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Research article

Government Expenditure on Education and Health in Nigeria: Implications for Economic Growth using Evidence from ARDL Analysis

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Abstract
This study examines the effects of government expenditures on education, health and economic growth in Nigeria using time series data from 1981 to 2024. Specifically, the study evaluates the effects of government investment on education and health, school enrolment and gross fixed capital formation on the growth of the Nigerian economy. Preliminary data analysis showed that the variables were integrated of order I(0) and I(1), validating the adoption of the ARDL technique. The major findings of the analysis indicated that a robust long-run relationship exists between economic growth and government expenditures. The results further revealed that government investment in human capital through education and health showed a significant ($p < 0.05$) positive long-run impact on economic growth. School enrolment showed a significant ($p < 0.05$) and positive effect on economic growth in both the short and long run, while gross fixed capital formation positively influenced long-run economic growth. Relying on the findings, this analysis advised that the government should continue to boost its allocation to the education and health sectors; the government should also implement measures that directly target outcomes, such as increasing school enrolment through initiatives like free education and school feeding programs, and enhance public-private partnerships to boost capital formation.

Keywords: Education expenditure, Health expenditure, School enrolment, Gross fixed capital formation, Economic growth, ARDL.

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INTRODUCTION

Education and health are fundamental components of human capital development and contribute significantly to stimulating economic growth and development. Government spending in these sectors improves productivity, efficiency, innovation, and the general quality of life, thereby promoting economic growth, enhancing the standard of living and fostering economic growth (Chima & Yusuf, 2023; Armeanu et al., 2018; Oluwatobi & Ogunrinola, 2011). The Human Capital Theory, proposed by Theodore Schultz (1962), argues that expenditures on human capital improve workers' output and promote long-term economic growth.Empirical findings further identify expenditures in human capital as key drivers that determine economic growth through their influence on productivity, innovation, technological progress, and workforce efficiency (Keji, 2021). Despite continued government investment in these sectors and numerous policy reforms, Nigeria's economic growth has been constrained by challenges such as policy conflicts, unethical practices, rapid population growth, and resource misallocation (Keji, 2021; Onifade et al., 2020).

Despite the recognized importance of education and health expenditure in promoting human capital development and economic growth, concerns remain regarding whether government spending in these sectors has translated into sustained economic growth in Nigeria. Although successive governments have continued to invest in education and health, economic growth has remained volatile, suggesting a possible disconnect between public expenditure and growth outcomes. This provides a basis for empirically examining the short-run and long-run effects of government expenditure on education and health on economic growth.

Recent studies on the connection between government investment in human capital and economic growth in Nigeria provide contradictory reports, with some showing positive growth effects while others reveal an insignificant impact. Abbah et al. (2025) found that government human-capital expenditure significantly enhanced economic growth, while Eniekezimene et al. (2023) and Ayaga et al. (2024) reported insignificant effects of government education and health expenditure. These divergent findings suggest that the growth effects of government investment in human capital in Nigeria remain inconclusive.

These inconclusive findings highlight the need for additional empirical studies. Consequently, this study evaluates the effects of government investment on education and health on economic growth in Nigeria. In addition, the study examines the effect of gross fixed capital formation and school enrolment on economic growth in Nigeria. Time series data over the period of 1981 to 2024 was used.

LITERATURE REVIEW

Related concepts are discussed here. These include economic growth, government expenditure, health expenditure, Government expenditure, School enrolment, and Gross Fixed Capital Formation (GFCF). Economic growth refers to a steady rise in a country's productive outcome over time, leading to increased national output and income. It is normally measured by the increase in real GDP, indicating the expansion of goods and services produced in an economy (Todaro, 2000).

While economic growth centres on numerical increases in output, it differs from economic development, which also encompasses qualitative improvements in the quality of life, welfare, and social conditions.

Government expenditure on education denotes public funds earmarked by the government to fund educational services such as primary, secondary, and tertiary education. The funding comprises expenditures on infrastructure, staff, and learning materials. In Nigeria, it forms a vital fiscal policy tool targeted towards developing human capital and enhancing long-term economic growth via upgraded skills, knowledge, and productivity. Empirical and policy literature, including UNESCO (2021) and the World Bank (2022), highlights that enough investment in education is critical for enhancing literacy, increasing access, and supporting economic competitiveness. However, Nigeria has mostly been confronted with inadequate and poor allocation of education funds, which undermines the sector's contribution to growth (Ayaga et al., 2024). Thus, the efficiency of education and health care expenditures depends on the extent and productive management of public spending.

Health expenditure in Nigeria refers to the monetary resources allocated by the government, private sector, and households to the provision of healthcare services, infrastructure, and programmes aimed at improving population health outcomes. Government spending on health in Nigeria has remained below the 15% target established under the 2001 Abuja Declaration, indicating persistent constraints in public health financing (World Health Organization [WHO], 2022). Consequently, households bear a substantial proportion of healthcare costs through out-of-pocket payments, which can create financial barriers to access and expose households to financial hardship (WHO, 2022). Efficient health expenditure is therefore important for improving health outcomes, strengthening human capital, reducing the disease burden, and supporting long-term economic development.

School enrolment refers to the aggregate number of student population registered in formal education at primary, secondary, and tertiary levels within a specified period. In the context of Nigeria, it is considered as a key variable of human capital development and portrays the accessibility and utilization of the education system. In economic terms, school enrolment is regarded as a product of education investment and a proxy for human capital accumulation, contributing to improved knowledge and skills, higher productivity and long-term economic growth (Becker, 1964). Empirical literature, including UNESCO (2021) and World Bank (2022), emphasizes that more school enrolment contributes to inclusive growth by broadening educational access and enhancing the quality of the workforce. In Nigeria, enrolment levels are influenced by factors like government expenditure on education, demographic expansion, and availability of educational infrastructure.

Gross Fixed Capital Formation (GFCF) denotes the overall worth of expenditure on fixed capital assets like buildings, machinery, equipment, infrastructure, and other productive capital in the economy after subtracting wear and tear. Concerning Nigeria, it represents the extent of domestic investment used to enlarge the productive base and support long-term economic growth. In macroeconomic theory, GFCF is a major part of total demand and a core driver of capital accumulation in both the Solow growth model and endogenous growth models. It shows the magnitude to which an economy is accumulating physical capital stock necessary for production expansion and

technological advancement (Solow, 1956). Finally, GFCF in this scenario represents a crucial element of economic growth, as it reflects the economy's capacity to invest in productive assets that sustain long-term expansion and structural change.

Theoretical Review

Human Capital Theory posits that investment in education, training, acquisition of skills, and health care can increase the output and earnings of individuals, thereby driving economic growth and development. The pioneers of this theory include Adam Smith (1776), Schultz (1961), Becker (1964), and Mincer (1974), who validated education as an underlying factor of labour productivity and economic gains. The theory is related to this investigation as it supports the view that increasing the availability of effective education and health services strengthens Nigeria's productive capacity and long-term economic performance.

Endogenous Growth Theory argues that economic growth is propelled mainly by endogenous determinants like human capital, innovation, and knowledge rather than exogenous technological shocks. It postulates that expenditure in education and research generates increasing returns that support long-term economic growth. Current institutional structures such as the World Bank (2024) and UNDP (2023) also support that innovation-led growth is heavily dependent on human capital development and knowledge accumulation.

Keynesian Public Expenditure Theory (Keynes, 1936) postulates that government spending is critical for boosting economic growth, especially when private demand is low. It further posits that a rise in public investment increases aggregate demand, employment, income, and productivity. Government expenditure on education and health enhances human capital by improving skills, literacy, and workforce effectiveness, while better health enhances labour productivity (Todaro & Smith, 2021). The theory also recognises a multiplier impact, where government spending on social services and infrastructure creates employment and improves consumption and aggregate economic activity (Jhingan, 2022). Contemporary Institutions such as the World Bank (2024) further support the view that public investment in human capital is vital for steady growth. In Nigeria, the theory validates that increased and effective spending on education and health is a means of improving productivity and economic performance.

Empirical Review

Empirical reports on the connection between government expenditure and economic growth in Nigeria remain varied. Most studies present findings that reveal that expenditure on education enhances human capital development and economic growth (Okerekeoti, 2022; Chima & Yusuf, 2023; Udude et al., 2023), whereas others discovered a negative or weak impact attributable to inefficiency, corruption, and misallocation of public resources (Ugochukwu & Oruta, 2021; Ayaga et al., 2024). Comparable disparities exist for health expenditure, with some studies revealing positive growth impacts through enhanced labour productivity (Imandojemu et al., 2020; Ogunbunmi, 2023), whereas other findings report weak or negative effects due to institutional inefficiencies (Muhammad & Bichi, 2022; Okolie & Fadeyi, 2023; Danlami et al., 2024). Reports on GFCF is more stable, revealing

favourable impacts on economic growth through improved productive capacity (Kanu & Ozurumba, 2014; Osunkwo, 2021; Olabisi & Akeju, 2025), although some empirical evidence reveals weak effects attributable to poor capital allocation (Nweke et al., 2017). School enrolment is commonly associated with increased economic growth, especially at secondary and tertiary levels (Okuneye & Adelowokan, 2014; 2019; Kolawole, 2021), though reports from the primary level remain insignificant (Sule et al., 2020; Nenbee & Igbogidi, 2021). Generally, while education, health, school enrolment, and capital formation are theoretically key determinants of growth, empirical evidence remains mixed due to variations in empirical methodology, data periods, and model specifications.

RESEARCH METHOD AND MATERIALS

The study employs a quantitative research approach based on annual secondary time-series data for Nigeria covering 1981 to 2024. The data were obtained from relevant national and international sources, while the ARDL approach was employed to examine the short-run and long-run relationships among the variables.

Theoretical Framework

The study is based on Human Capital Theory, complemented by Endogenous Growth Theory (Mincer, 1974; UNDP, 2023). Human Capital Theory posits that investment in education and health improves an individual's knowledge, skills, productivity and productive capacity, thereby promoting economic growth. Likewise, Endogenous Growth Theory highlights that human capital and productive investment are internal forces for long-run economic growth. Consequently, government expenditure on education and health, school enrolment and gross fixed capital formation are expected to boost Nigeria's productive capacity and economic growth.

Model Specification

Relying on the theoretical underpinning and study objectives, economic growth is specified as a function of education expenditure, health expenditure, school enrolment and gross fixed capital formation as shown below:

$GDPGR_t = f\ (GEXE_t, GEXH_t, SER_t, GFCF_t)$

Given the dynamic nature of the relationship and the adoption of the Autoregressive Distributed Lag (ARDL) approach, the empirical model is specified as:

$$\mathrm{GDPGt} = \alpha 0 + \sum_{t=1}^{.} \alpha i\ \mathrm{GDPGt} - 1 + \sum_{j=0}^{q1} \beta \mathrm{j}\ \mathrm{GEXEt} - \mathrm{j} + \sum_{k=0}^{q2} \Upsilon \mathrm{k}\ \mathrm{GEXHt} - \mathrm{k} + \sum_{l=0}^{q3} \delta \mathrm{l}\ \mathrm{SERt} - \mathrm{l} + \sum_{m=0}^{q4} \theta \mathrm{m}\ \mathrm{GFCFt} - \mathrm{m} + \varepsilon \mathrm{t}$$

where GDPG represents economic growth; GEXE denotes government expenditure on education; GEXH is government expenditure on health; SER represents school enrolment rate; GFCF denotes gross fixed capital formation; p and q1−q4 represent the optimal lag lengths; α0 is the intercept and εt is the error term. The model was estimated using Eviews 13.

RESULT PRESENTATION AND DISCUSSION

Pre-estimation Tests

Table 1. Descriptive Statistics and Unit Root Test Results

Variable	Mean	Std. Dev.	ADF Statistic	p-value	Order of Integration
GDP Growth Rate	3.0509	0.1947	-3.2866	0.0219	I(0)
Education Expenditure	0.2707	0.0063	-8.7309	0.000	I(0)
Health Expenditure	2.4634	0.0611	-7.6826	0.000	I(1)
School Enrolment	2.6109	0.0362	-5.4612	0.000	I(1)
Capital Formation	8.5299	0.0646	-6.3117	0.000	I(1)

The Augmented Dickey-Fuller (ADF) test results show a mixed order of integration among the variables. The combination of I(0) and I(1) variables validates the adoption of the Autoregressive Distributed Lag (ARDL) model.

Table 2. ARDL Bounds Cointegration Test and Error Correction Result

Test	Statistic	Value	Decision
ARDL Bounds Test	F-statistic	6.4752	Cointegration exists
Critical Value (5%)	Lower Bound I(0)	2.85	
Critical Value (5%)	Upper Bound I(1)	3.91	
Error Correction Term	ECM(-1)	-0.6270***	Significant
t-statistic		-6.6519	
p-value		0.0000	

*****Significant at 5% level.

The ARDL Bound test results show an F-statistic of 6.475235, which is higher than the 5% upper bound critical values of 3.91, confirming that a long-run, stable relationship exists among the model variables. From the error correction term (CointEq(-1)) results above, the coefficient is negative (-0.626972) and statistically significant at 5% level (p = 0.0000), showing that approximately 62.7% of the disequilibrium in economic growth from the preceding year is corrected or adjusted in the present year.

Table 3. ARDL Long -run and Short-run Estimates with Diagnostic Tests

Variable	Short-run Coefficient	p-value	Long-run Coefficient	p-value
Education Expenditure	5.6864*	0.0068	9.0696*	0.0096
Health Expenditure	0.0792	0.6303	4.1264*	0.0004
School Enrolment	24.2773*	0.0008	38.7215*	0.0013
Capital Formation	-0.1019	0.7801	1.1625*	0.001
Constant	2.9424*	0.0003	4.6930*	0.000

Model Diagnostics

Diagnostic Test	Statistic	p-value	Decision
Breusch-Godfrey LM Test	Obs*R-squared = 4.9921	0.0824	No Serial Correlation
Breusch-Pagan-Godfrey Test	Obs*R-squared = 1.4317	0.9208	No Heteroskedasticity

***Significant at 5% level.**

The short-run results reveal that education expenditure and school enrolment variables, with coefficients of 5.686 and 24.277, are both positive and have a substantial impact on economic growth; whereas health expenditure and capital formation variables are not statistically significant in the short-run. The long-run ARDL indicates the existence of a sustained equilibrium relationship among the explanatory variables and economic growth in Nigeria. The findings provide strong evidence that human capital formation, alongside school enrolment and capital formation, exerts a positive and significant long-run effect on Nigeria's economic growth. The results therefore support the theoretical proposition that investment in human and physical capital is essential for sustainable economic development. The diagnostic tests confirm that the model is devoid of serial correlation and heteroskedasticity, indicating the dependability and robustness of the ARDL estimates.

Model Stability Tests

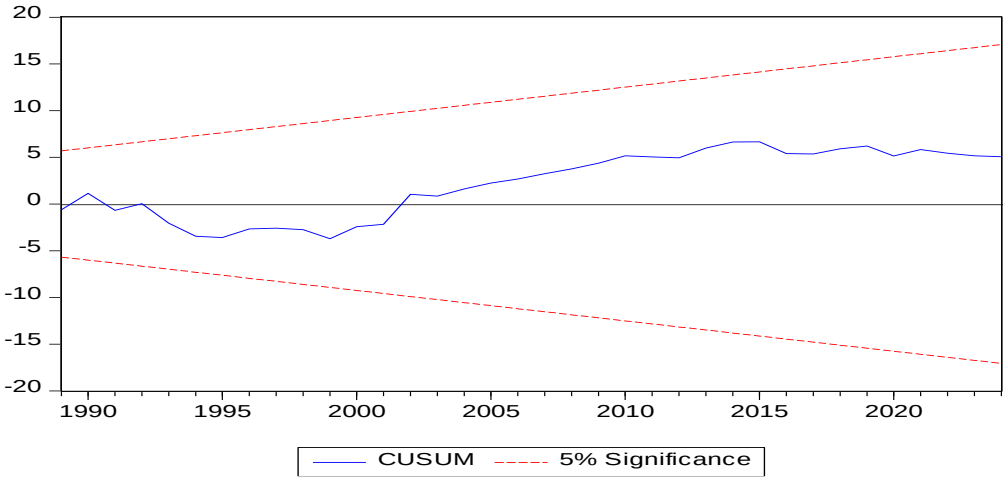


Figure 1: CUSUM Test Result

This CUSUM test indicates that the model's parameters are consistent, as the cumulative sum of recursive residuals remains within the 5% significance bounds. This shows that there are no significant structural breaks within the data from 1981 to 2024. This result adds a high level of confidence to the findings of the study, confirming that the long-run and short-run relationships identified are consistent and dependable throughout the study period.

Discussion of findings

Education Expenditure: Education expenditure contributes significantly to economic growth in Nigeria, with a coefficient of 9.070, showing that increased spending on education strongly enhances GDP growth. This aligns with Human Capital Theory, which emphasises that investment in education promotes output, innovation, and aggregate economic performance. The finding is in tandem with studies such as Okerekeoti (2022), Iheanacho and Nwaogwugwu (2021), and Chima and Yusuf (2023), but contradicts studies such as Ayaga et al. (2024) found negative or insignificant effects due to inefficiency and poor policy implementation. Summarily, the result gives insight into the need for effective investment in education for sustainable economic growth.

Health Expenditure: The coefficient of 4.126 for health expenditure demonstrates a strong positive and significant impact, suggesting that government spending on health positively influences economic growth in Nigeria. This supports the Health-Led Growth Hypothesis and Human Capital Theory, which argue that a healthier population enhances labour productivity and economic output. The finding is consistent with studies by Ogunbunmi (2023), Imandojemu et al. (2020), and Chima and Yusuf (2023), which established a positive relationship between health expenditure and growth. However, it contradicts with studies such as Muhammad and Bichi (2022) and Danlami et al. (2024), which reported negative effects due to inefficiency in public spending. The result therefore highlights the importance of increased and effectively monitored health investment as a strategy for promoting sustainable economic growth.

School Enrollment: The coefficient of 38.722 for school enrolment is positive and highly significant, indicating that increased access to education strongly boosts GDP. This finding validates the Human Capital Theory by confirming that human capital accumulation through education improves skills, productivity, and innovation. The finding is consistent with studies such as Sule (2020), and Okuneye and Adelowokan (2014), which established that higher school enrolment promotes economic growth in Nigeria. Overall, the result implies that policies aimed at improving school access and completion rates are essential for sustainable and inclusive economic growth.

Gross Fixed Capital Formation: The coefficient of 1.163 for gross fixed capital formation is positive and highly significant, confirming that physical capital accumulation promotes economic growth in Nigeria. This finding supports the Solow-Swan and Endogenous Growth theories, which emphasises that expenditure on capital stock is a key driver of economic expansion. The coefficient indicates that a 1% increase in gross fixed capital formation leads to a 1.163% increase in GDP. The result is consistent with studies by Olabisi and Akeju (2025), Esomnofu and Onyejegbu (2025), and Osunkwo (2021), which found that capital formation positively influences economic growth. Nevertheless, some studies reported negative or insignificant impacts due to poor project

implementation and inefficient allocation of investment resources. The findings, therefore, suggest that increased and efficiently managed capital investment remains crucial for enhancing productive capacity and sustaining long-run economic growth in Nigeria.

The overall significance of this investigation is that both human capital (education and health) and physical capital (gross fixed capital formation) are essential, complementary drivers of long-run economic growth in Nigeria. This study provides strong evidence that public expenditure on education and health is not "dead weight" but rather a productive investment that yields significant economic returns over time. The results also stress the key role of human capital development, with school enrolment emerging as a particularly potent variable.

CONCLUSION

This study, through the application of the ARDL model, has empirically demonstrated the positive and significant impact of government expenditure on education and health on Nigeria's economic growth over the period 1981 to 2024. The findings confirm that investments in both human and physical capital are essential for long-term economic development. The results underscore that public spending is a vital tool for economic management, but its effectiveness depends on strategic allocation and focus on tangible outcomes like improved school enrolment rates.

Based on the findings, the study suggests that government should continue to raise her funding on the education and health sectors with a shift in focus from merely increasing budgets to ensuring the efficiency and quality of the expenditure. Policies should focus on the enhancement of measures that directly target outcomes, such as improving school completion rates, improving the quality of health services, and increasing school enrolment through initiatives like free education and school feeding programs. Also, to boost capital formation, the government should promote a business-friendly environment that will enable the private sector to invest within the economy. Additionally, the government should implement a strong monitoring and evaluation system to ensure that funds disbursed to the education and health sectors are used appropriately.

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