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AN EMPIRICAL ANALYSIS OF THE NEXUS OF HEALTH CARE EXPENDITURES, EDUCATION EXPENDITURES, AND ECONOMIC GROWTH IN NIGERIA

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ABSTRACT

This study investigated the nexus between economic growth, health and education expenditure in Nigeria, using time series data for the period of 28 years (1990-2018). The study adopted the use of the Philips-Pheron test for unit root, ARDL bound test procedure to co-integration, and OLS method to estimate the relationship of the parameters used in the study. The findings revealed that all variables are stationary at first level I(1), there is a long-run relationship between economic growth, health, and education expenditure, and both education and health expenditures are good determinants of growth as revealed by the regression result. The study concluded that recurrent expenditures on health and education are required for economic growth and development, which thus affects the standard of living and life expectancy which goes a long way in contributing to aggregate output. Therefore, the study calls for the urgent need for policymakers to ensure budgetary allocations on education and health are given preeminence.

KEYWORDS: ***Economic growth, health and education expenditure, Cointegration.***

INTRODUCTION

Health is a fundamental factor contributing to the economic growth and development of every nation. This is because, a sickening population does not contribute substantially to productive activities necessary to stimulate the desired level of growth as expressed in the Gross Domestic Product (GDP). Likewise, education is paramount in resulting to human and capital development which is a prerequisite to advancement emanating from improved technical know-how through research and development which is necessary for technological innovations needed for growth and development.

WHO (as cited by Bakare & Olubokun, 2011) revealed that 50 percent of economic growth differentials between developed and developing worlds are attributable to ill-health and low life expectancy. This connotes that the potential for the economic growth of the developing world lag behind because of poor health, which results in low life expectancy (55/56 years) and hence resulting in loss of labour force necessary to engineer this growth. Although the recurrent expenditure on health in Nigeria has been on the increase in recent years as compared to the previous decades, yet more needs to be done to improve this sector performance.

In the other hand, Education has been identified as the most vital instruments in the process of economic growth and development. It is being referred to as the most vital or significant investment in human capital which brings about revolution in productive processes which can stimulate growth through increasing the efficiency of labour, improving health and enhancing conditions and environment for good governance. Looking at the government expenditure in Education over the past years, it can be said that although the government have been playing significant roles in increasing the expenditure of this sector, there is still a revolutionary need for improvement.

It is obvious that various literatures in diverse geographic entity have undertaken the study to analyse the relationship between health expenditure and economic growth with little reference or inhibiting impact of education to growth. Hence, this study is undertaken to complement the information in the bank of knowledge of various existing literatures (Abdulwahab, Kefeli & Hashim, 2018; Sefa, Siew & Mehmet, 2015; Inuwa & Haruna, 2012).

LITERATURE REVIEW

Investigation on the connections, linkages or relationship between health, education and growth has been an ongoing

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subject of debate. This subject is of great interest especially in LDCs where the health and education sector has been lagging those of the developed and other developing world (Bakare & olubokun, 2011). However, little studies have been done inculcating education in the model adopted in various studies. This resaerch therefore review diverse literatures to give a background of requisite information in concord to the subject.

Serap (2016) examine the health care expenditures and Economic growth in Developing Countries using Granger causality test for the period of 1995 to 2013. The study indicated that in emerging markets, income proffer a fundamental explanation to healthcare expenditure among countries used in the study. This therefore means that the proportion of healthcare expenditure in total GDP increases with an increase in economic growth. This finding is related to the study of Fuhwei (2015) who investigated the empirical evidence from OECD countries of more health expenditure, better economic performance using Generalized Method of Moment (GMM) to derive the design of the estimators of the focal variables from 1990 to 2009. The result of his findings indicates that when the ratio of health spending to gross domestic product (GDP) is less than the optimal level of 7.55 percent, increase in health spending effectively led to better economic performance. Whereas more spending above the optimal level does not translate to better care. The study further revealed that 5.48 percent of GDP is the real level of health spending in OECD countries, with a corresponding economic growth rate of 1.87.

More so, Oni (2014) used the Multiple regression analysis to investigate the growth impact of health expenditure in Nigeria. The result shows that the key determinants of economic growth in Nigeria are gross capital formation, total health expenditures and the labour force productivity, while life expectancy rate has negative impact on growth for the period covered by the study. the study suggests that improving the health expenditures will result to improving the life expectancy, the efficiency, productivity and income of labour as well as the level of investment in the economy, hence growth.

Moreover, Bakare and olubokun (2011) undertook an empirical study of health care expenditure and economic growth in Nigeria using the ordinary least square multiple regression analytical method for the time 1974-2008. The result of the study depicts that that public expenditure has vital relationship to the growth and development of any nation. It is a priori expectation to improve the health, life expectancy, efficiency and productivity of labour. They further suggest that government of Nigeria had placed emphasis on the recurrent expenditure more than the capital expenditure on health for the time being of study. The findings show a positive relationship between Health care expenditure and economic growth which is in conformity with the priori expectation. Positive relationship also holds for Gross Capital Formation and economic growth as well as labour force and economic growth.

Similarly, Inuwa and Haruna (2012) have studied the relationship between health expenditures and economic growth in Nigeria for the period 1980-2010 using the autoregressive distributed lag (ARDL) bound test approach to the cointegration Pair Wise Granger causality test. The result of the ARDL revealed that there is a prevalence of a long-run relationship between health expenditures and economic growth whilst that of the Granger causality indicates a bidirectional causality between health expenditures and economic growth in Nigeria. The study further suggest that the Nigerian government should include investment in health as a tool of macroeconomic policy as it has the potency of increasing aggregate growth in the economy.

In addition, Nyamwange (2012) examines the relationship between economic growth and public healthcare expenditure in Kenya for the period 1982 – 2012 using ordinary least square (OLS) regression. It checks for co-integration, granger causality and unit root presence on the long-run relationship between public healthcare expenditure (PHCE) and GDP. The study which attempts to determine the properties of healthcare in Kenya finds out that healthcare in Kenya has an elasticity of 0.024 percent to GDP per capita. This is to mean that for every 1% increase in GDP per capita, PHCE should increase by 0.024 percent. The study suggests for "a suitable strategy for financing healthcare in Kenya."

Sefa, Siew and Mehmet (2015) using a sample of 306 estimates drawn from 31 primary studies conducted a study on the meta analysis study of the effects of government education and health expenditures on economic growth. The study shows that the effect of education expenditure on growth is positive, whilst the growth effect of health expenditure is negative.

In the same vein, Abdulwahab, Kefeli and Hashim (2018) analysed the dynamic effect of healthcare expenditure and education expenditure on economic growth in Organisation of Islamic Countries (OIC) 1990 to 2015. They adopt the use of Pool Mean Group (PMG) method. The study reveals that in OIC countries there is the prevalent of robust long-run co-integrating relationship between healthcare expenditure, education expenditure, research and development and the economic growths. The investigations suggest that well managed and administered healthcare and education are device to advance the attainment of economic growth and development in OIC countries.

Also, Fatima, Zina and Adbelaziz (2014) test for co-integration and causality in examining the relationship between public spending on health and economic growth in Algeria for the period being 1974-2014. The findings revealed that there is a long-run causality from public spending on health to economic growth while it is not observed any short-run causality from public spending on health to economic growth. The recommends that The lack of durable connection from public spending on health to economic growth is not necessarily a reason to

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reallocate health investment away from the health sector. In concord to the above finding, Serdar and Ebru (2014) investigate health expendıtures and economıc growth in G8 countries for a period of 1995 to 2012. They adopt the use of the Kao cointegration which shows the existence of long run relationship between health expenditures and economic growth.

METHODOLOGY

Time series data obtained from the Central Bank of Nigeria (CBN) bulletin and National Bureau of Statistics (NBS) bulletin are employed for this study for the time period of 1990 to 2018. This study investigates the relationship between health expenditure, education expenditure and economic growth to determine the time series properties of the parameters using autoregressive distributed lag (ARDL) bound testing procedure to examine the cointegration (long run) relationship between the dependent (economic growth) and independent variables (health expenditure and education expenditure). The choice of the ARDL was because (i) It does not require that the variables under study must be integrated of the same order unlike other techniques such as the Johansen cointegration approach (ii) It is suitable for small or finite sample data unlike other conventional cointegration approach (iii) It is a simple technique because it allows the co-integration relationship to be estimated by OLS once the lag order of the model is identified unlike other multivariate co-integration methods. The functional form of the model is expressed as;

$$RGDP = f(HEXP, EEXP) \text{ ----------(1)}$$

From equation (1) the ARDL model specification of equation is expressed as unrestricted error correction model (UECM) to test for cointegration between the variables under study below:

$$\Delta InRGDP_t = \varphi_0 + \sum\varphi_1\Delta InRGDP_{t-1} + \sum\varphi_2\Delta InHEXP_{t-1} + \sum\varphi_3\Delta InEEXP_{t-1} + \beta_1\Delta InRGDP_{t-1} + \beta_2\Delta InHEXP_{t-1} + \beta_3\Delta InEEXP_{t-1} + \mu \text{ ----------(2)}$$

The long run relationship is estimated using the conditional ARDL model specified as:

$$InRGDP_t = \varphi_0 + \beta_1 InRGDP_{t-1} + \beta_2 InHEXP_{t-1} + \beta_3 InEEXP_{t-1} + \mu_t \text{ ----------(3)}$$

Where in equation (2) Real Gross Domestic Product (LRGDP) is the dependent variable and is expressed as the function of Health Expenditure and Logarithm of Education Expenditure. φ_0 is the vector of constant where φ_1 to φ_3 short run elasticities and β_1 to β_3 are long run elasticities. The analysis of the data was carried out using Eviews 9.

RESULT AND DISCUSSION

The bounds testing procedure does not require the pre-testing of the variables included in the model for unit roots, however, the Philips-Pheron test for unit root was undertaken and is presented in the table below.

Table 1: Result of Philips-Pheron Unit Root Test

Variable	PP Statistics	Test Critical Values (5%)	Decision
Level			
InRGDP	0.776311	-2.971853	Non-stationary
InHEXP	-2.971853	3.323824	Non-stationary
InEEXP	-2.971853	5.006291	Non-stationary
First Difference			
InRGDP	1.552709	0.024085	Stationary
InHEXP	0.806136	0.068324	Stationary
InEEXP	1.332380	0.080964	Stationary

Source: Authors Computation using Eviews 9

From the table 1 above, it could be depicted that all variables are integrated of order one.

Table 2: ARDL Bound Test for Cointegration

Critical Value	Lower Bound Value	Upper Bound Value
1 %	5.15	6.36
5 %	3.79	4.14

Source: Authors Computation using Eviews 9

From table 2 above, the computed F-statistics; FlnRGDP (lnHEXP, lnEEXP) is = 4.82. This value is above the upper bounds of the critical value of 4.14 at 5% level of significance. This implies that there is cointegration (long run relationship) between economic growth, health expenditure and education expenditure, the null hypothesis of no cointegration between the variables is rejected and the alternative hypothesis is accepted.

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Table 3: OLS Result

Variables	Coefficient	T-Statistics
HEXP	38.39544	0.621242
EEXP	91.25387	2.318787
R^2	0.906565	

Source: Authors Computation using Eviews 9

The above table indicates the result of the ordinary least square regression which indicates that a 1-unit increase in health expenditure will bring about 38.4-unit increase in Economic growth and a unit increase in education expenditure will result to a 91.3-unit increase in economic growth which is expressed as real GDP. However, the result of our R^2 connote that 90.7 percent variation in the dependent variable (RGDP) is brought about by changes or variation in the dependent variables (Health and Education Expenditure). The result of the R^2 indicates that our model is a good fit.

CONCLUSION

This study examines the connections between economic growth, health expenditures and education expenditures using time series data from 1990 to 2018 obtained from CBN statistical Bulletin of 2018. The result of Philips-Pheron unit root test indicates that all variables to be stationary at first difference. The bounds testing (ARDL) approach to cointegration was employed to analyse the data which revealed that there is a prevalence of long run relationship between economic growth, health and education expenditure. However, the result of OLS indicates that our education and health expenditures are good explanatory of the variation in economic growth.

The result of our regression analysis and ARDL bound test calls for urgent need for the government to increase the budgetary allocations of Health and Education sector as it results to tremendous impact on economic activities which in the long run increases growth and thus development. Policy makers should therefore ensure that recurrent expenditures on health and educations are increased which thus impact the resaerch and development in education and increased life expectancy which in the long run result to increased aggregate output.

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APPENDIX

Null Hypothesis: LRGDP has a unit root
Exogenous: Constant
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		0.776311	0.9917
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	2049747.
HAC corrected variance (Bartlett kernel)	5175633.

Phillips-Perron Test Equation
Dependent Variable: D(LRGDP)
Method: Least Squares
Date: 03/31/19 Time: 14:29
Sample (adjusted): 1991 2018
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRGDP(-1)	0.024085	0.015512	1.552709	0.1326
C	862.5237	658.3615	1.310106	0.2016

R-squared	0.084858	Mean dependent var	1787.140
Adjusted R-squared	0.049661	S.D. dependent var	1524.064
S.E. of regression	1485.739	Akaike info criterion	17.51396
Sum squared resid	57392910	Schwarz criterion	17.60912
Log likelihood	-243.1955	Hannan-Quinn criter.	17.54305
F-statistic	2.410907	Durbin-Watson stat	0.553708
Prob(F-statistic)	0.132582		

Null Hypothesis: HEXP has a unit root
Exogenous: Constant
Bandwidth: 13 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		3.323824	1.0000
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

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Residual variance (no correction)	1361.595
HAC corrected variance (Bartlett kernel)	340.9419

Phillips-Perron Test Equation
Dependent Variable: D(HEXP)
Method: Least Squares
Date: 03/31/19 Time: 14:40
Sample (adjusted): 1991 2018
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HEXP(-1)	0.068324	0.084755	0.806136	0.4275
C	7.387026	9.785071	0.754928	0.4571

R-squared	0.024385	Mean dependent var	12.69643
Adjusted R-squared	-0.013139	S.D. dependent var	38.04362
S.E. of regression	38.29273	Akaike info criterion	10.19715
Sum squared resid	38124.66	Schwarz criterion	10.29230
Log likelihood	-140.7600	Hannan-Quinn criter.	10.22624
F-statistic	0.649854	Durbin-Watson stat	2.177469
Prob(F-statistic)	0.427477		

Null Hypothesis: EEXP has a unit root
Exogenous: Constant
Bandwidth: 26 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		5.006291	1.0000
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	1806.074
HAC corrected variance (Bartlett kernel)	293.7057

Phillips-Perron Test Equation
Dependent Variable: D(EEXP)
Method: Least Squares
Date: 03/31/19 Time: 14:41
Sample (adjusted): 1991 2018
Included observations: 28 after adjustments

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
EEXP(-1)	0.080964	0.060767	1.332380	0.1943
C	8.464927	11.62959	0.727878	0.4732

R-squared	0.063914	Mean dependent var	19.27143
Adjusted R-squared	0.027911	S.D. dependent var	44.73084
S.E. of regression	44.10218	Akaike info criterion	10.47964
Sum squared resid	50570.06	Schwarz criterion	10.57480
Log likelihood	-144.7150	Hannan-Quinn criter.	10.50874
F-statistic	1.775237	Durbin-Watson stat	1.633385
Prob(F-statistic)	0.194296		

Dependent Variable: RGDP
Method: ARDL
Date: 03/31/19 Time: 14:48
Sample (adjusted): 1994 2018
Included observations: 25 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): HEXP EEXP
Fixed regressors: C
Number of models evalulated: 100
Selected Model: ARDL(4, 1, 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	1.815590	0.226962	7.999542	0.0000
RGDP(-2)	-0.576219	0.461669	-1.248122	0.2325
RGDP(-3)	-0.607414	0.538291	-1.128413	0.2781
RGDP(-4)	0.640092	0.382796	1.672148	0.1167
HEXP	-32.30395	14.24892	-2.267115	0.0397
HEXP(-1)	-38.75507	12.90281	-3.003614	0.0095
EEXP	13.84480	9.740093	1.421424	0.1771
EEXP(-1)	15.26916	9.017127	1.693350	0.1125
EEXP(-2)	-1.599906	7.414884	-0.215770	0.8323
EEXP(-3)	-14.77008	7.149779	-2.065809	0.0579
C	-4835.296	2239.389	-2.159203	0.0487

R-squared	0.998762	Mean dependent var	42648.13
Adjusted R-squared	0.997878	S.D. dependent var	18544.48
S.E. of regression	854.3484	Akaike info criterion	16.63874
Sum squared resid	10218756	Schwarz criterion	17.17504
Log likelihood	-196.9842	Hannan-Quinn criter.	16.78748
F-statistic	1129.360	Durbin-Watson stat	2.069254
Prob(F-statistic)	0.000000		

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

ARDL Bounds Test
Date: 03/31/19 Time: 15:50
Sample: 1994 2018

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Included observations: 25
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	4.826534	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(RGDP)
Method: Least Squares
Date: 03/31/19 Time: 15:50
Sample: 1994 2018
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP(-1))	0.543541	0.218816	2.484012	0.0263
D(RGDP(-2))	-0.032678	0.296817	-0.110094	0.9139
D(RGDP(-3))	-0.640092	0.382796	-1.672148	0.1167
D(HEXP)	-32.30395	14.24892	-2.267115	0.0397
D(EEXP)	13.84480	9.740093	1.421424	0.1771
D(EEXP(-1))	16.36998	8.458464	1.935338	0.0734
D(EEXP(-2))	14.77008	7.149779	2.065809	0.0579
C	-4835.296	2239.389	-2.159203	0.0487
HEXP(-1)	-71.05902	20.91063	-3.398224	0.0043
EEXP(-1)	12.74398	13.36110	0.953812	0.3564
RGDP(-1)	0.272049	0.116379	2.337609	0.0348

R-squared	0.811378	Mean dependent var	1976.703
Adjusted R-squared	0.676648	S.D. dependent var	1502.441
S.E. of regression	854.3484	Akaike info criterion	16.63874
Sum squared resid	10218756	Schwarz criterion	17.17504
Log likelihood	-196.9842	Hannan-Quinn criter.	16.78748
F-statistic	6.022256	Durbin-Watson stat	2.069254
Prob(F-statistic)	0.001368		

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Dependent Variable: RGDP
Method: Least Squares
Date: 03/31/19 Time: 16:37
Sample: 1990 2018
Included observations: 29

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HEXP	38.39544	61.80429	0.621242	0.5398
EEXP	91.25387	39.35415	2.318787	0.0285
C	22639.60	1580.311	14.32603	0.0000

R-squared	0.906565	Mean dependent var	39457.11
Adjusted R-squared	0.899378	S.D. dependent var	18991.98
S.E. of regression	6024.453	Akaike info criterion	20.34274
Sum squared resid	9.44E+08	Schwarz criterion	20.48418
Log likelihood	-291.9697	Hannan-Quinn criter.	20.38704
F-statistic	126.1340	Durbin-Watson stat	0.831321
Prob(F-statistic)	0.000000		