Full Length Research

Impact of Government Educational Spending on Total Productivity and Economic Growth in Nigeria

Nonye ODIONYE
Department of Science Education (Biology),
Faculty of Education,
University of Nigeria Nsukka, Enugu, Nigeria.
Email: nonyeodionye@unn.edu.ng

Joseph Chukwudi ODIONYE
Department of Economics,
Faculty of Economics and Management Sciences,
Abia State University, Uturu, Nigeria.
Email: josephodionye@yahoo.com

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Abstract: Education is an essential tool for human development since it increases a country's potential for economic growth and productivity. For this reason, policy officials in both advanced and growing nations, as well as education experts, have made education a top priority. Despite the existence of a theoretical relationship between growth and education investment, there is no empirical agreement regarding their relationship. Therefore, the purpose of this study was to ascertain how education spending affected Nigeria's overall productivity and economic growth between 1981 and 2021. Penn World Table (9.5) and the Central Bank of Nigeria Statistical Bulletin (2021) were the secondary sources of data used in this study. Multiple regression analysis was used in the study to examine how government education investment affects overall productivity and economic growth. The study's conclusions demonstrate, among other things, the favorable and substantial effects of public education spending on productivity; yet, when it comes to its effect on economic growth, the impact is positive but negligible. The report suggests that in order to boost overall productivity and economic growth, the government should invest more money on education.

Keywords: Government Spending; Education; Total Productivity; Economic Growth.

1.0 Introduction of the Study

The importance of education as an instrument of human capital in improving productive capacity and economic growth of a nation cannot be over emphasized. Education serves as engine of economic growth and development in every economy based on its quality and quantity (Egounleti, 2022; Falode & Mustapha, 2022a). Human capital theory underscores how education leads to increase in productivity and efficiency of work force by raising the degree of cognitive human capital stock, as a function of innate abilities and investment in human capital (Woodhall, 1997; Odior, 2011). Comparatively, investment in education leads to increased individual training, enhanced individuals’ abilities and hence foster high job performance (Schultz, 1979). This explained why the United Nations Educational Scientific and cultural Organization (UNESCO) have called on government worlds over to ensure that minimum of 26% of the total budget is earmarked towards education development (Kucharu, 2011).

Many developed and emerging economies, in responding to this have devoted a significant of their resources to investment in quality education with the sole aim of improving the level, quantity and quality of human capital for enhanced productivity and economic growth (Annabi et al., 2011; Agil et al., 2014; Yuan & Zhan, 2015). According to Ololube et al. (2016), a well funded education system provides quality education thereby producing first class brains that will propel the national productivity and economic development.

However, the case is different for Nigeria as the Nigerian government has consistently devoted insignificant portion of her total budgeted expenditure to investment in education for more than three decades; amount far below the UNESCO approved minimum benchmark (CBN, 2019; James et al., 2022; Nnamdi, 2014). Evidence from Central Bank of Nigeria Statistical bulletin (2010 and 2019) show that in 1980 Nigeria devoted 10.4% of her total budgeted expenditure to education which represents an all time high since 1980 till date. In 2007, 8.7% of her budgeted total expenditure was made available for education while in 2017 it was 7.4% and in 2020 only 6.7% of its total budgeted expenditure was devoted to investment in education. Comparing the Nigerian case with other neighboring West African countries, the case of Nigeria seems to be the least. Figure 1 shows amount spent on education as a percentage of total expenditure for six (6) selected West African countries from 2012 to 2016.
From the figure above, during the between 2012 and 2016, the proportion of spending in education in Nigeria is the least when compared with the five other Africa countries namely South Africa, Benin Republic, Botswana, Kenya and Tanzania. Comparatively, the percentage devoted to education by Botswana represents the most for almost all the five years except in 2013. This is followed by Benin Republic, Kenya, South Africa and Tanzania in that order. Given, this continuous gross shortfall of total spending on education relative to the UNESCO recommendation, one might be tempted to attribute the low productivity and economic growth in Nigeria to this situation. This, however, reinvigorate the study of the impact of government spending in education on total productivity and economic growth in Nigeria (Yani et al., 2022).

Many empirical studies exist in emerging and developed countries but only few studies exists in developing countries like Nigeria. Most existing studies in Nigeria either focus on the impact of government spending on economic growth. According to the human capital theory, spending on education does not have one on one relationship with economic growth. Quality education which is a function funding enhances economic growth and development through increased productivity (Woodhall, 1997). Thus, it is important to include productivity as a moderating variable towards enhancing economic growth. This study therefore adds to the existing literature by investigating the impact of government spending in education on total productivity and economic growth (Mustapha, 2022; Ohanyelu, 2022). This study is organized in five sections: following the introduction in section one, is section two which reviews both the theoretical views of the study and past studies. Section three explores the data and methodological issues while section four discusses the empirical results. Section five is the conclusion and recommendations of the study.
2.0 Literature Review

The theoretical framework of this study is based on two theories namely the Human Capital Theory (HCT) which postulates that education plays a vital role in improving the productive capacity of a nation and Endogenous Growth Theory (EGT). The HCT states that by raising the amount of cognitive stock of economically productive human capacity—which is the result of both intrinsic abilities and investments in human capital—education increases workers’ productivity and efficiency (Woodhall 1997). It makes the case that people with education are more productive. However, endogenous growth theory gave rise to two different methods for integrating human capital into the model of economic growth. While the second approach stresses the significance of human capital in the process of innovation and the adoption of new technologies (Romer 1990), the first method views the accumulation of human capital as the engine of economic growth through better productivity (Lucas 1988). These theoretical views have prompted many researches in both emerging and developed countries but only few studies exist in developing countries like Nigeria. Recent studies in Nigeria includes Irughe & Edeafe (2020), Adetula et al. (2019), Babatunde (2018), Adetula et al. (2017), Ololube (2016), Yusuf et al. (2015), Olulu et al. (2014) and Omojimite & Ben (2014).

In a most recent study, Okwu et al. (2022) adopted the ARDL technique to determine the impact of overall spending on the development of human capital in Nigeria. Total secondary enrollment was utilized in the study as a proxy for human capital development, and total spending was separated into capital and recurring categories. The study's findings support Omodero's (2019) finding that there is an inverse connection between the series under investigation. Least square was used in a panel framework by Adewumi & Enebe (2019) to examine the impact of government education spending on the development of human capital in West Africa. Enrollment in basic and secondary education was employed in the study as a stand-in for the development of human capital. The study's findings suggest that there is a positive correlation between the factors under investigation in the West African region. Sikayena et al. (2022) conducted a related study on the effectiveness of governmental spending on human capital in Africa. The study's results point to the inefficiencies in public spending on health and education in Africa. It used bootstrapping models and data envelopment indicators in its estimation technique.

Irughe & Edeafe (2020) examined the relationship between educational and economic growth in Nigeria between the periods 1970 to 2013. The study decomposed the school enrolment into primary school, secondary school and tertiary school enrolments and used them to estimate how they affect three different components of growth namely, oil growth, non-oil growth and overall growth. The study employed ordinary least square in
the method of analysis. The result of the study shows that different school enrolments have positive and significant impact on growth components. Contrary to the works of Irughe & Edafe (2020), Okere et al. (2019) investigated government expenditure on education and economic growth nexus in Nigeria between 1981 and 2016. They used Granger Causality test to examine the direction of causality between the variables and their findings show a two-way direction between economic growth and expenditure on education in Nigeria (Tsegaye, 2022; Wubante et al., 2022). They further tested for long run relationship between the variables using Johansen cointegration test and the result shows evidence of long run relationship between the model variables.

Ihugba et al. (2019) examined the impact of government education expenditure on primary school enrolment in Nigeria from 1970 to 2017. The study employed ARDL bound co-integration test. In their empirical result, they found out that government education expenditure has an insignificant impact on primary school enrolment in Nigeria. On his own, Babatunde (2018) examined government expenditure on infrastructure in Nigeria between 1980 and 2016 employing vector error correction model (VECM). In testing for time series properties of the model, he used Augmented Dickey-Fuller (ADF) and Phillip Perron (PP) tests. The empirical revealed that expenditure on agriculture and infrastructure significantly but negatively affecting economic growth in Nigeria.

Adetula et al. (2017) examined the impact of investment in education on economic development in Nigeria between 1980 and 2015. The study used ordinary least square estimation technique to study the relationship between the variables. Their findings showed amongst other thing, that spending in education impacts positively and significantly on economic development in Nigeria (Falode & Mustapha, 2022b; Hassan et al., 2022). They recommended that all the three tiers of government should intensify spending in education as well as form partnership with private sector to provide quality education in the country with a view of increasing economic growth in Nigeria. In 2016, Ololube investigated whether education fund misappropriation and mismanagement are the main reason for declining quality of education in the country. He adopted both descriptive analytical and linear regression methods in his study. The empirical finding of the study showed amongst other things that inadequate funding adversely affect quality of education in Nigeria. Also that education funds misappropriation and mismanagement are the major factors responsible for deterioration of education in Nigeria. He therefore recommended that adequate funding be provided for public institutions of higher learning.
Omojimite & Ben (2014) examined the relationship between education and economic growth in Nigeria for the periods of 1980 to 2005. The study employed Granger Causality test and co-integration. The result, contrary to the finding of Okere et al. (2019), showed a one way direction of causality from expenditure on education to economic growth in Nigeria. Almost all the studies carried out in Nigeria on the effects of government spending in education on economic growth, none consider productivity as a moderating variable. This study differs from the previous studies in Nigeria by examining how spending in education affect economic growth through improvement in productivity as well as using expenditure on health as a control variable for the study.

3.0 Model Specification and Data Used

Annual data from Central Bank of Statistical Bulletin (2021) and Penn World Table 9.1 were used for this study. The study covered the period 1981 to 2021. Following the Endogenous Growth Theory by Lucas (1988) which models economic growth as a function of human capital, this study specifies a two-single multiple regression models: the first model captures the impact of government spending in education on economic growth while the second model explains the relationship between total productivity and spending in education.

The functional forms of the models are given as:

\[ GDP = f(PSE, PSH) \] .................................................................(1)

\[ TPRO = f(PSE, PSH) \] .................................................................(2)

Where, GDP = gross domestic product, PSE = public spending in education, PSH = public spending in health, TPRO = total productivity, public spending in health is used as control variable to avoid the problem of omitted variable biased. In order to estimate equations 1 and 2, we specify the econometrics form as in equations 3 and 4 below:

\[ \ln GDP = \alpha_0 + \alpha_1 PSE + \alpha_2 PSH + \mu \] .................(3)

\[ TPRO = \beta_0 + \beta_1 PSE + \beta_2 PSH + \mu \] .................(4)

Where \( \beta_0 = \) intercept, \( \beta_i \) (where i = 1, 2) = parameters to be estimated for the first model, \( \mu = \) iid stochastic error term. \( \alpha_0 = \) intercept, \( \alpha_i \) (where i = 1, 2) = parameters to be estimated for the second model.

We used the Augmented Dickey-Fuller test to look at the time series characteristics of the model variables in order to properly investigate the data-generating process.

The regression equations for the ADF test with a constant are:

\[ \Delta Z_t = \gamma_0 + \gamma_1 \Delta Z_{t-1} + \sum_{j=1}^{\gamma_j} \Delta Z_{t-j} + \varepsilon_t \] ..............................................(5)
where $\Delta$ is the initial difference operator $\epsilon_i$ is the stochastic error term that is iid $k = no$ of lagged differences $Z$ $t$ is the investigated series. The unit root test is conducted under the null hypothesis $\beta = 0$ against the alternative hypothesis of $\beta < 0$. Once a value for the test statistics $ADF = \frac{\hat{\beta}}{SE(\beta)}$.............(6) The expression Eqn. 6 is calculated and is being compared with the relevant critical value of ADF. If the test statistic is larger (in absolute value) than the critical value at 5% level of significance, then the null hypothesis of $\beta = 0$ is rejected and no unit root is present. If the variables are non-stationary at level form and integrated of the same order, this implies evidence of co-integration in the model. The co-integration equation is stated in equation 7 as:

**Co integrated equation**

$$\eta_i \log Y_t = \alpha_i + \sum_{i=2}^{p} \alpha_i \eta_{m} Z_i - \left[ \eta_i \log Y_t - \sum_{i=1}^{p} \beta X_{t-i} + \nu_{2t} \right]..............(7)$$

Where

$$\left[ \eta_i \log Y_t - \sum_{i=1}^{p} \beta X_{t-i} \right]$$

is the linear combination of the non co integrated vectors,

$X$ is a vector of the non co integration variables. The individual influence of the co integrated variables can only be separated with an error correction mechanism through an error correction model as shown below. The **Error Correction Model Equation**

$$\eta_i \log Y_t = \alpha_i + \sum_{i=2}^{p} \alpha_i \eta_{m} Z_i - (\lambda ECM_{t-i} + \nu_{4t}) ..............(8)$$

Where $-\lambda$ is the error correction mechanism, $-\lambda$ is the magnitude of error corrected each period specified in its a priori form so as to restore the models to equilibrium

### 4.0 Data Analysis and interpretation

#### 4.1 Data Analysis

The estimates from the analysis (ADF, regression, test of co-integration) carried out using E-views 10 software are presented thus:

#### 4.1.1 Unit Root Test

To assess the order of integration of the model variables and whether the variables are stationary, a unit root test (ADF) was performed. This is essential since it prevents erroneous regression findings. The following table provides a full summary of the Unit Root Tests (ADF) findings using the E-views software:
### Table 1: Summary of ADF test results at 1%, 5% and 10% critical value

<table>
<thead>
<tr>
<th>Variable</th>
<th>Order of Integration</th>
<th>ADF Test Statistics</th>
<th>ADF Critical Value</th>
<th>Lag Length</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1%</td>
<td>5%</td>
<td>10%</td>
</tr>
<tr>
<td>lnGDP</td>
<td>I ~ (1)</td>
<td>-3.157565</td>
<td>-3.6329</td>
<td>-2.9484</td>
<td>2.6129</td>
</tr>
<tr>
<td>TPRO</td>
<td>I ~ (1)</td>
<td>-4.694311</td>
<td>-3.6329</td>
<td>-2.9484</td>
<td>2.6129</td>
</tr>
<tr>
<td>PSE</td>
<td>I ~ (1)</td>
<td>-5.100474</td>
<td>-3.6397</td>
<td>-2.9482</td>
<td>2.6129</td>
</tr>
<tr>
<td>PSH</td>
<td>I ~ (1)</td>
<td>-6.172355</td>
<td>-3.6394</td>
<td>-2.9511</td>
<td>2.6143</td>
</tr>
</tbody>
</table>

It is clearly seen that all of the series in table 1 above remain stationary after their first difference, demonstrating that the variables are first-differenced stationary process. We employed the Engle-Granger co-integration method because the variables are of uniform integrating order.

#### 4.2 Engle-Granger (EG) Co-integration Test

The prerequisite is that all of the factors must be integrated in a similar sequence in order to test co-integration. The process entails creating a residue and running a unit root test on it. If the residual is integrated to order zero, co-integration is present, according to the decision rule. Table 2 below displays EG co-integration test result.

### Table 2: Engle-Granger Co-integration Test Result

<table>
<thead>
<tr>
<th>Model</th>
<th>ADF Stat (Residual)</th>
<th>Critical Values</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1%</td>
<td>5%</td>
</tr>
<tr>
<td>Growth</td>
<td>-1.70922</td>
<td>-3.632900</td>
<td>-2.948404</td>
</tr>
<tr>
<td>Productivity</td>
<td>-2.283470</td>
<td>-3.632900</td>
<td>-2.948404</td>
</tr>
</tbody>
</table>

Table 2 indicates that there is no co-integration between the two models, indicating that government spending on education has no lasting impact on Nigeria's productivity or economic growth. This outcome supports the conclusion made by Kabuga & Hussaini (2015).
Table 3: Summary Regression Result for the Two Models

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1 Dependent variable: lnGDP</th>
<th>Model 2 Dependent variable: TPRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>7.003***</td>
<td>0.2783</td>
</tr>
<tr>
<td>PSE</td>
<td>0.027***</td>
<td>0.0087</td>
</tr>
<tr>
<td>PSH</td>
<td>0.0042</td>
<td>0.0141</td>
</tr>
<tr>
<td>F- Stat.</td>
<td>36.63***</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

R² = 0.683
Adj.R² = 0.664

Durbin
= 1.747

R² = 0.722
Adj.R² = 0.705

Durbin
= 1.639

***[**] (*) denotes significant of variable at 1% [5%] (10%) significance level respectively. Variables are in their order of integration.

The estimated models can be shown as:

lnGDP = 7.003 + 0.027PSE + 0.004PSH  …(8)

TPRO = 0.539 + 0.011PSE + 0.026PSH +  …(9)

Government expenditure on education has a favourable and considerable impact on Nigeria's overall productivity as well as economic growth, according to the results of models 1 and 2 in table 3 above. To be precise, a one naira rise in government spending will result in a 0.01 and 0.03 unit improvement in productivity and economic growth, respectively. The HCT, which holds that higher education investment will boost worker productivity and efficiency by raising the level of cognitive stock of economically productive human ability, hence promoting economic growth, is supported by this conclusion (Woodhall, 1997). It bolsters the conclusions of Adefula et al. (2017), Ololube (2016), and Irughe & Edafe (2020), which revealed that education spending has a favourable and significant impact on economic growth.

The outcome also demonstrates that government investment on health care has a positive, but little, effect on economic growth, whereas it has a good, substantial influence on overall productivity. The coefficient of
determination and its adjusted value for the economic growth model are 0.683 and 0.664, respectively, suggesting that the model has a relatively good fit. This indicates that variations in the external factors account for roughly 66.4% of the deviations in economic growth. According to the total productivity model, variations in the exogenous variables account for roughly 70.5% of the changes in total productivity, as indicated by the coefficient of determination and its adjusted values of 0.722 and 0.705, respectively. This demonstrates the model's excellent fit as well. The combined effects of all the variables included were significant, as indicated by the overall regression's significance at the 1% level of significance. Given that it is around 2, the Durbin Watson statistic demonstrates that there is no first order serial autocorrelation in the models.

5.0 Conclusion and Policy Recommendations
This study investigated the impact of government spending in education on total productivity and economic growth from 1981 to 2021. The study employed a two single equation models and used spending in health as a control variable. The empirical findings show that government spending in education has a positive and significant impact on economic through total productivity in Nigeria. It further shows that spending in health has positive and significant impact on total productivity but has insignificant impact on economic growth in the country. Following this empirical result, governments at all levels should increase their investment in education so as to enhance productivity and economic growth in the country as a well funded education guarantees quality education which in turn will produce first class brains who will engage in economic activities in the country.

6.0 References of the Study


