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Public Sector Infrastructure Financing and Economic Growth in Nigeria: An ARDL Approach

[1]Nasiru, S. Olayemi, [2]Alalade, Yimka S. A., & [3]Ogboi, Charles
[1,2&3]Department of Finance, School of Management Sciences,
Babcock University, Ilishan-Remo, Ogun State, Nigeria

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Abstract

Economic growth is a focal point of every government as it shows improvement in the national economy. Nigeria's economic performance has remained sluggish due to low productivity and capacity. Existing studies suggest that insufficient infrastructure investment in critical sectors has contributed to low economic performance. Hence, this study examined the effect of public sector infrastructure financing on Nigeria's GDP. Utilizing an *ex post facto* research design, the study utilized data from the 2024 CBN Statistical Bulletin and the World Bank's World Development Indicators. Descriptive statistics and the autoregressive distributed lagged (ARDL) techniques were employed. Results showed that public sector infrastructure financing had a significant effect on GDP in Nigeria ($Adj.R^2$ = 0.36, $F(4, 33) = 5.39$, $p < 0.05$). The study concluded that public sector infrastructure financing has a significant positive effect on GDP and recommends that appropriate investments in health infrastructure be made to enhance economic growth.

Keywords: *Economic growth, Gross domestic product, Infrastructure, Infrastructure financing, Public sector*

Corresponding Author: Nasiru, S. Olayemi

Background to the Study

Economic growth is a focal point for every government as it measures the functioning of the government and the associated development in the nation's gross domestic product. Nigeria's economic growth has been hampered due to poverty, inflation, unemployment, and other poor macroeconomic indicators. Infrastructure deficit is also linked to poor economic growth, and this has been a serious setback to the realization of Nigeria's objectives. The infrastructure deficit level has reached an alarming level in the last few years, leading to low production, high cost of doing business, and low industrialization level. Inadequate infrastructure was mostly viewed by many scholars (Ogunlana et al., 2016; Akuesodo et al., 2023; Aladejana et al., 2021) as responsible for poor economic performance in Nigeria, as measured by low gross domestic product.

Kenny and Tooraj (2020) observed that gross underfunding of power and other infrastructure is the greatest challenge for African nations. Cecilia and Vivien **(**2018) noted that most countries in the Region spend less than $600 million yearly on infrastructure projects, which is considered far below a desirable amount, as this amount translates to less than $50 per person when looked at from the angle of population. Africa has lost its ability to thrive and reach its full potential in the area of economic development and growth because of its high infrastructure deficit.

Nigeria is currently experiencing one of the most pressing crises in infrastructure development, despite the government's efforts in the last few years. There is a huge concern for the country on the state of its infrastructure, as this has affected productivity and the general well-being of the citizens (Edo et al., 2022). Companies and entrepreneurs are daily groaning over the cost of production owing to the unavailability of electricity, the high cost of diesel to power generators, and the high cost of transportation. This has imposed major constraints on the achievement of economic growth and development (Akuesodo et al., 2023).

Ikpefan (2021) confirmed that there will be accelerated economic growth, improved quality of life, and a reduction in the general inflation level, and employment opportunities when the bottleneck in infrastructure development is removed. The provision of effective, efficient, and reliable infrastructure development in telecom, power, and transportation is essential for ensuring economic and sustainable growth (Kalu & Boniface, 2023).

Many scholars (Beals, 2023; Ayoko et al., 2023; Kingsley, 2023; Abdullahi et al., 2022) have observed public sector infrastructure financing as the solution to a country's challenged economic performance and low level of economic growth. This necessitated postulating how the existing public sector infrastructure financing influences a nation's economic growth. Other studies (Kolawole, 2023; Chijioke, 2020) were of the view that there is no linkage between infrastructure financing and economic growth. Given these mixed empirical results, and the importance of economic growth to national discuss, this study seeks to investigate the effect of public sector infrastructure financing on the economic growth of Nigeria. The study will test the null hypothesis that public sector infrastructure financing has no significant effect on gross domestic product (GDP) in Nigeria.

Literature Review

Concept of Infrastructure Development

Infrastructure development is critical to national development, and a country can barely develop economically when the level of infrastructure is poor and underdeveloped. Scholars have generally agreed on this in their various studies. Nkemgha et al. (2023) were of the view that when efficient infrastructure is available and adequate, it will lead to improved quality of life for the citizens, help promote improved industrialization, and facilitate increased production of goods and services. Dimuna (2023) held that a country's capital stock is greatly enhanced through infrastructural development, through investment in economic and social infrastructures.

Where there is appropriate and adequate infrastructure, the costs of transportation and any prices of things generally across different markets will come down, which opens up more markets because the operational costs and expenses are lowered and businesses thrive sufficiently (Oyedokun et al., 2023). When roads are constructed and health facilities are improved, this will open up opportunities for new investments in industries or health services (Olaoye, 2023). Chijioke et al. (2020) observed that even development can be promoted by Infrastructural development. In the words of Ogunlana et al. (2016), Infrastructure is an important economic driver as it helps to raise the quality of growth and reduce poverty.

Dimuna (2023) agreed with other Scholars in classifying infrastructure into two categories, such as "social or soft-core infrastructure" and "physical or hard-core infrastructure". The Soft-core infrastructures are infrastructures relating to the provision of education, the healthcare system, transparency/accountability, and property rights, which mostly drive the economy. The hard-core infrastructures are the physical structures and development, such as Power, water supply facilities, housing, transportation, and telecommunication.

Concept of Economic Growth

Okwu et al. (2017) observed that economic growth deals with the long-run growth trend of the economy, or potential growth path, with a focus on factors of production that create economic growth over a long period. In his study, he argued that in the economic growth concept, there are forces that affect the growth pattern, and that the forces make some to grow quickly, some very slowly, and some don't grow at all as a result of how such forces are dealt with. Olaoye (2023) confirmed that there are many key macroeconomic factors affecting economic performance and economic growth which including factors like output, per capita income, investment, exchange rates, interest rate, national reserve, and inflation rate.

Aladejana and Akanbi (2021) believed that economic growth is one of the most important single measures of the economic performance of a nation. Economic growth means an increase in the capacity of a country in the production of goods and services, compared to output levels at a comparable period. When increases are recorded, it will denote positive growth, and similarly, result in negative growth when output reduces. By convention, economic growth is measured as the percentage rate of increase in real gross domestic product (RGDP). When the proactive capacity of a nation increases, economic growth becomes noticeable (Olaoye, 2023).

Empirical Review of Literature

Infrastructure Financing and Economic Growth

Aworinde and Akintoye (2019) investigated how institutions and infrastructure financing impact economic growth in Nigeria, adopting the ARDL method of Analysis. It uses the Augmented Dickey-Fuller (ADF) for its unit root test. The study concluded that the population and institutions have a positive effect on economic growth, while the public infrastructure does not affect economic growth. Kolawole (2020) investigated the impact of government expenditure on infrastructure development on the economic growth of Nigeria. The ARDL Technique was used, and the result showed that there is a positive relationship between government expenditure and infrastructural development in Nigeria.

Chijioke and Amadi (2020) examine the effect of government expenditure on Infrastructure as a key driver for Nigeria's economic growth. The study used the Augmented Dickey-Fuller and Philip Perron model, and found that economic growth is significantly impacted by government expenditure (transport, communication, education, housing, and health infrastructure). Alalade et al. (2021) investigated how internally generated revenue (IGR), corruption, and governance can affect economic growth in Nigeria. The study used the *ex-post facto* research design, using the Autoregressive Distributed Lag Model (ARDL). It concluded that IGR, CPI, and Governance significantly positively affect economic growth.

Ekeocha et al. (2021) investigated the impact of Public infrastructural development on economic performance in Africa using a panel data set. The study used the dynamic system GMM framework for the data analysis, and the results showed a positive and significant effect on economic growth. Aluthge et al. (2021) examine the effect of government infrastructure expenditure on Economic Growth in Nigeria using time-series data from 1970-2019. The Autoregressive Distributed Lag (ARDL) model was employed for data analysis. The study found that capital expenditure on infrastructure has a significant positive relationship with economic growth in both the long and short run. Akintoye et al. (2022) examined how tax revenue affects the infrastructure expectation gap in some selected African countries using the *ex-post-facto* research design and the ARDL model. The study concluded that tax revenue had a positive effect on the total infrastructure expectation gap in Africa. Okoroigwe (2022) investigated the effect of government expenditure on education development, health development, security, and gross domestic product (GDP). The study used the time-series data covering 2016 – 2022 and found that government expenditure on health infrastructure has a significant positive effect on the GDP in Nigeria.

Xin et al. (2022) sought to investigate how investment in infrastructure may affect economic growth using evidence from China. The study adopted the fixed-effect model (FE) for the regression model to test the Hypotheses. The study concluded that new infrastructure spending affects economic growth significantly. The endogeneity treatment further confirmed the finding, especially pointing to the development and promotion of technological innovation, improvement in industrial production and structure, and enhancement in the efficiency of production. Oyedokun and Adewinle (2023) investigated the effect of government expenditure on Infrastructure on Nigeria's economic growth, using data from

1977 to 2009. The data was analysed using OLS and ARDL models. The study found that expenditure by the government on health has a negative effect on the growth and development of the economy. Olaoye (2023) investigated how road infrastructure development facilitates economic growth using the Autoregressive Distributed Lag (ARDL) model for its analysis. It concluded that electricity, health, and education infrastructures had a positive impact on the real gross domestic product (GDP). And that transport infrastructure has a negative effect on the real GDP.

Theoretical Framework

This research work is based on the underlying assumptions for public expenditure theory to investigate the effect of public sector infrastructure financing and economic growth in Nigeria. This is most relevant because they address the issue of government spending to stimulate economic growth and spending to gradually move a nation to a modern society. The Keynesian theory in 1939 on public expenditure believed that government expenditure can be used to effectively drive sectoral growth in the economy, which will help drive economic growth and development. For necessary infrastructure development to be achieved, with the possibility of growing the economy, it has to do with government spending to stimulate production, which agrees with Keynes' position

Data, Variables, And Methodology

Data and Variables

Using an *ex post facto* research design, the study utilizes annual time series data captured between 1986 and 2023, sourced from the Statistical Bulletin of the Central Bank of Nigeria (CBN, 2024), and the World Bank's World Development Indicators (WDI, 2024).
The measurement of the variables is shown in the table below:

Table 1: Variables, Description, Measurement, and Sources

Variables	Measurement	Source(s)
Gross domestic product (GDP)	Measured as total goods and services produced in an economy	World Bank Development Indicator, 2024
Road infrastructure financing	Actual government capital expenditure on the road and transport system	Central Bank of Nigeria (CBN) Statistical Bulletin, 2024
Education infrastructure financing	Actual government capital expenditure on education facilities	Central Bank of Nigeria (CBN) Statistical Bulletin, 2024
Housing infrastructure financing	Actual government capital expenditure on housing facilities	Central Bank of Nigeria (CBN) Statistical Bulletin, 2024
Health infrastructure financing	Actual government capital expenditure on health and medical facilities	Central Bank of Nigeria (CBN) Statistical Bulletin, 2024

Source: Researchers' Compilation, 2025

Model Specification

The study adopts the endogenous growth model, which argues that long-term growth can be achieved through knowledge, technology, and seasoned ideas that are not exogenously given

but are greatly influenced through government policies and investments (in infrastructure) depicted by a basic model below:

$$\text{GDP} = f(RIF, EIF, HTIF, HSIF) \qquad \text{(eqn. 1)}$$

Where:
GDP = Gross domestic product
RIF = Road Infrastructure Financing
EIF = Education infrastructure financing
HTIF = Health infrastructure financing
HSIF = Housing infrastructure financing

Following the above, the model below was employed in an attempt to determine the effect of public sector infrastructure financing on gross domestic product in Nigeria. The model is specified below:

$$LnGDP_t = \alpha_0 + \alpha_1 LnRIF_t + \alpha_2 LnEIF_t + \alpha_3 LnHTIF_t + \alpha_4 LnHSIF_t + \mu_t \qquad \text{(eqn. 2)}$$

Where:
$LnGDP_t$ = Log of the Gross domestic product at time $_t$
$LnRIF_t$ = Log of the Road infrastructure financing at time $_t$
$LnEIF_t$ = Log of the Education infrastructure financing at time $_t$
$LnHTIF_t$ = Log of the Health infrastructure financing at time $_t$
$LnHSIF_t$ = Log of the Housing infrastructure financing at time $_t$
μ_t = Error term

To avoid the problem of heteroskedasticity, the variables were rescaled into ratios by logging them. It was re-specified in a log-linear form as follows:

$$LnGDP_t = \alpha_0 + \alpha_1 LnRIF_t + \alpha_2 LnEIF_t + \alpha_3 LnHTIF_t + \alpha_4 LnHSIF_t + \mu_t \qquad \text{(eqn. 3)}$$

The long-run model with the error correction term is expressed as follows:

$$\begin{aligned} \Delta LnGDP_t = \alpha_1 &+ \sum_{i=1}^{N1} \alpha_2 \Delta LnGDP_{t-1} + \sum_{i=1}^{N2} \delta_3 \Delta LnRIF_{t-1} + \sum_{i=1}^{N3} \rho_4 \Delta LnEIF_{t-1} \\ &+ \sum_{i=1}^{N4} \lambda_4 \Delta LnHTIF_{t-1} + \sum_{i=1}^{N5} \varphi_4 \Delta LnHSIF_{t-1} + \Upsilon_1 LnRIF_{t-1} + \Upsilon_2 LnEIF_{t-1} \\ &+ \Upsilon_3 LnHTIF_{t-1} + \Upsilon_4 LnHSIF_{t-1} + \pi ECT_{t-1} + \mu_t \end{aligned} \qquad \text{(eqn. 4)}$$

The *a priori* expectation of the model is given as $\alpha_1 > 0; \alpha_2 > 0; \alpha_3 > 0; \alpha_4 > 0$

This model is consistent with the work of Aladejana and Akanbi (2021), but is adapted to suit the objective of this study. However, this study deviates from existing studies by employing the autoregressive distributed lag model (ARDL) in testing the relationship between public sector infrastructure financing on gross domestic product in Nigeria.

Model Estimation

The study employed the bounds cointegration test and the autoregressive distributed lagged (ARDL) estimation technique to examine the effect of public sector infrastructure financing on gross domestic product in Nigeria, and by extension, examine the individual effects of road infrastructure financing, education infrastructure financing, health infrastructure financing, and housing infrastructure financing on gross domestic product in Nigeria. Introduced by Perasan and Shin (1999), with subsequent extensions in Perasan et al. (2001), the ARDL estimation technique is anchored on the estimation of an unrestricted error correction model. This estimation technique exhibits several advantages over conventional cointegration techniques, as it allows for the estimation of the cointegration of variables that are both I(0) and I(1).

Results

The analysis begins with an examination of the natural characteristics of the variables as shown in the descriptive statistics table below.

Descriptive Statistics

Table 2: The Result of the Descriptive Statistics

	Mean	Maximum	Minimum	Std. Dev.	Skewness
GDP	72989.58	326131.8	3084.730	77256.55	1.470496
RIF	165.4607	763.4600	12.27000	176.0571	1.804024
EIF	57.12931	232.1500	4.650000	51.36260	1.700874
HTIF	34.09828	144.4900	1.220000	32.78037	1.659847
HSIF	35.19517	163.4300	0.500000	39.50115	1.511227

Source: Author's Computation (2025)

The dependent variable, gross domestic product (GDP), represents the total value of goods and services produced in a given year. The average GDP during the reviewed period was ₦72,989.58 billion, with a minimum of ₦3,084.73 billion and a maximum of ₦326,131.8 billion. The wide range indicates significant economic growth over time. The high standard deviation of ₦77,256.55 billion suggests considerable fluctuations in economic activity, likely driven by policy changes, external economic shocks, or resource-based booms. The positive skewness (1.47) implies that extremely high values (periods of economic boom) occurred more often than low values. The kurtosis value (5.11) highlights the presence of sharp peaks in GDP data, suggesting periods of rapid expansion or contraction. The Jarque-Bera test result ($p = 0.0004$) indicates that GDP does not follow a normal distribution, reflecting irregular growth patterns.

With the independent variables, the result shows the high standard deviation across the measures of public sector infrastructure financing (RIF at ₦176.06 billion, EIF at ₦51.36 billion, HTIF at ₦32.78 billion, and HSIF at ₦39.50 billion) indicates significant variability in

public sector infrastructure investments in Nigeria, likely due to fluctuating fiscal priorities or external funding. All the variables are positively skewed, suggesting periods of particularly high investment, while the absence of zero skewness further shows that the distributions of the variables are closer to symmetry. Furthermore, the individual kurtosis values of the variables (RIF = 6.08; HTIF = 5.88; and HSIF = 5.11) show that the distributions of the variables have heavier tails than a normal distribution, hinting at the occurrence of extreme outliers. The Jarque-Bera test also showed that with the p-values of the Jarque-Bera statistic each less than 0.05, the time series of the variables do not follow a normal distribution, hence, confirming the results of the skewness and kurtosis.

Test for Multicollinearity

The presence of multicollinearity in a regression model renders it unreliable in predictions related to an economic phenomenon. Hence, we check to see if the independent variables are highly correlated using the correlation text matrix in the table below:

Table 3: Correlation Matrix of the Independent Variables

	LNEIF	LNRIF	LNHTIF	LNHSIF
LNEIF	1			
LNRIF	0.555274	1		
LNHTIF	0.689368	0.491714	1	
LNHSIF	0.303499	0.389925	0.240930	1

Source: Author's Computation (2025)

The rule of thumb for checking for the presence of multicollinearity is that the independent variables in a model should not be highly correlated, as evidenced by a correlation coefficient greater than 0.7. From the table above, there is no evidence of high correlation amongst the independent variables, hence, we rule out the presence of multicollinearity in our model.

Unit Root Test

Most times, time series data of variables are non-stationary in levels due to changes in an economy that make predictions more difficult (Oziengbe, 2013). As such, it is standard practice to test for stationarity to avoid yielding spurious results in the model which can be misleading. For this study, both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were utilized to determine the stationarity of the variables as shown in the table below.

Table 4: Result of Unit Root Tests using Augmented Dickey Fuller (ADF) and Phillips-Perron (PP)

Augmented Dickey-Fuller (ADF)				Phillips-Perron (PP)			
LEVEL				LEVEL			
	None	Constant	Constant and Trend	None	Constant	Constant and Trend	Order of Integration
LnGDP	5.0353	4.6494	4.4489	6.7601	5.6218	3.9942	-
LnRIF	0.8158	-1.4812	-2.8577	1.0993	-1.4403	-2.8577	-
LnEIF	0.9794	-1.5725	-2.6112	0.9148	-2.009	-2.4549	-
LnHTIF	0.9548	-1.8122	-1.7624	0.3493	-1.082	-2.4406	-
lnHSIF	0.2244	1.2089	-3.2460*	0.2244	-1.1183	-3.2460*	-
FIRST DIFFERENCE				FIRST DIFFERENCE			
	None	Constant	Constant and Trend	None	Constant	Constant and Trend	Order of Integration
LnGDP	-1.4471	-5.7048***	-6.0832***	-3.1505***	-5.7042***	-6.0862***	I(1)
LnRIF	-6.5786***	-7.0576***	-6.9673***	-6.5786***	-7.4654***	-7.6709***	I(1)
LnEIF	-6.3760***	-7.0618***	-7.0522***	-6.4206***	-9.8030***	-13.8623***	I(1)
LnHTIF	-9.1737***	-10.9894***	-11.1498***	-8.6315***	-11.2926***	-13.1168***	I(1)
lnHSIF	-6.2202***	-6.9704***	-6.9656***	-6.2172***	-7.5333***	-9.0621***	I(1)

Note: "*", "**" and "***" represent probability values are 10%, 5% and 1% respectively

Source: Author's Computation (2025)

The Table showed the order of integration among the variables, the results showed that GDP and the remaining independent variables, such as LnRIF, LnEIF, LnHTIF, and LnHSIF, were all found to be non-stationary at level. It was observed that their test statistics were higher than the critical value, indicating the presence of a unit root. These variables, including GDP, however, became stationary after first differencing, as their test statistics turned lower than the critical levels. In summary, the test results showed that GDP is stationary at first differencing (I(1)). The inference is that a long-run equilibrium technique like co-integration analysis or an autoregressive distributed lag (ARDL) model is appropriate as the variables become stationary after first differencing.

Bounds Testing

Given the mixed order of integration observed among the variables in the series, the study proceeded to test for the possibility of a long-run relationship among them. This was achieved through the application of the bounds testing approach under the ARDL framework, which is well-suited for analyzing datasets with variables integrated at different levels (I(0) and I(1)

Table 5: Bounds Cointegration Test

Level of Significance	Critical Values		F Statistic
	Lower Bound	Upper Bound	
10%	2.45	3.52	7.2214 (k = 4)
5%	2.86	4.01	
2.5%	3.25	4.49	
1%	3.74	5.06	

Source: Author's Computation (2025)

The result indicates the presence of a long-run cointegrating relationship between the public sector infrastructure financing variables and GDP in Nigeria. This is shown by the high F-statistic value of 7.22 which is significantly greater than both the lower (2.86) and upper (4.01) critical value bounds at 5% level of significance. Next, we employ the ARDL model to analyze both the short-run and long-run dynamics.

Long-run Effects

Table 6: Long-run Coefficients, dependent variable is GDP

Variables	Coefficient	Prob.
LNRIF	0.385565	0.1108
LNEIF	-0.182703	0.4560
LNHTIF	0.850023	0.0065
LNHSIF	-0.032958	0.8441
C	6.026385	0.0000
R-Squared = 0.474383 Adjusted R-Squared = 0.367979 F-stat. F (4, 33) = 5.398123[0.0000]		

Source: Author's Computation (2025)

The estimated long-run co-integrating equation is given below:
Cointeq = GDP - (0.3855*LNRIF -0.1827*LNEIF + 0.8500*LNHTIF - 0.0329*LNHSIF)

Short-run Dynamics

Table 7: Error Correction Model Result

Variables	Coefficient	Prob.
D(LNRIF)	0.226426	0.0990
D(LNEIF)	-0.107294	0.4054
D(LNHTIF)	-0.22282	0.2186
D(LNHSIF)	-0.019355	0.8446
ECT (-1)	-0.587258	0.0001

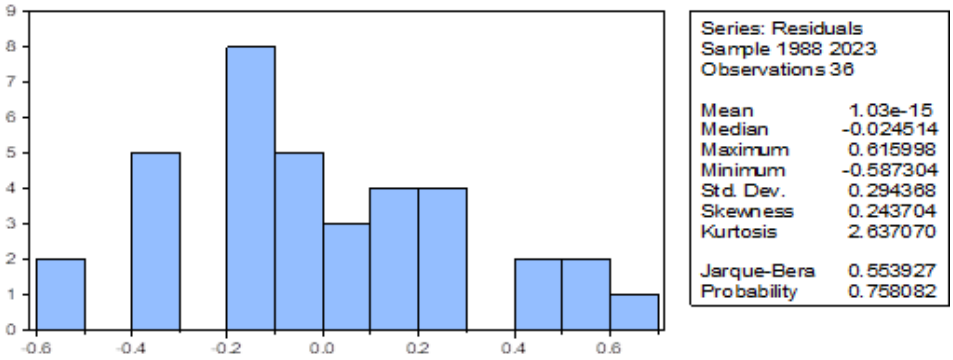
Source: Author's Computation (2025)

Post Estimation Tests

Normality Test

This test checks whether the residuals of the model are normally distributed. This is depicted in the normality histogram below:

Figure 1: Normality Plot of the Model Residuals



Source: Author's Computation (2025)

Serial Correlation Test

A key determinant of the reliability of a model is the ability of its residuals to be independent, hence not serially correlated. The test result for this is shown in the table below:

Table 8: Breusch-Godfrey Serial Correlation LM Test Result

F-statistic	5.39	Prob. F(4,33)	0.3626
Obs*R-squared	1.369449	Prob. Chi-Square(2)	0.2589

Source: Author's Computation (2025)

The decision rule holds that the residuals of the model are not serially correlated if the Prob. Chi-Square value is greater than 0.05. As seen in the table above, this decision rule is satisfied, hence the acceptance of the null hypothesis of no serial correlation in the error terms of the model.

Heteroscedasticity Test

This test verifies the presence of constant variance in the residuals of the model. The result is shown below:

Table 9: Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.844656	Prob. F(7,28)	0.3417
Obs*R-squared	11.36211	Prob. Chi-Square(7)	0.3119
Scaled explained SS	12.75382	Prob. Chi-Square(7)	0.0783

Source: Author's Computation (2025)

The decision rule posits that if the Prob. Chi-Square of the Obs*R-squared is greater than 0.05, accept the null hypothesis of constant variance. As seen above, the decision rule is satisfied

(0.3417 > 0.05). The null hypothesis is therefore rejected, and establishes that the ARDL model is homoscedastic and is reliable.

Stability Test

To further confirm the robustness and validity of the model, the stability test was conducted to see how stable the model is overtime with changing datasets. This was ascertained using the plot of the cumulative sum of recursive residual (CUSUM) as shown below:

Figure 2: CUSUM Test Plot

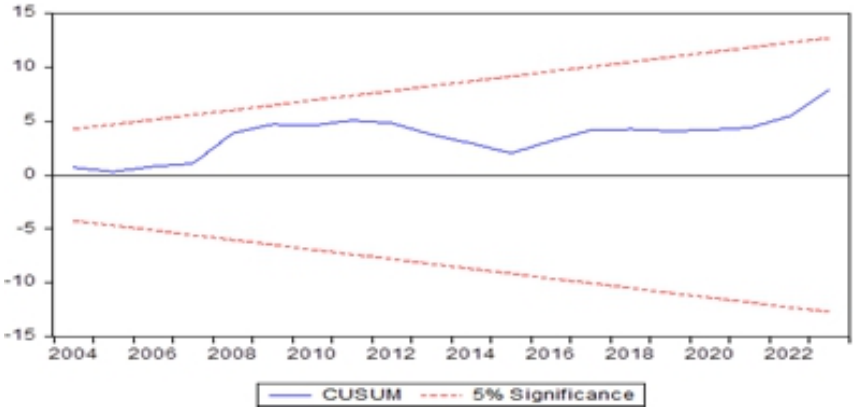


Figure 2 CUSUM stability test
Source: Author's computation (2025)

As shown above, the plot of CUSUM (blue line) lies between the straight lines (red) which denote the critical bounds at 5% level of significance, indicating that panel the model is stable. All the diagnostic tests have further confirmed the validity and robustness of the model, establishing that the coefficients of the model can be significantly relied upon for predictions and policy directions that pertain to the utilization of public sector infrastructure financing as a tool for improving gross domestic product in Nigeria.

Discussion of Findings

The study showed that public sector infrastructure financing had a significant effect on GDP ($Adj.R^2 = 0.36$, $F(4, 33) = 5.39$, $p < 0.05$). The findings from the short-run estimates reveal that road infrastructure financing has a positive but insignificant effect on GDP, aligning with some previous studies (Ekeocha et al., 2021; Foster et al., 2022; Azam & Abubakar, 2017), which highlight the long-term economic benefits of transport infrastructure. However, the results indicated that education, health and housing infrastructure financing have negative and insignificant short-term effects, raising concerns about inefficiencies in resource allocation. This supports the argument made by Zuopeng et al. (2023), which suggests that infrastructure projects often experience implementation delays and budget overruns, reducing their immediate impact on economic output. Additionally, the negative and significant effect of lagged health infrastructure financing suggests that previous investments in healthcare

infrastructure may have created short-term economic distortions, possibly due to mismanagement or disruptions in workforce productivity during project execution. This finding is consistent with Adebisi et al. (2020), who argue that corruption and inefficiencies in public health investments often hinder their intended economic benefits.

In the long run, the estimated results demonstrate that health infrastructure financing has a strong and statistically significant positive effect on gross domestic product (GDP), showing that health infrastructure plays a critical role in enhancing GDP growth. This aligns with findings from Ng et al. (2019), who emphasize that sustained investments in healthcare infrastructure improve labor productivity and economic efficiency by reducing disease burdens and enhancing workforce participation. The insignificant effect of road infrastructure financing in the long run, despite its positive coefficient, suggests that while transport infrastructure is essential for economic expansion, its full impact may depend on complementary factors such as trade openness and industrial development. This partially contradicts the findings of Foster et al. (2022), who argue that road infrastructure significantly contributes to economic growth when paired with effective governance and policy support. The negative but insignificant impact of education infrastructure financing on GDP raises concerns about inefficiencies in Nigeria's education sector, which may hinder the expected positive effects of human capital investment. This finding supports Dimuna (2023), who notes that corruption and poor planning in educational projects often reduce their economic returns.

Similarly, the lack of significance in housing infrastructure financing implies that investments in this sector do not directly translate into economic expansion, possibly due to limited linkages with productive sectors of the economy. These findings suggest that while infrastructure financing is essential for long-term economic growth, its effectiveness is highly dependent on governance quality, resource allocation efficiency, and broader macroeconomic conditions. The importance of this finding is that the government should know which of the infrastructural facilities to focus on and invest in for maximum impact on economic growth.

Conclusion and Recommendations

The study investigated the effect of public sector infrastructure financing on Nigeria's economic growth, proxied by the gross domestic product (GDP). The conclusion showed that public sector infrastructure financing has a significant effect on economic growth in Nigeria. It further concluded that road infrastructure financing has a positive but statistically insignificant impact on GDP in both the short and long run, suggesting that while infrastructure investments can stimulate economic activity, inefficiencies and delays in project execution may limit their immediate benefits. In the long run, however, health infrastructure financing has a strong and statistically significant positive effect on GDP, others have a negative impact, showing that health infrastructure plays a critical role in enhancing GDP growth, while the negative impact of other sectors raises concerns about inefficiencies in resource allocation, and project implementation delays.

The study recommends that the Federal Government of Nigeria (FGN), through the appropriate Ministries and Departments, should prioritize sustained investments in health infrastructure, ensuring equitable access to quality healthcare services, strengthening healthcare systems, and improving medical facilities at primary and tertiary levels. This will enhance workforce productivity, reduce disease burden, and contribute to long-term economic stability and growth.

This study contributed to the existing body of knowledge by addressing several gaps identified in the literature. It broadens the literature by confirming the importance of public sector infrastructure financing on the development of Nigeria's gross domestic product.

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