FOREIGN DIRECT INVESTMENT-UNEMPLOYMENT NEXUS: Empirical Evidence

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ABSTRACT

There is a great debate on the impact of foreign direct investment (FDI) on unemployment. Some scholars are of the view that FDI increases unemployment in the host economy, while others argue that FDI is key to reducing the unemployment rate. This paper therefore empirically investigated the FDI-unemployment nexus in Nigeria for the period 1981 to 2016. Data was sourced from the Central Bank of Nigeria Statistical Bulletin (2016) and the World Bank database. The study employed the Johansen cointegration test and the Error Correction Model to establish that FDI has an inverse relationship with the unemployment rate in Nigeria, making FDI a necessary tool for tackling the unemployment challenge of the country. Findings also revealed that there is a long-run relationship between the variables in the model, and the model has a speed of adjustment of about 46%. Therefore, it is recommended, amongst other things, that FDI should be directed to sectors such as Agriculture and Manufacturing, that are able to employ a major percentage of the unemployed in the economy.

JEL classification: F21, F43, C23, O47

1. Introduction

One of the crucial problems faced by most developing countries is unemployment, therefore several strategies have been advanced to tackle this

monster (unemployment). In recent years, foreign direct investment (FDI) has been seen as a vital tool for developing countries to achieve their macroeconomic objectives, including tackling unemployment. FDI is generally described as a flow of capital, technology, and know-how from one (home) country to another (host) country. According to Abaukaka (2014), FDI is a viable tool for augmenting domestic investment in the host economy which brings about the efficient utilization of both human and material resources. It has also been regarded by the authorities from ex-communist countries as being an important source for management skills, for new and better paid jobs, and for products and services of an improved quality, which could increase both the internal market and also the export potential of their economy (Strat et al, 2015).

However, the role of FDI in advancing host economies has remained a major topic of debate among policymakers. Some scholars argue that FDI is not beneficial to the host country, thus calling for its reduction. The basis for their argument is that domestic companies that are lagging behind technologically are usually unable to compete with their foreign counterparts, thus leading to their closure, giving room for the monopoly of foreign companies. Akter and Ozturk (2009) opined that FDI leads to an increase in the unemployment rate, meaning that FDI and unemployment rate have a direct positive link. A similar view is shared by Isaac (2012), and Hisarciklilar et al. (2010). They opined that the increasing rate of employing new technology accompanied by FDI, in the production of goods and services has a negative impact on employment.

Ozughalu and Ogwumike (2013) maintain a different view from Akter and Ozturk (2009), Isaac (2012), and Hisarciklilar et al. (2010). They are of the view that FDI reduces unemployment as it leads to an increase in real gross domestic product (GDP). This view is also maintained by Onu (2012). In view to this debate, this paper is aimed at empirically investigating the FDI-unemployment nexus in Nigeria using data from the period 1981 to 2016.

2. Review of Related Literature

The theory of labour demand states that total demand for labour is inversely related to real wages, but has a positive relationship with output. Thus, variables such as wage, the real unit of labour costs, real GDP, level of investment (foreign and domestic), government, technology, etc, are seen as factors that

influence the demand for labour (see Massoud, 2008). Demand for labour is a derived demand. Thus, any increase in the demand for any commodity would result in a commensurate increase in the demand for the labour that produces that commodity. This paper is anchored on the labour demand theory as it investigates the unemployment-FDI nexus in Nigeria. In building the model, the paper assumes that FDI can help in generating the needed employment opportunities in Nigeria, which in turn will lead to increased output (Zeqiri, Likaji and Bytyqi, 2011).

Balcerza and Zurek (2011) conducted an empirical study on the influence of foreign direct investment on the labour market of Poland from 1995 to 2009. Using the vector auto-regressive model, they established that there is an interdependence between FDI and employment in Poland. Their findings showed that the impulse of FDI leads to decreasing unemployment rate. However, they argued that the positive influence of FDI on the Polish labour market is only in the short term. This calls for further investigation as FDI should have a long-term impact on the labour market of the receiving nation.

In another study, Dzambaska and Lozanoska (2015) empirically studied the nexus between foreign direct investment and unemployment for the Republic of Macedonia for the period 1999 to 2013. The study adopted a multivariate regression analysis, and showed that FDI did not have a significant impact on the decrease of unemployment in Macedonia. The study revealed rather that inflation has an inverse relationship with unemployment, which signals the fact that the unemployment challenge can be reduced by increasing the inflation rate. Another discovery from their study is that any reduction in the level of corruption would bring about a significant decrease in unemployment.

In a recent study, Akram (2016) analysed the impact of foreign direct investment on both unemployment and economic growth in Jordan, using time series data spanning the period 1998-2015. The study adopted the ordinary least squares estimation technique and revealed that a slight increase in FDI would result in a less than proportionate decrease in unemployment.

Another study on Jordan by AL-Saraireh (2014) investigated the relationship between the rates of unemployment, economic growth rate, foreign labour force, and government expenditure. The study found a significant negative correlation coefficient between the unemployment rate and migration labour force, and a

positive significant correlation coefficient with government expenditure. There was a significant prediction relationship between unemployment as the dependent variable and government expenditure rate as the explanatory variable. FDI is often seen as a significant factor of economic development in developing countries.

Habib and Sarwar (2013) analysed the impact of foreign direct investment on employment level in Pakistan during the time period 1970-2011. The variables used in the study were employment level, FDI, exchange rate and GDP per capita. The study used the Johansen test of co-integration to analyse the long-run relationship between the variables. The study revealed that FDI has a positive significant effect on the employment level in Pakistan.

Zdravkovic et al. (2017) studied the impact of FDI on unemployment in seventeen (17) transition countries for the period 2000 to 2014. Their study tested the premise suggesting that higher attraction of FDI in transition countries results in a reduction in unemployment. The study used a combination of panel cointegration test, fully modified and dynamic OLS panel estimation to show that FDI and unemployment are most likely not cointegrated. Empirical evidence from their study is inconclusive, indicating that the long-run impact of FDI on unemployment in economies in transition is either very low or does not exist.

Mucuk and Demirsil (2013) explored the relationship between foreign direct investment and unemployment for seven developing countries, namely Argentina, Chile, Colombia, Philippines, Thailand, Turkey and Uruguay, for the period 1981-2009. Panel unit root, panel co-integration, and panel causality tests were performed for all the countries. Results showed that FDI and unemployment move together in the long run. FDI increased unemployment in Turkey and Argentina, while it reduced it in Thailand. They also suggested that the negative effects of FDI on unemployment are due to brownfield investments, which are composed of acquisitions and mergers, so policymakers should focus on greenfield investments to create more job opportunities.

Mpanju (2012) investigated the impact of FDI inflows on employment generation/creation in Tanzania for the period 1990-2008. Using a mix of quantitative and econometric analyses, the study found that FDI has a strong positive significant impact on patterns of employment, meaning that a strong

positive relationship exists between FDI and employment generation in Tanzania.

In a related study, Zeb et al. (2014) explored the impact of foreign direct investment on unemployment in Pakistan in the midst of some other explanatory variables, namely corruption, population size, and inflation. The study covers the period 1995 to 2011. Multiple regression analysis was used to examine the effect of the selected explanatory variables on unemployment in Pakistan. Results revealed that FDI plays a significant role in unemployment reduction in Pakistan.

Irpan et al. (2016) focused on the impact of FDI on the employment rate in Malaysia. Other factors such as the number of foreign workers, GDP, and exchange rate were also included in the study. The data used in the study was annual data spanning 1980 to 2012. The auto-regressive distributed lag (ARDL) model was used to determine the long-run relationship between the variables. The study found that FDI, the number of foreign workers, and GDP significantly influenced the unemployment rate in Malaysia.

Recently, Grahovac and Softic (2017) devoted a study to the influence of foreign direct investment on the labour market in Western Balkan countries, using comparative analysis. The study period was from 2000 to 2014. The analysis showed that since 2009, there has been a significant reduction of net investments, which is more obvious in the case of FDI due to a lower domestic and external demand, as a result of the global economic crisis that led to a decreasing number of employees and rising unemployment. Results also show the absence of a positive impact of FDI on employment, which was present in most Central and Eastern European (CEE) countries during the transition period, as shown in numerous empirical studies.

Salami and Oyewale (2013) analysed the impact of foreign direct investment on employment generation in Nigeria for the period 1990 to 2010. Using an econometric technique of estimation, the study found a significant connection between foreign direct investment and employment generation in Nigeria, both in the short and long runs.

In another study, Abaukaka (2014) investigated the nexus between foreign direct investment and employment generation in Nigeria for the period 2002 to 2012. The study, which used the multiple regression model to analyse variables

such as employment level (dependent variable), nominal value of FDI, GDP growth rate, and interest rate, found that FDI has a negative relationship with the level of employment in Nigeria, while GDP and interest rate are positively related to employment, but this relationship is not statistically significant. The findings of Abaukaka (2014) are not sufficient either to make a generalization or formulate policies because his study is plagued by "micronumerosity", in other words, it is limited in scope.

Anyanwu (2011), in his study of the determinants of FDI in Nigeria, identified change in domestic investment, change in domestic output or market size, indigenization policy and change in the openness of the economy as the major determinants of FDI. Ugwu (2014) also studied the nexus between foreign direct investment and employment generation in Nigeria for the period 1981 to 2012. The study found that FDI had a significant and positive impact on employment over the period reviewed.

From the review of literature, it is obvious that empirical studies on the FDI-unemployment relationship in Nigeria are not only few but limited. Thus, this study is an addition to the available literature in the field and takes a different view in analysing the FDI-unemployment nexus in Nigeria, as it captures the importance of domestic capital investment in the form of gross fixed capital formation (GFCF) in attracting FDI to the host country, which is a key determinant of FDI inflow.

Figure 1 presents the FDI inflow into the Nigerian economy from 1981 to 2016. The inflow between 1981 and 1992 was 3757.9, 5382.8, 5949.5, 6418.3, 6804.0, 9313.6, 9993.6, 11339.2, 10899.6, 10436.1, 12243.5 and 20512.7 dollars, respectively; making an average growth rate of about 18.4 percent. The year 1993 witnessed a sharp increase in FDI inflow, recording an increase of 202 percent. From 1993 there has been an upward trend in the flow of FDI into the Nigerian economy.

The trend analysis of unemployment rate in Nigeria is presented in figure 2. The results show that between 1981 and 1998, the Nigeria economy witnessed single digit rates of unemployment, but recorded double digit unemployment rates between 1999 and 2016, despite government’s efforts to reduce it.

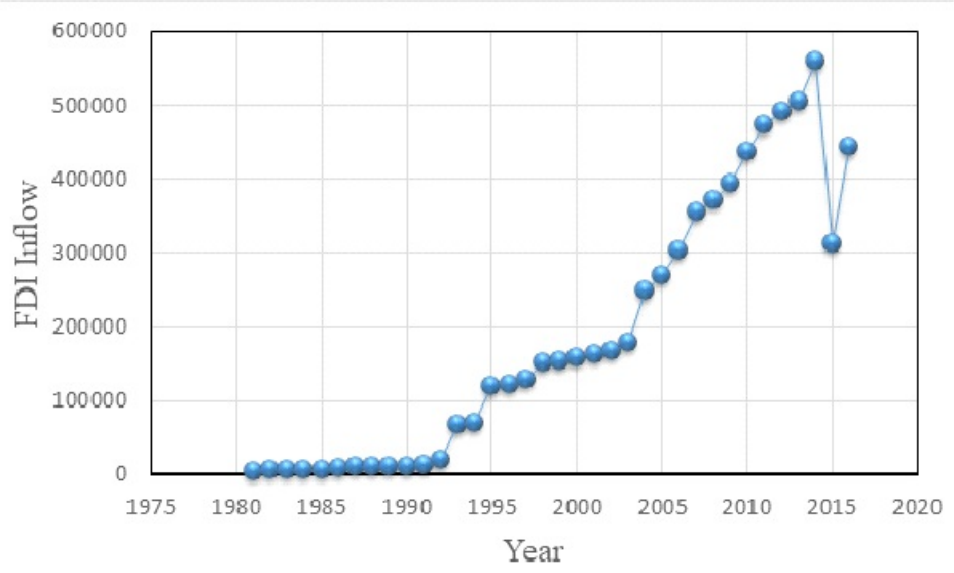

Figure 1: Stylized facts of FDI inflow to Nigeria from 1981 - 2016.

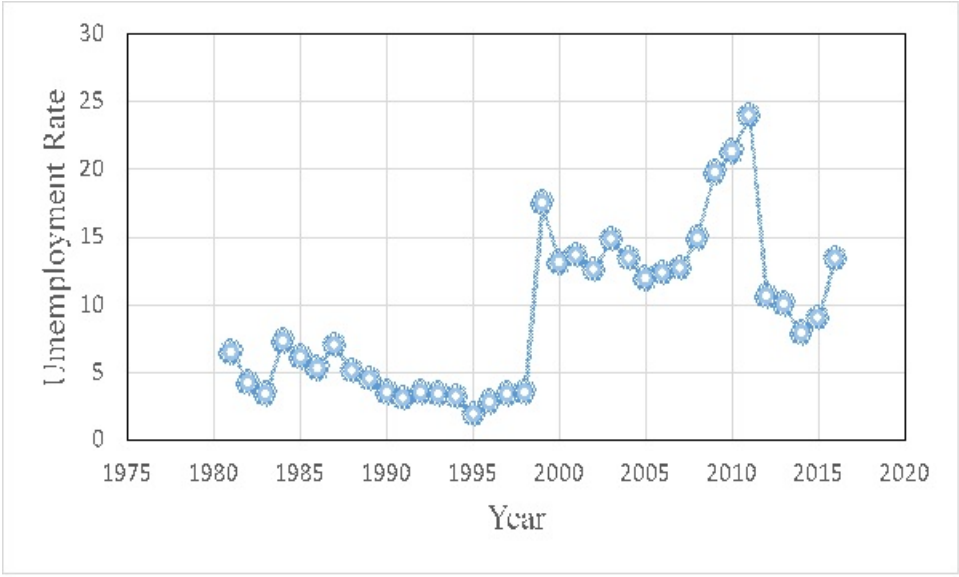

Figure 2: Stylized facts of unemployment Rate inflow to Nigeria from 1981 – 2016.

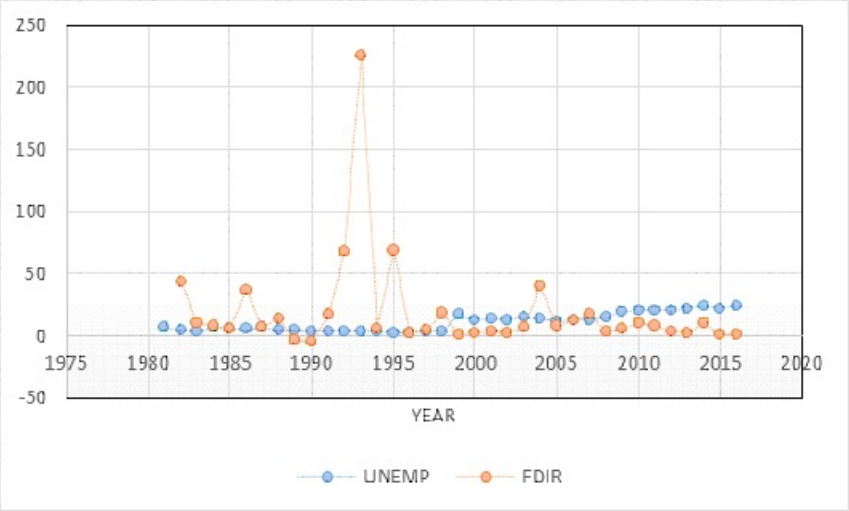

Figure 3. Stylized facts of FDI growth and unemployment rate to Nigeria from 1981 - 2016.

3. Methodology and Data

To investigate the FDI-unemployment nexus in Nigeria, the study adopted the ordinary least squares (OLS) method to estimate the relationship between the selected variables. The variables used in this study are foreign direct investment (FDI), unemployment rate (UNEMP), real gross domestic product growth rate (GDPR), gross fixed capital formation (GFCF), government recurrent expenditure (GREXP), of which UNEMP is the dependent variable. Annual data for the period 1981 to 2016, sourced from the *Central Bank of Nigeria Statistical Bulletin* (2016) and the World Bank database, was used for the analysis. To take care of the stochastic trend associated with time series data, the Augmented Dickey-Fuller (ADF) unit root test was used to test the stationarity of the data, while the Johansen co-integration technique was used to check for the existence of a long-run relationship among the variables. The error correction model was also employed to ascertain the speed of convergence of the parameters back to their equilibrium path in the event of any divergent movement from their equilibrium path. The functional relationship of the impact of FDI on economic growth is expressed as:

$$UNEMP = f(FDI, GDPR, GFCF, GREXP) \quad (1)$$

Econometrically, this can be stated thus;

$$UNEMP_t = \delta_0 + \delta_1 FDI_t + \delta_2 GDPR_t + \delta_3 GFCF_t + \delta_4 GREXP_t + \mu_t \quad (2)$$

where:

UNEMP	=	unemployment rate
FDI	=	foreign direct investment
GDPR	=	gross domestic product growth rate
GFCF	=	gross fixed capital formation
GREXP	=	government recurrent expenditure
δ_{i-n}	=	parameters estimates
μ	=	the stochastic/error term

As is the norm in time series analyses, the first step is to determine the stationarity properties of all the variables. This was done using the Augmented Dickey-Fuller (ADF) and Ng-Perron tests. The Augmented Dickey-Fuller (ADF) unit root test equation is presented as:

$$\Delta y_t = \beta + \delta t + \theta y_{t-1} + \sum_{i=1}^{q} \gamma_i \Delta y_{t-1} + \mu_t \quad (3)$$

where: δ is the variable of interest, Δ is the difference operator and the time trend, μ is the stochastic or white noise residual of zero mean, and constant variance, λ_1, λ_2, β_1,…β_n are set of parameters to be estimated and *q* is the maximum lag length, and it is determined empirically by the lag order selection criteria, such as the Bayesian Information Criterion (SBIC), the Akaike Information Criterion (AIC) and the Hannan Qin Information Criterion (HQIC). The various versions of the DF test are also applicable to the ADF, and where the optimal lag length is zero (0) the ADF reduces to DF unit root test.

The ADF test, at first difference, is conducted following the same procedure, except that now, the variable has to be differenced twice as shown in equation 4. This is necessary if the variable is non-stationary at a level.

$$\Delta\Delta y_t = \beta + \delta t + \theta y_{t-1} + \sum_{i=1}^{q} \gamma_i \Delta\Delta y_{t-1} + \mu_t \quad (4)$$

Once the stationary properties of the variables are ascertained, there is the need to establish the long-run relationship between the variables. This is done by either estimating the auto-regressive distributive lag (ARDL) model – when the stationarity status of the variables is a mixture of I(0) and I(1) or the Johansen cointegration test (where all the variables are integrated of order I(1)). The estimation output/result of the Johansen cointegration test serves as a guide for the estimation of either the error correction model (ECM) or the vector auto-regressive (VAR) models. The necessary condition for the estimation of the ECM is that there must be at least one cointegrating vector among the variables in the model in equation 4. This means that the variables must exhibit a long-run cointegrating relationship as a necessary condition to fit the ECM. According to Engle and Granger (1987), in the presence of cointegration in the model, we proceed to formulate the error correction model (ECM), which is stated below:

$$\Delta UNEMP_t = \beta_0 + \beta_1 \Delta FDI_t + \beta_2 \Delta GDPR_t + \beta_3 \Delta GFCF_t + \beta_4 \Delta GREXP_t + \beta_5 \Delta ECT_t + \mu_t \quad (5)$$

4. Results and Discussion

The estimated ADF test results are presented in table 1.

Table 1. Augmented Dickey-Fuller Unit Root Test Results

Variables	Level	1st Diff	Lag(s)	Model	Order of integration
UNEMP	-0.076882	-5.715399**	1	Trend & Int.	1(1)
GDPR	-0.804991	-5.956511**	1	Trend & Int.	1(1)
GFCF	-0.471325	-4.734019**	1	Trend & Int.	1(1)
FDI	-0.471325	-4.734019**	1	Trend & Int.	1(1)
GREXP	-2.145052	-5.316862**	1	Trend & Int.	1(1)
ECT	-6.207163		0	None	1(0)
Critical Value 5%	-3.552973	-3.557759			

Note: *(**) ***denote statistically significant at 1%; 5%, and 10% level, respectively. ECT was generated from the residual of the short run or standard regression output of equation 2. See Appendix for result.

Source: Authors' computation.

Table 2. Ng-Perron Test of Stationarity to complement the ADF test in Table 1.

Variables	Level	1st Diff	Lag(s)	Model	Order of integration
UNEMP	-2.713751	-4.019656**	1	Trend & Int.	1(1)
GDPR	-1.093080	-3.701203**	1	Trend & Int.	1(1)
GFCF	-2.582192	-5.106838**	1	Trend & Int.	1(1)
FDI	-2.303156	-4.992279**	1	Trend & Int.	1(1)
GREXP	-0.631959	-4.087654**	1	Trend & Int.	1(1)
ECT	-4.025560		0	None	1(0)
Critical Value 5%	-3.875302	-3.933364			

Note: *(**) ***denote statistically significant at 1%; 5%, and 10% level, respectively. ECT was generated from the residual of the short run or standard regression output of equation 2. See Appendix for result.

Source: Authors' computation.

The results in tables 1 and 2 show that all the series (UNEMP, GDPR, GFCF, FDI, and GREXP) became stationary after differencing once, that is, of order one. The residual of the series (ECT) is stationary at a level, as expected. This is a sufficient condition to test for the existence of a long-run relationship between the variables, using the Johansen cointegration test. The result of the Johansen cointegration test is presented in table 3.

Table 3: Johansen Cointegration Rank Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.705482	76.56270	47.85613	0.0000
At most 1 *	0.497488	37.44540	29.79707	0.0054
At most 2	0.361454	15.42506	15.49471	0.0512
At most 3	0.205847	8.137424	13.43461	0.1356
At most 4	0.032918	1.071105	3.841466	0.3007

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.705482	39.11730	27.58434	0.0011
At most 1 *	0.497488	22.02035	21.13162	0.0374
At most 2 *	0.361454	14.35395	14.26460	0.0484
At most 3	0.280457	10.65428	12.49471	0.2337
At most 4	0.032918	1.071105	3.841466	0.3007

Notes: Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level;

**MacKinnon-Haug-Michelis (1999) p-values.

Source: Authors' computation.

The Johansen cointegration test result in table 3 indicates the presence of a long-run relationship between the variables in the model. This is validated by both the Trace test and Maximum Eigen value test. This implies that the variables exhibit a long-run equilibrating trend. Thus, the relationship existing among them was estimated using the Error Correction Model. This is very helpful in determining the speed of adjustment and short-run behaviour of the variables. The short-run behaviour of the model is represented as the Error Correction Model (ECM), which is presented in table 4.

Table 4. ECM Estimation Results

Dependent Variable: D(UNEMP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.940459	0.507038	-1.854810	0.0848
D(GDPR)	-0.001661	0.000466	-3.563343	0.0031
D(GDPR(-3))	0.002150	0.000333	6.453717	0.0000
D(GDPR(-4))	0.002096	0.000468	4.478862	0.00005
D(GFCF)	-0.182540	0.071743	-2.544360	0.0275
D(GFCF(-3))	-0.212566	0.096466	-2.203533	0.0412
D(FDI)	-0.000210	2.89E-05	-7.247010	0.0000

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI(-4))	-6.85E-05	1.60E-05	-4.273294	0.0008
D(FDI(-5))	-6.37E-06	2.56E-05	-0.248412	0.8074
D(GREXP)	-0.006390	0.001824	-3.503975	0.00035
D(GREXP(-2))	0.025192	0.003792	6.642624	0.0000
D(GREXP(-4))	-0.015856	0.004737	-3.347370	0.0048
ECM(-1)	-0.456482	0.213160	-2.141499	0.0389

R-squared = 0.79; Adjusted R-squared = 0.65; F-statistic = 12.69; Prob(F-statistic) = 0.000014; DW = 1.95.

Source: Authors' computation.

The findings from the error correction model in table 4, revealed that GDP has a negative but significant relationship with unemployment. This means that for every one-unit increase in GDP, unemployment will decrease by 0.001661 percent. Table 4 also shows that GFCF was inversely related to unemployment over the reviewed period. Meaning that a one percent increase in GFCF would result in approximately 0.18 percent reduction in the unemployment rate. FDI also is seen to have a negative impact on unemployment and it is statistically significant. This is a clear pointer to show that every increase in FDI inflow into the Nigerian economy over the period investigated led to about 0.00021 percent reduction in the number of unemployed persons in the economy. Meaning that FDI is key in reducing the number of unemployed persons in the Nigerian economy. The same is true of the fourth lagged period. This result is in conformity with the findings of Ozughalu and Ogwumike (2013), and Onu (2012). They opined that FDI is an important element in the solution to Nigeria's problem of high unemployment. The coefficient of GEXP shows that it also has a negative relationship with the unemployment rate, meaning that the unemployment rate would reduce by approximately 0.0064 percent for every one percent increase in government expenditure. The coefficient of the ECM appeared with the expected negative sign and it is statistically significant with a speed of approximately 46 percent of adjusting to equilibrium in the long run. This is an indication that deviations from equilibrium in the short run will be slowly reconciled. The coefficient of determination (Adjusted R-squared) indicates that the estimated model has a good fit. Moreover, judging from the

Durbin Watson statistic value of 1.95, the model is devoid of first order auto-correlation, making it very reliable and consistent for forecasting in the long run.

Diagnostic Test

The result of the Breusch-Godfrey Serial Correlation LM test is presented in table 5. The result clearly shows the estimated model is free from serial or auto-correlation, judging from the Probability chi-square value of 0.7745, which is statistically not significant at 5% level of significance. This means that the residuals of the estimated model in table 3 are not serially correlated, thus the estimated coefficients of the model can be used to make recommendations. This is affirmed by the normality below.

Table 5. Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.024786	Prob. F(2,24)	0.8923
Obs*R-squared	0.052021	Prob. Chi-Square(2)	0.7745

Source: Authors' computation.

Normality Test

The result of the normality test is presented in figure 4.

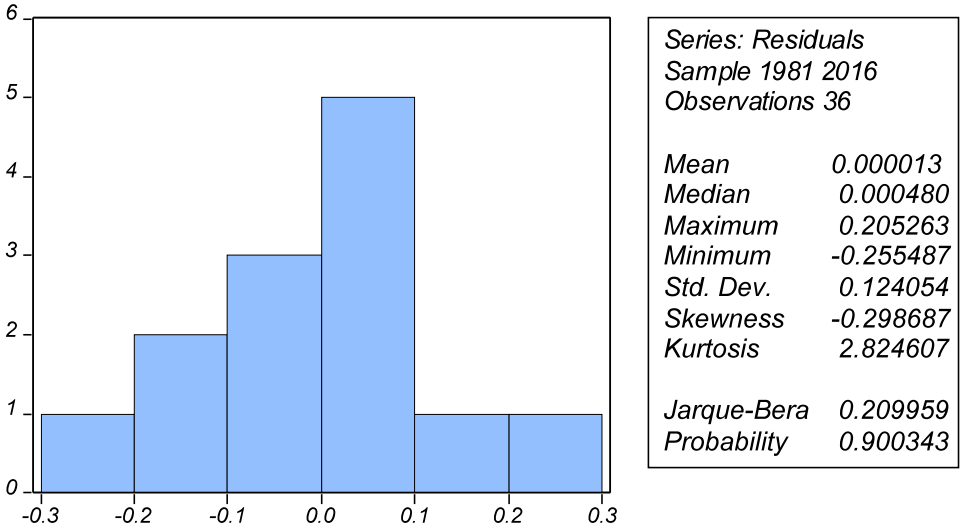

Figure 4. Normality Test of Regression Residuals.

Since the probability value of 0.900343 for the Jarque-Bera statistics is greater than 0.05, we conclude that there is a normal distribution of the residuals of the model.

5. Conclusion and Recommendations

The conclusion drawn from the findings of this paper is that foreign direct investment is vital in reducing the number of unemployed persons in the Nigerian economy. Gross fixed capital formation is also key to salvaging the Nigerian economy from the high unemployment rate that has bedevilled the country for so long. This means that the infrastructural/capital deficit in the Nigerian economy has made most foreign firms and investors repatriate their investment funds to either their home countries and/or other neighbouring economies, with better infrastructure or capital outlay. This has contributed to the high level of unemployment that is prevalent in Nigeria. Thus, this paper recommends that:

1. FDI, being exogenous, has the potential of reducing unemployment in the long run. Thus, government should formulate proper economic policies, improve infrastructure, better the security situation, overcome the energy crisis and provide a peaceful environment to attract more FDI to overcome the severe problem of unemployment.
2. FDI should be directed to the real sectors of the Nigerian economy, such as agriculture and the manufacturing industry, which is able to employ a major percentage of the unemployed in the economy.
3. There is a need for government to provide an enabling environment by focusing on infrastructural development and maintaining a sound regulatory framework in the country. This would not only attract high FDI inflow, but also result in job creation in the economy.
4. The Nigerian government should, as a matter of urgency, prioritize investment in domestic assets to create jobs for the teeming population of the country.

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Appendix

Short-run regression output

Dependent Variable: UNEMP

Method: Least Squares

Date: 01/05/18 Time: 19:48

Sample (adjusted): 1981 2016

Included observations: 13 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.112898	0.094505	22.35759	0
GDP	-0.011858	0.028037	-0.422937	0.6835
GFCF	-0.745343	0.346077	-2.153688	0.0534
FDI	-0.098841	0.340873	-0.289964	0.7792
GREXP	0.051595	0.043806	1.177811	0.2727

R-squared	0.318002	Mean dependent var	2.096154
Adjusted R-squared	0.127003	S.D. dependent var	0.162611
S.E. of regression	0.151934	Akaike info criterion	-0.647014
Sum squared resid.	0.184672	Schwarz criterion	-0.429725
Log likelihood	9.205589	Hannan-Quinn criterion	-0.691676
F-statistic	1.43644	Durbin-Watson stat.	2.270138
Prob(F-statistic)	0.306565		