

# Strategic Investment in Education: a Catalyst for Accelerated Economic Growth in Nigeria

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### JEL Classification:

C22; H52; O40.

**Abstract:** High levels of illiteracy, a shortage of skilled labour, and low marginal productivity have collectively created a detrimental impact on various aspects of Nigeria's economic landscape. These issues have resulted in a decline in real income, savings and capital formation. Despite the government's efforts to achieve a minimum adult literacy rate of 65% and promote skill acquisition and knowledge development as pillars for a dynamic economy, these persistent challenges continue to cast a shadow over the economy. In response to these pressing concerns, this study investigates the relationship between investment in education and economic growth in Nigeria between 1980 and 2021 utilizing Auto-regressive Distributed Lag bound models. The study reveals that a consistent sustained investment in education is foundational elements for driving Nigeria's future economic growth. Education, with its capacity to enhance human capital, productivity, and innovative capabilities, emerges as a pivotal factor in the journey toward economic prosperity. In light of this, the study emphasizes the critical importance of effective governance in the domain of education. It advocates for a rigorous and vigilant approach by the government in monitoring and evaluating the outcomes of education policies and initiatives. This level of scrutiny is imperative to ensure their efficacy and alignment with the overarching objective of fostering economic growth.

**Keywords:** ARDL; Education Funding; Economic Growth; Nigeria.

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## Introduction

Sustainable economic development relies on significant investments in human capital worldwide. Research extensively explores the pivotal role of human capital in driving development, especially in conjunction with physical capital. Discrepancies between these forms of capital and the externalities of human capital have significant implications for economic growth, as shown in scholarly literature. Human capital development is a universally recognized goal rooted in the belief that education, skills, and competencies enhance individual well-being, fuelling economic progress and societal advancement. Investments in education, healthcare, and other human development aspects amplify workforce productivity, reduce poverty and inequality, and uphold sustainable development objectives. Thus, human capital development is an essential element in strategies for sustainable and inclusive growth (Leal *et al.*, 2019; Langer, 2015; Cremin, & Nakabugo, 2012; Šlaus, & Jacobs, 2011).

Nigeria's government has taken determined steps to enhance human capital development. Allocations for education and healthcare have risen significantly both absolutely and proportionally. The United Nations acknowledges education and health as pivotal components of financial prosperity, integral to human resources (Ezojiet *et al.*, 2019; Paul & Akindele, 2016; Ehikioya, 2013; Aluko & Aluko, 2012). Emphasizing education's pivotal role, especially in countries like Nigeria with noteworthy accomplishments, underscores the collective expertise, skills, and innovative potential within the population (Ekesiobiet *et al.*, 2018; Ahmed & Alfaki, 2013; Ugal & Betiang, 2009).

Nigeria, despite its abundant natural resources, confronts persistent challenges in achieving sustained economic growth and development due to inadequate investments in human capital. This deficiency in human capital development in comparison to similar nations hampers economic competitiveness and stifles innovation (Osinubi & Amaghionyeodiwe, 2017). Consequently, Nigeria grapples with high unemployment and poverty rates, which in turn constrain overall economic expansion. Various factors contribute to this shortfall, including an education system that falls short, resulting in an inadequately skilled workforce (Alabi, 2019), a lack of policies and initiatives for continuous learning and skill enhancement and insufficient budget allocations for education and healthcare (Herlitzet *et al.*, 2020 Kimathi, 2017; Atmore *et al.*, 2012; ), thereby limiting access to quality services.

The ramifications of elevated illiteracy, a scarcity of skilled labour, and outdated production methods manifest in Nigeria's low marginal productivity. This translates to diminished real income, reduced savings, lowered investment, and constrained capital formation. Despite governmental endeavours, the target of attaining a minimum adult literacy rate of 65% and fostering skill acquisition remains unattained (Oyedepo, 2014; Ploeg, 2011). Addressing these challenges necessitates a concentrated focus on human capital, channelled through investments in education and skills enhancement (Pieninget *et al.*, 2014; Chryssolouris *et al.*, 2013; Šlaus & Jacobs, 2011). This strategic approach aims to alleviate unemployment, elevate the standards of education, and invigorate overall economic growth. The present study seeks to examine the relationship between investment in education and economic growth in Nigeria within the context of these multifaceted challenges.

This paper's subsequent sections are structured as follows: Section two provides a comprehensive review of relevant findings from existing literature. Section three outlines the study's methodology and empirical model. In section four, we present and discuss the data and results. Finally, the conclusion summarizes the findings and underscores policy implications derived from the empirical analysis.

## Literature Review

The endogenous growth theory suggests that economic expansion is driven by internal factors such as investments in personal capital, research and development, and technological progress. Unlike neoclassical growth theory, endogenous growth theory views technological progress as endogenous, meaning it is not fixed or exogenous but rather the result of research and development expenditures. This theory emphasizes the importance of innovation and human capital accumulation as primary factors contributing to sustained economic growth. It highlights the need for policies that stimulate innovation and human capital formation.

The studies conducted by Adelokun (2011), Simeon-Oke (2012), and Mbaet *al.* (2013) all explore the relationship between human capital and economic development in Nigeria. Adelokun (2011) used both theoretical analysis and the ordinary least squares (OLS) approach to evaluate the interlink between GDP growth and human capital growth. The study found that the development of Nigeria's economy and the country's growth in human capital are highly related with one another. Simeon-Oke (2012) found a reliable link between different components of human capital and overall levels of production, with expenditure on education having a positive effect on economic development. Mbaet *al.* (2013) also used OLS to evaluate the influence of increasing human capital on economic expansion in Nigeria, finding a substantial positive relationship between the two.

Studies by Olalekan (2014), Obi and Obi (2014), Anyanwuet *al.* (2015), Sulaimanet *al.* (2015), and Borojo and Jiang (2015) shows that all studies agreed on the positive relationship between human capital development and economic growth. Olalekan (2014), Anyanwuet *al.* (2015), and Borojo and Jiang (2015) found that increased government expenditure in the health and education sectors can stimulate economic growth, while Obi and Obi (2014) suggested ensuring effective use of public resources, good governance, responsibility, and openness in the educational system. Sulaimanet *al.* (2015) found that human capital and technological advancements had major and favourable impacts on economic expansion. However, while Obi and Obi (2014) found no evidence of a long-run relationship between economic growth and recurrent schooling expenses, all other studies found a positive relationship between human capital development and economic growth in the long-run.

Also, a comparative review of the studies by Hadir and Lahrech (2015), Ekesiobiet *al.* (2015), Ogunleyeet *al.* (2017), Adejumo (2017), Oyedokun (2019), and Abubakar, Bala and Musa (2020) revealed that all studies agree on the positive relationship between human capital development and economic growth in Nigeria. Hadir and Lahrech (2015) found a significant relationship between government spending on education and health and enrollment in primary, secondary, and university institutions, while Ekesiobiet *al.* (2015) found that public investment in education had a marginal but beneficial effect on the expansion of the manufacturing sector. Ogunleyeet *al.* (2017) found a strong and favourable relationship between the growth of human capital and the expansion of the economy, while Adejumo (2017) found that the amount of human capital in Nigeria was not adequate to increase employment or decrease unemployment to a satisfactory level. Oyedokun (2019) found a substantial and favourable long-run relationship among various indicators of human capital development, including total school enrollment, gross capital formation, employment rate, life expectancy rate, and economic growth. Finally, Abubakar, Bala, and Musa (2020) found that improvements in education and healthcare led to faster and more sustained economic expansion over the medium and long-terms, with education having a larger influence on economic growth than healthcare.

## Methodology

The study employs a modified version of the framework proposed by Hadir and Laurech (2015) to investigate the impact of improving education on economic growth in Nigeria. By utilizing this framework, the study aims to make a valuable contribution to the growing body of literature on this subject matter. The model is specified as:

$$gdp_t = f(ler, gee, ter, inf, inv) \quad (1)$$

Equation (1) above is specified as an econometric model in equation (2) below:

$$\text{Log}(gdp)_t = \varphi_0 + \varphi_1 ler_t + \varphi_2 \log(gee)_t + \varphi_3 \log(ter) + \varphi_4 inf + \varphi_5 \log(inv) + \varepsilon_t \quad (2)$$

Where:

$gdp$  = Gross Domestic Product;

$ler$  = Life Expectancy Rate;

$gee$  = Government Expenditure on Education;

$ter$  = Tertiary School Enrolment;

$inf$  = inflation rate;

$inv$  = investment;

$\varepsilon$  = Error term.

Equation (3) is the long-run estimating model to investigate the link among the variables. To achieve this objective, this study uses the ARDL estimating technique, the equation for this is specified below:

$$\begin{aligned} \Delta \ln gdp_t = & \delta_0 + \sum_{i=1}^n \delta_{1i} \Delta \ln gdp_{t-i} + \sum_{i=0}^n \delta_{2i} \Delta \ln(ler)_{t-i} + \sum_{i=0}^n \delta_{3i} \Delta \ln(gee)_{t-i} + \\ & \sum_{i=0}^n \delta_{4i} \Delta ter_{t-i} + \sum_{i=0}^n \delta_{5i} inf_{t-i} + \sum_{i=0}^n \delta_{6i} inv_{t-i} + \omega_1 \ln gdp_{t-1} + \omega_2 \ln(ler)_{t-1} + \\ & \omega_3 \ln(gee)_{t-1} + \omega_4 ter_{t-1} + \omega_5 inf_{t-1} + \omega_6 inv_{t-1} + \mu_{1t} \end{aligned} \quad (3)$$

Where  $\delta_0$  is the intercept;  $\delta_1 - \delta_6$  and  $\omega_1 - \omega_6$  are short-run and long-run elasticities respectively with respect to the variables identified above; while  $\mu_{1t}$  is the error term;  $\Delta$  is the difference operator; and  $n$  is the lag length.

$gee$  is expected to have an impact on the economic output of a country, as education contributes to human capital development and productivity.  $ter$  is a measure of the number of students enrolled in higher education institutions. It is another indicator of human capital development and can influence a country's economic performance.  $inv$  refers to spending on capital goods that are expected to generate future benefits which is an important component of economic growth.  $inf$  is the rate at which the general level of prices for goods and services rises, leading to a decrease in the purchasing power of money. Data pertaining to the variables are extracted from two principal sources: Central Bank of Nigeria (CBN) Statistical Bulletin and the World Development Indicators (WDI), 2022.

## Results

### Descriptive Statistics

Table 1 presents the statistical properties of the analyzed series. Despite the presence of an outlier, the median values for most variables are not significantly different from the extremes, suggesting that the series' variability has not decreased over the examined time period. The J-B test for normality indicates that only the inflation rate fails to meet the threshold of 0.05. With the

exception of inflation and life expectancy rates, all other series have negative skewness, and only inflation has a leptokurtic kurtosis. The government spending on education series has similar minimum, maximum, and mean values, indicating a platykurtic sequence with negative skewness that follows a normal distribution according to the J-B test. The investment series has a maximum value that is significantly higher than its lowest value, indicating platykurtic kurtosis with negative skewness and a normal distribution. Finally, the range of tertiary enrollment is much larger than the minimal range.

**Table 1.** Descriptive Statistics

	<i>log(gdp)</i>	<i>log(gee)</i>	<i>inf</i>	<i>log(inv)</i>	<i>ter</i>	<i>log(ler)</i>
Mean	9.2199	3.6154	19.5354	12.8919	6.4011	3.8870
Medium	9.4956	4.3371	12.2731	13.5978	8.8444	3.8548
Maximum	12.0230	6.3859	72.8355	14.6926	10.4000	4.0156
Minimum	5.3104	-1.4916	5.3822	8.8987	0.7408	3.8302
Std. Dev.	2.0998	2.3561	17.8187	1.8455	3.6206	0.0621
Skewness	-0.4016	-0.7681	1.7018	-0.7413	-0.3359	0.6516
Kurtosis	1.8764	2.5060	4.5461	2.2828	1.3448	1.9181
Jarque- Bera	2.7822	3.7975	20.3805	3.9558	4.6531	4.1840
Probability	0.2488	0.1497	0.0000	0.1383	0.0976	0.1234

Source: Authors' computation, 2023.

### Correlation Matrix

Table 2 presents the correlation between economic growth and independent variables which such as life expectancy rate, government expenditure on education, tertiary school enrolment and the inflation rate.

**Table 2.** Correlation Matrix

	<i>log(gdp)</i>	<i>log(gee)</i>	<i>inf</i>	<i>log(inv)</i>	<i>ter</i>	<i>log(ler)</i>
<i>log(gdp)</i>	1.000					
<i>log(gee)</i>	0.968	1.000				
<i>inf</i>	-0.445	-0.419	1.000			
<i>log(inv)</i>	0.981	0.385	-0.438	1.000		
<i>ter</i>	0.940	0.416	-0.477	0.549	1.000	
<i>log(ler)</i>	0.870	0.600	-0.390	0.379	0.582	1.000

Source: Authors' computation, 2023.

The essence of the correlation matrix in table 2 is to ascertain the level and possible extent of the direction of the link among the variables. We find that the series (explanatory variables) do not suffer from the problem of multicollinearity.

### Unit Root Test

The unit roots in the series were detected using the Augmented Dickey-Fuller (ADF) test. The result is presented in Table 3.

Table 3. Unit Root Tests

Variable	ADF H <sub>0</sub> : $\rho$ has a unit root		I(d)
	Constant	Constant and Trend	
$\log(gdp)$ $\Delta\log(gdp)$	-3.9926 (0.004)***	-0.0768 (0.993)	I(1)
$\log(gee)$ $\Delta\log(gee)$	-2.7096 (0.085)* -7.4118 (0.000)***	-3.3903 (0.070) -7.6123 (0.000)***	I(1)
$\log(ler)$ $\Delta\log(ler)$	4.2229 (1.000) -1.4444 (0.548)	-1.6479 (0.752) -5.1730 (0.001)***	I(1)
$\log(inv)$	-3.8984 (0.005)***	-0.6700 (0.967)	I(0)
$inf$	-4.6578*** (0.001)	-3.0084 (0.148)	I(0)

Note: \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10% respectively.

Source: Authors' computation, 2023.

Given that the series have a mixed order of integration, that is, they are I(0) and I(1), the autoregressive distributed lag model is adequate in estimation, especially to ascertain both short and long-run association.

## Regression Analysis Result

### Bounds Test of Cointegration

To determine the possible long-run relationship existing among the variables of interest, the Bounds test of cointegration is conducted. Long-run cointegration exists if the F-statistic of the Bounds test is higher than the upper critical bounds. Table 4 provides the results of a Bounds test used to examine the relationship between educational funding and economic growth in Nigeria.

Table 4. Bounds test for the model on the impact of educational funding on economic growth in Nigeria

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	15.09	10%	2.45	3.52
K	6	5%	2.86	4.01
		2.5%	3.25	4.49
		1%	3.74	5.06

Source: Authors' computation, 2023.

The Bounds test of cointegration for all the models show that their individual F-statistics is greater than the critical value bounds for the upper bounds. It can be concluded that the series in the models are cointegrated, that is, they have a long-run relationship.

### Estimation Results

The regression result to meet objective one which is to estimate the impact of educational funding on economic growth in Nigeria is presented in Table 5. Given that the bounds test of cointegration in Table 4 showed long-run relationship among the series, we present the short-run and long-run estimate here.

**Table 5.** Impact of educational funding on economic growth in Nigeria

<b>Short-Run Model</b>				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
$dlog(gee)$	0.0016	0.0168	0.0971	0.9234
$dlog(gee(-1))$	-0.0294*	0.0170	-1.7277	0.0974
$d(inf)$	0.0045***	0.0007	6.4454	0.0000
$dlog(inv)$	0.1301**	0.0510	2.5493	0.0179
$dlog(inv(-1))$	-0.1257**	0.0533	-2.3600	0.0271
$d(ter)$	0.0100	0.0083	1.1988	0.2428
$ect(-1)$	-0.1523***	0.0372	-4.0933	0.0004
<b>Long-Run Model</b>				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
$log(gee)$	0.3446**	0.1639	2.1016	0.0467
$inf$	0.0298***	0.0074	4.0031	0.0006
$log(inv)$	0.5572***	0.1654	3.3669	0.0027
$ter$	0.0657	0.0579	1.1337	0.2686
$c$	1.0567	1.6304	0.6481	0.5233

Note: \*\*\*, \*\* and \* indicate significance at 1%, 5% and 10% respectively.

Source: Authors' computation, 2023.

Table 5 shows how increasing government spending on schools has boosted the Nigerian economy. The research shows a favourable relationship between government expenditure on education and economic development in the near, while the connection is not statistically significant. A better rate of economic development is linked specifically to more government expenditure in education in Nigeria. To be more specific, a 1% increase in government spending on education results in an additional 0.0016 percent growth in the economy. Nevertheless, government spending on education has a negative influence on economic development, albeit one that is a year late. Increasing public spending on education by 1 percent in the prior year is related with a 0.0294 percentage point decline in current economic growth, according to empirical evidence. This association, however, fails to meet the criteria for statistical significance at the 0.05 level of analysis. However, at the 0.05 level of significance, there is a favourable relationship between government expenditure on education and economic development in Nigeria.

Historically, greater inflation rates have been associated with higher rates of economic growth in the short-term. If everything else stays the same, a 1% increase in inflation will result to a 0.045% increase in economic growth. However, in the long-term, a higher inflation rate is associated with greater economic growth. In other words, if everything else is equal, an increase of 1% in the inflation rate would cause a rise of 0.0045% in economic growth. Furthermore, in the near term, a 1% increase in investment triggers around a 0.13% increase in economic growth. At the 5% level of significance, this connection is undeniable. Investment's influence on GDP growth in the long-term is comparable to that in the short-run. The findings suggest that greater levels of tertiary student enrollment are connected with faster rates of economic expansion. If everything else remains constant, a one percent increase in postsecondary enrollment would boost GDP growth by around 0.01% in the near term.

Figure 1 describes the normality of the data using the Jarque-Bera (J-B). The Jarque-Bera (J-B) test's p-value being greater than the 0.05 threshold set for this study leads to the conclusion that the residual term is normally distributed.

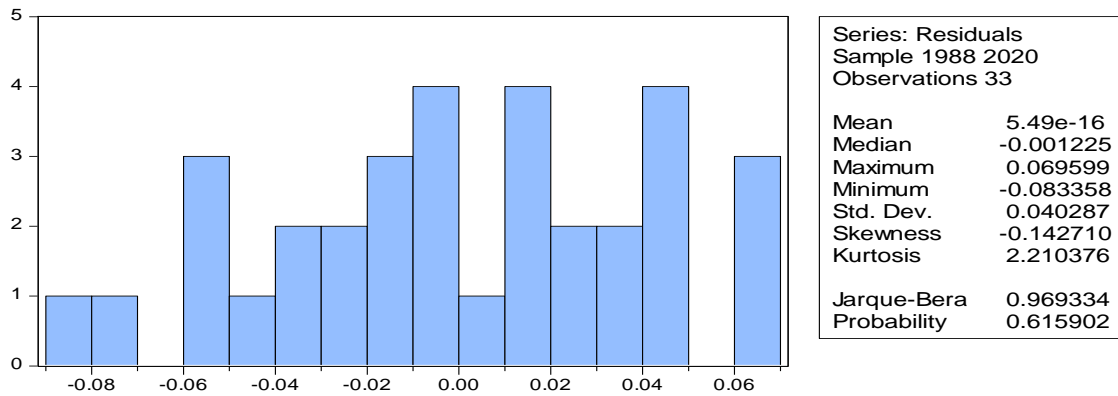


Fig. 1. Jarque-Bera (J-B)

Source: Authors' research findings.

Table 6 presents the results of the Breusch-Godfrey Serial Correlation LM Test, which is a statistical test used to assess whether there is serial correlation in a model.

Table 6. Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.1627	Prob. F(2,21)	0.8509
Obs*R-squared	0.5035	Prob. Chi-Square (2)	0.7774

Source: Authors' computation, 2023.

Based on the results in Table 6, there is no significant evidence of serial correlation in the regression model being tested. This is good news for the validity of the regression analysis, as it suggests that the assumption of uncorrelated error terms over time is met.

Table 7 presents the results of the Heteroskedasticity Test using the Breusch-Pagan-Godfrey test.

Table 7. Heteroskedasticity Test: Breusch-Pagan-Godfrey

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.9002	Prob. F(9,23)	0.5408
Obs*R-squared	8.5964	Prob. Chi-Square (9)	0.4553

Source: Authors' computation, 2023.

As the probability of the F-statistics is greater than the 0.05 threshold set for this study, it can be concluded that the error term is not affected by heteroscedasticity.

The CUSUM and CUSUMQ test statistics, depicted in Figures 2 and 3 respectively, demonstrate that both remained within the 5% critical lines for the entire evaluation period, indicating stability of the parameters throughout. This supports the robustness of the ARDL model's long-run coefficient of economic growth with respect to independent variables.



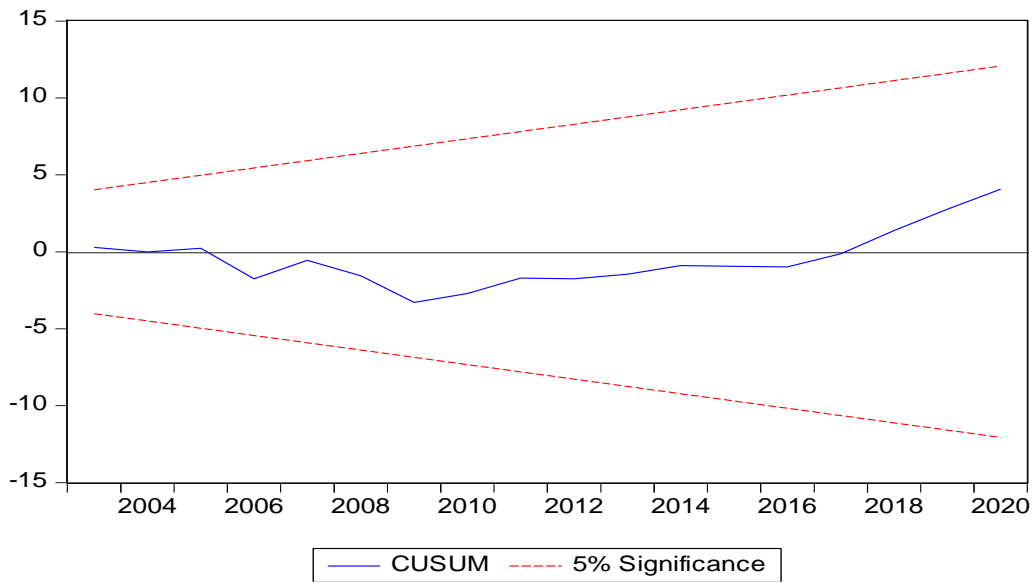


Fig. 2.CUSUM Test

Source: Authors’ research findings.

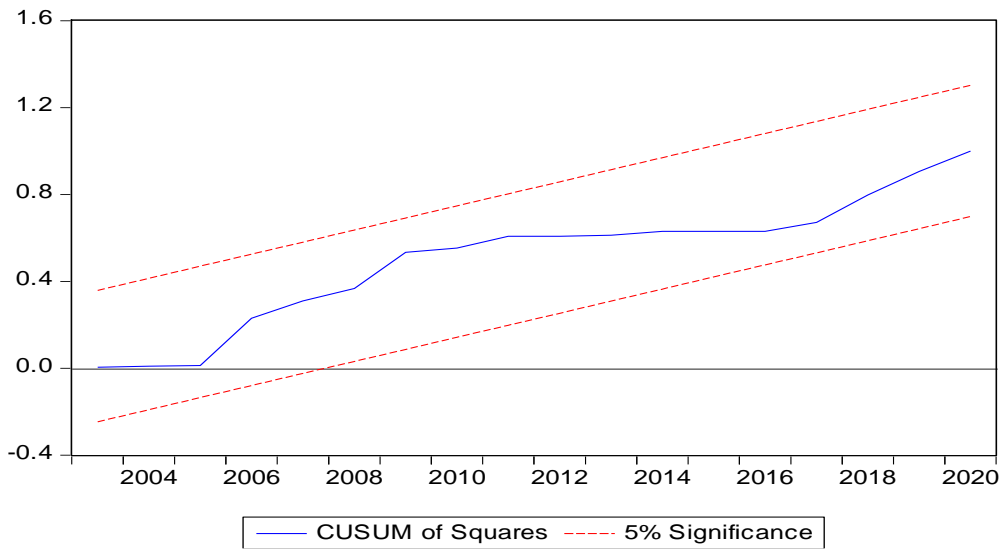


Fig. 3.CUSUMQTest

Source:Authors’ research findings.

### Discussion of Findings

The aim of this study is to examine the impact of educational funding on economic growth in Nigeria. In order to accomplish this, the researchers utilised the Bound test approach to Autoregressive Distributed Lag (ARDL) cointegration, a statistical technique that identifies long-term relationships between variables. The error correction process was used to calculate the time required for the variables to reach equilibrium after the short-term adjustment. Although the favourable effect of government spending on education on economic development was not statistically significant in the short-term, it was found in the research. But at the 0.05 level of significance, government expenditure on education has a beneficial effect on economic

development in Nigeria over the long-term. These findings imply that Nigeria's economy may see long-run development if resources are allocated to education.

Short-run effects of government spending on education on economic growth were seen, although the effect was not statistically significant. This is a fascinating discovery that warrants more investigation. It is crucial to stress that this finding does not disprove the relevance of public spending in education as a driver of economic expansion. This finding, on the other hand, implies that the benefits of government spending on education may not be immediately apparent and may be subject to short-run fluctuations caused by other causes. The fact that returns on educational investments take time to materialise is one potential reason for the lack of immediate effect. The returns on an investment in one's education are not always obvious in the short-term. It might be a while before college graduates start making contributions to GDP via the job market. The quality of education, the level of teacher preparation, and the evolution of curricula are all variables that might mitigate the effect of government spending on education. Human capital development and economic growth may not significantly increase if government spending on education is not supported by initiatives to enhance the quality of education.

## Conclusions

The economy of Nigeria has grown rapidly, yet inadequate education persists. Education spending and economic growth in Nigeria have a complex relationship. Supporting education can boost the economy by increasing productivity, innovation, and entrepreneurship. However, challenges like low enrollment rates, especially in remote areas, and poor educational facilities persist due to poverty and cultural norms. Additionally, a lack of skilled instructors and overcrowded classrooms hampers effective education delivery. The government can tackle these issues by enhancing education accessibility through improving enrollment rates and facilities, increasing education funding, and rigorously monitoring and evaluating the impact of education policies and programmes to ensure their effectiveness in achieving desired objectives.

Future research could explore a micro-level analysis i.e. a more granular examination of the impact of education on economic growth at the household level could provide deeper insights. This could involve exploring the relationships between education, employment, income, and entrepreneurial activities among Nigerians.

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