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Health Expenditure, Life Expectancy and Economic Growth in Nigeria

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Abstract

Indeed, health is wealth; in the same vein wealth depends on health, therefore, for wealth of a nation to be sustainable, the healthcare is perceived as a crucial element for attaining long-term economic growth. Consequently, the study focuses on the impact of health expenditure and life expectancy on economic growth in Nigeria from 1985 to 2024. Situation analysis and Autoregressive distributed lag (ARDL) techniques were employed. The study concluded that there is a long run relationship between the independent variables (expenditure on health and life expectancy and the dependent variable (GDP). This means that merely raising public health spending is likely to lead to improved health and, in turn, boost the economy's GDP. The policy implication of the results of this study is that government should increase its health expenditure in order to help enhance the life expectancy of the people as this in turn will promise economic growth.

Keywords: *Health Expenditure, Life Expectancy, Economic Growth, Autoregressive Distributed Lag (ARDL)*

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Background to the Study

Although achieving economic growth remained the most prioritised macroeconomic variable considering both emerging and advance economies in the world but it is noteworthy to say despite the fact that a number of variables contribute to improvement in economic growth, the place of health expenditure and life expectancy cannot be relinquished. No wonder it is incontestable to say that health is wealth; in the same vein wealth depends on health, by implication for wealth of a nation to be sustainable, the health of that nation must be properly maintained. Is this narrative obtainable in Nigeria? The answer remained open to verification. Therefore, health systems goals include efficiency, effectiveness, equity, and quality. To achieve this relies on a nation's health policy, spending on health, national income, and access to health facilities (Joseph, 2019).

Undoubtedly, individuals with good health have the tendency of being more productive while reverse is the case with poor-health individuals which in turn decreases an economy's growth. In addition, Linden et al., (2017); AlvarezGalvez et al., (2018) opined that improved health status of an economy positively and significantly strengthens the labour force, and increases economic growth. Most countries of the world are working rigorously on their healthcare delivery in order to sustain and have viable economic and social growth, which is a function of their healthcare sector. This is important because a society with many unhealthy individuals would certainly not catch up with standard macro and micro economic targets. Bloom et al., (2018); Ajayi and Akinbobola (2020) reiterate that working life is prolonged when appropriate human capital investment surface. This further increase returns to investment in human capital, evident either on an individual's productivity or that of their offspring.

Statement of the Problem

Nigeria's health spending pattern continues substantially small. For example, 4.6% of GDP was spent on health care in 1997. In 2005, the figure grew to 6.6% and subsequently dropped to 5.8 in 2009. The complete 1997, 2005 and 2009 spending amounted to 134,522, 972,921, 1,596,573 (in a million naira), respectively. The figure is an indication of the nation's bad engagement during these periods to enhanced health care and deliveries in addition, the Federal Government allocated N304 billion to the health of over 180 million Nigerians in the 2017 budget, amounting to N1.688 per citizen throughout the year, while the Government allocated N340.45 billion to the health sector in 2018, representing 3.9 per cent of N8.6 trillion spending plans. The distribution in the budgets for 2017 and 2016 is less than the 4.16% and 4.23% produced by the administration to the health industry. These numbers indicate that the Nigerian government is not allocating sufficient resources for health interventions because their priority is not regarded. No wonder Nigeria is still finding alternatives to most of the country's health challenges, such as the ongoing outbreaks of Lassa fever, elevated maternal and infant fatalities, bad main health equipment, absence of functioning radiotherapy devices, HIV prevalence, malnutrition, bad response to health emergencies.

It is interesting to confirm that despite the perceived proclamation that Nigeria is the giant of Africa, Algeria, Cape Verde, Tunisia, Mauritius and Morocco ranked first, second, third, fourth and fifth position with 77.3, 76.9, 76.9, 75.7 and 75.2 life expectancy rate respectively Nigeria ranked 52nd in Africa with life expectancy of 55.8 years (Statista 2023). Prior to the COVID-19 pandemic, it was recorded that world population continues to live longer in good health. This is evident in the WHO (2021) report that global life expectancy at birth, and healthy life expectancy increased from 66.8 years to 73.3 years; and 58.3 years to 63.7 years between 2000 and 2019 respectively. Until recently, stylized facts of average life expectancy at birth in Nigeria revealed 53.95 in 2017; 54.3 in 2018; 54.6 in 2019; 54.8 in 2020; and 55.12 in 2021 (WDI, 2021). In the tail end of 2019, COVID-19 pandemic surfaced in the whole world which has caused great havoc to the global health population and claiming millions of lives. The COVID-19 pandemic contributed to the shortened life experienced globally, and even in Nigeria specifically (Arias, TejadaVera, & Ahmad, 2020). During this time, the Nigerian government increased health spending to combat the pandemic by increasing general health expenditure from 6.2% to 8.2% between 2019 and 2020 (NHA report for 2020). A small proportion of people who live in metropolitan areas receive expensive medical treatment, which accounts for around three-quarters of total public health spending. In some nations, hospitals account for a significant percentage of the health budget which is around 80 to 90 percent, and these hospitals are mostly located in metropolitan areas. However, only around 60% of the population has access to primary healthcare. Because the healthcare system available in most rural areas cannot be provided for the economic agents inhabiting these areas, they are compelled to turn to home cures, self-medication, and traditional medicine (Ogungbenle, et al., 2013).

In summary, considering different scholarly submission reviewed, it is evident that there is no convergent view on the impact of health spending on economic growth and development from the empirical evidence above in both emerging and advanced countries, there is also a divergence in outcomes between life expectancy and economic growth and development. These studies also indicate divergence in outcomes of causality direction between spending on health and economic growth as well as life expectancy and economic growth. All these opinions of divergence placed policymakers at a crossroads and raise a multitude of questions as to what impact does life expectancy and public health spending have on economic growth.

Research Questions

i. What is Nigeria's health expenditure trend and pattern from 1985 to 2022?
ii. To what extent is the interaction effect of life expectancy rate and health expenditure on economic growth in Nigeria in the short run and long run

Objectives of the Study

This research broad objective assessed the effects of health expenditure and life expectancy on the economic growth of Nigeria from 1985 to 2024. The specific objectives are:

i. Examine Nigeria's health expenditure trend and pattern from 1985 to 2024
ii. Determine the effect of life expectancy rate and health expenditure on economic growth in the short run and long run in Nigeria.

Literature Review

The scholarly debate, which has taken a long period of time, is whether health expenditure influences economic growth or not**.** Sethi et al. (2020) examine the relationship between GEH and economic growth in China. They find a positive and significant relationship between these two variables. Evidence from China suggests that GEH has a positive and significant influence on economic growth. The study found that an increase in GEH of 1% is associated with an increase in economic growth of 0.13%. The results also showed that the impact of GEH on economic growth is higher in provinces with a higher level of development.

Konatar, Kaštelan, Kaštelan, Đurašković, and Radović (2024) investigated the determinants of healthcare expenditure in Central and Eastern Europe countries. They found a positive and significant relationship between public expenditure on health and economic growth in Central and Eastern European countries. However, several studies also find a negative relationship between GEH and economic growth.

Yang (2024) explored the effects of GEH on economic growth in 21 developing countries from 2000 to 2016. The study found a negative relationship between health expenditure and economic growth. The literature on the relationship between public expenditure on health and economic growth in the WB is very limited. Writers have examined the relationship between GEH and economic growth in the WB have found a positive relationship between the two variables. Ibukun and Osinubi (2020) looked at the relationship between environmental quality, economic growth, and health spending in 47 African countries and discovered that economic growth has a positive and inelastic effect on health spending.

Anowor, Ichoku, and Onodugo (2020) used GDP capital to investigate the relationship between health financing and economic growth performance. Their research found that private and public health-care spending have a positive effect on economic performance, with a long-run correlation between health-care spending and output per capita in the ECOWAS region. Olayiwola and Olusanya (2021) investigated the relationship between health financing and Nigerian economic growth and found that domestic private health expenditure has a significant positive growth effect on Nigerian economic growth.

Adeoti, Adeoti and Adeoye (2020) analyzed health expenditure and life expectancy in Nigeria. Time series data spanning from 1995 to 2018 was used. They employed the Autoregressive Distributed Lag (ARDL) approach to estimate the short-run and long-run relationships between health expenditure and life expectancy. According to the findings, health capital expenditure and out-of-pocket health spending had a positive and substantial effect on life expectancy, whereas health recurrent spending had a significant and negative impact. They recommended the Nigerian government increase health capital expenditure while decreasing out-ofpocket health expenditure in order to improve the country's life expectancy.

Bankole, Ajayi and Oladapo (2021) investigated the impact of health expenditure on life expectancy in Nigeria from 1986 to 2016 using the ARDL technique and discovered that total health expenditure, as well as capital and recurrent expenditure, has a considerable positive impact on life expectancy in both the short and long run. A 1% increase in overall health expenditure resulted in a 0.13% increase in short run life expectancy with a 0.28% increase in long-run life expectancy. The study recommended the Nigerian government should raise its health spending in order to improve the health of its citizens and raise their life spans.

Khattak, (2022), examined the nexus between public health expenditure and economic growth using panel data from 1995 to 2018 for seven South Asian countries. It found that long-term economic growth is positively affected by public health expenditure, HDI, labor force, life expectancy, and infant mortality. In addition, public health expenditure is positively and significantly impact on economic growth. In fact, a well-known important, significant and positive impact of human capital, expressed and influenced by expenditure on health and education, meanwhile, such impact depends on the healthier labor force participation in total factor productivity (TFP). On the other side, more expenditure on health accompanied with high rate of unemployment especially in youth unemployment, may cause no or negative impact on economic growth through higher burdens on public and private budgets, and higher expenses on elderly peoples.

Methodology

This study adopts empirical approach to explore the impacts of health expenditure on economic growth in Nigeria using ARDL bound test and Long Run Form and granger causality test compare to other studies Ekperware et al (2017) and Olowookere et al (2022) which they make use of Dynamic Ordinary Least Square (DOLS) regression technique this study under consideration was analyzed using the unit root test, Autoregressive Distributed Lag (ARDL) Bounds Test, ARDL Cointegration and Long Run Estimates as well as the Granger Causality using pairwise technique.

This examines health expenditure's long-term and short-run effects on economic growth. This technique is commonly employed in econometric studies to explore the relationship between variables and estimate their impact on one another Model specification:

Model Specification

The model used in this study is the Ordinary Least Squares (OLS) regression analysis model, which allows for examining both the long-run and short-run effects of health expenditure on economic growth.

The model for this study was adapted from similar work by Qehaja et.,al. (2023) as shown below:

GDP growth per Capita = $a+ \beta_1 (GEH)_t + \beta_2 (HI)_t + \beta_3 (ALE)_t + \beta_4(AA)_t+ \beta_5(MOR)_t + \mu I$ ….(1)

Where;
GDP growth per Capita= Proxy for Economic Growth
β_i = coefficient for the explanatory variables
GEH= Government expenditure on health
HI= Health insurance
ALE= Average Life Expectancy
AA= Average Age
MOR= Mortality
μi= Error term

Given the dependent variable Y and the independent variables X_1, regression analysis was used to determine the functional relationships between the dependent and independent variables as specified below:

The model goes as thus: $GDP_t = \beta o + \beta_1 HE_t + \beta_2 LE_t + \beta_3 FR_t + u \ldots\ldots\ldots\ldots\ldots\ldots (2)$

Where;
GDP=Economic growth
βo =intercept/ constant
β_t= coefficient for the explanatory variables
H.E=Health Expenditure
L.E= Life Expectancy
F.R=Fertility Rate
u= error term

The model goes as thus: $GDP_t = \beta o + \beta_1 HE_t + \beta_2 LE_t + \beta_3 FR_t + u \ldots\ldots\ldots\ldots (3)$

Where;
$\beta_0$is constant, β_1-$\beta_3$are coefficients of the independent variables u is the error term

Equation 2 was reformulated as follows:

$GDP_t = \beta o + \beta_1 logHE_t + \beta_2 logLE_t + \beta_{3t} logFR_t + u \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$
On apriori, we expect $\beta_1>0$, $\beta_2>0$, and $\beta<0$

Estimation Techniques
The data was collected and analyzed using the unit root test, Autoregressive Distributed Lag (ARDL) Bounds Test, ARDL Cointegration and Long Run Estimates as well as the Granger Causality using pairwise technique. This examines health expenditure's long-term and short-run effects on economic growth. This technique is commonly employed in econometric studies to explore the relationship between variables and estimate their impact on one another.

Sources and Types of Data Used
This study made use of a secondary data obtained from the World Development Indicator. The data collected will be time-series data covering the period from 1985 to 2024.

The concerned variable and their data source are presented in the table below:

Table 1.

S/N	NOTATION	VARIABLE	Apriori	DATA SOURCE
1	HE	HEALTH EXPENDITURE	+	WORLD DEVELOPMENT INDICATOR
2.	LE	LIFE EXPECTANCY RATE	+	WORLD DEVELOPMENT INDICATOR(2024)
3.	GDP	ECONOMIC GROWTH (PROXY IN ANNUAL GDP)	+	WORLD DEVELOPMENT INDICATOR(2024)
4.	FR	FERTILITY RATE	+/-	WORLD DEVELOPMENT INDICATOR(2024)

Results
This chapter is on data analysis, presentation of results and discussion of findings. This study investigates health expenditure, life expectancy and economic growth in Nigeria from 1985-2022.

Table 2: Descriptive Statistics

	FERTILITY	GDP	HEALTH	LIFEEXPECT
Mean	0.781	0.556	0.332	1.688
Median	0.784	0.712	0.511	1.687
Maximum	0.821	1.186	0.704	1.724
Minimum	0.719	-1.215	-0.232	1.659
Std. Dev.	0.026	0.484	0.303	0.023
Skewness	-0.622	-1.932	-0.330	0.123869
Kurtosis	2.806	7.172	1.383	1.430
Jarque-Bera	2.114	43.103	4.066	3.371
Probability	0.348	0.000	0.131	0.185
Sum	25.002	17.804	10.622	54.010
Sum Sq. Dev.	0.021	7.245	2.840	0.017
Observations	40	40	40	40

The descriptive statistics of the variables are presented in table 2. It shows that life expectancy had the highest mean score of 1.69 followed by fertility rate with a mean score of 0.78 and

GDP with a mean score of 0.56 while GDP expenditure on health had the lowest mean score of 0.33. The standard deviation shows that there is some dispersion in all the variables. Lastly, skewness, kurtosis and Jarque-Bera (JB) statistics showed that all the variables are normally distributed at 1% level of significance.

Augmented Dickey Fuller (ADF) Test

The use of ARDL models does not impose pre-testing of variables for unit root problems. However, unit root tests are conducted in this study to find out if there are mixtures in the order of integration of our variables. The order of integration of the time series was investigated by applying the Augmented Dickey and Fuller (1979) test. The Augmented Dickey-Fuller (ADF) unit root test results for the time series variables are presented in table 3 below:

Table 3: Augmented Dickey Fuller (ADF) Test

Variable	5% Level	Critical Value	P-Value	1ST Diff	Critical Value	P-Value	Decision
LOGGDP	-2.972	-5.103	0.000	-2.843*	-8.484	0.000	I(1)
LOFERTILITY	-2.948	2.464	1.000	-2.951*	-5.614	0.000	I(1)
LOGLIFEEXPECT	-2.514	-2.430	0.229	-3.166*	-5.654	0.000	I(1)
LOGHEALTHEXP	-0.293	-2.411	0.835	-3.038*	-5.225	0.000	I(1)

Note indicates significance at 5 percent level.*

The result of the Augmented Dickey Fuller unit tests is presented in table 3 above. The test indicated all the variables have unit root at levels except GDP, since their respective ADF statistics are much less than the critical values. These are supported by their p-values which are greater than 0.05 levels. However, three (3) variables (Fertility rate, Life expectancy and Health expenditure) proved to be stationary after first differencing, since the ADF statistics are much more than their respective critical values while GDP was stationary at level. This was proven their respective p-values which are less than 0.05. The study conclude that GDP was stationary at level while Fertility rate, Life expectancy and Health expenditure were integrated to order one I(1). Since the first difference values of fertility rate (logfertility) -2.9511, Life Expectancy (LOGLIFEEXPECT) -3.1662 and Expenditure on health (LOGHEALTHEXP) -3.0384 are greater than the critical values -5.6140, -5.6537 and -5.2249 respectively, we conclude that the variables GDP, Fertility rate, Life expectancy and Health expenditure are stationary.

Autoregressive Distributed Lag (ARDL)

This is an econometric model used for analyzing long and short run relationships between different time series variables. The results are presented in table 4 below.

Table 4: Autoregressive Distributed Lag (ARDL) result

Dependent Variable: LOGGDP
Method: ARDL
Dynamic regressors (4 lags, automatic): LOGFERTILITY LOGLIFEEXPECT
Fixed regressors: LOGGDPHEALTH C
Number of models evaluated: 100
Selected Model: ARDL(4, 3, 2)

Variable	Coefficient	t-Statistic	Prob.*
LOGGDP(-1)	0.837842	4.601	0.003
LOGGDP(-2)	0.032131	0.175	0.866
LOGGDP(-3)	0.304260	3.516	0.010
LOGGDP(-4)	0.348834	3.786	0.007
LOGFERTILITY	44.15494	1.034	0.335
LOGFERTILITY(-1)	-124.5727	-1.366	0.214
LOGFERTILITY(-2)	167.8144	2.108	0.043
LOGFERTILITY(-3)	-77.54656	-2.651	0.033
LOGLIFEEXPECT	45.24518	1.732	0.127
LOGLIFEEXPECT(-1)	23.22701	0.539	0.607
LOGLIFEEXPECT(-2)	-52.02580	-1.962501	0.041
LOGGDPHEALTH	0.820056	2.398961	0.048
C	-34.30421	-1.888822	0.101

R-squared	0.936152	Mean dependent var	0.726
Adjusted R-squared	0.826699	S.D. dependent var	0.340
S.E. of regression	0.141412	Akaike info criterion	-0.824
Sum squared resid	0.139981	Schwarz criterion	-0.176874
Log likelihood	21.24100	Hannan-Quinn criter.	-0.697755
F-statistic	8.552971	Durbin-Watson stat	2.524928
Prob(F-statistic)	0.004363		

*Note: p-values and any subsequent tests do not account for model selection

Table 4 presents the results of short-run coefficients of the estimated Autoregressive Distributed Lag model. The coefficient of determination (= 0.936) of the estimated model shows that about 94% of the variation in economic growth of Nigeria is jointly explained and accounted for by the independent variables (Fertility rate, Life expectancy and Health expenditure) in the estimated ARDL (4, 3, 2) model. This when adjusted for degree of freedom based on the adjusted coefficient of determination (Adjusted R-bar squared = 0.827) shows that the ARDL (4, 3, 2) model has about 83% explanatory power with respect to variations in economic growth of Nigeria. This implies that the ARDL model has a satisfactory goodness of fit. The F-test which is used to determine the overall statistical significance of a regression model shows that the overall regression is statistically significant at 5% level $F = 8.55, p < .05$). This therefore means that the overall ARDL (4, 3, 2) model (that is, the short run coefficients of the entire explanatory variables as they relate to the dependent variable) is statistically different from zero.

As shown in Table 4 in the short run, the first quarter lag, the third quarter lag and fourth quarter lag of gross domestic product (GDP) are statistically significant at 5% with positive impact. The current fertility rate is not statistically significant; the second quarter lag of fertility rate has a significant positive impact while the third quarter lag of fertility rate has a significant negative impact. The current life expectancy is not statistically significant; the first quarter lag of life expectancy is not statistically significant while the second quarter lag of life expectancy is negatively significant. Furthermore, the current health expenditure is positively significant at 5%.

Table 5: Long run Co-integration

ARDL Cointegrating And Long Run Form
Dependent Variable: LOGGDP
Selected Model: ARDL(4, 3, 2)

Cointegrating Form

Variable	Coefficient	t-Statistic	Prob.
D(LOGGDP(-1))	0.622075	2.261117	0.0582
D(LOGGDP(-2))	0.658090	4.547128	0.0026
D(LOGGDP(-3))	0.351876	3.789155	0.0068
D(LOGFERTILITY)	44.455546	1.026485	0.3388
D(LOGFERTILITY(-1))	-166.29755	-2.068002	0.0274
D(LOGFERTILITY(-2))	77.554813	2.619442	0.0344
D(LIFE_EXPECTANCY_RATE)	0.419673	1.785741	0.1173
D(LIFE_EXPECTANCY_RATE(-1))	0.474088	1.974780	0.0389
D(LOGGDPHEALTH)	0.817584	2.374092	0.0493
CointEq(-1)	-2.453523	-5.769922	0.0007

Cointeq = LOGGDP - (3.7177*LOGFERTILITY + 0.0572*LIFE_EXPECTANCY _RATE + 0.3332*LOGGDPHEALTH -5.2273)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGFERTILITY	3.717680	3.098058	1.200003	0.2692
LIFE_EXPECTANCY_RATE	0.057184	0.022119	2.585240	0.0362
LOGGDPHEALTH	0.333229	0.111667	2.984117	0.0204
C	-5.227302	3.238743	-1.613991	0.0206

Table 5 presents the results of log-run co-integration of the estimated Autoregressive Distributed Lag model. The second and third quarter lags of GDP are positively statistically significant at 5%. The second quarter lag of fertility rate negatively significantly impacted GDP at 5% level of significance while the third quarter lag of fertility rate positively significantly impacted GDP at 5% level of significant. The current level of fertility rate did not significantly impact economic growth on the long run.

The first quarter lag of life expectancy positively significantly impacted GDP at 5% level of significance, similarly, the current level of life expectancy positively significantly impacted GDP at 5% level of significance. Furthermore, the current level of health expenditure positively significantly impacted economic growth at 5% level of significance.

ARDL Bounds Test

Table 6: ARDL Bounds Test

ARDL Bounds Test
Included observations: 40
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	17.26376	2

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	3.17	4.14
5%	3.79	4.85
2.5%	4.41	5.52
1%	5.15	6.36

Test Equation:
Dependent Variable: D(LOGGDP)
Method: Least Squares
Included observations: 40

Variable	Coefficient	t-Statistic	Prob.
D(LOGGDP(-1))	0.621	2.271	0.058
D(LOGGDP(-2))	0.653	4.554	0.003
D(LOGGDP(-3))	0.349	3.786	0.007
D(LOGFERTILITY)	44.15494	1.034	0.336
D(LOGFERTILITY(-1))	-90.26781	-1.556	0.164
D(LOGFERTILITY(-2))	77.54656	2.651	0.033
D(LOGLIFEEXPECT)	45.24518	1.732	0.127
D(LOGLIFEEXPECT(-1))	52.02580	1.963	0.091
LOGGDPHEALTH	0.820056	2.399	0.048
C	-34.30421	-1.889	0.101
LOGFERTILITY(-1)	9.850082	1.143	0.291
LOGLIFEEXPECT(-1)	16.44639	2.204	0.063
LOGGDP(-1)	-2.458805	-5.814	0.001

R-squared	0.976276	Mean dependent var	0.022871
Adjusted R-squared	0.935607	S.D. dependent var	0.557271
S.E. of regression	0.141412	Akaike info criterion	-0.824100
Sum squared resid	0.139981	Schwarz criterion	-0.176874
Log likelihood	21.24100	Hannan-Quinn criter.	-0.697755
F-statistic	24.00522	Durbin-Watson stat	2.524928
Prob(F-statistic)	0.000160		

The null hypothesis of this model is that there is no long-run relationship between the examined variables. Table 6 presents the ARDL bound test. The Bounds testing is an extension of ARDL modelling which uses the F and t-statistics to test the significance of lagged levels of the variables in a univariate error correction system Also, the ARDL Bounds testing estimates both the short run and long run relationships simultaneously and provide unbiased and reliable estimates.

The result of the ARDL bound test in table 6 indicates that the F- statistic for this Bound test is 17.262, which is greater than the critical values of both the lower and the upper bounds at all levels of significance, respectively. As a result, the null hypothesis of no long-run relationship shall be rejected. This implies that, there is a long run relationship between the independent variables (Fertility rate, expenditure on health and life expectancy and the dependent variable (GDP). The coefficient of determination (= 0.976) of the estimated model shows that about 98% of the variation in economic growth of Nigeria is jointly explained and accounted for by the independent variables (Fertility rate, Life expectancy and Health expenditure) in the ARDL Bound test. This when adjusted for degree of freedom based on the adjusted coefficient of determination (Adjusted R-bar squared = 0.935) shows that the ARDL Bound test has about 94% explanatory power with respect to variations in economic growth of Nigeria.

Conclusion

Based on the findings above, it is revealed that there is a long run relationship between the independent variables (Fertility rate, expenditure on health and life expectancy and the dependent variable (GDP). This finding supports the study of According to Edeme, Emecheta and Omeje (2017) who reported that improved health conditions have the potential to increase economic growth in both developed and developing nations by improving not only life expectancy. The finding also agrees with the study of Adeniyi and Abiodun (2011) who analyzed the effect of health using data on life expectancy at birth, fertility rate, capital, and recurrent expenditure between 1985 and 2009 and found direct and substantial effect on healthcare expenditure and economic growth.

In the short run, it was only the second quarter lag of life expectancy is negatively impacted GDP, the current health expenditure positively impacted GDP, the second quarter lag of fertility rate positively impacted GDP while the third quarter lag of fertility rate negatively impacted GDP. This finding supports the study of Wang (2015) who used data from 19 OECD countries and found a positive relationship between public expenditure on health and economic growth. Sethi et al. (2020) also examined the relationship between government expenditure on health and economic growth in China and found a positive and significant relationship between the two variables. The study of Zhang, Zong, & Xiao, 2020; Aboubacar and Xu (2017) on the impact of health expenditure on economic growth in sub-Saharan Africa also reported a positive and significant impact on economic growth.

For the long run, the second quarter lag of fertility rate negatively significantly impacted GDP at 5% level of significance while the third quarter lag of fertility rate positively significantly impacted GDP at 5% level of significant. The first quarter lag of life expectancy positively significantly impacted GDP at 5% level of significance, similarly, the current level of life expectancy positively significantly impacted GDP at 5% level of significance. Therefore, the findings of this study conclude that long run and short run relationship existed between the independent variables (Fertility rate, expenditure on health and life expectancy and the dependent variable (GDP).

Recommendations

The following recommendations are made for this study:

1. The study strongly recommends the strict implementation of the risk-focused and rule-based regulatory framework by the policy makers and regulatory bodies considering the trend of variation in the variables under study.
2. Government and concerned private agency should invest more in the health sector and ensure that health facilities are of high and quality standard by implication the economic growth will improve.
3. Also, the government and concerned private agency should put in place basic amenities and policies that will make life easy for citizens as this will have a significant impact of life expectancy of the citizens of the country. This means that merely raising public health spending is likely to lead to improved health and, in turn, boost the economy's GDP.

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