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Assessing the Impact of Government Spending and Human Capital Development on Nigeria's Economic Growth

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Abstract

Government spending is a vital instrument for steering economic progress, affecting various sectors, including healthcare, education, infrastructure, and welfare. This study examines the impact of government spending and human development on Nigeria's economic growth, spanning the period from 1989 to 2023. The study utilizes economic growth as the dependent variable, with government spending and human development as the independent variables. The control variables included in the analysis are inflation, trade openness, population, and infrastructure. The dynamic Ordinary Least Squares (DOLS) approach is employed for data analysis, as it offers an improvement over the basic ordinary least squares model, since the study variables do not require any transformation to achieve a normal distribution. The findings reveal that government spending has a negative and significant impact on economic growth. Although the effects of human development on economic growth are positive, they are not statistically significant. Moreover, government spending negatively and significantly impacts human development. The combined effects of government spending and human development are not significant in influencing economic growth. The study recommends that the Nigerian government increase its budget for education and health to align with global trends. Additionally, the educational curriculum should be regularly reviewed to incorporate emerging trends in international and industrial developments.

Keywords: Dynamic ordinary least squares (DOLS), Economic growth, Government spending, Human development, Inflation.

1. Introduction

Nigeria, the most populous and one of the largest economies in Africa, has a complex existence characterised by vast natural resources but persistent economic challenges, including poverty, inequality, and underdevelopment. Understanding the factors that contribute to this economic dichotomy is crucial for policymakers and scholars alike. Significantly, two factors highlighted in the discourse surrounding Nigeria's economic growth are government spending and human development. This research aims to explore the relationship between these factors, examining how government expenditures can drive human development, which in turn contributes to sustainable economic growth.

Government spending is a vital instrument for steering economic progress, affecting various sectors, including healthcare, education, infrastructure, and welfare. The expenditure choices made by the government can either stimulate growth or hinder it, particularly in a developing economy like Nigeria, where endemic inefficiencies and corruption can impede the effective allocation of resources. Moreover, human development, often measured by indices such as life expectancy, educational attainment, and standard of living, is increasingly recognised as a fundamental component of economic development. Contemporary economic theories emphasise that a well-educated and healthy populace is more capable of innovation and productivity, thus spurring economic growth.

Human development can play a vital role in driving the growth and development of a nation, as it has the capacity to improve the productivity of firms and government services. This is because the potential and skills of workers are enhanced through education and various skills development exercises. The concept, popularised by the United Nations Development Programme (UNDP) through the Human Development Index (HDI), emphasises that, in addition to income growth, human development is also about improving a person's education, health, and

overall welfare. Some authors have argued that nations with the highest levels of human development skills have developed faster than those with low levels of these skills (Kuzminov et al., 2019; Angrist et al., 2021).

A better-educated workforce enhances efficiency in productivity, innovation and the capacity to facilitate and adapt to technological changes. With a skilled workforce, a nation can attract a greater inflow of foreign investment, drive industrial productivity, and compete on a global scale in terms of product quality and services. A nation's investment in health services improves the state of health of its citizens, thereby enhancing longevity and reducing the mortality rate of the labour force. A healthy labour force reduces absenteeism, increases productivity, and improves the income-earning capacity of workers. Moreover, human development raises the intellectual capacity of the labour force to be more creative in innovation and entrepreneurship, and enhances their capacity to be receptive to and apply new technological improvements. A knowledgeable citizen enhances the quality of a nation's institutions by providing services at both the firm and government levels, and by demanding accountability and better governance from the political authority.

Taken together, government spending and human development are not isolated forces in the contribution to the growth and development of a nation. The two variables can be effectively combined to create a synergistic effect that accelerates and sustains the nation's long-term growth and development. The interactive effects of government spending and human development arise when government spending is directed towards key sectors of the economy, which in turn further boost human development and increase the productivity of businesses and the government, ultimately enhancing a nation's growth and development. For instance, government investment in schools, health, and infrastructure raises the level of worker productivity, governance capacity, and innovation in the country. Government spending improves the level of aggregate demand and encourages higher-quality spending from the people. As output expands, it generates additional revenues for the government. It stimulates further investment in human capital, thereby enhancing the nation's capacity for output growth and creating the conditions for long-term development.

This research study examines the contributions of government spending and human development to Nigeria's economic growth. At the same time, several authors have investigated the impact of government spending on economic growth (Tammar, 2021; Castillo et al., 2022; Buthelezi, 2023; Okunola et al., 2024). Several other empirical studies have been conducted on the relationship between human development and economic growth (Awogbemi, 2023; Raj et al., 2024; Alenoghena et al., 2025; Puttitanun & Lerskullawat, 2025). However, studies on the combined effect of government spending and human development on economic growth are scarce in the literature. The lacuna in the dearth of literature on the combined effect of government spending and human development on economic growth constitutes the gap that this study attempts to fill. Accordingly, this study has the following specific objectives: one, to examine the impact of government spending on economic growth in Nigeria; two, to investigate the effect of human development on economic growth; three, determine the impact of government spending on human development; four, to evaluate the interactive effect of government spending and human development on economic growth and; five, to determine the long-run equilibrium status among the variables of study.

Given Nigeria's unique geographical, social, and historical context, it is imperative to assess how government spending and human development can be optimised to yield realistic economic growth for the economy. By focusing on established theoretical paradigms and available empirical evidence, this research aims to foster a deeper understanding of the interplay between these factors, offering insights and recommendations for future policies that can enhance Nigeria's economic trajectory. The scope of this study encompasses the period from 1990 to 2023.

The remaining sections in this study are divided as follows: Section two covers a review of the conceptual and empirical literature. Section three focuses on the study's methodology, while Section four concerns the analysis of the data. Section five presents the study conclusions and policy recommendations.

2. Literature Review

2.1. Theoretical Literature Review

The theoretical literature surrounding the roles of government spending and human development in economic growth is well-established but remains particularly poignant in the context of developing economies. Several economic theories elucidate the significance of these variables, with the Keynesian Theory of Fiscal Deficit and the Human Capital Development Theory being paramount.

Keynesian Economics posits that government spending plays a crucial role in economic activity, particularly during recessions. According to Keynesian principles, increased government expenditure can boost aggregate demand, which subsequently leads to higher levels of employment and income. The Keynesian theory argues that increased government spending raises the level of aggregate demand, stimulates improved output of goods and services, crowds in private investment and ultimately raises the level of economic growth (Alenoghena, 2022). In the context of Nigeria, where external shocks and internal inefficiencies often aggravate cyclical downturns, targeted government spending is crucial for economic stabilisation and growth. The work of Maynard Keynes has laid the foundation for understanding how effective fiscal policy can stimulate economic activity, suggesting a direct link between government outlays and growth rates.

Moreover, the Human Capital Theory, as explained by economists like Gary Becker (Human Capital, A Theoretical and Empirical Analysis, 1964 and Theodore Shultz (Investment & Human Capital, 1961), emphasises the significance of investing in human capital—education, health, and skills—as a pathway to enhancing productivity and economic performance. The human capital development theory posits that public sector investment in a worker's education, training, skills, and health promotes their productivity, work attitude, efficiency, and earning capacity. Hence, a well-implemented policy on human capital development leads to increased economic growth and development for both individuals and nations. The key aspects of human capital development include regarding education as an investment, improving workforce capabilities, and fostering a more innovative and productive economy through the accumulation of knowledge and abilities. Nigeria, with a high population of uneducated and underemployed citizens, indicate an immense potential for growth and development, which is often frustrated by a lack of investment in human capabilities. Japinye et al. (2025) underscore this need for human

capital investment as a fundamental precondition for the country's economic advancement. Government public sector policies aimed at fostering education and health services are not merely social welfare initiatives but essential components of a financial strategy to improve the

The theories interlink in a manner that suggests an effective government stance on spending should prioritise sectors that directly influence human development. Economists have documented cases where countries with higher investments in health and education enjoy faster rates of GDP growth. In Nigeria, the challenge remains in translating theoretical principles into practical action.

2.2. Empirical Literature Review

The empirical literature review is discussed in terms of the relationships between government spending and economic growth, as well as between government spending and human development.

2.2.1. Relationship Between Government Spending and Economic Growth

The discussion on the relationship between government spending and economic growth yields three strands of literature. First, empirical studies suggest a positive relationship between the variables (Bakare et al., 2016; Nwakobi et al., 2018; Biplob, 2019; Wahyudi, 2020; Chandana, 2020; Tammar, 2021; Okunola et al., 2024). The proponents of a positive relationship between government spending and economic growth favour the Keynesian theory of fiscal deficit. The Keynesian Theory posits that government spending increases aggregate demand, which in turn enhances the level of economic activity and stimulates private investment. The second strand of literature believes that government spending has a negative relationship with economic growth and crowd-out private investment (Shetta & Kamaly, 2014; Hussain et al., 2015; Saibu & Alenoghena, 2017; Oladele et al., 2017; Tung, 2018; Akamobi & Unachukwu, 2021; Castillo et al., 2022; Buthelezi, 2023). The authors in support of a negative relationship between government spending and economic growth belong to the classical school of thought who believe that government involvement in economic activity adversely impacts on the economy and crowd out private The third strand of empirical studies on the relationahip between government spending and economic growth contend that the country's level of economic activity is indifferent to the changes in government spending These empirical studies in this section favour the Ricardian Equivalence Hypothesis (REH) and argue that households anticipate the level of taxation required for the changes in fiscal policy and hence smoothen their expenditures such that their pattern of consumption and total output does not respond to changes in government spending (Sunge et al., 2015; Abada, 2016; Ofori-Abebrese & Pickson, 2018; İkiz, 2020; Munir & Mumtaz, 2021: Isah et al., 2022; Rašković, 2023).

2.2.2. The Relationship Between Human Development and Economic Growth

An investigation into the results of empirical studies on the relationship between human development and economic growth reveals a positive relationship between the variables in all the studies examined (Altiner & Toktas, 2017; Rahman, 2020; Kuswanto, 2021; Sultana, 2022; Awogbemi, 2023; Raj et al., 2024; Alenoghena et al., 2025; Puttitanun & Lerskullawat, 2025). The proponents of a positive relationship between human development and economic growth believe in the application of the Human Capital Development Theory. The theory argues that improvements in human capabilities (skills, health, income, and education) will enhance innovation and productivity, thereby fostering an increase in the level of economic activities. The authors argue that economic growth will generate the necessary resources to finance improved income, better health, enhanced skills and education, and a boost in overall economic welfare for the people. Therefore, the relationship between human development and economic growth creates a virtuous cycle, whereby progress in human development promotes progress in economic growth in a reinforcing manner, leading to a beneficial and sustainable outcome for the nation in the long run.

2.2.3. The Relationship Between Government Spending and Human Development

A positive relationship exists between government spending and human development (Akinyele et al., 2025; Rahmawati & Intan, 2020; Nurvita, 2022; Amalia et al., 2022; Goldani & Momeni, 2023; Bassey et al., 2023). Empirical studies that emphasise a positive relationship between government spending and human development suggest that the government may invest in education and health to build human capacity and improve the quality of life, thereby enhancing the Human Development Index (HDI). Additionally, increased government expenditure on capital projects has a positive impact on human income and welfare. Hence, the allocation of spending on social infrastructure and public services is vital for optimising the benefits for human development. The second strand of empirical literature confirms a negative relationship between government spending and human development (Olofin, 2020; Omodero, 2019; Abbah et al., 2025). The advocates of a negative relationship between government spending and human development argue that it occurs when a specific type of government spending, specifically related to administrative costs, can lead to diminished human development outcomes. On a standard scale, public investments in areas such as infrastructure, health, and education tend to have positive effects. This trend of a reverse relationship suggests inefficiency or corruption in the government's administrative function, leading to the diversion of resources that could have been used to enhance human development and the welfare of the people.

The third strand of literature concerns empirical studies that have yielded mixed results regarding the relationship between disaggregated government spending and human development, or have found no relationship between the two (Onabote et al., 2023; Sasongko & Wibowo, 2022; Ruzima & Veerachamy, 2023; Nwokoye, 2017; Okafor, 2017). The empirical studies in this category were unable to identify a specific or categorical relationship between government spending and human development.

2.3. Gaps in Empirical Literature

The first gap in the literature concerns the inconclusive and contradictory results in the empirical relationship between government spending, human development, and economic growth (Amalia et al., 2022; Sasongko & Wibowo, 2022; Ruzima & Veerachamy, 2023). Some studies find a positive and significant relationship, indicating that improved government spending on education, health, and infrastructure enhances human capital accumulation

and long-run growth. Other studies on the subject, however, report weak, negative, or statistically insignificant effects, often attributing this to issues such as misallocation of resources, corruption, poor governance, or the crowding out of private investment. The second gap pertains to the non-interacted (synergistic) effect of government spending and human development on economic growth. The lacuna created by the second gap constitutes the central point to be sorted out in this research study.

3. Methodology

3.1. Research Design

This study examines the impact of government spending and human development on Nigeria's economic growth. The Nigerian government is the largest spender in the country and can impact formal educational institutions, training institutes, and health facilities to improve the service contributions of human resources in the country. The improvements in human skills and work attitude will, in turn, enhance the quantity and quality of productivity in both the public and private sectors of the economy, thereby improving the level of economic growth. Additionally, government investment in infrastructure and other productive endeavours may also enhance the earning capacity and welfare of workers. The research design adopted for this study is an exploratory design that employs an Ex-Post Facto approach and a survey. Thus, the research study utilises secondary data secured from the Central Bank of Nigeria (CBN) and World Development Index (World Bank) data publications. The variables deployed for analysis in this study include economic growth (proxied by GDP per capita), government spending (GSP), human development (HDI), inflation (INFL), trade openness (TRADE), population (POPN), and infrastructure (IFRST).

3.2. Model Specification

The model deployed in this research study follows the model by Sultana et al. (2022) and Castillo et al. (2022). The model expresses Economic Growth (EG) as the dependent variable and Government Spending (GSP) and Human Development (HDI) as the explanatory variables. The control variables for the model include inflation (INFL), trade openness (TRADE), population (POPN) and infrastructure (IFRST). The variables are shown in equation (1) as follows:

Economic Growth = f(Government Spending, Human Development, Inflation, Trade Openness, Infrastructure).

The expression may be more compact in equation (1) shown as follows:

$$EG = f(GSP, HDI, INFL, TRADE, POPN, INFRST) \quad (1)$$

Equation (1) can be expressed further in the functional form:

$$EG_t = \beta_0.(GSP_{1t})^{\beta_1}.(HDI_{2t})^{\beta_2}.(INFL_{3t})^{\beta_3}.(TRADE_{4t})^{\beta_4}.(POPN_{5t})^{\beta_5}.(INFRST_{6t})^{\beta_6} \quad (2)$$

For estimation purposes, equation 2 has to be log-linearised. The log-linearising process is necessary to configure the scales of the variables to streamline the data fluctuations. Therefore;

$$LnEG_t = \beta_0 + \beta_1 LnGSP_{1t} + \beta_2 LnHDI_{2t} + \beta_3 LnINFL_{3t} + \beta_4 LnTRADE_{4t} + \beta_5 LnPOPN_{5t} + \beta_6 LnINFRST_{6t} + \mu_t \quad (3)$$

Equation (3) may be utilized to investigate objectives one and two – the effects of government spending and human development on economic growth. Equation (2) will be recalibrated to resolve objective three as follows:

$$LnHDI_t = \beta_0 + \beta_1 LnGSP_{1t} + \beta_2 LnEG_{2t} + \beta_3 LnINFL_{3t} + \beta_4 LnTRADE_{4t} + \beta_5 LnPOPN_{5t} + \beta_6 LnINFRST_{6t} + \mu_t \quad (4)$$

Equation (4) is configured to assess the effect of government spending on human development

$$LnEG_t = \beta_0 + \beta_1 LnGSP_{1t} + \beta_2 LnHDI_{2t} + \beta_3 LnGSP * HDI_{3t} + \beta_4 LnINFL_{4t} + \beta_5 LnTRADE_{5t} + \beta_6 LnPOPN_{6t} + \beta_7 LnINFRST_{7t} + \mu_t \quad (5)$$

Equation (5) is designed to determine the interacted effects of government spending and human development on economic growth in Nigeria.

Where $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ & β_7 are the coefficients to be estimated in the models and μ_t is the stochastic error term.

Furthermore, the apriori expected signs of the coefficients are $\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 < 0, \beta_5 > 0, \beta_6 < 0$ & $\beta_7 > 0$. Therefore, the parameter $\beta, > 0$ implies a positive relationship between the dependent and the explanatory variables. Also, $\beta, < 0$ indicates a negative relationship between the dependent and explanatory variables.

3.3. Sources of Data and Variable Definition

The study uses annual time series data with 34 observations from 1989 to 2023. Thus, the data's primary sources are the Nigerian Central Bank's statistics report and the World Bank Development Indicators, 2022.

Table 1. Variable Definition and Measurements.

Variable	Full Name	Measurement	Source
EG	Economic Growth	GDP per capita refers to the gross domestic product (at constant prices) divided by mid-year population	WDI
GSP	Government Spending	Federal government spending refers to the total expenses incurred by the federal government to execute its functions and responsibilities. Some examples are defense, education, healthcare and infrastructure. (Taken as a ratio of GDP)	CBN
HDI	Human Development index	HDI measures the contributions of formal education, new skills, training and income to the employee's productivity. It is an index that ranges between zero and one to indicate the productivity capacity of an ideal employee who enjoys full health and with a good educational standard.	WDI
INFL	Inflation	The inflation rate on the consumer price index estimates the annual percentage change in cost to the average consumer in terms of purchasing a basket of goods and services annually. The Laspeyres formula is used	WDI
TRADE	Trade Openness	The addition of exports and imports together divided by the GDP and taken as a percentage. It indicates the degree of trade liberalization.	WDI
POPN	Population	Population Growth Rate: The average annual change in the size of a population. It is expressed as a percentage and reflects the overall change in individuals due to changes in births, deaths, immigration, and emigration.	WDI
INFRST	Index for Infrastructure	Principal Component Analysis estimation of an index comprising Air and Road Transport, Fixed Telephone and Energy use.	CBN

Source: Compiled from WDI and CBN Reports (2023).

3.4. Analytical Framework

This research employs the Dynamic OLS (DOLS) approach for data analysis. The DOLS is firmly entrenched in the Fully Modified OLS (FMOLS) as an estimator that utilises a semi-parametric correction method to address the inherent challenges associated with the long-run association of the stochastic regressors that often arise in the assessment of a long-run equilibrium cointegrating framework. The FMOLS estimator is a characteristically unbiased approach that provides optimal estimates in developing the cointegrating regression methodology. Additionally, the procedure incorporates the attribute of combining efficiency with the normalised asymptotic, allowing for the basic Wald tests while utilising the standard statistical inference procedure of the Chi-square approach. Consequently, the expanded framework of the DOLS streamlines the groundwork for the assessment of the asymptotic attribute of the FMOLS in replications that merge regressors with the volatile order of integration, like regressors with characteristics of being stationary at level [I(0)] with those that are stationary at first difference [I(1)].The cointegrating regression method deploys the initial estimates of a symmetric long-run covariance matrice of the error term. Suppose $\hat{u}_{1t}$ is the set of residuals attained after assessing Equation 4, then $\hat{u}_{2t}$ can be obtained incidentally and acknowledged as $\hat{u}_{2t} = \Delta\hat{\epsilon}_{2t}$ in the course of the regression analysis.

$$X_t = \hat{\Gamma}_{21}' D_{1t} + \hat{\Gamma}_{22}' D_{2t} + \hat{\epsilon}_{2t} \quad (4)$$

r may be obtained from the simulated regression analysis procedures. Hence, we can generate equation (5) in the order:

$$\Delta X_t = \hat{\Gamma}_{21}' \Delta D_{1t} + \hat{\Gamma}_{22}' \Delta D_{2t} + \hat{u}_{2t} \quad (5)$$

If we declare $\hat{\Omega}$ and $\hat{\Lambda}$ as the long-run of the associated covariance matrices that is estimated while applying the error term residuals $\hat{u}_t = (\hat{u}_{1t}, \hat{u}_{2t}')'$, then we can present the adjusted data in the form of equation (6) as follows:

$$y_t^+ = y_t - \hat{\omega}_{12}\hat{\Omega}_{22}^{-1}\hat{u}_2 \quad (6)$$

Inferring from the FMOLS, the DOLS procedure is developed from an asymptotically efficient estimator that eliminates the feedback often associated with the cointegrating regression system that is supported by Saikkonen (1992) and Stock and Watson (1993). The DOLS approach demands an extension of the cointegrating regression analysis utilizing lags and leads associated with ΔX_t in a way that the incidental cointegrating equation residual is orthogonal in reference to the history process of the random regressor simulation. Hence, equation (7) presents the basic DOLS model:

$$y_t = X_t'\beta + D_{1t}'\gamma_1 + \sum_{j=-q}^{p} \Delta X_{t+j}'\delta + \mu_{1t} \quad - \quad - \quad - \quad (7)$$

Where: y_t is the dependent variable; X refers to the matrix of dependent variables; β comprises the cointegrating vector associating the long-run cumulative multipliers, also, often regarded as the long-run impact of a change in X on Y; p refers to the lag length and q is the lead length.

Assuming the summation of q lags in addition to r leads, the differenced regressors will immerse all the existing long-run association between $\mu_{1t}$and μ_{2t}, such that least-squares estimates of $\theta = (\beta', \gamma')'$ of equation (7)

will now possess a similar asymptotic distribution as those estimated from the FMOLS. The DOLS is characterised as an estimator to asymptotic variance matrix of $\hat{\theta}$ is assessed by utilizing the classical OLS coefficient covariance. The process entails the substitution of the basic estimator for the residual variance which belongs to μ_{1t} in addition to another estimator with the long-run variance for the random term. Therefore, the cointegrating regression to be estimated may be presented thus:

$$LnEG_t = \beta_0 + \beta_1 LnGSP_{t1} + \beta_2 LnHDI_{t2} + \beta_3 LnINFL_{t3} + \beta_4 LnTRADE_{t4} + \beta_5 LnPOPN_{t5} + \beta_6 LnINFRST_{t6} + \sum_{j=-q}^{p} \vec{d}_1 \Delta LnGSP_{t-j} + \sum_{j=-q}^{p} \vec{d}_2 \Delta LnHDI_{t-j} + \sum_{j=-q}^{p} \vec{d}_3 \Delta LnINFL_{t-j} + \sum_{j=-q}^{p} \vec{d}_4 \Delta LnTRADE_{t-j} + \sum_{j=-q}^{p} \vec{d}_5 \Delta LnPOPN_{t-j} + \sum_{j=-q}^{p} \vec{d}_5 \Delta LnINFRST_{t-j} \quad - \quad - \quad (8)$$

3.5. Estimation Procedure

The estimation procedure for this research study utilises a four-step procedure. Step one involves descriptive statistics, as well as the correlation matrix of the regressors. Step two consists of the stationarity test, which entails determining the order of integration using the augmented Dickey-Fuller (ADF) approach and the Phillips-Perron (PP) approach. Step three focuses on determining the long-run equilibrium cointegration of the study variables using the Engle-Granger Single-Equation Cointegration Model. The fourth step involves regression analysis using the Dynamic OLS method.

4. Empirical Analysis and Results

4.1. Descriptive Statistics

This subsection of the research work examines the statistical properties of the variables used in this study. The attributes of the study variables are presented in Table 1. The means of economic growth, government spending, human development, inflation, trade openness, population, and infrastructure are 7.02, 8.88, 8.32, 19.06, 35.47, 2.59, and 0.37, respectively. The maximum values for the variables, presented in the same order, are 8.07, 17.28, 10.52, 72.83, 53.27, 2.80, and 2.74. The period of study for the variables spans from 1989 to 2023, resulting in 35 observations. The variables that recorded the highest and lowest standard deviation values (variability) are inflation and population, with 16.56 and 0.22, respectively. The skewness of the data shows that it is negatively skewed, with economic growth, human development, trade openness, and population all recording negative values. Hence, the distribution is negatively skewed (to the left). Kurtosis measures the peak of the distribution, and in this data, it shows that it is platykurtic (below normal), as four variables (economic growth, human development, trade openness and infrastructure) all have values that fall below the threshold of 3, while the other three variables have kurtosis with values above 3. For the Jarque-Bera statistic, four variables (economic growth, human development, trade openness and infrastructure) have high probability values above 0.05. Therefore, the null hypothesis of a normal distribution cannot be rejected. Hence, the study data are typically distributed.

Table 1. Descriptive Statistics.

	LNEG	GSP	HDI	INFL	TRADE	POPN	INFRST
Mean	7.0258	8.5538	8.3210	19.0626	35.4764	2.5909	0.3672
Median	7.4098	8.1113	8.4710	13.0070	34.4578	2.6422	0.3104
Maximum	8.0712	17.2862	10.6240	72.8355	53.2780	2.8028	2.7395
Minimum	5.5985	5.0893	5.6910	5.3880	16.3522	2.0928	-1.6971
Std. Dev.	0.7787	2.6702	1.4145	16.5578	9.3378	0.2220	1.6804
Skewness	-0.2700	1.4184	-0.1868	1.9471	-0.0203	-1.2950	0.0765
Kurtosis	1.4672	5.2321	2.1457	5.6990	2.3738	3.3756	1.3658
Jarque-Bera	3.8516	19.0017	1.2680	32.7383	0.5743	9.9885	3.9288
Probability	0.1458	0.0001	0.5305	0.0000	0.7504	0.0068	0.1402
Sum	245.903	299.382	291.236	667.191	1241.675	90.683	12.851
Sum Sq. Dev.	20.6182	242.4168	68.0284	9321.4220	2964.6080	1.6756	96.0054
bservations	35	35	35	35	35	35	35

4.2. Correlation Matrix of Regressors

The correlation matrix presents the estimates of the correlation values for all variables and is shown in Table 2. The estimated correlation values of all study variables are generally low, except for those between government spending and infrastructure, as well as government spending and economic growth. The weakest correlations occur between trade openness and inflation, as well as population and inflation. Overall, the general trend of correlation values among the variables suggests that the dataset does not suffer from multicollinearity.

Table 2. Correlation Matrix.

Covariance Analysis: Ordinary							
Correlation	**LNEG**	**GSP**	**HDI**	**INFL**	**TRADE**	**POPN**	**INFRST**
LNEG	1						
GSP	-0.7579	1					
HDI	0.5199	-0.6303	1				
INFL	-0.5612	0.2321	-0.4840	1			
TRADE	-0.2696	0.2568	-0.3944	-0.1115	1		
POPN	-0.2845	0.2419	-0.6047	0.0113	0.6256	1	
INFRST	0.5396	-0.7023	0.6844	-0.4447	-0.3709	-0.5134	1

4.3. Unit Root Test

Table 3 presents the unit root test results obtained using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The test involves deploying all the variables used in this study. The results from the test show that all the variables covered in the study become stationary at the first difference. Hence, they are stationary at order one [I(1)]. The scenario of order-one stationarity indicates that the series's values are uniformly stationary at a second level. The most appropriate next step in analysis is to test for an equilibrium cointegrating relationship using the Engle-Granger approach or the Johansen test to determine if a long-run equilibrium cointegrating relationship exists.

Table 3. Unit Root Test.

Null Hypothesis: Series has a unit root								
Series: LNEG GSP HDI INFL TRADE POPN INFRST								
Method		ADF - Fisher Chi-Square			Phillips-Perron Test			
Series	**t-Stat**	**Prob**	**Order of Integration**	**Maximum Lag**	**t-Stat**	**Prob**	**Order of Integration**	**Maximum Lag**
LNEG	-4.6676	0.0007	I(1)	1	-4.6763	0.0007	I(1)	1
GSP	-10.0282	0.0000	I(1)	1	-13.6451	0.0000	I(1)	1
HDI	-3.8494	0.0060	I(1)	1	-3.8221	0.0064	I(1)	1
INFL	-6.1946	0.0000	I(1)	1	-6.1264	0.0000	I(1)	1
TRADE	-5.7583	0.0000	I(1)	1	-12.0319	0.0000	I(1)	1
POPN	-4.1017	0.0375	I(1)	1	-4.7041	0.0076	I(1)	1
INFRST	-6.4541	0.0000	I(1)	1	-6.4541	0.0000	I(1)	1
	1% level	-3.6394			1% level	-3.6463		
	5% level	-2.9511			5% level	-2.9540		
	10% level	-2.6143			10% level	-2.6158		

4.4. Engle-Granger Cointegration Test

The Engle-Granger method of cointegration analysis was employed in this study to examine the long-run equilibrium cointegration relationship among all the variables considered. The test engages all the variables that make the model endogenous, enabling the determination of a long-run equilibrium relationship among them. The results of the cointegration evaluation are presented in Table 4. The z-statistic (comprising the normalised autocorrelation coefficient) together with the Engle-Granger tau-statistic jointly reject the null hypothesis of no cointegration among the variables at the 5% significance level. An assessment of the seven variables in the study confirms the existence of cointegration among four of them: government spending, human development, inflation, and trade openness. The values of the complementary probability are evaluated based on the MacKinnon feedback to culminate in the apparent model output. With the size of the sample and the associated probabilities of all the variables, the respective critical values validate the presence of seven (7) cointegrating equations at the 10% level of significance based on the application of the tau-statistic and z-statistic estimations. Therefore, the test confirms the presence of a long-run equilibrium cointegrating relationship among the variables: economic growth, government spending, human development, inflation, trade openness, population, and infrastructure.

Table 4. Engel-Granger Cointegration Test.

Series: LNEG GSP HDI INFL TRADE POPN INFRST								
Automatic lags specification based on Schwarz criterion (maxlag=8)								
Dependent	tau-stat	Prob.*	z-statistic	Prob.*				
LNEG	-5.0793	0.1141	-29.4856	0.1156				
GSP	-6.2682	0.0139	-37.8830	0.0087				
HDI	-5.0734	0.1033	-53.4446	0.0000				
INFL	-5.7860	0.0274	-35.1628	0.0447				
TRADE	-5.8262	0.0253	-35.9093	0.0367				
POPN	-3.4254	0.7050	-18.0446	0.6945				
INFRST	-4.4237	0.2844	-25.1589	0.2811				
		LNEG	**GSP**	**HDI**	**INFL**	**TRADE**	**POPN**	**INFRST**
Rho - 1		-0.8672	-1.1142	-0.2280	-0.8544	-0.9155	-0.5307	-0.7400
Rho S.E.		0.1707	0.1778	0.1012	0.2287	0.1745	0.1549	0.1673
Residual variance		0.0217	2.4940	0.1075	105.7886	45.9705	0.0088	0.1089
Long-run residual variance		0.0217	2.4940	0.1075	109.4473	45.9705	0.0088	0.1089
Number of lags		0	0	0	1	0	0	0
Number of observations		34	34	34	33	34	34	34
No. of stochastic trends**		7	7	7	7	7	7	7

4.5. DOLS Impact Analysis of Government Spending and Human Development on Economic Growth in Nigeria

The impact analysis of government spending and human development on Nigeria's economic growth is presented in Table 5. At the same time, government spending, inflation, trade openness, and infrastructure are significant in impacting economic growth, human development, and population, but not significant. In more specific terms, government spending has a negative and significant impact on human resources. In terms of elasticity analysis, the explanatory variable regression coefficients for GSP, INFL, TRADE, and INFRST are -0.043, -0.006, -0.007, and 0.332, respectively. Thus, a 1% change in GSP, inflation, and trade will induce a 0.04%, 0.01%, and 0.01% change in economic growth, respectively, in the opposite direction. Conversely, a 1% change in TRADE will induce a 0.33% change in economic growth in the same direction. Finally, while government spending has a negative and significant impact on economic growth, the effect of human development on economic growth is not substantial.

Table 5. Effect of Government Spending and Human Development on Economic Growth.

Dependent Variable: LNEG				
Method: Dynamic Least Squares (DOLS)				
Cointegrating equation deterministics: C				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
GSP	-0.0431	0.0130	-3.3193	0.0026
HDI	0.0916	0.4309	0.2127	0.8332
INFL	-0.0061	0.0018	-3.2975	0.0027
TRADE	-0.0076	0.0033	-2.3187	0.0282
POPN	0.4266	0.9308	0.4583	0.6606
INFRST	0.3315	0.0739	4.4884	0.0028
C	7.2698	4.7527	1.5296	0.1700
R-squared	0.8925	Mean dependent var		7.0526
Adjusted R-squared	0.8669	S.D. dependent var		0.7809
S.E. of regression	0.1421	Sum squared resid		0.1413
Long-run variance	0.0083			

The effect of the adjusted R-Square shows that 87% of the variation in the dependent variable is accounted for by the variations in the explanatory variables.

4.6. DOLS Impact Analysis of Government Spending on Human Development

An evaluation of the effect of government spending on human development using the DOLS approach is shown in Table 6. The table shows that four out of the six explanatory variables in the model have a significant effect on human development. The impact of government spending on human development is negative and significant. More specifically, a 1% change in government spending induces a 0.41% change in human development in the opposite direction. The adjusted R-squared in the model indicates that the variation in the independent variables explains 77% of the variation in human development.

Table 6. Effect of Government Spending on Human Development.

Dependent Variable: HDI				
Method: Dynamic Least Squares (DOLS)				
Cointegrating equation deterministics: C				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
GSP	-0.4138	0.0597	-6.9275	0.0002
LNEG	-1.6330	0.5519	-2.9588	0.0211
INFL	-0.0563	0.0038	-14.9805	0.0000
TRADE	-0.0457	0.0143	-3.2082	0.0149
POPN	-1.3775	0.7463	-1.8458	0.1074
INFRST	0.5796	0.2588	2.2401	0.0601
C	29.4095	2.9308	10.0348	0.0000
R-squared	0.7937	Mean dependent var		8.4089
Adjusted R-squared	0.7721	S.D. dependent var		1.2621
S.E. of regression	0.2108	Sum squared resid		0.3109
Long-run variance	0.0110			

4.7. DOLS Impact Analysis of the Combined Effect of Government Spending and Human Development on Economic Growth

An examination of the synergistic effect of government spending and human development on economic growth in Nigeria is shown in Table 7. The model indicates that four of the seven independent variables (inflation, trade openness, population, and infrastructure) have a significant impact on economic growth. Moreover, the model results indicate that the interaction coefficient between government spending and human development has a positive but insignificant impact on economic growth.

Table 7. Effect of the Interacted impact of Government Spending and Human Development on Economic Growth in Nigeria.

Dependent Variable: LNEG				
Method: Dynamic Least Squares (DOLS)				
Cointegrating equation deterministics: C				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
GSP	-1.0495	0.7724	-1.3587	0.2674
HDI	-0.7646	0.8044	-0.9505	0.4120
GSP*HDI	0.1493	0.1013	1.4742	0.2369
INFL	-0.0063	0.0019	-3.2794	0.0030
TRADE	-0.0086	0.0038	-2.2526	0.0329
POPN	2.4299	0.7316	3.3214	0.0450
INFRST	0.4273	0.0528	8.0904	0.0039
C	6.4605	6.9524	0.9292	0.4213
R-squared	0.6994	Mean dependent var		7.0526
Adjusted R-squared	0.6935	S.D. dependent var		0.7809
S.E. of regression	0.0629	Sum squared resid		0.0119
Long-run variance	0.0028			

This means that government spending in Nigeria has not been well-targeted to impact human development in the country positively. The adjusted R-squared indicates that 69% of the variation in economic growth is explained by the variations in the model's independent variables.

4.8. Normality Test

The normality test for the data utilized in this study in shown in Figure 1. While the data is positively skewed, the Kurtosis shows an average height with 3.13. Therefore, the distribution is mesokurtic falling into the category of a normal distribution. The Jarque-bera is 0.697 with a probability of 0.706 indicates that we cannot reject the null hypothesis of a normal distribution.

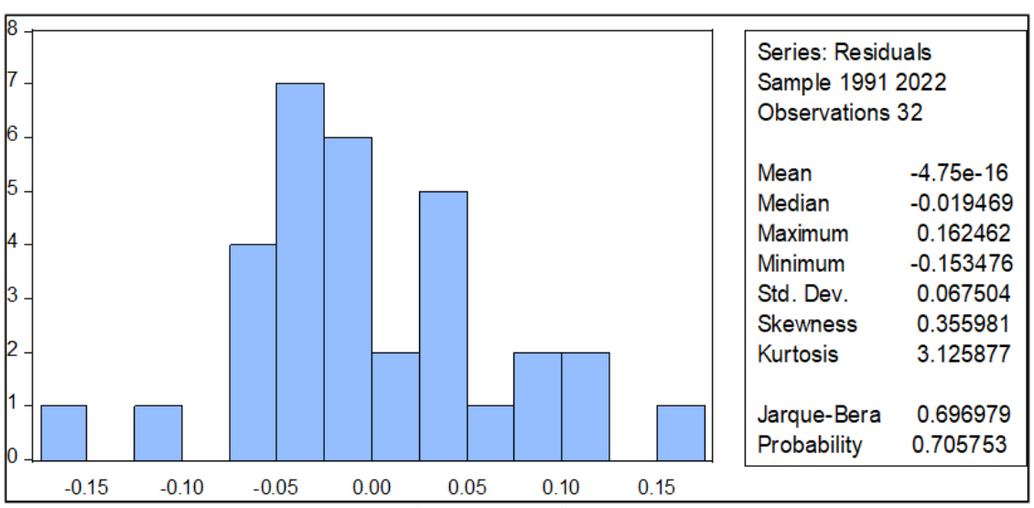

Figure 1. Normality test.

5. Summary, Conclusions and Policy Recommendations

This study examines the impact of government spending and human development on Nigeria's economic growth, spanning the period from 1989 to 2023. The study utilises economic growth as the dependent variable with government spending and human development as the independent variables. The control variables deployed in the study include inflation, trade openness, population and infrastructure. The study is timely, as the country is still in the planning stage to enhance the development and contributions of the human factor to the overall improvement of welfare in the country. For analysis, the study employed the dynamic OLS approach, which constitutes an improvement over the basic ordinary least squares model, as the study variables do not require any transformation to achieve a normal distribution. The study has drawn specific conclusions based on the empirical findings of the research analysis. The study underscores that government spending has a negative and significant effect on economic growth in Nigeria. The adverse effects of government spending on economic growth are corroborated by some existing empirical studies (Akamobi & Unachukwu, 2021; Castillo et al., 2022; Buthelezi, 2023). The proponents of an adverse effect of government spending on economic growth argue in favour of the Neoclassical crowding-out hypothesis. The belief that government spending and borrowing activities negatively impact private sector productivity, ultimately leading to adverse effects on the country's economic activities. Also, the study found that human development has no significant effect on economic growth. The adverse effect of human development on economic growth often occurs in developing countries where the population is large and unskilled. Additionally, when there is excessive and reckless government spending on education without adequate consideration for its impact on other sectors of the economy, or poor execution of human capital development programs, it can reduce the effect on economic growth (Bawono, 2021). The third finding of this study concerns the negative and significant effect of government spending on human development in Nigeria. There are existing empirical studies that support the adverse effect of government spending on human development (Olofin, 2020; Omodero, 2019; Abbah et al., 2025). The negative relationship between government spending and human development may occur when a specific type of government spending, such as administrative costs, leads to diminished human development outcomes. The reverse relationship between the variables may indicate inefficiency or corruption in the administrative function of the government, leading to a diversion of resources that could have been used to enhance human development and the welfare of people. The final finding shows that the combined (synergistic) effect of government spending and human development has no significant effect on economic growth in Nigeria. When the interaction between government spending and human development has no significant effect on economic growth, it may signal underlying issues in the system, such as corruption, inefficient resource allocation, or political instability and conflict. These negative features would undermine the positive effects of investment in areas like education and health. There are other factors, like the type of expenditure (capital vs. recurrent) or the specific context of a country's stage of development, that could also play a substantial role in undermining the positive effects of government public sector investments.

Based on the aforementioned findings, this study would proffer the following policy recommendations. The human development indicators of Nigeria remain low (HDI ~0.54), while government public spending on education and health is well below international benchmarks. Capital spending and investment execution have also been weak in the country. Therefore, the first recommendation focuses on improving government spending (15% of the budget) on education and health to meet the international standard. The improvement in health and education spending must be closely followed by effective execution and monitoring to ensure that the projects are well executed and completed. The attention of governments at the state and local levels must be focused on education and health. Besides building schools, governments should ensure the maintenance of facilities for optimal performance and provide teachers and health staff at the local school and health centre levels. Governments must emphasise the creation of institutions and centres for skills development, with a focus on technology-based courses. The educational curriculum of schools should be continually revised to incorporate modern trends in production and expand the scope of innovative courses, guiding the direction of the young people.

The government policy should prioritise early childhood educational development, nutrition, basic schooling, and maternal health. The mode of implementation focuses on scaling up national school-feeding and micronutrient programs in impoverished states to boost school attendance and learning. Additionally, the government should expand primary healthcare packages to include community health workers, maternal/child services, and vaccines. Additionally, safety net programs must be integrated into schemes like nutrition screening and conditional cash transfers for pregnant women and low-income families.

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