Academic Journal of Economic Studies
Vol. 6, No. 3, September 2020, pp. 53–58
ISSN 2393-4913, ISSN On-line 2457-5836

Exchange Rate and Unemployment in Nigeria: An ARDL Approach

Agbutun Shedrach Adzugbele[1], Afamefuna Angus Eze[2], Ejimofor Morba[3], Nnebuihe Ihechi Nwokocha[4]

[1,2,3,4]Department of Economics, Faculty of the Social Sciences, University of Nigeria, Nsukka, Nigeria,
[1]E-mail: adzuagbutun@gmail.com, [2]E-mail: angus.eze@unn.edu.ng, [3]E-mail: blessingmorba@gmail.com, [4]E-mail: nnegoldihe@yahoo.com

Abstract

The main objective of the study is to investigate the effect of real exchange rate on the rate of unemployment in Nigeria. Time series data spanning from 1983 to 2015 which were sourced from the Central Bank of Nigeria (CBN) and Debt Management Office (DMO) statistical bulletin for 2019 and also the World Development Indicators (WDI) (2019) were used for the analysis. The ARDL bounds testing approach to cointegration was used to analyse the data. The results from the estimations show that real exchange rate has both in the short and long run, led to increase in the rate of unemployment. Other covariates in the study such as economic growth and credit to the private sector were only significant in the short run, while external debt is a significant determinant of unemployment both in the short and long run. In conclusion, it is recommended that the government should strengthen the economy through diversification, such as to improve the quality of the local industries to attenuate shocks that come as a result of exchange rate volatilities.

Keywords

Exchange rate, Unemployment, ARDL, Nigeria, Credit to Private Sector

JEL Codes: O24

Received: 25 June 2020 **Revised: 03 July 2020** **Accepted: 14 July 2020**

1. Introduction and literature review

Although Nigeria has witnessed some level of economic growth over the past few decades, this growth has not overall been significantly beneficial to the overall health of the economy. Even though positive but sometimes unstable Gross Domestic Products (GDP) growth rates are been reported, high levels of poverty, unemployment, inequality, and fall in living standards continue to ensue. These among many other issues in turn, continue to militate against the developmental strides of the country. However, one of the most prominent problems limiting the progress of the country is unemployment; which has generally been defined as the size of the population who is willing, qualified and available to work but cannot find one to do. This problem is very pernicious to development; hence reducing it is adopted as one of the basic goals of macroeconomics.

Unemployment is a major problem both at micro and macro levels. At the individual or micro level, financially, it reduces the incomes of individuals thus reducing household earnings and future saving plans. Psychologically, it leads to loss of or low self-esteem and identity which affect the mental health the individuals hence demeaning their productive capacity. Also, it further causes high levels of both physical and mental ill health, and mortality. Furthermore, it leads to poverty which reduces the ability of individuals to buy and consume nutritious food, health care and housing. At macro levels, it leads to loss of valuable productive resources with everything that implies for a stable economic growth, and improved standard of living in the whole country. It further increases dependency ratios, diverts funds which ought to be used for developmental purposes, to social welfare spending.

Available statistics from the Nigeria Bureau of Statistics (NBS) and the Central Bank of Nigeria (CBN) shows that the rate of unemployment in the country has continued to increase rapidly since 2007. Figures show the rates of 12.70, 14.90, 19.70, 21.40, 23.90, 27.40, 24.70, 25.10, and 26.80 from 2007 to 2015 respectively (NBS and CBN, 2017). Although in availability are numerous studies that have sought to unravel the possible causes, effects and solutions to unemployment in the country, for instance, Adebowale (2015) and Orji *et al.* (2015) who have carried out studies on the relationship between inflation and excahnge rate in the country, and Essien, et al., (2016) which have also tried to study whether a dynamic relationship exist between monetary variables such as investment, money supply, monetary policy rate, and unemployment, there is a scarcity of studies regarding how the country's exchange rate regime affects its unemployment rate.

Exchange rate could be defined as the economy of a country's currency relative to that of others (Coricelli & Jazbec, 2004; Sallenave, 2010). It presents the value of a country's currency versus another country's or economic zone's currency

(Wang, 2006). It (exchange rate) has become a very important concept in macroeconomic discourse especially due to globalization and international trade, and because of the important role it plays in the economic stability and strength of countries especially through their trade performance. According to Nicita (2013) the relative rate of exchange of currencies among countries and their volatilities have often shown important feedbacks on the international trade, balance of payments and overall economic performance of countries. Studies such as Akinlo & Lawal (2015) and Akinmulegun & Falana (2018) have all found in existence, a long run relationship between exchange rate and industrial output in Nigeria. While Hong Vo *et al.* (2019) and Dhasmana (2013) have also found a relationship between exchange rate and manufacturing sectorial output in Vietnam and India respectively. More recent studies on the direct effects of exchange rates on unemployment is relatively scanty, however, there are few that have delved into this relationship in recent times. For instance, Chimnani *et al.* (2016) carried out a study on the impact of exchange rate on unemployment by using an unbalanced panel of selected Asian Countries using a time period of 1995-2005. By utilizing the Ordinary Least Estimator, they found that volatilities in exchange rate had a positive and signficant impact on unemployment in these countries. Also, Bakhshi & Ebrahimi (2016) using an autoregressive model approach in Iran for data spanning from 1981-2012 found a negative and significant (although at 10%) relationship between real exchange rate and unemployment.

Hence, it becomes important to look at how exchange rage affects a major economic performance variable (unemployment) in Nigeria. We divide the study into five sections; the first section is the introduction which includes the statement of the problem with theoretical and empirical literature reviews. The second section is the methodology used in the study where we give justification for the choice of technique. The third section is the presentation of results from the analysis, with the fourth section discussing the findings from the results. And, the last section is the conclusion and recommendations.

2. Methodology of research

2.1. Data Source

The paper utilizes secondary data. The data used was sourced from the Central Bank of Nigeria (CBN) and Debt Management Office (DMO) statistical bulletin for 2019 and also the World Development Indicators (2019). The data spans from 1983 to 2015 in order to have sufficient observations for long run inference. The variables used in the study includes; the rate of unemployment, the real gross domestic product, the amount of credit to the private sector, external debt and the real exchange rate.

2.2. Estimation Strategy, Model Specification and Estimation Procedures

The empirical strategy employed for investigating the relationship between real exchange rate and unemployment in this study is the Autoregressive Distributed Lag (ARDL) estimator. It is chosen for this study basically because of the stationarity levels of our variables, which are stationary both at level and first difference. The ARDL approach was proposed by Pesaran *et al.* (1996b). According to Nkoro & Uko (2016) some of the advantages of the approach above the Ordinary Least Squares (OLS) Estimator and other dynamic lag models are its ability to handle the possible endogeniety problems that usaully arise as a result of residual correlation since all underlying variables stand as single models. Furthermore, they stated that, "the major advantage of this approach lies in its identification of the cointegrating vectors where there are multiple cointegrating vectors." Again, another major advantage of the approach is that it gives results both short run (Error Correction Model) and long run cointegration among variables under study. Hence, our ARDL model for this study is written as

$$\Delta UNEMP_t = \alpha_1 UNEMPp_{t-1} + \alpha_2 X_{t-1} + \sum_{i=1}^{p-1} \beta_i \Delta UNEMP_{t-i} + \sum_{j=0}^{q-1} \gamma_j \Delta X_{t-j} + \varepsilon_t \quad (1)$$

Where;

$\alpha_1 UNEMP_{t-1} + \alpha_2 X_{t-1}$ is the long run part of the model which shows the long run among the variables. And $\alpha_2 X_{t-1} + \sum_{i=1}^{p-1} \beta_i \Delta UNEMP_{t-i} + \sum_{j=0}^{q-1} \gamma_j \Delta X_{t-j}$ is the Error Correction Model (ECM) showing the shortrun relatioship among the variables.

α_1 & α_2, are the parameters of the longrun form of the dependent and independent variables, β_i & γ_j are the parameters of the shortrun form of the dependent and independent variables.

X_t a vector of independent variables; Real Exchange Rate, Real Gross Domestic Product (GDP), Credit to the Private Sector and External Debt

Δ is the first-difference operator

$UNEMP_t$ is the dependent variable; which is the Unemployment rate in the country.

However, before estimating the model, we conduct a unit root test (unit root with structural breaks) to ascertain the stationarity level of our variables. The choice of this unit root procedure is as a result of the fact that most varaibles in this study are likely to suffer from external shocks as a results of issues such as recessions, political instability etc.

After the analysis, we further conduct post estimation test to ascertain if our estimates are unbiased and efficient, to be relied upon for policy thrust and formulation. We conducted post estimation tests such as the Ramsey RESET Test, the Breusch-Godfrey Serial Correlation LM Test to check for the presence of serial correlation and the Breusch-Pagan-Godfrey test for Heteroskedasticity.

3. Results

3.1. Stationarity Test

Table 1. Unit Root Test Result

Variable	ADF Critical Values	ADF Test Statistics	Stationarity
Unemployment	-4.443649	-5.150382***	I(1)
Exchange Rate	-4.443649	-7.197504***	I(0)
GDP	-4.443649	-7.255143***	I(0)
Debt	-4.443649	-4.575084**	I(1)
Credit to Private Sector	-4.443649	-6.396877***	I(1)

Source: Author's computation from E-views 9

$p < 0.05$, ** $p < 0.01$, ***

The results of the unit root test shows that variables; unemployment, credit to private sector, and external debt were stationary at first difference, while GDP and Exchange rate were stationary at level. This validates our choice of the ARDL approach for establishing the relationship between our variables in the model.

3.2. Results of Estimation

Table 2. Bounds Test for Cointegration

Test Statisitc	Value	K
F-statistic	4.489	4
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
5%	2.86	4.01

Source: Author's computation from E-views 9

$p < 0.05$, ** $p < 0.01$, ***

ARDL Bounds Test. Null Hypothesis: No long-run relationships exist

In utilizing the ARDL approach, one of the first procedures is to conduct the cointegration test in order to check if a long run relationship exists among the variables. To do this, the bound test is used. For there to be in existence a long run relationship among the variables, the value of the F-statistic should be greater than the value of the I1 bound. From the results, the value of the F-statisitic is 4.48 while the value of the I1 bound is 4.01 showing that a long run relationship (cointegration) exists among the variables under study.

3.3. Error Correction Model (ECM) Results

Table 3. ECM Estimates

Variable	Coefficient	Std. Error	t-Statistic
D(Unemployment(-1))	-0.185663	0.113328	-1.638274
D(Exchange rate)	0.087417***	0.011802	7.407152
D(Gross Domestic Product)	-0.032308	0.031905	-1.012631
D(Credit to Private Sector)	0.049063	0.048268	1.016472
D(Credit to Private Sector (-1))	0.016767	0.046181	0.363077
D(Credit to Private Sector (-2))	-0.144840***	0.045284	-3.198513

Variable	Coefficient	Std. Error	t-Statistic
D(External Debt)	-0.000632	0.000383	-1.650699
D(External Debt(-1))	0.001513***	0.000530	2.854026
D(External Debt(-2))	0.000237	0.000360	0.659660
ECM(-1)	-0.558440***	0.072227	-7.731777

Source: Author's computation from E-views 9

$p < 0.05$, ** $p < 0.01$, ***

The ECM shows the speed of adjustment of the variables in the short run. The result shows a short run relationship among the variables since the coefficient of the ECM is negative and significant at less than one percent. It is evident from the result that in the short run, the lag of unemployment, GDP, credit to the private sector and its first lag and external debt does not significantly influence unemployment. However, the real exchange rate and the first lag of external debt both significantly increase unemployment in the short run, while the second lag of credit to private sector has a negative and significant relationship with unemployment.

Table 4. Long Run Estimates

Variable	Coefficient	Std. Error	t-Statistic
D(Exchange rate)	0.156538***	0.010536	14.857391
D(Gross Domestic Product)	-0.267813***	0.084630	-3.164527
D(Credit to Private Sector)	0.251141	0.127824	1.964732
D(Eternal Debt)	-0.001883***	0.000481	-3.913955

Source: Author's computation from E-views 9

$p < 0.05$, ** $p < 0.01$, ***

Table four shows the long run estimates of the model. It is visible that the exchange rate significantly increases unemployment in the long run by about 16%. However, GDP and External debt both significantly reduce unemployment in the long run by about 27% and 1% respectively, whereas, credit to the private sector had no significant effect on the rate of unemployment in the long run.

3.4. Post Estimations

Table 5. Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.152782	Prob. F(2,12)	0.8600
Obs*R-squared	0.695280	Prob. Chi-Square(2)	0.7064

Source*:* Author's computation from E-views 9

Table 6. Heteroskedasticity Test

Breusch-Pagan-Godfrey Test			
F-statistic	0.790331	Prob. F(13,14)	0.6614
Obs*R-squared	11.85123	Prob. Chi-Square(13)	0.5399
Scaled explained SS	2.724858	Prob. Chi-Square(13)	0.9988

Source: Author's computation from E-views 9

Table 7. Ramsey RESET Test

	Value	Df	Probability
t-statistic	0.974381	13	0.3477
F-statistic	0.949419	(1, 13)	0.3477

Source: Author's computation from E-views 9

Table five, six and seven shows the results of the post estimations undertaken, that is, the Breusch-Godfrey Serial Correlation LM Test to check for the presence of serial correlation in the results, the Breusch-Pagan-Godfrey Test to check for the presence heteroskedasticity in the results and the Ramsey Reset Test to check for model misspecification. From the result presented in the tables, all the probability values are greater than 0.05 significance level showing that estimates is

free from serial correlation, heteroskedasticity, and is well specified, showing that the standard errors are unbiased and efficient.

4. Discussion of results

It is evident from the result that the exchange rate regime practiced in the country has not been favourable in terms of the rate of unemployment. It shows that both in the short and long run, exchange rate has led to increase in the rate of unemployment. This is possible especially as a result of the country's dependence on crude oil. Since the economy is largely dependent on crude oil exports, the successive increases in the exchange has been devastating on local manufacturers in order sectors since most their raw materials are imported, rather than produced locally. Hence, as the exchange rate changes with the inability of other sectors to handle the shocks, unemployment ensues as result high cost of production due increases in prices of raw materials and dwindling profits. Dogruel *et al.* (2010) found that in Turkey import prices and Dollar-Euro parity changes were major determinants the manufacturing sector in Turkey. The direction of relationship between exchange rate and unemployment in the study is similar to that of Chimnani *et al.* (2016) and Chimnani *et al.* (2012) who all found a positive and significant relationship between exchange rate and unemployment, however, Bakhshi & Ebrahimi (2016) found an inverse relationship between real exchange rate and unemployment.

The results further shows an inverse relationship between credit to the private sector and unemployment but in the short run, meaning that in the short run, making credit facilities available to the private is likely to leads economic gains. Especially, as an almost mono-economy which is prone to divers kinds of shocks such as economic, political and even social shocks, the injection of funds into the private sector is critical to its survival, especially in terms of serving as shock absorbers, expansionary purposes through channels such as increased output, investment in labor and human resources. With increased investments and output comes a need to increase labor which will invariably reduce unemployment. Lin (2012) states that, experience shows that an opened business operating environment in many African countries with appealing legislation incentives offered by government can be used as a facilitating mechanism in generating more investment from private sectors for economic development. He further states that investment from private organizations are mainly concentrated in agriculture, construction, manufacturing, hospitality and horticulture sectors, and these have significantly stimulated the development and growth of local SMEs and the industrialization process.

Furthermore, evident from the result is that economic growth (increase in GDP) reduces unemployment in the long run. This is arguably correct in several ways. First, for instance, consistent and steady increase in GDP is sign of economic health basically. This then can lead to increases in both domestic and foreign direct investments. When the economy is growing, expansion in domestic investment is almost inevitable and with stimulation through monetary or fiscal policy instruments, business are likely to demand for increased labor services which leads to creation of more employment opportunities and hence reduce unemployment. So also, inflows of FDI will also lead increase availability of funds for the economy which improves industrialization and reduces unemployment. Secondly, education and health are very important determinants of the employability in the country. Hence, higher economic growth rate means more funds are available for the government for fiscal expansion in other sector of the economy such as education and health which increases the likelihood of individual acquiring good education and increasing their health status which gives them a higher chance of been employed and hence, reducing unemployment. Again, since the private sector as also large employers of labor and participate in the stock market, GDP growth remains very critical in reducing unemployment. Most firms and companies trade in the stock market and a decreasing or unstable GDP is likely to reduce investment in the stock market, either through outflow of FDI or reduction in the inflow of FDI, reducing the participation of domestic firms and individual in the market, which may cause unemployment.

5. Conclusions

The rate of exchange of a country's currency remains cardinal to its overall economic health and system. Hence, the study sought to investigate how the exchange rate of Nigeria currency affects a major macroeconomic variable; Unemployment. This is because addressing unemployment is the major economic objective of any country. The study utilized the Auto Regressive and Distributed Lag (ARDL) Bound testing approach to cointegration and the ARDL-ECM estimator in order to capture both long-run and short-run dynamics between real exchange rate and unemployment in the country respectively, and to also account for endogeniety problems likely to arise as a result of lags.

Results from our estimations shows that both in the short and long run, exchange rate have led to increase in the rate of unemployment in the country. This we argued is possible due to the countries over dependence on crude oil. And, since the country is largely dependent on one commodity, that is crude oil exports, volatilities in the currency's exchange rate is likely to have devastating effect on local manufacturers, especially in sectors where most of their raw materials are imported, rather than produced locally. Hence, we can assert that, the inability of most sectors in the country to handle the shocks

and volatilities associated with the exchange rate causes unemployment ensues as result high cost of production due increases in prices of raw materials and dwindling profits.

We therefore recommend that the currency market should be monitored close especially against the activities of informal marketers. Also, the government should of necessity diversify the economy in order to reduce the over reliance on crude oil exports. Other sectors of the country especially the primary sectors such as the agricultural and solid mineral sectors should be developed in order to reduce the cost and importation of primary products. With these, the manufacturing sector will be strengthened and the trade balance improving, and hence more jobs will be created and unemployment reduced. Conclusively, the findings of this study are relevant for addressing unemployment in the country.

References

Adebowale, K. B. (2015). The Relationship between Inflation and Unemployment in Nigeria. *Submitted to the Institute of Graduate Studies and Research in partial fulfilment of the requirements of degree of Master in Economic Science.Eastern Mediterranean University* .

Akinlo, O. O., & Lawal, Q. A. (2015). Impact of Exchange Rate on Industrial Production in Nigeria 1986-2010. *International Business and Management, 10*(1), 104-110.

Akinmulegun, S. O., & Falana, O. E. (2018). Exchange Rate Fluctuation and Industrial Output Growth in Nigeria. *International Journal of Economics and Financial Research, 4*(5), 145-158.

Bakhshi, Z., & Ebrahimi, M. (2016). The effect of real exchange rate on unemployment. *Marketing and Branding Research, 3*, 4-13.

Chimnani, H., Bhutto, N. A., Butt, F., Shaikh, A. S., & Devi, W. (2016). The Effect of Exchange Rate on Unemployment Rate in Asian Countries. *Proceedings of 2nd International Conference on Business Management (ISBN: 978-969-9368-06-6).* Sukkur: Sukkur Institute of Business Administration.

Chimnani, H., Bhutto, N. A., Butt, F., Shaikh, S. A., & Devi, W. (2012). The effect of Exchange rate un unemployment rate in Asian countries. *Sukkur institure of business administration*.

Dhasmana, A. (2013). Real Effective Exchange Rate and Manufacturing Sector Performance: Evidence from Indian firms. *MPRA Paper No. 47479*.

Dogruel, A. S., Dogruel, F., & Izmen, U. (2010). Changes In Exchange Rates And The Performance Of The Manufacturing Sectors In Turkey. *Topics in Middle Eastern and African Economies, 12*.

Enders, W., & Hum, S. (1994). Theory and tests of generalized purchasing-power parity: Common trends and real exchange rates in the Pacific Rim. *Review of International Economics, 2*(2), 179-190.

Essien, S. N., Manya, G. A., Arigo, M. O., Bassey, K. J., Ogunyinka, S. F., Ojegwo, D. G., et al. (2016). Monetary Policy and Unemployment in Nigeria: Is there a Dynamic Relationship? *CBN Journal of Applied Statistics, 7* (1(b)).

Hong Vo, D., The Vo, A., & Zhang, Z. (2019). Exchange Rate Volatility and Disaggregated Manufacturing Exports: Evidence from an Emerging Country. *Journal of Risk and Financial Management, 12*(12), 1-25.

Lin, J. Y. (2012). New Structural Economics: A Framework for Rethinking. *Development and Policy*.

Nicita, A. (2013). Exchange Rates, International Trade and Trade Policies. *Policy Issues In International Trade And Commodities No. 56. Unctad, Geneva*, 1-30.

Nkoro, E., & Uko, A. K. (2016). Autoregressive Distributed Lag (ARDL) cointegration technique: application and interpretation. *Journal of Statistical and Econometric Methods, 5*(4), 63-91.

Orji, A., Anthony-Orji, O. I., & Okafor, J. C. (2015). Inflation And Unemployment Nexus In Nigeria: Another Test of the Phillip's Curve. *Asian Economic and Financial Review, 5*(5), 766-778.

Pesaran, M., Smith, R., & Shin, Y. (1996b). Testing for the Existence of a long run Relationship. *DAE Working paper No.9622, Department of Applied Economics, University of Cambridge*.