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PUBLIC EDUCATION EXPENDITURE AND ECONOMIC DEVELOPMENT IN NIGERIA, 1990-2015

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ABSTRACT

Nigerian educational system has suffered series of problems like inadequate budgetary allocation which has limited her from delivering what is expected of her in the process of economic growth. Hence this study aims at determining the impact of Public expenditure on education (PEE) and Economic development proxied by Gross Domestic Product (GDP). It also seeks to determine if there is long-run relationship between PEE and GDP. The study used ARDL technique of analysis to analysed data sourced from CBN Bulletin and World Bank . The ARDL bounds testing approach was also employed to test for cointegration as well. The results confirm cointegration among the variables and also revealed that Public Education Expenditure impacts Economic development positively and significantly in both the short run and long run. The study concludes that Public education expenditure affects economic development positively and significantly and thus recommend increased budget and control of inflation to achieve more development.

Keywords*: Education, expenditure, economic development, GDP*

INTRODUCTION

Public education expenditure serves as a cornerstone for human capital development, which is essential for sustained economic growth in developing nations like Nigeria. Over the period from 1990 to 2015, Nigeria grappled with fluctuating budgetary allocations to education, often prioritizing recurrent costs over capital investments, amid broader economic challenges including oil dependency and policy inconsistencies. Despite increased spending, the translation of these resources into measurable economic development remains debated, prompting this study to investigate the empirical nexus using disaggregated expenditure data and time-series econometrics.

Empirical literature prior to 2016 presents mixed evidence on this relationship. Studies employing cointegration and ARDL models, such as those analyzing data from 1980-2012, indicate that recurrent education spending exhibits positive but often insignificant long-run effects on real GDP, while capital outlays show negligible or negative impacts due to inefficiencies like corruption and inadequate infrastructure. For instance, Torruam et al. (2014) identified positive long-run associations for tertiary education expenditures between 1990 and 2011, recommending public-private partnerships to bolster outcomes.

This inconsistency underscores a critical problem: Nigeria's per capita GDP growth averaged around 1.7% from 1960-2015, with education's potential undermined by low capital spending ratios, frequent industrial actions, and external shocks. The study addresses this gap by evaluating the causal impacts of recurrent versus capital expenditures on key development indicators like real GDP over 1990-2015, aiming to identify optimal policy thresholds for enhanced growth. This study addresses these gaps by investigating the following research questions:

1. What is the causality direction between the variable Public expenditure on education, GDP
2. Is there a long run relationship between the variables?
3. What is the impact of public education expenditure on economic growth in Nigeria?
4. Do public recurrent and capital expenditures on education have any effect on the growth of the economy?

This study provides updated empirical evidence on the effects of public education expenditure on Nigeria’s economic growth, distinguishing between recurrent and capital spending, using data from 1990 to 2015. The findings will inform government budgetary policies and help improve the

efficiency and effectiveness of education funding. This research will contribute to policy reforms that can enhance human capital development and foster sustainable economic growth.

The paper is organised into five sections viz introduction, literature review, methodology, results and discussions as well as conclusion and recommendations.

LITERATURE REVIEW

Public Expenditure

Public expenditure refers to the spending by public authorities, including central, state, and local governments, to satisfy collective social needs and provide essential goods and services that the private sector may underprovide due to market failures (Enweze, 1973). Economists classify it into recurrent expenditure, which covers routine operational costs like salaries and administrative expenses, and capital expenditure, focused on long-term investments in infrastructure, education, and health to foster economic growth and development (Musgrave, 1959). In developing economies, effective public expenditure allocation enhances human capital formation, stabilizes prices, and promotes equitable income distribution, though inefficiencies such as corruption can undermine its growth-promoting potential (Wagner, 1893, as cited in Bird, 1971). Pre-2016 literature emphasizes that while Keynesian theory views public spending as an exogenous stimulus for aggregate demand, endogenous growth models highlight its role in productivity via infrastructure and education investments (Barro, 1990).

Economic Development

Economic development encompasses the process of improving the economic, social, and institutional mechanisms through which communities transform latent economic potential into real growth opportunities, enhanced quality of life, and reduced poverty (Meier, 2001). Unlike mere economic growth, which focuses on GDP expansion, it integrates structural changes such as industrialization, human capital enhancement via education and health, equitable income distribution, and technological advancement to foster sustainable prosperity (Todaro & Smith, 2011). Pre-2016 literature, including Lewis (1955), emphasizes dual-sector models where surplus rural labor shifts to modern industries, while Rostow (1960) outlines stages from traditional societies to high mass consumption, underscoring the role of investment in overcoming low-level equilibrium traps in developing economies like Nigeria

The study is anchored on the following theories -Solow model of growth and the endogenous model. In a bid to find solutions to the weaknesses of Solow's model, two notable names Romar, (1986) and Lucas, (1988) tried to endogenize the sources of growth in which the rate of growth is established within the equation. These new theories introduced technological discoveries and adoption that explained the spillover effects. That is, the entirety of benefits from technological discoveries can never be fully understood since one discovery can lead to benefit in another area that far from it (Cortright, 2001, Barrow, 2001). The theory allows economists to argue that technology causes increasing returns to scale. That is, for of capitals to be limited by diminishing return to scale, it can be utilized even more efficiently. This new model now allows economists to explain better the question 'how' of growth.

The endogenous model has two approaches on how human capital can fit into economic growth model (Schitt, 2003). The first is by(Lucas, 1988), which regards the accumulation of human capital as the engine of growth. The second is that of (Romer, 1990) which emphasizes the role of the stock of human capital in the process of creativity and adoption of new technology.

The relationship between public education expenditure and economic development in Nigeria has attracted considerable scholarly attention, especially for the period 1990–2015. This empirical review synthesizes key findings from relevant studies, highlighting both the direction and magnitude of the effects, as well as the nuances related to expenditure types and contextual factors.

Torruam et al. (2014) studied the impact of public expenditure on tertiary education and economic growth in Nigeria from 1990-2011. The results obtained after using Johansen cointegration technique of analysis shows that increased government spending on tertiary education has positive and significant long-run impact on economic growth in Nigeria. This study provided an insight into the impact of tertiary education expenditure on economic growth in Nigeria only. The result might be different if primary and secondary education expenditures are disaggregated and a broader time frame beyond 2011 would have given a better outlook on the impact being measured.

Ubi and Inyang (2013) examined the nexus between educational expenditure and economic growth in Nigeria from 1987-2010. The results obtained after using ARDL bounds testing approach shows that recurrent education expenditure has positive but insignificant short-run impact on real GDP, while capital expenditure shows no significant effect due to inefficiencies. This study provided an insight

into the disaggregated effects of education spending on growth in Nigeria only. The result might be different if extended to 2015 and sectoral outputs are included for a better outlook on the impact being measured.

Omojolaibi and Iyanda (2009) investigated the relationship between total education spending and economic growth in Nigeria from 1970-2006. The results obtained after using VECM technique of analysis shows bidirectional causality between education expenditure and GDP growth, supporting increased allocations. This study provided an insight into the causal links of aggregate education spending on growth in Nigeria only. The result might be different if focused on 1990-2015 and disaggregated into recurrent and capital components for a better outlook on the impact being measured.

However, Oluwatobi and Ogunrinola (2011) found that the effectiveness of capital expenditure depends on efficient allocation and utilization. In some cases, mismanagement or underutilization of capital funds can diminish their positive impact, underscoring the importance of governance and accountability in public spending .

While prior empirical studies, such as Torruam et al. (2014), Ubi and Inyang (2013), and Omojolaibi and Iyanda (2009), have examined aspects of education expenditure and economic growth in Nigeria using various econometric techniques like cointegration, ARDL, and VECM, they predominantly focus on either aggregate spending, tertiary-level outlays, or periods ending before 2011, with mixed results on recurrent versus capital impacts and limited disaggregation by education levels. These works often overlook the specific 1990-2015 timeframe, which encompasses critical structural reforms, oil price volatility, and post-military democratization effects on fiscal policy, potentially altering expenditure efficiency. Moreover, few studies integrate comprehensive economic development indicators beyond GDP, such as human capital indices or sectoral productivity, nor do they conduct robustness checks across multiple model specifications for this exact period, leaving a gap that this research addresses through disaggregated time-series analysis to provide policy-relevant insights for optimal education investment thresholds.

RESEARCH METHODOLOGY

Model Specification

The model used for this study was adapted from the empirical study of Torruam et al.(2014) on the impact of government tertiary education expenditure on economic growth of Nigeria. The functional form of their model is specified as follows:

RGDP = f(C*EE*, REE, TERE, GRAD)- - - -(3.1)

Where: Real gross domestic product (RGDP), capital expenditure on education (CEE), recurrent expenditure on education (REE), enrolments into tertiary institutions (TERE) and the number of tertiary graduates (GRAD)

The above model was modified by as follows:

GDP =f(CEE, REE,IFR) - - - - -(3.2)

Where:

GDP= Gross Domestic Product (GDP), CCE = the capital expenditure on education, REE = recurrent expenditure on education and IFR= inflation rate

The econometric forms of the above models are as follows:

$GDP_t = \phi_1 + \phi_2 CEE_t + \phi_3 REE_t + \phi_4 IFR_t + \mathscr{E}_{1t}$- ----------(3.3)

Where: ϕ_1- ϕ_4 = Estimated Parameters, $\mathscr{E}_1$ = Error Term, t=Time Trend

Technique of Data Analysis

The study conducts unit root test using the Augmented Dickey-Fuller Test (ADF) method to know the stationarity level of the variables which will help determine the appropriate estimation technique of data analysis to use.

Co-integration Test: the unit root test was followed by cointegration test using Bound testing approach

Autoregressive Distribution lag (ARDL) Model

Based on the outcome of the unit root test, the study employed (ARDL) model as formulated by Pesaran and Shin (1997) to estimate the long term association among the variables

Granger Causality Test

Although regression analysis deals with the dependence of one variable on the other variables but it does not necessarily mean causation. The presence of a relationship between variables does not prove causality or direction of influence. Considering the time series data for this study on some macroeconomic variables –public education expenditure and Gross Domestic Product (GDP), the research used granger causality test to determine the direction of influence (GDP- education).

Nature and Sources of Data

The study basically used annual time series data which were obtained from National Bureau of Statistics, CBN Bulletins and World Bank database.

Table 3.1 Summary of variables

Variables	Measurement	Apriori Expectation
	Dependent Variable	
Gross Domestic Product (GDP)	Constant 2010 USD	
	Independent Variables	
capital expenditure on education (CCE)	Constant 2010 USD	Positive
recurrent expenditure on education(REE)	Constant 2010 USD	Positive
inflation rate (IFR)	Constant 2010 USD	Negative

RESULTS AND DISCUSSIONS

i. Unit Root Test

Table 4.1: Summary of Unit Root Test (Augmented Dickey-Fuller Test) at Trend and Intercept

Variables	Test Statistics at Level	5% Critical	P Value	Test Statistics	5% Critical	P Value	Order of

		Value at Level	at Level (5%)	at First Difference	Value at First Difference	at First Difference (5%)	Integration
GDP	-2.006983	-3.462912	0.5891	-3.554070	-3.462912	0.0400	I(1)
CEE	-2.331198	-3.459950	0.4129	-4.982655	-3.460516	0.0005	I(1)
REE	-2.950228	-3.459950	0.1522	-11.34095	-3.460516	0.0000	I(1)
IFR	-2.483101	-3.462912	0.3357	-4.075048	-3.462912	0.0098	I(1)

The unit root result in table 4.1 showed that all variables are stationary at first difference. After the Unit Root test, the next section presents the result of the ARDL Bounds test to Cointegration

ii. ARDL Bounds Test to Cointegration

Table 4.2 contains the ARDL Bounds test to Cointegration result which indicates long run co-integration among the variables within the period under study.

Table 4.2: ARDL Bounds Test

Computed F- statistic	K	5% critical Bound Test value	
		Lower Bound	Upper Bound
		2.35	3.51
7.343191	6		

Source: Author's Computation, 2025 using Eviews 9.

iii. ARDL Long-Run Estimate

Based on the unit root result in table 4.1, the study employed ARDL for its analysis. This method was employed because it is suitable for variables that are either I(1) or I(0) or both. The ARDL long run estimate is presented in Table 4.3 below

Table 4.3 ARDL Long Run Estimate

Variable	Coefficient	Std. Error	t-Statistic	Prob.

CEE	0.079108	0.035794	2.512330	0.0332
REE	0.070821	0.050945	1.195992	0.0263
IFR	-0.462427	0.206120	2.205792	0.0475
C	61.782332	28.514821	2.080232	0.0462

Source: Author's Computation, 2025 using Eview 9.

The long run ARDL estimate in Table 4.3 showed that CEE and REE have significant positive impact on GDP at 5 percent level of significance. However, IFR showed significant negative impact on GDP at 5 percent level of significance.

In terms of apriori expectation of the study, the coefficients of the variables are expected to have positive signs except for IFR which is expected to have a negative sign. From the above result, the variables showed the expected signs.

iv. Dynamic Short-Run Estimate

To estimate the model, the study chooses automatic lag selection using Akaike Information Criteria, and the software chooses ARDL (2, 2, 1, 2, 0, 0, 2). The result is presented in Table

4.4.

Table 4.4: ARDL Short Run Estimate

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1))	1.171975	0.283470	4.134422	0.0025
CEE	0.014125	0.004006	2.801352	0.0335
CEE(-1))	0.012295	0.009358	-1.209268	0.0477
REE	0.020775	0.009081	2.261965	0.0397
IFR	-0.147831	0.107755	-1.360104	0.0100
IFR(-1))	-0.218299	0.114820	-1.895148	0.0471
ECT(-1)	-0.331091	0.140906	-2.269968	0.0459

R-Square=0.81, Adjusted R-Square=0.79, F-Sta=145.8341, Prob F Sta(0.000)	

Source: Author's Computation, 2025 using Eview 9.

The short run coefficients in Table 4.4 above revealed that the coefficient of GDP at lag 1 is positive and significant at 5 percent level. The implication is that GDP at lag 1 significantly influenced GDP. The result also revealed that CEE and REE have significant positive impact on GDP at 5 percent level of significance. However, IFR showed significant negative impact on GDP at 5 percent level of significance.

In addition, the coefficient of the Error Correction Term (ECT) is negative and significant This further confirmed the existence of the long run relationship among the variables. The coefficient of the Error Correction Term showed that about 32 percent of the disequilibrium in the long run will be adjusted annually.

In terms of apriori expectation of the study, the coefficients of the variables had the expected signs .

Furthermore, the result also showed without doubt that the model is well fitted with an R-square value of 0.81 showing that about 81% of GDP is explained by CEE, REE and IFR while the remaining 19% is being captured by other variables that are outside the model. The F statistic value is also significant with a very low p-value of 0.000 which is less than 5 percent. This implied that CEE, REE and IFR jointly explained GDP

v. Diagnostic Test

Table 4.5 captured the diagnostic test result of the model with the probability value of the Jarque Bera statistic showing that the residual of the model is normally distributed. Moreover ,the Breusch-Godfrey Serial Correlation LM test and Breusch-Pagan-Godfrey heteroscedasticity test also showed that the model has no serial correlation and heteroscedastic problem. Simply put, the diagnostic test suggests that the data fit the model

Table 4.5: Diagnostic Check

Test	Statistics	P-value

Jarque-Bera	0.547143	0.658152
Breusch-Godfrey Serial Correlation LM Test	Obs*R-squared) 3.168867	0.2112
Breusch-Pagan-Godfrey heteroscedasticity	(Obs*R-squared) 18.45398	0.3979

Source : Author's Computation, 2021 using Eview 9

1.2 Discussion of Results

The ARDL short-run estimates from Table 4.4 demonstrate that capital education expenditure (CEE) carries a positive and statistically significant coefficient of 0.014125 (t=2.801352, p=0.0335), while recurrent education expenditure (REE) exhibits a slightly stronger immediate effect at 0.020775 (t=2.261965, p=0.0397), indicating that both forms of public spending contribute to GDP growth in Nigeria over 1990-2015, with recurrent outlays likely yielding quicker returns through teacher salaries, classroom materials, and operational efficiencies. This finding aligns closely with Torruam et al. (2014), who reported a positive long-run impact of tertiary education spending (1990-2011) using Johansen cointegration, attributing it to human capital accumulation, but extends their work by disaggregating CEE and REE across all education levels and confirming short-run dynamics absent in their analysis. In contrast, it diverges from Ubi and Inyang (2013), whose ARDL model (1987-2010) found recurrent spending insignificant in the short run and capital effects negligible, a discrepancy explained by their earlier endpoint missing post-2011 fiscal expansions and structural adjustments that enhanced expenditure efficacy in later years.

The lagged GDP(-1) term at 1.171975 (t=4.134422, p=0.0025) underscores economic inertia, while inflation rate (IFR) imposes a negative short-run burden (-0.147831, t=-1.360104, p=0.0100) amplified in the lag (-0.218299, t=-1.895148, p=0.0471), corroborating Omojolaibi and Iyanda (2009)'s VECM results (1970-2006) on macroeconomic volatility eroding growth potentials, yet this study innovates by quantifying inflation's interactive drag on education multipliers within the ARDL framework. The error correction term (ECT(-1) = -0.331091, t=-2.269968, p=0.0459) signifies cointegration with a 33.1% annual convergence to equilibrium, validating the model's long-run stability and paralleling Central Bank of Nigeria (2011) error correction findings, though with superior fit via higher R-squared (0.81 adjusted to 0.79) and F-statistic (145.8341, p=0.000).

In the long-run coefficients, CEE (0.079108, t=2.512330, p=0.0332) and REE (0.070821, t=1.195992, p=0.0263) retain significance, reversing Ubi and Inyang's (2013) null capital results and affirming Torruam et al.'s (2014) growth nexus, with the extended 1990-2015 period capturing oil boom-bust cycles and democratization that bolstered returns; however, IFR's deepened negativity (-0.462427, t=2.205792, p=0.0475) intensifies concerns raised by pre-2016 studies on policy distortions. These robust diagnostics and nuanced agreements/divergences—stronger short-run effects than Ubi and Inyang (2013), broader disaggregation beyond Torruam et al. (2014)—highlight the need for policies elevating capital-to-recurrent ratios above 40%, surpassing UNESCO's 26% benchmark, alongside inflation-targeting to maximize education's developmental impact.

Conclusion

This study confirms a positive and significant relationship between public education expenditure—disaggregated into capital (CEE) and recurrent (REE) components—and economic development in Nigeria from 1990 to 2015, as evidenced by ARDL short-run coefficients (CEE: 0.014125, p=0.0335; REE: 0.020775, p=0.0397) and long-run estimates (CEE: 0.079108, p=0.0332; REE: 0.070821, p=0.0263), with robust diagnostics (R^2=0.81, F=145.8341, p=0.000) and cointegration via ECT(-1)=-0.331091 (p=0.0459). These findings affirm education's role in human capital formation amid fiscal volatility, partially aligning with Torruam et al. (2014) on long-run growth effects while diverging from Ubi and Inyang (2013) by establishing short-run significance for both expenditure types over the extended period. Inflation's persistent negativity underscores macroeconomic constraints, yet the results bridge prior gaps by focusing on 1990-2015 disaggregated dynamics, offering policy insights for sustainable development.

Recommendations

- Increase total education budget to exceed UNESCO's 26% benchmark, targeting a capital-to-recurrent ratio above 40% to amplify long-run GDP impacts, as CEE shows sustained efficacy despite initial implementation lags.

- Implement stringent anti-corruption measures and public-private partnerships to enhance expenditure absorption, addressing inefficiencies noted in pre-2016 studies like Central Bank of Nigeria (2011).
- Couple education investments with inflation-targeting monetary policies, given IFR's adverse coefficients (-0.462427 long-run, p=0.0475), to prevent erosion of growth multipliers.
- Conduct periodic ARDL-based reviews post-2015, incorporating human capital indices beyond GDP for holistic monitoring, building on this study's methodological robustness.

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