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Effect of Human Capital Investment on Economic Growth in Nigeria

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Abstract: To achieve more sustainable and inclusive economic growth, Nigeria needs a consistent, long-term human capital investment. Thus, this paper examines how government investment in human capital affected the economy of Nigeria between 1981 and 2023. By employing the autoregressive distributed lag model, the research demonstrates that public investment in the educational sector does not substantially affect the growth of the Nigerian economy in the long term. This phenomenon is due to the inadequate funding of the sector, which constrains the quality of infrastructure and curriculum in the sector. Likewise, public health investment has no significant contribution to the economic prosperity of Nigeria. This result shows that health budgets have been inadequate to provide quality health services or meet the needs of the people in the long term. Inadequate funding of both sectors reduces productivity and hence, the growth of the economy. Also, employment has a significant enhancing effect on economic prosperity in the long run for Nigeria. This significance is due to the labour population leveraging technological advancement for employment, as well as the growth of the informal sector in the country, since white-collar jobs are increasingly difficult to find. Various policy measures were recommended by the study.

Keywords: Human capital, Government spending, Education, Health, Employment rate, Economic prosperity.

JEL Classification: H5, I0, J6.

1. Introduction

Investing in human capital through education and healthcare is widely recognised as a fundamental driver of economic growth and development. Human capital, which encompasses the skills, knowledge, and health acquired by individuals that enhance their productivity, has become increasingly significant in discussions of sustainable development (Amadi & Alolote, 2019; Odonkor et al., 2021; Lawal & Onifade, 2021). Education and healthcare are central pillars of human capital development, playing crucial roles in shaping the overall well-being and productivity of a nation's workforce. Economic growth, typically measured by an increase in a country's output or income through Gross Domestic Product (GDP), differs from economic development, which includes broader improvements in living standards, education, health, and societal well-being (Todaro & Smith, 2020).

For Nigeria, distinguishing between these concepts is vital. While the country has experienced periods of economic prosperity largely driven by the oil sector, it has struggled to achieve comprehensive economic development due to underinvestment in education and healthcare. Education is crucial for developing human capital by providing individuals with the skills and knowledge necessary to participate effectively in the economy. Despite its importance, Nigeria's education sector faces significant challenges such as chronic underfunding, poor infrastructure, and inadequate teacher training (NBS, 2023a; Abiodun & Okon, 2023). These issues have led to below-average educational outcomes, limiting the development of a skilled workforce (NBS, 2023a,b). Nonetheless, improvements in education are directly linked to higher labour productivity, greater innovation, and entrepreneurship (Ekpo & Onuoha, 2022; Muhammad et al., 2022; Ojima & Anyawu, 2021). For Nigeria, where the economy remains heavily dependent on oil, investing in education is essential for diversifying into other sectors such as technology, manufacturing, and services (World Bank, 2023; Aladejare & Musa, 2024a,b). Without addressing educational deficiencies, Nigeria risks perpetuating low productivity and limited economic diversification.

Healthcare is equally important for human capital development. A healthy population is more productive and able to contribute significantly to the economy. However, Nigeria's healthcare system suffers from inefficiencies, including insufficient funding, inadequate facilities, and a shortage of medical personnel, leading to poor health outcomes such as high infant mortality rates and low life

expectancy (World Health Organisation, 2022; Aladejare et al., 2022; Adewole & Oni, 2023). Countries with better healthcare systems tend to experience higher economic growth rates due to the enhanced productivity of their populations. In Nigeria, improving healthcare is crucial not only for individual well-being but also for boosting economic performance (World Bank, 2023).

The interplay between education, healthcare, and economic prosperity in Nigeria is complex and interdependent. Education provides the skills necessary for economic participation, while healthcare ensures that the workforce remains healthy and productive. Mamoloko and Ngwakwe (2020) argue that the combined effect of education and healthcare on economic growth is greater than their individual contributions. A well-educated but unhealthy workforce will be less productive, and conversely, without adequate education, health interventions may not lead to sustainable economic prosperity. Recent evidence indicates that regions in Nigeria with better educational and healthcare outcomes experience higher economic prosperity rates. For example, states with higher literacy rates and better healthcare access show more robust economic activities and lower poverty levels compared to regions with less investment in these sectors (National Bureau of Statistics, 2023). This disparity highlights the need for equitable human capital investment across the country to reduce inequality and promote balanced economic development (United Nations Development Programme, 2023; Magaji & Aladejare, 2024).

Analysing Nigeria's human capital investment reveals a pattern of inconsistent and insufficient government spending on education and healthcare. During the 1990s and early 2000s, the government's reliance on oil revenues led to underinvestment in these sectors, resulting in deteriorating infrastructure and poor human capital outcomes (Alao & Aluko, 2021; Aladejare, 2021; Ogundipe & Sanni, 2023; Okonkwo & Eze, 2024; Aladejare & Musa, 2024c). Efforts under President Olusegun Obasanjo's administration (1999–2007), such as the Universal Basic Education (UBE) program and the National Health Insurance Scheme (NHIS), were steps toward addressing these issues but faced inconsistent implementation and funding gaps. Economic growth during this period was driven primarily by high oil prices, with little reinvestment into human capital sectors, hindering sustainable development (World Bank, 2023). The late 2000s and early 2010s saw more focused efforts to invest in human capital under Presidents Umaru Musa Yar'Adua and Goodluck Jonathan through initiatives like Vision 20:2020 and the

Transformation Agenda. These policies increased budget allocations for education and healthcare, aiming to build a more skilled and healthier workforce. However, continued reliance on oil revenues and political instability limited the effectiveness of these investments. The collapse of global oil prices in 2014–2015 underscored Nigeria's vulnerability and the need for economic diversification.

In response, the Buhari administration introduced the Economic Recovery and Growth Plan (ERGP) in 2017, which emphasised human capital development as a key to long-term economic prosperity. Although there was increased international support, particularly during health crises such as the Ebola and COVID-19 pandemics, inconsistent government spending on education and healthcare persisted, resulting in mixed outcomes (National Bureau of Statistics, 2023; Umejei, 2023; Olagunju & Okunade, 2022). The historical pattern of economic growth, marked by high oil prices, often masks underlying deficiencies in human capital development. Periods of increased government spending on education and healthcare have been associated with GDP growth, suggesting that these sectors are critical drivers of economic progress. However, the lack of a coherent and sustained strategy for investing in education and healthcare has limited the long-term benefits of these investments. Insufficient funding for education has led to stagnant workforce productivity, while inadequate healthcare investment has undermined the labour force's potential. Regional disparities in human capital investment have deepened inequality, with some regions benefiting more from sporadic spending increases while others remain underserved (Nwosu, 2022; Olatunji & Adebayo, 2022; Olagunju & Okunade, 2022).

To achieve more sustainable and inclusive economic prosperity, Nigeria needs a consistent, long-term strategy for human capital investment. A robust and sustained investment in education and healthcare is necessary to diversify the economy, enhance labour productivity, and foster innovation (Magaji & Aladejare, 2024). Thus, this study explored the extent to which sustained investments in human capital, particularly in education and healthcare, as well as employment levels, can drive long-term economic growth in Nigeria. By employing the dynamic ordinary least squares method (DOLS), this research analysed data from 1981 to 2023. Empirically, the study confirmed that public investments in the health and education sectors have no significant long-run impact on the economy. However, an increase in employment robustly promotes economic prosperity in Nigeria.

The rest of the research has Section 2 containing the reviewed literature; Section 3, the study's data and methodology; Section 4, the study findings and discussion; and Section 5, the conclusions and policy implications.

2. Literature Review

2.1. Theoretical Review

Human Capital Theory: According to Theodore Schultz's (1961) and Becker's (1964) Human Capital Theory, investments in human capital—through health, education, and training—are comparable to those made in physical capital. These investments increase a person's capacity for production, which raises personal incomes and contributes to societal economic expansion. The importance of education and training in raising personal income and productivity is highlighted by human capital theory (Becker, 1964; Schultz, 1961), but it does not adequately address how these expenditures affect overall economic growth. Whereas Endogenous Growth Theory takes this to the macroeconomic level and emphasises how investments in human capital can result in long-term economic prosperity through innovation and knowledge spillovers, Human Capital Theory mainly concentrates on the relationship between individual human capital and personal earnings. Whereas the endogenous growth theory extends this to the macroeconomic level, emphasising how human capital investments can lead to sustained economic growth through innovation and knowledge spillovers (Romer, 1990).

Furthermore, the human capital theory distinguishes between general human capital, which is broadly applicable across various jobs and industries, and specific human capital, which is tailored to particular jobs or firms. General human capital, such as literacy and numeracy skills, is essential for a well-functioning economy, while specific human capital, such as vocational training, can enhance productivity in certain sectors (Becker, 1964). Also, the theory links individual productivity to macroeconomic performance. As individuals become more skilled and knowledgeable, their productivity increases, leading to higher output and economic prosperity. Mincer (1974) provided empirical evidence that countries with higher levels of human capital experience faster economic growth. The theory implies that economies with greater human capital investment will grow more rapidly than those with lower levels.

However, while the human capital theory has been influential, it has faced criticism for overemphasising formal education and neglecting other forms of human capital, such as informal learning and work experience (Blaug, 1976). Furthermore, the theory has been extended to include the role of health as a critical component of human capital. Healthier individuals are more productive and contribute more effectively to economic prosperity (Grossman, 1972).

Nevertheless, the theory is particularly relevant to Nigeria, where investments in education and health are critical for improving labour productivity and fostering economic development. By increasing access to quality education and healthcare, Nigeria can enhance its human capital stock, essential for driving long-term economic growth. The theory underscores the importance of addressing challenges such as inadequate funding, regional disparities, and the need for vocational training to meet labour market demands (Olaniyan, 2019).

2.2. Empirical Review

Education Investment and Economic Growth Nexus

Le and Tran (2021) used the Granger and Vector Autoregressive (VAR) methods in their study, and showed that a two-way nexus exists between government educational funding and economic growth in Vietnam. Ogunjobi et al. (2021) employed the autoregressive distributed lag (ARDL) model and showed that quality of education substantially improves economic prosperity in Nigeria. Adeniyi et al. (2021) examined the role of education in the economic advancement of West African economies. By engaging the ARDL technique, the research revealed a beneficial impact of education in the short and long-run period for most of the countries. Adejumo et al. (2021) applied the vector autoregressive (VAR) method in their paper. They were able to show that investment in education, particularly at the advanced level, will enhance long-term economic prosperity for Nigeria.

Zaman et al. (2021) conducted a panel ARDL study for China, Bangladesh, Egypt, the Philippines, Nigeria, Indonesia, India, Pakistan, and Mexico. The study revealed that public education spending positively and substantially affects economic growth in the examined economies. Ziberi et al. (2022) applied the two-stage least squares (2SLS) and revealed that public spending on education positively impacts economic prosperity in North Macedonia. Also, Muhammad and Bichi (2022) showed with

their study that public expenditure on education substantially and adversely impacts economic advancement in Nigeria. However, Muhammed et al. (2022) used the OLS method and confirmed the positive effect of total school enrolment as well as public recurrent educational expenditure on economic prosperity for Nigeria. In contrast, Villela and Paredes (2022) used an instrumental variables (IV) approach and submitted that no significant relationship exists between government education outlay and economic growth for Honduras.

Balogun et al. (2023) employed the vector error correction model (VECM) and submitted that education public spending substantially enhances economic advancement in Nigeria. With the use of the ARDL technique, Lupu and Nuta (2023) demonstrated the relationship between government education spending and economic growth for 11 European Union member countries. Empirically, the research showed mixed outcomes in the 11 economies examined. Cetin (2023) applied the ARDL technique and found that public educational expenditures substantially impact economic prosperity in the United States of America. Similarly, Almutairi (2024) employed the ARDL model in his study for Saudi Arabia. Empirically, the study revealed that scholarships and tertiary education enrolment are adversely related to economic growth. Nevertheless, the mean school year showed an insignificant impact on economic prosperity. Eniekezimene et al. (2023) applied the ARDL model in their study. Empirically, the research showed that public outlay on education and tertiary enrolment had an insignificant effect on economic prosperity in the long run for Nigeria. Likewise, Duwal and Suwal (2024) used the ARDL approach to reveal that public educational outlay has an insignificant negative impact on economic prosperity for Nepal. However, population growth and educational index substantially and positively affect economic growth in Nepal.

Health Investment and Economic Prosperity Association

Olayiwola et al. (2021) used the Granger Causality Approach in their study and confirmed a unidirectional impact of public health expenditure on economic growth for Nigeria. Also, Ogunjobi et al. (2021) showed that the quality of healthcare significantly enhances economic advancement in Nigeria. Also, Yusufu et al. (2021) employed the generalised method of moments (GMM) approach and submitted that government health expenditure significantly stimulates economic prosperity in Sub-Saharan African (SSA) economies. Likewise, Muhammad and Bichi (2022)

showed with their study that public outlay on health substantially and adversely impacts economic advancement in Nigeria. Also, Muhammad et al. (2022) used the OLS technique to confirm the beneficial impact of government recurrent health spending on economic prosperity for Nigeria. Beylik et al. (2022) employed the Driscoll-Kraay approach in their health expenditure-economic growth relationship study. The study affirmed that all health spending measures used were significantly and positively related to the economic advancement of OECD economies. Likewise, and by employing the NARDL technique, Jiang and Wang (2023) revealed that private and public health outlay significantly and asymmetrically impact economic growth in the short- and long-run periods.

Furthermore, Balogun et al. (2023) showed that the health government outlay positively enhances economic advancement in Nigeria. Conversely, the study by Eniekezimene et al. (2023) demonstrated that public spending on health had an insignificant effect on economic prosperity in the long run for Nigeria. By applying the ARDL model, Agu and Okwor (2023) revealed that governance quality impacts the level of effect public health spending exerts on economic growth in Nigeria. However, Ewurum and Okafor (2024) applied the three-stage least squares technique and concluded that health expenditure indirectly impacts economic development through health status in Nigeria. In contrast, and by applying the OLS method, Musa et al. (2024) revealed that health spending in Nigeria has no significant impact on economic advancement in Nigeria. Atilgan et al. (2024) used a battery of methods to show that despite health outlay having been beneficial for economic progression, substantial variations exist in the potential of health spending to motivate economic prosperity in OECD countries.

Employment and Economic Growth Relationship

Adeosun and Shittu (2022) employed the error correction mechanism (ECM) and confirmed that employment elasticity positively expands the Nigerian economy through an increase in micro, small and medium scale enterprises in Nigeria. Similarly, Sultana et al. (2022) revealed, with the aid of FMOLS, DOLS, and dynamic fixed effect (DFE) approaches, that growth in informal employment accelerates economic growth in developing nations. However, Ziberi et al. (2022) further showed that improvement in employment is inversely related to economic prosperity in North Macedonia. By using the ARDL and Granger causality techniques, Thaddeus et al.

(2022) demonstrated that female labour force employment has an adverse impact in the long term and an irrelevant short-term effect on the economic growth of SSA economies. Akhtar et al. (2023) used the NARDL model and unearthed an uneven long-run association between female labour force employment and economic prosperity in Malaysia.

Gap in the Literature

Despite the extensive research on human capital investment and economic growth in Nigeria, there are still empirical gaps. Existing studies predominantly utilised public spending on education and health in their measure of human capital. While both indicators are integral for human capital measurement, the role of employment is conspicuously missing. Only a handful of studies have come close in assessing the impact of employment on economic prosperity, particularly for a developing economy. Hence, this study covers this gap and extends the discourse on the human capital-economic growth association in Nigeria.

3. Data and Methodology

3.1. Data

While gross domestic product (GDP) indicates the response variable, public education and health expenditures, as well as the employment rate measures for the regressor (human capital investment). Population growth was used as an intermediating variable in the model. Population growth rate was introduced into the study as an intermediating (control) variable, since any investment in human capital will need to consider the rate at which the population of the country increases. Furthermore, the population of a country can impact the growth of an economy in terms of investment, consumption, and productivity levels. These data were collected for the period between 1981 and 2023. Also, the data were extracted from the Central Bank of Nigeria annual statistical bulletin (2024), the World Bank (2024) World Development Indicators, and the Penn World Table (Feenstra et al., 2015).

3.2. Methodology

The extant literature has adopted various techniques in deriving exclusively long-run parameters in multivariate analyses. Prominent among these estimators are the

OLS, FMOLS and DOLS. However, Pedroni (2001) submitted that the OLS method is prone to second-order asymptotic bias and serial correlation problems. Also, the method is likely to produce biased estimates when operating with small sample observations. Nevertheless, the FMOLS (Phillips and Moon, 1999) and the DOLS (Stock & Watson, 1993) were developed to handle such OLS deficiencies; therefore, they are regarded as superior estimators. In addition, the FMOLS and DOLS techniques are developed using a white heteroskedastic standard error framework. However, while the DOLS estimator has a parametric feature, the FMOLS is non-parametric. This research applied the DOLS procedure due to the additional estimation constraint posed by the FMOLS method. For instance, a criterion for the implementation of the FMOLS estimator demands that all variables be integrated of the same order (Masih and Masih, 1996). Furthermore, the DOLS is better equipped to deal with endogeneity or simultaneity bias in a model because it can regress an I (1) series on other I (1) or I (0) variables and leads and lags of the first differences of any I (1) variables (Aladejare, 2022).

Accordingly, to estimate the long-run and short-run relationships between gross domestic product, investment in education, healthcare, and employment levels, the following linear equation is postulated as follows:

$$GDP = f\,(PEDU, PHLT, EMP, POG) \qquad \text{(Equ. 1)}$$

where GDP is proxy for economic growth, PEDU is public investment on education, PHLT denote public investment on health, EMP is employment level, and POG represents population growth rate.

Hence, Equation 1 is explicitly specified in its econometric form as follows:

$$IGDP_t = \beta_0 + \beta_1\, PEDU_t + \beta_2 PHLT_t + \beta_3 EMP_t + \beta_4 POG_t + \varepsilon_t \qquad \text{(Equ. 2)}$$

Therefore, the DOLS presentation of the research model is captured as follows:

$$\Delta lGDP_t = \beta_0 + \delta_1 PEDU_{t-i} + \delta_2 PHLT_{t-i} + \delta_3 EMP_{t-i} + \delta_4 POG_{t-i} + \sum_{k=-k_i}^{k_i} \beta_1\ \Delta PEDU_{t-i}$$

$$+ \sum_{k=-k_i}^{k_i} \beta_2\, \Delta PHLT_{t-i} + \sum_{k=-k_i}^{k_i} \beta_3\ \Delta EMP_{t-i} + \sum_{k=-k_i}^{k_i} \beta_4\, \Delta POG_{t-i}$$

$$+ \varepsilon_t \qquad \text{(Equ. 3)}$$

Where $-k_i$ and k_i represents the lags and leads, respectively, while the PDOLS estimator for every individual independent series is built up as:

$$\hat{\beta}_{PEDUDOLS} = I^{-1}\sum_{i=1}^{I}\hat{\beta}_{DOLS} \quad \text{(Equ. 4)}$$

$$\hat{\beta}_{PHLTDOLS} = I^{-1}\sum_{i=1}^{I}\hat{\beta}_{DOLS} \quad \text{(Equ. 5)}$$

$$\hat{\beta}_{EMPDOLS} = I^{-1}\sum_{i=1}^{I}\hat{\beta}_{DOLS} \quad \text{(Equ. 6)}$$

$$\hat{\beta}_{POGDOLS} = I^{-1}\sum_{i=1}^{I}\hat{\beta}_{DOLS} \quad \text{(Equ. 7)}$$

4. Empirical Analyses

4.1. Correlation Result

Captured in Table 1 is the correlation matrix for the variables, showing that the regressors are not highly correlated with each other. This decision was based on the proof that none of the correlation coefficients between the regressors attain at least 0.50 (or 50%) correlation significance. Hence, there is no multicollinearity challenge between the independent series adopted for the study.

Table 1: Correlation matrix

	lGDP	*PEDU*	*PHLT*	*EMP*	*POG*
lGDP	1				
PEDU	0.236	1			
PHLT	0.521	0.207	1		
EMP	0.950	0.117	0.472	1	
POG	0.220	0.183	0.211	0.405	1

Source: Authors' estimated result.

4.2. Descriptive Statistics

Table 2 summarises the descriptive statistics applied in this research. The estimates shown in the table indicate that the GDP over the studied period averaged ₦14.12 trillion in the country. With a mean education expenditure per budget of 7.25%, Nigeria can be said to be underfunding the educational sector since it falls short of the 26% recommended by the United Nations Educational, Scientific and Cultural Organisation (UNESCO). Similarly, health spending per budget of 3.46% can be

considered highly insignificant to meet the country's health demand. The mean employment rate of 43.68% suggests a high level of unemployment for the study period. This value is grossly inadequate considering the enormous resources Nigeria has. Also, the average population growth rate within the period is 2.6%, which is considerably high. Additionally, all the variables exhibit positive skewness.

Table 2: Descriptive Statistics

	GDP	*PEDU*	*PHLT*	*EMP*	*POG*
Mean	4.12E+13	7.254	3.458	43.675	2.607
Skewness	0.410	4.970	0.181	0.675	0.630
Kurtosis	1.526	30.209	1.943	2.141	3.773
Jarque-Bera Prob	5.099 0.078	1503.388 0.000	2.238 0.327	4.590 0.101	3.912 0.141
Obs	43	43	43	43	43

Source: Authors' estimated result.

4.3. Unit Root Test

The stationarity level of the variables utilised in the analysis was ascertained through the ADF and PP unit root procedures. These test outcomes are represented in Tables 3 and 4, respectively. For the critical unit root analysis, three test criteria were used: the test with constant, the test with constant and trend, and the test without constant and trend.

The PP unit root outcome is shown in Table 3, while the ADF unit root outcome is shown in Table 4. Table 3 shows that PEDU and POG are the level stationary variables. However, additional stationarity testing showed that first-difference

Table 3: PP Unit Root Test

	PP Test at Level			*PP Test at 1st Difference*		
	With Constant	*With Constant & Trend*	*Without Constant & Trend*	*With Constant*	*With Constant & Trend*	*Without Constant & Trend*
lGDP	0.023	-2.432	3.585	-5.311***	-5.096***	-3.396***
PEDU	-5.309***	-5.449***	-2.682***	-	-	-
PHLT	-2.006	-2.675	-0.413	-5.829***	-5.751***	-5.856***
EMP	1.906	-1.756	5.691	-3.445**	-3.968**	-2.418**
POG	-3.290**	-3.247*	-1.383	-	-	-5.492***

Where *, **, *** indicate significance at 10%, 5%, and 1%, respectively, and *l* is the logarithm operator.
Source: Authors' estimated output.

stationary variables (GDP, HLT, and EMP) are present. In a similar vein, the ADF unit root (Table 4) technique identified only PEDU as an I (0) stationary variable, while GDP, PHLT, EMP and POG were I (1) series. Thus, the PP and ADF unit root investigation confirmed the presence of level and first difference stationary variables, justifying the adoption of the DOLS technique for the study.

Table 4: ADF Unit Root Test

	ADF Test at Level			*ADF Test at 1st Difference*		
	With Constant	*With Constant & Trend*	*Without Constant & Trend*	*With Constant*	*With Constant & Trend*	*Without Constant & Trend*
lGDP	-0.903	-1.613	-3.710	-5.320***	-5.093***	-3.313***
PEDU	-5.322***	-5.446***	-2.885***	-	-	-
PHLT	-2.006	-3.437*	-0.413	-5.830***	-	-5.857***
EMP	0.881	-2.423	2.432	-3.482**	-3.951**	-2.542**
POG	-1.713	-1.406	-0.916	-4.907***	-11.236***	-4.925***

Where *, ** and *** indicates significance at 10%, 5%, and 1%, respectively.

Source: Authors' estimated output.

4.4. Cointegration Test Result

The Gregory-Hansen cointegration test is employed in this research to examine if there is a long-run nexus between PEDU, PHLT, EMP, and POG in Nigeria. Table 5 presents the result, demonstrating that the test statistic (0.038) falls below the 0.05 significance level. Therefore, the H_0 hypothesis—that the regressors are cointegrated cannot be rejected. Put another way, there is a long-run relationship between PEDU, PHLT, EMP, and POG.

Table 5: Cointegration Test Output

Equation	*Lc statistic*	*Stochastic Trends (m)*	*Deterministic Trends (k)*	*Excluded Trends (p2)*	*Prob.*
*lGDP=f (*PEDU, PHLT, EMP, POG*)*	0.038	4	0	0	>0.2

Source: Authors' estimated result.

4.5. DOLS Outcomes

Demonstrated in Table 6 are the DOLS estimated outcomes, revealing that education investment has an insignificant positive effect on economic prosperity

in Nigeria. Specifically, a percentage rise in education investment will produce a 0.006 percentage point increase in economic growth. However, this relationship is statistically insignificant. Similarly, investment in health has an insignificant positive effect on economic prosperity. A percentage increase in health spending by the government will lead to a 0.015% increase in economic growth, but is statistically insignificant.

On the other hand, the employment rate has a significant positive effect on the economy, as seen in Table 4.6, over the long term. According to the finding, a percentage rise in labour employment will produce a 0.037% increase in economic prosperity. This relationship is statistically significant at the 1% level. Likewise, population growth is shown to have a significant positive effect on economic growth in the long term. According to the result, the economy tends to accelerate by 1.551 percentage points for every percentage increase in the population growth, and this association is statistically significant at the 1% level.

Table 6: DOLS estimates

Variables	*Coefficient*	*Std. Error*	*t- statistics*	*Prob.*
PEDU	0.006	0.006	0.959	0.346
PHLT	0.015	0.013	1.123	0.271
EMP	0.037	0.002	20.864	0.000***
POG	1.551	0.254	6.111	0.000***
Intercept	25.493	0.678	37.626	0.000***

Note: *** indicates significance at 1%.

Source: Authors' estimated result.

4.6. Diagnostic Tests

Diagnostic tests were conducted to make sure that the model's conclusions are valid and well-fitting and to guarantee the robustness of the parameter estimations. The estimates for the diagnostic tests are shown in Table 7. The study's residuals are first tested for normalcy using the Jarque-Bera statistics, which yielded a result of 3.708. Its P-value of 0.157, which is statistically insignificant, suggests that the model's residuals normal distribution null hypothesis is supported. Similarly, the outcome for the Breusch-Godfrey (BG) Lagrange Multiplier Serial Correlation finding is given in the second row, and it is statistically insignificant. This suggests that it is not possible to invalidate the null hypothesis of invalid serial correlation

in the research model. Thirdly, the residuals were tested for heteroskedasticity, and like the two preceding tests, it is statistically insignificant. Thus, the result shows the study model's residuals to be homoscedasticity, validating the null hypothesis.

Table 7: Diagnostic Analysis

lGDP = f(PEDU, PHLT, EMP, POG)		
Diagnostic test	Statistic	P-value
Normality	3.708	0.157
Serial-correlation	1.651	0.438
Heteroskedasticity	0.142	0.706

Source: Author's estimated result.

4.7. Stability Test

The stability test, which verifies the model's residual consistency and stability, is another crucial step in ARDL modelling. The cumulative sum of recursive residuals test (CUSUM) and cumulative sum of squares (CUSUMQ) were used to assess the parameter's stability. The CUSUM and CUSUMQ plots are shown in Figure 1. The critical boundaries are found to be within the 5% level of statistical significance, according to the CUSUM statistics plot. At the 5% significance level, the CUSUMQ plot also falls inside the critical boundaries. It follows that this indicates the consistency and reliability of the ARDL estimates.

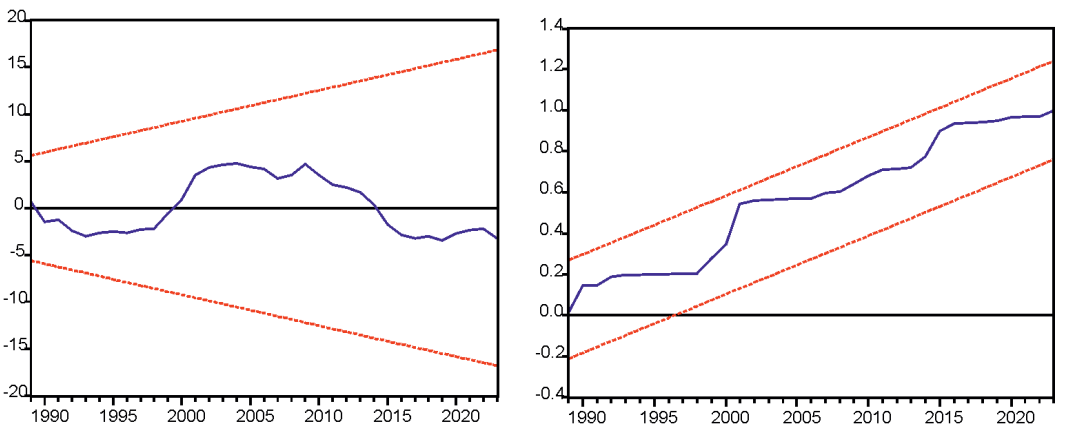

Figure 1: CUSUM and CUSUMSQ for the study model

Source: Author's estimated output.

4.8. Discussion of Findings

The present study examines the findings in accordance with the research objectives, drawing on the empirical evidence presented in Table 6. Evidence from Table 6 has revealed that public educational expenditure has an insignificant positive relationship with economic prosperity. The insignificance of education investment for economic prosperity in Nigeria aligns with findings by Villela and Parede (2022), Eniekezimene et al. (2023), and Duwal and Suwal (2024). The extant literature reported insignificant contributions of education to economic growth. This outcome indicates that more spending on the educational sector by the government has not helped to boost the growth of the economy in the country. As demonstrated by the descriptive statistic, the average allocation to the educational sector (7.25%) implies underfunding of the sector since it falls short of the 26% recommended by UNESCO. Accordingly, educational infrastructure and curriculum remain inadequate, hampering the quality contributions of the sector to the growth of the economy through weak productivity. Specifically, quality investment in the sector has not helped to produce the needed quality human capital and skilled manpower and, by extension, failed to boost individual income levels (Aladejare & Bobbo, 2024). Increased public funding for education has not advanced access to skills and knowledge for wealth creation, hence its insignificance for economic growth. Furthermore, such increased funding has failed to help individuals from marginalised societies attain higher social mobility and opportunities for a dignified life (Aladejare & Osagu, 2024).

Similarly, the insignificant effect of health investment on economic prosperity is demonstrated by the study. The irrelevance of health investment for economic growth in Nigeria agrees with findings by Eniekezimene et al. (2023) and Musa et al. (2024). The extant literature reported insignificant contributions of health to economic growth. This outcome suggests that public health investments are also either inadequate to provide quality health services or meet the demands of the people in the long term. Hence, individuals are left with no option but to defray services for health from out of pocket. Consequently, many individuals have been left to struggle financially, especially as found in recent times, due to the ever-rising cost of health services, thereby affecting the productivity of the economy. Another factor for the insignificant relationship stems from the fact that inadequate funding of the health sector has forced individuals to use up their savings, dispose of assets, or take up a loan just to be able to meet medical bills or maintain a health condition.

This phenomenon has the tendency to leave most individuals unproductive, as it gives no room for investment opportunities required to promote economic growth.

In contrast, the labour employment rate has a significant beneficial effect on the growth of the economy. The significance of employment for economic advancement in Nigeria aligns with findings by Adeosun and Shittu (2022) and Sultana et al. (2022). These extant works of literature affirmed the relevant role of employment in economic growth. This result is plausible given that an increase in employment suggests higher job creation and accelerated output in the economy. It is critical to emphasise that the growth is not a function of improved productivity; rather, it is due to the demographic feature of the country. Nigeria is a country with two-thirds of its population below 30 years of age; hence, a very "youthful country". This factor has seen many of the country's labour population leverage technological advancement for employment, since white-collar jobs are increasingly difficult to find. For instance, many youths are into content creation, foreign exchange (FOREX) trading, agri-tech, etc. Also, the scarcity of formal employment has led to a surge in the informal sector. For instance, in 2022 alone, the informal sector contributed about 57.7% to Nigeria's GDP (Bank of Industry, 2022; Aladejare, 2023).

5. Conclusions and Recommendations

This study looked at how government investment in human capital affected the economy of Nigeria between 1981 and 2023. By employing the ARDL method, the study concludes that government investment in the educational sector does not substantially affect the growth of the Nigerian economy in the long term. This phenomenon is due to the inadequate funding of the sector, which constrains the quality of infrastructure and curriculum in the sector. Therefore, such investment cannot robustly affect the growth of the economy. Likewise, public health investment has not significantly contributed to the economic growth of Nigeria. This result shows that health budgets have been inadequate to provide quality health services or meet the needs of the people in the long term. Consequently, most of the citizens are left with no other option than to pay for health services out of their pocket. This situation reduces their productivity and hence, the growth of the economy. Also, employment has a significant enhancing effect on economic prosperity in the long run for Nigeria. This significance is due to the labour population leveraging technological advancement for employment, as well as the growth of the informal sector in the country, since white-collar jobs are increasingly difficult to find.

Consequently, it is recommended that, given the insignificant effect of educational investment in the long term, the government will need to do more by increasing its budgetary allocation to the sector. The UNESCO 26% annual budgetary allocation to the sector must be implemented for better funding of the sector. This measure will ensure that Nigerians have access to quality education that can help them boost personal confidence and improve their income opportunities. It would also ensure that the country has access to highly productive manpower, which can entice FDI and help to reduce unemployment; hence, poverty is also tackled.

Furthermore, if the health sector is going to have a robust impact on the economy, the government will have to increase its allocation to the sector. The slightly above 3% average allocation to the sector is grossly inadequate. A significant improvement in health spending will help to lower the cost of health services, increase the quality of health delivery, and provide satisfaction to health workers. Also, such funding should include increasing allocations to health research for the development of drugs that are considered highly expensive and needed by the citizens. These measures will improve the productivity of labour and further grow the economy.

Since employment has a substantial beneficial effect on the economy, it would be of great importance for the government to provide a conducive environment for both the informal and information communication sectors to thrive, since they contribute significantly to the economy. Improving the citizens' access to ICT can further increase the number of those employed and boost their contribution to the economy. Also, intensifying the fight against insurgencies, kidnapping, and banditry will further grow employment in the informal sector in the country. To this end, more funding to the sector will help boost, for instance, farmers' confidence to return to farmland and revive sole proprietorships abandoned due to acts of terrorism. Thus, they too will be able to fend for themselves, and the aggregate contribution to the economy will improve. It would also reassure foreign investors of the safety of their investments in both sectors and encourage more job inflows to help advance the growth of the Nigerian economy.

However, this research is constrained to federal government evaluation. Consequently, the assessment of human capital at the sub-national levels (i.e., state and local government levels) was not achievable due to an unavailable dataset. Hence, subsequent research on the effect of government investment in human capital on

economic growth for Nigeria may explore the aforesaid limitation by conducting a robust examination of the relationship at all government levels (i.e., federal, state, and local government). Such a study will help to enrich the literature further on the human capital-economic prosperity nexus in Nigeria.

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The authors have no competing interests to declare relevant to this article's content.

Research involving human participants and or animals

This study article does not contain any studies with human participants or animals performed by the author.

Data Availability Statement

The data supporting the study's findings are available from the corresponding author upon reasonable request.

Consent to participate

Not applicable.

Consent to publish

Not applicable.

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