



## Public Education Expenditure, Human Capital Development and Economic Growth in Nigeria

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### Abstract

The study theoretically and empirically investigates the public education expenditure, human capital development and economic growth in Nigeria between 1981 and 2020. The study looked at the education and health sector of the economy as determinant of revolutionary and productive economic growth in Nigeria with the aim of ascertaining the relationship between government educational expenditure, human capital development and economic growth in Nigeria. The data was analyzed using the post-estimation econometric methodologies with the use of EViews9 statistical software. Therefore, the results revealed that there exist a short-run and long-run relationship between public educational expenditure, human capital development and economic growth in Nigeria. Given the context of the study, recommendations were made that in order to maintain long-term economic growth, the government should first create specific agencies with the mandate to enhance the skills and talents of graduate, also that the government should focus on enhancing the health and education sectors of Nigeria through higher government financial allocation and incentive programs for sustained continuous growth in order to boost the nation's productivity capacity.

**Keywords:** Public education expenditure, Human capital development, Economic growth, ARDL.

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## 1. Introduction

The economies of developing nations see education as a huge investment in human capital development (HCD), which is paramount for national development. As such, education contributes to human development through divulging common attitudes and the exact skills required for productivity [1]. Factually, the linkage between education and economic growth (EG) is a well-referenced and quantifiable issue that serves as a crucial indicator for the economic development of developed and developing economies in the 21st century. Government expenditure (GE) is an important tool used by the government to regulate and make the economy of a nation function. It is a fiscal capacity tool used to redistribute and disburse responsibilities between various tiers of the government and its sectors [2]. GE is a comprehensive resource used to regulate the fiscal policies of an economy, especially the values of goods and services provided through the public sector. GE is also seen as a transfer of funds from the government to other sectoral parts of the economy, whether it is required or not [3]. In Nigeria, GE is classified into capital and recurrent expenditure. By this classification, the current expenditure is wages, salaries, interest on loans, and maintenance, while on the other hand, the recurring expenditure is roads, infrastructural development, airports, health, investment in education, telecommunications, and electricity. Contrarily, recurrent government expenditures (RGE) are payments for non-repayable transactions within one year, while current government expenditures (CGE) are payments for non-financial assets used for manufacturing purposes, usually within a year [3].

Education is an important tool for providing access to what provides the required skills and knowledge necessary to adapt to an economy that experiences new technologies that boost EG [4]. However, education is also seen as the development of human capital in order to boost the economy. To achieve this, governments in developing economies need proper educational funding. This funding could be capital - and recurrent-oriented to invest in the human capital and productivity of the economy. However, education as a major tool for developing human capital is expected to build individuals with the requisite skills and knowledge that will help increase their efficiency and worth [5]. With this,

it then establishes the contribution to and nexus of education and EG in Nigeria. As such, it births the role of the government, especially in emerging economies like Nigeria, in devoting a considerable expanse of resources to deliver educational services with the underlying objective of improving the level, quantity, and quality of their human capital for better economic performance [6].

Government educational expenditure in the last three decades has increased to promote HCD and EG in Nigeria. Most emerging economies like Nigeria are allocating significant resources to educational services with the overarching goal of increasing the quality of human capital in order to improve EG [7]. Research has touched on and heightened the nexus between government expenditure on education (GEE) and EG, which has revealed a heated dispute about whether government investment promotes EG. Previous studies suggest the literature at the micro level is only interested in the rate of return on education for individuals, whereas at the macro level, the literature underlines the effect of education on macroeconomic growth [6]. Notably, the significance of GEE in Nigeria implies that the micro-level literature is only concerned with labor quality, which is affected by many factors that include the level of education and its quality [8]. While the empirical literature on the impact of GEE, and in particular its composition, on EG has so far yielded mixed results, most economists seem to think the level and type of expenditure undertaken by the government do matter for economic performance [6].

HCD is building a nation's human resource endowment to make its citizens knowledgeable, skilled, healthy, and productive, which allows for the optimal exploitation and utilization of other resources to stimulate growth and development [9]. In actualization of the foregoing, the enrolment in tertiary education in Nigeria is increasing and playing a more efficient role in the investment of the human capital of the nation. Therefore, [10] asserts that in emerging-economy nations like Nigeria, GE plays a significant role in ensuring better access to education, as evidenced by an improved literacy and enrolment rate, higher quality, and a more equitable distribution of education services. Averagely, the rate of tertiary education enrollment between 1980 and 1989 accounted for 13.10 percent; 15.50 percent



between 1990 and 1999; 23.83 percent between 2000 and 2009; and about 35.68 percent between 2010 and 2020. Therefore, the persistent increase in the average percentage rate of tertiary education enrolment in Nigeria reveals that there is an improved literacy rate and enrolment rates in tertiary education in Nigeria, resulting in a more equitable distribution of education services and the development of human capital in the nation.

The nexus is also seen as establishing the indicator used to measure the quality of education [11]. To an extent, education is also seen as contributing to the social, political, human resources, and economic development of a nation [12]. The beneficial implication of education for EG has, to some extent, brought about an increase in GE on socio-economic and physical infrastructure, which invariably promotes EG. Notably, [2] asserts that if GEE increases, labor productivity, HCD, and national productivity growth will increase.

Nigeria is ranked 10th out of the 10 poorest nations as a developing economy, and an increase in GE might hinder the EG and development of the nation [13]. To an extent, this could also result in poor funding, misappropriation, leakages, industrial action, and supervisory seizure—all factors that contribute to this detrimental effect in the education sector. Averagely, the percentage share of gross domestic product spent on education between 1980 and 1989 accounts for 6.81 percent; 6.29 percent between 1990 and 1999; 5.92 percent between 2000 and 2009; and about 7.95 percent between 2010 and 2020. This percentage share of gross domestic product on education between 1980 and 2020 amounted to 6.77 percent on average, and this stance is pitiable against the 20 percent of the UNESCO share on education [14]. Also, despite the dilapidating trend in GDP, the share of education and the health of the citizens as a measure for HCD have an influence on economic productivity and development. However, the percentage of health to the GDP of any nation should be 15 percent [14]. This is the strength of the study, which examines the effect of public education expenditure and HCD on EG in Nigeria, though the predicted educational impact on economic transformation for growth and development between the periods of 1981 and 2020 remains. Hence, specifically, the study aims to ascertain the relationship between public education expenditure, HCD, and EG in Nigeria.

To this end, the following null hypotheses were formulated and tested at the significance level of  $p$  0.05:

1. There is no significant relationship between government expenditure on education and economic growth in Nigeria.
2. Human capital development has no significant relationship with economic growth in Nigeria.

The first section of the paper deals with the introduction, while the second section focuses on theoretical and empirical reviews of related literature. The third section entails the methodology employed for the study, while the fourth section focuses on the methodology and discusses the results. The paper ends with a section on conclusions and recommendations.

## 2. Literature Review

### 2.1 Theoretical Review

Several economic studies have shown theories of how GE could be beneficial or harmful to EG in Nigeria. The study examined Wagner's theory of increasing state activities developed by [15], which talked about GE, while the human capital theory developed by [16] talked about the economic theory of human capital. Both the theoretical and empirical reviews were adopted to juxtapose the nexus between GE, HCD, and EG in Nigeria.

#### 2.1.1. Wagner's Theory of Increasing State Activities

A German economist, Aldolph Wagner, was the inspiration for this rule (1835–1917). Wagner, in the 1880s, observed that the tiers of governments (federal, state, and local governments) had a natural tendency to expand their activities over time, both intensely and broadly. The theorist linked the evolution of public expenditure in various categories, such as law and justice, security, education, health and welfare services, recreation and culture, and information, among others, to the development of the economy and its derivatives. Increases in GE are required as a result of the increased government operations. In light of the foregoing, it was hypothesized that a



functional relationship exists between an economy's growth rates and the growth rates of government-run activities so that the government sector expands faster than the general economy. That is, when per capita income rises, there is a long-term trend for GE to climb.

However, based on their analysis of public expenditure in the United Kingdom from 1890 to 1955 [17], they formulated a hypothesis on the increase in public expenditure. They argued that public expenditure increases in jerks or stepwise fashion rather than smoothly and continuously, favoring a post-ante analysis of the direction of causality on government budgets. They also claimed that at times, social or additional instability occurs, necessitating an increase in public expenditure that current public revenue will not be able to meet.

### 2.1.2. The Economic Theory of Human Capital

The human capital theory is based on the notion that formal education is both beneficial and required for improving a population's productive potential. Human capital theorists suggest that a productive population is one that is educated. Education improves the degree of cognitive stock of economically productive human aptitude,

which is a product of intrinsic abilities and investment in human beings, according to human capital theory.

However, the Economic Theory of Human Capital developed by [16] talks about the importance of labor maximization and how a company might accumulate employees' knowledge, skills, and abilities to boost employee capacity. Without a doubt, people bring various levels of education, knowledge, ability, and skills to the workplace, as well as their expectations. According to [18], they asserted that a more educated and better-trained person is capable of giving a bigger amount of effective and productive effort than one with less education and training. In other words, the theory aims to improve organizational performance by creating value, skill, knowledge, and ability for the employee. After Gary Backer won the Nobel Prize for Literature, "human capital theory" was developed, which stated that different levels of education and training contribute to different levels of wages and salaries and that the more knowledge, skill, and ability, the more likely it is to get a better job [19]. As such, human capital, according to [16], is a physical method of production.

## 2.1 Review of selected empirical literature

| Author(s) and Year | Objectives  | Methodology  | Findings   |
|--------------------|---|--|--|
| [20]               | examined the relationship between education and EG in Nigeria using annual time series data for the period 1980–2008.   | The study employed the OLS estimation technique for the analysis.  | The result revealed that education investments have a direct and significant impact on EG in Nigeria.  |
| [21]               | analyzed the relationship between EG and human capital.   | The study adopted the ordinary least square (OLS) method, using GDP as a proxy for EG, total GEE and health, and the enrolment pattern of tertiary, secondary, and primary schools as proxies for human capital. | The analysis reveals that there is a strong positive relationship between HCD and EG.  |
| [22]               | investigate the effects of public expenditure in education on EG in Nigeria over a period, from 1977 to 2012, with particular focus on disaggregated and sectorial expenditures analysis. | The study used an ex post facto research design and applied time series econometrics techniques (an error correction model).   | The results revealed that total expenditure on education is highly and statistically significant and has a positive relationship with EG in Nigeria in the long run. |
| [23]               | examined the relationship between education and EG in Nigeria using annual time series data for the period from 1981 to 2012.   | The study adopted the use of Johansen co-integration.  | The result revealed that there is no long-run relationship between education and EG over the period of 1981 and  |





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|------|--|--|---|
| [24] | examined the extent to which education affected EG in India from 1951 to 2012. | The study applied co-integration and Granger causality in econometrics.                          | 2012.<br>The findings showed that education generated EG while a long-term relationship was established.        |
| [25] | examined the impact of educational expenditure on EG from 1973 to 2012.        | The study adopted the Fully Modified Ordinary Least Squares method for 14 major Asian countries. | The result revealed that investment in education impacted positively on the EG of the 14 major Asian countries. |
| [26] | examined the relationship between education and EG in India from 1975 to 2016. | The study employed Granger causality and co-integration methods.                                 | The study found that there is a positive link between different levels of education and EG.                     |

Source: Author's compilation.

### 3. Methodology and Model Specification

The type of research design used was an analytical research design. The data was analyzed using the econometric methodologies of the unit root test to check for stationary co-integration bounds, the auto-regressive distributed lag (ARDL), and error correction to correct the disequilibrium in the ARDL model using EViews 9. Specifically, this research adopted the models of [27] on government educational expenditure from 1980–2015 and [28] on HCD from 1990–2014 and EG in Nigeria.

The study adopted the natural log of recurrent government expenditure on education and health as proxies for expenditure on education and HCD, respectively, while the gross domestic product growth rate was used as a proxy for EG. The data used was obtained from the 2020 Central Bank of Nigeria Statistical Bulletin and the 2020 National Bureau of Statistics. Therefore, this was done to investigate the impact of GEE and HCD on EG in Nigeria from 1981 to 2020.

The model for the study and the *a priori* expectations are specified as follows:

$$EG_t = \alpha_0 + \alpha_1 GEE_t + \alpha_2 HCD_t + \mu_t \quad (1)$$

where:

$EG_t$  = economic growth at time “ $t$ ”;

$GEE_t$  = Government expenditure on education at time “ $t$ ”;

$HCD_t$  = Human capital development at time “ $t$ ”;

$\alpha_0$  = constant term;

$\alpha_1, \alpha_2$  are Regression coefficient of the independent variables, and

$\mu_t$  = Stochastic error term.

However, on the *a priori*, we expect  $\alpha_1, \alpha_2 > 0$ .

### 4. Results

#### 4.1.1 Unit root test (Test for Stationarity)

To stay away from spurious regressions that could arise as a result of carrying out regressions on time series data, we first subject the data to a stationarity test by using the Augmented Dickey-Fuller (ADF) tests. To test for unit root, there are numerous tests used by econometricians to check for stationarity of the variables. As highlighted by [29], some of these tests include the Phillips-Perron (PP) test, the ADF test, and the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test, which are the most frequently used tests for stationarity and unit root in the literature. However, having adopted the ADF unit root test, the unit root test can be represented as follows:

$$\Delta y_t = \mu + \delta_{t-1} + \sum_{i=1}^p \beta_i \Delta y_{t-1} + \varepsilon_t \quad (2)$$

Where:

$\Delta y$  = the first difference of  $y_t$ ; that is  $y_t - y_{t-1}$ ;



$\delta_{t-1}$  = is the constant term in the model, and it is equal to  $\alpha-1$ , where  $\alpha$  is the coefficient of  $y_{t-1}$ ;

$\Delta$  = is the first difference operator;

$\alpha$  = coefficient of  $y_{t-1}$ ;

$\varepsilon_t$  = error term at time  $t$ ;

$p$  = is the  $i$ th order autocorrelation of the disturbance process;

$\beta_i$  = coefficient of the lagged first difference term for  $i = 1, 2, \dots, p$ .

The stationarity test result presented in Table I shows that at various levels of significance (1 percent, 5 percent, and 10 percent), variables GEE and HCD were not stationary at level but stationary at first difference, while variables EG were stationary at the significance level of 1 percent and not stationary at the significance level of 5 percent and 10 percent.

**Table I: ADF Unit Root Test at Level**

| Variables | ADF Value | 5% Critical Level | Prob. Value | ADF Value | 5% Critical Level | Prob. Value | Order of Integration |
|-----------|-----------|-------------------|-------------|-----------|-------------------|-------------|----------------------|
| EG        | -3.020    | -2.941            | 0.041       | -         | -                 | -           | I(0)                 |
| GEE       | -2.275    | -2.948            | 0.185       | -7.885    | -2.941            | 0.000       | I(1)                 |
| HCD       | -1.676    | -2.948            | 0.434       | -10.250   | 2.941             | 0.000       | I(1)                 |

Source: Author's compilation.

Specifically, since all the variables were not stationary at the first or second difference (integrated from order one), the results of the

variables being stationary at various levels make it inappropriate for the application of the ADF method.

**Table II. ARDL Short-run and Long-run Regression Results**  
**II.I: Short-run Regression Results**

| Variable | Coefficient | Std. Error | t-Statistic | Prob.  |
|----------|-------------|------------|-------------|--------|
| EG(-1)   | 0.458       | 0.136      | 3.372       | 0.001* |
| GEE      | 3.007       | 2.083      | 1.443       | 0.157  |
| HCD      | -2.661      | 1.934      | -1.376      | 0.177  |
| C        | -1.164      | 2.130      | -0.546      | 0.588  |

Source: Author's compilation (\* $p < 0.05$ .)

**II.II: Long-run Regression Results**

| Variable       | Coefficient | Std. Error | t-Statistic         | Prob.   |
|----------------|-------------|------------|---------------------|---------|
| GEE            | 5.558       | 3.914      | 1.419               | 0.164   |
| HCD            | -4.919      | 3.696      | -1.331              | 0.191   |
| C              | -2.151      | 3.943      | -0.545              | 0.588   |
| R-squared      | 0.375       |            | SSR                 | 557.258 |
| Adj. R-squared | 0.321       |            | Durbin-Watson stat  | 2.3168  |
| F-statistic    | 7.010       |            | Prob. (F-statistic) | 0.000   |

Source: Author's compilation.



Therefore, the result can be estimated as:

$$EG_t = -1.164 + 3.007GEE_t - 2.661HCD_t \quad (3)$$

The constant term of the model represents the autonomous growth rate of real GDP. It implies that the EG decreased approximately at a constant rate of 1.16 percent during the period, on the axiom that the regression is zero. The result shows that in the short run, an increase in government educational expenditure (GEE) causes a decrease in EG. Therefore, a 1 percent rise in current GEE will bring about a 3.01 percent increase in EG. The corresponding probability value of 0.1579

obtained shows that such an impact is statistically significant at the 5-percent level. However, in the short run, a decrease in HCD causes a decrease in EG. Thus, a 1 percent rise in current HCD will bring about a 2.66 percent decrease in EG. The probability value of 0.1775 obtained shows that such an impact is statistically significant at a 5 percent level in the short run.

The long-run estimates show that GEE contributed to an increase in EG in Nigeria of 5.55 percent, which is found to be statistically significant due to its probability value of 0.16. Similarly, the result shows that HCD causes a decrease in EG in Nigeria by 4.92 percent, and this is found to be statistically significant due to its probability value of 0.19 at the 5 percent significant level.

**Table III: ARDL Co-Integration Bound Test**

| F-Statistic | K | I(0) Bound at 5% Critical | I(1) Bound at 5% Critical |
|-------------|---|---------------------------|---------------------------|
| 4.848       | 2 | 3.10                      | 3.87                      |

Source: Author's compilation.

The ARDL co-integration The bound test outlined above summarizes the long-run co-integration and relationship of the variables. It can be observed that the F-statistic (4.848) is greater than the upper I(1) and lower I(0) bounds of the bound test. The result here shows that there is a long-run relationship among the variables of the independent variables (GEE, HCD) and the dependent variable (EG) as proxies. Moreover, it should be noted that, despite the long-run co-integration between the variables, there is a disequilibrium in the model since the F-statistic (4.848) is greater than the upper I(1) and lower I(0) bounds of the bound test. To correct this disequilibrium, there is a need for an error correction model (ECM).

An ECM from equation 4 is obtained from the ARDL model in equation 5 by the use of a straightforward linear conversion, and it unifies short-run alterations with long-run equilibrium. As asserted by [30], the ARDL model also permits the use of unique optimal delays within the model. The ARDL model is also appropriate for variables with varying orders of integration, and it only requires one equation to analyze long-term relationships.

Equation (4) explains a liner regression model in which a change in the independent variables and the dependent variable at lagged one brings about a change in the dependent variable at time  $t$ .

$$\Delta EG_t = \alpha_0 + \sum_{i=1}^p \beta \Delta EG_{t-i} + \sum_{i=1}^q \delta \Delta GEE_{t-i} + \sum_{i=1}^q \gamma \Delta HCD_{t-i} + \varphi_1 \Delta EG_{t-1} + \varphi_2 \Delta GEE_{t-1} + \varphi_3 \Delta HCD_{t-1} + \varepsilon_t \quad (4)$$

Where:

$\Delta EG_t$  = change in economic growth at time  $t$  ;

$\Delta EG_{t-1}$  = change in economic growth at lagged one period with coefficient  $\beta$  ;

$\Delta GEE_{t-1}$  = change in government expenditure on education at lagged one period with coefficient  $\delta$  ;



$\Delta HCD_{t-1}$  = change in human capital development at lagged one period with coefficient  $\gamma$ ;

$\Delta EG_{t-1}$ ,  $\Delta GEE_{t-1}$ ,  $\Delta HCD_{t-1}$  = lagged changes in economic growth, government expenditure on education, and human capital development with coefficients of  $\phi_1$ ,  $\phi_2$ , and  $\phi_3$  respectively;

$p$  and  $q$  = is the  $i$ th order of the disturbance process;

$\alpha_0$  = intercepts; and

$\varepsilon_t$  = error term at time  $t$ .

The model posits that the lagged changes in two additional variables and their prior coefficients, as well as the changes in economic growth at time  $t$ , are all dependent on their respective past coefficients. The correlation between these factors

and the shift in economic growth is represented by the coefficients. The unaccounted-for variability in the change of economic growth that cannot be explained by the independent variables is captured by the error term.

$$\Delta EG_t = \alpha_0 + \sum_{i=1}^p \beta_1 \Delta EG_{t-1} + \sum_{i=1}^q \delta \Delta GEE_{t-1} + \sum_{i=1}^q \gamma \Delta HCD_{t-1} + \lambda ECT_{t-1} + \varepsilon_t \quad (5)$$

Where:

$\Delta EG_t$  = change in economic growth at time  $t$ ;

$\Delta EG_{t-1}$  = change in economic growth at lagged one period with coefficient  $\beta$ ;

$\Delta GEE_{t-1}$  = change in government expenditure on education at lagged one period with coefficient  $\delta$ ;

$\Delta HCD_{t-1}$  = change in human capital development at lagged one period with coefficient  $\gamma$ ;

$ECT_{t-1}$  = error correction term at lagged one period with coefficient  $\lambda$ ;

$p$  and  $q$  = is the  $i$ th order of the disturbance process;

$\alpha_0$  = intercepts; and

$\varepsilon_t$  = error term at time  $t$ .

As such, from equation (5) above, the model can be explained in the table and results below.

**Table IV: Error Correction Model**

**Restricted Constant and No Trend Levels Equation**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|-------|
| GEE      | 5.558       | 3.914      | 1.419       | 0.164 |
| HLT      | -4.919      | 3.696      | -1.331      | 0.191 |
| C        | -2.151      | 3.943      | -0.545      | 0.588 |

**Source:** Author's Compilation.

As revealed by the result of the restricted constant and no trend levels equation of the ECM above, the ECM can be estimated as:

$$ECM = EG - 5.558GEE - 4.919HCD - 2.151 \quad (6)$$

With the results shown above, the constant coefficient explains the error correction term, which turned out to be negative. The coefficient tells the rate at which the disequilibrium is corrected. Therefore, it upholds that there exists a long-run relationship between the dependent and independent variables, with its coefficient being





negative, which in turn shows a constant long-term equilibrium between economic variables. As such, the ECM fixes any short-term imbalances in the following period if they exist. Moreover, the negative coefficient specifies that the ECM is usable.

The result shows that in the short run, an increase in GEE causes a decrease in EG. Therefore, an increase in current GEE will bring about an increase in EG, which tends to be statistically significant at the 5 percent level. This means that the government's educational expenditure has a significant effect on EG in Nigeria [31-34]. However, in the short run, a decrease in HCD causes a decrease in EG, which is also statistically significant at the 5 percent level. This means that HCD has a significant effect on EG in Nigeria [33-36]. The long-run estimates show that GEE has a significant impact on Nigeria's EG in the long run [34, 37]. Similarly, the result shows that there is a long-run nexus between HCD and EG in Nigeria [38-39].

## 5. Conclusions and recommendations

Devising an empirically-based investigative measure on the impact of public education expenditure and HCD on EG in Nigeria from 1981 to 2020, the results revealed that there exists a short- and long-run relationship between public educational expenditure, HCD, and EG in Nigeria. Moreover, for both the short-run and long-run, the study showed that government educational expenditure has a significant effect on EG in Nigeria, while on the other hand, for HCD, the study also showed that there is a short-run and long-run relationship in Nigeria between the periods of 1981 and 2020.

Therefore, given the context of the study, the following recommendations were made: in order to maintain long-term EG, the government should first create specific agencies with the mandate to enhance the skills and talents of graduate students before losing them to other nations in pursuit of their graduate studies, thereby adding to the growth of other nations other than their own. That is, in order to achieve the long-term benefit of the government's educational expenditure, it is necessary to enhance the skills and talents of graduates before losing them to other nations. Also, efforts should focus on enhancing the health and education sectors of Nigeria through higher government financial allocation and incentive

programs for sustained, continuous growth. In order to achieve this, it boosts the productivity capacity. To this end, statistics and studies have shown that numerous medical-oriented graduates are now leaving the country to work and enhance the health capacity and utilization of other developed nations [40-41].

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