International Journal of Economics, Business and Management Research

Vol. 9, No.05; 2025

ISSN: 2456-7760

Public Sector Infrastructure Financing and Unemployment in Nigeria: an ARDL Approach

Charles OGBOI[1], Yimka S. A. ALALADE[2], Olayemi S. NASIRU[3]

[1]Department of Finance, School of Management Sciences,
Babcock University, Ilishan-Remo, Ogun State, Nigeria

[2]Department of Finance, School of Management Sciences,
Babcock University, Ilishan-Remo, Ogun State, Nigeria

[3]Department of Finance, School of Management Sciences,
Babcock University, Ilishan-Remo, Ogun State, Nigeria

doi.org/10.51505/IJEBMR.2025.9521 URL: https://doi.org/10.51505/IJEBMR.2025.9521

Received: Apr 22, 2025 Accepted: May 12, 2025 Online Published: May 17, 2025

Abstract

Economic performance measures how well an economy is functioning and is a focal point of any responsible government. Nigeria's economic performance has remained sluggish, evidenced by high unemployment rates in the country. Existing studies suggest a linkage between low or non-existent public infrastructure financing and labor force redundancy within an economy. Hence, this study examined the effect of public sector infrastructure financing on unemployment levels in Nigeria. Utilizing an *ex post facto* research design, the study employed data from the 2023 editions of the CBN Statistical Bulletin and the World Bank's World Development Indicators. Descriptive statistics and the autoregressive distributed lagged (ARDL) techniques were employed to analyze the individual effects of public sector infrastructure financing variables (road, education, housing, health) on unemployment rates at a 5% significance level. Results indicate that public sector infrastructure financing had significant influences on the unemployment rate both in the short run and in the long run ($Adj.R^2 = 0.62$, $F(4, 33) = 9.42$, $p < 0.05$); education infrastructure financing exhibited significant positive effects on unemployment rate in the short run ($\beta=0.35$, $t = 3.0976$) and long run ($\beta=0.27$, $t = 2.513$). The study concluded that public sector infrastructure financing has a significant positive effect on the unemployment rate, and if optimized, is an appropriate investment vehicle for relevant Ministries and Departments (MDA) and other policymakers to lower high unemployment rates, while improving economic performance in Nigeria.

Keywords: ARDL approach, Economic performance, inflation rate, infrastructure financing, public sector, unemployment rate.

Vol. 9, No.05; 2025

ISSN: 2456-7760

1. Introduction

Unemployment remains a fundamental problem of most developing nations, chiefly due to the inability of these countries to adequately employ the vast human resources at their disposal in productive activities within the country that can, in turn, contribute to growth in the economy (Ngubane et al., 2023). In Nigeria, the unemployment rate continues to rise, critically affecting the productive capacity of the country from an inclusive growth perspective, while also affecting social stability within the country (ILO, 2012). With global rates at 12.6%, and comparative African economies such as South Africa at 25.2% and Ghana at 14%, Nigeria's unemployment rate at 27% as at Q2 of 2020 (PwC, 2020) significantly puts its unemployment rate as a crisis, with recent data suggesting a significant increase on the 2020 data.

While several factors have been identified as key factors influencing the rising rate of unemployment in the country such as slow growth rate of the economy, poor industrialization levels, low quality levels of the labor force (PwC 2020; Ita & Bassey, 2022; Umoh, 2024), the ripple effect of this macroeconomic problem continues to dampen the economic outlook of the country, resulting in increasing capital flight, economic instability, and further reduced productivity (Offor et al, 2022; Abdulrazaq & Lambe, 2024).

From a historical perspective, there is the argument that successive Nigerian governments have made concerted efforts through targeted fiscal policies to reduce unemployment, yet the evidence of the rising annual rates suggests that past and current programs of the government such as NAPEP, PAP, SURE-P, YOUWIN, have not yielded the right effects, despite each of these programs consuming huge budgetary allocations (Katode, et al., 2014). Unfortunately, these increases in government expenditure have not had the intended effect at reducing unemployment rates in Nigeria, with recent studies such as Olubusoye et al. (2023) suggesting more increases in unemployment rates, especially among the youths.

Endogenous growth models identify the role that public investments in infrastructure (as well as education and research) could play in an economy, in that it can stimulate its productive capacity through active engagement of the workforce (Ogbuabor et al., 2023; Silvia et al., 2025). That is, as the government spends on public infrastructure, this would result in the need for more labour, and with increased private sector participation (as a result of improved infrastructure), more productive activities are generated within the economy to absorb more labor. However, Nigeria is currently passing through one of the most pressing crises in infrastructure development, despite the efforts by the government in the last few years, with inadequate infrastructure finance mostly viewed by many scholars (Ogunlana et al., 2016; Aladejana et al., 2021; Akuesodo et al., 2023) as responsible for poor infrastructure, and consequently poor economic performance, including high unemployment rates.

Nigeria is currently passing through one of the most pressing crises in infrastructure development, despite the efforts by the government in the last few years (Edo et al., 2022). This lack of adequate infrastructure has imposed major constraints on the achievement of economic growth with attendant increase in the unemployment rate (Akuesodo et al., 2023).

Vol. 9, No.05; 2025

ISSN: 2456-7760

The relationship between infrastructure financing and unemployment rate has been explored in the literature, with earlier studies like Leigh and Neil (2011) suggesting that investments in infrastructure could reduce unemployment by creating job opportunities. More recent studies have also found the linkage between infrastructure financing and unemployment rate reductions. Ikpefan (2021) and Kalu and Boniface (2023) have the view that the unemployment rate is linked to poor infrastructure development. Studies such as (Kolawole, 2023; Chijioke & Amadi, 2020) had a contrary view that there is no linkage between infrastructure financing and the level of unemployment.

Given these mixed empirical results, and the importance of addressing unemployment rate in national discuss, this study seeks to investigate the effect of public sector infrastructure financing on unemployment rates in Nigeria. The study will test the null hypothesis that public sector infrastructure financing has no significant effect on the unemployment rate in Nigeria. The research work covers the period from 1986 to 2023.

2. Literature Review

2.1 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.

Ogunlana et al. (2016), Infrastructure is an important economic driver as it helps to raise the quality of growth and reduce poverty. When roads are constructed and health facilities are improved, this will open up opportunities for new investments in industries or health services. Chijioke and Amadi (2020) observed that even development can be promoted by Infrastructural development. Akuesodo et al. (2023) stressed that when there is good infrastructure, it will generally increase a nation's productivity.

2.2 Concept of Infrastructure Financing

Aladejana et al. (2021) defined infrastructure financing as capital expenditure on infrastructure, seen as capital goods. Infrastructure financing has also been seen as an investment in key sectors of the economy through the provision of key social and capital goods like electricity, transport and road, water and irrigation, and telecommunications systems, all of which are capable of improving production, improving life quality, and job opportunities, and by extension, the economic growth of the country (Nkemgha et al., 2023).

Vol. 9, No.05; 2025

ISSN: 2456-7760

2.3 Concept of Unemployment Rate

Unemployment is a common word on the lips of everyone, both in advanced economies and in developing economies, even though the experience varies. Unemployment occurs when anyone of working age, willing to work, actively seeking work, but is without a job (Angahar & Olalere, 2023).

Unemployment is mostly used to measure the health situation of an economy. This is measured by the unemployment rate, which comprises the number of unemployed persons divided by the number of labour force or people of working age and available to work (Azolibe et al., 2025). Many types of unemployment have been observed, such as structural unemployment, frictional unemployment, cyclical unemployment, and classical unemployment (Fedderke & Garlick, 2018). Unemployment occurs when anyone of working age, willing to work, actively seeking work, but is without a job (Faturohim et al, 2023).

2.4 Empirical Review of Literature

Infrastructure Financing and Unemployment

Fedderke and Garlick (2018) examined the effect of infrastructure development on economic growth in South Africa and found a significant positive relationship between unemployment, growth, and infrastructure development in South Africa. Elena et al. (2019) examined the relationship between the road transport infrastructure and the economic performance for 28 countries in the EU and found that road infrastructure expenditure has a significant positive effect on unemployment and economic growth.

Chukwuebuka et al. (2020) examined how government infrastructure expenditure impacts investment drive in an emerging market economy in Nigeria and found that there were long-run relationships between government expenditure on road, defense, transport, and health infrastructure and domestic investment, unemployment, and FDI. Chijioke and Amadi (2020) investigated how government expenditure on infrastructure impacts economic growth in Nigeria and found a significant positive relationship between economic growth and spending on transportation, education, health, and communication infrastructure. It also found that expenditures on agriculture and natural resources infrastructure have a negative relationship with economic growth in Nigeria.

Aladejana and Akanbi (2021) investigated the effect of government expenditure on education infrastructure on Nigeria's economic growth and found that economic growth is positively and significantly affected by the government's expenditure on education infrastructure. It further concluded that education infrastructure development is positively and statistically significant to economic growth.

Aluthge et al. (2021) investigated the impact of government expenditure on infrastructure on economic growth in Nigeria and found that, in the short and long run, capital expenditures on health have a positive and significant effect on economic growth. Xin et al. (2022) examined

Vol. 9, No.05; 2025

ISSN: 2456-7760

how new infrastructure investment affects economic growth quality in China and found that economic growth can be greatly enhanced with new infrastructure investment. Abdullahi et al. (2022) studied the impact of social and economic infrastructure expenditure on economic growth in Nigeria and found that a long-run relationship exists between economic and social infrastructure development and the unemployment rate in Nigeria.

Ogunode et al. (2024) examined how investment in education infrastructure in Nigeria impacts the unemployment rate. The study used secondary data, while the data analysis was based on content analysis. The results showed several challenges to education investments, which had caused a significant reduction in education infrastructure investment in Nigeria and increased the unemployment level.

2.5 Gaps in Literature

The empirical review of past academic literature on infrastructure finance and economic performance has thrown up several observable gaps. One major gap was in the mixed results presented by the studies. Studies such as (Akuesodo et al., 2023; Olaoye, 2023; Aladejana & Akanbi, 2021; Azam & Abubakar, 2017; Ogunlana et al., 2016) noted a significant positive relationship between infrastructure financing and unemployment rate. However, some studies (Arazu & Mustapha, 2023; Chijioke & Amadi, 2020) held a different view that infrastructure financing has no effect or holds a negative effect on economic growth.

2.6 Theoretical Framework

This research work is based on the underlying assumptions of 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 is in agreement with Keynes' position.

3. Data, Variables, and Methodology

3.1 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:

Vol. 9, No.05; 2025

ISSN: 2456-7760

Table 1: Variables, Description, Measurement, and Sources

Variables	Measurement	Source(s)
Unemployment Rate (UNPR)	Measured as the total number of unemployed people within the workforce, expressed as a percentage of the population.	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

3.2 Method of Data Analysis

The research used descriptive and inferential statistics for its analysis. The tools of descriptive analysis used in this study were descriptive statistics and correlation coefficients. The descriptive statistics metrics were mean, maximum, minimum, standard deviation, and skewness.

The Autoregressive Distributed Lag (ARDL) models was adopted to express the functional or dependency relationships between the economic growth proxied by gross domestic product (GDP), on the one hand, and the proxies of public sector infrastructure financing (road infrastructure financing (RIF), education infrastructure financing (EIF), health infrastructure financing (HTIF), and housing infrastructure financing (HSIF)).

3.3 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:

$$Y = AK$$

Where:

Y = Output (GDP)
A = factor productivity, such as technology, efficiency, and infrastructure

Vol. 9, No.05; 2025

ISSN: 2456-7760

K = Capital

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

$$UNPR_t = f(RIF_t, EIF_t, HTIF_t, HSIF_t, CPI_t) \quad \text{(eqn. 1)}$$

The econometric model below is specified in linear form:

$$UNPR_t = \rho_0 + \rho_1 LnRIF_t + \rho_2 LnEIF_t + \rho_3 LnHTIF_t + \rho_4 LnHSIF_t + \mu_t \quad \text{(eqn. 2)}$$

Where:

$UNPR_t$ = Unemployment rate 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:

$$LnUNPR_t = \rho_0 + \rho_1 LnRIF_t + \rho_2 LnEIF_t + \rho_3 LnHTIF_t + \rho_4 LnHSIF_t + \rho_5 CPI_t + \mu_t \quad \text{(eqn. 3)}$$

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

$$\begin{aligned} \Delta UNPR_t = {} & \alpha_1 + \sum_{i=1}^{N1} \alpha_2 \Delta UNPR_{t-1} + \sum_{i=1}^{N2} \delta_3 \Delta LnRIF_{t-1} + \sum_{i=1}^{N3} \rho_4 \Delta LnEIF_{t-1} \\ & + \sum_{i=1}^{N4} \lambda_4 \Delta LnHTIF_{t-1} + \sum_{i=1}^{N5} \varphi_4 \Delta LnHSIF_{t-1} + \Upsilon_1 LnUNPR_{t-1} \\ & + \Upsilon_2 LnRIF_{t-1} + \Upsilon_3 LnEIF_{t-1} + \Upsilon_4 LnHTIF_{t-1} + \Upsilon_5 LnHSIF_{t-1} + + \pi ECT_{t-1} \\ & + \mu_t \end{aligned}$$

(eqn. 4)

The *a priori* expectation of the model is given as $\alpha_1 > 0;\ \alpha_2 > 0;\ \alpha_3 > 0;\ \alpha_4 > 0;\ \alpha_5 > 0$

Vol. 9, No.05; 2025

ISSN: 2456-7760

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 unemployment rate in Nigeria.

3.4 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 unemployment rate in Nigeria, and by extension, examine the individual effects of road infrastructure financing, education infrastructure financing, health infrastructure financing, and housing infrastructure financing on unemployment rate 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).

4. Results and Discussion of Findings

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

4.1 Descriptive Statistics

Table 2 - *The Result of the Descriptive Statistics*

	Mean	Maximum	Minimum	Std. Dev.	Skewness
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
UNPR	4.047931	5.710000	3.070000	0.611657	1.378506

Source: Author's Computation (2025)

The dependent variable, unemployment rate (UNPR), represents the percentage of the labor force that is unemployed. The mean unemployment rate was 4.05%, with a narrow range of 3.07% to 5.71% and a low standard deviation of 0.61%. This stability suggests consistent labor market conditions over the period. Positive skewness (1.38) indicates symmetry and a slight tendency for higher unemployment rates, while kurtosis (4.06) reflects some occurrences of outliers and the distribution having heavier tails than the normal distribution. The Jarque-Bera

Vol. 9, No.05; 2025

ISSN: 2456-7760

test (p = 0.0052) reveals deviations from normality, although the variability in unemployment rates remains relatively modest.

With the independent variables, the result shows the high standard deviation of 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 (UNPR = 6.08; 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.

4.2 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.

4.3 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.

Vol. 9, No.05; 2025

ISSN: 2456-7760

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

Augmented Dickey-Fuller (ADF)				**Philip-Perron (PP)**			
LEVEL				**LEVEL**			
	None	**Constant**	**Constant and Trend**	**None**	**Constant**	**Constant and Trend**	**Order of Integration**
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*	-
UNPR	-0.6897	-2.7036*	-3.2572*	-1.046	-2.238	-2.0871	I(0)
FIRST DIFFERENCE				**FIRST DIFFERENCE**			
	None	**Constant**	**Constant and Trend**	**None**	**Constant**	**Constant and Trend**	**Order of Integration**
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)
UNPR	-3.2694***	-3.2337**	-2.7927	-5.7345***	-5.8024***	-5.8314***	I(1)

Note: "*", "**" and "***" represent probability values are 10%, 5% and 1% respectively
Source: Author's Computation (2025)

The findings reveal a mixed order of integration among the variables, with some being stationary at levels and others achieving stationarity after first differencing. The results showed that UNPR was stationary at the level, with an ADF test statistic of 27036. This implies that both UNPR data do not exhibit a unit root and remain stable over time without requiring a transformation. The results, however, for the remaining variables, such as those of the independent variables (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.

Vol. 9, No.05; 2025

ISSN: 2456-7760

These variables, however, became stationary after first differencing, as their test statistics turned lower than the critical levels. In summary, the test results showed that the unemployment rate (UNPR) is stationary at level (I(0)), and other variables became 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. These results confirm that the Autoregressive Distributed Lag (ARDL) modelling technique is appropriate for the study, as it can accommodate variables with different integration orders, specifically those integrated at levels and first difference.

4.4 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	10.45367 (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 the unemployment rate in Nigeria. This is shown by the high F-statistic value of 10.4537, which is significantly greater than both the lower (2.86) and upper (4.01) critical value bounds at a 5% level of significance. Next, we employ the ARDL model to analyze both the short-run and long-run dynamics.

Vol. 9, No.05; 2025

ISSN: 2456-7760

Long-run Effects

Table 6 – *Long-run Coefficients, dependent variable is UNPR*

Variables	Coefficient	Prob.
LNRIF	0.028161	0.189073
LNEIF	0.275497	0.109598
LNHTIF	-0.249035	0.226282
LNHSIF	-0.116030	0.149996
C	3.706117	0.560920
R-Squared = 0.702152 Adjusted R-Squared = 0.627690 F-stat. F (5, 30) = 9.429676[0.0000]		

Source: Author's Computation (2025)

The estimated long-run co-integrating equation is given below:
Cointeq = UNPR - (0.0216*LNRIF + 0.2754*LNEIF - 0.2490*LNHTIF - 0.1160*LNHSIF)

Short-run Dynamics

Table 7 – *Error Correction Model Result*

Variables	Coefficient	Prob.
D(LNRIF)	0.012075	0.7413
D(LNEIF)	-0.005298	0.8842
D(LNHTIF)	0.007486	0.1088
D(LNHSIF)	0.006548	0.5843
ECT (-1)	-0.439152	0.0014

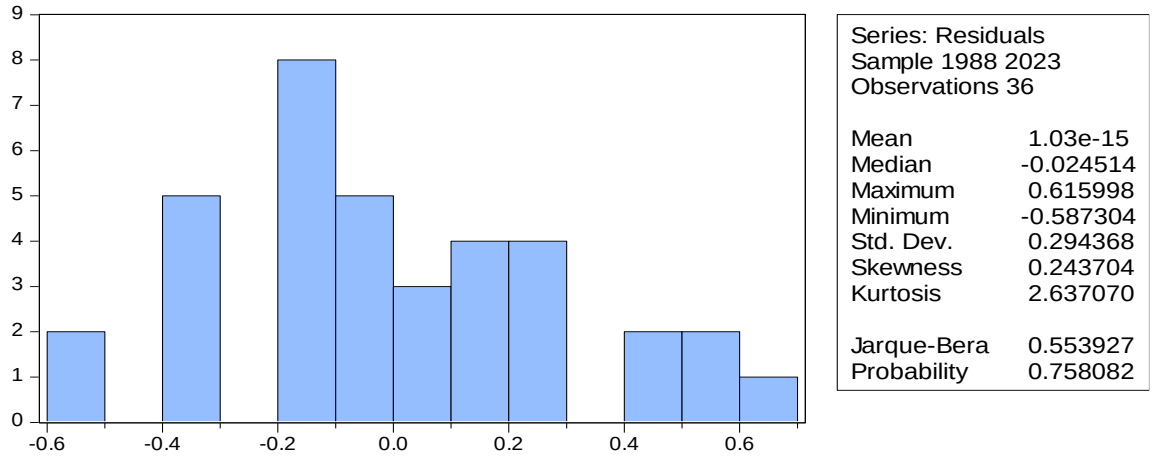
Source: Author's Computation (2025)

4.5 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	0.514079	Prob. F(2,20)	0.6040
Obs*R-squared	1.369449	Prob. Chi-Square(2)	0.5042

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)	0.1177
Obs*R-squared	11.36211	Prob. Chi-Square(7)	0.1236
Scaled explained SS	12.75382	Prob. Chi-Square(7)	0.0783

Source: Author's Computation (2025)

Vol. 9, No.05; 2025

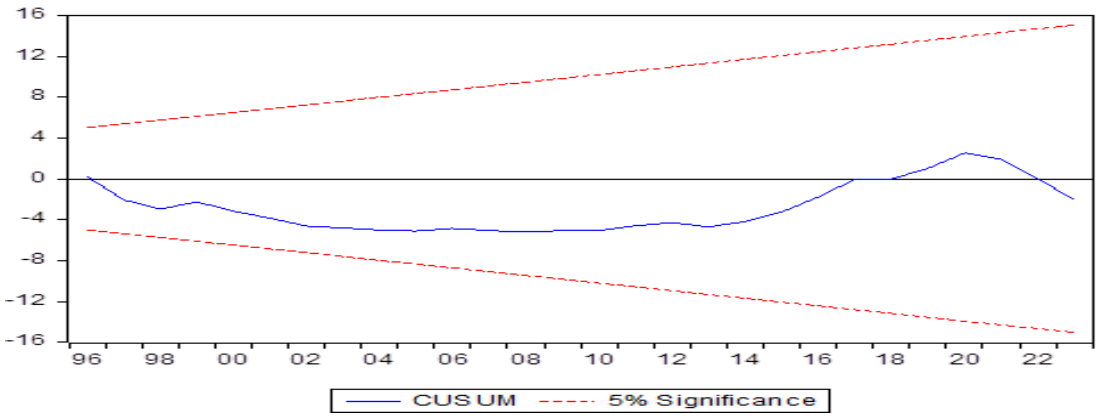
ISSN: 2456-7760

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 (0.1236 > 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, a stability test was conducted to see how stable the model is over time 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*



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 a 5% level of significance, indicating that 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 labor force participation, while reducing unemployment rates in Nigeria.

4. Discussion of Findings

Based on the unit root tests, the study found that while unemployment rate was stationary at level, public sector infrastructure financing variable were only stationary when differenced by one, leading to use of the autoregressive distributed lagged (ARDL) model to estimate the short and long-run relationship between public sector infrastructure financing and unemployment rate in Nigeria.

The short-run result shows that, consistent with theory, the error correction term (ECT) is negative and highly significant, with a coefficient of -0.5735 ($p < 0.01$), indicating a strong adjustment mechanism toward the long-run equilibrium. The magnitude of the coefficient suggests that approximately 57.35% of any short-term deviation from the long-run

Vol. 9, No.05; 2025

ISSN: 2456-7760

unemployment rate (UNPR) equilibrium is corrected within one year, hence, full equilibrium is achieved within 2 years. This means that the unemployment rate has a strong tendency to revert to its long-term path after short-term fluctuations. The high statistical significance confirms the presence of a stable long-run relationship between unemployment and the independent variables, reinforcing the reliability of the model. The relatively large magnitude of the ECT suggests that unemployment adjusts quickly to economic shocks and policy changes, reducing long-term distortions in labor market dynamics.

Among the short-run coefficients, the lagged unemployment rate (D(UNPR(-1))) has a positive and statistically significant coefficient of 0.3078 (p = 0.0100), indicating that a 1% increase in unemployment from the previous period leads to a 0.31% increase in current unemployment. This suggests persistence in unemployment trends, meaning that past unemployment levels strongly influence present levels. Road infrastructure financing (D(LnRIF)) has a positive coefficient of 0.0162, meaning that a 1% increase in road infrastructure financing results in a 0.02% rise in unemployment. However, this effect is not statistically significant (p = 0.8826), implying that road infrastructure spending does not have a reliable short-term effect on unemployment. On the other hand, education infrastructure financing (D(LnEIF)) has a positive and statistically significant coefficient of 0.3457 (p = 0.0044), suggesting that a 1% increase in education infrastructure financing leads to a 0.35% rise in unemployment. This counterintuitive finding may indicate that investments in education infrastructure take time to translate into job creation, or that increased education spending temporarily raises unemployment as more people enter the labor market before securing employment.

Health infrastructure financing (D(LnHTIF)) has a negative coefficient of -0.1428, implying that a 1% increase in health infrastructure financing reduces unemployment by 0.14%. However, this effect is not statistically significant (p = 0.2961), suggesting that health infrastructure investments do not have an immediate impact on reducing unemployment. Similarly, housing infrastructure financing (D(LnHSIF)) has a negative coefficient of -0.0665, meaning that a 1% increase in housing infrastructure financing lowers unemployment by 0.07%. However, this effect is also not statistically significant (p = 0.4630), indicating that housing infrastructure investments do not have a strong short-term effect on employment creation.

In the long run, the variable LNRIF (Road Infrastructure Finance) has a positive coefficient of 0.028161, meaning that a 1% increase in road infrastructure finance leads to a 0.03% increase in unemployment (UNPR). However, the t-statistic is very low (0.148944), and the p-value is high (0.8827), indicating that this relationship is statistically insignificant. This suggests that, although there is a positive association between road infrastructure finance and unemployment, the effect is not statistically significant in the long run, and it does not offer a reliable explanation for changes in unemployment.

On the other hand, LNEIF (Education Infrastructure Finance) has a statistically significant positive effect on unemployment, with a coefficient of 0.275497. A 1% increase in education infrastructure finance leads to a 0.28% increase in unemployment. This effect is supported by a t-

Vol. 9, No.05; 2025

ISSN: 2456-7760

statistic of 2.513706 and a p-value of 0.0180, which is significant at the 5% level. Conversely, LNHTIF (Health Infrastructure Finance) has a negative coefficient of -0.249035, suggesting that a 1% increase in health infrastructure finance results in a 0.25% decrease in unemployment. However, the relationship is not significant, as indicated by the t-statistic (-1.100550) and p-value (0.2805). Similarly, LNHSIF (Housing and Social Infrastructure Finance) has a negative but insignificant effect on unemployment, with a coefficient of -0.116030, a t-statistic of -0.773551, and a p-value of 0.4457. This implies that housing and social infrastructure finance do not significantly influence unemployment in the long run.

The summary statistics of the estimated model is an indicative of a model with a very good fit, as evidenced by the adjusted coefficient of determination (adjusted R2) of 0.627690, suggesting that about 63% of the variations in unemployment rate can be linked to the explanatory variables of public sector infrastructure financing, hence the variables in the model are strong explanatory variables and determinants of unemployment rate outcomes in Nigeria. Furthermore, the F-statistic value of 9.429676, with a p-value of 0.000006, is statistically significant at the 5% level, indicating that overall, public sector infrastructure financing variables jointly explain changes in unemployment rate, albeit significantly. This showed that public sector infrastructure financing significantly affects the unemployment rate ($Adj.R^2 = 0.62$, $F(4, 33) = 9.42$, $p < 0.05$).

The findings from the short-run estimates of the impact of infrastructure financing on the unemployment rate revealed that education infrastructure financing has a positive and significant effect on the unemployment rate, suggesting that an increase in education infrastructure may increase the level of unemployment. This aligns with the argument made by Dimuna (2023), who highlights that education investments often lead to an initial increase in labor market entrants before job opportunities are created, causing a temporary rise in unemployment. However, this effect is expected to reverse as skilled labor demand catches up with the expanded labor force.

Road infrastructure financing has a positive but insignificant effect on the unemployment rate, suggesting that short-term investments in road infrastructure may not immediately generate sufficient employment opportunities, possibly due to delays in project execution or capital-intensive construction processes that do not absorb a large number of workers. This finding contrasts with Ekeocha et al. (2021), who found that infrastructure investments in European countries significantly reduced unemployment in both the short and long run. Housing and Health infrastructure financing have a negative but insignificant effect on the unemployment rate, suggesting that an increase in these infrastructures may reduce the level of unemployment if properly harnessed and that their presence alone may not be sufficient to drive sustained employment growth.

In the long run, the housing and health infrastructure financing both exhibited negative but insignificant individual effects on unemployment, and this suggests that while their investments may lead to a reduction in the unemployment rate, a sustained reduction in the level of unemployment may not be achieved, unless complemented by policies that enhance labor-intensive sectors. This is consistent with Adebisi et al. (2020), who emphasize that inefficiencies

Vol. 9, No.05; 2025

ISSN: 2456-7760

in public sector spending on health and housing can limit their potential to generate broad employment opportunities. These findings underscore the need for a more integrated approach to infrastructure financing that considers both demand-side labor policies and the efficiency of public investments to enhance employment outcomes. The findings of Zuopeng et al. (2023), who argue that infrastructure spending must be paired with active labor market policies to maximize employment benefits, also support this position.

The significant and positive effect of education infrastructure financing on unemployment further reinforces the notion that an increasing number of graduates may outpace job creation, particularly in economies with skills mismatches. This result is also supported by Okwu et al. (2017), who found that in many developing economies, education expansion does not always lead to immediate employment gains due to gaps between academic training and labor market needs.

5.2 Conclusion and Recommendations

This study concluded that public sector infrastructure financing has a significant effect on the unemployment rate in Nigeria. The study further revealed that while infrastructure investments can influence employment levels, the effects vary across sectors. Education infrastructure financing appears to increase unemployment in the short run, likely due to a growing labor force that exceeds immediate job creation, whereas health and housing infrastructure investments have a negative coefficient, suggesting that these investments will help reduce the unemployment rate in Nigeria, but with an insignificant effect on employment outcomes.

The study recommends that the Federal Government of Nigeria (FGN) through the appropriate Ministries and Departments (MDAs) should focus on aligning education infrastructure investments with labor market needs by emphasizing skills development in high-demand sectors, strengthening public-private partnerships for job placement, and promoting vocational and entrepreneurial training to enhance employability and reduce unemployment in the long term.

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.

Declaration of Competing Interest

None

Acknowledgements

The author acknowledges the grace, power, and direction of Almighty God. A humble and sincere appreciation also goes to Dr Y. S. A. Alalade and Dr Charles Ogboi, who supervised my Thesis as main and co-supervisors, respectively.

Vol. 9, No.05; 2025

ISSN: 2456-7760

References

Abdullahi, B., Abdulsalam, S. A., & Nasiru, S. (2022), "Impact of social and economic infrastructure expenditure on economic growth: Evidence from VECM in Nigeria". *Niger Delta Economic and Financial Review. 4* (1), 82 – 94.

Abdulrazaq, B. O., & Lambe, E. O. (2024), "Unemployment Challenges in Nigeria: The Imperative for Economic Diversification". *Kashere Journal of Politics and International Relations, 2*(2), 302-317.

Adebisi, Y. A., Umah, J. O., Olaoye, O. C., Alaran, A. J., Sina Odunsi, A. B., & Lucero-Prisno, D. E. (2020), "Assessment of health budgetary allocation and expenditure toward achieving universal health coverage in Nigeria". *International Journal of Health and Life Sciences. 6* (2), 1 – 8.

Akuesodo, U. E., Okonkwo, I. V., Okaro, C. S., & Okoye, N. J. (2023), "Infrastructure deficit and human development index: Nigeria's experience". *African Banking and Finance Review Journal (ABFRJ). 6* (6), 273-291.

Aladejana, S. A., & Akanbi, M. M. (2021), "Government expenditure on infrastructure on economic growth in Nigeria". *Journal of International Economics and Finance. 1(*2), 43 - 59

Aladejana, S. A., & Akanbi, M. M. (2021), "Government expenditure on infrastructure on economic growth in Nigeria". *Journal of International Economics and Finance. 1(*2), 43 – 59

Angahar, J.S., & Olalere, V. D. (2023), "Internally generated revenue (IGR) and the economic viability of states in Nigeria". *Finance & Economics Review. 5*(1), 27 – 39.

Aluthge, C., Jibir, A., & Musa, A. (2021), "Impact of government expenditure on economic growth in Nigeria". *CBN Journal of Applied Statistics*. *12* (1). 139 – 174.

Ayila, N., David, T. A., & Paul, T. L. (2017), "Education financing, labor productivity, and economic development in Nigeria". *International Journal of Advanced Studies in Economics and Public Sector Management*. *5* (1), 22 – 39.

Azolibe, C. B., Dimnwobi, S. K., & Uzochukwu-Obi, C. P. (2025), "The determinants of unemployment rate in developing economies: does banking system credit matter?" *Journal of Economic and Administrative Sciences, 41*(1), 300-319.

Chijioke, A. K., & Amadi, A. I. (2020), "Government expenditure on infrastructure as a driver for economic growth in Nigeria". *Journal of International Business Research and Marketing*. 5 (2), 20-26.

Chukwuebuka, B. A., Okonkwo, J. J., & Adigwe, P. K. (2020), "Government infrastructure expenditure and investment drive in an emerging market economy: Evidence from Nigeria". *Emerging Economy Studies.* 6(1), 61–85.

David, E. B., David, C., Kevin, C., & Dara, L. L. (2015), "Higher education and economic growth in Africa". *dbloom@hsph.harvard.edu*. 25 – 57.

Dimuna, K. (2023), "Corruption And the Challenges of Infrastructural Development in Developing Countries: Nigeria in Perspective". C*oou African Journal of Environmental Research, 4*(1), 41-62.

Vol. 9, No.05; 2025

ISSN: 2456-7760

Ekeocha, D. O., Ogbuabor, J. E., & Orji, A. (2021), "Public infrastructural development and economic performance in Africa: New evidence from panel data analysis". *Economic Change and Restructuring*. *55* (1), 931–950

Elena, C., Daniela, T. A., Anca, F. G., & Elena, T. (2019), "Transport infrastructure development, public performance and long-run economic growth: A case study for the EU-28 Countries". *Sustainability*. *11* (67), 1 – 22.

Faturohim, A., Akbar, A., Hidayat, B. A., & Saksono, H. (2023), "An Analysis of Urban Poverty and Unemployment". *Jurnal Bina Praja, 15*(2), 309-324.

Fedderke, J., & Garlick, R. (2018), "Infrastructure development and economic growth in South Africa: A review of the accumulated evidence". *University of Cape Town Journal*. *12,* 1 - 25

Grainca, B. (2022), "Methodological basis of unemployment". *International Journal of Social, Political and Economic Research, 9*(1), 163-183.

Ikpefan, O. A. (2021), "Challenges of public-private partnership in infrastructural financing in Nigeria". *Covenant University Journal*. Ochei_Ikpefan@yahoo.Co.Uk.

International Labour Organisation (2012), "Global employment trends for youth". 2012. Retrieved on 12/07/2013 http://www.ilo.org/wcmsp5/groups/public/...dgreports/---dcomm/documents/publication/wcms-180976.pdf

Ita, V. E., & Bassey, J. E. (2022), "Rising youth unemployment and the socio-economic realities in Nigeria: the Akwa Ibom State Experience". *International journal of development and Economic Sustainability, 10*(10), 1-14.

Kalu, F., & Boniface, I. I. (2023). "Empirical analysis of the effect of public debt on the economic growth of Nigeria". *Economics and Business Quarterly Reviews*. *6* (1), 1-18.

Kayode, A., Arome, A., & Silas, A. (2014), "The rising rate of unemployment in Nigeria: the socio-economic and political implications". *Global Business and Economics Research Journal, 3*(1).

Kolawole, B. O. (2020), "Government expenditure and infrastructure development in Nigeria". *Journal of Economic Studies*. *17* (1). 1 – 14.

Leigh, A., & Neill, N. (2011), "Can national infrastructure spending reduce local unemployment? Evidence from an Australian roads program". *Economics Letters*, 113(2), 150-153.

Liudmila, V. G., Igor, S. K., & Olga, D. K. (2017), "Financing of infrastructure in education: International experience of attracting private investments and opportunities for Russia to form a knowledge-driven economy". *European Research Studies Journal*. *20* (1), *348-363*

Nadia, H. & Noman, A. (2016), "Relationship between school education and economic growth: SAARC countries". *International Journal of Economics and Financial Issues*. *6* (1), 294-300.

Ngubane, M. Z., Mndebele, S., & Kaseeram, I. (2023), "Economic growth, unemployment and poverty: Linear and non-linear evidence from South Africa". *Heliyon, 9*(10).

Nkemgha, G. Z., Nchofoung, T. N., Sundjo, F. (2023), "Financial development and human capital thresholds for the infrastructure development-industrialization nexus in Africa". *Elsevier*. 104108.

Vol. 9, No.05; 2025

ISSN: 2456-7760

Offor, P. U., Egbulonu, K. G., Ikwumezie, A., & Njoku, A. I. (2022), "Unemployment and Nigeria's Human-Capital Flight (1990–2020): An Empirical Investigation of a Modelled Case Study of Recruitment of Nigerian Doctors by Saudi Arabia". *Asian Journal of Economics, Business and Accounting, 22*(17), 81-97.

Ogbuabor, J. E., Emeka, E. T., & Iheonu, C. O. (2023), "Do industrialization, trade openness, and labor force participation enhance Africa's productive capacity?" *Innovation and Development*, 1-26.

Ogunlana, O. F., Yaqub, J. O., & Alhassan, B. T. (2016), "Infrastructure finance and development in Nigeria". *Arabian Journal of Business and Management Review. 3* (12), 1-17.

Okwu, A. T., Ngoepe-Ntsoane, M., Tochukwu, O. R., & Obiwuru, T. C. (2017), "Housing and economic growth nexus in Nigeria: Data-based evidence". *Transylvanian Review of Administrative Sciences*, 51(E), 70-88

Olubusoye, O. E., Salisu, A. A., & Olofin, S. O. (2023), "Youth unemployment in Nigeria: nature, causes and solutions". *Quality & Quantity, 57*(2), 1125-1157.

Pesaran, M. H., & Shin, Y. (1995), "Autoregressive distributed lag modelling approach to cointegration analysis". DAE Working Paper Series No. 9514. Cambridge, UK: *Department of Applied Economics, University of Cambridge*

Pesaran, M. H., Shin, Y. & Smith, R. J. (2001), "Bounds testing approaches to the analysis of level relationships". *Journal of Applied Economics*, 16, 289-326.

PricewaterhouseCoopers. (2020, September), "Nigeria Economic Alert: Unemployment rate expected to hit 30% amid the effect of COVID-19 on the economy". PwC Nigeria. https://www.pwc.com/ng/en/assets/pdf/economic-alert-september-2020.pdf

Silvia, V., Agustina, M., & Zulfa, D. (2025), "What drives household labor absorption in Indonesia? A provincial-level analysis using panel ARDL modeling". *Cogent Economics & Finance*, *13*(1), 2485398.

Umoh, E. (2024), "Unemployment and Economic Development in Nigeria: An Analysis of Trends and Implications". 4(1), 17 – 37.

Xin, D., & Zhang, H. (2022), "How does new infrastructure investment affect economic growth quality? Empirical evidence from China". *Investment, Growth and Sustainability Journal*. *14*(6), 3511.

Zuopeng, M., Chenggu L., Pingyu, Z., Jing, Z., Daqian, L., & Mingke, X. (2023), "The impact of transportation on commercial activities: The stories of various transport routes in Changchun, China". *Elsevier. 132.* 1 – 14.