

**PREDICTIVE INFLUENCE OF HUMAN CAPITAL FORMATION ON ECONOMIC
GROWTH IN NIGERIA**

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Abstract

This study examined the predictive influence of Human Capital Formation (HCF) on Economic Growth (EG) in Nigeria, using Gross Domestic Product (GDP) to proxy for economic growth and government expenditure on both health and education to proxy for human capital formation. An ex-post-facto research design was adopted for the study. Secondary data (time series) sourced from both CBN and NBS statistical bulletins and reports was used for analysis conducted. The sample covered 37 years period, 1981-2017. The data collected were analyzed applying E-view. Augmented Dickey-Fuller test was conducted and it was discovered that the series consisted of random walk at level and these were eliminated at the first difference. Cointegration test was equally conducted making use of Johanson cointegration test and it was confirmed that the series were free from cointegration. Subsequently, multiple regression analysis was conducted by means of OLS estimation technique. Consequently, the following were established: F-statistics value of 570.0899, which implies that the model is of good fit; the probability of the t-statistics value $p < 0.05$ ($p = 0.000$) indicating a significant relationship between HCF and EG; the R^2 value of 0.971044, denotes that 97% of the total variation in the dependent variable (EG) is explained by the independent variable (HCF); The result also indicates a positive but insignificant relationship between education and GDP evidenced by LNEDU probability value $p > 0.05$ ($p = 0.1900$) and the coefficient (0.295112). Furthermore a positive and significant relationship is revealed between investment on health and GDP, evidenced by LNHLT probability value $P < 0.05$ ($P = 0.0108$) and the coefficient (0.547753). The study therefore recommends that Nigeria government should simultaneously increase her budgetary allocation, streamline and monitor its implementation in both health and education sectors to prevent misappropriation of funds so that the required growth could be fostered.

Keywords: Economic Growth, Human Capital Formation

INTRODUCTION

Previous researchers have established that human capital development has positive influence on economic growth (Awopegba, 2003). Health and education are important factor in human capital formation while human capital is crucial to productivity Todaro & Smith, (2003) and productivity is essential for growth in any nation.

Human capital is the stock of competencies, knowledge, social and personality attributes, including creativity, cognitive abilities, embodied in the ability to perform labour so as to produce economic value (Adelakun, 2011). Health on the other hand has been defined by World Health Organization (WHO) as “ a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Health and education are two closely related human (resources) capital components that work together to make individual more productive.

A healthy populace will be highly productive because they have ability to exert more effort and tendency to devote labour hours to productive activities, and the educated have the tendency to apply a degree of sophistication gathered during learning period to the productive process. The human development index (HDI) includes income, life expectancy (proxy for health) and knowledge (proxy for education); this shows the importance of education and health. In economic term; it helps people to lead a richer lives; culturally it prevents people to be unnecessary bound by tradition; from social point of view, it promotes a fuller lives, and politically prepares people for maximum participation in democratic processes.

Investment on human capital is a means of empowering people, and this in turn helps them contribute substantially to the growth process in the economy. That explanation justifies Nigerian government effort driven by vision 2020:20 which seeks to improve the educational

system in terms of access, infrastructure, teacher quality and curriculum relevance, funding and planning.

Economic growth on the other hand, is the increase in the amount of goods and services produced by economy over a period of time. It is conventionally measured as the percentage ratio of increase in the Gross Domestic Product (GDP) or Gross National Product (GNP). Economic growth means the expansion of a country's capacity to produce goods and services its people want within a given period.

Statement of Research Problem

The human development index (HDI) included health and education among its three indicators. The United Nation recommended that developing countries should invest a minimum of 26% of their budgetary allocation on health and the World Health Organization specified at least 5% on health. Vision 2020:20, among its effort seeks to improve the education system in a diverse ways. The second millennium development goal, specified that primary education should be made free and compulsory by 2015. These under-score the important role of education and health in human capital formation and economic growth.

Nigeria budgetary allocation to both education and health (which is crucial to human capital formation) is also generally low. For instance only 10.6% of the total budget was allocated to education in 2014 contrary to UNESCO 26% recommendation while 5.7% was allocated to health sectors. In 2015, health sector got 5.5%, while in 2016 Nigeria's budget on health and education sector were 4.3% and 8% respectively. The outcome of the low public expenditure on education and health is continued decline in educational opportunities and standard in the country; in line with the above, Nigeria has been experiencing a high level of illiteracy. Many of

the workers are unskilled and they make use of old fashioned equipment and methods of production. By implication, their marginal productivity is extremely low which leads to low real income, low savings, low investment and consequently low rate of capital formation. Overtime, the following issues relating to the concept have remained unresolved: un-even distribution of skilled manpower, misemployment of human capital, poor reward system etc. Which retards the acquisition and development of human capital and hence growth.

The primary school enrollment rate in Nigeria has been reducing drastically over the years, contrary to the proclamation of the second MDG goal. According to Human Development Report (2016) Nigeria ranked 153 with a value of 0.496 among 188 countries and the position never improved up till the time of the report.

Following from the above, investment in human capital is not given priority in Nigeria. Accordingly this study aims to examine the level of government spending on the education and health sector and the influence of human capital formation on economic growth in Nigeria. In effect the study will test the hypothesis; **H₀**: There is no significant relationship between human capital formation and economic growth.

LITERATURE REVIEW

Concept and Theory of Human Capital

According to OECD (2001), human capital is concerned with knowledge, skills, competitiveness and attributes embedded in an individual that facilitate the creations of personal, social and economic wellbeing. The term denotes all the knowledge, talents, skills, abilities, experience, intelligence, training, judgement, and wisdom possessed individually and collectively by individuals in a population ([https://en.wikipedia.org/wiki/human capital](https://en.wikipedia.org/wiki/human%20capital)). Application of human

capital concept on human is not recent, therefore it is important to dispel the misconception that the theory of human capital is an entirely new field. The different sources of human capital are: innate ability, schooling investments, training, school quality, non-schooling investments and pre-labour market influences (Acemogluo, D & Author, D, 2010). Going by the viewpoints of some neo-classical economies such as: Becker – Gardener, Schultz, Nelson – Phelps Bowles – Gintis and Spencer, (Acemoglou et al 2010) some uses of human capital can be exemplified as 1). Facilitation of production process; 2). Identification of different skills such as physical and mental abilities; 3). Dealing with disequilibrium situation; 4). Instilling of the “correct” ideology and approach towards life in individuals; 5). Act as signal of ability independently useful in production process (Acemoglou et al 2010). Three kinds of human capital have been identified by researcher as: a general, firm specific and task- specific (Gibbons & Waldman 2004; Hatch & Dyer, 2004) cited in (Acemoglou et al 2010). It is difficult that the specific human capital embedded in an individual transfers to different industries (Acemoglou et. al 2010). The view that human and his qualification might be a part of capital has proponents among economist since the birth of science and economics. The origin of human capital goes back to the emergence of classical economies such as: W. Petty, N. Farr, A. Smith, J.B. Say, N. Senior, F. List, J.S. Mill, A. Marshall, V. Thunen, W. Roscher, W. Bagchot, E. Engel, H. Sigwick, L. Walras and I. Fisher (Bilidirci, M., Orean, M., Sunal, S., & Aykac, E., 2005). The first estimate of a nation’s stock of human capital was probably made around 1676 by Sir William Petty in his publication political arithmetick; exactly a hundred year later in 1776, Adam Smith in his work inquiry into the nature and causes of the wealth of Nations’. Adam Smith considered education as one of the effective ways of increasing the productivity of human capital (Machlup, 2014). Following from the above, it is indicated that including human beings within the analytical

framework of capital is not a new idea (Nnamdi, 2010) and it suffices to show at this point that the theory of human capital had been in the economics and statistical literature for about 300 years before popularized by Schultz and Becker (Machlup, 2010). Though, Arthur Lewis is said to have begun the field of development economics and consequently the idea of human capital ([https://en.wikipedia.org/wiki/human capital](https://en.wikipedia.org/wiki/human%20capital)), but the use of the term “human capital” in the modern neoclassical economic literature dates back to Jacob Mincer’s article “Investment in human capital and personal income distribution” in the journal of political economy in 1958. Despite the fact that thereafter, Schultz applied the notion of human capital to the economics of education, particularly to an explanation of human resources (Machlup, 2014). The best known application of the idea of “human capital” in economics is that of Mincer and Gray Becker of the Chicago School of Economics. Becker’s book entitled Human Capital, published in 1964, became a standard reference for many years; In his view, human capital is similar to physical means of production and one’s output depend partly on the rate of return on the human capital one owns. Thus human capital is substitutable, but not transferable like land, labour, or fixed capital (<https://en.wikipedia.org/wiki/human-capital>).

The Second Romer Model: Romer focused this time on the production of knowledge by research workers. This model assumes that technological is labour-augmented, enhancing their productivity. The production function is expressed as: $Y = K^a (AL)^{1-a}$ so that AL denotes a knowledge-adjusted work-force. Further, the model assumes that research workers create technological knowledge. In a simple form, this is expressed as:

$$\frac{dA}{dt} = \delta H_A A$$

where H_A is human capital of research workers, and δ is a parameter. It is plain to see that the more researchers, the more new ideas are created, and the larger the existing stock of knowledge “A”, the more new ideas are produced (i.e. effects of externalities).

Equation (3) shows that the rate of technical progress will be determined by the stock of human capital of research workers. In other words, an economy with a larger total stock of human capital will grow faster (Romer, 1990, p.S99).

EMPIRICAL REVIEW

There seems to be a consensus from most of these studies that the development of human capital engenders economic growth. A review of some of the empirical literature is provided below;

Sankay, Ismail, & Shaari, (2010) investigated the impact of human capital development on economic growth in Nigeria during the period 1970 to 2008. Johansen cointegration technique and vector error correction analysis were used to ascertain this relationship. The result indicated that human capital formation has a significant impact on Nigeria’s economic growth.

Dauda, (2010) using the human capital model of endogenous growth developed by Mankiw, et al (1992), examined empirically the role of human capital in Nigeria’s economic development. The findings show that there is a feedback mechanism between human capital formation and economic growth in Nigeria.

Amassoma, & Nwosa, (2011) studies the casual nexus between human capital investment and economic growth in Nigeria for sustainable development in Africa at large between 1970 and 2009 using a Vector Error Correction (VEC) and Pairwise granger causality methodologies. The finding of the VEC model and Pairwise estimate revealed no causality between human capital development and economic growth.

Johnson, (2011) evaluates human capital formation and economic growth in Nigeria by adopting conceptual analytical framework that employs the theoretical and ordinary least square (OLS) to analyze the relationship using GDP as proxy for economic growth; total government expenditure on education and health, and the enrolment patterns of tertiary, secondary and primary schools as proxy for human capital. The analysis confirms that there is strong positive relationship between human capital formation and economic growth.

Oluwatobi, & Oluranti, (2011) examined the relationship between human formation efforts of the Government and economic growth in Nigeria. The result shows that there exists a positive relationship between government recurrent expenditure on human capital formation and the level of real output, while capital expenditure is negatively related to the level of real output.

Adawo, (2011) study used an econometric model to examine the contributions of primary education, secondary education and tertiary education to economic growth of Nigeria. Physical capital formation and health were found to contribute to growth.

Ishola, & Alani, (2012) evaluated the contribution of different measures of human capital to economic growth in Nigeria. Empirical analysis showed that both education and health components of human capital formation are crucial to economic growth in Nigeria.

Eigbiremolen, & Anaduka, (2014) examined the impact of human capital development on national output. Using quarterly time-series data form 1999-2012. The result shows that human capital development, in-line with theory, exhibits significant positive impact on output level.

Sharif, Ahmed, & Abdullah, (2013) verifies the contributions of human resource development (HRD) efforts in the growth process of Bangladesh. In this research, the Engel-Granger

cointegration tests have suggested a positive correlation between HRD activities and economic growth process of Bangladesh.

Mba, Mba, Ogbuabor, & Ikpegbu, (2013) evaluated the relevance of human capital development on the growth of the economy using ordinary least square (OLS) technique and deduced there is a strong positive relationship between human capital development and economic growth.

METHODOLOGY

Research Area: The research was conducted in Nigeria and the data used were extracted from statistical documents relating to Nigerian.

Research Design: An ex-post-facto research design was adopted for the study. There were no manipulation of the independent variables. Gross Domestic Product (GDP) was used as proxy for economic growth while government expenditure on both health and education to proxy as human capital formation.

Sample and Sampling Technique: Secondary data (time series data) sourced from both central bank of Nigeria and the National Bureau of Statistics were used for analysis conducted. The sample (series) covered 37 years from 1981 to 2017.

Method of Data Analysis: The data collected were analyzed with the aid of E-view. Unit root test was conducted using Augmented Dickey-Fuller test and it was discovered that the series consisted of random walk at level and these were eliminated at the first difference. Cointegration test was equally conducted with Johanson cointegration test and that confirmed that the series was free from cointegration; consequently a multiple regression analysis was conducted with ordinary least square estimation technique.

Model Specification: The model was denoted in a compact form as $\text{LnGDP} = f(\text{LnEDU} + \text{LnHTH})$ or $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \text{Er}$ and more elaborate as: $\text{LnGDP} = \beta_0 + \beta_1 \text{LnEDU} + \beta_2 \text{LnHTH} + \text{Err}$.

Where

$Y = \text{LnGDP}$ = Natural Logarithm of real GDP

$X_1 = \text{LnEDU}$ = Natural Logarithm of Government Expenditure on Education

$X_2 = \text{LnHTH}$ = Natural Logarithm of Government Expenditure on Health

Er = Error term

β_0 = Intercept; β (i.e. $\beta_1 \beta_2$) = Correlation of X_1, X_2 .

RESULTS

Table 4.1: Descriptive Statistics

	LNEDU	LNGDP	LNHLT
Mean	3.016368	8.447280	2.332305
Median	3.953741	8.576850	3.179303
Maximum	6.105016	11.64142	5.716600
Minimum	-1.237874	4.975561	-2.302585
Std. Dev.	2.554924	2.305176	2.777117
Skewness	-0.385161	-0.163263	-0.278420
Kurtosis	1.669787	1.593764	1.560967
Jarque-Bera Probability	3.642748 0.161803	3.213016 0.200587	3.670534 0.159571
Sum	111.6056	312.5494	86.29530
Sum Sq. Dev.	234.9950	191.2981	277.6456
Observations	37	37	37

The associated probability value of Jarque-Bera result from table 4.1 above reveals a higher value than 0.05 which is not enough to reject the null hypothesis that the sample is normally

distributed. Therefore the alternative hypothesis that the sample is not normally distributed is accept.

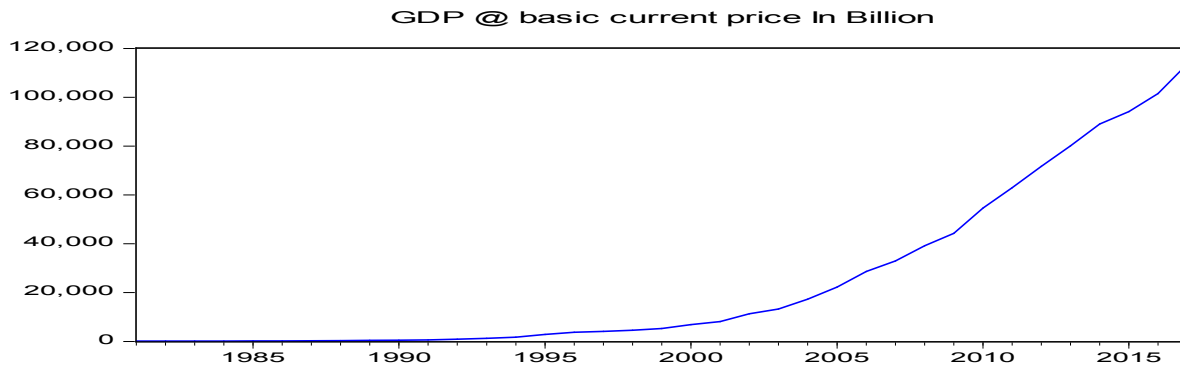


Figure 4.1: The trend of Real Gross Domestic Product between 1981 to 2017

In figure 4.1 above shows that the GDP is relatively stable. It increases steadily through the period covered.

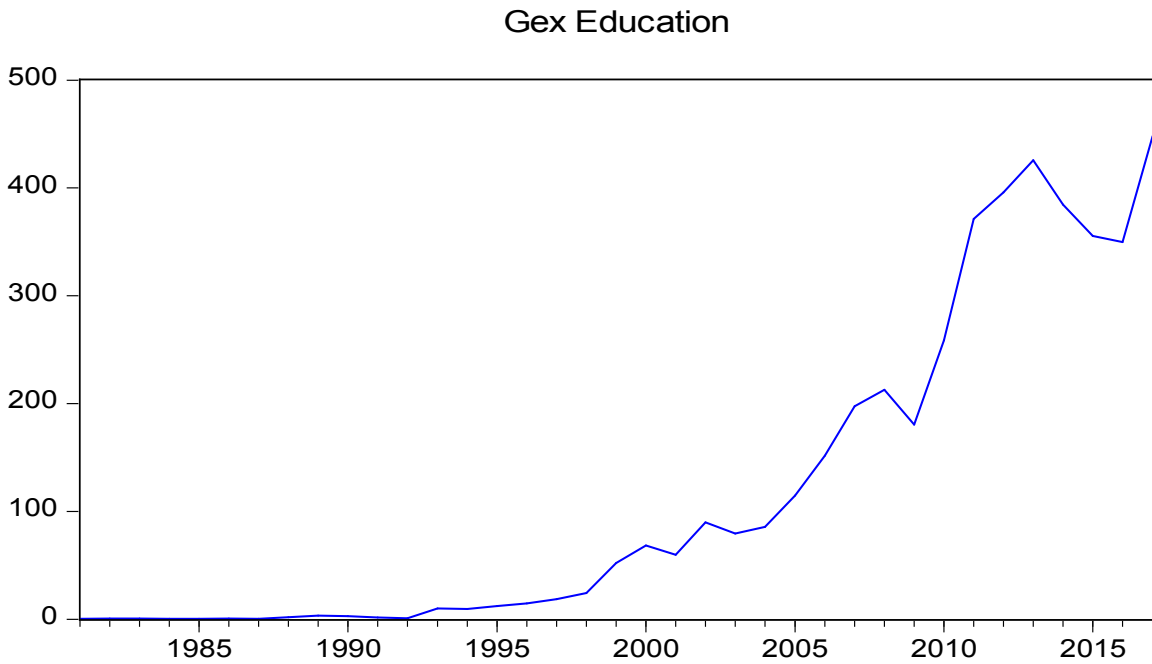


Figure 4.2: The trend of Government Expenditure on Education between 1981 to 2017.

Figure 4.2 above on government expenditure on education has not be stable over the year covered, declined between 1990 to 1992, 2000 and 2001, 2002 and 2003, 2008 and 2009, 2013 and 2016 and then continue to increase.

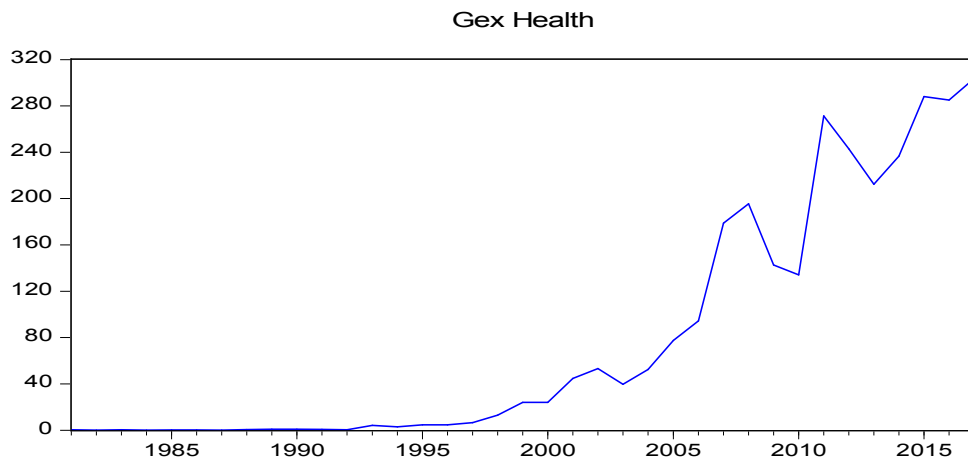


Figure 4.3: The trend of government expenditure on health between between 1981 to 2017.

The associated probability value of the Augmented Dickey- Fuller test 0.00314 $p < .05$ reveals that the result of the stationarity test is significant enough to reject the null hypothesis and accept that the series has no unit root.

Table 4.3: Unit Root Test Result for Government Expenditure on Health

Null Hypothesis: D(LNHLT) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Figure 4.3	Null Hypothesis: D(LNGDP) has a unit root		above
shows that	Exogenous: Constant		government
expenditure	Lag Length: 0 (Automatic - based on AIC, maxlag=9)		on health
has been	Augmented Dickey-Fuller test statistic	-3.157453	0.0314
It was	Test critical values: 1% level	-3.632900	fluctuating.
stable	5% level	-2.948404	relatively
1981 to	10% level	-2.612874	between
began to	*MacKinnon (1996) one-sided p-values.		2017, and
from 1998 through the period covered.	\		fluctuate

Unit Root Tests

Table 4.2: Unit root Test result for real Gross Domestic Product (GDP)

Table 4.4: Unit Root Test Result for Government Expenditure on Education

Augmented Dickey-Fuller test statistic		-9.264975	0.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

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

The associated probability value of the Augmented Dickey-Fuller test statistics. (0.000)

$P < .05$ reveals that the result of the stationarity test is significant enough to reject the null hypothesis and accept that the series has no unit root.

Null Hypothesis: D(LNEDU) has a unit root
 Exogenous: Constant
 Lag Length: 4 (Automatic - based on AIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.036601	0.0424
Test critical values:		
	1% level	-3.661661
	5% level	-2.960411
	10% level	-2.619160

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

The associated probability value of the Augmented Dickey-Fuller test statistics (0.0424) $P < .05$ reveals that the result of the stationarity test is significant enough to reject the null hypothesis and accept that the series has no unit root.

Cointegration Test Results

Table 4.5: COINTEGRATION RESULT

Date: 09/14/18 Time: 17:15
 Sample (adjusted): 1984 2017
 Included observations: 34 after adjustments
 Trend assumption: Linear deterministic trend
 Series: LNEDU LNGDP LNHLT
 Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
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None	0.371565	28.06027	29.79707	0.0783
At most 1	0.259503	12.26652	15.49471	0.1446
At most 2	0.058561	2.051764	3.841466	0.1520

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

The trace statistic of the Johanson test indicate a significant level at 5% $P < .05$ which denotes that the null hypothesis should be rejected and accept that the variable has no cointegration.

Regression Tests

Table 4.6: REGRESSION RESULT

Dependent Variable: LNGDP

Method: Least Squares

Date: 09/14/18 Time: 16:54

Sample: 1981 2017

Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.279589	0.214042	29.33812	0.0000
LNEDU	0.295112	0.220651	1.337461	0.1900
LNHLT	0.547753	0.202997	2.698331	0.0108
R-squared	0.971044	Mean dependent var		8.447280
Adjusted R-squared	0.969340	S.D. dependent var		2.305176
S.E. of regression	0.403634	Akaike info criterion		1.100990
Sum squared resid	5.539301	Schwarz criterion		1.231605
Log likelihood	-17.36831	Hannan-Quinn criter.		1.147038
F-statistic	570.0899	Durbin-Watson stat		1.536533
Prob(F-statistic)	0.000000			

The regression result above that independent variables (proxy by government expenditure on education and health) explains the variation in economic growth (proxy by real gross domestic product) by 96.9% Ln edu has a coefficient value of 0.295112 which implies that a unit change in education will result in 29.5% change in gross domestic product. Ln hlt has a coefficient value of 0.547753 which implies that a percent change in government expenditure on health will result in 54.8% change on gross domestic products.

The result also revealed that expenditure on health is potent than expenditure on education in the prediction of GDP evidenced by the value of the t-statistic probability value; the associated p-value for Lnedu $P < .05$ implies that there is a significant positive relationship between expenditure on health and GDP while that of Lnhtl $P < .05$ implies a positive significant relationship between expenditure on health and GDP.

The F-Statistic value of 570 indicates that the variables best captures the model, while the Durbin Watson value of 1.536533 shows that there is autocorrelation.

CONCLUSION AND POLICY IMPLICATION

Conclusion

The main objective of the study is to examine the predictive influence of human capital formation on economic growth in Nigeria (using real GDP as a proxy for economic growth while government expenditure on health and education as a proxy for capital formation). The study revealed a strong positive relationship between capital formation and economic growth. The finding of the study corroborated the assertion of the following researchers; Sankay, et al (2010), Dauda (2010), Amassoma, et al (2011), Johnson (2011), Oluwatobi, et al (2011), Adawo, (2011), Isola and Alani, (2012), Eigbiremolen and Anaduaka (2014), Sharif, Ahmed and Abdullah (2013) Mba, Mba, Ogbuabor and Ikpegbu (2013)

Policy Implication

The results of the study have important policy implications. Government should prioritize public expenditure towards the improvement of basic health and education services provision. This will facilitate access to quality education and health services and increase man hour devoted to production, creation and adoption of any appropriate technology needed in an economy.

Government should also devote more resource to health and education sectors by increasing its budgetary allocation to these sectors. This does not only strengthen these sectors, but allows for provision of quality manpower. Apart from the foregoing, government should also create institutional capacity that will increase school enrolment and improve basic health services. In addition, government should continue to create an enabling environment and awareness that will encourage private sectors' participation in improving investment in education and on-the-job training and health of their employee's; that will fast track the processes of human capital formation and economic growth in Nigeria.

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