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An Empirical Analysis of the Impact of Government Health Expenditures on the Performance of the Health Sector in Nigeria

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Abstract: The purpose of this study is to investigate the impact of government health expenditures on the performance of the health sector in Nigeria over the period from 1979 to 2019. The study employs an ex-post facto research design and utilizes annual time series data obtained from the World Development Indicators (WDI) and the Central Bank of Nigeria (CBN) Statistical Bulletin. To analyze the data, the dynamic ordinary least square (DOLS) estimation method is used, allowing for the assessment of the relationship between government spending on health and sector performance, as proxied by life expectancy. The findings reveal that both capital and recurrent health expenditures are positively associated with improvements in life expectancy. However, while recurrent health expenditures are statistically insignificant, capital health expenditures show a significant and positive impact on life expectancy. The study concludes that effective allocation and utilization of capital health expenditures can significantly enhance health sector performance in Nigeria. The implications suggest that policymakers should prioritize capital investments in health infrastructure, such as the construction and equipping of health centers, to improve accessibility and overall health outcomes. Future research could explore the long-term effects of different types of health expenditures on other health indicators and economic growth.

Keywords: Health Capital Expenditures, Health Recurrent Expenditures, Life Expectancy, Dynamic Ordinary Least Square, COVID-19.

1. Introduction

Globally, Globally, the health condition of the population is crucial for a nation's well-being and sustainable economic growth. Health refers to the overall condition of the mind and body, encompassing more than just the absence of illness, injury, or disability (Yusuf, 2016). When an individual's health is compromised, it becomes challenging to engage in economic activities effectively, leading to reduced productivity. Hence, health issues should be addressed with utmost seriousness (Crémieux, Ouellette, & Pilon, 1999).

Numerous studies have highlighted that advancements in the health sector are essential for promoting Human Capital Development (HCD) across economies. Siddiqui, Afridi, Haq, and Tirmazi (1995) noted that improvements in national health status lead to an outward shift in the labor supply curve and increased labor productivity, ultimately boosting output and investments in human capital. Consequently, the level of public health expenditure significantly influences human capital development, contributing to more productive, skilled, and efficient investments in sectors such as commerce, education, agriculture, and mining (Ghosh et al., 2007).

In Nigeria, government expenditures in the health sector, both recurrent and capital, have shown fluctuating trends. For example, capital expenditures decreased from ₦7.3 million in 1969 to ₦6.88 million in 1970. However, it increased to ₦16.40 million in 1973 and further to ₦136.00 million in 1983, before dropping sharply to ₦51.10 million in 1984. This fluctuation is attributed to the government's focus on other economic sectors, often neglecting capital health expenditures. In subsequent years, capital expenditure rose to ₦257.00 million in 1990, dipped slightly in 1991, and then climbed steadily to ₦586.2 million in 1993, reaching ₦34,647.9 million in 2007. Recently, it increased from ₦79.63 billion in 2016 to ₦147.90 billion in 2017 (Boachie & Ramu, 2017; Olakunle et al., 2014).

Similarly, recurrent health expenditure has mirrored this trend. It rose from ₦11.90 million in 1970 to ₦14.10 million in 1971 and continued to increase, reaching ₦109.50 million in 1978. However, it fell to ₦72.90 million the following year. The trend of recurrent health expenditure during this period was influenced by the government's commitment to health during the oil boom. It rose sharply to ₦155.30 million in 1980, then to ₦279.20 million in 1986, and continued to grow, reaching

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₦72.290 billion by 2007, and further increased from ₦202.36 billion in 2016 to ₦236.10 billion in 2017 (Adelowokan Oluwaseyi, 2012).

A robust healthcare system is critical to the health production function, as it directly impacts welfare by lowering infant mortality rates and improving overall health. In developing economies like Nigeria, where child mortality, environmental hazards, poverty, inequality, unemployment, communicable diseases, and corruption are prevalent, private-sector spending on health often overshadows public efforts. The absence of widespread health insurance schemes forces many to pay out-of-pocket, limiting access to healthcare, particularly in impoverished areas. The role of health in human capital development and education is undeniable. Olopade et al. (2020) argue that increased public health expenditure can significantly enhance access to healthcare and foster human capital development. A rise in public health spending not only improves life expectancy but also strengthens the economy by expanding the workforce, thereby accelerating growth and development (Anyanwu, Adam, Obi, & Yelwa, 2015).

This study aims to examine the impact of government expenditure on healthcare on the performance of the health sector in Nigeria.

2. Literature Review

2.1. Theoretical Literature

Economists have proposed several theories to understand public spending and its impact on the growth of various sectors and the overall economy. Key theories reviewed include Wagner's Law of Increasing State Activity (1835-1917), the Peacock-Wiseman Hypothesis (1891-1955), Baumol's Theory of Unbalanced Productivity Growth (1922-2017), Musgrave's Theory of Public Expenditure (1910-2007), and Keynesian Theory (1883-1946).

Wagner's Law of Increasing State Activity (1835-1917): Adolph Wagner, a prominent German economist, studied the pattern of government expenditure growth in various countries, starting with his own. He observed that the expansion of state roles generally results in increased public spending, both in terms of governance and the overall control of the economy. Wagner posited that industrialization pressures political leadership to invest in social infrastructure and raise wages, thereby enhancing industrial productivity. He further argued that government expenditure growth can outpace the proportional rise in national income, leading to a relatively larger public sector (Danladi, Sale, & Elisha, 2019).

The Peacock-Wiseman Hypothesis (1891-1955): Alan Peacock and Jack Wiseman extended Wagner's theory by examining UK government spending from 1891 to 1955. They confirmed that Wagner's observations still held true. Peacock and Wiseman noted that government spending growth is closely linked to revenue generation. Economic growth leads to increased government revenue, which in turn supports expanded public spending. They also highlighted a gap between citizens' expectations of government spending and accepted tax levels, which forces governments to meet public demands as revenues grow. Additionally, during times of war, governments often raise taxes to fund defense spending. After the war, citizens may become accustomed to higher tax rates, leading to sustained public spending growth (Danladi et al., 2019; Orji, Ogbuabor, Okeke, & Anthony-Orji, 2018).

Baumol's Unbalanced Productivity Growth (1922-2017): William Jack Baumol, an American economist, made significant contributions to the theory of public expenditure and economic growth. He categorized the economy into two broad sectors: the "Progressive Sector," characterized by technical advancements that increase output and worker productivity, justifying higher wages, and the "Non-progressive Sector," characterized by stagnant productivity, with the government sector (e.g., health, education, security) as the dominant component. In the non-progressive sector, development in technology is less relevant, leading to rising costs that increase public expenditure. Baumol argued that differences in productivity between these sectors create wage pressures that drive public spending. However, his theory has been criticized for underestimating the potential for technological advancement in the government sector, even though it remains influential in understanding public expenditure growth (Comfort, Ojamaliya, Okafor, Godwin, & Oluwapelumi, 2018; Danladi et al., 2019).

2.1.1. The Theory Of Public Expenditure By Musgrave (1910-2007)

In 1964, Musgrave propounded the theory of public expenditure. He observed that the need for government services evolves through three stages as per capita income changes, affecting the income elasticity of demand. Musgrave argued that when per capita income is low, the demand for government services is also low, as income is primarily directed towards meeting basic needs. As per capita income rises above this low level, the demand for public services, such as security, electricity, health, water, transport, and education, increases, thereby driving up public expenditure on these items. Musgrave noted that when per capita income reaches a high level, the growth rate of the government sector may decline because most primary needs have already been met, as seen in more advanced countries (Danladi et al., 2019).

This theory is quite significant; however, it has a notable shortcoming: the size of government expenditure cannot be reliably forecasted in the later stages. It is not always the case that the government's share decreases during the later stages of development. As the pattern of private consumption changes due to increasing per capita income in the later stages of industrialization, the public share might also rise to meet the growing demand for government services like health, social security, education, and infrastructure. Consequently, the size of the government sector

depends on income levels and the specific needs of citizens, which can cause the public share to either increase or decrease.

Moreover, it is challenging to identify a single level of development for any given economy. In underdeveloped countries like Nigeria, different levels of development can coexist simultaneously. For example, while urban areas might be at a higher level of development, rural villages and ghettos often lag far behind and remain at a lower level of development.

2.1.5. The Keynesian Theory (1883-1946)

John Maynard Keynes, a British economist, developed his theory in the 1930s while studying the Great Depression. Among several economists who studied public finance and development in the industrial sector, Keynes stood out with his distinct perspective. He viewed government spending as an exogenous factor that could be used as a policy measure to improve the economy. Keynes believed that public expenditure could result in positive economic growth. Specifically, he argued that an increase in public consumption could lead to higher investment, profit-making, and employment due to its multiplier effects on aggregate demand. Since public expenditure supports aggregate demand, it stimulates productivity growth depending on government spending multipliers. Keynes's ideas were highly influential in macroeconomic policy from the 1930s to the 1980s. Although his theory has some shortcomings, it remains relevant in public sector policy formulation (Danladi et al., 2019; Orji et al., 2018).

2.2. Empirical Literature

Studies on the relationship between government expenditure on health and health sector performance have produced mixed results. While some studies argue that government expenditure does not necessarily influence the performance of the health sector, others hold a contrary opinion, as reviewed below.

Firstly, Xian et al. (2010) acknowledged that government expenditure on health is positively affected by environmental quality and the country's economy, both in the short and long run. Their study assessed the impact of environmental pollution on healthcare expenditure using panel data from 31 Chinese provinces between 1997 and 2003. They investigated the short- and long-run effects of per capita provincial GDP, dust and smog emissions, waste and water emissions, and waste and gas emissions on per capita government expenditure on health, using panel stationarity and panel cointegration methods.

Secondly, in Nigeria, studies have explored the relationship between healthcare expenditure and economic growth. A. A. Bakare and S. Olubokun (2011) employed the ordinary least squares method to examine this relationship. Their findings indicate a significant and positive relationship between healthcare spending and economic growth. They recommended that the Nigerian government prioritize the health sector by increasing its annual budget allocation and ensuring transparent utilization of the budget to positively impact the economy.

Ahmed, Naser, and Deam (2016) confirmed that health outcomes, public expenditure, income levels, government stability, and corruption have a long-run relationship. They employed an ARDL model to examine the impact of Malaysian public expenditure on health and governance on health outcomes from 1984 to 2009. Their results revealed that corruption negatively affects health outcomes in both the short and long run. The study recommended a focus on the importance of health programs and efforts to combat corruption in the country.

In addition, Fullman et al. (2018) used Pearson's moment correlation to examine the impact of public spending on social services in Nigeria, specifically focusing on health sector performance between 2000 and 2013. Their study used secondary data from CBN statistical bulletins, the World Bank, and the Nigerian Budget. They found that public expenditure has a negative and statistically significant effect on infant mortality rates, suggesting that increased government allocation to the health sector reduces child mortality. However, a weak and statistically insignificant correlation was found between public spending on health and overall life expectancy. The study suggested that the government increase allocations to the health sector and encouraged private sector funding as part of corporate social responsibility to promote growth and development.

Conversely, Onisanwa, Sunday, and Adaji (2018) found that government spending on health was negatively related to life expectancy and under-five mortality when governance variables were included. This was attributed to high levels of corruption and embezzlement of public health funds in Nigeria. Their study employed both OLS and two-stage least squares methods to examine the effectiveness of public spending on health and governance in Nigeria. The study concluded that reducing child mortality and increasing life expectancy in Nigeria would be unachievable without curbing the embezzlement of public funds. These mixed results from the literature underscore the need for further research in this area.

2.2. Hypotheses Development

This hypothesis is built on the assumption that the overall government expenditures on health, encompassing both capital and recurrent expenditures, do not significantly affect key performance indicators such as life expectancy, mortality rates, or general health outcomes in the country. Previous studies have suggested mixed results in different contexts, with some indicating that health expenditures positively impact health outcomes (Bakare & Olubokun, 2011), while others find no significant effect (Fullman et al., 2018). This hypothesis aims to explore this relationship in the Nigerian context.

H1: *Government health expenditures do not have a significant impact on the performance of the health sector in Nigeria.*

Recurrent expenditures, which include spending on salaries, wages, consumables, and maintenance within the health sector, are often seen as essential for the daily functioning of healthcare services. However, some studies have questioned the efficiency of these expenditures in improving healthcare performance (Ahmed, Naser, & Deam, 2016). This hypothesis posits that such recurrent spending does not significantly influence the health sector's overall performance.

H2: *Government recurrent expenditures on health do not have a significant impact on the performance of the health sector in Nigeria.*

Capital expenditures, such as investments in infrastructure and medical equipment, are critical for the long-term development of the health sector. However, their impact on health outcomes is debated, with some studies highlighting the importance of capital investment (Ghosh et al., 2007) and others showing limited impact (Onisanwa, Sunday, & Adaji, 2018). This hypothesis examines whether these capital investments significantly affect the health sector's performance in Nigeria.

H3: *Government capital expenditures on health do not have a significant impact on the performance of the health sector in Nigeria.*

This hypothesis challenges the assumption that government spending directly causes improvements in health sector performance. Previous research has shown that while there might be correlations between spending and health outcomes, establishing a causal relationship is more complex (Xian et al., 2010). This hypothesis would be tested using causality analysis techniques, such as the Granger causality test, to determine if government expenditures are a direct cause of performance improvements in Nigeria's health sector.

H4: *Government expenditures on health have no causal link with the performance of the health sector in Nigeria.*

3. Data And Methodology

This study is an empirical analysis aimed at determining whether government expenditures on health affect the performance of the health sector in Nigeria. An ex post facto research design was employed, given that the data used in this study already exist and cannot be manipulated. This design is systematic and empirical, where the researcher does not have direct control over the variables, as they are pre-existing and not subject to manipulation.

3.1. Data Sources

The study utilized secondary data sourced from the Central Bank of Nigeria's statistical bulletins for the years 2010, 2013, 2015, and 2016, as well as the World Development Indicators. The time series data spans from 1979 to 2019. As established in the literature, life expectancy was used as a proxy for the performance of the health sector, while capital, recurrent, and total government health expenditures were proxies for government expenditures on health, capturing the variables under study.

3.2. Theoretical Framework

To examine the effects of government expenditures on health on the performance of the sector in Nigeria, this study employed the work of Grossman (1972), who proposed a theory on the health production function at the micro-level, represented as:

$HL=f(I)$ ……(i)

In this equation, *HL* represents an estimate of an individual's health outcomes, and *I* is a vector of inputs into the health production function for a single individual. Components of this vector include education, income level, time spent on health procedures, nutrition, general consumption, public goods, genetic makeup, and a clean environment. While Grossman's theory examines health production at the micro-level, this study focuses on government expenditure on health and health sector performance at the macro-level in Nigeria (Oluwatoyin, 2014). Transitioning to macro analysis, the components of vector *I* are represented by capital health expenditure, recurrent health expenditure, and environmental, social, and economic factors as::

$hl = f(T\ C\ R)$ ……..(ii)

where *T* represents the vector of total government expenditure on health, CCC represents the vector of capital health spending, and *R* represents the vector of recurrent health spending. Equation (ii) in scalar form can be rewritten as:

$$hl = f(\mathrm{t}_1, t_{2.....}t_n c_1 c_2 ....\mathrm{c}_m\ r_1, \mathrm{r}_{2...}\ r_n) \text{..... (iii)}$$

From the above equation, hl which is health performance in Nigeria proxies the general life expectancy at birth

$(\mathrm{t}_1, t_{2.....}t_n) = t(\mathrm{c}_1 \mathrm{c}_2 ....\mathrm{c}_m) = c(\mathrm{r}_1, \mathrm{r}_{2...}\ r_n) = r$ in equation(iii) m and n are the numbers of variables in each section

3.3. Model Specifications

To examine the impact of government expenditures on health on the health sector in Nigeria, life expectancy (LFEXP) was used as a proxy for health sector performance in Nigeria (dependent variable), while government capital expenditure on health (CEH), government recurrent expenditure on health (REH), and total government expenditure on health (TGEH) were used as proxies for public health expenditures (independent variables). The theoretical framework was used to specify the relationship between government expenditure on health and health sector performance as:

$LFEXP=f(GHEXP)$……..1

The government health expenditures in Nigeria can be categorized into capital expenditure on health, recurrent expenditure on health and total expenditure on health (CEH, REH, TGEH). Thus

$LFEXP= f(CEH, REH, TGEH)$……..2

This can be expanded as;

$$LFEXP_t = \beta_0 + \beta_1 CEH_t + \beta_2 REH_t + \beta_3 TGEH_t + \mu_t \text{.....3}$$

Where:

- $LFEXP$ = represent the general life expectancy at birth in Nigeria;
- f = function;
- CEH= government capital expenditure on health in Nigeria;
- REH= government recurrent expenditure on health in Nigeria;
- $TGEH$= total expenditure on health in Nigeria;
- $\beta 0$ = the intercept of the function;
- $\beta 1, \beta 2, \& \beta 3$= represents the slope coefficients of the function;
- μt = the stochastic variable, disturbance term or error term.

A poriri Expectations: $\beta 1>0\ \beta 2>0\ \beta 3>0$

3.4. Estimation Procedure

This study utilized both descriptive and analytical techniques for data analysis. Descriptive statistics such as mean, standard deviation, skewness, kurtosis, and the Jarque-Bera test were employed to establish the normality of the data. For analytical or inferential analysis, DOLS (Dynamic Ordinary Least Squares) regression techniques were utilized due to their favorable qualities of being best, linear, unbiased, and efficient. The estimation process involved three stages: the pre-estimation stage (including descriptive statistics, unit root test, cointegration test, and the Error Correction Model (ECM) test), the estimation stage (involving OLS estimation to measure the various parameters in the model), and the post-estimation stage (including tests for serial correlation using the LM test, normality distribution, heteroscedasticity, and parameter stability using the Cusum test). These estimations were conducted using E-Views 10 software.

4. Empirical Analysis

4.1. The Descriptive Evidence

LFEXP, TGEH, CEH, and REH were subjected to descriptive statistics and the results were revealed in Table 1. LFEXP, TGEH, CEH, and REH mean were not the same. This indicated that LFEXP, TGEH, CEH, and REH reveal significant changes in magnitude, suggesting that some biases in the results will occur when the measurement of the variables is in levels. The Jarque-Bera statistics p-value of all the variables was less than 0.05. The null of the Jarque-Bera test is that the variables are not normally distributed. So statistical significance of the p-value indicates a rejection of the null hypothesis. All the variables used are normally distributed Therefore the time series data in each variable used in this study are normally distributed.

Table 1: Descriptive Statistics of LFEXP, TGEH, CEH, and REH.

Descriptive Statistics	LFEXP	TGEH	CEH	REH
Mean	46.87333	54456.92	11492.28	26978.01
Median	45.84668	16180.40	2012.800	4860.500
Maximum	50.94941	447948.2	46649.80	102620.0
Minimum	45.11571	236.4000	69.50000	133.9000
Std. Dev.	1.864569	101138.9	16099.29	35086.28
Skewness	0.917215	2.845640	1.137942	1.066012
Kurtosis	2.439416	10.83857	2.624548	2.647760
Jarque-Bera	3.832699	97.74368	5.542302	4.864168
Probability	0.042143	0.000000	0.022590	0.037854

Sum	1171.833	1361423.	287307.0	674450.2
Sum Sq. Dev.	83.43886	2.45E+11	6.22E+09	2.95E+10
Observations	41	41	41	41

Source: Authors Computation, 2021 (Eview-10.0)

4.2. Correlation Matrix

Table 2 shows the correlation matrix which shows the relationship between the dependent and the independent variables among the independent variables themselves.

Table 2: Correlation matrix

	LFEXP	TGEH	CEH	REH
LFEXP	1.000000	0.629821	0.781448	0.713878
TGEH	0.629821	1.000000	0.600354	0.542484
CEH	0.781448	0.600354	1.000000	0.728568
REH	0.713878	0.542484	0.728568	1.000000

Source: Authors Computation, 2021 (Eview-10.0)

Table 2 presents the correlation coefficient results which reveals, that there are no high correlations of up to 0.8 or more among the variables of the study. Since none of the coefficients is more than 0.8, thus there is the absence of harmful multicollinearity.

4.3. The Unit Root Test

In economics, macroeconomic time series data mostly exhibit a stochastic trend feature, this trend can be checked by differencing. The unit root test is used to establish the stationarity or otherwise of each variable in the model. This helps to reduce the issue of spurious regression results at the end. In carrying out this test we add the lagged values to the dependent variable the error term is serially uncorrelated (Danladi et al., 2019).

There are many tests developed that can be used to estimate the unit test, however, the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were employed in this paper to establish the stationarity or otherwise of each variable. The summary results are presented in Table 2 below.

Table 3: ADF Unit Root Test Results

Variables	ADF Test Statistic(at first difference)	Order of Integration	P-Value
LFEXP	-4.767329(-2.981038)*	*I(1)*	*0.0008*
TGEH	-7.085995 (-2.951125)*	*I(1)*	*0.0000*
CEH	-6. 776570(-3.622033)*	*I(1)*	*0.0001*
REH	-4.168742(-3.655446)*	*I(1)*	*0.0190*

Source: Authors Computation using E-view-10.0 software (2021)

Table 4: PP Unit Root Test Results

Variables	PP Test Statistic(at first difference)	Order of Integration	P-Value
LFEXP	-2.847417(-1.951332)*	*I(1)*	*0.0058*
TGEH	-11.38220(-3.544284)*	*I(1)*	*0.0000*
CEH	-6. 706719(-3.622033)*	*I(1)*	*0.0001*
REH	-9.639448(-3.62203)*	*I(1)*	*0.0000*

Source: Authors Computation using E-view-10.0 software (2021)

The summary of the unit test results from tables 3 and 4 above, found out that LFEXP, TGEH, CEH and REH were not stationary at level 1(0). However, at first difference 1(1) that is at 5%, all the variables were stationary. This result gives insight for more analysis.

4.4. Co-Integration Test

In econometrics, cointegration tests are used to test whether a long-run relationship exists among CEH, REH, TGEH and LFEXP variables in the model above. Working with two or more variables there is a situation that the emerging cointegrating vectors governing the joint evolution of all the series will be more than one. Engle-Granger approach was adopted in this study because it is suitable for a single equation as in the model above (Asteriou & Hall, 2006).

Table 5: Engle-Granger Cointegration test

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
LFEXP	-1.835379	0.9101	-47.86603	0.0000
TGEH	-6.089683	0.0033	-86.23938	0.0000
CEH	-3.352586	0.3153	-16.57316	0.2482
REH	-4.264781	0.0880	-48.82124	0.0000

Source: Authors Computation, 2021 (Eview-10.0)

The tau-test statistics in Table 5 show one cointegrating equation at 5%. This means that a long-run relationship exists in the variable.

Table 6: The Short-run ECM Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CointEq(-1)*	-0.710904	0.086005	-2.452242	0.0235
R-squared	0.88629	Mean dependent var		0.082559
Adjusted R-squared	0.88629	S.D. dependent var		0.695694
S.E. of regression	0.626654	Akaike info criterion		1.942334
Sum squared resid	9.424686	Schwarz criterion		1.991089
Log-likelihood	-23.27917	Hannan-Quinn criter.		1.955856
Durbin-Watson stat	1.784513			

Source: Authors Computation, 2021 (Eview-10.0)

The ECM result -0.710904 was negative, less than one and significant which meets all the necessary conditions with high speed of adjustment in times of shocks. LFEXP a proxy for health sector performance is indeed cointegrated, and the statistical significance on its long-run growth path effectively adjusts to short-run shocks by about 71.09% in each period.

4.5. Model Estimation

The parameter of the intercept and the coefficient of CEH, REH, and TGEH were estimated below using DOLS since all the variables were stationary at first difference 1(1).

From our model established above,

$$LFEXP_t = \beta_0 + \beta_1 CEH_t + \beta_2 REH_t + \beta_3 TGEH_t + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots 3$$

Table 7: Model Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TGEH	9.55E-06	8.54E-06	1.118238	0.2924
REH	8.38E-05	3.34E-05	1.505553	0.4172
CEH	0.53530	3.200118	2.850219	0.03360
C	45.36429	0.164814	275.2454	0.0000
R-squared	0.989250	Mean dependent var		46.91505
Adjusted R-squared	0.974916	S.D. dependent var		1.953952
S.E. of regression	0.309464	Sum squared resid		0.861910
Long-run variance	0.210011			

Source: Authors' Computation using E-view-10.0 software (2021)

$$LFEXP_t = 45.36 + 0.5CEH_t + 8.4REH_t + 9.5TGEH_t + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots 4$$

SEE = (0.16) (3.2) (3.3) (8.5)

t* = 275.24 2.8 2.5 1.1

$R^2 = 0.9892; \overline{R^2} = 0.9749$

4.6. Statistical Test Of Hypothesis

Based on the results of the statistical tests for the four hypotheses derived from the study's objectives, we observed the following interpretations:

For the first hypothesis (H01), which posited that government health expenditures do not have a significant impact on the performance of the health sector, the p-value for Total Government Expenditure on Health (TGEH) was 0.2924, which is greater than the 0.05 significance level. As a result, we retained H01, concluding that government health expenditures do not significantly impact the performance of the health sector in Nigeria.

The second hypothesis (H02) tested whether government recurrent expenditures on health impact the health sector's performance. With a p-value of 0.4172, also greater than 0.05, we retained H02, concluding that recurrent government health expenditures do not significantly affect the sector's performance.

The third hypothesis (H03) examined the impact of government capital expenditures on health on the sector's performance. The p-value for Capital Expenditure on Health (CEH) was 0.03360, which is less than 0.05. Thus, we rejected H03 and concluded that capital expenditures on health significantly impact the performance of the health sector in Nigeria.

Lastly, the fourth hypothesis (H04), which tested whether there is no causal link between government health expenditures and the performance of the health sector in Nigeria, is implied by the results. The specific test details for this hypothesis were not provided in the section, but the findings from H01, H02, and H03 collectively contribute to understanding the relationship between government spending and health sector performance.

Table 8: The Granger Causality Tests

Null Hypothesis	Obs	F-Statistic	Prob.
TGEH does not Granger Cause LFEXP	41	0.76885	0.4731
LFEXP does not Granger Cause TGEH		3.31180	0.0412
REH does not Granger Cause LFEXP	41	3.68432	0.0456
LFEXP does not Granger Cause REH		6.09001	0.0095
CEH does not Granger Cause LFEXP	41	0.06399	0.9382
LFEXP does not Granger Cause CEH		4.48632	0.0263
REH does not Granger Cause TGEH	41	1.37660	0.2778
TGEH does not Granger Cause REH		2.62133	0.1002
CEH does not Granger Cause TGEH	41	1.73574	0.2045
TGEH does not Granger Cause CEH		3.40804	0.03409
CEH does not Granger Cause REH	41	1.15629	0.1328
REH does not Granger Cause CEH		5.04341	0.0182

Source: Authors Computation, 2021 (Eview-10.0)

The Causality Tests in Table 8 indicated a unidirectional causality. LFEXP lead to variation in TGEH, however, TGEH does not lead to variation in LFEXP. Also, there is unidirectional causality between CEH and LFEXP. LFEXP lead to a change in CEH, however, CEH does not lead to a change in LFEXP. LFEXP lead to a change in REH, however, REH does lead to a change in LFEXP.

4.7. Post-Estimationdiagnostics Tests

i) Test For Serial Correlation

Table 9: Serial Correlation LM Test Breusch-Godfrey

F-statistic	1.918622	Prob. F(2,32)	0.1633
Obs*R-squared	4.068819	Prob. Chi-Square(2)	0.1308

Source: Authors Computation using E-view-10.0 software (2021)

In the Breusch-Godfery LM test in Table 7 a p-value of 0.1308 > 0.05, therefore, we retained the hypothesis that serial correlation does not exist among the variables.

ii) Heteroskedasticity Test

Table 10: Breusch-Pagan-Godfrey Heteroskedasticity Test

F-statistic	10.16853	Prob. F(3,34)	0.1341
Obs*R-squared	17.97073	Prob. Chi-Square(3)	0.0004
Scaled explained SS	27.79424	Prob. Chi-Square(3)	0.5346

Source: Authors' Computation using E-view-10.0 software (2021)

Since the p-value in Table 8 was 0.1341 > 0.05. Therefore we retained the H0 and concluded that heteroscedasticity does not exist between the variables at 0.05 or the result is homoscedastic.

iii) Normal Distribution Test

To establish the assumption of normality in OLS, the normal distribution test was employed below in Figure 1. Jarque-Bera statistics and the histogram help to establish that.

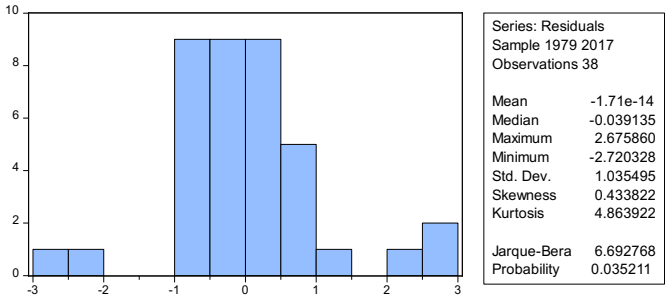

Figure 1: Normality test

Source: Authors Computation, 2021 (Eview-10.0)

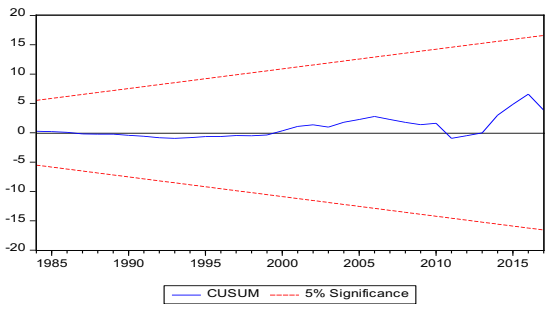

Figure 2: CUSUM test

Source: Authors Computation, 2021 (Eview-10.0)

The shape histogram above indicated that the residuals were normally distributed. Also, the Jarque-Bera statistics further show normal distribution since the p-value(0.035211)<0.05.

iv) Parameter Instability Test- CUSUM Test

The parameter instability test is one of the post-estimation tests used to show the parameter instability in a situation where the total sum moves outside the borders between the two red lines (critical lines) in the graph. The CUSUM test is used to establish No specification is needed it is only to construct the total sum of the recursive residuals together with the critical line at 5% to establish it.

The CUSUM test results in Figure 2 above, show that there is parameter stability from the curve since the total sum did not move outside the border between the two red lines (critical line) at 5%.

5. Discussion

The first result revealed a positive but insignificant impact between government expenditures and health sector performance in Nigeria. Specifically, a unit increase in government expenditures on the health sector would lead to an increase in the performance of the health sector, as measured by life expectancy, by 1.8 units and vice versa. This finding aligns with the works of Omosuyi, Ojo, and Olorunfemi (2008), A. A. Bakare and S. Olubokun (2011), whose studies showed that public expenditure, while negatively affecting child mortality, can cause a decline in child death rates with increased government allocation in the health sector. However, the impact on general life expectancy remains positive but statistically insignificant. Despite some level of increased public expenditures in the health sector over the past decades, Nigeria's health sector is still far from meeting international standards regarding health infrastructure and personnel compared to more advanced countries. The deficiencies in Nigeria's health sector have been starkly highlighted by the recent COVID-19 pandemic. In 2000, Nigeria ranked 187th out of 191 countries in terms of health sector performance, according to WHO (S. H. Ahmed et al., 2016). Today, the situation remains largely unchanged.

Secondly, the findings indicate no significant impact of government recurrent expenditures on health on the performance of the health sector in Nigeria. However, a positive relationship exists, suggesting that a unit increase in government recurrent health expenditures would enhance the performance of the health sector, as indicated by a 0.30 unit increase in life expectancy and vice versa. This finding is consistent with the works of Omosuyi et al. (2008) and Bakare and Olubokun (2011), which also revealed an insignificant relationship between public spending and general life expectancy. These studies further highlighted that poor budget implementation is a major cause of ineffective government expenditures in Nigeria and several other developing economies. Despite substantial public health expenditures, Nigeria was ranked 74th among 115 countries using various health indicators (The World Bank, 2018; World Health Organization, 2010). Additionally, Nigeria is one of the countries with the highest infant mortality rates, with 91 children dying between the ages of 0-5 years out of every 1000 births (World Health Organization, 2005). Unfortunately, this situation has not improved.

Thirdly, the findings further revealed that government capital health expenditures have a significant impact on the performance of the health sector. A positive relationship was found, where a unit increase in government capital health expenditures leads to a 7-unit increase in the performance of the health sector, as measured by life expectancy, and vice versa. This finding is in agreement with the works of Xian et al. (2010), Ebiringa and Charles-Anyaogu (2012), and Barenberg, Basu, and Soylu (2015), which also indicated that increased government expenditure in the health sector reduces child mortality rates. Specifically, a unit increase in government expenditures in the health sector results in a corresponding decrease in infant mortality rates, which also implies an increase in life expectancy.

Finally, the causality test findings indicate a unidirectional causality, where life expectancy (LFEXP) leads to changes in total government expenditure on health (TGEH). However, changes in TGEH do not lead to changes in LFEXP.

This discussion highlights the critical need for more efficient and targeted government spending in the health sector to improve outcomes and ensure that expenditures translate into tangible improvements in the population's health.

6. Conclusion

Efficiency in the allocation and utilization of scarce resources across various competitive sectors remains a significant challenge for governments in underdeveloped countries like Nigeria. Adequate allocation of funds and infrastructure in the health sector has been shown to lead to significant improvements in its performance. This paper examined whether government expenditures on health impact the performance of the health sector in Nigeria. Through a review of literature, analysis of secondary data, and subsequent findings, it is evident that investment in the health sector directly contributes to economic growth, as health is indeed wealth. Despite annual allocations to the health sector, Nigerian health centres still do not meet international standards to provide the necessary quality of healthcare to Nigerians. The recent COVID-19 pandemic has exposed severe underinvestment in the Nigerian health sector, resulting in poor performance and an over-reliance on foreign countries for support. Although the Nigerian government increased its budgetary allocation to the health sector in the 2021 budget proposal, it remains below the 15% of the total yearly budget recommended by the WHO. Overall, government

spending on the health sector is crucial for health sector performance and economic growth, as it enhances life expectancy from birth and increases labour productivity in any country.

7. Policy Recommendation

Based on the study's findings, several policy recommendations are essential to enhance the performance of Nigeria's health sector. The government should prioritize increasing the annual health budget allocation to meet the WHO's recommended 15%, ensuring these funds are managed with transparency and accountability. Emphasis should be placed on capital expenditures, such as building and equipping health centres across the country, to improve healthcare accessibility and overall sector performance. Additionally, robust implementation, monitoring, and evaluation of national health policies—like malaria and polio eradication, HIV/AIDS, tuberculosis prevention, and the National Health Insurance Scheme (NHIS)—are crucial to elevating the health status of the population and increasing life expectancy. Furthermore, international organizations like the WHO, alongside NGOs, should focus on providing continuous training for Nigerian health workers to align their skills with global standards, thereby enhancing service quality. Lastly, stringent measures must be implemented to curb corruption within the health sector, ensuring that public funds are utilized effectively to prepare the health infrastructure for future challenges, such as pandemics, and to foster sustainable economic growth through improved health outcomes.

8. Implications And Future Research

The implications of this study highlight the critical role of government expenditure in the health sector's performance, particularly in underdeveloped countries like Nigeria. The findings suggest that strategic investment in healthcare infrastructure and services not only improves health outcomes but also contributes to broader economic growth. The study underscores the need for effective budget allocation, rigorous implementation of health policies, and combating corruption to maximize the impact of public health spending. For future research, it is essential to explore the long-term effects of government health expenditures on other socioeconomic factors, such as poverty reduction and educational outcomes. Additionally, future studies could examine the impact of private sector involvement and public-private partnerships in the health sector, as well as the effectiveness of specific health interventions and programs in different regions of Nigeria. Expanding the scope of research to include comparative studies with other developing nations would also provide valuable insights into best practices and areas for improvement in health sector financing and management.

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