Original Research Article

Human Capital Development and Economic Growth: Evidence from Nigeria.

Abstract
This study examined the impact of human capital development on economic growth in Nigeria from 1981 to 2021. Human capital development was proxied by Government expenditure on education and health alongside gross fixed capital formation, primary, secondary and tertiary school enrolments, while economic growth was proxied byreal gross domestic product growth rate. The study applied the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration. The results revealed that in the long run government expenditure on education and tertiary school enrolment had insignificant negative impact of economic growth while government expenditure on health, gross fixed capital formation, primary and secondary school enrolments had insignificant positive impacts on economic growth. On the other hand, in the short run, while government expenditure on education exhibited significant negative impact on economic growth, government expenditure on health had significant positive impact on economic growth. Gross fixed capital formation impacted positively on economic growth, primary school enrolment had negative impact while secondary and tertiary enrolments had positive impact on economic growth. Consequently, the study recommended among others that the government should set incremental annual targets expenditure on health aimed at achieving the Abuja agreement of 15% of total public expenditure in the health sector. This will create multiplier effect in the long run and serve as a boost to economic growth in the country.
Keywords:*Human Capital Development, Economic Growth, Endogenous Growth Theory, Autoregressive Distributed Lag, Nigeria.*

1. Introduction

Human capital development is the process of building the inherent skills, knowledge and capabilities of people to enhance their contributions towards productive activities in their location, environment or country. Human capital development entails educating the populace so that they have the wherewithal to make better use of the world's existing resources. The health of the population, which in turn influences productivity, and on-the-job training designed to boost employee efficiency are both aspects of human capital development. Conversely, economic growth refers to an increase in the value of the economy as a whole as a result of increased production of products and services through time. Self-sufficiency may also be seen as a nation's ability to create the vast majority of its own consumable products and services. It follows that countries that fail to fully tap the potential of their people would struggle to maintain high rates of economic growth. Therefore, education expenditure as well asprimary, secondary, and tertiary school completion rates are important indicators of human capital development, and the government must take the initiative in this area by allocating resources to fund the construction and maintenance of educational institutions. Vital to national productivity is the provision of health care facilities and services aimed at increasing the vigour, strength, vitality, and life expectancy of the people. This is an area where the government must also take the lead through public expenditure. On-the-job training is the third component of human capital development, and it's meant to help people who are currently working in the public or private sectors enhance their abilities over time. Due to frequent structural changes in the economy, workers' skills may become outdated and require updating. In this way, on-

the-job training is crucial to maintaining and enhancing labour productivity. These factors are consistent with the Human Development Index (HDI), a composite assessment of life expectancy, education level, and gross national product per capita developed in 1990 by the United Nations Development Programme.

Human capital development is important for economic growth, and the United Nations Development Report (1996) argued that increased national investment in this area would lead to a more equitable distribution of income, since education opens doors to better paying jobs for people of all socioeconomic backgrounds. Human capital development was found to have an effect on GDP growth through environmental protection and the more educated and environmentally conscious utilisation of society's natural resources in the interest of future generations. Countries throughout the world, including Nigeria, have made policies and investments to maximise the benefits of human capital development for their national economies because of this realisation.

1.2 Stylized Facts on Human Capital Development in Nigeria

1.2.1 The Education Sector

In Nigeria, the Federal government is charged under the Constitution with the obligation of formulating, coordinating, and monitoring in basic education in terms of government policy coordination and responsibility in the education sector. Following the declaration of the international conference on education for all (EFA) held in Jomtien, Thailand in September 1990, the federal government instituted universal basic education (UBE). One of the major purposes of the UBE is to provide students a firm footing for lifelong learning by making sure they reach the necessary levels of literacy, numeracy, manipulative, communication, and life skills. The first UBE project began in 1976 and made primary school for all children, regardless of their socioeconomic status, a priority for six years. From there, the UBE was extended to encompass nine years of compulsory education (National Policy on Education, 2013): six years of primary school and three years of junior secondary education.

Unity schools and Technical colleges are among the few secondary schools that fall under federal jurisdiction. The Federal Ministry of Education (FMOE) and the National Universities Commission (NUC) are two examples of regulatory organisations that establish standards at different levels of education and are therefore reasonably under the control of the federal government. However, the State governments, which comprised of 36 states, are directly in charge of a substantial number of tertiary institutions in the country, including state universities, polytechnics, and colleges. Legally, primary school management rests with local governments, with appropriate oversight provided by federal and state governments. A large number of religiously affiliated private schools and institutions are also located in the nation and are within the purview of the FMOE and NUC (National Policy on Education, 2013).

Recurring government spending on education includes things like monthly payments to teachers at all levels, as well as R&D, administration, overhead, and other costs that are necessary to keep the education system running and meet the sector's human capital needs. The two sections of Table 1 are as follows. Part one presents data from 1990 through 2021 about the real gross domestic product (RGDP), federal government recurrent expenditure (GREE) in billions of Naira, and GREE as a percentage of RGDP. From 1990 to 2021, the federal government's recurrent expenditure was less than one percent of real GDP, as shown in the table below. There was a severe shortfall in funding for education between this time period and the standard set by UNESCO's education 2030 Incheon statement, which called for spending between 4 and 6 percent of GDP on education. Enrollment in primary, secondary, and higher education may be seen in the second half of table 1. From 1990 to

2021, the average proportion of children between the ages of 6 and 12 who were enrolled in primary school was 89.97% (see table). In 1996, enrollment was at its lowest (78.66%), while in 2006, it was at its highest (102.11%). However, secondary school enrollment numbers were lower than primary school enrollment numbers during the research period. In Nigeria, just 33.14 percent of pupils between the ages of 16 and 17 were enrolled in secondary school in any given year between 1990 and 2021. In 1998, the number was at its lowest (21.87%), while in 2013, it was at its peak (56.21%). The number of persons enrolled in postsecondary institutions, defined as those aged 17 and up, was also fewer than the number of those enrolled in secondary institutions. Over the time frame of this study, enrollment was at an average of 8.68%. In 1990, enrollment was at a low of 4.34%, and in 2021, it was at a high of 13.65%. it could be seen that, unlike the primary and secondary schools' enrolment, tertiary school enrolment maintained successive annual increase.

Table 1:Government Recurrent Expenditure on Education (GREE), Real Gross Domestic Product (RGDP), GREE as percentage RGDP & School Enrolment in Nigeria, 1990 - 2021

Year	GREE (₦B)	RGDP(₦B)	% of RGDP	PSE (%)	SSE (%)	TSE(%)
1990	2.4	21,680.20	0.01107	86.49	24.72	4.34
1991	1.26	21,757.90	0.005791	85.65	22.54	4.78
1992	0.29	22,765.55	0.0012739	89.7	23.43	4.89
1993	8.88	22,302.24	0.0398166	93.82	21.98	5.12
1994	7.38	21,897.47	0.0337025	93.61	22.43	5.41
1995	9.75	21,881.56	0.0445581	89.3	23.12	5.65
1996	11.67	22,799.69	0.0511849	78.66	24.54	5.76
1997	14.85	23,469.34	0.063274	81.65	20.98	5.87
1998	13.59	24,075.15	0.0564482	85.72	21.87	6.06
1999	43.61	24,215.78	0.1800892	94.11	23.55	6.12
2000	57.96	25,430.42	0.227916	98.69	24.61	6.67
2001	39.88	26,935.32	0.1480584	96.38	27.03	7.21
2002	80.53	31,064.27	0.2592367	98.01	29.61	8.65
2003	64.78	33,346.62	0.1942626	99.47	32.96	9.71
2004	76.5	36,431.37	0.2099839	100.68	35	9.93
2005	82.8	38,777.01	0.2135286	101.37	34.96	10.49
2006	119.2	41,126.68	0.2898362	102.11	34.46	10.76
2007	150.78	43,837.39	0.343953	93.31	31.87	10.94
2008	163.98	46,802.76	0.350364	84.14	35.39	10.52
2009	137.12	50,564.26	0.2711797	85.39	39.23	9.21
2010	170.8	55,469.35	0.3079178	85.12	44.22	9.57
2011	335.8	58,180.35	0.5771708	90.67	45.56	10.17
2012	348.4	60,670.05	0.5742537	92.09	47.18	10.31
2013	390.4	63,942.85	0.6105452	94.12	56.21	10.54
2014	343.75	67,977.46	0.5056823	90.1	45.62	10.76
2015	325.19	69,780.69	0.4660172	86.43	46.78	10.96
2016	339.28	68,652.43	0.4941995	84.73	42	11.04
2017	403.96	69,205.69	0.5837092	79.08	42.65	11.76
2018	465.3	70,536.35	0.6596599	87.45	43.51	12
2019	593.33	72,094.09	0.822994	85.73	44.31	12.32
2020	646.75	70,800.54	0.9134817	83.54	45.87	12.76
2021	620.59	73,382.77	0.845689	81.87	42.32	13.65

Source: CBN Statistical Bulletin 2021; UNESCO, Institute for Statistic (UIS) Bulk Data Download, Accessed October 24, 2022.

1.2.2 The Health Sector

Primary, secondary, and tertiary care are clearly distinguished subsectors within Nigeria's health care system. Despite some wiggle room in who pays for what when it comes to providing medical care, each branch of government has certain legal duties that must be met. Primary healthcare is the purview of the local government, secondary healthcare is the responsibility of the state government, and tertiary healthcare is the province of the federal government. The Federal Ministry of Health is responsible for developing and implementing policies, programmes, and any other measures required to sustain and enhance a national health system that is able to provide a service that is effective, efficient, affordable, and of high quality, and that ultimately improves the quality of life for all Nigerians. It represents the nation in international forums, provides direction for the development of a national health information network, and monitors the provision of tertiary care at academic medical centres and other specialised facilities. The Federal Ministry of Health oversees a wide range of health-related agencies, including the National Primary Health Care Development Agency (NPHCDA), the National Agency for Food, Drug Administration and Control (NAFDAC), the National Health Insurance Scheme (NHIS), the National Institute for Pharmaceutical Research and Development (NIPRD), the National Institute for Medical Research (NIMR), and the National Agency for the Control of AIDS (NACA).These organisations also oversee a wide range of independent medical professionals. The National Health Policy (2016) identified the following as policy thrusts for the health sector: governance, health service delivery, health financing, human resources for health, medicine, vaccines, commodities and health technology, health infrastructure, health information system, health research and development, community ownership/participation and partnership for health. The roles and responsibilities framework consist of 52 actors ranging from the office of the President of the Federation to Conference of Speakers of States Houses of Assembly.With a growing population of over 200 million people and an annual growth rate of 2.8%, the government's participation in the health sector through these organisations, policy thrusts and actors is more important than ever. Without accounting for the size of government, however, it is impossible to assess whether or not her health care spending is proportional to its value. Health spending in Nigeria as a share of total government expenditure is displayed in Table 2 from the years 2009 through 2022. Although the Abuja declaration of 2001 called on member countries of the African Union to allocate at least 15% of their budgets to health care, the current allocations fall short of this goal.According to the World Health Organization (2023) between 2009 and 2022 the highest government general health expenditure in Nigeria was in 2020 with 587 billion Naira expended for health care representing 5.43% of total government expenditure. This height in public expenditure on health in the country could be attributed to the COVID-19 pandemic which compared governments across the world to increase their public expenditure on health to tackle the spread of the virus. The least expenditure during this period, however, occurred in 2010 with 186 billion expended for health care representing only 2.70% of total government expenditure, see table 2.

Table 2. Domestic General Government Health Expenditure (GGHE-D) as percentage of Total Government Expenditure (GE-T) in Nigeria, 2009– 2022.

Year	GGEH-D (₦Billion)	GGHE-D as % of GE-T
2009	158	3.69
2010	186	2.70
2011	262	2.77

2012	290	3.67
2013	299	3.46
2014	276	3.34
2015	278	5.33
2016	259	4.87
2017	316	4.44
2018	418	4.59
2019	461	5.17
2020	587	5.43
2021	695	4.84
2022	835	4.88

Source: World Health Organization (2023).

1.3 Statement of the Problem and Objective of the Study

Though the government of Nigeria has made a variety of efforts to foster human capital development to achieve long-term economic growth, given her rapidly expanding population, particularly among the young, it has been suggested that the government's investments in education and healthcare have been insufficient to spur sustained economic growth (UNESCO, 2022). In addition, other recent studies have examined the connection between human capital development and economic growth, with divergent results necessitating further research on the nexus between human capital development and the growth of the Nigerian economy. Some of these studies includeAttahir, Ahmad, and Abdullahi (2020), Ogunjobi, Ekiran, and Adesanmi (2021), Keji (2021), and Anyanwu, Adam, Obi, and Yelwa (2015). Consequently, this research seeks to examine the impact of human capital development on Nigeria's economic growth from 1981 to 2021. The study's specific objectives are to (i) analyse the effect of primary, secondary, and tertiary education enrollment on economic growth; (ii) examine the effect of government spending on healthcare on economic growth; (iii) evaluate the relationship between gross fixed capital formation and economic growth; and (iv) assess the effect of government education expenditure on economic growth. The rest of the paper is as follows: section two is a survey of the relevant literature, including both theoretical and empirical works. Methodology is discussed in section 3, data analysis and discussion of results are covered in section 4, and a summary and suggestions are presented in section 5.

2. Literature Review

2.1. Theoretical Framework

In this analysis, we used Romer's (1986) endogenous growth model. Romer's (1986) endogenous growth theory, often known as the new growth theory, contends that an economy's expansion is driven by elements inside itself, rather than from beyond, as was proposed by earlier theories such as those of Harrod (1939), Domar (1946), Solow (1956) and Swan (1956). Unlike traditional growth models, which turn to external factors like savings and technology for explanations of economic expansion, Romer's (1986) endogenous growth model focuses on factors within the model itself. The endogenous growth model also avoids the problems faced by the Solow-Swan model, another neoclassical growth model that assumed a production function with constant returns to scale and capital depreciation. Endogenous growth theory, in light of this, argues that spending on things like education and research may help an economy thrive. Positive externalities and spillover effects in a knowledge-based economy are highlighted as a means through which this paradigm may be used to stimulate economic expansion.

2.2. Review of Empirical Literature

This section looked at the research on how human capital development affects economic growth. To determine the gap that needs to be filled in this study, an evaluation of these studies is required. The Solow growth model was studied in 1992 by Mankiw, Romer, and Weil to see if it agreed with the regional differences in living standards. They discovered that countries converged at about the rate indicated by the enhanced Solow growth model by including human capital in the model, holding the same and population constant, and looking at the implications of convergence in the standards of living between poor and rich countries.

Azariadis and Drazen (1990), using the more sustainable framework of an overlapping generation's model, defined the method of passing on human capital from generation to generation. However, they did so without taking into account the precise elements that have an immediate influence on growth. A formal demonstration of how employees' decisions to spend in their own education and training may have positive spillover effects (pecuniary externalities) and lead to rising human capital returns at the macro level was presented by Acemoglu (1998). His finding of "social increasing returns" in physical capital was overlooked in favour of private investment in infrastructure, and the same was true of the role that government spending played in fostering human capital development. For their study, Haouas and Yagoubi (2005) looked at the MENA region's openness to trade and investment and the region's human resources as potential drivers of productivity development. Despite finding any correlation, their study discounted the significance of endogenous factors in fostering human capital and economic growth. Robert (1991), the World Bank (1993), Leoning (2002), Sanderson, Yansha, and Pierre (2018), and many others have evaluated the impact of human capital on economic growth in a number of East Asian countries and Guatermala. Studies like this highlighted how vital health and education are to the development of human capital. To make matters worse, the sequential nature of education's impact on human capital development was ignored.

Khalafalla and Suliman (2013) studied the effect of human capital on economic growth in Sudan between 1982 and 2009 using a simultaneous equation model that links human capital to variables like GDP growth, total productivity, FDI, and the human development index. There was enough room for interpretation in their model, but the analytic strategy ignored the study's temporal dynamics. Evaluations of the effect of human capital and infrastructure development on economic growth in the BRICS and transition countries have been conducted by Oluwumi (2019), Tsaurai and Ndou (2019), Igor, Valentyna, Tatjana, and Iryna (2022), and others, with consideration given to variances across nations. Their a priori hypothesis were validated, despite the fact that the research weren't country-specific and didn't account for the order in which schooling affects human capital. Using a variant of the Mankiw-Romer-Weil equation for the Cobb-Douglas function that takes into account convergence/divergence and differentiation due to changes in territory size, Gruzina, Firsova, and Strielkowski (2021) studied the dynamics of human capital development across economic development cycles. Conventional wisdom has it that early industrialisation occurred with little regulation and that the growth of human capital was a happy accident. Human capital was shown to increase as a result of industrialisation. This study's methodology may not apply in the Nigerian context, however, because of the little data available there.

Many Nigerian studies have looked at the connection between investing in people and growth of the country's economy. Several researchers have employed VECM, including Sankay, Ismail, and Shaari (2010), Oluwatobi and Ogunrinola (2011), and Keji (2021), whereas Mba, Ogbuabor and Ikpegbu (2013) relied on OLS. Their models were strong, and their findings showed that investing in human capital boosts economic growth, but they failed to account

for either the short- or long-term dynamics of the relationship. That is to say, the models did not reveal whether or not variables related to human capital development had a differential effect on economic growth over the short and long terms. Using the Autoregressive Distributed Lag (ARDL) method, researchers like Anyanwu, Adam, Obi, and Yelwa (2015), Attahir, Ahmad, and Abdullahi (2020), Keghter, Oliver, and Afamefuna (2020), Ogunjobi, Ekiran, and Adesanmi (2021), and Euphemia (2022) found conflicting outcomes while looking at the same nexus. Primary, intermediate, and tertiary school enrollments all have an influence on human capital development, but this study's authors failed to account for this progression. The flip side of the coin is that there are a few studies that looked at the link between public health investment and economic growth. These studies all took a somewhat different approach, but they all revealed a strong positive association between public health investment and economic growth. The Autoregressive Distributed Lag (ARDL) method of analysis was used in only one research, by Ideh, Nenbee, and Vite (2022), to compare and contrast the short and long run dynamics. As an example, Olayiwola Bakare-Aremu and Abiodun (2021) investigated the nexus in Nigeria through the lens of Wagner's theory of expanding State power. They discovered a highly substantial positive association between the two factors they were studying. Equally convincing was the conclusion reached by Viju and Wullianallur (2020) that federal spending on public health had a materially favourable effect on economic growth throughout the United States. Two more groups of researchers have looked at the impact of healthcare spending on China's GDP growth: Zhang, Gang, and Dong (2020) and Xu, Zhao, and Li (2022). Both studies used geographical panel data and the Durbin model or the knowledge production function to determine that government spending significantly boosted economic development. Government health investment was found to have a considerable beneficial influence on economic development by studies conducted by Wang (2015) and Aboubacar and Xu (2017), who used the generalised technique of moments to analyse data from sub-Saharan nations and OECD countries, respectively. By adapting Keji's work (2021) with certain changes, the current study hopes to address these gaps and add to the existing knowledge. In specifically, the current study employed the ARDL econometric approach to analyse the data and also separated total school enrolment to include elementary, secondary, and tertiary enrolments, whereas Keji (2021) used the endogenous growth model along with the VECM technique. We also disaggregated the effects of government spending on health and education and gross fixed capital creation (a proxy for physical capital) on economic development in Nigeria from 1981 to 2021.

3. Methodology

Romer (1986); Mankiw et al (1992) showed that labour as a factor of production is heterogenous in the production process due to prevailing distinct levels of human capital development. This is in line with the works ofOluwatobiandOgunrinola(2011) and Keji(2021) models which the current study has adopted with modifications. Thus, this study expressed the human capital model algebraically using the Cobb Douglas formulation as:

$$Y=(AL^{\alpha}K^{\beta}) \quad (3.1)$$

Where: Y = total output or economic growth; L = labour input; K = physical stock of capital input; A = total factor productivity; α and β are output elasticities of capital and labour respectively. This study however, expanded the Cobb-Douglas production function to include human capital development to examine its interaction and impact on total output. Thus, the expanded model is expressed as:

$$Y=f(L, K, HCD) \quad (3.2)$$

Where: Y = total output or economic growth; L = labour input; K = physical stock of capital

input; A = total factor productivity; α and β are output elasticities of capital and labour respectively.

3.1 Model Specification

Following the Romer (1986) endogenous growth theory used as theoretical framework in this study and the Cobb-Douglas formulation, equation 3.2 is the expanded model with the introduction of human capital development (HCD). The HCD variables that interact with L and K include:government expenditure on education (GEE), government expenditure on health (GEH), gross fixed capital formation growth rate (GFCFG), primary school enrollment (PSE), secondary school enrollment (SSE) and tertiary school enrolment (TSE), while real gross domestic product growth rate (RGDPG) is the dependent variable. Consequently, the new functional model is expressed as:

$$RGDPG = f(GEE, GEH, GFCFG, PSE, SSE, TSE) \quad (3.3)$$

In equation 3.3, real GDP growth rate (RGDPG) was used as proxy for economic growth. Government expenditure on education, government expenditure on health, primary, secondary and tertiary school enrolments were proxies of human capital development while gross fixed capital formation growth rate was used as proxy for capital.

The autoregressive distributed lag (ARDL) econometric technique for the estimationof equation (3.3) is expressed as:

$$RGDPG_t = \alpha + \sum_{i=0}^{n} \beta_{1i}\Delta RGDPG_{t-i} + \sum_{i=0}^{n} \beta_{2i}\Delta GEE_{t-i} + \sum_{i=0}^{n} \beta_{3i}\Delta GEH_{t-i} + \sum_{i=0}^{n} \beta_{4i}\Delta GFCFG_{t-i} + \sum_{i=0}^{n} \beta_{5i}\Delta PSE_{t-i} + \sum_{i=0}^{n} \beta_{6i}\Delta SSE_{t-i} + \sum_{i=0}^{n} \beta_{7i}\Delta TSE_{t-i} + \beta_8 RGDPG_{t-1} + \beta_9 GEEt_{-1} + \beta_{10} GEH_{t-1} + \beta_{11} GFCFG_{t-1} + \beta_{12} PSE_{t-1} + \beta_{13} SEE_{t-1} + \beta_{114} TSE_{t-1} + \varepsilon_{1t} \quad (3.4)$$

Where:Δ is the first difference operator,β_{1i},……,β_{7i}, indicate the short-run dynamics of the model,β_8,…….β_{14}, denote the long-run association and$\varepsilon_{1t}$is the random termin equation 3.4. The specific form of error correction mechanism (ECM) estimated for RGDPG as a measure of economic growth in this study is expressed as:

$$RGDPG_t = \beta_0 + \sum_{i=0}^{n} \beta_1 RGDPG_{t-1} + \sum_{i=0}^{n} \beta_2 \Delta X_{t-1} + \beta_3 ECM_{t-1} + \varepsilon_{3t} \quad (3.5)$$

Where:X_t is the vector of matrix representing a set of explanatory variables, ECM_{t-1} is the error correction term and it captures the speed of adjustment back to the long run after a short run shock and ε_{2t} is the stochastic error term.

3.2 Estimation Technique and Procedure

The study employed Augmented Dickey Fuller(ADF) unit root test to ascertain the stationarity status of the variables used, after which the autoregressive distributed lag (ARDL) regression technique was adopted to examined the impact of the explanatory variables on the dependent variable. The diagnostic tests included the Breusch-Godfrey serial correlation LM test, Breusch-Pagan-Godfrey Heteroscedasticity test for residual stability.

4. Empirical Results and Discussion

4.1 Unit Root Test Result

The unit root test for stationarity of the series using the Augmented Dickey Fuller test is shown in table 3 below.

Table 3. ADF Unit Root Test Results

Variable	ADF Statistics			Probability		Integration
	Critical Val (5%)	Levels	1st Diff	Levels	1st Diff	
RGDPG	-2.9350	-3.6780	……ψ	0.0082	……ψ	I(0)
GEE	-2.9350	1.8028	-4.7010	0.9996	0.0005	I(1)
GEH	-2.9571	0.0124	-7.4514	0.9530	0.0000	I(1)
GFCFG	-2.9369	-4.2883	……ψ	0.0016	……ψ	I(0)
PSE	-2.9369	-3.0251	……ψ	0.0410	……ψ	I(0)
SSE	-2.9350	-1.5719	-6.5550	0.4876	0.0000	I(1)
TSE	-2.9369	-0.0050	-4.0278	0.9525	0.0032	I(1)

…….ψ denotes a variable already integrated at levels. The null hypothesis is stationary around the intercept.
Source: Author's computation with the use of Eviews 10

In table 3, real GDP Growth rate (RGDPG) was integrated of order zero I(0), and government expenditures on health (GEH) and education (GEE) were stationary at first difference and at the one percent level of significance, suggesting that the variables were also integrated of order zero I(0).Gross fixed capital formation and enrollment in primary schools were integrated with order zero (I(0)), while enrollment in secondary and tertiary schools was integrated with order one (I(1)) and was significant at the one percent level.

4.2 Bound Test for Cointegration Result

Long run relationship validity was evaluated once time series characteristics were established. The ARDL model and the Bound test were employed to ascertain if the series showed any statistically significant long-term associations. The success of the ARDL procedures depends on the lag time, thus it must be selected with care. Using AIC, as suggested by Pesaran et al. (2001), this investigation established how long the lag should be. Therefore, the selected ARDL model (4, 4, 4, 4, 3, 4, 4) was used to analyse the long-term correlation between each variable. You can see the Bound test's outcomes in Table 4. The F-statistic (3.429615) was found to be greater than the upper critical bound value (3.28) at the conventional 5% threshold of significance. Results point to a long-term connection between all factors. Thus, these factors would shift together over time.

Table 4. Bound Test to Cointegration Result

F-Statistics = 3.429615 K = 6		
	Critical Bounds Value	
Significance	Lower Bounds	Upper Bounds
10%	1.99	2.94
5%	2.27	3.28***
2.5%	2.55	3.61
1%	2.88	3.99

Notes: Critical values are obtained from Pesaran et al (2001) with trend and intercept, *,**,*** and **** indicate significance at the 10, 5, 2.5 and 1 percent levels
Source: Author's computation using Eviews 10

4.3 Estimation and Discussion of Findings

4.3.1.1 The ARDL Model's Long-Term Prediction

After establishing a long-term connection between the variables, we proceeded to estimate

the long-run coefficient estimates in Equation (3.2). The long-run elasticities were estimated using the AIC, and the ARDL model was determined to be optimal [4, 4, 4, 4, 3, 4, 4]. Table 5 displays the results. The boundary test showed that there was a long-term relationship between the variables, but that none of them had any significant effect on real GDP growth. There was a negative correlation between real GDP growth rate and government expenditure on education (GEE) and tertiary school enrollment (TSE), but a positive correlation between real GDP growth rate and GEH, GFCFG, PSE, and SSE over the long term, even though the explanatory factors were not statistically significant.

Table 5. ARDL Long Run Results Estimate

Dependent Variable: RGDPG				
Variable	Coefficients	Std. Error	t-Statistics	Probability
GEE	-0.623883	2.425106	-0.257260	0.8097
GEH	1.311313	6.178222	0.212248	0.8423
GFCFG	1.481111	8.604223	0.172138	0.8717
PSE	2.920793	17.06700	0.171137	0.8724
SSE	0.807455	1.679456	0.480784	0.6558
TSE	-0.532106	10.23204	-0.052004	0.9610
C	-287.8725	1552.602	-0.185413	0.8619

Source: Author's computation using Eviews 10

The results in table 5 implies that investments in human capital alongside the capital accumulation and other institutional parameters such as government expenditure on education and health, gross capital formation and school enrolments at primary, secondary and tertiary levels have had no significant impact on the real growth rate of GDP in Nigeria at the 5% level of significance.

4.3.2 The ARDL Short Run Estimates and Error Correction Mechanism (ECM).

The ARDL short run estimations and ECM findings are shown in Table 6. It was the CointEq(-1) that solved the ECM mystery. We used the ECM model to investigate the speed with which the variables would react if the long-run equilibrium were to be disrupted, and to reflect the short-run dynamics of the growth rate of human capital. The error correction term's coefficient is shown to be statistically significant and negative, with a rate of correction from lagged period error shocks accounting for around 17% of the short-run disequilibrium. According to the coefficient of determination R2 = 0.982093, the fluctuations in the dependent variable RGDPG were explained by the explanatory variables in the model 98% of the time. After applying n-k correction, the R-squared (R2) value is 0.939766, which is rather high. The short-term estimations showed that RGDPG was negative but still statistically significant. Coefficients of -1.203030, -0.663777, and -1.061871 for lag periods D(RGDPG(-1)), D(RGDPG(-2), and D(RGDPG(-3)) indicate that the RGDPG is reduced by 1.20%, 0.66%, and 1.06% for every 1% change in the subsequent Real GDP growth rate. Spending on education by the government has a negative, albeit statistically insignificant, effect on the rate of growth of real GDP. For the years 2021, 2020, 2019, and 2018, the real GDP growth rate was reduced by 0.22%, 0.11%, approximately 0.06%, and 0.08%, respectively, according to the coefficients of -0.221482, -0.105359, -0.057114, and -0.083873 for the lag periods D(GEE), D(GEE(-1)), D(GEE(-2)), and D(GEE(-3)). On the other hand, health spending by the government was positively correlated with real GDP growth rate at the 1% level of significance across all years. Real GDP growth rate was reduced by approximately 0.34 percentage points in 2021, 0.32 percentage points in 2020, 0.27 percentage points in 2019, and 0.15 percentage points in 2018, according to the coefficients of 0.336397, 0.315617,

0.267025, and 0.147855 for the lag periods of D(GEH), D(GEH(-1), and D(GEH(-2)). When compared to real GDP per capita growth (RGDPG), the GFCFG was negative and negligible in the first year of the brief period but positive and relevant in the second and third years. However, GFCFG was statistically significant and favourable relative to RGDPG in 2020. In the short term, the correlation between primary school enrollment and RGDPG was negative and statistically significant, with the exception of the first lag year 2020. In the short term, the correlation between secondary school enrollment and RGDPG was positive and statistically significant at the 1% level of significance for all years except the second lag year. Current and lag periods of D(SSE), D(SSE(-1)), D(SSE(-2)), and D(SSE(-3)) have coefficients of 0.527203, 1.111604, -0.861867, and 0.693612, respectively. This indicates that changes in government spending in 2021, 2020, 2019, and 2018 increased real GDP growth rate by approximately 0.53%, 1.11%, decreased real GDP growth rate by 0.0.86%, and increased it by 0.69%. Participation in postsecondary education had contradictory results. The years 2021 and 2019 saw an increase, while the years 2020 and 2018 had a decrease. In both instances, TSE had a considerable impact on RGDPG. Changes in tertiary school enrollment in 2021 increased RGDPG by 12.49% and 7.76% approximately, while tertiary school enrollment in 2020 decreased RGDPG by 4.59% and 6.56% approximately, as indicated by the coefficients of 12.49245, -4.591318, 7.757060, and -6.556702 for the current and lag periods of D(TSE), D(TSE(-1)), and D(TSE(-2))

.Table6.ARDL Short Run Estimates Result

Dependent Variable: RGDPG				
Variable	Coefficient	Std. Error	t-Statistics	Probability
D(RGDPG(-1))	-1.203630	0.076819	-15.66846	0.0001
D(RGDPG(-2))	-0.663777	0.084944	-7.814294	0.0014
D(RGDPG(-3))	-1.061871	0.069963	-15.17757	0.0001
D(GEE)	-0.221482	0.022929	-9.659411	0.0006
D(GEE(-1))	-0.105359	0.025796	-4.084341	0.0150
D(GEE(-2))	-0.057114	0.014780	-3.864391	0.0181
D(GEE(-3))	-0.083873	0.015824	-5.300391	0.0061
D(GEH)	0.336397	0.034162	9.847236	0.0006
D(GEH(-1))	0.315617	0.044939	7.023263	0.0022
D(GEH(-2))	0.267025	0.041761	6.394154	0.0031
D(GEH(-3))	0.147855	0.028741	5.144353	0.0068
D(GFCFG)	-0.013134	0.016725	-0.785302	0.4762
D(GFCFG(-1))	0.139546	0.024306	5.741114	0.0046
D(GFCFG(-2))	0.044798	0.022538	1.987679	0.1178
D(GFCFG(-3))	0.058258	0.022074	2.639212	0.0576
D(PSE)	-0.516479	0.068900	-7.496096	0.0017
D(PSE(-1))	-0.034343	0.076429	-0.449342	0.6765
D(PSE(-2))	-0.371809	0.070452	-5.277508	0.0062
D(SSE)	0.527203	0.107835	4.888980	0.0081
D(SSE(-1))	1.111604	0.107369	10.35313	0.0005
D(SSE(-2))	-0.861867	0.134165	-6.423921	0.0030
D(SSE(-3))	0.693612	0.129087	5.373234	0.0058
D(TSE)	12.49245	1.094371	11.41519	0.0003
D(TSE(-1))	-4.591318	1.446327	-3.174468	0.0337
D(TSE(-2))	7.757060	1.065245	7.281949	0.0019
D(TSE(-3))	-6.556702	0.708386	-9.255836	0.0008

CointEq(-1)*	-0.168004	0.019341	-8.686284	0.0010
Adjusted R^2	0.9392	Jarque-Bera	6.72358(0.7562)	
Breusch-Godfrey test	0.07383			
Breusch-Pagan-Godfrey test	0.7920			

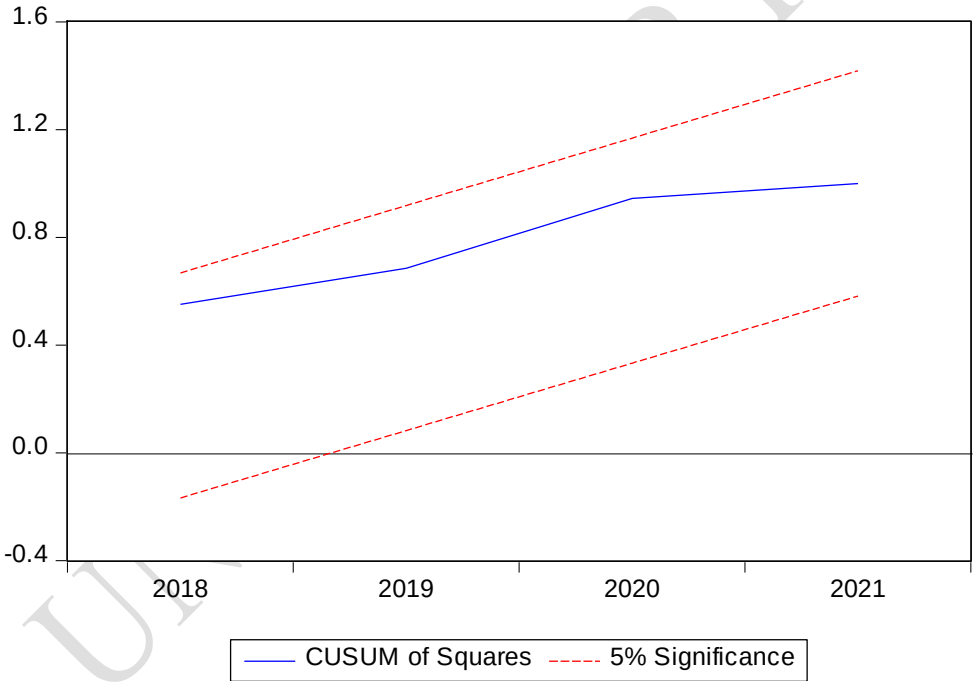
Source: Author's computation using Eviews 10

4.3 Diagnostic Test Results

Diagnostic tests of constant variance of the error term or test of heteroscedasticity and residual stability or normality testas well as the parameter stability through CUSUM tests were conducted. The result of the heteroscedasticity test shows no heteroscedasticity exist given the P-value of 0.7820 necessitating the retention of the null hypothesis of no heteroscedasticity as seen in table 6.

The Jarque-Bera normality test revealed that the probability could be approximated to 5% to retain the null hypothesis of normality of the error term.

The cumulative sum (CUSUM) test shows no evidence of parameter instability as the lines lie with the upper and lower boundaries as seen in figure 1.



Source: Author's computation using Eviews 10.

Figure 1. Cumulative Sum test for stability.

5 Conclusion

This research sought to contribute to the continuing dialogue about the relationship between human capital development and economic growth by analysing this nexus in Nigeria through the lens of the new growth theory and the ARDL method. Human capital development model data for primary, secondary, and tertiary enrollments were obtained

from the United Nations Educational, Scientific, and Cultural Organisation (UNESCO) data bank on 24 October (2022), while data on government expenditures on education and health were obtained from the Central Bank of Nigeria Statistical Bulletin (2021). This research shows that health care spending, secondary and even some higher education enrollment all contribute to economic growth in the short run, but human capital development has little effect on growth in the long run.

6. Recommendations

The following are the recommendations based on the study's findings:

(i) The government should raise its spending on education, notably on worker remuneration and welfare, as well as on other recurring expenditures that would restore workers morale and improve performance in these areas.

(ii) The government should set incremental annual targets expenditure on health aimed at achieving the Abuja agreement of 15% of total public expenditure in the health sector. This will create multiplier effect in the long run and serve as a boost to economic growth in the country.

(iii) The government should also increase the pace of growth in gross fixed capital formation by investing more in social and economic infrastructure such as power and decent roads. These assets work in tandem with other elements such as health care and education to boost economic growth.

(iv) The negative connections between government spending on education and real GDP in both the short and long run periods suggest that government spending on education is misdirected. The government should investigate any leakages in its educational financing and guarantee that monies are routed to the intended uses.

(v) The government should also revise the tertiary education curriculum to make it more relevant to local needs. To put it another way, the curriculum should be tailored to the needs of local enterprises, natural resource discovery and exploitation, and service delivery. This would aid in the production of problem-solving personnel and entrepreneurs rather than job-seeking graduates.

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