



Health Financing and Economic Growth: The Nigerian Experience (1999 – 2020)

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ABSTRACT

This paper examined the impact of government health expenditure on economic growth in Nigeria for the period 1999-2020. Real gross domestic product (RGDP) proxy for economic growth was adopted as the dependent variable while health recurrent expenditure (REHLT) and health capital expenditure (CEHLT) were adopted as the independent variables. The unit root test revealed that all the variables in the model became stationary at first difference hence the Johansen cointegration method and Vector Error Correction Model (VECM) were applied to test the long run relationship among the variables and data analysis respectively. Findings of the study revealed that a negative relationship existed between recurrent and capital expenditures and real gross domestic product in the long run, with capital expenditure exerting the most significant impact. In the short run, the recurrent health expenditure had a positive and significant impact on real gross domestic product while the capital expenditure was found to exert a negative and significant impact on real gross domestic product. The Granger causality test showed a one-way causality from RGDP to REHLT while CEHLT Granger caused RGDP. Consequently, the study concludes that to enhance RGDP in Nigeria, government should prioritize adequate funding of the health sector with the best blend of recurrent and capital expenditures by increasing yearly budgetary allocation to the health sector since it is requisite for economic growth. The study further suggested that policy makers should collaborate with health professionals – including the Nigerian medical professionals in Diaspora to form a strong force in creating long-term blueprint for adequate and proper financing in the health sector.

Keywords: Economic Growth, Government, Health Expenditure, Human Capital Development

INTRODUCTION

The growing rate of decay in key health infrastructures in Nigeria is a thing of concern to the future of Nigeria as a country. A good number of people live their lives in the face of non-readily available health facilities and institutions. These people are susceptible to various forms of sicknesses, social vices and institutional abuses which in turn affect their active participation in the production process. Kenny (2019) posited that the success of human capital investment will depend largely on the availability and efficient allocation of funds to education and health services. No country or nation can strongly survive without public investments in the areas of health and education, aimed at empowering citizens for sustainable and gainful employment (Onyele and Ariwa, 2020; Okodua, Matthew and Osabohien, 2019).

According to Nwaeze, Nwakodo, Herbert and Godwin (2020), education and health are central to wellbeing and rewarding lives of citizens. Health is a necessity for improved labour, productivity and output which enhance growth and welfare of citizens in a country. Health investment will encompass both aggregate capital and recurrent expenditures on the health sector, involving hospitals, other health facilities and institutions in the country for the purposes of processing and development of human

resources for improved productivity and growth. Sound health and body is required by an individual to perform every day activities and tasks as a healthy person contributes to the production process and also earn a living without relying on others. The importance of health as a fundamental component of human capital cannot be over-emphasized as it enhances or improves worker efficiency and productivity; increased disease awareness and also determines a country's economic growth (Ojo and Ojo, 2022).

According to World Health Organization (2005), health is an important determinant of economic development; a healthy population means higher productivity, thus higher income per head. When labour is healthy, their urge to develop new attitudes, skills, capacities and knowledge is higher because they expect to enjoy long term benefits (Bloom and Conning, 2000 as cited in Piabuo and Tieguhong, 2017). However, Cole and Neumayer (2006) posited that when the labour force is predominant with workers with poor health, productivity declines. This singular scenario explains the disparity in development in different regions of the world.

In Nigeria today, basic health infrastructures are lacking. Hospitals and health institutions are not adequately funded; as a result, workers of the health institutions are always embarking on strike to press home their demands of better funding of the health institutions. Brain-drain is the order of the day in the health sector as medical tourism is predominant among the elites and oligarchs who can afford medicare abroad for themselves and families. The major issue here is that the level of funding of the health sector is not good enough to ensure quality healthcare for citizens hence, low productivity as output has a direct relationship with the health of a worker.

With the picture painted above, the relevance of health expenditure in economies of the world deserves adequate study. Therefore, this study examined specifically the impact of health recurrent and capital expenditure on economic growth of Nigeria for the period 1999 – 2020.

Literature Review

Conceptual Review

The Health Sector and Economic Growth

The effect of health on worker's productivity suggests a relationship between health and aggregate output. Healthy workers lose less time from work due to ill health and are more productive when working. Health gains had the economic consequences of widespread economic growth and an escape of ill-health traps in poverty (World Health Organization, 2005). There has been a growing interest to extend the relationship between health and economic growth, catalyzed in considerable extent by a 1993 World Bank report on health (World Bank, 1993). Barro (1996) commented that health is a capital productive asset and an engine of economic growth. Fifty percent of economic growth differentials between developed and developing nation is attributable to ill-health and low life expectancy (World Health Organization, 2005). Developed countries invest a substantial proportion of their budgetary allocations on provision of health care because they are convinced that their residents' health can serve as a major driver for economic growth. As health is wealth, no amount spent on health by a nation is considered too much. The United Nation (UN) recommended for a country, an average of 8 to 10 percent of the GDP as benchmark expenditure on health. Governments in Nigeria, over the years have made deliberate efforts at ensuring that there is increase in the level of public expenditure on health (Oni, 2014).

The importance of health to nation building and as a facilitator of economic progress cannot be over emphasized. It should however be noted that despite the increase in government expenditure on health provisions in Nigeria, the contribution of this to human health is still marginally low. Moreover, the extent and magnitude of its impact on economic growth is yet to be adequately investigated probably because of the general unidirectional impression that economic growth facilitates better health (Kenny, 2019). Off course, for example, economic growth could lead to increased availability of food for better healthy living; increased earning which makes health spending more affordable; and also raises demand for good health services. Higher growth could also imply higher public revenue which can translate into higher investment in health infrastructure.

A study by Saheed and Samuel (2021) examined the impact of health financing on economic growth in Nigeria using Auto-Regressive Distributive Lag (ARDL) technique with time series data for the period

1990-2020. The findings of the study revealed that the previous year's productive activities had a growth effect on economic growth in both the short-run and long-run. The current domestic government general health expenditure had a negative growth effect on economic growth while the previous year's domestic general expenditure on health improved economic growth.

Theoretical Review

The following theories were discussed in this study:

The Keynesian Theory

Keynes (1936), a British economist and the father of macroeconomics argued that public expenditure is a fundamental determinant of economic growth. Keynes theory made it clear that fiscal policy instruments (i.e. government expenditure) is an important tool for achieving short-term stability and superior long run growth rate. To achieve stability in the economy, this theory prescribes government interventions in the economy through economic policy specifically fiscal policy. Keynes argued that there is need for government to intervene in the economy because government could alter economic downturns by borrowing money from the private sector of the economy and then returning the money to the private sector through its various spending programmes.

In addition, government capital and recurrent expenditure aid in the building of quality classrooms, laboratories, purchase of teaching and learning aids including computed and payment of salary will have multiplier effect on the economy. Expenditure in education will improve productivity and development by raising the quality of the labour force. It will also help in creating a body sector of the economy to plan and manage the economy. This study is hinged on this theory.

Rostow-Musgrave Theory

Rostow presented a political theory of the stages of growth and the role of public finance in process, whereas Musgrave (1969 – 1971) provided a macroeconomic view point of public expenditures policy for industrialization and development. According to this theory in the early stages of economic growth and development, investment made by public sector as an amount of total investment is found to be high. That is, Rostow and Musgrave, submitted that the rate of growth of public expenditure will be very high during the early stage of economic development. The public sector therefore is seen to provide a social overhead capital in the form of expenditure on education, health, nutrition etc. This public investment, it is argued is necessary to gear up the economy into the middle stages of socio-economic development (i.e. social overhead capital provided by the public sector is necessary to launch the economy from the traditional stage to take off stage of economy development). Rostow argued that once the economy reaches the mature stage, the mix of public expenditure will shift from expenditure on infrastructures to increasing expenditure on education, health and welfare service. This theory presented approaches to the role of public sectors.

Empirical Review

Saheed, O. O., Tunde, A. B. and Abiodun, S. O. (2021) re-examined the connection between public health and expenditure and economic growth in Nigeria within the context of Wagner's Theory of increasing state activities. Findings of the study showed evidence of a long-run relationship between public health expenditure and economic growth. The granger-causality test results indicated neither uni-directional nor bi-directional relationship between public health expenditure and GDP. Health expenditure had a uni-directional causal relationship with real gross domestic product. The study concluded that though there is no causal relationship between public health expenditure and gross domestic product, public health expenditure and gross domestic product still have evidence of long-run connection.

Daniel, Simeon and Itode (2018) examined the effect of public investment in the social sector on employment generation in Nigeria between 1980 and 2016. Time series data were sourced from secondary sources on unemployment rate (UNE) a proxy for employment generation, government expenditure on education (EDU), government expenditure on health (HEH) and government expenditure on other social and community services (COM). The data set were analyzed based on the Dynamic OLS proposed by Stock-Watson (1993) technique of analysis to estimate the model. The result of the analysis

revealed that government expenditure on education (EDU) is rightly signed and is statistically significant while government expenditure on health (HTH) and government expenditure on other social and community services (COM) were wrongly signed and statistically significant at 5 percent level. This implies that government expenditure on health (HTH) and government expenditure on other social and community services have not generated employment in Nigeria within the period under review.

Echekoba and Amakor (2017) examined the impact of government expenditures on general administration, defence, education and health on Gross Domestic Product (GDP) of Nigeria for the period 1983-2016. The study made use of time series data spanning from 1983 to 2015. The Ordinary Least Squares (OLS) technique was adopted as the data analysis technique. Results of the study revealed that expenditure on General Administration had a positive impact and significant relationship on economic growth; Expenditure on Defence had a negative impact but significant relationship with GDP; Expenditure on Education had a positive and highly significant impact on GDP and Expenditure on Health and a positive but insignificant impact on GDP. The paper thus recommended that government should ensure that her expenditure whether capital or recurrent should be managed and monitored at the implementation stage to enhance comparable achievement on economic growth.

Okafor, Ogbonna and Okeke (2017), focused on the long run relationship between governmental expenditure in education and health and human capital development in Nigeria. The result of the vector autoregressive model (VAR) model showed human capital development index was significant in the current year but tended to converge insignificantly in the previous years. On the other hand, the value of the joint significance indicated that the current values of government expenditure on education and health were most influencing factors that determined the current values of human capital development index. This was economically evidenced that what influence human capital development in Nigeria are the nature, pattern and level of governmental expenditure in education and health because the model revealed their insignificant direct impact on the human capital development index.

Egbo, Nwankwo, Okoye and Onuora (2016) explored the relationship between government disaggregated expenditure and growth of the Nigerian economy over the period of 1970 to 2014 with a critical focus on growth analysis. Using percentage changes in government expenditures on administration, economic services, social and community services and transfers and GDP the study employed *ex-post facto* research design and the required data were sourced from Central bank of Nigeria Statistical Bulletin and subjected to Ordinary Least Squares (OLS), Error Correction Model (ECM), Granger Causality and Johansen Cointegration methods of estimations. Utilizing the ADF statistics, the employed variables were found to be stationary at level, while the OLS revealed a short run positive association between expenditures on administration, social and community services and transfers and gross domestic product while economic services expenditure relates negatively to GDP. The study also revealed the existence of equilibrium or long run relationship among employed variables, while the ECM was rightly signed at 92% speed of adjustment. The granger Causality revealed a demand-following unidirectional relationship between GDP and expenditures on economic services. Based on this, the paper recommended among others that expenditures on economic services should be channeled towards diversification of the economy especially in this period of dwindling oil price.

Maduka, Chekwube and Chukwunonso (2016) used Toda and Yamamoto (TY) causality analysis to examine health care expenditure, health outcomes and economic growth nexus in Nigeria during the period 1970 to 2013. The Toda and Yamamoto (TY) causality test revealed that government health expenditures do not directly influence economic growth, but indirectly through health outcomes such as mortality rate and life expectancy.

Omodero and Azubuike (2016), examined the extent to which the Nigerian GDP affects the government expenditure on education, social and community services and the number of school enrolment within the period being reviewed. Secondary data employed were from the EFA 2015 report and CBN bulletin published in 2016. Multiple regression analysis and student t-test were the statistical tools applied, with the use of SPSS for both data analysis and to test the hypotheses formulated for the study at 5% level of significance. The result indicated that expenditure on education is significant and impacts on the economy. While the result on SCS and ENRL showed a significant relationship with the GDP but little or

no impact. The conclusion is that, the anti-graft fight by the present government to encourage proper use of resource allocation has to be encouraged by all good citizens and lovers of education. If the resources allocated are efficiently utilized to equip Government owned schools, education will be affordable by all and number of schools drop-outs will reduce significantly.

Friday, Fidelis, Udeme and Olumide (2016) assessed the impact of government capital expenditures on economic growth during 1970 to 2012. The study adopted a multiple regression model based on a modified endogenous growth framework to capture the interrelationships among capital expenditures on agriculture, education, health, economic infrastructure on economic growth. The Ordinary Least Squares (OLS) technique was used to analyze annual time series data. Both short and long run effects of government capital expenditures on economic growth were estimated. Findings of the study revealed that government capital expenditures had differential effects on economic growth. Capital expenditure on Agriculture did not exert any significant influence on growth both in the long run and short runs. The corresponding short-run and long-run impacts on growth of capital expenditures on Education were 0.45 and 0.48 respectively. These results were positive and statistically significant at 5% level. The short-run impact of health capital expenditure on economic growth was 0.21, while the long-run impact was 0.16. These impacts were negative and insignificant. Expenditures on economic infrastructure had significant impacts on growth of 0.28 in the short-run and 0.32 in the long-run. Generally, the result of the study indicated that government expenditure on human capital development through social services sector tended to promote economic growth unlike that on Agriculture.

Onisanwa (2014) employed co-integration and Granger causality techniques to examine the impact of health on economic growth in Nigeria for the period of 1999 to 2009. It was revealed that health indicators have a long run impact on economic growth. Also, health indicators Granger cause the per capital GDP.

Nasiru and Usman (2012) used ARDL Bounds test and Granger causality test to examine health expenditure and economic growth in Nigeria from 1980 to 2010. The result suggested that there is a long run relationship between health expenditure and economic growth. Also, there is a unidirectional relationship between health expenditure and economic growth.

Odubunmi, Saka and Oke (2012) examined the relationship between health care expenditure and economic growth in Nigeria for the period of 1970 – 2009. They employed the multivariate cointegration technique proposed by Johanson and found the existence of at least one cointegrating vector describing a long run relationship among economic growth, foreign aids, health expenditure, total saving and population. The cointegrating equation however shows some deviations in terms of the signs of the coefficients of forcing aids and health expenditure which they attributed to some diversification of foreign aids to other uses or inadequate allocation to health services.

Bakare and Sanmi (2011) examined health care expenditure and economic growth in Nigeria. The study adopted Ordinary Least Squares multiple regression analysis. The result showed a significant and positive relationship between health care expenditure and economic growth in Nigeria.

RESEARCH AND METHODS

Research Design

The *ex-post facto* research design was adopted in the area of obtaining already existing secondary data for the study. Time series data were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin for the period 1999-2020. The data were on real gross domestic product (RGDP), government recurrent expenditure on health (REHLT) and government capital expenditure on health (CEHLT). Economic growth as the dependent variable is proxied by real GDP. This denotes the money value of all currently produced goods and services in a country within an accounting period usually one year. The major explanatory variable is total government expenditure on health subdivided into recurrent government expenditure on health and capital government expenditure on health. This includes the aggregate expenditure of government made on hospitals, other health facilities and institutions in the nation for the development of human resources for growth.

The study made use of pre-testing methods involving the Augmented Dickey-Fuller (ADF) unit root test to test the stationarity of the variables in the model. This is to avoid the issue of spurious results from the use of non-stationarity data set and to obtain results that can be relied upon for decision making (Izedonmi, 2016). The results showed that all variables became integrated at I(1), thus, the adoption of the Vector Error Correction Model (VECM) in order to test the long-run and short-run dynamics of data analysis. The Johansen Co-integration test was also carried out to test the long-run relationship among the variables in the model.

Model Specification

Nwaeze, Nwakodo, Herbert and Godwin (2020) specified a model which examined the effects of government social and community services expenditure on economic growth of Nigeria, as thus:

$$RGDP = f(RESCS, CESCO) \dots \dots \dots \text{eqn. 1}$$

Where:

RGDP = Real Gross Domestic Product (proxy for economic growth)
 f = Function

RESCS = Recurrent Expenditure on Social and Community Services
 CESCO = Capital Expenditure on Social and Community services

The above model was adopted and modified to suit the objectives of the present study and thus, specified as:

$$RGDP = f(REHLT, CEHLT) \dots \dots \dots \text{Eqn 2}$$

Where:

REHLT = Recurrent government expenditure on health
 CEHLT = Capital government expenditure on health.

Transforming equation (2) to its econometric form, thus:

$$RGDP = \beta_0 + \beta_1 REHLT + \beta_2 CEHLT + \mu \dots \dots \dots \text{Eqn 3}$$

Where:

β_0 = Constant (Intercept) term
 β_1, β_2 = Coefficient parameters of the independent variables
 μ = Stochastic or error term

Thus, transforming equation (3) to its logarithm form in order to bring the variables to the same base, we have:

$$\text{LnRGDP} = \beta_0 + \beta_1 \text{LnREHLT} + \beta_2 \text{LnCEHLT} + \mu \dots \dots \dots \text{Eqn 4}$$

By Apriori expectation, $\beta_0 > 0$, $\beta_1 > 0$ and $\beta_2 > 0$

Table 3.1 shows the variables and expected signs based on their intuition (apriori expectation)

Table 3.1

Variables	Theory Intuition	Expected Sign
<ul style="list-style-type: none"> • Recurrent Expenditure on Health (REHLT) 	Increased government recurrent expenditure on health is expected to translate to a healthy workforce which will increase productivity and growth	+
<ul style="list-style-type: none"> • Capital Expenditure on Health (CEHLT) 	Higher government capital expenditure on health - physical facilities and equipment in the health sector is expected to translate to enhanced productivity and growth.	+

DATA PRESENTATION AND ANALYSIS

The nominal data on variables employed in this study is presented as below:

Table 4.1: Data on Real Gross Domestic Product (RGDP), Recurrent Expenditure on Health (REHLT), Capital Expenditure on Health (CEHLT) (₦Billion)

YEAR	RGDP	REHLT	CEHLT
1999	22,449.41	16.64	4.76
2000	23,688.28	15.22	7.72
2001	25,267.54	24.52	14.72
2002	28,957.71	40.62	8.96
2003	31,709.45	33.27	15.38
2004	35,020.55	34.20	8.29
2005	37,474.95	55.66	19.70
2006	39,995.50	62.25	21.72
2007	42,922.41	81.91	41.65
2008	46,012.52	98.22	42.00
2009	49,856.10	90.20	40.00
2010	54,612.26	99.10	41.89
2011	57,511.04	231.80	25.63
2012	59,929.89	197.90	26.88
2013	63,218.72	179.99	42.70
2014	67,152.79	195.98	30.72
2015	69,023.93	257.70	22.90
2016	67,931.24	200.82	18.99
2017	68,490.98	245.19	46.27
2018	69,799.94	296.44	56.14
2019	71,387.83	388.37	73.09
2020	72,975.72	480.30	89.96

Source: Central Bank of Nigeria Statistical Bulletin, (2020).

Analysis and Results

Trend Analysis

In a time series analysis, it is expedient to display the trend of the data used to ascertain their movements. In this regard, the trend analysis of the variables was carried out. Fig. 1 presents the trend of RGDP while Fig. 2 combined the trends of REHLT and CEHLT.

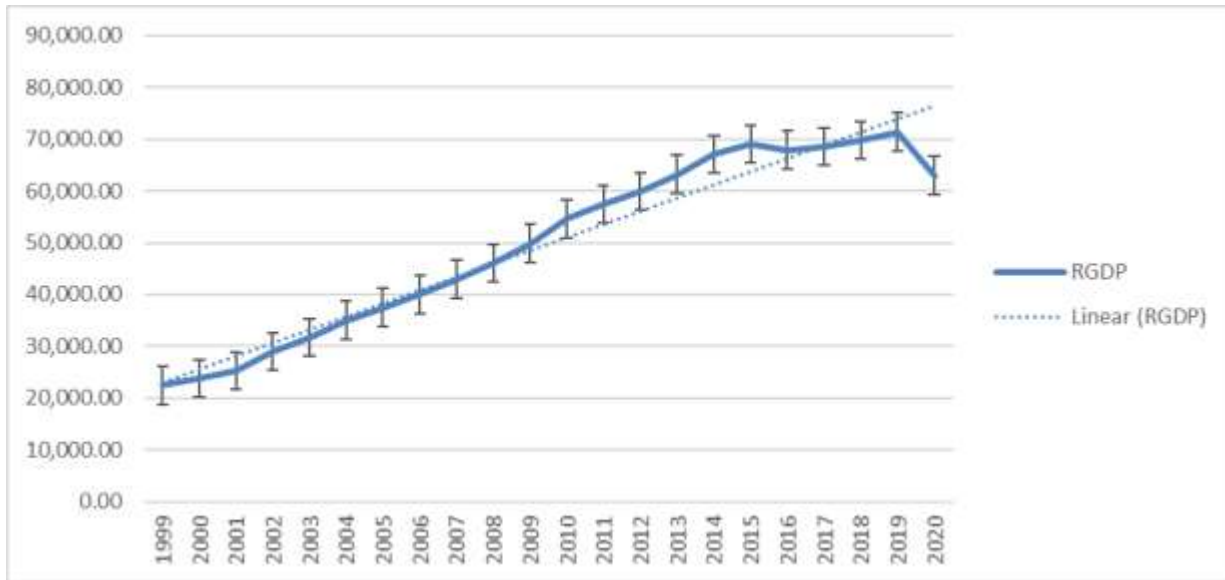


Fig. 1: Trend of RGDP

Looking at the trend of RGDP between 1999, it was observed that the annual increase in RGDP was quite slow, depicting the level of instability inherent in the Nigerian economy due to poor economic management and insecurity. However, from 1999 to 2015, the level of swings in the RGDP was somewhat mild until slumped in 2016 due to the economic recession and further decrease was recorded in 2020 due to the COVID-19 pandemic.

The trends of REHLT and CEHLT as captured in Fig. 2 is indicative of the fact that the Nigerian government's recurrent expenditures has been rising more than its capital expenditure. This explains the level of infrastructural decay in the country and the low level of domestic productivity since 1999 till date. It is known that capital expenditures are meant to bring about the requisite infrastructure for economic growth while the recurrent expenditures are majorly aimed at boosting short-term consumptions. As such, the widening gap between the REHLT and CEHLT paints a blink picture of the Nigerian economic system.

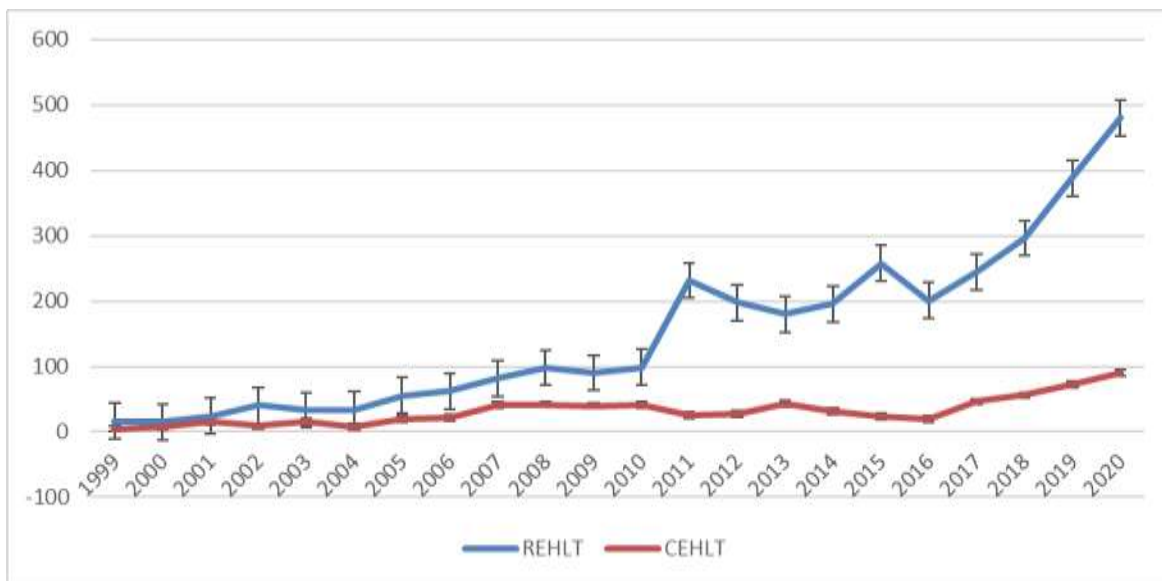


Fig. 2: Trends of REHLT and CEHLT

Descriptive Statistics

The descriptive statistics of the data are presented in Table 4.1:

Table 1: Descriptive statistics

	RGDP	REHLT	CEHLT
Mean	50244.94	151.1955	31.82136
Median	52234.18	98.66000	26.25500
Maximum	71387.83	480.3000	89.96000
Minimum	22449.41	15.22000	4.760000
Std. Dev.	17504.23	127.8678	21.69011
Skewness	-0.215029	0.954653	-0.126065
Kurtosis	1.577954	3.220960	1.707094
Jarque-Bera Probability	2.023234 0.363631	3.386418 0.183928	4.318621 0.115405
Observations	22	22	22

Source: EViews 10

The mean value shows that RGDP was averagely 50244.94. Comparing the average value of RGDP with its minimum and maximum values that ranged between 22449.41 and 71387.83 shows that, indeed, the Nigerian RGDP has not been rapidly increasing. This was also indicated by the Kurtosis value of $1.577954 < 3$ which implied that the series of RGDP recorded more values below the mean and it was negatively skewed as shown by the skewness.

The mean value of REHLT was 151.1955 with series ranging from 15.22000 to 480.3000. This is an indication that the series associated with REHLT has been rapidly increasing over the years. Its positive skewness lends support to this rapid increase and the Kurtosis of $3.220960 > 3$ also indicates that the values rose more than the average.

The series of CEHLT averaged 31.82136 with its values ranging from 4.760000 to 89.96000, implying that, though the CEHLT was increasing but not as rapid as that of REHLT. The sluggish rise in CEHLT can be seen from its Kurtosis of $1.707094 < 3$ which indicates lower values than the average while the skewness shows that the series of CEHLT was negative skewed.

Stationarity Test

The tests for stationarity were determined by Augmented Dickey Fuller (ADF) unit root test.

The t-values of ADF tests are reported in Table 4.2.

Table 4.2: Summary of ADF Unit Root Test Results

Variable	Level		First Difference		Status
	t-Statistic	Prob.	t-Statistic	Prob.	
LOG(RGDP)	-0.514907	0.9985	-4.737463	0.0068	I(1)
LOG(REHLT)	-3.002893	0.1545	-5.746186	0.0010	I(1)
LOG(CEHLT)	-2.819877	0.2060	-5.792560	0.0008	I(1)

Source: EViews 10

Table 1 presents the results of ADF unit root test. At levels, the null hypothesis of non-stationary data cannot be rejected for all the variables understudy. Therefore, the variables were adjudged non-stationary which indicates that they had unit root, but stationary after first difference. This scenario justifies the use of the Johansen method.

Johansen Cointegration Test

Prior to the cointegration tests and VECM analysis, the optimal lag used for the study was ascertained by the VAR lag order selection criteria as shown in Table 4.3.

Table 4.3: VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-16.97930	NA	0.001346	1.902790	2.052008	1.935174
1	50.63764	109.4750*	5.14e-06*	-3.679775*	-3.082905*	-3.550239*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Source: EViews 10

The VAR lag order selection criteria indicated different lag order for the analysis. However, the optimal lag for the model was one based on the Schwarz Information Criteria (SC) and Akaike Information Criteria (AIC). Hence, one period lag was used for the Johansen cointegration tests and VECM.

To determine the extent of cointegration in the model, the Johansen based cointegration test was conducted as shown in Table 4.4. Both the trace and maximum eigen value statistic detected at least three (cointegrating equations) at 5% level of significance. In other words, these cointegration results was indicative of a long-run equilibrium relationship in the model. Therefore, this result was plausible that RGDP is driven by the government expenditure on health.

Table 4.4: Johansen Cointegration Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.687034	33.06000	29.79707	0.0203
At most 1	0.312689	10.98845	15.49471	0.2122
At most 2 *	0.184024	3.864041	3.841466	0.0493

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigen value)

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.687034	22.07156	21.13162	0.0368
At most 1	0.312689	7.124407	14.26460	0.4745
At most 2 *	0.184024	3.864041	3.841466	0.0493

Max-eigen value test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: EViews 10

Vector Error Correction Model (VECM) – Long-Run Dynamics

The long-run relationship was captured by the normalized cointegrating coefficients as shown in Table 4.5.

Table 4.5: Normalized Cointegrating Coefficients; Standard errors in () & t-statistics in []

CointegratingEq:	CointEq1
LOG(RGDP(-1))	1.000000
LOG(REHLT(-1))	-0.013195 (0.09570) [-0.13788]
LOG(CEHLT(-1))	-0.246091 (0.10554) [-2.33163]
C	-9.915038

Source: EViews 10

The long-run coefficients of REHLT and CEHLT indicate that government health expenditures have a negative impact on the Nigerian economy. The coefficient of REHLT shows that a percentage increase in the recurrent health expenditure resulted to approximately 1.3% decrease in RGDP. The estimated coefficient of CEHLT indicates that a percentage increase in the capital health expenditure caused about 25% decrease in RGDP. This is against the *a priori* expectation that government health expenditures should spur economic growth by strengthening human capital development. This problem could be due to insufficient expenditure in the sector coupled with the level of corruption in the country. This state of public health expenditure is also reflected in the incessant strike of health workers in the country. Using the 2t-rule of thumb, it was found that only CEHLT had significant long run effect on RGDP in Nigeria since the t-Statistic was greater than 2 while that of REHLT was less than 2 and thus, had a long-run insignificant effect on RGDP in Nigeria.

Vector Error Correction Model (VECM) – Short-Run Dynamics

The estimated coefficients in the VECM output indicates the short-run dynamics of the regression Model as presented in Table 4.6.

Table 6: Vector Error Correction Mechanism (VECM)

	Coefficient	Std. Error	t-Statistic	Prob.
ECM (-1)	-0.105983	0.028809	-3.678819	0.0022
D(LOG(RGDP(-1)))	0.244149	0.195619	1.248081	0.2311
D(LOG(REHLT(-1)))	0.417926	0.186755	2.237832	0.0420
D(LOG(CEHLT(-1)))	-0.110380	0.034669	-3.183846	0.0033
C	0.044397	0.013316	3.334080	0.0045
R-squared	0.812698	Mean dependent var		0.056257
Adjusted R-squared	0.762750	S.D. dependent var		0.035716
S.E. of regression	0.017397	Akaike info criterion		-5.052756
Sum squared resid	0.004540	Schwarz criterion		-4.803823
Log likelihood	55.52756	Hannan-Quinn criter.		-5.004162
F-statistic	16.27109	Durbin-Watson stat		2.233834
Prob(F-statistic)	0.000025			

Source: EViews 10

The results presented in Table 4.6 indicate that the coefficient of the error correction model (ECM) is correctly signed and statistically significant which is in conformity with the short-run equilibrium after lag adjustments. Therefore, the ECM implies that approximately 11% disequilibrium in the previous period is corrected in the current period showing a relative speed of adjustment from short-run disequilibrium to long-run equilibrium. This speed of adjustment is quite slow, implying that it takes a longer period for the Nigerian economy to return to its normal state after unexpected shocks to government health expenditures.

The Adjusted R-squared (0.762750) implied that 76% of the variations in RGDP is explained by the explanatory variables (REHLT and CEHLT). The F-statistic of 16.27109 and its probability value of $0.000025 < 0.05$ indicates that the explanatory variables collectively explained changes in the RGDP. This re-emphasizes the significant role collectively played by public finance in the process of economic growth and development. This finding was in consonance with those of Onyele and Ariwa (2020); Adeniyi, Ajayi and Adedeji (2020); Ridder, Hannon and Pfajfar (2020); Amaghionyeodiwe (2018); Ogbara, Ebong and Nath (2018) observed that government spending in the education sector is relevant for economic growth. The differenced (D) coefficients represent the short-run dynamics. The short-run estimates revealed that REHLT caused positive and significant effect on RGDP in Nigeria. On the other hand, CEHLT had negative and significant effect on RGDP in the short run. The lagged coefficient of RGDP indicates that the state of the previous year's RGDP did not significantly encourage an increase in the current year's value of RGDP, indicating the slow pace at which the Nigerian RGDP increases.

Pairwise Granger Causality

The Granger causality test is presented in Table 4.7:

Table 7: Pairwise Granger causality test

Null Hypothesis:	Obs	F-Statistic	Prob.
LOG(REHLT) does not Granger Cause LOG(RGDP)	20	0.56081	0.5823
LOG(RGDP) does not Granger Cause LOG(REHLT)		3.90066	0.0465
LOG(CEHLT) does not Granger Cause LOG(RGDP)	20	4.37291	0.0319
LOG(RGDP) does not Granger Cause LOG(CEHLT)		2.08519	0.1588
LOG(CEHLT) does not Granger Cause LOG(REHLT)	20	0.99836	0.3917
LOG(REHLT) does not Granger Cause LOG(CEHLT)		0.96811	0.4023

Source: EViews 10

From the Granger causality test results in Table 4.7 above, there is one-way causality from LOG(RGDP) to LOG(REHLT), implying that previous values of RGDP have a predictive ability in determining the current values of REHLT, and not the other way round. On the other hand, a one-way causal flow ran from LOG(CEHLT) to LOG(RGDP) but not from LOG(RGDP) to LOG(CEHLT), implying that CEHLT has a predictive ability in determining RGDP. These findings signify a significant interaction among the explanatory variables and that these variables are integral to the VECM.

Summary of Findings

The findings of the study can be summarized as follows:

1. Recurrent government expenditure on health (REHLT) had a negative and insignificant impact on economic growth in the long-run but a positive and significant impact in the short-run.
2. Capital government expenditure on health (REHLT) revealed a negative and significant impact on economic growth in the long-run but a negative and significant impact on RGDP in the short-run.
3. The Granger causality test showed a one-way causality from RGDP to REHLT while CEHLT Granger caused RGDP.

CONCLUSION

The study investigated how government health expenditure affect economic growth in Nigeria using yearly time series data from 1999 to 2020. Using the Johansen cointegration test and VECM, a long-run relationship between real gross domestic product, government recurrent health expenditure and government capital health expenditure was found. The negative and significant error correction mechanism indicates a speed of adjustment of the model variables to their equilibrium every year. Specifically, as shown by the cointegrating equation, RGDP reduced due to the changes in REHLT and CEHLT with the effect of CEHLT being the most significant. This negative effect was adduced to the high rate of corruption and under funding of the health sector.

RECOMMENDATIONS

Consequently, the study recommended that to enhance RGDP in Nigeria, government should prioritize adequate funding of the health sector with the best blend of recurrent and capital expenditures by increasing yearly budgetary allocation to the health sector since it is requisite for economic growth. Further, it is recommended that policy makers should collaborate with health professionals – including the Nigerian medical professionals in Diaspora and form a strong force in creating long-term blueprint for adequate and proper financing in the health sector.

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Appendix 1

Data on Real Gross Domestic Product (RGDP), Recurrent Expenditure on Health (REHLT), Capital Expenditure on Health (CEHLT) (₦Billion)

YEAR	RGDP	REHLT	CEHLT
1999	22,449.41	16.64	4.76
2000	23,688.28	15.22	7.72
2001	25,267.54	24.52	14.72
2002	28,957.71	40.62	8.96
2003	31,709.45	33.27	15.38
2004	35,020.55	34.20	8.29
2005	37,474.95	55.66	19.70
2006	39,995.50	62.25	21.72
2007	42,922.41	81.91	41.65
2008	46,012.52	98.22	42.00
2009	49,856.10	90.20	40.00
2010	54,612.26	99.10	41.89
2011	57,511.04	231.80	25.63
2012	59,929.89	197.90	26.88
2013	63,218.72	179.99	42.70
2014	67,152.79	195.98	30.72
2015	69,023.93	257.70	22.90
2016	67,931.24	200.82	18.99
2017	68,490.98	245.19	46.27
2018	69,799.94	296.44	56.14
2019	71,387.83	388.37	73.09
2020	72,975.72	480.30	89.96

Source: Central Bank of Nigeria Statistical Bulletin, (2020).