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IMPACT OF HUMAN CAPITAL DEVELOPMENT AND ECONOMIC GROWTH IN NIGERIA

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Abstract

This study examined the impact of human capital development and economic growth in Nigeria using time series spanning from 1986 to 2021 which were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and from the Statistical and Nigeria Education Management Information System, Educational planning, Research and Development office of the Federal Ministry of Education, Abuja. It was set out to explore the relationship between human capital indicators (primary school enrolment, government expenditure on education and government expenditure on health) and economic growth (gross domestic product). The study employed Autoregressive Distributed Lag (ARDL) bounds testing approach to Co-integration analysis to estimate the relationship among the variables used in the study. The study established long-run co-integration among the variables. The findings from the study revealed that there is strong positive long-run relationship among primary school enrolment, government expenditure on education, government expenditure on health and economic growth though not statistically significant while only government expenditure on education and economic growth is statistically significant. In line with the findings, the study recommended that government and all stakeholders should make conscious effort to curb the menace of increasing out of school children which is regarded as "a time bomb" in order to increase primary school enrolment in Nigeria. Government should also improve her expenditure on education in providing educational infrastructure, training and retraining of teachers at all levels in the country so as to sustain long-run economic growth. Furthermore, effort should be made towards increasing budgetary allocation to health sector for continuous growth sustainability.

Keywords: *Human Capital Development, Economic Growth, ADF and ARDL Approach.*

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1. INTRODUCTION

In recent years, it has become very imperative that no nation has accomplished a sustained development in term of economic without massive investment in human capital. Human capital such as knowledge, skills and abilities of employees are used for production.

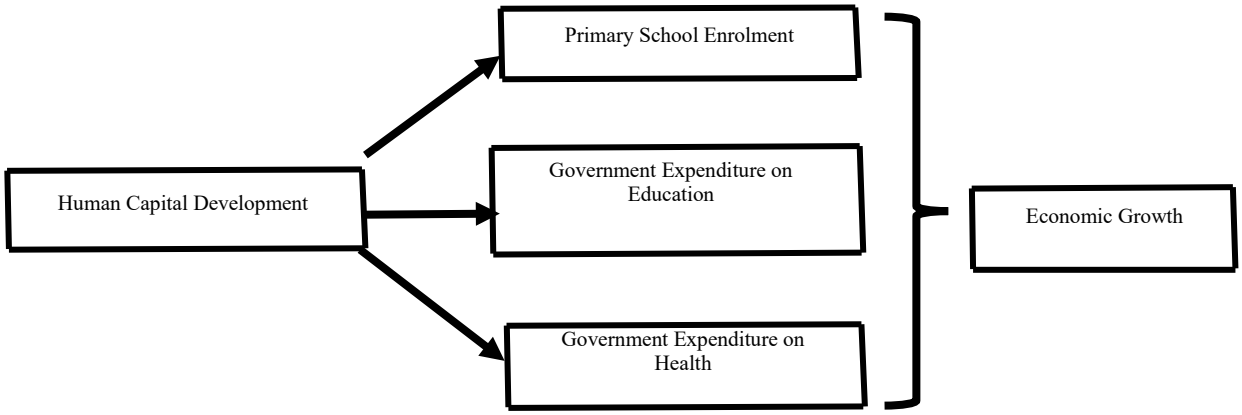
The importance of human capital to economic growth and development cannot be overstressed, particularly for the fact that human capital is central to the development step to any economy, Krokeyi & Niyekpemi (2022). Human Capital exhibited a cordial mutuality with growth of the economic, meaning that strengthened human capital lead to growing economy. Physical Infrastructure also exerted a positive impact on the country's economic growth process, Physical Infrastructure positively induces the country's growth, Olapade & Oladeji (2022). Human capital development has been viewed as final goal of development. It is a mean to accomplish human being's potential by enhancing their expertise. Human capital development can also be known as human capital formations or Human Resource development. Capital and natural resources are passive factors in the production process while employees (human resources) take initiative as active component that assemble capital resources, tap the resources provided by nature, formulate social, economic, and political institutions, as well as national development. Anyanwu, Adam, Obi, and Yelwa (2015) cited Harbison (1971) that it is obvious that, any nation that is incapable to grow the talents and expertise of its citizens and to utilize such adequately in the interest of national economy will be incapable to develop anything else". Investment in human capital plays significance role in promoting competitiveness, enhancing good standard of living of the citizens and in creating country's economic growth which a sustainable of it leads to development.

Nigeria, endowed with abundant resources, has failed to achieved her full development potential with sustainable development or people-oriented development currently given the top priority in most countries of the world especially the developed economies and many multilateral institutions such as the World Bank, UNESCO, and UNDP. It is important to improve the growth of the economy in Nigeria and tackle the challenges faced by human capital development. Therefore, this study is aimed at examining human capital development and economic growth nexus in Nigeria with emphasis on the effect of government expenditure on education on the economic growth in Nigeria from 1986-2021. This paper is divided into five main sections, including the references and appendices. Each section is subdivided, with the introduction as the first section. Section two contains the Literature Review. Section three contains the Research Methodology. Section four contains a data presentation and a discussion of results, while section five has a summary, policy recommendations, and conclusion.

2. CONCEPTUAL LITERATURE REVIEW

The conceptual framework review how human capital development influence economic growth in the country. GDP growth rate is about economic productivity, the standard value of goods and services produced within the boundary of an economic within a period of time. Human being are the one who run these activities irrespective of the sector of the economy. However, if human beings drive the economic activities with low preparation, low skill development, low education, poor policy, and low moral/motivation, such is a recipe for economy failure. A country with lack of entrepreneurial skills or lack of proper education cannot grow to full capacity or produce result.

Fig. 1:



2.1 Theoretical Review

This study is anchored on the theories of human capital development and economic growth. Human capital theory and other theories were reviewed such as Augmented Solow growth model theory and Endogenous growth model were employed. These theories are being adopted as explanatory tools. The concepts of human capital development and economic growth nexus is best understood within the framework of these theories.

Human Capital Theory

This theory review how learning through education leads to improved productivity and efficiency of employee by increasing the level of their reasoning skills. Theodore, Schultz, Gory Bucker and Jacob Mincer initiated the belief that people invest in education in order to

increase their stock of human capabilities which can be formed by combining innate abilities with investment in human beings (Babalola, 2000). These investments include expenses on education, on-the-job training, money spent on health as well as nutrition. Human capital theory views schooling and training as investment in skills and competences (Schultz, 1960 and 1961.

The Lucas Model

According to Ahuja (1980) Lucas assumes that investment on education and skills leads to the production of human capital which is the crucial determinant in the growth process.

In Lucas's framework, the difference between internal effects and external effects of human capital is very important in understanding the mechanisms driving economic growth. Internal effects of human capital refers to the direct influence of an individual's investment in human capital on their own productivity. The more individual acquires knowledge and training through formal and informal education, he or she becomes more skilled and productive in his or her specific roles. Output for firm 'i' take the form

$$Yi = A(Ki).(Hi).He$$

Where A = technical coefficient;

Ki = inputs of physical capital

Hi = inputs of human capital

He = economy's average level of human capital.

The model also comprises of a "learning by doing" mechanism, where individuals worker gather human capital which is not limited to only through formal education but also involve through on-the-job training experience. This learning method contributes to rising productivity over time.

Lucas emphasizes the accumulation of human capital through education and learning. The spillover effects go beyond the individual. They mean the positive effects of one individual's human capital gathered on the productivity of others in the economy, both capital and labour. For example, if a labour acquires new skills, it will not only increase their own productivity (internal effect), but the knowledge and expertise they deploy to the workplace can also

improve the productivity of their co-workers and potentially influence the overall productivity of the firm or industry.

2.2 Empirical Review

Different studies have examined empirically, the relationship between human capital development and economic growth. For example, Adebayo, Oloke etal. (2023) examined human capital development and economic growth in Nigeria using secondary data obtained from CBN statistical bulletin for the period of forty years between 1981 and 2020. The result showed that, there is smooth correlation between human capital development and economic growth in Nigeria. The analysis of structural break revealed absence of structural break incidence in Nigeria during the years under study. Their finding highlighted that the introduced Structural Adjustment Program (SAP) in the 80s which lasted for 12 years was not strong enough to enhance human capital development and economic growth.

Awogbemi (2023) investigated the effect of developing human capital on Nigeria's economic growth. Contextual analysis served as the main information source for his study. He adopted human capital theory. He affirmed that there was a clear link between human capital development and economic growth in Nigeria. He made some recommendations, such as encouraging private sector investment in health and education to increase their participation in the delivery of human capital services to the populace. He assumed that government expenditure on the health sector is ineffective in addressing health challenges without private investment in health.

Olapade and Oladeji (2022), assessed the direct effects of human capital development and selected total factor productivity components (technology and infrastructure) on economic growth in selected Sub-Saharan African Countries during the period 1981-2020 using the panel least square method. His study employed the augmented Solow growth model. The variables they used were the growth rate of Real Gross Domestic Product (RGDP) as the explained variable; while the independent variables are Human Capital Development proxy by the Human Development Index (HDI); Physical Infrastructure Index (PII) as a proxy for Physical Infrastructure; Research and Development (R&D) to proxy technology; Labour force growth; Share of Private Investment in GDP, Trade Openness, Financial Openness and Share of Total

Government Expenditure (SGE). Their study found out that human capital development is not sufficient enough to bring about the needed growth in an economy, hence, there is a need for

complementary factors such as technology and infrastructure for human capital to actualize its full potential. The results indicated that Human Capital has a positive relationship with economic growth, meaning that, the economy grows when human capital is strengthened. Physical Infrastructure also have a positive influence on the nation's economic growth process. Their study recommended that government expenditure should be centered on the infrastructural development which serves as the bedrock for industrial growth and export promotion.

Babangida (2022) examined the relationship between human capital development and economic growth in Nigeria for the period 1981-2020. He used time series data on life expectancy rate, public spending on education and public spending on health, tertiary school enrollment, secondary school enrollment and primary school enrollment as proxies for human capital development, and real gross domestic product (GDP) as variable for economic growth. He finding revealed that human capital development has a positive significant relationship with economic growth for the period under reviewed and in the long run. The results revealed that increases in human capital increases economic growth in Nigeria. He therefore recommended that efforts should be made by every entity of the economy to harmonize the activities in the educational and health sectors of the economy, as it will have a long run effect on the economy. He also advised the Nigerian government to also increase its allocation to education in its future annual budgets in order to set standards in the education sector.

Abe, Zumba etal. (2021), evaluated the impact of human capital development on economic growth in Nigeria over the period 1990-2018. He applied the Augmented Dickey Fuller unit root test and Autoregressive Distributed Lag (ARDL) co-integration techniques. The co-integration test result revealed that there exists a long run relationship between human capital variables and economic growth in Nigeria. his study recommended that government should increase its budgetary allocations to the education and health sectors while ensuring that the funds released to these sectors are utilised for the purpose for which they have been released.

Maku et al (2019), investigated the relationship between human capital development and macroeconomic performance in Nigeria using ARDL approach. They use annual time series data on GDP per capita, government education and health expenditures, and secondary and tertiary school enrolment rate for the period 1986 to 2015. Using GDP per capita as a proxy for macroeconomic performance, human capital development was proxies by government expenditure on education, government expenditure on health, secondary school enrolment and

tertiary school enrolments. Their results showed that human capital development has a negative and insignificant impact on macroeconomic performance in the short run, while only TER has a positive and significant impact on GDP per capita. Their study concluded that human capital development has not been an efficient determinant of the rate of growth in the macroeconomic performance in Nigeria.

3. METHODOLOGY

Research Design

This study utilized the enlightening exploration plan and the time series yearly optional information was taken on with the end goal of the review. The decision of the time series is prefaced on the way that the information utilized in this research was gotten from existing information on the period under investigation as it targets examining the impact of human capital development on economic growth in Nigeria. The Ordinary least squares (OLS) techniques was used to break down the impact of human capital development on economic growth in Nigeria. Information on absolute government use on health and all government consumption on education will be acquired from the Central Bank Statistical Bulletin while data on Primary school enrolment will be gathered from Statistical and Nigeria Education Management Information System, Educational planning, Research and Development office of the Federal Ministry of Education, Abuja.

Data Analysis Techniques

Descriptive Statistics was utilized to gauge the outline measurements of the information collection utilized in the review. These incorporate genuine GDP, primary school enrolment, health and education financial plan, and its parts. EViews 13 was utilized for information examination. Distinct measurements include the utilization of mean, least, greatest, line diagram, tablets, rates among others. This was utilized for true one and two.

Model specification

Human capital development is no doubt one of the cardinal factors influencing economic growth of most economies of the world. In view of this, a working relationship can be said to exist between human capital development and economic growth. To evaluate the impact of

human capital development on economic growth nexus in Nigeria, the study adopted the modified model of Hadir & Laurech (2015) by the inclusion primary school enrolment variable.

Economic Growth = *f*(Primary school enrolment, Government expenditure on education and Government expenditure on health)

Where,

The model is represented symbolically in its functional form as:

GDP = f (PES, GEE and GEH)

Where;

GDP = Gross Domestic Product;

PSE = Primary School Enrolment

GEE = Government Expenditure on Education

GEH = Government Expenditure on Health

$GDP = b_o + b_1 PSE + b_2 GEE + b_3 GEH + U_t$

Where

b_o = Constant term/parameter intercept.

b_1 = Regression coefficient of primary school enrollment;

b_2 = Regression coefficient of sum of government expenditure on education;

b_3 = Regression coefficient of total government expenditure on health;

U_t = Error Term

is the constant, and $\mathbf{b_1}$, $\mathbf{b_2}$, and $\mathbf{b_3}$ are the coefficients of the various independent variables of the model above capturing the impact of changes in each independent variable on the dependent variable. The Subscripts, t, refer to the time period of observations and in the case of the present study t= 1986 – 2021.

Description of Variables

Gross Domestic Product: This is the monetary value of all finished goods and services produced within a country's boarder in a specified time period. In entering the specified.

Primary School Enrolment: This is the sum enrolment in primary education, irrespective of age, expressed as a percentage of the population of official primary education age.

Government Expenditure on Health: This is the sum amount of expenses of government on health sector in the economy.

Government Expenditure on Education: This is the sum amount of expenses of government on education sector in the economy.

A priori Expectations

Theoretically, it is expected that increase in sum of government expenditure on education, sum of government expenditure on health will have positive relationship with gross domestic product, while primary school enrollment is expected to assume a negative relationship with the gross domestic product.

Table 1

REGRESSAND	REGRESSOR	RELATIONSHIP
GEE	GDP	+
GEH	GDP	+
PSE	GDP	+

Any boundary gauges with a positive sign (+) demonstrates that the free factor being referred to has an immediate or positive relationship with the dependent variable. Accordingly, they move in a similar direction.

Econometric Test

These are diagnostic test done on the variables in the model. It includes pre and post estimation tests.

Pre Estimation Test

Unit Root Test

Unit Root Test is used to check for stationarity in the time series. The testing procedure for the ADF test is the same as for the Dickey-Fuller test but it is applied to the model. p

$$\Delta Y_t = \beta o - \beta_{1t} + \lambda Y_{t-1} + \ldots, \qquad \alpha_i \Delta Y_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.2)$$

$$\sum$$

$$t=1$$

Where,

Y is the single time for [RGDP and PSE], [RGDP and GEE] and [RGDP and GEH] under investigation and ***β*** the parameter coefficient, is a pure white noise error term, and are coefficients of the lag terms and is the length of the lag terms which is automatically selected. If it is 0, then there is a unit root, but if it is less than zero (negative), the null hypothesis is rejected and the alternative that the series is stationary and is accepted.

Co-integration Test

Most macroeconomic factors like RGDP per capita, education and health yield are not fixed at their levels structure since they display pattern or/and irregularity. To dissect the long run relationship between the factors in the model, a co-integration test was utilized. Granger (1981) and Engel and Granger (1987) prescribed a co-integration test to decide the long-run relationship among the series. The Johansen (1988) co-integration test with lags is characterized as beneath:

$$\Delta Yt = \Gamma 1 \Delta Xt\text{-}1 + \Gamma k\text{-}1\ \Delta Xt\text{-}k + 1 + \Pi\ Xt\text{-}k + \mu + e\_t\ \ldots\ldots (3.3)$$

Sources of Data

Time series data from secondary source will be utilized for this review. Data on Government expenditure on Education and Health were gathered from the Central Bank of Nigeria (CBN) Statistical Bulletin while data on Primary school enrolment was gathered from Statistical and Nigeria Education Management Information System, Educational planning, Research and

Development office of the Federal Ministry of Education, Abuja. This information spread over through the time of 1986 to 2021.

4. DATA ANALYSIS AND DISCUSSION OF RESULTS

Presentation of Data

Annual data which covered period from 1986 to 2021 was used for analysis. Gross Domestic Product (GDP) is the dependent variable being explained while the independent or the explanatory variables are Primary School Enrolment (PSE), Government Expenditure on Health (GEH) and Government Expenditure on Education (GEE) represent the basic human capital determinants of the economy in the models. The secondary data on Government expenditure on Education and Health were gathered from the Central Bank of Nigeria (CBN) Statistical Bulletin while data on Primary school enrolment was gathered from Statistical and Nigeria Education Management Information System, Educational planning, Research and Development office of the Federal Ministry of Education, Abuja. This information spread over through the time of 1986 to 2021.

Descriptive Statistics of the Variables

Table 2

	GDP	PSE	GEE	GEH
Mean	42744.07	20194979	168.7650	102.1986
Median	15840.52	20039557	78.51500	37.41000
Maximum	176075.5	30455582	646.7500	423.3300
Minimum	198.1232	11540178	0.230000	0.040000
Std. Dev.	51764.80	5587711.	198.4354	127.3981
Skewness	1.108225	0.197288	1.065161	1.160684
Kurtosis	3.021739	1.889470	2.918612	3.166903
Jarque-Bera	7.369680	2.083449	6.817342	8.124911
Probability	0.025101	0.352846	0.033085	0.017207
Sum	1538786.	7.27E+08	6075.540	3679.150
Sum Sq. Dev.	9.38E+10	1.09E+15	1378181.	568059.8
Observations	**36**	**36**	**36**	**36**

Source: Researcher's computation from E-view (2024)

The result from the table above presented in Table 2 shows the statistics for Primary School Enrolment (PSE), Government Expenditure Education (GEE), Government Expenditure Health (GEH), and Gross domestic products (GDP). The result reveals that the primary school

enrolment has a mean of 20,194,979 in the period of the study, with a skewness of 0.197 which implies that primary school enrolment in the distribution is approximately symmetric within the acceptable skewness of between -0.5 and 0.5 (GoodData, 2007). Also, Kurtosis measures the skewedness and flatness of the series. The kurtosis was 1.889 and since the kurtosis is less than 3, it means that the distribution possesses lighter tails than normal distribution. Primary school enrolment was platykurtic which means the distribution produces less outliers than the normal distribution.

The result reveals that the government expenditure on education has a mean of N16.88 billion in the period of the study, with a skewness of 1.065 which implies that the expenditure on education is also skewed to the right of the distribution and within the acceptable skewness of between -3 and +3 (Brown, 2014). The kurtosis was 2.919 and since the kurtosis is less than 3, it means that the distribution possesses lighter tails than normal distribution. The expenditure on education was platykurtic which means the distribution produces less outliers than the normal distribution.

On government expenditure of Health, the mean result reveals for the period of the study was N10.22 billion with a skewness of 1.16 which implies that the expenditure on health is skewed to the right of the distribution and within the acceptable skewness of between -3 and +3 (Brown, 2014). Also, Kurtosis measures the pawedness and flatness of the series. The kurtosis was 3.167 and since the kurtosis is more than 3, it means that the distribution possesses more extreme outliers than normal distribution. The expenditure on health was leptokurtic which means the distribution produces more outliers than the normal distribution.

The result for the GDP has a mean of N42,744 trillion. GDP was skewed to the right with a skewness of 1.11. The result further shows that the GDP has a kultosis of 3.022 which means that the GDP is leptokultic because the value is more than 3, which implies that there are more extreme outliers than in the normal distribution.

Jarque-Bera statistical test indicates the variables that are nomally distributed as its measures the differences in the skewness and kurtosis. The results of the Jarque-Bera for GDP, PSE, GEE, and GEH were 7.37, 2.08, 6.82 and 8.12 respectively and further way from zero (0) and suggest that the variables were not normally distributed. Given the various finding from the descriptive statistics, a unit root test will be carried out to further test the normality of the variables.

Unit Root Test of Stationarity

Table 3: Augmented Dickey-Fuller Test

Variables	Level	Critical Value	First Difference	5% Critical Value	Order of Integration
GDP	3.215766	-4.243644	-4.305925	-3.54849	1(1)
PSE	-3.563745	-3.544284	-	-	1(0)
GEE	-1.117567	-3.544284	-4.834464	-3.54849	1(1)
GEH	-1.595277	-3.544284	-2.048869	-1.356068	1(1)

Source: Researcher's computation from E-view (2024)

Presented in Table 4.2 above is the result of the Augmented Dickey-Fuller test for Gross domestic products (GDP), Primary School Enrolment (PSE), Government Expenditure Education (GEE) and Government Expenditure Health (GEH). From the result, only (PSE) was stationary at level i.e. integrated at order zero (0) given that the t-statistic of -3.563745 which is higher than the critical value at 0.05 significance in absolute term. (GDP, GEE and GEH) were stationary at first difference i.e. integrated at order one (1) which is higher than the critical value at 0.05 significance in absolute term.

This allows for further use of the variables for analysis, guaranteeing the shortfall of deceptive relapse. Given the worth of the unit root test which includes I (0) and I (1) a Johansen Test of Co-integration and Vector Error Correction Estimates model was led.

Table 4: Correlation Matrix

	GDP	**PSE**	**GEE**	**GEH**
GDP	1.00000			
PSE	0.88595	1.00000		
GEE	0.98584	0.90074	1.00000	
GEH	0.98315	0.88348	0.99116	1.00000

Source: Researcher's computation from E-view (2024)

The table above shows relationship between variables, they have strong and positive relationship with each other as the relationships between one variable and another variable are all greater than 0.5

4.4 ARDL Bounds Test for Co-integration Analysis

Table 5: Critical value (F Statistic) for the bounds test: Unrestricted intercept and no trend

Computed F – Statistic	5% Critical Values	
	Lower Bounds	Upper Bounds
9.789262	3.71	5.02

Source: Researcher's computation from E-view (2024)

The above results shows that there are three co-integrating equations, therefore, there is a long-run relationship between the variables, i.e. long-run relationship between GDP, PSE, GEE and GEH. Basically, it means that the model has passed through co-integration test. The reason being that the F-statistics is greater than the lower and upper bounds at 5% significant level.

Long-Run and Short-Run ARDL Model
Table 6: Long-Run ARDL Model
gdp gdp(-1) gdp(-2) pse pse(-1) pse(-2) gee gee(-1) gee(-2) geh geh(-1) geh(-2) c

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.133644	0.454389	0.294117	0.7714
GDP(-2)	0.979260	0.442014	2.215449	0.0374
PSE	0.000223	0.000304	0.734521	0.4704
PSE(-1)	-4.16E-05	0.000322	-0.129384	0.8982
PSE(-2)	0.000345	0.000306	1.129557	0.2708
GEE	57.48521	29.64828	1.938906	0.0654
GEE(-1)	-2.517516	25.09771	-0.100309	0.9210
GEE(-2)	-17.45281	23.93529	-0.729167	0.4736
GEH	-14.95139	39.31923	-0.380256	0.7074
GEH(-1)	-40.90379	33.13691	-1.234388	0.2301
GEH(-2)	-1.978947	37.52242	-0.052740	0.9584
C	-7116.699	3698.012	-1.924466	0.0673
R-squared	0.998540	Mean dependent var		45245.40
Adjusted R-squared	0.997809	S.D. dependent var		52210.74
S.E. of regression	2443.652	Akaike info criterion		18.71094
Sum squared resid	1.31E+08	Schwarz criterion		19.24965
Log likelihood	-306.0860	Hannan-Quinn criter.		18.89466
F-statistic	1367.501	Durbin-Watson stat		1.712756
Prob(F-statistic)	0.000000			

Source: Researcher's computation from E-view (2024)

From the above tables of long-run equilibrium relationship, a percentage change in lag one of the GDP will bring about 13% increase in GDP. Though, it is not statistically significant. Similarly, a percentage change in lag two will bring about 98% in GDP and statistically significant, though at 10%.

Also, a percentage change in Primary School Enrolment (PSE) will bring about 0.000223 increase in GDP. Though not statistically significant. While a percentage change in Government Expenditure on Education (GEE) will bring about 57.5 rate of change in GDP, and is statistically significant at 10%. Lastly, a percentage change in Government Expenditure on Health (GEH) will bring about 15 rate of change in GDP. Though, it is not statistically significant at p-value.

Table 7: Short-Run ARDL Model

d(gdp) d(gdp(-1)) d(gdp(-2)) pse pse(-1) d(pse(-2)) d(gee) d(gee(-1)) d(gee(-2)) d(geh) d(geh(-1)) d(geh(-2)) ecm(-1) c

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.348710	0.352701	-0.988685	0.3346
D(GDP(-2))	1.427002	0.291720	4.891689	0.0001
PSE	0.000421	0.000264	1.592619	0.1269
PSE(-1)	-0.000335	0.000269	-1.245759	0.2272
D(PSE(-2))	-7.87E-05	0.000224	-0.351025	0.7292
D(GEE)	66.42013	18.40665	3.608485	0.0018
D(GEE(-1))	11.79362	15.61910	0.755076	0.4590
D(GEE(-2))	6.643991	15.49125	0.428887	0.6726
D(GEH)	-16.87933	26.99418	-0.625295	0.5388
D(GEH(-1))	-74.74433	22.67178	-3.296801	0.0036
D(GEH(-2))	-40.29694	22.53839	-1.787925	0.0890
ECM(-1)	-0.611999	0.292829	-2.089953	0.0496
C	-1310.189	3642.860	-0.359659	0.7229
R-squared	0.913531	Mean dependent var		5326.057
Adjusted R-squared	0.861650	S.D. dependent var		5438.895
S.E. of regression	2023.022	Akaike info criterion		18.34968
Sum squared resid	81852343	Schwarz criterion		18.93921
Log likelihood	-289.7697	Hannan-Quinn criter.		18.54804
F-statistic	17.60809	Durbin-Watson stat		1.450616
Prob(F-statistic)	0.000000			

Source: Researcher's computation from E-view (2024)

From the above tables of short-run and equilibrium relationship, the Error Correction Term (ECM) is one-period lagged. The one-period ECM passed three criteria; it is statistically significant going by the probability value which is less than 0.05 and also less than one and negative. If (-0.611999) is multiplied by 100, it equals 61.2%. this means there is high speed of adjustment from the short-run to the long-run if there is any disequilibrium in the system. It takes an average speed of 61.2% to adjust back from the short-run to the long-run.

Also, from the R-squared, the model also has a good fit, going by the value of (0. 913531) i.e. 91.4%. The F-statistics measure the overall significant of the coefficients going by the probability value which was found to be statistically significant.

Serial Correlation

Table 8: Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.880013	Prob. F(2,30)	0.1701
Obs*R-squared	4.009503	Prob. Chi-Square(2)	0.1347

From table 8, the null hypothesis is that there is no serial correlation in the estimated equation. The chi square statistics is 0.1347 (13.47%) and it is greater than 5% level of significance. Therefore, the null hypothesis is accepted and it is concluded that there is no serial correlation.

Stability Test

Fig. 2: CUSUM TEST

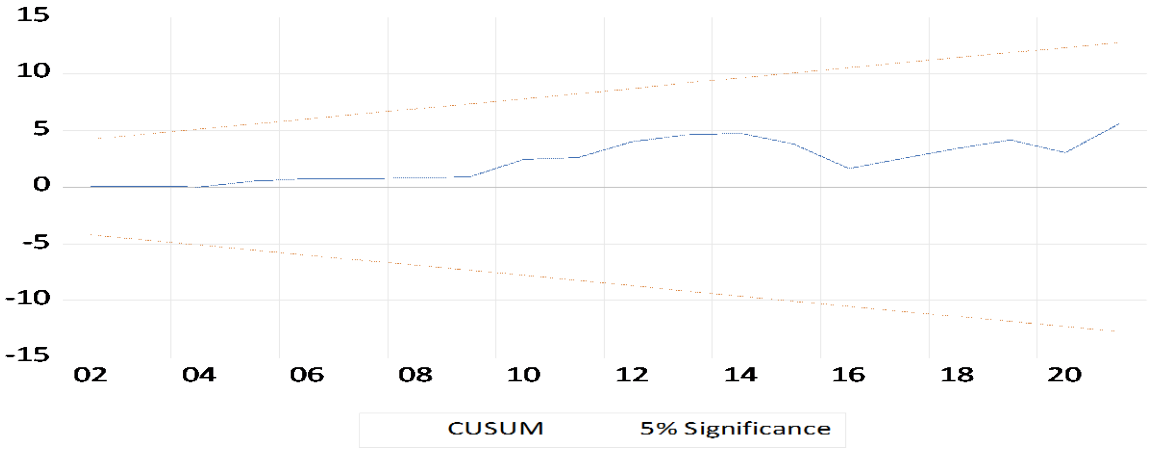
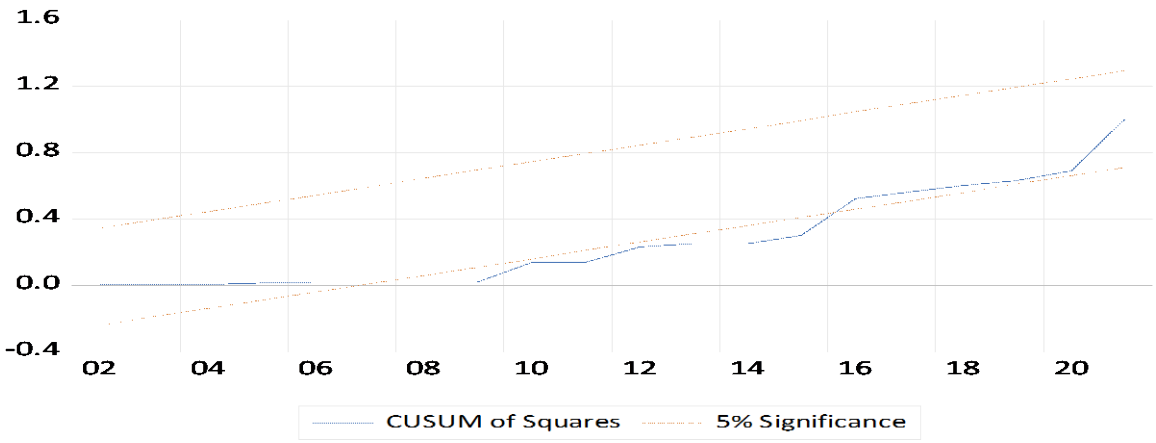


Fig. 3: CUSUM SQUARE TEST



Source: Researcher's computation from E-view (2024)

The results of the stability test are shown in the figures above. Going by the suggestion of the guideline that, if the blue line falls between the two red lines (above and below), it implies that the residual is stable. Therefore, from the foregoing, using the Recursive Estimation Test (CUSUM and CUSUM of Squares tests), we conclude that the residual is stable since the blue line falls between the two red lines (above and below).

5. CONCLUSION AND POLICY RECOMMENDATIONS

Conclusion

This study employed the Autoregressive Distribution Lag (ARDL) bounds testing approach to co-integration to assess the relationship between human capital development using (Primary School Enrolment, Government Expenditure on Education and Government Expenditure on Health) and Economic Growth (Gross Domestic Product) in Nigeria for the period of 1986 – 2021. The estimated results established that there are three co-integrating equations, therefore, there is a long-run relationship between the variables, i.e. long-run relationship between GDP, PSE, GEE and GEH. The study modified the Endogenous Growth by making Primary School Enrolment endogenous factor to growth in a separate model. The estimated long-run relationship established the positive contribution of human capital development in economic growth process of Nigeria. In addition, Breusch-Godfrey Serial Correlation LM Test affirmed that there is no serial correlation in the estimated equation. Moreover, it is concluded that Johansen test confirmed that the variables used are co-integrated, meaning there is long-run nexus between human capital indicators (PSE, GEE and GEH) and economic growth in

Nigeria. These human capital indicators are important determinants of Nigerian economic growth.

The inferences from this study corroborate with the views of Krokeyi & Niyekpemi (2022), Anderu (2021), Abe, Zumba etal. (2021), Adeyemi and Ogunsola (2016) and Babangida (2022). In contratry, Olapade and Oladeji (2022) opined that human capital development is not sufficient enough to bring about the needed growth in an economy, hence, there is a need for complementary factors such as technology and infrastructure for human capital to actualise its full potential. Amassoma and Nwosa (2017), have contrary views on the link between human capital development and economic growth in Nigeria.

Policy Recommendations

In view of the findings, it is very important to make the following recommendations:

i. Government should improve her expenditure on education in providing educational infrastructure, training and retraining of teachers at all levels in the country so as to sustain long-run economic growth.
ii. More investment should be in technical and vocational education. Hence, the need for the government to revive our technical colleges across the country that are in state of comatose.
iii. Both the government and multinational companies should establish special training centres with the responsibility of enhancing the skill, knowledge and capabilities of human capital. This will in turn has positive multiplier effect on the economic growth and development.

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