

Impact of Health Investment on Economic Development in Nigeria

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Abstract

This study examined the impact of health investment on economic development in Nigeria. Using secondary data sourced from Central Bank of Nigeria Statistical Bulletins and World Bank development indicators, World Bank Database for the period of 1981- 2020. It applied Augmented Dickey Fuller (ADF) and Philips-Perron (PP) tests for unit root which indicated that all the variables were stationary at first difference except gross fixed capital formation at level. The mixed order of the unit root tests necessitated the adoption of Autoregressive Distributed Lag (ARDL) bounds Cointegration technique. The study submitted that a strong evidence of cointegration among the variables exist. It prove that health investment variables (recurrent and capital health investment, public education expenditure, gross fixed capital formation and labour participation rate) have positive impacts on economic development in Nigeria except foreign exchange rate which reveals negative impact. The result of Pairwise Granger causality test indicated that there were uni-directional and bidirectional causality among health investment variables and economic development in Nigeria. Therefore, it concluded that health investment variables have positive and significant impacts on economic development in Nigeria except exchange rate. Moreover, this study recommended that health policy should be made by government to increase the budgetary allocation to health sector particularly on recurrent and capital public health investment, improve quality of education through statutory allocation to education sector, provide exchange rate policy that will encourage investment in human capital by individuals and private sector. Finally, the government should expand institutional capacity to produce qualified manpower, improve personnel salaries, wages and working conditions in health and education sectors to achieve the sustainable development goals of enhancing healthy living and promote well-being for all by 2030 in Nigerian economy.

Keywords: Health Investment, economic development, education expenditure, exchange rate and ARDL

1.0 Introduction

Health sector is the most important sector to social, political and economic development of any country with clear evidence linking productivity to quality of health care in such country. In Nigeria, the vision of becoming one of the leading 20 economies of the world by the year 2020 and attain self-reliance of the economy by year 2030 is closely tied to the development of its human capital through the health sector. This aspired policy was in line with the third sustainable development goals of enhancing healthy living and promote well-being for all by 2030 (UNDP, 2019) and (Urhie *etal*, 2020) in Nigeria.

Health and education are not only beneficial in themselves, but they can be viewed as investments in human capital which lead to a higher future standard of living of any economy (Schultz, 1999). The Nigerian economy experience lower levels of both health and education than advanced economies of the world, which reflects in the lower level of economic development, this helps to explain that lower level of development, and suggests a set of policies for improving nation's standard of living in the country.

Meanwhile, Human capital development refers to the process of developing skills, knowledge, productivity and inventiveness of people through the channel of human capital formation. It is a people centered strategy and policy of development which is recognized as an agent of national development in all countries of the world (Schultz, 1999 & Gates, 2018).

In the word of Torruam and Abur (2014) providing education and health services to people is one of the major ways of improving the quality of human resources for productivity in the economy. Moreover, health is an important form of human capital. It can enhance workers' productivity by increasing their physical capacities, such as strength and endurance, as well as their mental capacities, such as cognitive functioning and reasoning ability for production of economic goods and services (Bloom & Canning, 2005).

In fact in the case of Nigerian economy, statistics available revealed that Nigeria's human development index (HDI) value for, 2017, 2018 were 0.532 and 0.534 respectively; which put the country in the low human development category, positioning it at 157 out of 189 countries and territories in the world (UNDP, 2018). This ranking of the Nigerian economy was thought provoking to stakeholders and policy makers in the country.

In addition, between 2005 and 2017, Nigeria's HDI value increased from 0.465 to 0.532, an increase of 14.4 percent. At glance of Nigeria's progress in each of the HDI indicators from 1990 to 2017, Nigeria's life expectancy at birth increased by 8.0 years but it is still low value of 53.9 years average compare to Norway, Switzerland, Germany, Japan and United States of America of 82.3, 83.2, 81.5, 83, 85.9 and 79.5 years respectively. On the continent of Africa were Algeria, Tunisia, Seychelles, and Egypt of, 76.5, 75.5, 73.3 and 71.5 years respectively (UNDP, 2018).

This can be evident by high mortality rate of 104 per 1000 lives birth of under-five year old children; 333 per 1000 of adult 15years and above; high child malnutrition of 43.6%, high deaths of malaria fever of 349.5 death per 1000 live birth, HIV-prevalence rate of 2.9% and only 58% of children have access to immunisation in Nigeria.

Furthermore, several studies have been conducted on impact of health investment on economic growth (development) in both developing and developed economy of the world. Some of these studies reported positive relationship between investment in health and economic development (see Maitra, 2018; Aluko & Oluseyi, 2015; Bakare & Olubokun, 2011; Abel & Gabe, 2010; Rena, 2008, Becker, 1964; Gallup, Sachs & Mellinger, 1998). On the other hand, some authors

found negative relationship between investment in health and economic development, for examples (Babatunde, 2014 & Shobande et al., 2014). This negative findings or outcomes negate the theoretical backing of economics in those studies.

From the above empirical studies reporting controversial findings of positive or negative impact regarding investment in health on economic development in Nigerian economy. Hence, there is need to resolve this contradicting findings and this informed the need to examine the impact of health investment on economic development in Nigeria.

Statement of the problem

The role of investment in health on economic development of any economy is high and as result many economies aspired to allocate more funds or scarce economic resources on health sector to unlock its potentials for economic transformation. It has been on record that many advanced economies like United States of America (USA), Germany, Russia, Japan, China and Norway (UNDP, 2017) budget large chunk of their national income on health sector hence the economies experienced high standard of living and improved health status among the world economies.

However, Nigerian economy on the other hand, ranked low in human development index over the years, this can attract single question of what constitute its content of her investment in health and education? The major policies of achieving millennium development goals (MDGs) of 2015 in Nigeria which has been transformed into sustainable development goals (SDGs) of 2030 for Nigerian economy remain unattainable due to some numbers of issues(UNDP, 2018). The problems of poor budgetary allocations to health sector, inadequate manpower in the federal, state ministry of health and health departments in all 774 local government areas of the federation over the years (Federal Ministry of Health, Nigeria, 2019), high mortality rate, and low life expectancy rate. The worst of it all, the insufficient budgetary allocation to education sector which have affected the attitude of citizens to manage common illness (malaria, cholera, typhoid fever, measles, and sexual transmitted diseases) in order to enhance their health status for high productivity in Nigerian economy remain unachievable goal in this jet-age.

More to that, several studies have been conducted on impact of health investment on economic development in advanced economies which improved the health status of their citizenry whereas in the case of Nigerian economy only few studies have been carried out without a clear cut solutions for improvement of health indicators in the country. These have been the problems why health status of Nigerians were poor compare to the developed world economies. In addition, the existing research has not provided a sound policy option for the economy to improve her health status for higher productivity which would serve as working tool for economic growth and development of the nation.

From the above scenarios, number of broad questions have been raised as: what are the impact of public health investment on economic development? Do labour participation rate has effect on economic development? What are the impact of public education expenditure on economic development of Nigeria? What is the casual relationship between health investment indicators and economic development in Nigeria? Hence, the need to address the above questions necessitated the empirical examination of the impact of health investment on economic development in Nigeria.

The main objective of this study is to examine the impact of health investment on economic development in Nigeria. Besides this, the specific objectives include:

- i. to evaluate the impact of recurrent and capital public health expenditure on economic development,
- ii. to evaluate the impact of public education expenditure on economic development,
- iii. to examine the impact of labour participation rate on economic development and
- iv. to investigate the casual relationship among the studied variables in Nigerian economy.

In order to address the above objectives of the study, the researcher formulated the following hypotheses as:

H₀₁: recurrent and capital public health expenditure do not have significant impact on economic development in Nigeria.

H₀₂: Public education expenditure has no significant impact on economic development in Nigeria.

H₀₃: labour participation rate has no significant impact on economic development in Nigeria.

H₀₄: investment in health sector has no causal relationship with economic development in Nigeria.

Significantly, this study on impact of health investment on economic development in Nigeria would be of important to non-governmental organisations and international donors (World Bank, United States Agency for International Development (USAID), World Health Organisation (WHO), United Nation Children's Funds (UNICEF), and British Technical Assistance (BTA) in their quests for humanitarian services and policies implementation in Nigerian economy.

This study on the impact of health investment on economic development in Nigeria have covered a period of 40 years (1981- 2020). It is confined to Nigerian economy.

This research work have been structured into five sections. It covered general introduction in section one and summarises, concludes and made policy recommendations in section five respectively.

2.0 Literature Review

This section two concentrated on the conceptual clarifications which comprise of the conceptual framework where each of the independent variables have linked to the dependent variable; brief definition and explanation of the basic concepts of investment in health, human capital and overview of the Nigerian human capital expenditure particularly to health sector of the economy. It exposed the linkage between investments in health and economic development in Nigeria.

Moreover, it has also review theories which were relevant to the investment in health with regard to economic growth and development, theoretical basis, critiques and application on the economy. Similarly, it outline empirical review which formed empirical basis for this research work.

Health investment, World Health Organization (WHO, 2018) defined health as a state of complete physical, mental, and social wellbeing, and not merely the absence of disease or infirmity. Health is a dynamic condition resulting from a body's constant adjustment and

adaptation in response to stresses and changes in the environment for maintaining an inner equilibrium called homeostasis.

Investment in this context refers to public and private expenditure to improve health outcomes of a nation; while public expenditure is the main concern of this work. It is known as government consumption, investment, and transfer payment in national income accounting (World Bank Development Indicator, 2019).

Public Health Expenditure, WHO (2018) explained that Public health expenditure consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds. Total health expenditure is the sum of public and private health expenditure.

In Nigeria, it made up of federal, state and local government areas budgetary allocations for the health sector. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation. Health expenditure, total (% of GDP) in Nigeria was 3.67% as of 2014. Its highest value over the past 19 years was 4.47% in 2007, while its lowest value was 2.43% in 2002 in the economy (Central Bank of Nigeria, 2017).

Economic growth, the term economic growth is described as the positive and sustained increase in aggregate goods and services produced in an economy within a given time period (Jhingan, 2012). When measured with the population of a given country, then economic growth can be stated in terms of per capita income according to which the aggregate production of goods and services in a given year is divided by the population of the country in the given period. Economic growth can also be stated in nominal or in real terms (CBN, 2017). Hence, when the increase in the aggregate level of goods and services is deflated by the rate of inflation, we have the real economic growth, otherwise when measured without deflating; it is called nominal economic growth.

Economic development, Economic development in its broad sense refers to the process of improving the quality of all human lives and capabilities by raising people's levels of living, self-esteem, and freedom (Todaro & Smith, 2011). It means the efficient allocation of existing scarce productive resources and with their sustained growth over time, it must also deal with the economic, social, political, and institutional mechanisms, both public and private, necessary to bring about rapid and large-scale improvements in levels of living for the peoples in the country (Todaro *et al.*, 2011).

Investment in health and its outcomes in Nigeria would enhance and spur economic growth and development as noticed by World bank (2018) declaring that Nigeria spends less than one per cent of its Gross Domestic Product on health, imploring the government to spend more on its people, invest more in Human Capital Development that would improve economic development of the country.

Theoretical framework

For the purpose of analysing the impact of health investment on economic development in Nigeria, it adopt Grossman's model of investment in health capital has been the cornerstone of the way economists model health related behaviour both theoretically and empirically (Grossman, 1972). Grossman's model is firmly in the Becker tradition of Human Capital: it

assumes that the individual is a forward looking, optimizing individual who, in making decisions today, takes account of their possible future consequences. In Grossman's framework, as the name implies, the individual's underlying level of health is treated as a capital good, to be built up by investment and run down by lack of investment (Becker, 1964). It is not a commodity that can be acquired instantaneously - an individual who wishes to increase his stock of health capital to some target can only do so over time.

For purposes of the discussion here it can simply be assumed that at any time there exists a maximum possible Health and that if that Health changes it does so slowly that it is reasonable to treat it as exogenous as far as individuals in the population are concerned. As a first approximation, one could introduce the issue of perfect health by writing the health production function for the phenomenon. This theoretical foundation lend credence for our empirical model specification in chapter three of this study.

Review of related literature

This research work have review related literature on impact of health investment on economic development in Nigeria. It focused particularly on health aspect of human capital development which enhance socioeconomic development of Nigerian economy.

Meanwhile, some of these empirical studies on the health investment and economic development in the economies have been since time immemorial. However, this study have concentrated on the review of recent studies which include: Odhiambo (2021) studied the causal relationship between health expenditure and economic growth using panel data from sub-Saharan African countries for the period 2008–2017. It decomposed health expenditure into two components: public health expenditure and private health expenditure. Applying a panel ECM-based Granger-causality model and it found out that when public expenditure is used as a proxy, a distinct unidirectional causality from health expenditure to economic growth is found to prevail in low-income countries, but no causality is found to exist in middle-income countries. However, when private health expenditure is used, a short-run causality from economic growth to health expenditure is found to prevail in middle-income countries, but no causality is found to exist in low-income countries.

Moreover, Urhie *et al* (2020) examined Economic growth, air pollution and health outcomes in Nigeria. It applied moderated mediation model in explaining that interactions among economic growth, air pollution and health performance. Its findings were that air pollution and government expenditure on health has a significant interaction that affects health performance in Nigeria within the period of the analysis.

In addition, Ibukun and Osinubi (2020) investigated the relationship among environmental quality, economic growth and health expenditure in 47 African countries using both static (pooled OLS and fixed/random effect) and dynamic (system GMM) estimation methods from 2000 to 2018 data. They employed and proxied carbon dioxide, nitrous oxide and methane emission as the effect of environmental quality. The findings indicated the evidence of a positive and significant effect of economic growth on health expenditure, while also revealing a positively significant relationship between poor environmental quality and health expenditure. It also revealed that of the three proxies of environmental quality carbon dioxide emission had the highest effect on healthcare expenditure while economic growth significantly increased health expenditure across the five African regions.

In the same vein, Ijeoma, Adebayo, Babatunde, and Angela, (2019) studied Community based health insurance as a viable option for health financing: An assessment of household

willingness to pay in Lagos, Nigeria. Using multi-stage sampling technique on 960 household heads enrolled and the contingent valuation method. The study revealed that 86.3% of the households in the rural LGA and 78.6% of the households in the urban LGA were willing to pay for the proposed community based health insurance scheme and it was the type of investment in health practiced by people in Lagos to enhance their productivity in the state.

According to Bloom, Kuhn and Prettner (2018) studied health and economic growth between less developed countries and developed countries of the world. They concluded that there were two-way causality between health and economic growth among the economies. They also identified poor health in less developed countries to be a cause of reduction in labour force participation in productivity and determinant of investment in health. On the other, health expenditure in developed countries lead to longevity of life that enhance labour force participation which lead to economic growth and development in such economies.

Meanwhile, Dinda (2018) examined economic growth and the interaction mechanism of economic agents and their relations. The study highlights human capital and its social aspects and critical aspect in the process of economic growth through interaction of socio- economic factors, which were considered as investment for creation of human capital. It pointed out that investment in the forms of cost of time and effort, which actually built up social fabric and human knowledge and health capital, which in turn creates economic growth. It means that root of economic growth actually depends on human capital under social relations in any economy.

A study by Obialor (2017) examined the effect of government human capital investment on the economic growth of three Sub-Sahara African (SSA) countries of Nigeria, South Africa and Ghana from 1980 to 2013. The study analysed the growth effect of three government human capital investment variables of health, education and literacy rate on the economies. Using data of World Bank Development Indicators (WDI) and Co-integration techniques and Vector Error Correction mechanism (VECM) at 1% and 5% significance levels. The findings indicated that two out of the three human capital: Health, (GIH), and Education (GIE), show significant positive effect on economic growth only in Nigeria, while literacy ratio (LR) is insignificantly positive in all the countries. The study concluded that the SSA countries' economies still exhibit the potentials for enhanced economic growth in the long run based on the results.

Also, Piabuo and Tieguhong (2017) studied health expenditure and economic growth: a review of the literature and an analysis between the economic communities for central African states (CEMAC). The study applied panel ordinary least square (OLS), fully modified ordinary least square (FMOLS) and dynamic ordinary least square (DOLS) on data obtained from the World Bank Development Indicators (2016). They submitted that health expenditure has a positive and significant effect on economic growth in both countries.

Similarly, Amadu et al. (2017) determined the contribution of public health investments to the economic growth of Cameroon. They applied VECM procedure on the World Development Indicators (WDI, 2013) data of the World Bank which spanning from 1988 to 2013. The study showed that government health expenditures contribute to economic growth only in the long run and not in the short run.

Also, Osoba and Tella (2016) examined the interactive effects of the relationship between human capital investment components and economic growth in Nigeria from 1986 – 2014. The study used Fully Modified Ordinary Least Squares (FMOLS) on annual data of education expenditure, health expenditure, real gross domestic product and gross capital formation sourced from the Central Bank of Nigeria Statistical bulletin, 2014 in its analysis. The results

showed that there was positive and significant relationship between the interactive effects of human capital components and growth in Nigerian economy.

Many studies have been carried out on the impact of health investment on economic development in Nigeria with different findings and conclusions over a period of time. In fact, the literatures review concerning investment in health and economic development do not agree whether investment in health influence economic development positively or negatively which remain an empirical equation to find out on the course of this study.

3.0 Method and Materials

The *ex-post facto* research design is adopted to enable the researcher used secondary data. It is appropriate to analysed the impact of health investment on economic development in Nigeria within the period of 1981 to 2020. The method of data collection in this study was secondary sources because of its nature. The data were sourced from the United Nations Development Programme annual report (UNDP, 2020) and Central Bank of Nigeria (CBN) Statistical Bulletin for various years. It obtained some data from World Bank Development Indicators 2020 for this analysis. The data used covered the following variables HDI= Human Development Index which was proxied for economic development, PHX = Recurrent Public Health Expenditure and Capital Health Expenditure, PEX = Public Education Expenditure, LPR = Labour participation Rate and GCF = Gross capital formation for the period of 40 years for the analysis.

Model Specification

The functional model showing the technical relationship between the economic development proxied by human development index and health investment indicators in Nigeria as stated in the work (Shuaibu et al, 2016; Aluko & Oluseyi ,2015; Nwodo & Asogwa (2017) and Grossman(1972) will be modified and specified thus: According to Grossman (1972), health investment function is denoted as:

$$H=f(HC, \text{Other inputs}; I_0),$$

Where: HC = health care, I_0 = initial conditions

This model can be transformed into equation (3.1) as:

$$\text{HDI} = f(\text{PHCX}, \text{PHRX}, \text{PEE}, \text{LPR}, \text{EXC}, \text{GCF})\dots\dots\dots(3.1)$$

Mathematical form of the model in (3.1) above is given as:

$$\text{Ln HDI} = \partial_0 + \partial_1 \text{Ln PHCX} + \partial_2 \text{Ln PHRX} + \partial_3 \text{Ln PEE} + \partial_4 \text{Ln LPR} + \partial_5 \text{Ln EXC} + \partial_6 \text{Ln GCF} \dots\dots\dots(3.2)$$

Econometric form of the model in (3.2) is specified thus:

$$\text{Ln HDI} = \partial_0 + \partial_1 \text{Ln PHCX} + \partial_2 \text{Ln PHRX} + \partial_3 \text{Ln PEE} + \partial_4 \text{Ln LPR} + \partial_5 \text{Ln EXC} + \partial_6 \text{Ln GCF} + \mu_t \dots\dots\dots(3.3)$$

Where:

HDI = Human Development Index which proxied economic development in this analysis

PHCX = Public Health Capital Expenditure and PHRX= Public Health Recurrent Expenditure

PEE = Public Education Expenditure

LPR = Labour participation Rate

EXC = Exchange Rate

GCF = Gross capital formation

Moreover, ∂_0 is the intercept of the equation, $\partial_1 - \partial_6$ are the coefficients of the explanatory variables to be estimated, μ_t is the stochastic term.

The ARDL bound test co-integration framework was used for this analysis depending on the conditions of ARDL which includes:

- i. Dependent variable must be non-stationary in order for the model to behave better.
- ii. None of the variables should be $I(2)$ in normal conditions (ADF test) and (PP-test)

The model for this study is denoted as:

$$\begin{aligned} \Delta \text{LnHDI} = & \partial_0 + \partial_1 \text{LnHDI}_{t-1} + \partial_2 \text{LnPHCX}_{t-1} + \partial_3 \text{LnPHRX}_{t-1} + \\ & + \partial_4 \text{LnPEE}_{t-1} + \partial_5 \text{LnLPR}_{t-1} + \partial_6 \text{LnEXC}_{t-1} + \partial_7 \text{LnGCF}_{t-1} + \sum_{m=0}^p \lambda \Delta \text{LnHDI}_{t-1} + \\ & \sum_{m=0}^q \phi \Delta \text{LnPHCX}_{t-1} + \sum_{n=0}^q \psi \Delta \text{LnPHRX}_{t-1} + \sum_{n=0}^q \psi \Delta \text{LnPEE}_{t-1} + \\ & \sum_{m=0}^q \eta \Delta \text{LnLPR}_{t-1} + \sum_{k=0}^q \delta \Delta \text{LnEXC}_{t-1} + \sum_{m=0}^q \Pi \Delta \text{LnGCF}_{t-1} + \theta \text{ECM}_{t-1} + \varepsilon_t \dots \end{aligned} \quad (3.4)$$

Where:

The null and alternative hypotheses are as follows:

$$H_0: \partial_0 = \partial_1 = \partial_2 = \partial_3 = \partial_4 = \partial_5 = \partial_6 = 0 \quad (\text{No long run relationship exist})$$

Against the alternative hypothesis:

$$H_1: \partial_0 \neq \partial_1 \neq \partial_2 \neq \partial_3 \neq \partial_4 \neq \partial_5 \neq \partial_6 \neq 0 \quad (\text{Long run relationship exist})$$

$\partial_1 - \partial_6$ were the long run multipliers (parameters), ∂_0 is the intercept (the drift component); $\lambda, \phi, \psi, \eta, \delta$ and Π were the short-run parameters, θ is the coefficient of speed of adjustment while ECM_{t-1} is the speed of adjustment and ε_t is the stochastic error term.

4.0 Data presentation and discussion of results

This study started with descriptive statistics to ascertain the behaviours and characteristics of the data used. It help to checked and provide a preliminary evidences for the proper analysis on impact of health investment on economic development in Nigerian economy. This statistical evidences were presented in Table 4.1.

Table 4.1: Summary of descriptive statistics

	HDI	PHRX	PHCX	PEE	GFC	EXC	LPR
Mean	0.471950	89.03234	65.92603	138.5323	13.10645	107.5080	59.77892
Median	0.471500	20.58052	28.99886	50.78364	13.14910	111.5000	59.96900
Maximum	0.534000	691.0700	354.6905	691.0700	35.22126	306.9500	70.19900
Minimum	0.410000	0.041315	0.237600	0.162154	5.458996	0.610000	52.62100
Std. Dev.	0.037649	141.0980	82.98910	186.7813	6.104395	97.04356	3.755438
Skewness	0.126071	2.371238	1.553467	1.407963	1.867525	0.742839	0.266029
Kurtosis	1.977849	9.605520	5.285322	4.070029	7.400011	2.765615	3.775233

Jarque-Bera	1.847281	110.2066	24.79290	15.12400	55.51782	3.770295	1.473452
Probability	0.397071	0.060000	0.100004	0.210520	0.000000	0.151807	0.478679
Sum	18.87800	3561.294	2637.041	5541.291	524.2579	4300.319	2391.157
Sum Sq.							
Dev.	0.055282	776437.3	268600.5	1360603.	1453.282	367280.7	550.0293
Observations	40	40	40	40	40	40	40

Source: Extracted from Author's Computation Using E-View Version 10.

Unit Root Test

In Table 4.2, it shows the results of both the ADF and PP tests on the variables: HDI, PHRX, PHCX, PEE, GFC, EXC and LPR, the results indicated that HDI, PHRX, PHCX, PEE, EXC and LPR were non-stationary series at level but become stationary at first difference I(1) and were statistically significant at 5% level of significance. The evidences contain in Table 4.2 and except GFC which was stationary at level I(0) in both ADF and PP results presented.

Table 4.2: Unit Root Test Results

Variables	ADF		PP		Remark
	At level (Prob)	At first diff (Prob)	At level (Prob)	At first diff(Prob.)	
Ln(HDI)	- 0.416787(0.8959)	- 8.680568(0.0000)*	- 2.527854(0.1169)	- 15.00602(0.0000) *	I(1)
Ln(PHRX)	- 1.469846(0.5368)	- 10.23463(0.0000)*	- 0.560375(0.8679)	- 21.59099(0.0001) *	I(1)
Ln(PHCX)	- 0.414521(0.8965)	- 9.661102(0.0000)*	- 0.642498(0.8492)	- 9.661102(0.0000) *	I(1)
Ln(PEE)	- 2.217128(0.2041)	- 7.898607(0.0000)*	- 1.316802(0.6121)	- 10.81960(0.0000) *	I(1)
Ln(GFC)	- 2.698166(0.0434) *	- 3.521415(0.0000)* *	- 2.695714(0.0438) *	- 5.231930(0.0001) *	I(0)
Ln(EXC)	- 2.542344(0.1137)	- 5.603899(0.0000)*	- 2.590134(0.1036)	- 5.650842(0.0000) *	I(1)
Ln(LPR)	- 1.151142(0.6852)	- 5.147365(0.0001)*	- 1.784428(0.3824)	- 5.131599(0.0001) *	I(1)

Source: Extracted from Author's Computation Using E-View Version 10.

Note: * denote significant of the test conducted at 5% level of statistical significance. While the critical values for the data both ADF and PP were in Appendix III. ADF= Augmented Dickey Fuller (ADF), At first Diff = At first difference, Prob = Probability values in bracket and PP = Philips-Peron Test for unit root used in this study.

Furthermore, the choice of lag length three (3) was made because of the Akaike Information Criterion has the minimum value. Also it was the best lag length selection for the annual data of this nature. In the Table 4.3, other criteria for optimum length such as LR (Sequential modified LR test statistic), FPE (Final Prediction Error), SC (Schwarz Information Criterion) and HQ (Hannan-Quinn Information Criterion) were 87.96368*, 66650357*, 43.61802* and 38.98182* respectively.

Table 4.3: **ARDL Bound test for Long-run Equilibrium**

F-Bound TEST:

Null Hypothesis: No levels relationships

Test statistic	Values of F-Statistic	K	Signif. %	I(0)	I(1)
Sample size (n) = 40	12.56506	6	10%	2.353	3.599
			5%	2.797	4.211
			1%	3.8	5.643

Source: Extracted from Authour's Computation Using E-View Version 10, 2021.

In the Table 4.3, the result of F-bound test indicated that there were cointegration among the variables. That is, the variables included in the model have long-run relationship among themselves. This can be noticed from the value of F-statistic of 12.56506 which was greater than both lower and upper bounds (values I (0) and I (1)) of 2.797 and 4.211 at 5% level of significance in the result when sample size was 40 observations.

Table 4.5: **ARDL Long-run Estimates**

Dependent Variable :

HDI

Levels Equation

Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PHRX	0.001715	0.000239	7.186097	0.0000
PHCX	9.03E+05	9.98E+05	0.904463	0.3851
PEE	0.000548	8.93E+05	-6.140684	0.0001
GFC	0.006709	0.001037	-6.469257	0.0000
EXC	-0.000349	6.65E-05	-5.248353	0.0003
LPR	0.003953	0.002645	1.494749	0.1631

$$EC = HDI - (0.0017*PHRX - 0.0001*PHCX - 0.0005*PEE - 0.0067*GFC - 0.0003*EXC + 0.0040*LPR)$$

Source: Extracted from Authour's Computation Using E-View Version 10, 2021.

From Table 4.5 shows the long-run estimates for the various variables (HDI, PHRX, PHCX, PEE, GFC, EXC and LPR) and their coefficients with their probabilities values. The Standard Error and t-statistic were also presented in the Table 4.5.

More to that, the main objective of this study was to examine the impact of health investment on economic development in Nigeria. From the result in Table 4.5, the analysis proved that in the long-run, health investment has impacted positively on economic development in Nigeria. That is, by the coefficients of variables included in the model and the probability values, it can be noticed that health investment influenced economic development within the study period.

The outcomes of this finding in Table 4.5 agreed with the appriori expectation which states that the slope of the coefficient of health investment would be positively impact on economic development proxied by human development index in Nigerian economy.

Meanwhile, the coefficient of recurrent health investment and capital health investment as unbundles by this research contributed positive to economic development which were in line with economic theory of Grossman's model of investment in health capital (Grossman, 1972). It implied that, individual health outcomes must be projected on long term planning and investment before its result on improved human capital development in Nigeria.

By these coefficients of 0.001715 and 9.03E+05 for PHRX and PHCX respectively. It means 1 unit increase in PHRX and PHCR would bring about 0.001715 and 9.03E+05 units increase in human development index in Nigerian economy respectively.

Also, the t-statistic and its p-values of 7.186097 (0.0000) indicated that the PHRX was significant at 5% level in the model. It showed that recurrent public expenditure on health in term of wages and salaries, overhead expenses, immunization exercises, seminars, workshops and every year health programmes were important factors in improving human capital in Nigeria. The study, therefore reject the null hypothesis which stated that recurrent public health does not has significant impact on economic development in Nigeria.

The finding of this study agrees with the studies of Obialor (2017) which examined the effect of government human capital investment on the economic growth of three Sub-Sahara African (SSA) countries of Nigeria, South Africa and Ghana from 1980 to 2013 and Ogunniyi (2017) who explored impact of human capital formation on economic growth in Nigeria from 1981 to 2014. However, it disagreed with the result of Adeloye et al. (2017) which investigated the Health workforce and governance: the crisis in Nigeria from 2010 to 2016.

Moreover, PHCX contributed positively to economic development but it was statistically insignificant at 5% level of significance. This can be seen by its t-statistic and p-values of 0.904463 (0.3851). It means public health capital expenditure on building standard hospitals, teaching hospitals, specialised hospitals, research institutes, clinics, primary health centres across the country were not commensurable with her total population of 209 million people in Nigeria (NPC Projection, 2019). In this regard, the study accepted the null hypothesis which specified that public health capital expenditure do no has significant impact on economic development in Nigeria.

Furthermore, public education expenditure (PEE) which formed part of human capital investment in the economy. The result revealed that PEE impacted economic development in

Nigeria positively. In fact, its co-efficient of 0.000548 means a unit increase in PEE would result to 0.000548 unit increase in human capital development index(HDI) in the long-run.

While, its contribution to economic development was small which proved that Federal Government of Nigeria had non-challant attitudes toward education investment in the country. In Nigeria, budgetary allocations, private investment in education and Nigeria share of GDP allocated to education sector were poor (WHO, 2018). It was glaring in this study that education received less attention from Nigerian government.

This empirical investigation showed that public education investment do not meet the World Bank bench mark of 26 % of national budget should be expended on education sector (World Bank, 2018). Poor education expenditure in both tiers of government has been the problem why many people suffer from common illness (malaria fever, typhoid fever, STDs, measles and others). It was so because ignorance is more dangerous than sickness and diseases which affect the some people in Nigeria.

Although, PEE was statistically significant by its t-statistic and p-values of -6.140684 (0.0001). It meant the study has rejected the null hypothesis which postulated that PEE has not significant impact on human capital development in Nigeria within the study period.

In addition, Gross fixed capital formation was captured in this model as a result of aggregate investment in infrastructure by the Nigerian economy. In this analysis, it has contributed positively on human development index (HDI) in Nigeria by its coefficient of 0.006709. It was statistically significant by t-statistic and P-value of -6.469257 (0.0000) in this finding. Gross fixed capital formation was chosen as control variable in the model only.

Similarly, foreign exchange rate was introduced here in this analysis as a control variable since many health facilities, equipment, expertise and other health materials were usually imported into the Nigerian economy. It is imperative to include foreign exchange in this study in order to ascertain its impacts on human development Index (HDI).

This variable becomes necessary in the modelling of health investment on economic development in Nigeria. Its slope was -0.000349, i.e 1 unit increase in EXC will decrease the volume of health investment by -0.000349 units. This finding proved that there exist a negative relationship between exchange rate and human development index (HDI) in Nigeria. It may attributed to the weak value of Nigerian Naira compared to US Dollar (\$) standard currency as exchange rate among countries of the world. More or less, EXC was significant in this model by its t-statistic and p-values of -5.248353 (0.0003) at 5 % level of significance. Its choice as control variable was relevant to this findings.

Finally, labour participation rate has positive impact on economic development which was in line with economic theory of Endogenous growth model (Lucas, 1988 & Romer, 1990). They considered human capital as a separate input in the production function created principally by workers through education or on-the job training and well- being of labour force.

In Table 4.5, the result showed LPR coefficient of 0.003953, by this coefficient, it means 1 unit increase in LPR will improve human development index by 0.003953 units. Its t-ratio and P-values of 1.494749 (0.1631) indicated that the labour participation rate was statistically insignificant at 5 % level of significance.

The implication of this finding was that the number of labour in health sector in Nigeria were inadequate and insufficient compared to Nigerian population. It was clear fact that, World

Health Organization (WHO, 2017) reported that a physician per 1000 population is 0.4 and nurse per 1000 population is 1.6, with gross inequity in rural–urban distribution in terms of both number and skills range. From the above statistics, it proved that investment in human capital is not given a right priority in Nigerian economy.

This proved that there were long-run relationship among variables, i.e health investment variables and human development index were cointegrating in the long-run. In other word, there was equilibrium among the investigating data included in the model. This result agreed with Ogunniyi (2017) and Okafor *etal* (2017) that a long run dynamic relationship exists between human capital formation and economic growth in Nigeria. In addition, Shobande, *etal* (2014) supported that there were long-run between health investments on economic development of Nigeria.

5.0 Summary, Conclusion and Recommendations

This section summarized the results of the findings, concludes and recommended based on the results of the study on impact of health investment on economic development in Nigeria within the period of 1981-2020. It also outline its contributions to existing knowledge, limitations encountered during the study and suggestions for further studies in the field of health and public sector economics of Nigerian economy.

The study examined the impact of health investment on economic development in Nigeria. The findings from the unit root results indicated that all the variables were not stationery at level with the exception of gross fixed capital formation which was stationery at levels. While, the optimal lag was lag three (3) based of Akaike Information Criterion (AIC); cointegrating regression result test suggests that a strong evidence of cointegration among the variables included in the model exist.

The results of ARDL indicated that the recurrent public health investment, Capital public health investment, Public education investment, gross fixed capital formation and labour participation rate have positive impacts on economic development of Nigeria during the period of study. However, foreign exchange rate has negative impact of economic development.

Moreover, a long run relationship exist among the variables studied as confirmed by the cointegrating test. The ECM term and its speed of adjustment indicated that the variables were converged back to equilibrium points at 253% within 3years, 9 months and 5 days. Also, the result of Granger causality test proved that there were causal relationship among health investment variables and economic development in Nigeria.

Finally, post estimation tests proved that in the study, there were not presence of autocorrelation and heteroscedasticity. The model was fit and stable for policy making concerning health investment variables and economic development in the country within the study period.

The high level of government investment on health and education as claimed by the federal government of Nigeria over the years in order to improve economic development in Nigeria has not translated into full utilization of both human and physical resources in the economy. In fact, all the health investment indicators in the model contributed positively to economic development in Nigeria except foreign exchange rate which impact was negative. For the country to attain the sustainable development goals of good health for all, decent work and good education by years 2030, policy must be made to improve budgetary allocations to health and education sectors of the economy.

Based on the empirical literature reviewed and empirical analysis presented, the following policy recommendations were made:

- i. A major policy implication of this result is that a policy should be made by government to increase the budgetary allocation to health sector particularly public health capital investment. Although, it contributed positive impacts on economic development according to the study but statistically insignificant.
- ii. Adequate attention should be given to education sector in term of policy and statutory allocation of funds to improve its quality on the population of Nigerians.
- iii. Government should continue to provide policy that ensure macroeconomic stability especially foreign exchange rate stability that will encourage increased investment in human capital by individuals and the private sector in Nigeria.
- iv. Expand institutional capacity by strengthening the infrastructure of health and educational institutions to produce qualified manpower, teachers/lecturers, medical personnel, salaries and wages and improved working conditions in health institutions should be accorded high priority by the government. Government should embarked on policy that will improve recurrent expenditure in the health sector of Nigerian economy.

REFERENCES

- Adeloye et al. (2017). The health workforce and governance: the crisis in Nigeria. *Human Resources for Health Journal*, 2(1), 15-32. DOI 10.1186/s12960-017-0205-4.
- Amadu, I. et al. (2017). The contribution of public health investments to the economic growth of Cameroon. *Int. J. Soc. Sc. Manage*, 4(1), 12-21. DOI: 10.3126/ijssm.v4i1.16323.
- Bloom, D.E, Kuhn, M. & Prettner, K (2018). Health and economic growth. Program on the Global Demography of Aging at Harvard University, PGDA Working Paper No. 153. The National Institutes of Health: <http://www.hsph.harvard.edu/pgda/working/>.
- Chernew, M.E, Hirth, R.A & Cutler D.M (2003). Increased spending on health care: How much can the United States afford? *HEALTH AFFAIRS*, 22(4), 15-25. The People-to-People Health Foundation, Inc.
- Chakraborty, S. (2005). Mortality, human capital and persistent inequality. *Journal of economic growth*, 10(1): 159–192.
- Chandler, D. (2007). The security development nexus and the rise of Anti-Foreign Policy. *Journal for International Relations and Development*. 10. 362-386.
- Carlos J. García , Santiago Herrera and Jorge E. Restrep,O (2006) .Government expenditure composition and growth in Chile” Manuscript..
- Central Bank of Nigeria (2021). Statistical bulletin Nigeria. Central Bank of Nigeria, Abuja.
- Dinda, S. (2018). Interrelationships between social and human capital, and economic growth. MPRA Paper No. 89646. Munich Personal RePEc Archive, <https://mpra.ub.uni-muenchen.de/89646>.
- Edame, G.E. (2016). Switching regression analysis of public expenditure on infrastructure and economic growth in Nigeria. *Multi-Disciplinary Journal of Research and Development Perspectives*, 1(1), 29-43.

- Federal Ministry of Health (FMoH, 2019). USAID, Nigeria announces US\$20 assistance to prevent child, maternal mortality. World Economic Forum on Africa WEFA 7th to 9th May 2014. Abuja Nigeria.
- Gates, B. (2018). Invest in human beings in Nigeria: Punch Newspaper, <https://punchng.com/health-sector-an-important-driver-of-economic-growth-adewole/> retrieved on 1st September, 2019.
- Harrod, R.F & Domar, E. (1957). *Essay on the theories of economic growth*. London: Oxford University Press.
- Ibukun, C.O & Osinubi, T.T. (2020). Environmental Quality, Economic Growth, and Health Expenditure: Empirical Evidence from a Panel of African Countries. *African Journal of Economic Review*, VIII(II): 119-140.
- Ijeoma, A., Adebayo, O., Babatunde, O & Angela, E.(2019).Community based health insurance as a viable option for health financing: An assessment of household willingness to pay in Lagos, Nigeria. *Journal of Public Health and Epidemiology*, 11(2), 49-57. DOI: 10.5897/JPHE2018.1089.
- Maitra,B.(2018). Investment in physical, human capital, economic growth and life expectancy in Bangladesh: An empirical investigation. *South Asia Economic Journal*. DOI: 10.1177/1391561418799110.
- Odhiambo, N.M. (2021). Health expenditure and economic growth in sub-Saharan Africa: an empirical investigation. *Development studies Research, An Open Access Journal*, 8(1):1-15.
- Ogunniyi, M.B. (2017). Human capital formation and economic growth in Nigeria: A time bound testing approach (1981-2014). *African Educational Research Journal*. 6(2), 80-87, DOI: 10.30918/AERJ.62.17.046, ISSN: 2354-2160.
- Ogunsakin, S. & Olonisakin, T.Y. (2017). Health expenditure distribution and life expectancy in Nigeria: *International Journal of Scientific and Research Publications*, 7(7), 20-39.
- Ogunleye1, O. O., Owolabi, O. A., Sanyaolu, O.A., & Lawal, O. O. (2017). Human capital development and economic growth in Nigeria. *Ijrdo-Journal of Business Management*, ISSN: 2455-6661, 3(8): 17-37.
- Punch Newspapers (2019). Health sector an important driver of economic growth. <https://punchng.com/health-sector-an-important-driver-of-economic-growth-adewole/> retrieved on 1st September, 2019.
- Rena, R. (2008). Education in Eritrea: developmental challenges. *International Journal of Scientific Research in Education*, 1(1), 41-53.
- Riman, H. B and Akpan, E. A.(2012). Healthcare financing and health outcomes in Nigeria: A state level study using multivariate analysis. *International Journal of Humanities and Social Science*.2 (15), 296-309.
- Romer, D. (1996). *Advanced Macroeconomics*, McGraw-Hill Higher Education Publisher.

- Schultz, P.T. (1999). Health and schooling investments in Africa. Economic Growth Center, Discussion Paper No. 801, 27 Hill house, PO Box 208269, New Haven, Yale University, CT 06520-8269, USA.
- Schultz, T. W. (1961). Investment in human capital. *American Economic Review*, 1-17.
- Urhie, E., Afolabi, A., Adedeji, Matthew, O Osabohien & Ewetan,). (2020). Economic growth, air pollution and health outcomes in Nigeria: A moderated mediation model. *Cogent Social Sciences*, 6:1, 1719570, DOI:10.1080/23311886.2020.
- UNDP (2018). Human Development indices and indicators: 2018 Statistical update annual Report, 2018.
- World Health Organization (2019). Health expenditure per capita by country. Annual report of WHO, Geneva: World Health Organisation.
- Yunusa, U., Irinoye, O., Suberu, A., Garba, A., M., Timothy, G., Dalhatu, A. & Ahmed, S. (2014). Trends and Challenges of Public Health Care Financing System In Nigeria: The Way Forward. *IOSR Journal of Economics and Finance (IOSR-JEF)*. 4(3), 28-34.
- Zaidi, S., & Saidi, K. (2018). Environmental pollution, health expenditure and economic growth and in the sub-Saharan Africa countries: Panel ARDL approach. *Sustainable Cities and Society*, 41, 833–840doi:10.1016/j.scs.2018.04.034.