IMPACT OF HUMAN CAPITAL DEVELOPMENT ON THE ECONOMIC GROWTH OF NIGERIA

By

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ABSTRACT

This study uses annual time series data from 1985 to 2023 to investigate how human capital development affects Nigeria's economic growth. While real Gross Domestic Product (RGDP) is utilized as a stand-in for economic growth, the study focuses on important indicators of human capital development, such as government spending on health care, education, labour productivity, inflation, and private capital investment. The Autoregressive Distributed Lag (ARDL) model is used in the study to examine the relationships between the variables over the short and long terms. The results of the unit root and limits cointegration tests show that human capital development and economic growth in Nigeria have a steady long-term relationship. The long-term findings demonstrate that while inflation has a negative but negligible impact on economic growth, labour productivity, health spending, and education spending all have positive and statistically significant benefits. While labour productivity continues to be a significant growth driver in the short term, investments in health and education have adjustment effects before producing good results. The study comes to the conclusion that continued investment in healthcare and education is crucial for boosting innovation, increasing productivity, and fostering long-term economic growth in Nigeria. Therefore, the study suggests policies targeted at enhancing labour productivity and macroeconomic stability, more government investment in the health and education sectors, and effective use of public monies.

Keywords: RGDP, Health Care, Education, Labour Productivity and ARDL

1.0 INTRODUCTION

Economic growth is commonly acknowledged to be significantly influenced by the development of human capital. It encompasses the competencies that enhance economic performance and productivity (Becker, 1964; OECD, 2019). According to Schultz's (1961) and Becker's (1964) Human Capital Theory, investments in health, education, and skills increase national income and productivity just as investments in physical capital. Strong investments in human capital have allowed nations like Singapore, South Korea, and Malaysia to experience rapid economic growth (Lucas, 1988; Romer, 1990). However, Nigeria's human capital development is still lacking, which restricts the nation's capacity to fully leverage its sizable population for economic expansion (World Bank, 2023).

Because education increases skills, creativity, and labor productivity, it is a significant part of human capital. Compared to nations like Ghana and Kenya, Nigeria has an average primary school enrollment of 85–90 percent, but secondary and tertiary enrollment is still comparatively

low (UNESCO, 2022; AfDB, 2022). Inadequate money, inadequate infrastructure, packed classrooms, out-of-date curricula, and a teacher shortage are some of the other issues facing the education sector (Lawanson, 2009; Oni, 2014). These issues make it more difficult for the educational system to provide a workforce that is competitive and skilled.

Since healthy people are more productive and flexible, health is another crucial component in developing human capital. Underfunding, poor life expectancy, high maternal mortality, illness outbreaks, and a lack of medical personnel due to migration plague Nigeria's healthcare system (WHO, 2022; UNDP, 2023). These ill health issues impede economic growth and lower labor productivity.

The foundation of this research is Human Capital Theory, which contends that long-term economic growth, productivity, and creativity are all enhanced by investments in education, health, and skills (Schultz, 1961; Becker, 1964). Numerous studies have looked at human capital and economic growth in Nigeria, but the majority have neglected the combined effects of labor productivity, health, and education in favor of focusing on individual indicators like health or education spending. Additionally, some research used out-of-date data. This analysis fills up these gaps by using data from 1985 to 2023 and a number of variables, including as labor productivity and government spending on health and education, to give a more comprehensive picture of how human capital development influences economic growth in Nigeria.

2.0 LITERATURE REVIEW

Human capital development has been conceptualized by numerous scholars, each emphasizing unique facets that collectively highlight its role in fostering economic transformation, productivity, and innovation. At its core, it is the process of improving human resources' quality and capacity through education, training, healthcare, and other knowledge and competency development techniques. Schultz (1961) defined human capital development as investing in people's health, education, and skills to increase their productivity and efficiency in the labor market. According to Schultz, just as physical capital boosts industrial production, investing in people increases their ability to contribute to economic advancement. This perspective holds that human capital influences output and is a measure of society's well-being, acting as both a means and an end.

Though contemporary empirical research goes beyond the straightforward notion that "more schooling equals more growth," the relationship between education and real GDP has continued to be a major issue in growth literature. The discourse has grown increasingly complex. It now strongly favors education level, quality, and relevance rather than just access. First, using new long-term data for the US, Barro (2021) reexamined the relationship between human capital growth. His results confirm what previous research suggested but did not fully highlight: improvements in the average number of years spent in school greatly boost GDP per capita and productivity. But higher education is where the real punch is found. At the tertiary level, returns were not only greater but also more enduring over time.

The UK exhibits a similar trend. Using panel data approaches, Sianesi and Van Reenen (2020) discovered that the GDP increases by about 0.6% for every 1% increase in the percentage of highly educated workers. Although it doesn't seem striking at first, the effect intensifies at scale.

They make a simple but compelling case: increasing enrollment is insufficient; what matters are the skills students acquire and how they apply to the workforce moving to Asia.

Ono (2021) looked at Japan's experience and emphasized the importance of ongoing learning, whereas Monkman (2021) contended that education contributes not only to progress. Lifelong skill development is just as important as formal education. The study demonstrated that consistent investment in labor training and technical education greatly increased industry productivity and innovation. It presented a clear picture of economies that are always learning and expanding.

Hanushek and Woessmann (2020) examined vocational systems, specifically Germany's dual training model, in a more comprehensive comparative framework. Their conclusions were startling. The strategy decreased young unemployment and increased productivity by combining classroom education with practical experience. It was successful because it reduced the disparity that many emerging economies still face between education and employment. Stromquist gives economic resilience an additional dimension. According to their findings, nations with educated people are better equipped to withstand shocks, innovate under duress, and maintain long-term GDP growth. In this way, education serves as both a stabilizer and a catalyst for growth.

The data becomes much more context-specific when we look at Nigeria. The African Economic Research Consortium (AERC, 2020) investigated the relationship between education and growth using cointegration and causality tests. The results showed that enrollment and education spending are important, but not in the same way. Compared to basic education, secondary education in particular had a greater impact on real GDP. This implies that access is not as important as an individual's depth within the system. In support of this, the Central Bank of Nigeria (CBN, 2021) discovered a long-term positive correlation between real GDP and higher education spending. The conclusion is obvious: by generating skilled labor and encouraging innovation, postsecondary education promotes structural change. However, the report also cautioned that these improvements could be undermined by inefficient financial allocation.

Previous empirical study on the relationship between Nigeria's economic growth and the development of human capital has often been constrained by a number of factors. Many of them were too focused on the short term to grasp structural changes and long-term economic dynamics. Furthermore, rather than integrating numerous facets of human capital into a single analytical framework, the majority of research on human capital development used a single proxy, such as health spending or educational attainment.

3.0 THEORETICAL REVIEW

The human capital hypothesis, which analyzes the relationship between productivity, health, and education, is one of the most significant economic ideas. The theory's central claim is that rather than being merely passive actors, people are active participants in the production process whose productivity is governed by their knowledge, skills, and health. Like physical capital, human capital requires deliberate investment to yield returns, according to early proponents such as Schultz (1961). Workers' productivity is increased by investments in healthcare, education, vocational training, and even relocation to more advantageous labour markets. This increases workers' lifetime incomes and promotes national economic growth.

Empirical evidence provides strong support for these claims. Psacharopoulos and Patrinos (2004) found through a meta-analysis of educational returns that investments in education frequently provide high private and social returns, especially in low- and middle-income countries.
Long-term poverty and underdevelopment are therefore likely to be experienced by nations with significant disparities in the development of their human capital. Health is another essential component of human capital. Bloom and Canning (2003) found that employees in good health are more motivated, more cognitively alert, and less likely to miss work. Thus, the human capital framework provides an intellectual foundation for understanding why nations that prioritize health and education tend to have more fast and sustained economic growth.

The Human Capital Theory, which describes the connection between investments in people and an economy's overall success, serves as the foundation for this study. It argues that when people are educated, skilled, and healthy, they are productive assets that can significantly contribute to growth. As a result, education, training, and healthcare are viewed as investments that increase the labour force's future productivity, much like the acquisition of infrastructure or machinery.

4.0 METHODOLOGY

The quantitative, ex-post facto research design used in this study is especially well-suited for examining historical data in which the researcher has no influence over the independent variables. The goal of this study is to investigate how aspects of human capital development, as measured by spending on health care, education, labour productivity, inflation, and private capital investment, have impacted Nigeria's economic growth throughout time. The researcher uses secondary time series data from 1985 to 2023 because national and international entities have already produced and archived economic statistics.

4.1 Model Specification

The theoretical and quantitative framework used to investigate the relationship between human capital development and economic growth in Nigeria is presented in this section. The model specification is structured to capture both the short- and long-term dynamics among the variables, and it is informed by economic theory and empirical literature. The Endogenous Growth Theory, in particular the contributions of Lucas (1988) and Romer (1990), serves as the foundation for this study's model. According to the hypothesis, internal economic factors particularly investments in human capital like health, education, and productivity-boosting initiatives are what propel long-term economic growth. The following describes the functional relationship between human capital development and economic growth:

$$RGDP = f(EDU, HEALTH, LABPROD, INF, PCI) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

4.2 Econometric Model

Large values, increasing tendencies, and uneven variances over time are common characteristics of macroeconomic indicators like real GDP and government spending. Therefore, heteroskedasticity and non-linearity issues may arise while estimating the model in levels. All variables are converted into their natural logarithmic representations in order to get around these difficulties. Gujarati and Porter (2009) claim that logarithmic transformation enhances linearity

between variables and stabilizes volatility. The econometric model that has been log-transformed is described as:

$$\text{LN}RGDP_t = \beta_0 + \beta_1 \text{LN}EDU_t + \beta_2 \text{LN}HEALTH_t + \beta_3 \text{LN}LABPROD_t + \beta_4 \text{LN}INF_t + \beta_5 \text{LN}PCI_t + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The logarithm of real gross domestic product, or LNRGDP_t, is used in this specification to capture changes in economic output over time. Government spending on health and education, two essential elements of human capital development, is represented by LNEDU_t and LNHEALTH_t. Labour productivity is measured by LNLABPROD_t, which shows how effectively labour contributes to output. LNINF_t stands for inflation, which, depending on its amount and stability, can either help or impede economic progress. Private capital investment is captured by LNPCI_t, which also shows the growth and confidence of the private sector. While μ_t is the error term that accounts for other unobserved factors impacting the model, the coefficients (β_1 to β_5) assess the elasticities of the explanatory variables and illustrate how a 1 percent change in each variable influences RGDP.

5.0 RESULTS AND DISCUSSIONS

5.1 Unit Root Test

Table 1: Augmented Dickey-Fuller (ADF) Unit Root Test

Variables	ADF Statistics	P-value	Order of integration	Remark
LOG RGDP	-5.412696	0.0051	1(1)	first difference
LOGEDEXP	-6.686802	0.000	1(1)	first difference
LOGHEALEXP	-3.295487	0.0223	1(0)	Level
LABPROD	-3.969241	0.0187	1(1)	first difference
LOG INF	-5.074311	0.0012	1(1)	first difference
LOG PCI	-4.025172	0.0175	1(0)	Level

Source: Authors Computation E-view 12.0

The ARDL approach is justified by the unit root test findings in Table 1, which show that the variables are integrated at mixed orders. In particular, LOG(RGDP), LOG(EDU), LOG(LABPROD), and LOG(INF) are non-stationary at levels but become stationary upon first differencing, suggesting that they are integrated of order one, I(1). LOG(HEALTH) and LOG(PCI), on the other hand, are steady at levels, suggesting that they are integrated of order zero, I(0). The fundamental premise for using the ARDL bounds testing method is satisfied when there is no variable integrated of order two, I(2). These results verify that the dataset is appropriate for ARDL based cointegration analysis.

5.2 Cointegration Bound Test

Table 2: Cointegration Bound Test

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	6.201408	10%	2.08	3

K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Authors Computation E-view 12.0

The long-term link between the variables is confirmed by the ARDL bounds test results in Table 2. At all traditional significance thresholds (10%, 5%, 2.5%, and 1%), the calculated F-statistic (6.201408) surpasses the upper bound critical values. This suggests that there is a stable long-run equilibrium link between economic growth (RGDP) and the explanatory variables (education, health, labour productivity, inflation, and private capital investment), rejecting the null hypothesis of no cointegration. In order to capture short run dynamics, this result supports estimating both the long-run coefficients and the corresponding error correction model (ECM).

5.3 Estimation Test

Table 3: ARDL Long-Run Form

Levels Equation

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EDU)	1.260921	1.839277	3.685552	0.0008
LOG(HEALTH)	0.143608	0.639296	4.224635	0.0000
LOG(LABPROD)	2.849865	1.829608	2.557637	0.0310
LOG(INF)	-0.012107	0.091233	-0.132704	0.8954
LOG(PCI)	0.722019	0.672711	1.073297	0.2926
C	0.135533	3.840005	0.035295	0.9721

Source: Authors Computation E-view 12.0

According to Table 3's ARDL long-run results, human capital factors have a major impact on Nigeria's economic growth. In particular, LOG(EDU) exhibits a positive and statistically significant coefficient (1.260921, $p < 0.01$), suggesting that a 1% increase in government spending on education eventually results in a 1.26% increase in real GDP. In a similar vein, LOG(HEALTH) is positive and highly significant, demonstrating that more health spending boosts economic growth by increasing worker productivity. Additionally, LOG(LABPROD) demonstrates a substantial positive and significant effect, suggesting that labour productivity is a key factor in long term economic growth. On the other hand, LOG(INF) exhibits a negative but statistically negligible coefficient, indicating that inflation has little long-term impact on growth over the research period. Despite boosting growth, private capital investment does not appear to have a statistically meaningful long-term impact, as indicated by the positive but insignificant LOG(PCI). The fact that the constant term is negligible suggests that the explanatory factors adequately account for the fluctuations in economic development.

Table 4: ARDL Short-Run Form

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(EDU(-1))	-0.535906	0.114853	-4.666022	0.0003
DLOG(HEALTH)	-0.144551	0.052213	-2.768467	0.0137
DLOG(HEALTH(-1))	0.255362	0.065540	3.896256	0.0013
DLOG(HEALTH(-2))	0.119873	0.058696	2.042279	0.0580
DLOG(LABPROD)	1.077197	0.156611	6.878175	0.0000
DLOG(INF)	-0.003558	0.010682	-0.333121	0.7434
DLOG(INF(-1))	0.037142	0.012066	3.078148	0.0072
DLOG(INF(-2))	0.071822	0.015193	4.727202	0.0002
DLOG(INF(-3))	0.039481	0.013896	2.841293	0.0118
DLOG(PCI)	-0.010336	0.063166	-0.163626	0.8721
DLOG(PCI(-1))	0.335599	0.064621	5.193359	0.0001
DLOG(PCI(-2))	0.121719	0.030848	3.945714	0.0012
CointEq(-1)*	-0.064041	0.008289	-7.725836	0.0000
R-squared	0.980137	Mean dependent var		0.039236
Adjusted R-squared	0.969303	S.D. dependent var		0.027611
S.E. of regression	0.004838	Akaike info criterion		-7.546215
Sum squared resid	0.000515	Schwarz criterion		-6.968514
Log likelihood	145.0588	Hannan-Quinn criter.		-7.346792
Durbin-Watson stat	2.285654			

Source: Authors Computation E-view 12.0

Table 4's short-run dynamics showed that the explanatory variables had conflicting effects on economic growth. In the short term, education has a negative and considerable impact on economic growth, as indicated by the lagged dependent variable DLOGEDU(-1)). Government spending on health has positive and large lagged impacts, indicating that health investments may have adjustment costs at first but eventually result in growth benefits. The relevance of labour productivity in influencing economic performance is further supported by its substantial positive and highly significant short-run influence. Although the contemporaneous impact is negligible, inflation has variable but generally favorable lagged effects, suggesting delayed transmission mechanisms. Private capital investment appears to contribute to growth over time, as seen by its considerable positive lagged benefits but negligible immediate effect. The stability of the long-term connection is confirmed by the error correction term (CointEq(-1)), which is negative, substantial, and correctly signed (-0.064041), meaning that around 6.4% of the short-run disequilibrium is corrected each period. The robustness of the model is confirmed by the high R-squared (0.98) and Durbin-Watson value (~2.29), which show a good model fit and no autocorrelation, respectively.

5.4 Post Estimation Test

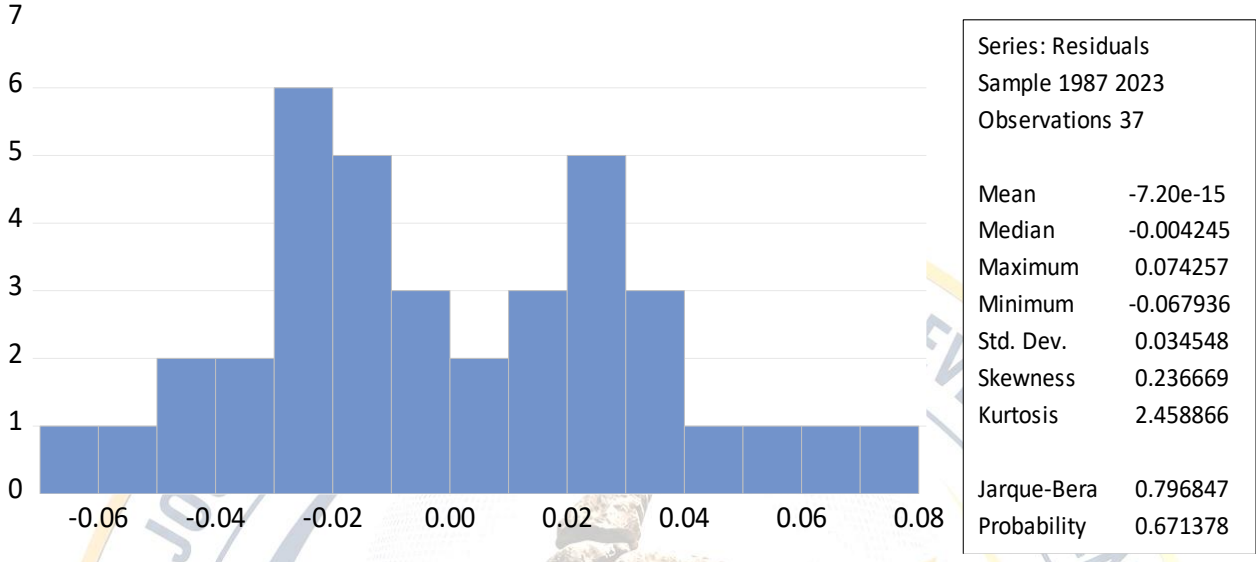

Figure 1: Normality Test (Jarque-Bera Test)
Source: Authors Computation E-view 12.0

Figure 1. The outcome demonstrates that the null hypothesis of normality cannot be rejected since the Jarque-Bera statistic has an associated probability value higher than the 0.05 significance level. This suggests that the model's estimations are impartial and effective as the residuals are roughly normally distributed. Because the residuals satisfy the assumption of normality necessary for robust econometric analysis, the ARDL regression model is statistically well-specified and appropriate for trustworthy inference.

Table 5: Serial Correlation Test (Breusch-Godfrey L. M. Test)

F-statistic	0.842824	Prob. F(2,25)	0.4424
Obs*R-squared	2.337174	Prob. Chi-Square(2)	0.3108

Source: Authors Computation E-view 12.0

Table 5 indicated that there is no evidence of autocorrelation in the model residuals. This is confirmed by both the F-statistic (0.842824) with a probability value of 0.4424 and the Obs*R-squared statistic with a probability of 0.3108, which are greater than the conventional 5% significance level. Consequently, the null hypothesis of no serial correlation cannot be rejected.

Table 6: Heteroskedasticity Test (Breusch-Pagan Test)

F-statistic	0.855618	Prob. F(9,27)	0.5741
Obs*R-squared	8.210840	Prob. Chi-Square(9)	0.5130
Scaled explained SS	10.40630	Prob. Chi-Square(9)	0.3186

Source: Authors Computation E-view 12.0

There is no indication of autocorrelation in the model residuals, according to the Breusch-Godfrey serial correlation test results in Table 6. The F-statistic probability value of 0.4424 and the Obs*R-squared probability value of 0.3108, both of which are higher than the 5% significance level, corroborate this. As a result, it is impossible to reject the null hypothesis that there is no serial association. This shows that the residuals are independently distributed across time and that there are no serial correlation issues with the ARDL model, which makes the estimates trustworthy and objective.

Table 7: Multicollinearity Test (Variance Inflation Factor-VIF)

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LOG(RGDP(-1))	0.021047	17.78980	5.197
LOG(RGDP(-2))	0.005954	49.95810	6.7624
LOG(EDU)	0.012224	46.98533	5.716
LOG(EDU(-1))	0.009082	34.11295	8.193
LOG(HEALTH)	0.003822	12.33549	1.320
LOG(LABPROD)	0.011058	16.87674	4.6910
LOG(LABPROD(-1))	0.056125	84.56978	3.517
LOG(INF)	0.000110	57.22491	2.665568
LOG(PCI)	0.001053	49.34019	2.0652
C	0.244892	19.61646	NA

Source: Authors Computation E-view 12.0

Table 7's Variance Inflation Factor (VIF) results shed light on whether multicollinearity exists between the explanatory variables. Multicollinearity in the model is not severe because all of the centered VIF values, which are better suited for interpretation, are below the critical threshold of 10. Even while some variables, such LOG(EDU(-1)) and LOG(RGDP(-2)), show comparatively larger VIF values, they are still within allowable bounds, indicating only mild regressor connection. This suggests that the computed coefficients are stable and trustworthy, and the explanatory factors are sufficiently independent. Therefore, the validity of the regression results is not threatened by multicollinearity.

Table 8: Ramsey RESET Test

	Value	Df	Probability
t-statistic	0.390782	26	0.6991
F-statistic	0.152711	(1, 26)	0.6991
Likelihood ratio	0.216683	1	0.6416

Source: Authors Computation E-view 12.0

The model is correctly described and does not experience functional form misspecification, according to the Ramsey RESET test findings in table 8. The likelihood ratio probability

(0.6416) likewise surpasses the significance level, while the F-statistic (0.152711) and t-statistic (0.390782) also have probability values (0.6991) more than 0.05. This implies that it is impossible to reject the null hypothesis of accurate model definition. To put it another way, the model shows no signs of missing variables or improper functional form. This demonstrates that the relationship between human capital development variables and economic growth in Nigeria is sufficiently captured by the selected ARDL model.

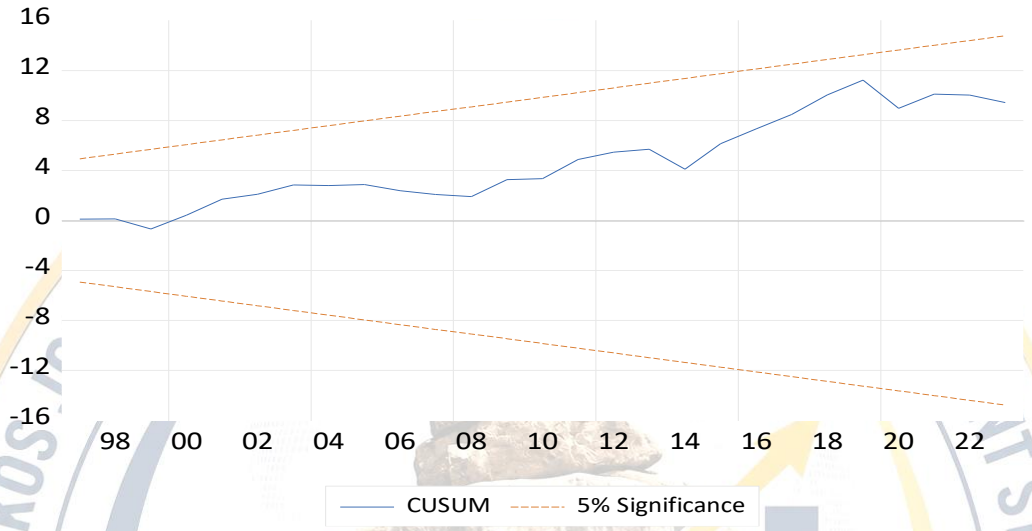

Figure 2: CUSUM Test
Source: Authors Computation E-view 12.0

The results of the Cumulative Sum (CUSUM) test, which evaluates the stability of the coefficients in the calculated ARDL model over time, are shown in Figure 2. The cumulative sum of recursive residuals is plotted against time and compared to critical boundaries at the 5% significance level using the CUSUM test. The model's parameters are stable and have not experienced structural fractures because the CUSUM line in the figure stays completely inside the upper and lower critical bounds throughout the sample period. This implies that the estimated correlations between labour productivity and economic growth in Nigeria and the development of human capital through spending on health care, education, and labour productivity are stable over the course of the study.

6.0 DISCUSSION OF FINDINGS

Both in the short and long term, labour productivity has a favorable and substantial impact on economic growth, which is consistent with the Solow Growth Model, which highlights the contribution of labour efficiency to raising output and productivity.

The results of education spending indicate that while education has a negative and large impact in the short term, it has a long-term positive and significant impact on Nigeria's economic growth. The Human Capital Theory, which contends that investing in education enhances knowledge, skills, and labour productivity, is supported by this. Additionally, it supports the Endogenous progress Model, which sees education as a major force behind efficiency, innovation, and sustained economic progress. The outcome is in line with research by Barro (2021), Sianesi and Van Reenen (2020), and Ajayi and Adebayo (2022), all of which discovered that increased educational attainment and spending have a beneficial impact on economic growth

and productivity. This implies that consistent investment in high-quality education can support Nigeria's long-term development by producing a workforce that is more creative and talented.

The results on health expenditures show that by increasing labour productivity and lowering productivity losses due to illness, health spending also favorably impacts economic growth. The Endogenous Growth Model, which highlights that healthy employees are more inventive and productive, is supported by this. The outcome is consistent with research by Omotoso et al. (2020), Adefeso and Akinlo (2021), and Ogundipe and Lawal (2020), which discovered that health spending enhances economic productivity, labour quality, and health outcomes over time. The results suggest that Nigeria's productive capacity can be increased and long-term economic growth can be supported by efficient and consistent health investment.

7.0 CONCLUSION

The study comes to the conclusion that health and education spending are important factors influencing Nigeria's economic growth based on the empirical data. By raising the caliber of human capital, encouraging innovation, and increasing workforce productivity, education spending makes a substantial long-term growth contribution. On the other hand, although its impacts are more noticeable over time than they are right away, health spending is crucial to raising labour productivity and economic performance. The findings highlight the need of ongoing investments in the development of human capital as a crucial tactic for attaining steady and equitable economic growth in Nigeria. Overall, the analysis confirms that bolstering the nation's growth trajectory requires efficient use and distribution of public resources in the fields of health and education.

8.0 RECOMMENDATIONS

Based on the findings of the study, the following recommendations are made:

First, the government should increase budgetary allocation to the education sector, with a focus on improving the quality, relevance, and accessibility of education at all levels, particularly secondary and tertiary education.

Second, there should be a strategic emphasis on aligning educational curricula with labour market demands to enhance skill acquisition, innovation, and employability.

Third, government should sustain and expand investment in the health sector, especially in healthcare infrastructure, medical equipment, and personnel training to improve health outcomes. Fourth, policies should be implemented to ensure efficient utilization of funds in both education and health sectors, minimizing wastage, corruption, and misallocation of resources.

Finally, macroeconomic stability should be maintained, particularly by controlling inflation, as instability can weaken the positive effects of human capital investment on economic growth.

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