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INFRASTRUCTURAL DEVELOPMENT AND UNEMPLOYMENT IN NIGERIA

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ABSTRACT

The prevailing rate of unemployment in Nigeria despite increasing government spending on infrastructure development is subject to public scrutiny and investigation. This study therefore assessed the connections among infrastructural development and unemployment in Nigeria with emphasis on their transmission channels from1991 to 2020. The stationarity test was conducted using the Phillip-Perron (PP) test, and the long-term link between the variables was confirmed using Johansen co-integration. The unit root test revealed that the study's variables were stationary at the 5% level of significance, and the bound co-integration test confirmed a long-term relationship between the variables. The Fully Modified Ordinary Least Square (FMOLS) was used to analyze the parameters of the study's variables. The FMOLS findings showed that that capital expenditure directed toward investment in the infrastructural facilities increase employment opportunities that reduce unemployment in the country. The finding shows that increase in capital expenditure reduces level of unemployment and infrastructural development enhances effect of capital spending on unemployment. The study therefore recommended that the Nigeria government must ensure that its yearly capital projects are directed towards investment in infrastructural facilities like railways, road, and building construction as well as many to facilitate foreign and local investments that promote job opportunities.

KEYWORDS: Infrastructure development, unemployment, transmission channel.

1.0 INTRODUCTION

A substantial macroeconomic issue, particularly in Less Developed Countries (LDCs), including Nigeria, is unemployment. The average youth unemployment rate in Africa is 10.9% and 10.8% by 2018 and 2019, respectively, according to the International Labor Organization's (ILO) global employment index. The employment to population ratio for the entire African continent is 40.1% for both years, which means that 59.9% of the population is unemployed. According to the World Development Indicators (WDI), Nigeria's unemployment rate is 8.39%, 8.24%, and 8.09% for the years 2017, 2018, and 2019, respectively. These statistics might not accurately reflect the situation because, according to Asaju and Eme (2014), there are worrying levels of visible unemployment in Nigeria and many Nigerians are either unemployed or underemployed.

The current increase in unemployment in Nigeria necessitates a hasty expansion of the nation's infrastructure. The government frequently directs a portion of its spending toward infrastructure development, such as building roads, electricity, and other fundamental social amenities that could result in the creation of more job opportunities and lower the country's unemployment rate (Kolawole, 2020). Infrastructure improvement is also regarded as a magic bullet for achieving economic growth, which can also be seen in the level of employment creation in the economy (Siyan & Adegoriola, 2017) as well as in the support of private enterprise growth, industrial development, and economic prosperity (Orji, Worika & Umofia, 2017; Stupak, 2018).

Additionally, the interplay between infrastructure development and the level of employment generation has a macroeconomic consequence on the level of economic performance (Al-saraireh, 2014; Valdivia, 2017, Siyan & Adegoriola, 2017) and the level of poverty alleviation in Nigeria (Nwosa, 2014; Omodero, 2019). In other words, significant macroeconomic indicators that may be used to determine the pace of economic growth in each country are the volume of infrastructure development and the unemployment rate. While developed countries (DCs) have very low rate of unemployment and high rate of infrastructural development; the LDCs have high rate of unemployment and low rate of infrastructural development. As a result of this, unemployment is an impediment to the growth of the economy and often leads to negative influence such as banditry, armed robbery, militancy, insurgency and many other socio-economic vices (Jakimovski, 2010; Nwogwugwu & Irechukwu, 2015), hence, an unfavourable consequence on the nation at large.

Although Nigeria has increased its budgetary support for infrastructure development over the years, it is paradoxical that socioeconomic indices like the unemployment rate do not accurately reflect the significant budgetary support. Despite the fact that the economy has grown at an average annual rate of at least 2.79 percent since the GDP was rebased in 2010 (Central Bank of Nigeria (CBN), 2019), with the exception of a decline in 2016, the unemployment rate in Nigeria as a share of the total labor force has remained above 8 percent for four years running (WDI, 2019).

Notably, in-depth study on the topic is scarce in Nigeria despite the theoretical link between infrastructure development and unemployment. The study was motivated by the fact that, in addition to the few studies that have looked at infrastructure development as a transmission mechanism for how public capital investment affects unemployment in Nigeria. Most studies (Siyan & Adegoriola, 2017; Orji, Worika & Umofia, 2017) focused on the association between certain variables and Nigeria's economy or sectoral growth. Therefore, this study examines how public capital investment affects unemployment in Nigeria from 1991 to 2020 as it relates to infrastructural development.

Four sections make up this study. The introduction, which includes the study's goals and research questions, is included in Section 1. The review of the literature is covered in section two. Section three concentrated on the study's methodology, while Section four deals with data analysis, result interpretation, conclusions, and policy recommendations based on the findings.

2.0 REVIEW OF LITERATURE

Infrastructure development was cited by Srinivasu and Rao (2013) as a crucial condition for the growth of an economy. They defined infrastructure as the basic social amenities in a society, such as schools, bridges, hospitals, airports, rail lines, and other facilities that facilitate the responsibilities of the general public and improve quality of life. Furthermore, The development of both physical and social infrastructure is how Siyan and Adegoriola (2017) classified infrastructural development. They contend that physical infrastructures are utilities like roads, railroads, energy, and power that are also referred to as economic infrastructures. Recreational parks, hospitals, and schools are more examples of social infrastructures.

Kolawole (2020) investigated the relationship between government spending and infrastructural development in Nigeria (ARDL) using the granger causality technique and the autoregressive distributed lag. The government's public capital spending, according to the research, has a significant influence on Nigeria's level of infrastructure development.

Similar analyses of the impact of road infrastructure on employment were conducted by Laborda and Sotelsek (2019) using the generalized method of moments (GMM). The study found that improvements in road infrastructure have a positive effect on both production and employment levels. This promotes the idea that improving infrastructure helps create jobs.

Stupak (2018) investigated the impact of infrastructure investment on the economy. The findings demonstrated that long-term employment creation levels are favorably impacted by infrastructural development. Hence, a rise in infrastructure spending tends to inspire an uptick in economic activity, which generates jobs for the whole country. It has been found that increasing infrastructure spending will result in job growth without necessarily raising inflation. Using a vector error correction model, Siyan and Adegoriola (2017) investigated the relationship between infrastructural development and Nigeria's economic growth (VECM). According to research, Nigeria's economic growth has increased as a result of improved road infrastructure. The evidence backs up the theory that rising levels of infrastructure development tend to raise levels of economic performance.

Using ordinary least square analysis, Orji, Worika, and Umofia (2017) explicitly examined the impact of infrastructural improvement on the industrial sector in Nigeria between 1990 and 2015. According to the study, infrastructure development boosts the economy's industrial sector. Particularly, a surge in power development aids in the growth of the nation's industrial sector.

Muammil (2018) investigated how government spending and private investment affected Indonesia's employment growth and unemployment rate. The study's approach was based on the path analysis. The results demonstrated that employment was positively impacted by government spending and private investment. The study also found a weak but substantial negative link between private investment and unemployment rate. The government's spending on social infrastructure, which has no direct impact on job creation, means that it has no impact on Indonesia's unemployment rate.

3.0 METHODS

Theoretical Framework and Model Specification

Modernization theory of infrastructural development describes the progression of a society from an infrastructural deficient state to a better and modernized state of infrastructural development. The theory was postulated based on the progressive trend recorded in African countries as a result of colonization (Kolawole, 2020). The pre-colonial state of infrastructure in Africa was in a state of stagnancy and backwardness, and not innovative. Buttressing the modernization theories of development, the dependency theory asserted that stipulates that infrastructural development is a major prerequisite towards the development of poorer nations coupled with the amelioration of the influence of the economically advanced countries over the poorer nations (Kolawole, 2020). This often results into economic problems in poorer nations such as unemployment.

In order to investigate infrastructural development as a transmission channel through which public capital expenditure affect unemployment.in Nigeria. an interaction terms between infrastructural development and capital government expenditure variable (CEX*IFD) is created. Hence,

Therefore, from theoretical view point, the model for this study is specified as follows:

$$UEM = f(CEX, IFD, \text{CEX} * IFD) \qquad 3.1$$

Where:

UEM = Unemployment rate

CEX = Capital expenditure

$\text{CEX} * IFD$= Interaction terms between infrastructural development and capital government expenditure

$$UEM_{i,} = \sigma_i + \theta_0 CEX_{i,} + \theta_1 IFD_{i,} + \theta_2(\text{CEX}_{i,t} * IFD_{i,t}) + \gamma Z_{i,t} + \varepsilon_{i,t} \qquad 3.2$$

The conditional hypothesis of the model is centred on the coefficients θ_0 and θ_2 and the main tool of analysis in this study is the derivative:

$$\frac{\partial UEM}{\partial CEX} = \theta_0 + \theta_2 IFD_{i,} \qquad 3.3$$

Equation (3.3) measures the effects of capital government expenditures for different values of infrastructural development factor to be examined in this study, holding the other factors constant. θ_0 measures the direct effects of capital government expenditures on unemployment while θ_2 measures the impact of infrastructural development on unemployment through its

effect on capital government expenditures. Therefore, holding other determinants of unemployment in the model constant, an increase in capital government spending creates four possibilities and they are;

1. If $\theta_0 > 0$ and $\theta_2 < 0$, and significant, then increase in capital government expenditure worsen the level of unemployment and infrastructural development ameliorate the negative effect of capital government expenditure on unemployment.
2. If $\theta_0 < 0$ and $\theta_2 > 0$, and significant, then increase in capital government expenditure reduces the level of unemployment and infrastructural development reduces the positive effect of capital government expenditure on unemployment.
3. If $\theta_0 > 0$ and $\theta_2 > 0$, and significant, then increase in capital government expenditure worsen the level of unemployment and infrastructural development aggravate the deteriorating effect of capital government expenditure on unemployment.
4. If $\theta_0 < 0$ and $\theta_2 < 0$, and significant, then increase in capital government expenditure reduces level of unemployment and infrastructural development enhance effect of capital government spending of capital government expenditure on unemployment.

4.0 RESULTS AND DISCUSSIONS

Unit Root Test

This study employed Phillip Peron (PP) unit root test. This was necessary in order to ensure that the time series data were estimated in their stationary format. Also this study sought to avert the occurrence of spurious regression. The essence of these tests was to verify the null hypothesis of unit root or non-stationary stochastic process. The Phillips-Perron test differs because it provides a more robust test for serial correlation and time dependent heteroskedasticities of the stochastic process. The results of PP test statistics for the levels and first differences of the annual time series data for the period under investigation were presented in Table 4.1.

Table 4.1: Results of Phillip Peron (PP) unit root test.

Test at Level					**Test at first level difference**			
Variable	Test Statistic	5% critical value	Level	Decision	Test Statistic	5% critical value	Level	Decision
UEM	/1.143258/	/2.981038/	I(0)	NS	/4.309087/	/2.981038/	I(1)	S
CEX	/0.113531/	/2.981038/	I (0)	NS	/5.528729/	/2.981038/	I(1)	S

IFD	/1.081703/	/2.976263/	I(0)	NS	/6.228182/	/2.976263/	I(1)	S
CEX*IFD	/2.445343/	/3.004861/	I (0)	NS	/5.950004/	/2.981038/	I(1)	S
Where; S indicates Stationary; NS non Stationary								

Source: Author's computation, 2023

The result from the Table 4.1 revealed that unemployment rate (UEM), capital expenditure (CEX), infrastructural development index (IFD), and the interaction of capital expenditure and infrastructural development (CEX*IFD) were not stationary at level using PP unit root test. Since their absolute values of the PP test statistics of UEM, CEX, IFD, and CEX*IFD were less than the 5% critical value in absolute term. However, at first difference, UEM, CEX, IFD, and CEX*IFD were stationary because the absolute value of test statistics is greater than the 5% critical value and the probability values of variables are less than the 0.05 level of significance. The implication of this finding is that at first level difference each of the identified variables was not characterized with unit root problem.

Co-integration Result

This study employed Johansen co-integration technique to test whether there is a long-run relationship between the dependent and independent variables in the model, by employing the Trace and Max-Eingen Statistics respectively at 5% significance level.

Table 4.2: Johansen Co-Integration Test.

Traces Statistics					
r = 0	*r = 1*	*r = 2*	*r = 3*	*r = 4*	
168.2216 (95.75366) { 0.0000*}	106.3733 (69.81889) { 0.0000*}	59.42017 (47.85613) { 0.0029*}	21.19958 (29.79707) {0.3453}	7.189089 (15.49471) { 0.5558}	0.050682 (3.841466) { 0.8219}
Max-Eingen Statistics					
r = 0	*r = 1*	*r = 2*	*r = 3*	*r = 4*	
61.84830 (40.07757) { 0.0001*}	46.95309 (33.87687) {0.0008*}	38.22059 (27.58434) { 0.0015*}	14.01049 (21.13162) { 0.3642}	7.138408 (14.26460) {0.4729}	0.050682 (3.841466) { 0.8219}
** denotes rejection of the null hypothesis at the 0.05 level, Critical value at 5% level in ( ) , &Prob in { }*					

Source: Author's computation, 2023

The results from both Traces and Max-Eingen Statistics established the presence of three co-integrating equations. Therefore, confirmed a long-run relationship between the variables and the use of VEC. This implies that the set of identified co-integrated time series in the model have an error-correction that indicates the presence of the long run adjustment mechanism. Given this, Dalina and Liviu (2015) reveal that Fully modified least square is a suitable technique for a model if there is the presence of co-integrating vectors among the set of variables in a model.

Fully Modified Least Squares Result

Table 4.3: Fully Modified Least Squares (FMOLS).

Dependent variable: UEM				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CEX	-0.005561	0.001334	-4.167923	0.0003**
IFD	0.016392	0.055132	0.297325	0.7686
CEX_IFD	-0.300042	0.059305	-5.059304	0.0000**
C	4.425410	0.592225	7.472518	0.0000**
R-squared	0.805050			
Adjusted R-squared	0.782556			
Durbin-Watson stat	1.889284			
*** indicates statistically significant at 5% significance level*				

Source: Author's computation, 2023

It was confirmed from Table 4.3 that capital expenditure (CEX) was significant and inversely related to unemployment rate (UEM) judging from the *p*-value that was less than 0.05. The implication of this finding is that massive investment in the real sector of the economy would increase employment opportunities through multipliers effect by encouraging investors to invest in the economy; therefore, reduces the rate of unemployed within the economy. The obtained sign was in support of the formulated *a priori* expectations.

Also, infrastructural development index (IFD) proved positive and non-significant judging from the *p*-values of the estimated result that was greater than 0.05 and 0.1. The mechanical interpretation of this is that provided all the variables are held constant, infrastructural development index (IFD) has infinitesimal impact on unemployment rate (UEM). The implication of this is that there is low level of infrastructural facilities within the country; as

such, lower the space of employment generation. However, the finding obtained sign was contrary with the *a priori* expectation.

The interaction of capital expenditure and infrastructural development (CEX*IFD) was negative and significance at 5% significance level. The *p*-value was less than the 0.05. The economic implication of this finding is that investments by government on the quality of the various components of infrastructure, such as roads, power, ICT, water sanitation as well as others reduce unemployment through the provision of employment opportunity. This shows that capital expenditure directed toward investment in the infrastructural facilities increase employment opportunities that reduce unemployment in the country. The finding shows that increase in capital expenditure reduces level of unemployment and infrastructural development enhances effect of capital spending on unemployment.

Concisely, findings show that capital expenditure directed toward infrastructural development supports investment in the real sector of the economy; therefore, increases the demand for labours. This shows that capital expenditure channel towards developmental investment reduces the level of unemployment in the country. Given this, studies like Matsumae and Hasuni (2016), Muammil (2018), Nwaeze (2019), Salase (2019) and Onuoha and Agbede (2019) explicitly confirmed that both capital expenditure and infrastructural development reduce unemployment rate.

Diagnostic Checks

Autocorrelation Test of the Model

According to the residuals test of serial correlation, the null hypothesis of no serial correlation was tested against the alternative hypothesis of serial correlation. In other to verify the status of serial correlation in the model, the probability value is observed. When the probability value is greater than 5% we accept the null hypothesis that there is no evidence of serial correlation in the model.

Table 4.4.: Breusch-Godfrey Serial Correlation LM Test

F-statistic	8.233886	Prob. F(2,24)	0.1119
Obs*R-squared	12.20806	Prob. Chi-Square(2)	0.1022

Source: Author's computation, 2023

Table 4.4 shows that all the probability values were greater than 0.05 levels of significance. This implies that the null hypothesis of no serial correlation is accepted. Thus, this necessitates the acceptance of null hypothesis and therefore concludes that the model has no serial correlation.

CONCLUSION

Infrastructural development index has inconsiderable impact on unemployment rate. The implication of this is that there is low level of infrastructural facilities within the country; as such, lower the space of employment generation. Nonetheless, capital expenditure directed toward infrastructural development supports investment in the real sector of the economy; therefore, increases the demand for labours. This shows that capital expenditure is a channel through which developmental investment reduces the level of unemployment in the country.

Recommendations

1. Government at all levels should ensure that amount of funds set aside for capital project are adequate, as well as, channel to public project in the real sector of the economic to accelerate aggregate output, which leads to demand for more labour that reduces the rate of people that fall within economic active age but find no work to do.
2. Nigeria government must ensure that its yearly capital projects are directed towards investment in infrastructural facilities like railways, road, and building construction as well as many to facilitate foreign and local investments that promote job opportunities.
3. Also, government must ensure that there is accountability on capital expense incurred in order to reduce the rate of corruption that worsens unemployment despite huge amount of funds incurred on capital project yearly.

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