenditure, gross domestic product, ageing population, medical density and environmental quality. The result of the causality test showed a bilateral causal relationship between health expenditure and income, both in the short and long runs. Their recommendation is that policies for encouraging health expenditure are necessary in order to develop a healthy and productive society to enhance economic growth and development in Tunisia. In a study by Bhargava *et al.,* [13], productivity was found to be positively related to total investment in human and physical capital and political and international conditions.

Olaniyan, Onisanwa and Oyinlola [14] investigated the relationship between expenditure on healthcare and economic growth in sub-Saharan African countries with the use of panel data. According to them, understanding the relationship between government expenditure on health and economic growth makes it possible to determine the extent of growth in the health sector over a given period and to predict the amount of expenditure required in the future. The empirical results show that healthcare expenditure and most of its determinants are non-stationary but show a stable relationship in the long run. Kamiya [15] did a study on the determinants of health expenditure and its relationship with economic growth. The results show that GDP per capita and access to improved sanitation are statistically significant in reducing child mortality.

Abbas and Heimenz [1] studied the determinants of government expenditure on health in Pakistan for the sample period 1972 to 2016. With the use of cointegration and error correction modeling approach, the study showed that healthcare in Pakistan is a necessity and that urbanization and unemployment are inversely related to expenditure on health care.

Agbatogun & Taiwo [8] investigated the relationship between government expenditure on health care and economic growth in Nigeria. Using standard econometric techniques, it was shown that gross domestic product was the most significant determinant of health care expenditure while education and population growth rate were shown to be insignificant. Also, Johansen and Juselius [16] studied the relationship between government expenditure on health and economic growth in Nigeria over the period 1970 to 2009. Using Johansen cointegration technique and error correction representation, the result showed that health expenditure has a positive and significant relationship with economic

growth. The result of the error correction model had the expected sign of being negative, fractional and significant. It showed that 40% of the discrepancy between the short-run and long-run values were corrected annually. Finally, Ogundipe and Lawal [17] investigated the relationship between government expenditure on health and economic growth in Nigeria. Using the classical linear regression model (OLS) technique, he result showed an inverse relationship between government expenditure on health and economic growth.

Methodology

Sources of Data: For this study, use will be made of data obtained from the Central Bank of Nigeria various issues from 1980-2015. The data for the study shall comprise Government Expenditure on Health (GEA) and Gross Fixed Capital Formation (GFCF).

Theoretical Framework and Model Specification: This study shall be based on Grossman (1972) health production function which is a modified version of Cobb-Douglas production function. In attempt to use the health model, the researcher shall include health expenditure and gross fixed capital formation as explanatory variables while gross domestic product (a proxy for economic growth) shall serve as the dependent variable. This study also shall be predicated on the Solow (1956)[18] model of long-run economic growth, which postulates a continuous production function linking output to inputs of capital and labour which are substitutable. This is on the understanding that the provision of health care is labour intensive. Both the Cobb-Douglas and Solow production functions try to explain the impact of capital and labour on economic growth. This lends support for government expenditure to be included in the model. Hence, the modified model shall be symbolically stated as follows:

$$Q = Ak^{\alpha}L^{\beta}H^{\gamma} \tag{1}$$

where:

Q = Gross domestic product (GDP), a proxy for economic growth

K = Capital

L = Labour

H = Government capital expenditure on health

α, β and γ are elasticities of Q with respect to capital, labour and government expenditure on health.

In order to make the estimated parameters represent elasticities, the model is expressed in the logarithm form:

In = InA + αInK + βInL + γInH   (2)

which can be stated as

Q* = A* + αK* + βL + γH*   (3)

For the purpose of this research, on the impact of government expenditure on health on economic growth in Nigeria, the modified model shall be structurally expressed as follows:

In $RGDP_t = \alpha_o + \alpha_1$ In $GEH_t + \alpha_2$ $GFCF_t + U_t$ (4)

where:
$RGDP_t$ = Current value of gross domestic product (a proxy for economic growth)
GEH_t = Current government expenditure on healthcare
$GFCF_t$ = Current value of gross fixed capital formation (which represent investments in the fixed assets).

Estimation Procedure

Unit Root Tests: This test shall be conducted to determine the long-run properties of the time series variables to be employed in the analysis. The Augmented Dickey-Fuller Test (ADF) statistic shall be employed for this purpose. The ADF test statistic shall is used to determine the existence or not of unit roots in the time series variables. The general form of the ADF test statistic is expressed as follows:

$\Delta y_t = a_o + a_1 Y_{t-1} + \Sigma a\Delta Yi + \Sigma t$

The advantage of the ADF test is that it takes care of the existence of autocorrelation in the model.

When a time series variable is not stationary (contains a unit root) at level, it can be made stationary by differencing. The number of times a variable is differenced in order to make it stationary is the order of integration of the variable. The purpose of testing variables for unit roots is to avoid spurious estimates of the parameters, which may occur when a non-stationary variable is regressed on another non-stationary variable.

Cointegration Test: This test is used to determine whether there exists a long-run equilibrium relationship among the regression variables. When variables are integrated of same order, a researcher is motivated to

suspect that there may exist a long-run stable relationship among the variables, a stable relationship which was absent in the short-run. This test shall be conducted using the Johansen and Juselius [16] method. The Johansen and Juselius test makes use of the rank (trace) test statistic and the maximum eigenvalue test to determine the number of cointegrating vectors.

Error Correction Model (ECM): The error correction representation or model is used to tie the short-run disequilibrium with the long-run equilibrium values. It gives the speed of adjustment as in distributed lag models. The ECM shows the speed at which the discrepancy between the short-run and long-run equilibria is corrected. The value of the error correction term is expected to be negative, fractional and significant.

Empirical Result and Discussions: In this section is provided the standard tests of significance of government expenditure on health, gross fixed capital formation and economic growth in Nigeria. The tests are based on the empirical estimation of equation 2.

Unit Root Tests: It is a common behaviour for time series variables to exhibit random walks or signs of non-stationarity, whereby both the means and variances of such macroeconomic variables to trend upwards overtime [19].

Here, the variables subjected to unit root tests using the ADF statistic, namely, Real Gross Domestic Product (RGDP), Government Expenditure on Health (GEH) and Gross Fixed Capital Formation (GFCF) were all nonstationary at levels, but became stationary after first differencing. All the variables were therefore integrated of order one 1(1). The results are as shown in Table 1 below:

Johansen and Juselius Cointegration Test: With the manifestation that the variable are integrated of order one, 1(1), the next step is to test for the longrun steady state or equilibrium relationship among the variables. Both the maximum eingenvalue test and trace statistic (Rank) indicate that there is one cointegrating relationship. With at least one cointegrating equation or relationship, the conclusion is that there exists a longrun equilibrium relationship among the variables. The results are as shown in Table 2 and 3 below:

Presented below is the normalized cointegrating equation which is a longrun equation showing the relationship between economic growth and the explanatory variables:

Table 1: Augmented Dickey-Fuller Unit Root Test Trend and Intercept at 1st Difference

Series	ADF Test Statistic	5% Critical Values	10% Critical Values	Remarks
LRGDP	-39.69219	-3.562882	-3.215267	1(1)
LGEH	-8.334745	-3.562882	-3.215267	1(1)
LGFCF	-4.693708	-3.562882	-3.215267	1(1)

Source: Researcher's Compilation from E-Views 7.

Table 2: Johansen-Juselius Cointegration Rank Test (Trace)

Hypothesized No. of CE (S)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob**
None*	0.561420	32.15376	29.79707	0.0263
At Most 1	0.238282	8.251591	15.49471	0.4389
At Most 2	0.012282	0.358392	3.841466	0.5494

Trace test indicates 1 cointegrating equation at 0.05 level.
Source: Researcher's Compilation from E-Views 7.

Table 3: Johansen-Juselius Cointegration Rank Test (Maximum Eigenvalue Test).

Hypothesized No. of CE (S)	Eigenvalue	Maximum Eigenvalue	0.05 Critical Value	Prob**
None*	0.561420	32.90217	21.13162	0.0198
At Most 1	0.238282	7.893200	14.26460	0.3896
At Most 2	0.012282	0.358392	3.841466	0.5494

Maximum-eigenvalue test indicates 1 cointegrating equation at 0.05 level.
 Source: Researcher's Compilation from E-Views 7.

$$LRGDP_t = 0.033441 LGEH \quad 0.219264 LGFCF$$
$$se = (0.01372) \quad (0.01960)$$
$$t = [2.4374] \quad [11.1869]$$

The normalized cointegration result shows that there is a positive and significant relationship between economic growth and the explanatory variables, namely, government expenditure on health (GEH) and gross fixed capital formation (GFCF). However, the rate of economic growth is slow. The result shows that a 1% increase in government expenditure on health leads to about 0.03% in economic growth and a 1% increase in gross fixed capital formation leads, on the average, to an increase in economic growth of 0.22% in the longrun.

Vector Error Correction Model (VECM): The interesting feature of the vector error correction model is that it shows both the longrun relationships side-by-side the shortrun interactions among the variables, in addition to the error correction term. The error correction term or coefficient (ECM-1) of -0.739821 indicates that about 74% of the shortrun disequilibrium is corrected annually. This is, of course, a high speed of adjustment. In addition, the ECM-1 term has satisfied the a priori economic expectations of being fractional, negative and significant. The adjusted R-squared value of 0.455287 indicates that only about 46% of Nigeria's economic growth performance is accounted for by changes in both government expenditure on health and gross fixed capital formation. This is considerably low.

CONCLUSION AND RECOMMENDATIONS

This study is an investigation into the impact of government expenditure on health and Nigeria's economic growth performance within the period 1980-2015. In order to do this, the study employed standard economic techniques of testing for unit roots, cointegration tests and error correction representations.

The empirical results showed that all the model variables were nonstationary at levels but became stationary after first differencing. The cointegration test result showed that there exists a longrun equilibrium relationship between the variables. However about 74% of the discrepancy between the shortrun disequilibrium and the longrun equilibrium is corrected annually. The normalized cointegration results showed that both government expenditure, on health (GEH) and gross fixed capital formation are significant determinants of economic growth in Nigeria, though their contribution, on the aggregate, leads to only about 46% changes in Nigeria's economic growth.

Recommendations: In view of the following, the following recommendations are made:
- That government should continue to increase its expenditure to the health sector to ensure availability of drugs and other supplies and equipment.
- That the government should ensure the accessibility of health care services for all segments of the population.

- That the government should increase the awareness of common communicable diseases and ensure their prevention and urgent treatment.
- Family health care services shall be promoted by the government by ensuring adequate maternal health care and referral facilities for high risk pregnancies.
- The government should ensure effective and efficient management of the expenditure on the health care sector.

When the above measures and others are put in place, a healthy nation will be guaranteed with the spillover effect towards increase in economic growth and general standard of living.

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