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EXPLORING THE IMPACT OF GOVERNMENT BORROWING ON HUMAN CAPITAL DEVELOPMENT IN NIGERIA

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Abstract: This paper investigates the impact of government borrowing on human capital development in Nigeria, using annual time series data from 1996 to 2022. Human capital was measured by secondary school enrolment rates and average life expectancy at birth, while government borrowing was gauged through domestic and external public debts. Institutional quality was assessed using control of corruption as an explanatory variable. The data were analysed through the error correction model. The findings revealed that domestic and external debts, along with their interaction with control of corruption, had no significant effect on secondary school enrolment rates, while control of corruption notably reduced enrolment. Conversely, public debt servicing and total public expenditure on social and community services significantly boosted secondary school enrolment. The study also showed that while domestic and external public debt, public debt servicing, and their interaction with control of corruption had the potential to increase life expectancy, the effects were not statistically significant. Moreover, total public expenditure on social and community services, and control of corruption were found to decrease life expectancy. These results imply that while increasing social service expenditure enhances school enrolment, achieving improvements in life expectancy requires more comprehensive, long-term strategies that delve deeper into the interaction between economic and governance factors.

Keywords: Public debt, secondary school enrolment, life expectancy, control of corruption
JEL Codes: H63, I25, I15, D73

1. Introduction

The intricate relationship between government borrowing and human capital development forms a critical nexus in the discourse on economic growth and policy efficacy. In Nigeria, a nation characterized by its diverse economic landscape and evolving policy framework, understanding this relationship is of paramount importance in establishing the nexus between public debt and the resultant effect of its application on Human Capital Development. Government borrowing, a common fiscal tool used to bridge budgetary gaps and finance developmental projects, has profound implications for various sectors of the economy, including human capital development (Akpan & Abang, 2013; Okoro, 2013; Udoka & Ogege, 2012).

Human capital, broadly defined as the economic value of an individual's skills, education, and experience, is central to a nation's growth trajectory (Becker, 1964). Investments in education, healthcare, and vocational training are crucial for enhancing the productivity and employability of a workforce. In the context of Nigeria, a country with significant socio-economic challenges and a burgeoning population, the efficient allocation of borrowed funds towards human capital development could potentially yield substantial long-term benefits (Umo, 2007; WDI, 2023).

The Nigerian government has historically engaged in borrowing to fund infrastructural projects, social programs, and other developmental initiatives. However, the effectiveness of such borrowing in advancing human capital development remains a subject of debate. On one hand, targeted investments in education and health can foster a more skilled and healthier workforce, driving economic progress and reducing poverty (Okoro, 2013). On the other hand, excessive or misallocated borrowing can lead to fiscal constraints, inflationary pressures, and reduced public sector investment in critical areas (CBN, 2023).

Over the period from 1996 to 2022, Nigeria has experienced notable changes in education, health, and economic conditions. The secondary school enrolment rate gradually improved, especially from the mid-2000s, where it rose from around 24% to a peak of 55% in 2013 (WDI, 2023). This suggests significant strides in educational access and possibly reflects the government's focus on improving human capital. However, after this peak, the enrolment rate slightly declined and stabilized between 41% and 47% in the following years, indicating potential challenges in maintaining progress. Life expectancy also showed a steady rise, moving from around 46 years in the late 1990s to over 55 years by 2022 (WDI, 2023), reflecting gradual improvements in healthcare and living standards.

On the economic front, both domestic and external public debt increased substantially, with domestic debt escalating from approximately 420 billion Naira in 1996 to over 22 trillion Naira by 2022 (CBN, 2023). External debt followed a similar upward trend, particularly during periods of economic stress, reaching over 18 trillion Naira by 2022 (CBN, 2023). These increases highlight the government's growing reliance on borrowing to finance its operations. However, the persistent negative values in the control of corruption index, which remained around -1.1 to -1.3 throughout the period (WGI, 2023) underscore ongoing governance challenges. This suggests that despite increased spending and debt, corruption continues to hinder Nigeria's development, potentially limiting the effectiveness of investments in education and health.

Despite extensive research on the impact of public debt on human capital development, significant gaps remain in understanding how these debts interact with institutional quality and their combined effects on human capital outcomes. This research paper seeks to explore the impact of government borrowing on human capital development in Nigeria by examining the role of institutional quality, particularly control of corruption, in the efficacy of such borrowing in enhancing human capital development. The mechanism through, which public borrowing impact human capital has been given less attention by previous researchers. Extant studies have focused attention on external debt and other economic variables, resulting in conflicting findings on the interaction between external borrowing and human capital development. This paper, therefore, aims to provide insights into how effectively borrowed resources are utilised in enhancing the country's human capital with a focus on institutional quality.

The second section presents the literature review, the third section discusses the methodology, results are provided in the fourth section, while the fifth section concludes this paper.

2. Literature Review

Theoretical Review

Endogenous growth theory posits that economic growth is primarily driven by internal factors such as investments in human capital, innovation, and knowledge, rather than external influences (Romer, 1986). This theory underscores the importance of government policies, including borrowing, in promoting sustainable economic growth by funding key sectors like education and healthcare, which are critical for enhancing human capital (Lucas, 1988). In contrast, fiscal sustainability theory emphasizes the long-term implications of government debt, warning that excessive borrowing can lead to unsustainable debt levels, which may crowd out essential public investments in human capital as more resources are diverted to debt servicing (Blanchard, 1990). These theories collectively highlight the need for a balanced approach to government borrowing, ensuring that the benefits of investing in human capital are carefully weighed against the risks of accumulating unsustainable debt.

Empirical Review

Ebele, Nwokoye, Dimnwobi, Onuoha, and Chekwube (2024) explored the impact of public debt on human capital development in Nigeria. Conducted within the period from 1990 to 2021, the research focuses on the growing public debt profile in Nigeria and its implications for human capital amid deteriorating development indicators. The authors employed Fully Modified Ordinary Least Squares (FMOLS) as the primary estimation technique and Canonical Cointegration Regression (CCR) for robustness checks. The variables analysed include domestic debt, external debt, economic growth, debt servicing, and environmental pollution. The findings revealed that domestic and external debts, along with economic growth and debt servicing, have a positive and significant impact on human capital development in Nigeria, while environmental pollution negatively influences it.

Atueyi (2019) examined the effect of external debt on human capital development in Nigeria over the period from 1986 to 2017. The study investigated how external debt impacts human capital development using an ex-post facto research design. Data for the study were collected from Central Bank of Nigeria's statistical bulletin, and analysed using the Ordinary Least Squares (OLS) regression technique. The key variables included the human capital index, debt servicing, gross fixed capital formation, and external debt. The analysis employed unit root tests, co-integration approaches, error correction models, causality tests, and stability assessments. The findings indicated that external debt had a negative and significant effect on human capital development, while debt financing showed a negative but insignificant effect, and gross fixed capital formation had a positive yet insignificant effect.

Egungwu (2018) investigated the impact of increases in external debt stock and its servicing on human capital development in Nigeria, focusing on data from 1986 to 2015. The study assessed how external debt and its servicing affect various aspects of human capital development. Using an ex-post facto research design, the research employed the Ordinary Least Squares (OLS) regression technique to analyze time series data spanning 30 years. The variables considered included external debt stock, external debt servicing, and specific categories of external debt, such as those from the Paris Club and multilateral creditors. The findings revealed that both external debt stock and debt servicing had a significant negative impact on human capital development. However, debt borrowed from the Paris Club and multilateral creditors showed an insignificant negative effect.

Ikenna C. Egungwu (2018) examined the impact of increases in external debt stock and its servicing on human capital development in Nigeria, using data from 1986 to 2015. The study evaluated how different types of external debt and their servicing affect human capital outcomes. Adopting an ex-post facto research design, the study employed the Ordinary Least Squares (OLS) regression technique to test four hypotheses at a 5% significance level. The analysis revealed that both external debt stock and debt servicing had a significant negative impact on human capital development. Specifically, external debt from the Paris Club and multilateral creditors showed an insignificant negative effect, while debt from the London Club had an insignificant positive effect, and debt from bilateral creditors had a significant positive effect. Regarding debt servicing, all creditors except the London Club showed insignificant positive effects.

Agu, Inyiama, and Ubesie (2024) examined the impact of government spending on human capital development in Nigeria from 2001 to 2021. The study investigated how government expenditures on administration, economic services, and social community services influence the Human Capital Index. Using an ex-post-facto research design and multiple regression analysis, the study finds that government expenditure on administration has a significant negative effect on the Human Capital Index, while spending on economic services shows a non-significant positive effect. On the other hand, government expenditure on social community services has a significant positive impact on the Human Capital Index.

Okafor, Adejumo, and Udeh (2017) explored the long-run relationship between government expenditure on education and health and its impact on Human Capital Development (HCD) in Nigeria. The research analysed data spanning 35 years, from 1980 to 2015. Utilizing a Vector Autoregressive (VAR) model, the study examined the dynamic interactions among government expenditure on education (EDU), government expenditure on health (HTH), and the Human Capital Development Index (HDI). The findings revealed that the joint significance of the current values of EDU and HTH were the most influential factors in determining the current values of HDI (-1). This provided economic evidence that the nature, pattern, and level of government expenditure on education and health significantly impact Human Capital Development in Nigeria, though the expenditures had an insignificant direct impact on HDI.

Madaki, Ahmed, and Musa (2020) investigated the disaggregated impact of government expenditure on human capital development in Nigeria from 1989 to 2018. The objective of their study was to assess how different types of government spending affect human capital development and economic growth in Nigeria. Using the Ordinary Least Squares (OLS) method, the researchers analysed the data. The study identified that capital expenditure had a significant impact on human capital development and economic growth, aligning with the endogenous growth hypothesis. Additionally, the variance decomposition analysis revealed that both recurrent and capital expenditure collectively contributed to changes in human capital development, supporting Wagner's hypothesis.

Kairo, Odinga, and Nduko (2017) investigated the relationship between human capital development and government expenditure in Nigeria, using data from 1990 to 2014. They employed the Autoregressive Distributed Lag (ARDL) approach and impulse response functions for estimation, and the Bounds Test was used to confirm the presence of a long-run relationship between Human Development Index (HDI) and government expenditure (GOVEXP). The findings revealed that while government spending had a positive impact on human capital development, this effect was largely insignificant in both the long and short run. This insignificance contributes to the persistent low ranking of Nigeria's per capita income globally.

Imandojemu, Adeyemi, and Ojo (2020) analysed the determinants of human capital development in Nigeria, focusing on data from 1990 to 2018. They utilized the Autoregressive Distributed Lag (ARDL) Model to assess the relationships between these determinants and human capital development. The empirical results revealed that while the relationship between tertiary school enrollment and human capital development was positive, it was statistically insignificant. In contrast, government expenditure on education (GXE), government expenditure on health (GXH), and life expectancy (LI) had a positive and significant impact on human capital development (HC). Conversely, the fertility rate showed a negative and significant relationship with human capital development.

Erasmus (2021) explored the relationship between public expenditure and human capital development in Nigeria using data from 1960 to 2019. The study evaluated how government spending on education and health influences the Human Development Index (HDI) in Nigeria. Secondary data were sourced from the Central Bank of Nigeria's statistical bulletins and United Nations Development Programme reports. The research employed Ordinary Least Squares (OLS) regression to test the hypotheses. The findings revealed that public expenditure on education had a significant positive impact on the HDI, while public expenditure on health also positively affected the HDI. However, when considered together, health and education expenditures had a positive but statistically insignificant impact on the HDI.

Onazi (2022) assessed the impact of government expenditure on health and education on human capital development in Nigeria using time series data from 1986 to 2018. Employing the Vector Autoregressive (VAR) model and impulse response functions, the research found that government expenditure on education and health positively impacted human capital development, as measured by indices such as school enrollment rates, life expectancy, and literacy rates. However, the study also revealed that these expenditures had a negative effect on human capital development through the mortality rate index.

Gap in Literature

Despite extensive research on the impact of public debt on human capital development, there is a notable gap in understanding how public debt interacts with institutional quality, such as control of corruption, and their combined effects on human capital outcomes. Previous studies have largely overlooked the specific mechanisms through which public borrowing influences human capital in the context of institutional quality. This paper aims to fill this gap by examining how government borrowing in Nigeria affects human capital development and how institutional quality moderates this relationship, providing new insights into the effective use of borrowed resources for enhancing human capital.

3. Methodology

Theoretical framework

The theoretical framework for this research on the impact of government borrowing on human capital development in Nigeria integrates endogenous growth theory and fiscal sustainability theory, emphasizing the critical role of institutional quality. Endogenous growth theory suggests that investment in human capital, innovation, and knowledge drives economic growth, with government borrowing potentially enhancing human capital by funding education and healthcare. However, the effectiveness of this borrowing hinges on the quality of institutions governing fund allocation; strong institutions ensure efficient use of borrowed resources, while weak institutions lead to mismanagement and corruption. Fiscal sustainability theory adds that excessive or poorly managed debt can crowd out investment in human capital if resources are diverted to debt servicing

rather than productive sectors. Therefore, the interaction between public debt and institutional quality is pivotal—effective borrowing can support human capital development in contexts with high institutional quality, while weak institutions may exacerbate the risks of borrowing, ultimately hindering long-term economic growth.

Model Specification

Drawing from the theoretical framework above, the models for this study are specified in econometric form as

$$SCH_t = \alpha_0 + \alpha_1 DDT_t + \alpha_2 EDT_t + \alpha_3 PDS_t + \alpha_4 TSC_t + \alpha_5 COC_t + \alpha_6 TDTCOC_t + \varepsilon_t \quad 1$$

$$LEX_t = \alpha_0 + \alpha_1 DDT_t + \alpha_2 EDT_t + \alpha_3 PDS_t + \alpha_4 TSC_t + \alpha_5 COC_t + \alpha_6 TDTCOC_t + \varepsilon_t \quad 2$$

Where SCH = secondary school enrolment rate percent of population, LEX = average life expectancy after birth, DDT = domestic public debt, EDT = external public debt, PDS = public debt servicing, TSC = total public expenditure on social and community services, COC = control of corruption, and TDTCOC = interaction between total public debt and control of corruption.

The error correction models (ECM) of Equations 1 and 2 are specified respectively as

$$D(SCH)_t = \alpha_0 + \alpha_1 D(DDT)_t + \alpha_2 D(EDT)_t + \alpha_3 D(PDS)_t + \alpha_4 D(TSC)_t + \alpha_5 D(COC)_t + \alpha_6 D(TDTCOC)_t + ECM_{t-1} + \varepsilon_t \quad 3$$

$$D(LEX)_t = \alpha_0 + \alpha_1 D(DDT)_t + \alpha_2 D(EDT)_t + \alpha_3 D(PDS)_t + \alpha_4 D(TSC)_t + \alpha_5 D(COC)_t + \alpha_6 D(TDTCOC)_t + ECM_{t-1} + \varepsilon_t \quad 4$$

Equations 3 and 4 are estimated in this study. A priori, it is expected that all the parameters in both models be greater than zero.

Data Measure and Source

The dependent variable, Human capital development, measured by secondary school enrolment rate percent of population (SCH) and average life expectancy after birth (LEX), both sourced from World Bank Development Indicators (WDI) 2023 database. Domestic public debt (DDT), external public debt (EDT), pubic debt servicing (PDS), and total public expenditure on social and community services (TSC) measured in billions of Naira were sourced from the Central Bank of Nigeria (CBN) 2023 statistical bulletin. Control of corruption (COC) estimates, which ranged from -2.5 (very weak institution) to +2.5 (very strong institution), was sourced from the World Governance Indicators (WGI) 2023 database. All data were annual time series that covered the period from 1996 to 2022.

Estimation technique

The Error Correction Model (ECM) is a statistical tool used in time series analysis to estimate how quickly a dependent variable returns to equilibrium after a change in other variables. It is particularly useful for non-stationary data that share a long-term relationship, capturing both short-term dynamics and long-term equilibrium by including first differences of variables and an error correction term. This makes the ECM valuable for understanding how variables, which may temporarily deviate from equilibrium, adjust over time to return to their long-term trend (Engle & Granger, 1987). By modelling these relationships, the ECM identifies the speed at which short-term shocks are corrected and provides insights into the stability and dynamics of the economic system. It also helps illustrate how policy changes impact economic indicators and how the economy adjusts back to its long-term path (Engle & Granger, 1987).

4. Results and Discussions

Table 1: Descriptive Statistics of Variables

	SCH	LEX	DDT	EDT	PDS	TSC	COC	TDTCOC
Mean	36.70370	50.20637	6214.796	4064.926	1050.163	677.0402	-1.1726	-11720.8
Median	38.00000	50.19800	3228.029	2577.374	394.0000	499.1125	-1.16061	-7754.27
Std. Dev.	9.359548	3.294676	6341.650	4844.613	1403.278	588.5171	0.130947	11733.63
Skewness	-0.04784	0.113501	1.034252	1.774114	1.925081	0.703264	-0.67076	-1.50756
Kurtosis	1.733433	1.575886	2.980519	5.300250	6.073113	2.416848	3.413750	4.362954
Jarque-Bera	1.815015	2.339584	4.813970	20.11620	27.30124	2.608184	2.217224	12.31710
Probability	0.403529	0.310432	0.090087	0.000043	0.000001	0.271419	0.330017	0.002115

Source: Authors' computation 2024

Table 1 presents descriptive statistics for several economic and social indicators. The secondary school enrolment rate (SCH) has a mean value of 36.70%, indicating that, on average, 36.7% of the population is enrolled in secondary education. The life expectancy (LEX) shows an average of 50.21 years, which reflects the expected number of years a newborn is anticipated to live on average.

In terms of debt, the domestic public debt (DDT) has an average value of 6214.80 units, while the external public debt (EDT) averages at 4064.93 units. This suggests that, on average, domestic debt is higher than external debt. The public debt servicing (PDS), which refers to the money allocated to cover debt payments, averages 1050.16 units, indicating the burden of debt on the economy.

The total public expenditure on social and community services (TSC) averages 677.04 units, highlighting the governments spending in this area. The control of corruption (COC), which is a measure of how well corruption is managed, has a mean value of -1.17, indicating a relatively low level of corruption control. Lastly, the interaction between total public debt and control of corruption (TDTCOC) has an average of -11720.8, suggesting a negative relationship between these two variables.

The standard deviations indicate the variability of these measures, with public debt indicators showing high variability compared to others. Skewness and kurtosis values provide insight into the distribution shapes, where debt-related variables tend to be positively skewed, indicating a tail on the right side of the distribution, and have higher kurtosis, suggesting heavier tails or more outliers compared to a normal distribution. The Jarque-Bera test and its associated probability values suggest that most variables do not significantly deviate from normality, with some exceptions like external public debt and public debt servicing.

Table 2: Correlation Matrix of Model 1

	SCH	DDT	EDT	PDS	TSC	COC	TDTCOC
SCH	1.000000						
DDT	0.741795	1.000000					
EDT	0.363836	0.842176	1.000000				
PDS	0.589461	0.955752	0.942616	1.000000			
TSC	0.835215	0.971562	0.764461	0.903618	1.000000		
COC	0.400489	0.368194	0.063419	0.289973	0.402490	1.000000	
TDTCOC	-0.59477	-0.96149	-0.9547	-0.98433	-0.91066	-0.18909	1.000000

Source: Authors' computation 2024

The correlation matrix from Model 1 (Table 2) reveals several significant relationships among the variables. Secondary school enrolment rate (SCH) is positively correlated with domestic public debt (DDT), public debt servicing (PDS), and total public expenditure on social and community services (TSC), indicating that higher school enrolment is associated with increased public spending and debt levels. However, SCH is negatively correlated with the interaction between total public debt and control of corruption (TDTCOC), suggesting that higher debt combined with stronger corruption control may reduce school enrolment rates. Additionally, DDT, EDT (external public debt), PDS, and TSC are highly interconnected, showing very strong positive correlations with each other, while TDTCOC exhibits strong negative correlations with most variables, indicating its potential to counteract positive economic effects when public debt is managed in the context of corruption control.

Table 3: Correlation Matrix of Model 2

	LEX	DDT	EDT	PDS	TSC	COC	TDTCOC
LEX	1.000000						
DDT	0.930242	1.000000					
EDT	0.623253	0.842176	1.000000				
PDS	0.805086	0.955752	0.942616	1.000000			
TSC	0.960030	0.971562	0.764461	0.903618	1.000000		
COC	0.490502	0.368194	0.063419	0.289973	0.402490	1.000000	
TDTCOC	-0.817	-0.96149	-0.9547	-0.98433	-0.91066	-0.18909	1.000000

Source: Authors' computation 2024

The correlation matrix for Model 2 (Table 3) highlights strong relationships between average life expectancy (LEX) and other economic indicators. LEX shows a very strong positive correlation with domestic public debt (DDT), public debt servicing (PDS), and total public expenditure on social and community services (TSC), suggesting that higher life expectancy is associated with increased public spending and debt levels. LEX also has a moderate positive correlation with external public debt (EDT) and a weak positive correlation with control of corruption (COC). However, LEX is strongly negatively correlated with the interaction between total public debt and control of corruption (TDTCOC), indicating that when high debt levels are combined with efforts to control corruption, life expectancy may be adversely affected. Additionally, similar to Model 1, DDT, EDT, PDS, and TSC are highly correlated, reinforcing the interconnectedness of these economic variables, while TDTCOC has strong negative correlations with most variables, highlighting its potentially destabilizing impact on positive economic outcomes.

Table 4: Unit Root Test of Variables

	Level			First Difference			
Variable	ADF Stat	5% Critical value	Prob	ADF Stat	5% Critical value	Prob	Remark
SCH	-2.37548	-3.59503	0.3825	-6.3198	-3.6032	0.0001	I(1)
LEX	-2.76726	-3.6032	0.221	-3.72473	-3.6032	0.0098	I(1)
DDT	-2.12839	-3.8753	0.4813	-4.65045	-3.64496	0.0369	I(1)
EDT	-2.81946	-3.8753	0.2188	-3.98955	-3.6032	0.0355	I(1)
PDS	-1.71448	-3.82898	0.6857	-4.08039	-3.6032	0.0223	I(1)
TSC	-0.95609	-3.59503	0.9333	-5.00207	-3.6032	0.0025	I(1)
COC	-1.82193	-3.82898	0.636	-4.97051	-4.00816	0.0173	I(1)
TDTCOC	-1.88857	-3.8753	0.5991	-4.65377	-3.93336	0.0495	I(1)

Source: Authors' computation 2024

The unit root test (table 4) evaluates the stationarity of various economic variables, both at their levels and after taking the first difference. For each variable, the Augmented Dickey-Fuller (ADF) statistic is compared to the

5% critical value to determine whether the variable is stationary (i.e., has a unit root). At the level, all variables—SCH, LEX, DDT, EDT, PDS, TSC, COC, and TDTCOC—fail to reject the null hypothesis of a unit root, as their ADF statistics are less negative than the corresponding 5% critical values. This indicates that these variables are non-stationary at their levels, with high p-values suggesting that any statistical inferences made at this stage could be unreliable due to the presence of trends or other non-stationary characteristics.

However, when the first differences of these variables are tested, all of them become stationary, as indicated by the ADF statistics exceeding the 5% critical values in magnitude and the corresponding p-values falling below the 0.05 threshold. This transformation indicates that these variables are integrated of order one, denoted as I(1), meaning they become stationary after differencing once. The results imply that while the original data series are non-stationary, their first differences can be used in further analyses, such as in cointegration tests or time series modeling, where stationarity is a critical assumption.

Table 5: Engle – Granger Cointegration Test

Residual Series	ADF Stat	5% Critical value	Probability	Remark
SCH Model	-4.35794	-3.6032	0.0104	I(0)
LEX Model	-3.89345	-3.59503	0.0205	I(0)

Source: Authors' computation

The Engle-Granger Cointegration Test results in Table 5 indicate that the residuals from both the SCH (secondary school enrolment rate) and LEX (life expectancy) models are stationary at their levels, as shown by the ADF statistics, which are more negative than the 5% critical values. The p-values for both models (0.0104 for SCH and 0.0205 for LEX) are below the 0.05 threshold, leading to the rejection of the null hypothesis of no cointegration. This suggests that the variables in both models are cointegrated, meaning they have a long-term equilibrium relationship despite being non-stationary individually. Thus, even though the individual variables may trend over time, their combination is stable, indicating a meaningful long-term association between the variables in the SCH and LEX models.

Table 6: Estimated Model of Secondary School Enrolment Rate

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DDT)	0.00239	0.002117	1.128805	0.2738
D(EDT)	-0.00098	0.002622	-0.37232	0.714
D(PDS)	0.006515	0.003648	1.785858	0.091
D(TSC)	0.015243	0.005596	2.724038	0.0139
D(COC)	-24.6575	13.91278	-1.77229	0.0933
D(TDTCOC)	0.001883	0.002085	0.90316	0.3784
ECM(-1)	-1.14156	0.25313	-4.50978	0.0003
C	0.30081	0.849198	0.354228	0.7273
R-squared	0.649119	F-statistic	4.757069	DW=2.175414
Adjusted R-squared	0.512666	Prob(F-statistic)	0.003557	

Source:

The estimated model for secondary school enrolment rates (SCH) (Table 6) reveals that public expenditure on social and community services (D(TSC)) significantly influences enrolment, with a positive coefficient of 0.015243 and a p-value of 0.0139. This finding suggests that increased government spending in social sectors

positively impacts secondary school enrolment. Meanwhile, other variables such as domestic public debt (D(DDT)), external public debt (D(EDT)), and the interaction between public debt and control of corruption (D(TDTCOC)) show statistically insignificant effects on SCH, indicating that changes in debt levels and their interaction with corruption control do not have a clear or immediate impact on school enrolment. Public debt servicing (D(PDS)) shows a potential positive relationship with enrolment, though it is only marginally significant (p-value of 0.091), while control of corruption (D(COC)) has a large negative coefficient, suggesting a complex or possibly adverse short-term impact on enrolment, though this finding is also marginally significant.

The model diagnostics highlight the overall strength and reliability of the model. The error correction term (ECM(-1)) is highly significant with a negative coefficient, indicating a strong and rapid adjustment towards long-term equilibrium, meaning that any deviations from the equilibrium in SCH are quickly corrected in subsequent periods. The R-squared value of 0.649119 and adjusted R-squared of 0.512666 suggest that the model explains between 51.3% to 64.9% of the variation in secondary school enrolment rates. The significant F-statistic (p-value of 0.003557) confirms the overall statistical significance of the model, while the Durbin-Watson statistic of 2.175414 indicates no significant autocorrelation in the residuals, further supporting the reliability of the model's estimates.

Table 7: Estimated Model of Life Expectancy

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DDT)	8.76E-05	0.000103	0.847091	0.4081
D(EDT)	0.000107	0.000139	0.769235	0.4517
D(PDS)	1.45E-05	0.000189	0.076543	0.9398
D(TSC)	-0.00019	0.00031	-0.61692	0.545
D(COC)	-0.36322	0.806501	-0.45037	0.6578
D(TDTCOC)	8.57E-05	0.00011	0.776461	0.4476
ECM1(-1)	0.26408	0.100543	2.626551	0.0171
C	0.374943	0.045252	8.285683	0
R-squared	0.484326	F-statistic	2.415107	DW=1.370722
Adjusted R-squared	0.283786	Prob(F-statistic)	0.062404	

Source: Authors' computation 2024

The estimated model for average life expectancy (LEX) reveals that none of the variables related to public debt and control of corruption have a statistically significant impact on life expectancy. Specifically, domestic public debt (D(DDT)), external public debt (D(EDT)), public debt servicing (D(PDS)), total public expenditure on social and community services (D(TSC)), and the interaction term between public debt and control of corruption (D(TDTCOC)) all have coefficients that are not significantly different from zero, with high p-values indicating no clear relationship with life expectancy. Similarly, the coefficient for control of corruption (D(COC)) is not significant, suggesting that short-term changes in corruption control do not significantly affect life expectancy.

The error correction term (ECM1(-1)) is significant with a coefficient of 0.26408 and a p-value of 0.0171, indicating a positive and significant adjustment process towards long-term equilibrium. This suggests that any

deviations from the long-term relationship in life expectancy are corrected at a moderate pace. The model has an R-squared value of 0.484326 and an adjusted R-squared of 0.283786, meaning it explains around 28.4% to 48.4% of the variation in life expectancy. The F-statistic (p-value of 0.062404) is close to the conventional significance level, indicating that the model is marginally significant. The Durbin-Watson statistic of 1.370722 suggests some positive autocorrelation in the residuals, which might affect the robustness of the model's estimates.

5. Conclusion and Recommendations

The analysis of the models for secondary school enrolment rates (SCH) and average life expectancy (LEX) reveals several key findings. For secondary school enrolment, the results highlight a significant positive impact of total public expenditure on social and community services (TSC), emphasizing the importance of investing in social sectors to improve educational outcomes. However, other variables, including domestic and external public debt, public debt servicing, and the interaction between public debt and control of corruption, show either insignificant or complex effects on school enrolment. The strong negative impact of control of corruption (COC) on enrolment, although marginally significant, warrants further investigation to understand potential unintended consequences. The error correction model indicates a robust adjustment towards long-term equilibrium, suggesting stability in the relationship between public expenditure and school enrolment rates.

In contrast, the model for average life expectancy indicates that none of the economic variables or changes in corruption control have a statistically significant impact on life expectancy in the short term. While the error correction term shows a significant adjustment towards equilibrium, suggesting some long-term stability, the overall model has limitations, including possible positive autocorrelation. The results imply that short-term policies may have limited immediate effects on life expectancy, suggesting the need for more nuanced, long-term strategies.

Based on the findings, several policy recommendations emerge. To improve secondary school enrolment rates, policymakers should prioritize increasing and sustaining public expenditure on social and community services, as this has a significant positive impact on enrolment. Additionally, further investigation is needed into the potential complex effects of control of corruption on educational outcomes to ensure that anti-corruption measures do not inadvertently hinder school enrolment. For improving average life expectancy, policymakers should recognize that short-term changes in public debt and corruption control may not immediately affect life expectancy. Instead, they should focus on developing comprehensive, long-term strategies that address broader determinants of health and wellbeing. Investing in targeted research can provide deeper insights into how various economic and governance factors interact with life expectancy, leading to more effective and sustained health improvements.

References

Agu, P. C., Inyiama, O. I., & Ubesie, C. M. (2024). Effect of government expenditure on human capital index in Nigeria. *European Journal of Accounting, Auditing and Finance Research, 12*(2), 18-33. https://doi.org/10.37745/ejaafr.2013/vol12n21833

Akpan, E. O., & Abang, D. E. (2013). Public debt and human capital development in Nigeria. *Journal of Economics and International Finance, 5*(5), 155-164.

Atueyi, C. L. (2019). External debt and human capital development in Nigeria (1986-2017). *International Journal of Business and Economics, 7*(1), 49-58.

Becker, G. S. (1964). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. University of Chicago Press.

Blanchard, O. J. (1990). Suggestions for a new set of fiscal indicators. *OECD Economics Department Working Papers*, No. 79, OECD Publishing. https://doi.org/10.1787/435618162862

Central Bank of Nigeria (CBN). (2023). *Annual Statistical Bulletin*. Retrieved from https://www.cbn.gov.ng/documents/statbulletin.asp

Egungwu, I. (2018). The impact of external debt stock and servicing on human capital development in Nigeria. *Journal of Economic and Social Studies, 43*(1), 78-95.

Egungwu, I. C. (2018). Impact of external debt on human capital development in Nigeria. *International Journal of Advance Research and Innovation, 6*(1), 47-57.

Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica, 55*(2), 251-276. https://doi.org/10.2307/1913236

Erasmus, P. (2021). Public expenditure and human capital development in Nigeria: Evidence from 1960 to 2019. *Journal of Economic Development Studies, 44*(2), 112-130.

Imandojemu, S., Adeyemi, A., & Ojo, J. (2020). Determinants of human capital development in Nigeria: Evidence from 1990 to 2018. *Journal of Human Capital Studies, 15*(2), 45-63.

Kairo, J., Odinga, S., & Nduko, M. (2017). The relationship between human capital development and government expenditure: Evidence from Nigeria (1990-2014). *African Economic Review, 29*(3), 221-239.

Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3-42. https://doi.org/10.1016/0304-3932(88)90168-7

Madaki, A., Ahmed, M., & Musa, J. (2020). Disaggregated impact of government expenditure on human capital development in Nigeria (1989–2018). *African Development Review, 32*(1), 102-118.

Nwokoye, E. S., Dimnwobi, S. K., Onuoha, F. C., & Madichie, C. V. (2024). Does public debt matter for human capital development? Evidence from Nigeria. *African Governance and Development Institute Working Paper No. WP/24/006*. Forthcoming in *Journal of Public Affairs*.

Okafor, C. I., Adejumo, O. S., & Udeh, F. N. (2017). The long-run relationship between government expenditure on education and health and human capital development in Nigeria. *Journal of Economic Studies, 45*(3), 278-294.

Okoro, A. S. (2013). Government spending and economic growth in Nigeria (1980-2011). *Global Journal of Management and Business Research, 13*(5), 21-29.

Onazi, O. (2022). The effect of government expenditure on health and education on human capital development in Nigeria: An analysis using VAR and impulse response functions. *Nigerian Journal of Development Economics, 37*(1), 88-104.

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of Political Economy, 94*(5), 1002-1037. https://doi.org/10.1086/261420

Udoka, C. O., & Ogege, S. (2012). Public debt and the crisis of development in Nigeria: Econometric investigation. *Asian Journal of Finance & Accounting, 4*(2), 231-243.

Umo, J. U. (2007). *Economics: An African Perspective*. Millennium Text Publishers.

World Bank. (2023). *World Development Indicators* (WDI). Retrieved from https://databank.worldbank.org/source/world-development-indicators

Worldwide Governance Indicators (WGI). (2023). *Control of Corruption Index*. Retrieved from https://info.worldbank.org/governance/wgi/Top of Form