Impact of Unemployment on Economic Growth in Nigeria: Bound Test and ARDL Approach

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Abstract: This study examined the impact of unemployment on economic growth in Nigeria. And based on the literature reviewed, the identified gaps were found in the scope, appropriate control variables and estimation techniques for the robustness of the findings. Data was sourced from the publications of World Bank-World Development Indicator, International Labour Organisation and Central Bank of Nigeria (CBN Statistical Bulletin) from 1980 – 2019 and various diagnostic tests such as Unit Roots and Bound Tests were carried out. Consequently, ARDL model was utilized to address the objective of this study. It was found out that unemployment had a positive and significant impact on economic growth both in the short run and in the long run. Furthermore, based on the findings, the paper recommended the introduction of programmes and policies that will promote enabling business environment to enable the teeming unemployed population to contribute to economic growth in Nigeria.

Keywords: Unemployment; Economic Growth; Bound Test; ARDL; Nigeria

JEL Classification: F00

1. Introduction

Unemployment remains major challenge even with the increased growth rate recorded over time in Nigeria (Nwosa, 2016). In 2015, the United Nations unanimously set up the Sustainable Development Goals (SDGs) where goal 1 and 2 centered on "No Poverty" and "Zero Hunger" respectively while goal 8 is on "Decent work and Economic growth" which must be achieved come 2030. Every minute, 90 people globally must leave the poverty line beginning from now (2015) to end extreme

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poverty everywhere by 2030. To achieve this in Africa and Nigeria, 57 and 12 people must be taken out of poverty every minute respectively (UN Report 2015). Paradoxically, instead of moving 12 people out of the poverty line in Nigeria, the number of poor people keep increasing due to insecurity, herders and farmers clashes, kidnapping and other social vices across the country hereby increasing the rate of unemployment (Orkar & Shaminja 2019).

There are divergence views among scholars as regards the definition of unemployment yet related. Adebayo (1999) defined unemployment as a condition where job seekers were unable to find job. There is measurement problem with this definition if the rate of unemployment is to be determined over time. However, Falae (1971) simplified the definition by concluding that some people that are out of jobs should not be regarded as unemployed despite the fact their zeal to work.

Englama (2001) described the unemployment rate as the proportion of job seekers over the total population in the country. Adebayo (1999) further stressed that the total labour force is the people years with or without jobs and within the age gap of 18 – 60 years.

The data published by the National Bureau of Statistics (2020) indicated that between 1981 to 1990, the average growth of the economy brought a rise in the unemployment rate from 3.93% to a higher rate of 33.3% between 2011 and 2020. Also, the Gini Index showed that the gap in income distribution was 38.0 to 40.1 between 1985 and 2004. Also, in 2010, the Gini coefficient rose to 43.0 but declined to 35.1 in 2020. The high economic growth rates with an increasing unemployment rate show an inconsistent link with the theory which implies that the impact of such growth is insignificant to the well-being of the people of Nigeria. This further explains that This further explains the fact that unemployment rates remain major challenge even with the growth rate experienced over the years in Nigeria (Nwosa, 2016; Erumebor 2021).

In an attempt to correct this, various Nigerian governments introduced different programmes (N-Power, Subsidy Reinvestment and Empowerment Program, Trade money etc) to create job opportunities for the citizens. However, all these government programmes did not achieve the desired results despite huge amounts of monies budgeted and spent on them. These programmes failed because of poor mobilisation of the target group, nonchalant attitude from the government agencies, lack of coordination and corruption, irregularity and politicizing of the programmes for personal gains. Despite several attempts made to analyze the influence of unemployment on economic growth in Nigeria, the previous findings on the subject matter are still ambiguous which calls for further research. See Akeju and olanipekun (2015); Adelowokan et al., (2019); Njoku and Ihugba (2011); Obasanmi and Akinrogunde (2022). Moreso, the paper will contribute to the existing knowledge by using ARDL bounds test to provide information on the connection between unemployment and economic growth in Nigeria from 1980 to 2019. This period covers

when the Structural Adjustment Programme (SAP) was established in Nigeria and its implications on Small and Medium Enterprises (SMEs) financing and the post- SAP period when the monetary authorities introduced various policies to aid the growth of the SMEs in Nigeria.

2. Literature Review

This section of the study was presented to examine the empirical studies on the nexus between unemployment and economic growth in developed, emerging economies and Nigeria. A vast amount of researches have emerged testing the impact of unemployment on economic growth empirically with mixed results.

Broadberry (1983) investigated the unemployment interwar in Britain using the disequilibrium model technique in order to determine the constant increasing rate of unemployment in Britain throughout the interwar era. However, the result revealed that between the 1930s and the 1980s, price behavior shifted significantly. Demand shocks caused production and cost to decrease during the interwar era, whereas supply shocks led to cost increases and declining production throughout the 1970s and 1980s.

Similarly, Zagler (2003) used Okun's Law-based theory to account for an examination in the connection between unemployment and economic growth in the near term rather than automatically disregarding the long-term relationship. The analysis also utilized a Vector Error Correction Method to analyze the impact of economic growth and unemployment in major European countries. The outcome, however, supports modern economic theories on endogenous growth and unemployment, which contend that economic growth and unemployment.

Furthermore, Noor et al., (2007) examined the nexus between production and unemployment in Malaysia using the descriptive analysis to evaluate if Okun's law existed in the Malaysian economy. The outcome revealed that Okun's law existed in Malaysia economy. Certainly, Okun's Law may be used to describe the situation in Malaysia. Any efforts to lower unemployment will lead to a rise in the rate at which the economy grows.

Vatter (2012) examined well-being in Germany by looking at the relationship between gross domestic products and unemployment. The Ordinary Least Squares result showed that the local disparities in family earnings and the personal consequences of unemployment do account for about 25% of total actual variability. Inferential statistics indicated a narrowing but persistent divide between East and West Germany as well as various degrees of subjective well-being in each region. The regional sequence of life fulfillment that has been identified is a reflection of macroeconomic basic principles, particularly the labor market.

Özel *et al*., (2013) analyzed the financial growth, output, and unemployment using information from the G7 of seven advanced economies from 2000 to 2011. The study's results showed a great, statistically inverse association between economic growth and unemployment over the 2000 - 2007 time frame, also referred to as the pre-crisis era. Furthermore, the results showed that during the post-crisis era of 2008 to 2011, there is an inverse and insignificant association between economic upswing and unemployment rates.

Makaringe and Khobai (2018) analyzed the patterns and the effect of uunemployment on South Africa's fiscal growth utilizing periodical data from the quarterly period of 1994 to the fourth month of 2016. This was carried out to check and verify the stationarity of the analysis's factors, the Augmented Dickey-Fuller (ADF) stationarity test and Phillip-Perron methods were employed. However, the outcomes of the test showed that the study's variables did not become stationary at the level but did so at the first difference. They also tested the existence of a short and long runs link between unemployment and financial growth using the ARDL model, and the outcomes of the test indicated that there is a negative short-and long- runs connection among the factors of interest. The analysis also agreed that Okun's law of a direct association between unemployment and fiscal growth existed.

However, Njoku and Ihugba (2011) carried out a study on the association between growth and unemployment in Nigeria from 1985 to 2009. One of the outcomes revealed that between 1991 and 2006, the population increased by 36.4% while the GDP grew by 55.5%. If everything remained the same, this should have led to a drop in the unemployment rate, but instead, it rose by 74.8%. According to the study, agriculture, which accounts for the majority of the nation's gainful employment, contributed 36.7% of the GDP on average between 1991 and 2006, which is just 6.1% more than the average contribution of the oil sector, which employs less than 10% of the labor force.

Adelowokan *et al*., (2019) measured the connections between low employment rate, deficiency and economic growth in Nigeria from 1985 to 2015. Granger causality analysis, the Augment Dickey-Fuller method, the Johansen co-integration, and the error correction method were used to determine the short term relationships between the parameters. However, the outcomes showed that the variables were stationary at intial difference. The causality analysis revealed showed that there is no connection among low employment rate, poverty, and growth in Nigeria. Similar to this, the co-integration revealed no long run correlation between low employment rate, poverty, and economic upswing in Nigeria but the short run parameter estimations revealed a adverse and substantial correlation between unemployment and growth.

Karikari-Apau and Abeti (2019) used the Phillips Perron Test and the Augmented Dickey-Fuller Test to investigate how low employment rate in China affects economic growth. The short-run and long-run cointegration were evaluated utilizing the (ARDL)

cointegration and the ARDL Bounds analysis. The outcomes indicated that low employment rate and economic progress have an inverse persisteNT and momentary relationship. Likewise, the causality analysis also demonstrated that there is no causality between economic expansion and low employment rates.

Obasanmi and Akinrogunde (2022) observed the causal relationship between low employment rates and economic growth in Nigeria between 1981 and 2020. Error correction method was utilized to analyse the causal relationship between the low employment rate and economic upturn in Nigeria. The outcomes revealed that there is a persistent correlation between the low employment rate and the economic upswing in Nigeria. The low employment rate was significantly inversely correlated with Nigeria's economic growth both in the short and long hauls. Moreso, the outcome of the Granger causality analysis outcomes indicated a unidirectional causality running from unemployment to economic growth in Nigeria.

However, it was observed based on the literature reviewed that there are apparent gaps in most of the existing literature in the areas of scope, appropriate control variables and estimation techniques. The study addressed the above mentioned dearth by expanding the scope from 1980 to 2019, a period of 40 years. Appropriate control variables were introduced in the model specification for the validity of the findings and the ARDL Bounds Test, were used to explore the relationship between unemployment and economic growth in Nigeria.

3. Methodology

The research utilized ex-post facto research design. Data were sourced from the publications of the World Bank - World Development Indicators, International Labour Organization and Central Bank of Nigeria (CBN Statistical Bulletin)

3.1. Model Specification

The model's functional form is given as:

$$ECG_t = f\ (UMR_t,\ LF_t,\ INFL_t,\ GE_t,\ OPEN_t) \tag{I}$$

The equation above could be equally specified in Log form as:

$$LnECG_t = \alpha_0 + \beta_1 UMR_t + \beta_2 lnLF_t + \beta_3 INFL_t + \beta_4 LnGE_t + \beta_5 OPEN_t + U_t \tag{II}$$

3.2. ARDL Model Specification

As soon as the cointegration relationship was established, estimating the ARDL model was required. This technique has some advantages over others; it is used when the series of the parameters of interest were integrated of order zero (I0) and order one (I1). In addition, it can be utilized to measure both the long run and short run estimation. Therefore, the ARDL bound test model according to Pesaran et al., (2001) can be represented as follows;

$$\Delta y_t = a + \alpha y_{t-i} + \beta \chi_{t-i} + \sum_{i=1}^{p-1} y \Delta y_{t-i} + \sum_{i=1}^{p-1} x \Delta x_{t-i} + \sum_{j=1}^{q} \varphi D_{t.j} + \varepsilon_t \quad \text{(III)}$$

The model can be transformed to;

$$y_t = c + \sum_{i=1}^{k} \alpha_1 y_{t-i} + \sum_{i=1}^{k} \beta_i x_{t-i} + \sum_{j=1}^{l} \varphi_j D_{t.j} + u_t \quad \text{(IV)}$$

Where *i = 1, 2, ... N, t = 1981, 1982, ... T, j* represents the number of time lags, χ contains the list of independent variables as mentioned earlier.

Table 1. Descriptive Statistics

Variables	Mean	Maximum	Minimum	SD	Skewness	Kurtosis	Jarque Bera
LGDP	25.523	27.027	24.047	0.944	0.320	1.572	3.979
POVT	53.055	66.900	39.100	7.462	-0.146	2.287	0.964
UMR	11.495	29.700	1.900	8.301	0.724	2.287	4.249
LF	55.563	61.000	50.070	2.061	0.969	5.759	18.464
INF	19.079	72.836	5.382	17.095	1.783	4.990	27.101
TOP	32.621	53.278	9.136	12.663	-0.368	2.179	1.979
LGE	29.143	32.666	25.602	2.429	-0.113	1.569	3.409

Source: Author's computation (2023).

The table above showed that the descriptive statistics of the variables of interest where the average values were 25.52%, 53.06%, 11.50%, 55.56%, 19.08%, 32.62% and 29.14% for economic growth, unemployment, labour force, inflation, trade openness and government expenditure respectively between 1980 and 2019. The result of the Jarque-Bera estimations revealed that all the variables were fairly distributed during the span observed with the values of the kurtosis were not far from 3. Moreso, the values of the mean and median tend to converge.

Table 2. Correlation Matrix

Variables	LECG	LGE	POVT	UMR	OPEN	INFL	LF
LECG	1.000						
LGE	0.770	1.000					
UMR	0.816	0.782	0.081	1.000			
OPEN	0.086	0.444	0.505	0.294	1.000		
INFL	-0.496	-0.275	0.062	-0.437	-0.070	1.000	
LF	-0.316	-0.269	-0.065	-0.202	-0.391	0.280	1.000

Source: Author's computation (2023).

The table above indicated that the outcomes of different pairs of correlation analyses conducted on all the variables of interest. The findings revealed that unemployment, government expenditure and trade openness had positive degree of association with economic growth which implied that the above-mentioned variables moved in the same direction. While inflation and labour force had an inverse degree of association with economic growth which implied that the variables move in opposite path. Therefore, the outcome revealed that there was no such high correlation between any pair of the proposed explanatory variables to result in multicollinearity in the estimated model because none of the pair's correlation coefficient is greater than 0.9.

Table 3. Unit Root Test

Variables	ADF Test			PP Test		
	Levels	1st Diff.	Remarks	Levels	1st Diff.	Remarks
LECG	-0.398	-6.581***	I(1)	-0.484	-6.360***	I(1)
UMR	-1.306	-7.008***	I(1)	-1.031	-9.157***	I(1)
TOP	-2.713	-7.938***	I(1)	-2.933	-8.958***	I(1)
LF	-2.890*		I(0)	-3.134**		I(0)
INFL	-3.002**		I(0)	-2.870*		I(0)
GE	-0.416	-3.582***	I(1)	-0.410	-3.601***	I(1)

Source; Author's computation (2023).   * Denotes statistical significance at 10%, ** denotes 5% and *** denotes 1%.

The unit root test finding as indicated in the table above having used the standard Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) analysis to verify if the variables possess unit root. However, it was discovered that labour force and inflation were stationary at levels I(0) while economic growth, government expenditure, unemployment and trade openness were stationary in their first difference I(1). This implies that the series of the variables of interest are integrated of order zero I(0) and order one I(1). Hence, the rationale for employing the Autoregressive Distributed Lag model which allows for long run cointegrating relationship when series have different orders of integration. Thus, eliminating the possibility of obtaining spurious empirical results.

Table 4. ARDL Bounds Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	7.6445	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Author's Computation (2023).

The result of the ARDL Bounds Test presented in Table 4 above indicated that the computed *F*-Statistic was 7.6445 and this is significant at 5 per cent level. Since the computed *F* statistic of 7.6445 is outstanding than the lower and upper bounds critical values at the 5 per cent level, this implies that there is existence of long run relationship between unemployment and economic growth in Nigeria in the period under study. Thus, the null hypothesis is rejected.

Table 5. Long Run Result

Dependent Variable: DLOG(ECG)				
Selected Model: ARDL(1, 4, 4, 2, 3, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-11.7987	8.8249	-1.3370	0.2060
LOG(ECG(-1))	-0.0681	0.0685	-0.9951	0.3393
UMR(-1)	-0.0012	0.0101	-0.1201	0.9064
LOG(LF(-1))	2.7960	1.9671	1.4214	0.1807
INFL(-1)	-0.0079	0.0034	-2.3371	0.0376
LOG(GE(-1))	0.0635	0.0296	2.1447	0.0531
OPEN(-1)	0.0053	0.0054	0.9770	0.3478
D(UMR)	0.0228	0.0071	3.1975	0.0077
D(UMR(-1))	0.0085	0.0078	1.0905	0.2969
D(UMR(-2))	0.0009	0.0071	0.1290	0.8995
D(UMR(-3))	0.0055	0.0059	0.9346	0.3684
DLOG(LF)	0.9307	1.9108	0.4871	0.6350
DLOG(LF(-1))	-2.6486	1.5504	-1.7084	0.1133
DLOG(LF(-2))	1.7282	1.3989	1.2355	0.2403
DLOG(LF(-3))	5.1705	1.2534	4.1253	0.0014
D(INFL)	-0.0067	0.0021	-3.2419	0.0071
D(INFL(-1))	0.0021	0.0023	0.8918	0.3901
DLOG(GE)	1.6119	0.2805	5.7470	0.0001
DLOG(GE(-1))	-0.2789	0.2834	-0.9843	0.3444
DLOG(GE(-2))	0.8895	0.3583	2.4824	0.0288
D(OPEN)	0.0014	0.0031	0.4484	0.6619
D(OPEN(-1))	-0.0061	0.0045	-1.3525	0.2012
D(OPEN(-2))	-0.0064	0.0042	-1.5213	0.1541
D(OPEN(-3))	-0.0073	0.0035	-2.0828	0.0593
R-squared	0.9963		**F-statistic**	141.7402*
Adjusted R-squared	0.9893		**Durbin-Wat. Stat**	2.3728
* p-value incompatible with t-Bounds distribution.				

*Source: Author's Computation (2023).   * Denotes statistical significance at 10%, ** denotes 5% and *** denotes 1%.*

The above table showed the long run estimation results of the relationship between unemployment and economic growth. The findings showed that the explanatory power of the model simultaneously illustrated almost 98.9% of the total swings in the dependent parameter (economic growth) while only 1.1% was unexplained as evidence from the value of adjusted R^2 which implied that the model had high goodness of fit. The F-statistic value (141.7402) was statistically significant at 5% level; this indicated that all the independent variables included in the model significantly explained the observed change in economic growth. The result of the Durbin – Watson statistics was practically 2 which indicated that the model had no consecutive autocorrelation in the long run.

The outcome demonstrated that unemployment had positive and significant impact on economic growth. This implied that a percentage rise in unemployment would dominate to 0.02 per cent boost in economic upswing. This result was in tandem with Okun's law which says that a percentage rise in unemployment would bring about 2% upswing in GDP growth in any economy. And also with the submission of Akeju and Olanipekun (2014) that unemployment had a substantial shock on economic upturn in Nigeria. Obasanmi and Akinrogunde (2022) that showed a long run relationship between unemployment and economic growth. Regardless, these findings contradict the works of Adelowokan *et al*., (2019) that there was no cointegration between low employment rate and economic upswing. Umaru (2014) also concluded that low employment rate had an adverse connection with economic growth. The negative impact might be the failure of the Nigerian economy to provide a substantial number of jobs for the people in the formal sector which translates to growth.

Table 6. Short Run Result

ARDL Error Correction Regression				
Dependent Variable: DLOG(ECG)				
Selected Model: ARDL(1, 4, 4, 2, 3, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(UMR)	0.0228	0.0037	6.2307	0.0000
D(UMR(-1))	0.0085	0.0034	2.4775	0.0291
D(UMR(-2))	0.0009	0.0035	0.2573	0.8013
D(UMR(-3))	0.0055	0.0037	1.5060	0.1579
DLOG(LF)	0.9307	1.0457	0.8900	0.3909
DLOG(LF(-1))	-2.6486	1.0302	-2.5710	0.0245
DLOG(LF(-2))	1.7282	0.9427	1.8333	0.0917
DLOG(LF(-3))	5.1705	0.9362	5.5226	0.0001
D(INFL)	-0.0067	0.0013	-5.1279	0.0002
D(INFL(-1))	0.0021	0.0013	1.6691	0.1210
DLOG(GE)	1.6119	0.2006	8.0341	0.0000
DLOG(GE(-1))	-0.2789	0.2020	-1.3807	0.1925
DLOG(GE(-2))	0.8895	0.1741	5.1099	0.0003

D(OPEN)	0.0014	0.0019	0.7312	0.4787
D(OPEN(-1))	-0.0061	0.0020	-3.0001	0.0111
D(OPEN(-2))	-0.0064	0.0021	-3.0350	0.0104
D(OPEN(-3))	-0.0073	0.0020	-3.7209	0.0029
CointEq(-1)*	-0.0681	0.0076	-8.9592	0.0000
R-squared	**0.8985**		**F-statistic**	
Adjusted R-	**0.8026**		**Durbin-**	**2.3728**
* p-value incompatible with t-Bounds distribution.				

*Source: Author's computation (2023)   * Denotes statistical significance at 10%, ** denotes 5% and *** denotes 1%.*

The results in the table above indicated that the explanatory power of the model illustrated almost 80.3 per cent of the total modifications in the dependent variable (economic growth) while only 19.7 per cent was unexplained as could be seen from the value of adjusted R^2. This implied that the model had a high goodness of fit. The F-statistic value (7.6445) was highly significant at 5% level which showed that the model was statistically significant. The result of the Durbin – Watson statistics was precisely 2 which indicated that no sequential autocorrelation in the short run.

The outcome demonstrated that unemployment had positive and significant impact on economic growth at 5 per cent level in the short run. This implied that a percentage rise in unemployment would lead to a 0.02 per cent boost in economic growth. The optimistic connection between unemployment and economic growth in Nigeria may be due the past employment programmes introduced by the Nigerian government but which were not sustained enough to translate into meaningful reduction of unemployment in Nigeria. The positive finding was in tandem with the recommendation of Akutson *et al*., (2018) that there was a favorable and substantial effect between unemployment and economic growth in Nigeria in the short run. But contradicted the works of Adelowonkan *et al*. (2019); Jibir *et al*. (2015) that unemployment had a negative result on economic growth in Nigeria in the short run.

However, the coefficient of the error correction term of -0.0681(0.000) was negative and statistically significant at 5 per cent level. This implied that the speed of adjustment between the short run and the long run is 6 per cent. It also indicated that 6 per cent of error in the short run is revised per annum in the long run equilibrium relationship.

Table 7. Diagnostic Test Results

Test	F-Statistics	Probability
Jarque-Bera	1.0272	0.5984
Serial Correlation	0.4370	0.6578
Heteroskedasticity	0.4933	0.9298

Source; Author's computation (2023)

The results of the diagnostic test indicated that to be able to draw statistical inference from the results, it is pertinent to examine whether the assumptions of normality, non-autocorrelation, homoscedasticity, linearity as well as stability of the model were not violated. The Jarque-Bera statistic was 1.0272 with a probability of 0.5984 which is not statistically significant, thus, the estimated model is normally distributed. In addition, the serial correlation statistics of 0.4369 with a probability value of 0.6578 is insignificant, thus, the successive error terms of the estimated model were not related. The heteroscedasticity test statistic of 0.4933 with a probability value of 0.9298 was greater than the 5 per cent level of significance, thus, the residuals from the estimated is homoscedastic.
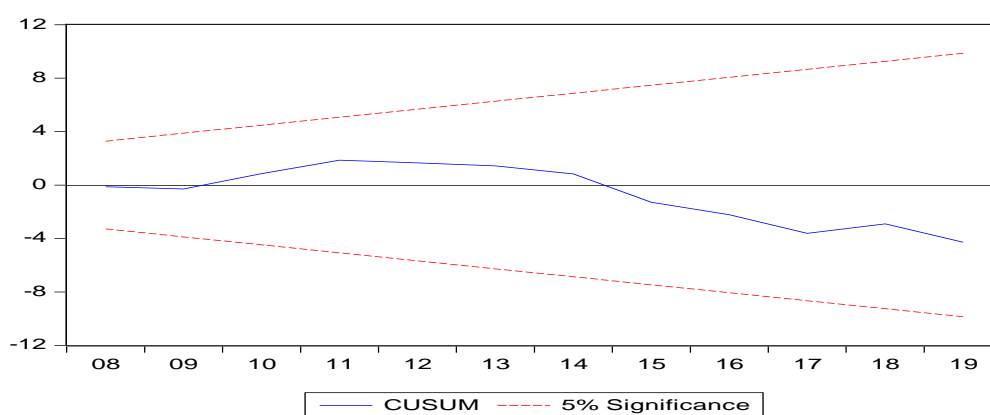

Figure 1. CUSUM Test

The equilibrium of the model as shown in the figure above indicated that the residual of the error-correction model lies within the critical bounds of 5 per cent significant level. This implied that the parameters computed are stable from 1980 to 2019.

3.3. Conclusion and Recommendations

The study concluded, having assessed the relationship between unemployment and economic growth in Nigeria from 1980 to 2019 utilizing Bounds Test and ARDL model, that unemployment had an effective and substantial effect on economic growth in the short run and in the long run. Meanwhile, only government expenditure among the control variables significantly impact economic growth positively both in the long run and short run while others do not significantly impact economic growth both in the long run and short run. However, based on the empirical result, this paper recommended the introduction of programmes and policies that will promote enabling business environment to enable the teeming unemployed population to contribute to economic growth in Nigeria.

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