The Implication of Health Human Capital Investment on Nigeria Economic Growth

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Abstract: **The study assessed the impact of health care investment on Nigeria economic growth (1985-2019). The utilized annual time series data on selected variables; real gross domestic product (RGDP), public health expenditure (PEH), infant mortality rate (IMR), maternal mortality rate (MMR), malarial prevention rate (MPR) a proxy for morbidity rate, life expectancy rate (LFE) and labour force participation rate (LFP) were collected from the statistical Bulletin of Central Bank of Nigeria (CBN), world fact book and indexmundi. The data were checked for stationarity and ARDL bound cointegration test. As such, ARDL approach was utilized in the analysis of the data. Findings from the result showed that PEH, IMR, MMR and MPR exerts negative influence on economic growth in the short term, while LFE and LFP exerts positive influence on economic growth in the short term. Consequently, the result showed that in the long run, PEH exert positive influence, though insignificant. Whereas the effect of other variables IMR, MMR, MPR, LFE, and LFP exerts the same level of influence on economic growth as in the short run. The granger causality test revealed that unidirectional causality runs from PEH to RGDP and from RGDP to PEH. Diagnostic tests such as Normality, serial correlation tests, heteroskedasticity test were carried out on the model output to establish the robustness or otherwise of the models. It was found that the residuals were normally distributed and no serial correlation is present lending credence to the robustness of the work and its ability to make correct forecast. The study recommended that government and stakeholders in health sector should adopt appropriate mechanism that can guarantee and ensure adequate investment in health sector, because Nigeria health sector has the capacity to attract inflow of revenue through health tourism.**

Key words: **Health, investment, economic growth, maternal mortality, life expetancy**

I. INTRODUCTION

In the literature, the relationship between health and the human capital index (HCI) has gotten a lot of attention, especially in the palace of development economics. Human capital's importance in achieving long-term economic progress has been established (Idowu, 2014). The world's economies, particularly those in industrialized countries, are attempting to optimize its labor force through comprehensive investments in health care, not only to meet economic development goals but also to ensure long-term viability and survival. According to studies, industrialized countries spend a significant portion of their gross domestic product (GDP) on health care and infrastructural development (Austine, Anaeto& Tunde, 2019)

It is worth noting that health is one of the most important determinants of the quality of human capital (HC) and a prerequisite for economic progress (Richard and Oluhukwu, 2019). Therefore, any public health spending can be considered as an investment in a country's overall health status (Dang et al., 2016). As such, a consensus has emerged among scholars who recognize health as a public good whose demand and supply cannot be left to the mercy of invisible hands or profit-maximizing individuals, nor can it be based solely on utility-maximizing behavior. The pattern of health finance, according to Riman and Akpan (2012), is inextricably tied to the quality of health outcomes, capable of fulfilling the long-term goal of improving the nation's economic development. Health-care financing encompasses not just how to raise adequate funds to meet health-care needs, but also how to ensure healthcare affordability and accessibility, equity in access to medical treatments, and financial risk protection (Richard and Oluhukwu, 2019).

Health care is a critical government-provided public service on a worldwide scale. As previously stated, industrialized countries devote a large amount of their Gross Domestic Product (GDP) to health care because they feel that a healthy population is a key driver of economic activity and progress. This is based on the idea that the government's primary goal in investing in the economy is to attain particular macroeconomic goals that will encourage economic growth.Governments will undoubtedly require a productive and active workforce to achieve this broad goal, as any investment aimed at improving human capital would inevitably boost economic growth. According to this, (Bloom and Canning, 2005) believe that human capital development (HCD) is critical for long-term economic growth, and that health is an important component of HCD, as it improves workers' productivity by enhancing their physical strengths and capacities.

In the Nigerian health sector, health expenditure as a proportion of GDP averaged 0.32 percent between 1985 and 1990, and little changed between 1995 and 1999, when it averaged 0.33 percent. When comparing Nigeria's performance to that of other African countries, it was discovered that government expenditure on health as a

percentage of GDP was 2.7 percent in 1990, compared to 3.5 percent in Ghana, 4.3 percent in Kenya, and 4 percent in Seychelles between 1995 and 1997. (Olaniyi and Adam, 2003). Nigeria's federal government made a concentrated effort to increase health spending after realizing the crucial role that a healthy population can play in encouraging economic growth. As a demonstration of commitment, the health sector's fiscal operation was restructured. Between 2000 and 2018, between 2.1 percent to 5.8 percent of total government expenditure was spent on health, according to available data, whereas the country's public health expenditure as a percentage of GDP is 4.1 percent, compared to 4.6 percent in South Africa (Olarinde and Bello, 2014).

Nigeria's overall health status performance has not been promising despite these efforts. The country's overall health performance was rated 187th out of 195 Member States, behind Egypt 64th, Kenya 112th, South Africa 119th, and Rwanda 173rd, according to the World Health Report (2018). Similarly, according to a WHO study from 2018, Nigeria was placed 178th out of 192 nations in terms of life expectancy at birth (total year), which measures how long on average a new-born infant is anticipated to live given a constant mortality rate.According to the statistics, Nigeria's total life expectancy was 55.2 years, which was lower than Rwanda's 68 years, South Africa's 63.6 years, Kenya's 66.7 years, and Egypt's 70.5 years. Nigeria's life expectancy is substantially lower than the continent's average, which is 62.5 years. Nigeria also outperformed the majority of African countries in terms of infant mortality. For example, according to World Bank (2017) statistics, nearly 65 percent of infants under the age of one perished in Nigeria, compared to 33.6 percent in Kenya, 28.9 percent in Rwanda, 28.8 percent in South Africa, and 18.8 percent in Egypt.Furthermore, according to World Bank statistics on crude death rate per 1000 people for 2016, Nigeria had the highest rate among peers at 12.5 percent, followed by South Africa at 9.8 percent, Egypt at 5.8 percent, Rwanda at 5.8 percent, and Kenya at 5.7 percent (The World Health Organization, 2002).

Furthermore, Nigeria's health spending per capita of $215 is substantially lower than South Africa's of $1,086 and Egypt's of $495, but higher than Rwanda's of $143 and Kenta's of $157. This can be explained by Nigeria's financial contribution to the health sector, which is significantly below the World Health Organization's guideline of 15%. In addition, the minister of health declared that 60 million people out of the projected 198 million people in the country suffer from mental disease, suggesting that around 30% of the population is mentally sick. Increased public health expenditure (investment) has a key role to play in obtaining a better healthier population, and as labor force is one of the four elements of production, it follows that an investment in health would stimulate economic growth through a multiplier effect. As a result, healthier people are more physically and intellectually active and strong, and they are less likely to miss work due to illness, whether it is their own or that of their family (World Health Organization, 2002).

Furthermore, if the Nigerian government's economic growth objective includes promoting productivity, reducing poverty and unemployment, achieving Millennium Development Goals, closing the health gap, and confronting new health challenges such as Ebola, Lassar fever, and the Covid-19, the questions that must be asked are: Are we investing well in healthcare?Is Nigeria equipped with appropriate social safety nets to deal with health-related emergencies that can spur economic growth through enhanced health human capital. In light of this, the study's particular objectives are to assess the impact of health-care investment on Nigerian economic growth and to investigate the causal link between health-care investment and Nigerian economic growth.

II. LITERATURE REVIEW

Theoretical Literature Review

Grossman theory of the demand for health care

Grossman (1972) established the idea of healthcare demand. The theory was concerned with how individual resources are allocated to generate health, as well as the concept that people are not just consumers of health but also creators of it. In addition, the strategy proposes investing in human capital, which includes health and education. Health is viewed as a capital good that depreciates at a non-constant pace in this country.Ageing boosts the depreciation rate, raising the cost or price of human capital, prompting individuals to lower their desire for health care. However, the demand for health care can also grow due to the inelastic demand curve for health. Education has an important role in improving human capital efficiency, which increases the demand for health care as well as the health stock, because better educated people want more health care owing to their knowledge and awareness of its worth. Individuals with more money have more resources to dedicate to healthcare and other activities, which improves their capacity to demand health care. Individuals appreciate their health, but their behavior does not demonstrate that they value it above all else; if they did, they would not smoke, drive too fast, or drink too much.

The second assumption is that people have a finite amount of money to spend on health and other products or activities. The third assumption is that people have a lot of control over their health since they can affect their consumption habits, how they use their health, and how they interact with their surroundings. Health demand, according to Grossman's model, is made up of two elements: consumption and investment impacts.The consuming effects have a direct effect or satisfaction and are generally short-term in nature, such as eating excellent food simply to feel better and healthier, but the investment effect has a long-term effect or indirect utility, such as engaging in good exercise just to live longer. Some of the model's flaws, according to Dolan (2003), include the assumption that health care is a constant life-time investment, the absence of insurance markets, the assumption that consumers have perfect information about the MEC (marginal efficiency of capital) of health care, depreciation, and interest

rates now and in the future, and the fact that it is deterministic by bringing in the choice of when to die.

The Solow neoclassical growth model

The most well-known model of economic growth and development was devised by Robert Solow of the Massachusetts Institute of Technology, for which he earned the Nobel Prize. According to the model, if economies have the same rates of savings, depreciation, labor force growth, and productivity growth, they will conditionally converge to the same level of income. The Solow growth model is a variation of the Harrod-Dormar growth model in that it allows for capital and labor substitution under the assumption of diminishing returns.Furthermore, the long-run pace of growth is set exogenously. Mankiw et al. (1992) improved the Solow growth model by include human capital as a component that has a substantial influence on economic growth.

This was also discovered in the studies of (Rico et al., 2005) and (Bloom et al., 2004), who employed the Solow growth model with the addition of human capital. Barro developed a growth model in 1996 that included physical capital inputs, education, health capital, and the number of hours worked, and he observed that an increase in health indicators and human capital raises the incentives to invest in education and lowers the rate of depreciation on health, respectively, demonstrating the existence of diminishing marginal returns to education (Gallego, 2000; Rico et al., 2005).Some of the criticisms leveled at the Solow neoclassical growth model include: a lack of strong empirical support for the model, as it has been observed that developed economies have grown faster than developing economies, contradicting the convergence expectation, with the exception of exceptional countries like Japan, which appear to have converged with developed economies; failure to account for innovation or technological change; and failure to take into account globalization. It also doesn't explain how or why technological advancement takes place.

Empirical Literature

Piabuo and Tieguhong (2017) conducted a comparative analysis on the impact of health expenditure between countries in the CEMAC sub-region and five other African countries that achieved the Abuja declaration. The results showed that health expenditure has a positive and significant effect on economic growth in both samples. In addition, a long-run relationship also exists between health expenditure and economic growth for both groups of countries.

Maduka, Chekwube and Chukwunonso (2016) used Toda and Yamamoto (TY) causality analysis to examined healthcare expenditure, health outcomes, and economic growth nexus in Nigeria during the period 1970 to 2013. The 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.

Becchetti, Conzo and Salustri (2015) investigated the impact of health expenditure on health outcomes on a large sample of Europeans aged above 50 using individual and regional-level data. The results showed that health expenditure to GDP and health expenditure per capita have a negative and significant impact on changes in the number of chronic diseases. It also showed that health expenditure produces heterogeneous effects on health outcomes, being more relevant for the elders, females, the overweight/obese, the below-median income group and for the less-educated vis-à-vis their complementary samples. After controlling for real per capita income, literacy level, and female participation in the labour market.

Idowu Daniel Onisanwa, (2014), examines the impacts of health on Economic growth in Nigeria. The Cointegration, and Granger Causality techniques were used in analyzing Quarterly time series data of Nigeria for the period of 1995-2009. The study finds that GDP is positively influenced by health indicators in the long run and health indicators cause the per capita GDP. It reveals that health indicators have a long run impact on economic growth. Thus, the impact of health is a long run phenomenon.

Odubunmi, A. S, Saka, J.O, and Oke, M. D, (2012) examined the relationship between health care expenditure and economic growth in Nigeria for the period 1970-2009. They employed the multivariate cointegration technique proposed by Johansen 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 foreign aids and health expenditure which they attributed to some diversification of foreign aids to other uses or inadequate allocation to health services.

Akram N, Ihtsham UP & Muhammad K (2011) investigated long term impact of health on economic growth in Pakistan. They employed the Cointegration, Error Correction and Granger Causality techniques on the time series data of Pakistan for the period of 1972-2006. They find that Per capita GDP is positively influenced by health indicators in the long run and health indicators cause the per capita GDP. However, in the short run the health indicators fail to put significant impact on per capita GDP. This suggests that impact of health is only a long run phenomenon and in the short run there is no significant relationship between health variables and economic growth.

Adeniyi and Abiodun (2011) analysed the effects of health expenditure on the Nigerian economic growth, using data on life expectancy at birth, fertility rate, capital and recurrent expenditures between 1985 and 2009 argues that if funds is judiciously expended in the health sector, the effects of this expenditure on the economic growth will be direct and substantial. Thus the need to improve the quality and type of health provided. Odior (2011) using an integrated sequential dynamic computable general equilibrium (CGE) model,

examined the potential impact of increase in government expenditure on health in Nigeria. His result shows that the re-allocation of government expenditure to health sector is significant in explaining economic growth in Nigeria. Thus, the need for government to investment in health services.

III. RESEARCH METHODOLOGY

Theoretical Framework

The study adopted the theoretical framework of; Akram N, Ihtsham UP & Muhammad K (2011) for this study. The models were created with the goal of taking into account the influence of healthy human capital on economic growth. Human capital is not assumed to be constant in endogenous models. Rather, they are founded on human capital's potential to impact growth in the short and long term. This study's theoretical model reveals a functional link between economic growth and health-care spending.Human capital, according to Romer (1990) and Barro (1991), is the most significant element in determining economic growth. Because the purpose of this research is to look into the impacts of health human capital on economic growth, human capital is divided into two categories: health human capital (H) and other types of human capital, such as education human capital (E). While income (Y) is considered to be a function of physical capital (K), health human capital (H), education human capital (E), and a vector of other factors (Z) such as technology and other environmental variables.

$Y = f(K, H, E, Z)$

Where RGDP stands for real gross domestic product, H stands for health human capital, E stands for education human capital, and Z stands for all other explanatory factors. H in time t is the sum of the preceding period's stock of health human capital and the current period's addition to the stock. It is considered that the quantity of resources committed to health care and the efficiency with which this expenditure is transformed into health stock determine the buildup of health human capital stock (H). It is also believed that the amount of money spent on health care is a function of the proportion of income spent on health care (Yh) and the level of income. The following is how the stock of healthy human capital changes over time.

$H_t = H_{t-1} + \Delta H_{t-1}$, and $\Delta H = \lambda Y_h Y$,

Where λ is the productivity parameter of health expenditure and all other variables. The ability to transform health spending into health stock is assumed to be dependent on the stock of health human capital. The health technology equation can be written as: $\lambda = \lambda(H)$. Substituting λ into the Δ(H) equation and that in turn into the production function, the income growth equation become.

$Y = Y(\Delta H + \Delta K + \Delta E + H_{t-1} + z)$

Model Specification

This study shall be based deeply on the Solow neoclassical growth theory and draws from the model specification of Nasiru and Usman (2012) who investigate health expenditure and economic growth nexus using ARDL Bounds testing procedure. Therefore, the model for this study can be specified implicitly as presented below:

RGDP= f (PEH, IMR, MMR, MPR, LFE, LFP) ……..…. (1)

Where;

RGDP= Real Gross domestic product per capita income as a proxy for economic growth

PEH = Public Expenditure on Health

IMR = Infant Mortality Rate

MMR = Maternal Mortality Rate

MPR = Malarial Prevalence Rate as a proxy for morbidity rate

LFE = Life Expectancy Rate

LFP= Labour Force Participation Rate

The equation 1 can therefore, be re-specified as a stochastic model

$RGDP = a_0 + PEH + IMR + MMR + MPR + LFE + LFP + u$ (2)

Where u, is he disturbance term that accounts for other factors that could influence the behaviour of the dependent variable.

To enhance the estimation of the above model, equation (2) is further re-specified in a partial log-linear functional form in order to linearize non-linear variables.

$InRGDP_t = a_0 + \delta_1 PEH_t + \delta_2 IMR_t + \delta_3 MMR_t + \delta_4 MPR_t + \delta_5 LFE_t + \delta_6 LFP_t + u_t$ …… (3)

In analyzing the Autoregressive Distributed Lag Techniques model, Bound Test technique of the ARDL framework is employed to evaluate the long run co-integration association among the variables. The Bound Testing approach to co-integration is given as:

$$\Delta In(RGDP_{t-1}) = a_0 + \beta_1 In(RGDP_{t-1}) + \beta_2(PEH_{t-1}) + \beta_3(IMR_{t-1}) + \beta_4(MMR_{t-1}) + \beta_5(MPR_{t-1}) + \beta_6(LFE_{t-1}) + \beta_7(LFP_{t-1}) + \sum \gamma i \Delta(RGDP_{t-i}) + \sum \gamma z \Delta(PEH_{t-z}) + \sum \gamma j \Delta(IMR_{t-j}) + \sum \gamma k \Delta(MMR_{t-k}) + \sum \gamma m \Delta(MPR_{t-m}) + \sum \gamma n \Delta(LFE_{t-n}) + \sum \gamma v \Delta(LFP_{t-v}) + \varepsilon_t \ldots. (4)$$

From equation (3), Δ represents the difference notation, while βi – 7 are the long run multipliers, β0 is the intercept and $\varepsilon_t$is white

noise errors. In order to estimate the long run relationship, the following hypothesis shall be tested H_0; $\beta_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 =$

$\beta_5 = \beta_6 = 0$ against the alternative H_1; $\beta_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$ $\beta_5 \neq 0$ $\beta_6 \neq 0$

The, short run and long run coefficient of the objective 1, which is the impact of health investment on economic growth is depicted in the equations below:

$$In(RGDP_{t-1}) = \sum_{i-1}^{p} \beta 1 In(RGDP_{t-1}) + \sum_{z-0}^{q1} \beta 2 (PEH_{z-1}) + \sum_{k-0}^{q2} \beta 3 (IMR_{t-k}) + \sum_{j-0}^{q3} \beta 4 (MMR_{t-j}) + \sum_{m-0}^{q4} \beta 5 (MPR_{t-m}) + \sum_{n-0}^{q5} \beta 6 (LFE_{n-1}) + \sum_{x-0}^{q6} \beta 7 (LFP_{x-1}) + \varepsilon_t \ldots (5)$$

The equation 5, involves selecting the orders of the ARDL (p, q1, q2, q3, q4, q5, q6) model in the seven variables using Aikaike Information Criteria (AIC). The next step is to obtain the short run dynamic parameters by estimating an error correction model associated with the long run estimates. This is specified as:

$$InRGDP_{t-1} = \sum \gamma i \Delta In(RGDPt-i) + \sum \gamma f \Delta (PEH_{t-f}) + \sum \gamma j \Delta (IMRt-j) + \sum \gamma k \Delta (MMR_{t-k}) + \sum \gamma m \Delta (MPR_{t-m}) + \sum \gamma n \Delta (LFE_{t-n}) + \sum \gamma v \Delta (LFP_{t-v}) + \gamma ecm_{t-1} + \varepsilon_t \quad (6)$$

In equation (6) γ represent the short run dynamic coefficients.

IV. PRESENTATION AND ANALYSIS OF REGRESSION RESULT

Unit Root Test (Test of Stationarity)

Table 4.1: Augmented Dickey Fuller (ADF)

Variables	Level	1st Difference	2nd Difference	Mackinnon	P-value	Order of Integration
RGDP	-2.598454	-3.424860**	--	-2.957110	0.0174	1(1)
PHE	2.353231	-5.765119**	--	-2.960411	0.0000	1(1)
IMR	1.257701	-3.276968**	--	-2.963972	0.0252	1(1)
MMR	-1.361862	-5.595654**	--	-2.957110	0.0001	1(1)
MPR	--	-3.235806**	--	-2.967767	0.0280	1(1)
LER	-1.039129	-1.154055	-7.286814**	-2.960411	0.0000	1(2)
LFP	-2.906042	-5.657790**	--	-2.957110	0.0000	1(1)

Source: Authors computed Result, Eviews 9.0, 2021

From table 4.1 above, ** denotes 5 percent significant level. As such, he ADF test shows that the time series variables (RGDP, PHE, IMR, MMR, MPR and LFP) are stationary at the 1st difference since the value for each is greater than the MacKinnon at 5% critical value. While the time series of the variables (LER) was found to be cointegrated of 1(2),since the value is greater than the Mackinnon at 5% critical value. Consequently, the different order of cointegration, satisfies the condition to utilizing ARDL bound cointegration procedure. Incidentally, the stationarity results lend credence for cointegration test, which evaluates the long run relationship among the variables.

Table 4.2: ARDL Bounds Test for Co-integration

MODEL		F-statistics = 13.74978
RGDP% PEH% IMR% MMR% MPR% LER% LFP%		K = 6
Critical Value	Lower Bound 1(0)	Upper Bound 1(1)
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

Source: Authors computed Result, Eviews 9.0, 2021

Table 4.2 above, shows the ARDL bound co-integration result. The result revealed that the computed F-statistic (13.74978) is greater than the Critical Value Bounds for the upper bound I(1) (3.61) at 5% level, we conclude that there is cointegration among the variables (RGDP, PHE, IMR, MMR, MPR, LER and LFP). This denotes that a long-run relationship exists. Accordingly, both long run and short run cointegration are estimated to critically determine the level of relationship amongst the variables.

Table 4.3: ARDL Short-Run Analysis: ARDL (1, 2, 0, 0, 3, 3, 2)

Regressors	Coefficient	Standard Error	t-statistic	P-value
DLOG(PEH)	-0.001333	0.003802	-0.350592	0.7315
D(IMR)	-0.000359	0.000572	0.627974	0.5409
D(MMR)	-0.000050	0.000034	1.465445	0.0126
D(MPR	-0.096363	0.044757	-2.153012	0.0307
D(LFE)	0.050875	0.019904	2.556055	0.0239
D(LFP)	-0.001001	0.000227	-4.403622	0.0007
CointEq(-1)	-0.033166	0.219079	0.151390	0.0003
R-squared= 0.999613	F-statistic =1972.881 Pro F-statistic= 0.000000		Akaike info criterion= -7.638328 SchwarsCreterion= -6.805690	Durbin Watson= 2.368675

Source: Authors computed Result, Eviews 9.0, 2021

Table 4.3 denotes the short-run dynamic coefficients result. The result showed that ECM is negative and statistically significant, denoting the speed of adjustment from short-run equilibrium to long-run equilibrium. Hence, any variation in economic growth (RGDP) in the short-run would quickly adjust back to equilibrium in the long-run. Furthermore, the partial log-linear regression results revealed that the explanatory ability of the model is 0.999. This connotes that, about 99.9% of the total variation in economic growth is explained by Health Care investment while the remaining 0.1% is captured by the error term. More so, the estimated model revealed that Durbin Watson (DW) value of 2.368675 which is approximately 2.0, implied that the model is free from autocorrelation. Hence, the model is valid for policy formulation and forecasting.

Consequently, the coefficient of (PHE) is negative (-0.001333), though statistically not significant. This result outcome showed that in the short run, PHE has a negative impact on economic growth in Nigeria for the period under review. Perhaps, the reason associated with this unfortunate outcome lies in the dwindling public expenditure on health in Nigeria. Over the decades, the government has not made any impressive attempt to overhauling the health sector, focusing on the guideline of the World Health Organization (WHO). However, health is a critical in any attempt to stimulate productivity and since labour is a factor of production, good health implies increase productivity and vise versa. In the palace of economic theory, a healthier labor force means more output which ultimately translate to economic growth.

The coefficient of (IMR) is negative (-0.000359) and statistically not significant in the short run. This implies that a 1 percent increase in the coefficient of (IMR) will result to 0.036 percent decrease in economic growth. This finding conforms with the stated apriori expectation of a negative relationship. Though, the result is not surprising because, available data showed that Nigeria has in the past and even presently among the countries with significantly high infant mortality rate. As such, when investment in health sector is abysmally below the average, high infant mortality rate is expected. Additionally, this result is in tandem with the study outcome of Yaqub J.O., Ojapinwa T.V. and Yussuff R.O. (2012). They found that infant mortality exert negative influence on economic growth.

The coefficient of (MMR) is also negative (-0.000050) and statistically significant, as well as the associated low standard error of (0.000034). This finding showed that a 1 percent increase in the coefficient of MMR will result to 0.005 percent decrease in economic growth. The result is valid because of the ripple effect of the loss of loved one can exert on labour force. Currently, Nigeria still record high maternal mortality rate (MMR), ofcourse, this can be attributed to the low public investment in health care. Particularly, in the rural settlement. The rural dwellers are predominantly farmers, as such, in most of these rural settlement, availability of health care is grossly at a low ebb. The immediate effect of this is, rural-urban migration. The rural population who are in the bracket of active work force, migrate to urban centers in search of better welfare. As a result, agriculture suffers shortage of labour force, which also affects its contribution to economic growth.

The coefficient of morbidity rate, measured as MPR (-0.096363) is negative and statistically significant. This result showed that a 1 percent increase in morbidity rate results to 9.6 percent decrease in economic growth. This result is valid because, a healthy labour force will stimulate increased productivity, which will ofcourse results to increase in economic growth.

The coefficient of LFE is positive (0.050875) and statistically significant. This implies that a 1 percent increase in the coefficient of LFE will stimulate economic growth 5.07 percent in the short run. This result is in tandem with the finding of Yaqub J.O., Ojapinwa T.V. and Yussuff R.O. (2012), their study outcome showed that life expectancy rate exerts positive influence on economic growth. The validity of this finding is also hinged on the preposition that as the longevity of life of labour force increases, productivity will be stimulated.

Surprisingly, the coefficient of LFP appeared negative (-0.001001) and statistically significant. This shows that LFP exerts negative influence on economic growth in Nigeria for the period under study.

Table 4.4: ARDL Long Run Coefficients. Dependent Variable: RGDP ARDL (1, 2, 0, 0, 3, 3, 2)

Regressor	Coefficient	t-statistic	P-value
LOG(PHE)	0.158039	0.121152	0.9054
IMR	-0.010829	-0.138875	0.8917
MMR	-0.001522	-0.166957	0.0400
MPR	-2.638182	-0.161520	0.0142
LER	0.054045	0.183700	0.0371
LFP	0.003761	0.131124	0.0177
C	1.809378	0.081702	0.0361

Source: Authors computed Result, Eviews 9.0, 2021

The results presented in table 4.4 above, shows long run ARDL analysis. The result showed that Log (PHE) is positive and statistically not significant in the long run. this clearly showed that in the long run the coefficient of PHE will influence economic growth in Nigeria. While the coefficient of IMR, MMR and MPR are negative and statistically significant. this denotes that in the long run the rate of MMR and MPR will jointly influence economic growth negatively in Nigeria. Additionally, the coefficient of LER and LFP are positive and statistically significant. This implies that in the long run, LER and LFP will jointly influence economic growth. Consequently, the result showed that in the long run, the investment in health care will spur economic growth in Nigeria.

Table 4.5: Pairwise Granger Causality Tests

Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
PEH does not Granger Cause RGDP	32	0.18141	0.8351
RGDP does not Granger Cause PEH		1.18022	0.3226

Source: Authors computed Result, Eviews 9.0, 2021

Granger causality is a way of examining causality between two variables in a series. The method is a probabilistic account of causality. Consequently, the result revealed a unidirectional causality. Meaning that causality runs from economic growth (RGDP) to investment in health care (PEH) and vice versa

Table 4.6: Ramsey RESET Test

Omitted Variables: Squares of fitted values			
	Value	df	Probability
t-statistic	1.604357	12	0.1346
F-statistic	2.573961	(1, 12)	0.1346
F-test summary:			
	Sum of Sq.	Df	Mean Squares
Test SSR	4.83E-05	1	4.83E-05
Restricted SSR	0.000274	13	2.11E-05
Unrestricted SSR	0.000225	12	1.88E-05

Source: Authors computed Result, Eviews 9.0, 2021

Output from the Ramsey reset test reports the test regression, the F-statistic and t-statistic for testing the hypothesis that the coefficients on the powers of fitted values from the regression are jointly zero, that is, the model is correctly specified. The null hypothesis cannot be rejected since the p-value is more than 0.10

Table 4.7: Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.581982	Prob. F(2,11)	0.5751
Obs*R-squared	2.966377	Prob. Chi-Square(2)	0.2269

Source: Authors computed Result, Eviews 9.0, 2021

Table 4.8: Q-statistic probabilities adjusted for 1 dynamic regressor						
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
.**| . |	.**| . |	1	-0.232	-0.232	1.8284	0.176
. | . |	. *| . |	2	-0.018	-0.075	1.8393	0.399
.**| . |	.**| . |	3	-0.242	-0.280	3.9764	0.264
. |* . |	. | . |	4	0.132	-0.001	4.6344	0.327
****| . |	****| . |	5	-0.513	-0.597	14.983	0.010

Source: Authors computed Result, Eviews 9.0, 2021

The results presented in table 4.7 and 4.8 above showed that both LM test and Q-statistic jointly indicate that the residuals are not serially correlated.

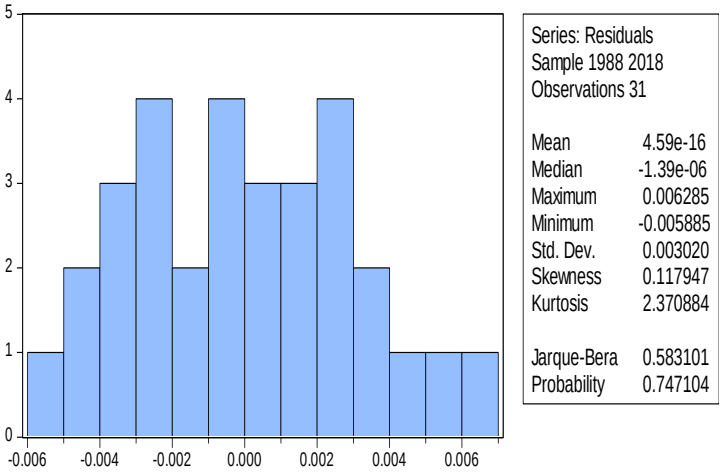
Table 4.9: Breusch-Pagan-Godfrey			
F-statistic	0.690173	Prob. F(17,13)	0.7664
Obs*R-squared	14.70594	Prob. Chi-Square(17)	0.6167
Scaled explained SS	1.772665	Prob. Chi-Square(17)	1.0000

Source: Authors computed Result, Eviews 9.0, 2021

The Breusch-Pagan Godfrey heteroskedasticity test in table 4.9, accepts the null hypothesis of homoscedasticity at the 1 percent level of significance.

Normality Test

Fig 1



Source: Authors computed Result, Eviews 9.0, 2021

Form the result of normality test, JB –statistics of 0.58 and the corresponding P-value of 0.74 is greater than the 5% (0.05) level of significance, hence, we cannot reject the null hypothesis, as such we conclude that the error terms are normally distributed.

V. CONCLUSION AND RECOMMENDATIONS

Based on the above findings, this study has drawn certain conclusions. First, public expenditure on health did not stimulate economic growth in Nigeria. What this means is that poor investment on health care and health infrastructures impacts negatively on the productivity of labour which invariably exerts depressing effect on economic growth. Since healthy work force can stimulate economic growth, it therefore means that increase in health care investment is critical for a stable economic growth in Nigeria. More so, IMR, MMR and MPR also depresses the Nigeria economic growth for the period under review. This means that reduction in IMR, MMR and MPR are critical to achieving sustainable economic growth. Lastly, LFE and LFP stimulates economic growth in both short run and long run. As such, to sustained economic growth trend, LFE and LFP are critical. Based on

the finding, the study recommended that government and stakeholders in health sector should adopt appropriate mechanism that can guarantee and ensure adequate investment in health sector, because Nigeria health sector has the capacity to attract inflow of revenue through health tourism.

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