# PUBLIC SOCIAL EXPENDITURE AND ECONOMIC GROWTH IN NIGERIA: EVIDENCE FROM A LONG-RUN FMOLS MODEL

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**Abstract**

*This study examines the long-run relationship between public social expenditure and economic growth in Nigeria, focusing on government expenditure on education and health. Annual time-series data for 1981-2022 were obtained from Central Bank of Nigeria statistical publications. The analysis employed the Augmented Dickey-Fuller unit-root test, Johansen cointegration test and Fully Modified Ordinary Least Squares (FMOLS). The unit-root results show that real gross domestic product (RGDP) and social expenditure are integrated of order one, I(1). Both the trace and maximum-eigenvalue tests identify one cointegrating relationship, indicating that the variables move together in the long run. The FMOLS estimate shows a positive and statistically significant coefficient for public social expenditure ($\beta = 33.8397$, $p < 0.001$), while the model records an $R^2$ of 0.8777. The evidence therefore supports a strong positive long-run association between public social expenditure and real output in Nigeria. The study concludes that social expenditure should be treated as productive public investment, but cautions that expenditure volume alone is insufficient. Sustained funding should be accompanied by stronger budget execution, transparency, outcome monitoring and accountability so that education and health expenditure translates into measurable human-capital and growth outcomes.*

**Keywords:** Public social expenditure; Economic growth; Education; Health; Real gross domestic product; Nigeria

## 1. Introduction

The relationship between public expenditure and economic growth remains central to public-finance and macroeconomic debate because theory does not predict a single direction of influence. Wagner's Law treats the expansion of public expenditure largely as a consequence of economic growth, whereas the Keynesian hypothesis regards government spending as a policy instrument capable of raising aggregate demand and output (Bazán et al., 2022; Mishra & Mohanty, 2021; Öztaşkın & Kara, 2022). Endogenous-growth models extend this argument by emphasising the composition of expenditure: spending that raises human capital, knowledge and productive capacity can influence the long-run growth path (Barro, 1990; Barro & Sala-i-Martin, 1992).

Public social expenditure is particularly relevant to this debate because education and healthcare affect both welfare and productive capacity. Investment in education can improve skills,

knowledge and labour productivity, while healthcare expenditure can enhance the quality and effective supply of labour by reducing morbidity and improving well-being. These channels make social expenditure more than a consumption or welfare item; when efficiently allocated, it can function as productive public investment (Kizilkaya et al., 2015; Münich & Psacharopoulos, 2018). The effectiveness of such spending, however, depends on institutional quality, the composition of expenditure and the extent to which budgetary allocations translate into actual services and outcomes (Chu et al., 2020; Nyasha & Odhiambo, 2019).

Nigeria provides an important setting for examining this relationship. Public spending on education and health has risen substantially in nominal terms over time, yet service delivery and human-capital outcomes have remained uneven. The education system continues to face infrastructure and capacity constraints, while the health system confronts persistent challenges in access, financing and service quality (Aluko & Aigbedion, 2018; Omotor, 2004). These conditions raise an empirical question that cannot be resolved by expenditure trends alone: whether aggregate government spending on social services is associated with higher real economic output over the long run.

Most Nigerian studies have considered total government expenditure or examined education and health expenditure separately. While disaggregation is useful, it does not directly reveal the long-run relationship between economic growth and social expenditure treated as a single functional expenditure category. Evidence is also mixed across model specifications, sample periods and estimation techniques (Aluthge et al., 2021; Olanrewaju & Funlayo, 2021; Onuoha & Okoye, 2020). This leaves scope for a focused assessment of the combined social-expenditure component.

Accordingly, this study examines the long-run relationship between public social expenditure and economic growth in Nigeria, using annual data from 1981 to 2022. Real gross domestic product (RGDP) is used as the measure of economic growth, while social expenditure (SE) comprises government spending on education and health. The study asks whether changes in public social expenditure are associated with significant changes in RGDP and tests the null hypothesis that public social expenditure has no statistically significant long-run effect on RGDP. The analysis is limited to Nigeria and to a bivariate time-series specification. Macroeconomic variables such as inflation, exchange rate, private investment and labour-force conditions are therefore excluded from the estimated model. This restriction preserves the study's focus on fiscal growth, but it also means that the estimated coefficient should be interpreted as a long-run cointegrating relationship rather than as a complete causal model of Nigerian economic growth.

Although expenditure on education and healthcare is expected to strengthen human capital and support productive activity, increases in public social spending in Nigeria have not always been matched by commensurate improvements in service delivery and development outcomes. The resulting gap between fiscal effort and observed outcomes raises questions about the relevance of growth and the efficiency of social expenditure. At the same time, the empirical literature does not provide a consistent answer: some studies report positive growth effects of government expenditure, whereas others find weak, insignificant or composition-dependent effects.

A further limitation is that much of the Nigerian evidence either uses broad measures of government expenditure or treats education and health as separate regressors. Consequently, the combined long-run contribution of public social expenditure as a functional spending category remains less clearly established. This study tackles that gap by estimating the long-run relationship between aggregate social expenditure and RGDP for 1981-2022 after testing the time-series properties and cointegration of the variables.

## 2. Literature Review

### 2.1 Conceptual Review

Public expenditure refers to government outlays undertaken to provide public goods and services, maintain administration, redistribute resources and pursue macroeconomic objectives. It may be classified economically as recurrent and capital expenditure, and functionally as administration, economic services, social and community services, and transfers (Aluthge et al., 2021). The present study focuses on the social and community services component, specifically government expenditure on education and health. These outlays are analytically important because they can generate positive externalities and raise the productivity of human resources.

Economic growth denotes a sustained expansion of an economy's real productive capacity and output. Real GDP is commonly used to track such changes because it measures production at constant prices, thereby abstracting from inflationary price movements (Ismaila &Imoughele, 2015; Todaro & Smith, 2009). In this study, RGDP is the dependent variable and the empirical proxy for economic growth.

### 2.2 Theoretical Framework

The study is anchored in Barro's endogenous-growth framework. In contrast to the neoclassical proposition that long-run growth is driven by exogenous technological progress, endogenous-growth theory allows policy and productive public expenditure to affect the steady growth path through human capital, knowledge and productivity (Barro, 1990; Barro & Sala-i-Martin, 1992). Social expenditure fits this framework when education and healthcare improve the quality, efficiency and productive capacity of labour.

Keynesian theory offers a complementary demand-side interpretation. Government expenditure can raise aggregate demand, output and employment, particularly when idle capacity exists. Wagner's Law, however, suggests the reverse: rising income and structural transformation may generate greater demand for public services and hence higher expenditure (Esener & İpek, 2018; Olanrewaju &Funlayo, 2021). These competing propositions underscore the importance of testing the time-series relationship rather than assuming its direction. Because the present empirical strategy estimates a long-run cointegrating equation and does not model short-run dynamics or causality, endogenous-growth theory provides the more direct theoretical basis for interpreting the FMOLS coefficient.

### 2.3 Empirical Review and Research Gap

Empirical findings on public expenditure and growth vary considerably. Cross-country evidence indicates that the growth effect of government expenditure depends on its composition and the institutional environment in which it is undertaken. Chu et al. (2020), for example, distinguish between productive and non-productive expenditure and show that the composition of public spending matters for growth outcomes. Alper and Demiral (2016) similarly report evidence linking public social expenditure to economic growth in selected OECD countries, while Nyasha and Odhiambo (2019) conclude from the wider international literature that the relationship is sensitive to country conditions, expenditure type and empirical method.

Nigerian evidence is equally mixed. Aluthge et al. (2021) find that the effects of government expenditure vary across expenditure components and over time. Onuoha and Okoye (2020) report evidence of a relationship between public expenditure and growth, while Olanrewaju and Funlayo (2021) show that the direction of this relationship can differ between education and health expenditure. Ogunjobi et al. (2022) further link human-capital formation to output and employment, reinforcing the view that social-sector investment can influence productive performance. Asiagwu et al. (2023), using disaggregated expenditure indicators, emphasise that the contribution of public spending depends on the category examined.

Three implications follow from this literature. First, aggregate government expenditure can obscure important differences between productive and less productive components. Second, separate estimates for education and health do not necessarily reveal the effect of the combined social-services category used in Nigeria's functional expenditure classification. Third, non-stationary fiscal and output series require econometric procedures that distinguish common trends from a genuine long-run equilibrium relationship. The present study addresses these issues by focusing on aggregate public social expenditure and applying unit-root, cointegration and FMOLS procedures to annual Nigerian data for 1981-2022.

## 3. Methodology

### 3.1 Research Design, Data and Variables

The study adopts a longitudinal ex post facto design, using annual secondary time-series data for Nigeria from 1981 to 2022, yielding 42 observations. Data on real gross domestic product (RGDP) and public social expenditure (SE) were obtained from published Central Bank of Nigeria statistical bulletins (Tumala & Osifodunrin, 2022). RGDP is the dependent variable and serves as a proxy for economic growth. SE is the independent variable and represents government expenditure on education and health.

### 3.2 Estimation Strategy and Model Specification

The estimation proceeds in three stages. First, the Augmented Dickey-Fuller (ADF) test is used to determine the order of integration of each series and to reduce the risk of spurious regression with non-stationary data. Second, because both variables are integrated of order one, the Johansen cointegration procedure is used to test whether they share a stable long-run equilibrium relationship. Third, after cointegration is established, Fully Modified Ordinary Least Squares (FMOLS) is used to estimate the long-run coefficient. FMOLS is suitable for a cointegrating regression because it adjusts the conventional least-squares estimator for endogeneity and serial-correlation effects associated with cointegrated series.

An econometric model was developed to assess the effect of social expenditure on Nigeria's economic growth. It is expressed as follows:

$$RGDP_t = \beta_0 + \beta_1 SE_t + \varepsilon_t \qquad (1)$$

where $RGDP_t$ is real gross domestic product in year t, $SE_t$ is public social expenditure, $\beta_0$ is the intercept, $\beta_1$ is the long-run coefficient on social expenditure, and $\varepsilon_t$ is the disturbance term. The a priori expectation is $\beta_1 > 0$. Statistical decisions are made at the 5 per cent significance level: the null hypothesis of no significant long-run effect is rejected if the reported probability for $\beta_1$ is below 0.05.

## 4. Results and Discussion

### 4.1 Descriptive Statistics

Table 1 summarises the distribution of the study variables. RGDP averaged 38,589.74 over the sample, while SE averaged 440.50. Both series show substantial dispersion, as expected over a 42-year period marked by structural, fiscal and macroeconomic changes. RGDP is positively skewed but does not depart significantly from normality at the 5 per cent level (Jarque-Bera p = 0.0749). SE is more strongly right-skewed, and its Jarque-Bera probability of 0.0036 indicates non-normality. However, normality of the raw series is not the central condition for the subsequent cointegration analysis; their integration properties are more important.

**Table 1**

*Descriptive Statistics of the Study Variables, 1981–2022*

| Statistic | RGDP | SE |
|---|---|---|
| Mean | 38,589.74 | 440.4971 |
| Median | 28,701.91 | 145.6550 |
| Maximum | 74,639.47 | 2,003.000 |
| Minimum | 16,048.31 | 0.5900 |
| Standard deviation | 20,854.23 | 577.3409 |
| Skewness | 0.5273 | 1.2488 |
| Kurtosis | 1.6398 | 3.4297 |
| Jarque-Bera (p-value) | 5.1837 (0.0749) | 11.2392 (0.0036) |
| Observations | 42 | 42 |

*Note.* RGDP = real gross domestic product; SE = public social expenditure. Authors' computation from EViews output.

### 4.2 Unit Root and Cointegration Results

The ADF results in Table 2 indicate that neither variable is stationary at levels when a trend is included. After first differencing, the ADF statistics are more negative than their respective 5 per cent critical values. RGDP and SE are therefore integrated of order one, I(1). This common order of integration justifies proceeding to the Johansen cointegration test.

**Table 2**

*Augmented Dickey–Fuller Unit-Root Test*

| Variable | ADF at level | 5% critical value | ADF at first difference | 5% critical value | Order |
|---|---|---|---|---|---|
| RGDP | -2.254449 | -3.536601 | -3.583322 | -3.526609 | I(1) |
| SE | 0.504461 | -3.523623 | -5.448557 | -3.526609 | I(1) |

*Note.* ADF regressions include a deterministic trend. RGDP = real gross domestic product; SE = public social expenditure; I(1) = integrated of order one. Authors' computation from EViews output.

Table 3 reports the trace and maximum-eigenvalue statistics. The null hypothesis of no cointegrating equation is rejected by the trace test (16.0287 > 12.3209; p = 0.0115) and by the maximum-eigenvalue test (16.0064 > 11.2248; p = 0.0068). In contrast, the null hypothesis of at most one cointegrating equation is not rejected. The two procedures therefore indicate one cointegrating relationship between RGDP and public social expenditure. The variables share a stable long-run equilibrium relationship despite possible short-run deviations.

**Table 3**

*Johansen Cointegration Tests*

| Test | Hypothesised rank | Statistic | 5% critical value | p-value | Decision |
|---|---|---|---|---|---|
| Trace | None | 16.02867 | 12.32090 | 0.0115 | Reject |
| Trace | At most 1 | 0.022325 | 4.129906 | 0.9028 | Do not reject |
| Max-eigen | None | 16.00635 | 11.22480 | 0.0068 | Reject |
| Max-eigen | At most 1 | 0.022325 | 4.129906 | 0.9028 | Do not reject |

*Note.* The 5% critical values are reported. Authors' computation from EViews output.

### 4.3 Fully Modified OLS (FMOLS) Results

The FMOLS estimate in Table 4 shows a positive coefficient for social expenditure ($\beta$ = 33.8397, t = 16.9402, $p < 0.001$). On the scale used in the estimation, a one-unit increase in SE is associated with an estimated 33.84-unit increase in RGDP in the long-run cointegrating equation. The null hypothesis that public social expenditure has no significant long-run effect on RGDP is therefore rejected at the 5 per cent level. The model's $R^2$ of 0.8777 indicates a strong fit for this bivariate long-run specification.

The magnitude of the coefficient should, nevertheless, be interpreted with care. Because the model is bivariate, the estimate does not control separately for other determinants of output, and the cointegrating regression by itself does not establish a complete causal mechanism. The result is best read as evidence of a strong positive long-run association between social expenditure and real output over the study period.

**Table 4**

*FMOLS Long-Run Regression Results*

| Variable | Coefficient | Standard error | t-statistic | p-value |
|---|---|---|---|---|
| Constant | 23,683.46 | 1,439.688 | 16.45041 | <0.001 |
| SE | 33.83968 | 1.997594 | 16.94021 | <0.001 |

*Note.* Dependent variable = RGDP. $R^2$ = 0.877665; adjusted $R^2$ = 0.874607. Authors' computation from EViews output.

### 4.4 Discussion of Findings

The positive long-run coefficient is consistent with the central proposition of endogenous-growth theory that productive public expenditure can support growth by strengthening human capital and productivity (Barro, 1990; Barro & Sala-i-Martin, 1992). Education and healthcare spending can enhance the productive quality of labour and generate external benefits that extend beyond the immediate recipients of public services. The result also aligns with empirical studies linking Nigerian public expenditure and human-capital formation to higher output (Aluthge et al., 2021; Ogunjobi et al., 2022; Onuoha & Okoye, 2020).

The finding also helps reconcile an apparent tension in the Nigerian literature. Studies that disaggregate education and health expenditure often report different signs, magnitudes, or directions of causality across components (Olanrewaju &Funlayo, 2021). By treating education and health jointly as social expenditure, the present model captures their joint long-run movement with output. This does not imply that every naira allocated to either sector is equally productive; rather, it suggests that the aggregate social-spending series has moved positively with real economic activity over the long run.

The result is broadly consistent with Keynesian reasoning that public expenditure can support economic activity, but the present analysis does not estimate a short-run error-correction model and therefore cannot directly demonstrate short-run multiplier effects. Similarly, it does not test Wagnerian reverse causality. The study's contribution is narrower and more defensible: after accounting for non-stationarity and establishing cointegration, the FMOLS estimate indicates a statistically significant positive long-run relationship between public social expenditure and RGDP in Nigeria.

From a policy perspective, the result strengthens the case for protecting productive social expenditure, but expenditure volume alone is insufficient. The literature emphasises that composition, institutional quality and implementation determine whether public spending translates into productivity and growth (Chu et al., 2020; Nyasha & Odhiambo, 2019). For Nigeria, stronger budget execution, outcome-based monitoring, transparent procurement and attention to the balance between recurrent needs and capital investment are therefore important complements to adequate social-sector funding.

## 5. Conclusion and Recommendations

This study examined the long-run relationship between public social expenditure and economic growth in Nigeria using annual data for 1981-2022. The ADF tests established that RGDP and social expenditure are I(1), while the Johansen tests identified one cointegrating equation. The FMOLS estimate subsequently showed a positive and statistically significant long-run coefficient for public social expenditure. The evidence therefore indicates that education and health expenditure, considered jointly as public social expenditure, are positively associated with Nigeria's real output over the study period.

The policy implication is not simply that the government should spend more, but that it should protect and improve the productivity of social expenditure. Budgetary allocations to education and healthcare should be sustained in a fiscally responsible manner, while monitoring, transparency and accountability mechanisms should ensure that these allocations translate into functioning infrastructure, personnel, essential services and measurable human-capital outcomes. Public authorities should also strengthen expenditure evaluation so that programmes with weak outcomes can be redesigned and resources shifted towards interventions with demonstrable social and economic returns.

The study's bivariate specification is intentionally narrow and should be regarded as a limitation. Future research can test the robustness of the relationship in multivariate models that incorporate investment, inflation, exchange-rate conditions, labour-force indicators and institutional quality and can use error-correction or causality frameworks to distinguish short-run dynamics and the direction of influence. Such extensions would complement, rather than overturn, the long-run association established in this study.

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