EXPLORING THE IMPACT OF EXTERNAL DEBT, FOREIGN DIRECT INVESTMENT, AND HUMAN CAPITAL DEVELOPMENT ON NIGERIA'S ECONOMIC GROWTH: A PATHWAY TO SUSTAINABLE ECONOMIC DEVELOPMENT

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Abstract

An investigation into the impact of external borrowings, human capital development and foreign direct investment is considered timely for Nigerian economy, given the growing public debt profile amid deteriorating living standard of the populace. Using data from 1981 to 2023, the study estimates the influence of external debts, human capital development foreign direct investment, and gross fixed capital formation on Nigeria's economic growth. The study employed the fully modified ordinary least squares (FMOLS) and canonical cointegration regression (CCR) as the main estimation technique and the robustness check respectively. The study discovered that external debt, foreign direct investment, and gross fixed capital formation exert negative influence, whereas, human capital development exhibits positive and statistically significant influence on economic growth in Nigeria. Premised on the findings, the study recommends that government should ensure comprehensive debt audits to prioritize servicing existing debts while reducing reliance on borrowing that diverts funds from development projects, and shift budgetary allocations from high-interest debt servicing to productive investment in social services and infrastructure that can stimulate economic growth.

Keywords: Nigeria, External debt, Foreign direct investment, Human capital development, Economic growth.

Introduction

In the contemporary global context, achieving a sustainable economy has become a critical objective for policymakers and scholars alike. A sustainable economy emphasizes robust economic growth and integrates principles of fiscal prudence, social inclusiveness, and environmental stewardship

(Oteino, 2024). External public debt, when judiciously managed, can provide essential financing for infrastructure and development projects. However, excessive borrowing may lead to a debt overhang, crowding out productive investments and undermining fiscal stability (Cabral et al., 2022). Meanwhile, FDI plays a dual role by injecting much-needed capital and transferring technology and managerial expertise, which are crucial for enhancing productivity (Muhammad et al., 2024). Nevertheless, the benefits of FDI are not automatic; they are contingent upon the host country's regulatory environment and its absorptive capacity, which is closely tied to the level of human capital. Human capital development, through investments in education, health, and skills development forms the backbone of long-term economic performance. It is widely recognized as a driver of innovation and productivity, enabling economies to better adapt to technological changes and global market shifts (Nwokoye et al., 2024). When human capital is adequately developed, it can amplify the positive effects of FDI and mitigate the adverse impacts of high external debt, thereby fostering sustainable growth.

Nigeria's economic landscape is at a critical juncture as it seeks to reconcile rapid economic growth with the imperatives of sustainability (Shamwil et al., 2024). In recent decades, the nation has experienced dynamic changes driven by external debt accumulation, varying levels of foreign direct investment (FDI), and evolving patterns in human capital development. Data from the regional outlook for Sub-Saharan Africa released by the International Monetary Funds (IMF) showed that the percentage of Nigeria's external debt to GDP increased to 22.7 percent in October 2024 from 11.9 percent in the corresponding period of 2023 and is projected to reach 25 percent next year (IMF, 2024). IMF's report further revealed that rising inflation rates, fiscal deficits, and high debt obligations continue to undermine the economic stability of many countries, Nigeria inclusive. Again, according to data from the Debt Management Office (DMO), Nigeria has as much as N63 trillion ($43 billion) as its foreign debt, representing 47 percent of the total debt stock as of Q2 2024 (Nwachukwu & Ashike, 2024). In the same vein, Nigeria's economic growth has been closely connected with foreign direct investment (FDI), which has long been viewed as a critical engine for capital formation, technology transfer, and industrial diversification in the country. Over the years, FDI has flowed into key sectors of the country's economy such as oil and gas, telecommunications, and manufacturing, helping to supplement domestic savings and stimulate productivity; however, its overall impact on growth remains mixed due to persistent challenges such as infrastructural deficits, regulatory inconsistencies, and currency volatility. For instance, data from the Central Bank of Nigeria revealed that total Foreign Direct Investment (FDI) inflows into Nigeria rose by 48.60 percent, or $176.60 million, to $540 million, in the first 11 months of 2024, compared with $363.40 million in the corresponding period of the preceding year (Chukunyem, 2025).

In Nigeria, substantial investments in human capital are seen not only as a means to enhance the capabilities of the country's workforce, but also as a strategic lever to minimize the adverse effects of high external debt and volatile foreign direct investment. Nonetheless, the interplay between human capital and external financing mechanisms remains a subject of ongoing academic debate,

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particularly in the context of developing economies like Nigeria, where resource constraints and institutional challenges persist. Despite the extensive literature on each of these determinants, empirical studies that simultaneously examine external debt, FDI, and human capital development within the Nigerian context are relatively scarce. This paper seeks to bridge this gap by employing a multifaceted analytical framework of Fully Modified Ordinary Least Square (FMOLS) and canonical cointegrating regression (CCR) that integrates macroeconomic indicators with institutional variables. The study's objective is to provide a nuanced understanding of how these factors collectively shape economic growth and contribute to the pursuit of a sustainable economy in Nigeria. In pursuing this objective, the paper is structured as follows: the next section reviews the relevant empirical studies, followed by a detailed exposition of the research methodology. Subsequent sections present the empirical findings and discuss their implications for policy and practice, culminating in a conclusion that highlights key insights and avenues for future research.

Review of Empirical Literature

This section critically reviews existing studies by categorizing them into three strands of literature. While the first strand focuses on the nexus between external debt and economic growth, the second lays emphasis on the nexus between human capital development and economic growth, and the last strand highlights the relationship between foreign direct investment and economic growth.

External Debt and Economic Growth Nexus

Although there are several studies on the relationship between external debt and economic growth, no consensus has been reached (Yue et al., 2019). Results on the link between external debt and economic growth vary across countries, economic growth indicators, and methodologies. For instance, employing the pooled OLS and fixed-effect estimators, Abdou et al. (2025) found that IMF loan growth tends to lower GDP growth and human development, and increases mortality in 13 most indebted countries from 1997 to 2020. A different approach of Spatial Durbin Fixed Effect (SDM-FE) and spatial weight matrix Models was adopted by Otieno (2024) to analyze the effects of external debt and foreign direct investment on the regional economic growth dynamics of Eastern Africa from 1992–2019 and they discovered that external public debt, FDI, and government expenditure have significant spatial spillover effects on regional economic growth. In a related study, Dinga et al. (2024) examined the effect of external debt and domestic capital formation on economic development using a panel of 35 SSA countries from 1995 to 2018 using the Dynamic Common Correlation Effects (DCCE) technique and the Driscoll and Kraay fixed-effect technique and the results revealed that domestic investment has a positive impact on economic development while external debt exhibits an adverse effect on economic development. These results are consistent with those of Osayor (2024) who reported that external debt services and the cost of servicing the debt hurt economic growth after employing linear regression analysis to examine the effect of

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government public debt on economic growth in Nigeria using yearly time series data from 2001 to 2022.

In addition, several studies have examined the relationship between external debt and economic growth in developed and developing countries. Nwokoye et al. (2024) employed fully modified ordinary least squares (FMOLS) and canonical cointegration regression (CCR) and they discovered that public debt, economic growth, and debt servicing exhibit positive and significant impacts on human capital development in Nigeria. In another related study, Shamwil et al. (2024) examined the impact of external debt, foreign direct investment, and financial development, on environmental sustainability in Nigeria using a novel Dynamic Autoregressive Distributed Lag (ARDL)-Simulations Framework. They found that external debt and FDI improve environmental sustainability in both the short and long term. Aruofor and Ph, (2024) provide clear evidence that external debt impacts positively on growth, in Nigeria. Aladejare and Musa, (2024) demonstrated that the impact of debt sustainability is positive in the long run, whereas, the effects of external debt servicing and foreign debt interest payment are significant and negative on the economy in the short and long run in Nigeria between 1980 and 2022 by employing Auto-regressive Distributed Lag (ARDL) model. The nexus between external debt and the economic growth of Ghana, Kenya, Morocco, Nigeria, Rwanda, Tunisia, and Zimbabwe was investigated by Duru et al. (2024) using the Pooled Mean Group Heterogeneous Dynamic Panel Data Approach and the Toda Yamamoto Granger causality tests technique. The results indicated that external debt hurt economic growth. while debt service exerted a positive impact on economic growth. Onafowora and Owoye (2019) confirmed that higher public debt and inflation rates hampered growth in five individual Caribbean countries. Given this literature, it is still unclear to conclude on the impact of external debt on economic growth from a global perspective.

Human Capital Development and Economic Growth Nexus

A relatively substantial body of literature exists on the link between human capital and energy consumption with more or less divergent results. For example, Shinkafi (2025) investigated the impacts of insufficient funding for Human Capital Development on economic progress in Zamfara State by employing the augmented Solow human capital growth model. The study found that low internal revenue generation hampers the state's capacity to sufficiently fund human capital development programs. In a related study, Samson et al. (2025) examined the effect of human resource reengineering on product quality of the manufacturing sub-sector of North-Central Nigeria using descriptive and inferential statistics, their findings revealed that there was a significant positive relationship between human resource reengineering and Product Quality. In a related study of Rwanda, Sibomana et al. (2025) concludes that a positive and significant relationship between current educational policies and reforms on the development of human capital. In the context of Pakistan, Khan et al. (2025) investigated the impact of human capital and government expenditure on economic growth using the Johansen co-integration approach and the results revealed that human

capital, employed labor force, FDI, polity index, and public expenditure positively impact GDP growth. Ullah and Faqir (2025) examined the relationship between Pakistan's economic growth and investments in human capital using time series data spanning 1985–2016. They employed the Autoregressive Distributed Lag (ARDL) and Error Correction models and concluded that investing in human capital, particularly in health and education, raises GDP and per capita income because it boosts worker productivity.

Examining the effect of diaspora remittance on human capital development in Nigeria for the period of 2010 to 2023, Efeeloo and Deebii, (2024) suggest that diaspora remittance has a significant positive effect on human capital development in Nigeria. Assessing the link between foreign direct investment inflow, diaspora remittance, and multilateral debt on human development in Nigeria, Theophilus et al. (2025) employed Auto-Regressive Distributed Lag modeling and found that, while foreign direct investment inflow and diaspora remittance increases human development, multilateral debt reduces human development in Nigeria. Achuo et al. (2024) examined the effects of human capital on energy consumption and growth using the system generalized method of moments (SGMM) for a panel of 134 countries from 1996 to 2019. They established that human capital development has an enhancing though non-significant effect on the energy transition process. Ezghiyr and Varahrami (2025) examined the effect of changes in the composition of the labor force on economic growth in Syria from 2000 to 2019 using the ARDL model and discovered that compared to men's physical capital, women's participation and the total number of employees have a positive and significant impact on economic growth. Ozegbe (2024) explored the impact of education and skills development on poverty alleviation and the role of government, private sector, and international organizations in fostering a sustainable human capital development framework. Findings suggest that a well-structured approach to education and skills training can significantly improve income levels, reduce unemployment, and promote long-term economic growth. Abdu Dawud (2020) assessed the impact of human capital on the economic growth in Morocco from 1990 up till 2019. ARDL approach along with the error correction model were applied. The outcomes revealed a positive and significant impact of human capital on economic growth both in the short and long term.

Foreign Direct Investment and Economic Growth Nexus

Numerous studies have analyzed the interplay between FDI and economic growth and the common assumption in these studies is that economic growth improves welfare (Omoniyi, 2024). The results of these studies have been mixed, but most research finds that FDI stimulates economic growth. For example, Muhammad and Adedeji (2024) investigated the effects of foreign direct investment (FDI) and remittances on economic growth in Nigeria using the ARDL technique and found that both FDI and remittances have a statistically significant effect on economic growth. Similarly, Conable and Onwuka (2024) explored the impact of Foreign Direct Investment on economic growth in Ethiopia over the period 1992-2012 and the results revealed a positive impact of FDI on economic growth.

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Using OLS and 2SLS methods on panel data covering the period from 1996 to 2022 and GMM, Carmel et al. (2025) explored how regulatory quality and FDI mitigate the resource curse in the EAC countries. Their results confirm the resource curse, and when FDI and regulatory quality are combined with natural resources, the negative impact of natural resources on GDP growth can be reversed to bring out the resource blessing in EAC countries. Omoniyi (2024) established that FDI led to a sustained, positive impact on poverty levels over time in Nigeria using a vector autoregressive model on annual data spanning from 1981 to 2019. In another similar study by Binuyo et al. (2022) using the Auto-Regressive Distributed Lag (ARDL) approach in Nigeria from 1981 to 2021 discovered a significant negative impact of foreign direct investment on economic growth.

Udo and Udo (2025) evaluated the influence of some selected factors on capital inflow in Nigeria using multiple regression to analyze annual time series data from 1986 to 2025 and established that external factors like external debt, foreign exchange reserve, and foreign interest rate are the major factors influencing capital flows in Nigeria in form of foreign direct investments and foreign portfolio Investments. Adegboyega et al. (2024) explored the nexus among financial inflows, financial development, and economic growth in sub-Saharan Africa (SSA) from 1990 to 2019 using cross-sectional Autoregressive Distributed Lag (CS-ARDL) and they found that foreign direct investment and foreign portfolio investment have mixed and statistically insignificant impact on economic growth. Ozegbe, (2024) employed the longitudinal research design to assess the roles of cross-border capital inflows on economic performance by employing the Autoregressive Distributed Lag (ARDL) estimator, and found that governance and remittances bear a negative impact on economic performance, while FDI is growth-enhancing with a positive influence.

Despite the existence of a relatively vast body of literature examining the relationship among external debt, human capital development, foreign direct investment, and economic growth, no consensus has been reached and the links between them remain an open debate. This study therefore fills an important gap in the literature by providing global comparative evidence of the linkages between external debt, human capital development, foreign direct investment, and economic growth in Nigeria.

Methodology

Variable description and data sources

Table 1 outlines variable description details and the data sources utilized in this study. This research considers real GDP as the endogenous variable, representing Nigeria's economic growth, and examines external public debt, foreign direct investment, human capital development, and gross fixed capital formation as explanatory variables. The variable *RGDP*, as well as the explanatory variable gross capital formation (*GFCF),* are computed in constant 2015 US dollars. Another explanatory variable FDI is measured as the net inflows (% of GDP), while Human capital development is proxied by the human capital index, which captures changes in human capital development across countries and time. The study employed time series data covering the period

1981–2023 for all the variables. To accommodate the assumptions of the Classical Linear Regression Model (CLRM), logarithmic transformation was applied to all variables during the estimation process except FDI which is in percentage.

The inclusion of Gross fixed capital formation in the empirical model is pivotal because it directly captures the level of domestic investment in physical assets such as machinery, infrastructure, and technology that underpins productive capacity and long-term economic development of an economy. By incorporating it into the analysis alongside external public debt, foreign direct investment, and human capital development, the study achieves a more holistic view of Nigeria's growth dynamics. While external debt and FDI provide insights into international financial influences and human capital reflect the workforce's skills and productivity, gross fixed capital formation measures the actual accumulation of tangible assets, bridging the gap between external resources and the domestic transformation into sustainable growth.

Table 1 Variable Description and Data Sources

Variable	Definition	Source
RGDP	GDP (constant 2015 US$): the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.	WDI
EXTD	External debt stocks, public and publicly guaranteed (PPG) (current US$): Total external debt is debt owed to nonresidents repayable in currency, goods, or services. It is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, short-term debt, and use of IMF credit	WDI
HCD	Human capital index (HCI) (scale 0-1): HCI calculates the contributions of health and education to worker productivity.	WDI
FDI	Foreign direct investment, net inflows (% of GDP): Foreign direct investments are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor.	WDI
GFCF	Gross fixed capital formation (constant 2015 US$): Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings.	WDI

Source: Authors' compilation

Empirical Model

To estimate the interactive impact of external debt, human capital development, foreign direct investment, and gross fixed capital formation on economic growth in Nigeria, the following model is specified following the empirical work of Oyasor (2024). The functional and econometric models are formulated as follows:

$RGDP = f(EXTD, HCD, FDI, GFCF)$ (1)

$RGDP_t = \beta_0 + \beta_1 EXTD_t + \beta_2 HCD_t + \beta_3 FDI_t + \beta_4 GFCF_t + \varepsilon_t$ (2)

Where β_1- β_4 is the parameter coefficients of the explanatory variables. RGDP is the real gross domestic products proxied for economic growth, EXTD is the external public debt, HCD is human capital development, FDI is the foreign direct investment, GFCF is the gross fixed capital formation representing capital formation, and ε is the error term which is assumed to be normally distributed. For estimation, there is need to log-linearize the model as in equation (3). This is necessary to minimize fluctuations in the data and to streamline the scales of the variables:

$\ln RGDP_t = \beta_0 + \beta_1 \ln EXTD_t + \beta_2 \ln HCD_t + \beta_3 FDI_t + \beta_4 \ln GFCF_t + \varepsilon_t$ (3)

Estimation Procedure

Cointegration test

Before cointegration analysis, the LM unit root test with two structural breaks developed by Lee and Strazicich (2003) was applied by this study for a better size and higher power, and to identify structural breaks in addition to the conventional unit root tests in the form of augmented Dickey-Fuller (ADF), and Philips Perron unit root tests in order to ascertain the stationarity properties of the variables.

Following the variables being cointegrated of order one I(1), the cointegration test was utilized to check the long-term nexus among the study variables. This study employed the Johansen cointegration test developed by Johansen and Juselius (1990) and Johansen (1995), which ensures reliability, consistency, and appropriateness in the estimates when the dataset is small, with at least 40 observations (Merlin and Chen, 2021), confirming its suitability for this study. The Johansen cointegration test result generates two statistics, trace and Max Eigenvalues. The null hypothesis states that H_0: There is no cointegration among the variables. While, the alternative hypothesis is that, H_1: There is cointegration among the variables.

The combined specifications of the four individual cointegration tests following the specified Fisher's equations are as follows:

EG-J = $-2[\ln(\mathrm{Pr})_{EG} + \ln(\mathrm{Pr})_{JOH}$ (4)

EG - JOH - BOS – BAN = $-2[\ln(\mathrm{Pr})_{EG} + \ln(\mathrm{Pr})_{JOH} + \ln(\mathrm{Pr})_{BOS} + \ln(\mathrm{Pr})_{BAN}]$ (5)

Where Pr represents the values of various individual cointegration tests; Engle-Granger (1987), Johansen (1988), Boswijk (1994), Banerjee et al. (1998) are shown by $(Pr)_{EG}$, $(Pr)_{JOH}$, $(Pr)_{BOS}$, and $(Pr)_{BAN}$, respectively.

Longrun Impact Estimates

This study estimated the long-run impact of the explanatory variables on the explained variable by employing a fully Modified Ordinary Least Square (FMOLS) model and a Dynamic Ordinary Least Square (DOLS) which are characteristically unbiased with the quality of being a fully efficient mixture with normalized asymptotics, they also provide optimal estimates of cointegration

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regressions by modifying OLS to correct serial correlation and endogeneity in the regressor as a result of the existence of long-run relationships (Inuwa, et al, 2022).

Robust Check

To check the consistency of FMOLS and DOLS results, this study utilized Canonical Cointegrating Regression (CCR) developed by Park (1992) as a robust checking technique following the work of Shamwil et al. (2023), Inuwa, et al. (2022) and Wasiu and Osi (2019) because of its capability of eliminating the long-run dependence between cointegrating equation and stochastic variable.

Results and Discussions

Summary Statistics

The summary statistics presented in Table 2 provide a detailed overview of the variables employed in the research. As suggested, there is negative skewness in terms of all the variables except FDI. Based on the results obtained, the mean and median values are approximately the same. However, the volatility in the variables is revealed by the standard deviation as it is high in GFCF compared to RGDP, EXTD, FDI, and HCD. The Jarque-Bera statistics indicated that all the variables are normally distributed. Similarly, the results of the correlation matrix are presented in the lower part of Table 2, revealing that explanatory variables are weakly correlated except for HCD.

Table 2: Descriptive Statistics

Variables	RGDDP	EXTD	HCD	FDI	GFCF
Mean	26.66780	23.20554	0.503400	1.444898	9269.835
Median	26.75116	23.12098	0.501500	1.452078	9251.703
Maximum	26.97416	24.31247	0.548000	2.900249	11445.86
Minimum	26.11453	22.00821	0.449000	0.183821	7348.339
Std. Dev.	0.285513	0.845307	0.029545	0.823423	1.178911
Skewness	-0.594145	-0.097990	-0.122816	0.226321	-0.054380
Kurtosis	1.943737	1.454769	1.832402	1.841218	1.992809
Jarque-Bera	2.106436	2.021789	1.186349	1.289717	0.855220
Probability	0.348813	0.363893	0.552570	0.524737	0.652066

Correlation Matrix

LRGDDP	1.000000				
LEXTD	0.038760	1.000000			
HCD	0.968874	0.224404	1.000000		
FDI	-0.732977	-0.502795	-0.801036	1.000000	
GFCF	0.707931	0.120448	0.746592	-0.705723	1.000000

Source: Author's computation

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Results of unit root tests

The ADF and PP unit root results presented in Table 3 show that all the variables in our model were non-stationary at the level but became stationary after differencing once. This implies that the series is stationary at first-order integration, I(1), which supports the adoption of the Johansen or ARDL bounds co-integration techniques.

Table 3 Results of unit root tests

Variables	ADF	PP	ADF	PP	Decision
LRGDP	-1.473119	-3.002117	-3.973952	-3.826989	
	(0.8223)	(0.1437)	(0.0175)	(0.0250)	I(1)
LEXTD	-1.895837	-1.858597	-4.329374	-4.261314	
	(0.6385)	(0.3480)	(0.0071)	(0.0085)	I(1)
HCD	-2.794090	-1.785256	-3.697562	-4.209322	
	(0.2187)	(0.3757)	(0.0494)	(0.0049)	I(1)
FDI	2.783360	-3.777302	-10.07400	-12.77706	
	(0.2274)	(0.0062)	(0.0000)	(0.0000)	(I1)
LGFCF	-5.883203	-5.983979	-5.546309	-6.232537	
	(0.0001)	(0.0001)	(0.0003)	(0.0000)	I(1)

Source: Author's computation

Results of the cointegration tests

Having established a stationarity status of the study variables, the long-run equilibrium relationship was estimated using the Johansen cointegration technique. The result is presented in Table 4. Both the trace test and max-eigenvalue outcomes of the Johansen test reveal 3 cointegrating equations at the 5% significant level which implies the rejection of the null hypothesis of no cointegration.

Table 4: The results of the Johansen cointegration test

Trace Outcomes

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.981565	178.4149	69.81889	0.0000
At most 1 *	0.959437	106.5316	47.85613	0.0000
At most 2 *	0.864368	48.84336	29.79707	0.0001
At most 3	0.484362	12.88279	15.49471	0.1192
At most 4	0.051961	0.960480	3.841466	0.3271
Max-Eigen No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.981565	71.88334	33.87687	0.0000
At most 1 *	0.959437	57.68820	27.58434	0.0000
At most 2 *	0.864368	35.96057	21.13162	0.0002
At most 3	0.484362	11.92231	14.26460	0.1136
At most 4	0.051961	0.960480	3.841466	0.3271

Source: Authors' estimation

FMOLS Result

FMOLS method is employed to examine the long-run effects of external public debts (EXTD), human capital development (HCD), foreign direct investments (FDI), and gross fixed capital formation (GFCF) on economic growth (RGDP) in Nigeria.

Table 5: The outcome of FMOLS: Dependent variable RGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXTD	-0.088098	0.015865	-5.553139	0.0001
HCD	9.294966	0.722342	12.86781	0.0000
FDI	-0.047095	0.027552	-1.709341	0.1095
LGFCF	-2.420005	1.420005	-1.710443	0.1092
C	24.32154	0.593188	41.00141	0.0000
R-squared	0.968232			
Adjusted R-squared	0.959155			
S.E. of regression	0.052758			

Source: Authors' estimation

Table 5 showcases the results of the FMOLS. The findings demonstrate that the predicted long-run coefficient of EXTD, FDI, and LGFCF are negative, meaning that a 1% rise in LEXTD, FDI, and LGFCF will result in a 0.089%, 0.047%, and 2.42% decrease in economic growth respectively. These findings justify the adverse effect of government allocating a disproportionate share of revenues to debt servicing, diverting funds from crucial infrastructure and social services, while FDI often flows predominantly into the extractive sector that repatriates profits and offers limited technology spillovers, thereby crowding out domestic enterprises; moreover, GFCF may be counterproductive when investments are misallocated or undermined by corruption and inefficiencies, resulting in infrastructure that fails to generate the desired productivity gains. These interconnected dynamics create a cycle of fiscal instability and limited economic diversification that ultimately stifles sustainable economic growth. LEXTD, FDI, and LGFCF on economic growth in Nigeria. This finding is consistent with the findings of Abdou et al. (2025), Duru et al. (2024), Otieno (2024) and contradict Dinga et al. (2024) and Osayor (2024) However, the long-run coefficient of human capital development is positive and statistically significant, implying that, a 1% change in HCD results in a 9% increase in economic growth in Nigeria. The improving effect of human capital development obtained by this study is unsurprising as it signifies that careful investment in critical sectors like infrastructure, healthcare, and education, can significantly improve human development indicators and stimulate economic growth, leading to enhanced opportunities and well-being for the population. This confirmed the findings of Sibomana et al. (2025), Samson et al. (2025), and Ullah and Faqir (2025).

Robustness check

As a robustness check of FMOLS estimation, CCR regression was adopted as indicated in Table 6. The findings of the CCR estimator validate the FMOLS estimation's robustness. The CCR outcome confirmed the coefficients of LEXTD, FDI, and GFCF to be negative and insignificantly associated with economic growth, but significant with EXTD in Nigeria, whereas HCD is positive and statistically significant as depicted by the FMOLS result.

Table 6: CCR Results: Dependent variable RGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXTD	-0.098189	0.021461	-4.575343	0.0004
HCD	8.838198	0.954077	9.263613	0.0000
FDI	-0.070029	0.049413	-1.417218	0.1783
LGFCF	-2.64E-05	2.58E-05	-1.020780	0.3247
C	24.83454	0.976489	25.43248	0.0000
R-squared	0.964326			
Adjusted R-squared	0.954133			
S.E. of regression	0.055907			

Source: Authors' estimation

Table 7: Diagnostics results

Diagnostic Tests	Coefficients	P-values	Decision
Jarque-Bera Test	0.5278	0.7680	Residuals are normally distributed
Langrage Multiplier Test	2.567298	0.1918	There is no serial correlation
Breusch-Pagan-Godfrey test	0.962241	0.5492	There is no heteroscedasticity

Source: Authors' estimation

Diagnostic Tests

To validate the efficiency of the estimation, we computed normality, heteroscedasticity, and serial correlation tests. The result indicates that there is an absence of auto-correlation and heteroscedasticity among the variables.

The stability tests of the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMQ) tests in Figures 1 and 2 reveals that the residuals' values are within the lines of confidence at a 5% significance level, which confirms that our model is stable.

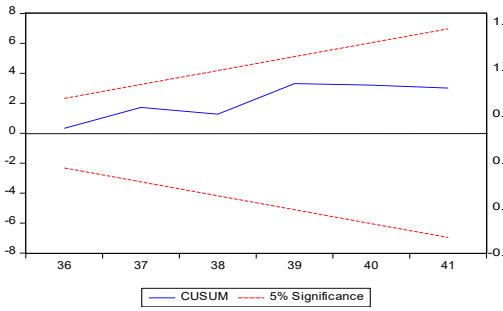

Figure 1: CUSUM Test
***Source*:** Authors' estimation

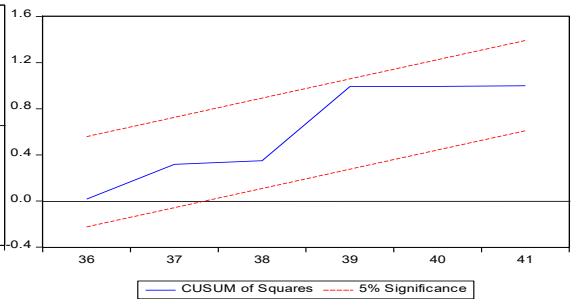

Figure 2: CUSUMQ Test
***Source*:** Authors' estimation

Conclusion and Policy Recommendations

This study investigated the impact of public external debt, human capital development, and foreign direct investment on economic growth in Nigeria using annual data that spanned from 1981 to 2023. The study employed the FMOLS and CCR as the main estimation technique and the robustness check respectively, and the findings revealed that external debt, foreign direct investment, and gross fixed capital formation exert negative influence, whereas, human capital development exhibits positive and statistically significant influence on economic growth in Nigeria. Based on the study's results, the policy implications demonstrate that the negative coefficient for external debt indicates that allocating a large share of revenues to debt servicing diverts critical resources from infrastructure and social services, making Nigeria's current fiscal strategy unsustainable over the long run and could be crowding out more productive spending. Again, the evidence that FDI is negatively associated with economic growth is associated with the concentration of FDI in extractive sectors that repatriate profits and do not foster significant technology spillovers, implying that Nigeria must re-evaluate the type of foreign investments it encourages. Moreover, the negative impact of gross fixed capital formation suggests that investments in physical capital may be misallocated or undermined by corruption and inefficiencies. This is because infrastructure projects that do not yield productivity gains contribute to a cycle of fiscal instability and limit economic diversification. Lastly, the positive and statistically significant impact of human capital development on economic growth underscores the crucial role that investments in education, healthcare, and skills training play in driving sustainable growth. Based on these, therefore, this study provides the following recommendations:

i. The government should Conduct comprehensive debt audits to prioritize servicing existing debts while reducing reliance on borrowing that diverts funds from development projects, and shift budgetary allocations from high-interest debt servicing to productive public investment in social services and infrastructure that can stimulate economic growth.
ii. Policymakers should formulate policies that favor FDI in sectors with high potential for technology transfer, domestic linkages, and job creation, and encourage joint ventures and partnerships integrating foreign expertise with domestic capacity, ensuring that FDI complements rather than crowds out local enterprises.

iii. Government should implement robust frameworks to assess, monitor, and evaluate public investment projects to ensure funds are used efficiently, yield tangible productivity gains, and strengthen institutional accountability and transparency in the allocation and execution of capital projects to minimize losses from corruption and mismanagement.

iv. Reforms in the education sector should be prioritized to improve quality and accessibility, ensuring that the workforce is equipped with skills relevant to modern economic demands and increasing investment in healthcare infrastructure and services to enhance the overall productivity and well-being of the population and develop programs that link education, vocational training, and employment opportunities to maximize the returns on human capital investment.

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