

EXTERNAL SECTOR VARIABLES AND UNEMPLOYMENT IN NIGERIA

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Abstract

The study examined external sector variables and unemployment in Nigeria from 1980-2016. To achieve the objectives of the study, secondary data on unemployment rate, exchange rate, external debt and export were collected from CBN statistics bulletin. The collected data was subjected to Augmented Dickey Fuller (ADF) unit root test in order to test for the order of integration of the variables; Johansen co-integration test to test for the long run equilibrium relationship amongst the variables and parsimonious ECM test to capture the short-run deviations as well as the speed of adjustment in the estimated model. The empirical results showed that the variables are individually integrated at order one and are indeed co-integrated. The ECM result showed that all the explanatory variables have the hypothesized signs and significantly impacted on unemployment rate, except that the exchange rate does not impact on unemployment rate. Also, the coefficient of ECM has the hypothesized negative sign and statistically significant at 5% level with the speed of adjustment of 60%. Based on these findings, the following policy recommendations amongst others were made: government should maintain a good market driven exchange rate policy in order to encourage local production that will lead to increase in export which will in turn lead to reduction in unemployment rate. Also, government should formulate and implement efficient and specific macroeconomic policy geared towards improving the real sector output to promote greater exchange rate stability and domestic production in the economy in order to increase employment rate.

Key words: Exchange Rate, Export, External Debt, External Sector & Unemployment.

1.0 INTRODUCTION

Some of the major problems in Nigeria that have hindered the attainment of macroeconomic objectives such as increase in economic growth as well as low unemployment rate have been attributed to unhealthy performance of external sector variables such as FDI, BOP, exchange rate, external borrowings as well as export (Obayori, 2016). With Nigeria vast mineral endowment particularly, petroleum and gas resources, and the rich and arable agricultural lands, Nigeria from independence till now, should have attained rapid economic development and national transformation.

The emergence of oil created distortions in the structure of the Nigerian economy. Thereby making the export of non-oil produce, particularly agricultural products like cocoa, groundnuts, rubber, cotton, and palm produce dropped, and this changed the structure of external trade, thus creating undesirable imbalance in the economy (Gbosi, 2015). A cursory inspection of data on the pattern and trend of external trade further explain or reveal the over dependence of the economy on oil, which has continued to remain often vulnerable to external shocks. The dependence of domestic production and consumption on the availability of foreign exchange was so high that when the price of oil collapsed in the 1980's, a spiral effect was felt on all sectors of the economy. The rate of growth of the economy took a downturn, with the GDP growth averaging 5.82% within the period; and this was exacerbated by government's excessive local and external borrowings. Similarly, the Central bank of Nigeria (CBN) report in 2014 revealed that inflation rate averaged 8.7% between 1980 and 1990. It then increased to 9.95 percent between 1991 and 2000. Inflation rate which was 9.9 percent between 1991 and 2000, drastically increased to 15.65 percent between 2001 and 2015. The cumulative effects was a sharp rise in the external debt service burden on an economy that had significant deficit budget financing. In the same vein, fluctuations in Nigeria's currency (Naira) exchange rate, which is a component of the external sector variables, caused economic instability in the country. For instance, CBN (2014) statistics revealed that the official exchange rate moved from a low level of ₦0.54: US \$ 1.00 in 1980 to a high of ₦ 22.05: US \$1.00 in 1994. Furthermore, between the year 2000 and 2014 the exchange rate rose again from ₦102.11: US \$1.00 to ₦ 161.00: US \$1.00. The official exchange rate released by the National Bureau of Statistics (NBS) for the last quarter of 2016 stood at ₦ 365.00: US \$1.00. Conversely, Nigerian export (oil and non-oil) which stood at ₦ 14.2m in 1980 increased to ₦109.9million in 1990, and then to ₦145.7million in 2000. In fact, it got to a peak of ₦12011.5m in 2010 and then fell to ₦ 10067.300m in 2014. Similarly, Tajudeen (2012) stated that Nigeria's debt burden discouraged investments in the economy and created difficulties in accessing needed additional funds from the international capital market. In the case of external debt, Mordi, Englama and Adebuseyi (2010) observed that the debt profile of the country revealed an economy that was largely characterized with under borrowed from 1960 to late 1970's, but over-borrowed between 1980 till 2016.

According to Obayori, (2016) the fluctuations in the external sector caused increase the rate of unemployment in the country. This is because, evidence in Nigeria shows that unemployment rate has continued to increase over the years. For example unemployment decreased from 6.4 percent in 1980 to 5.7 percent in 1990; it then increased to 11.5 percent in the 2000 and 2010, and made an average increase to 14.3 percent between 2001 and 2015. The persistent increase in unemployment means that an estimated more than 70 percent of Nigerians lived in poverty.

From the above, it is obvious that the performance of the external sector variables did not translate into reduction in unemployment as well as bring about equilibrium balance of payments. The country was still under developed, as evidenced by the low or negative growth rate, which was still much dependent on other economies. The much taunted benefits from the external sector seemed yet to be felt, meaning that the performance of the external sector in terms of exchange rate, external debt and export had not impacted on the unemployment rate of the country. Thus, it is the above state of affairs that

provoked this research work. The objectives of the study were to; examine the impact of exchange rate on unemployment in Nigeria; analyze the impact of external debt on unemployment in Nigeria; and determine the impact of export on unemployment in Nigeria.

2.0 LITERATURE REVIEW

This section reviews relevant literature under the following sub-headings: theoretical literature and empirical literature reviewed.

2.1 Review of Theoretical Literature

There are a variety of theories that link the economy to the components of the external sector. But the study examined the two-gap model of development. The two-gap model is contained in the post Keynesian growth model for closed economies as designed by Harrod (1939) and Domar (1946). The major element of the model is that most countries either face a shortage of domestic savings to augment for investment opportunity, or they are faced with foreign exchange constraints to finance needed capital and international goods.

Meanwhile, the model introduces the assumption that an imported commodity not produced domestically is essential for the production of investment goods.

The model is represented thus; $Y = C + I + (X - M)$

It can be rearranged as sources of income in the economy are equal to uses of resources in the economy. $Y + M = C + I + X$

Subtracting C from both sides and defining savings ($S = Y - C$)

Then $S + M = I + X$

The two-gap model is then represented by $M - X = I - S$ (Foreign exchange gap) (Savings gap).

In essence the model says that if the available domestic savings fall short of the level necessary to achieve the target rate of growth, a savings-investment gap is said to exist, and to close this gap requires Foreign Direct Investment (FDI); so also, if the maximum import requirements needed to achieve the growth target are greater than the maximum possible level of exports, this would denote a situation of high importation, which will lead to a shortfall in the foreign exchange. This constitutes the trade gap which may be corrected by foreign aid.

The model however has a weakness noted by Abdullahi, Aliero and Abdullahi (2013), as focusing solely on the savings-investment gap. By not considering the performance of the external sector of the borrower's economy, the model is silent on this transformation problem.

The relevance of this theory to this study is that the model advocated for domestic savings as a necessity to achieving reduction in unemployment. It also averred that foreign direct investment, foreign exchange and foreign aid would help to close the trade gap and boost economic growth and employment rate.

2.2 Review of Empirical Literature

Hua (2011) in his work "economic and social effects of real exchange rate evidence from Chinese provinces," used the one-step Generalized Movement Model (GMM) and panel data, to test variables of GDP, real exchange rate, capital intensity, share of employment, education level, export share, coastal provinces etc. His result showed that exchange rate

appreciated has negative effect on the economic growth. Also, the result showed that exchange rate appreciation had a negative effect on employment.

Ohwofasa, Nana and Kumapayi (2012) examined impact of external debt management on macroeconomic performance in Nigeria using data spanning 1986-2011 and employed an Ordinary Least Squares (OLS) technique. Four equations were modeled in which the independent variables included external debt, debt service payment, balance of payments and foreign direct investment (FDI). The dependent variables were unemployment and GDP. The OLS results revealed that impact of external debt, debt service payment, balance of payments is negative while FDI had a positive influence on GDP. Again, external debt, debt service payment, balance of payments had positive determining influence on unemployment while that of FDI on unemployment was negative.

Akpan and Atan (2012) examined exchange rate macro-economic aggregates in Nigeria, using a Generalized Moment Method (GMM) and simultaneous equations. They tested rate of inflation, growth rate, real exchange rate, real exports, real government revenue, and real government expenditure. Their results showed that there is no evidence of a strong direct relationship between changes in the exchange rate and inflation growth rate.

Imoisi (2012) examined the nexus between BOP and inflation rate in Nigeria using OLS method. He found that there was an insignificant relationship between BOP and inflation, while the relationship between BOP, exchange rate and interest rate was significant. This is in conformity with the economy theory.

Noel and Gulasekaran (2010) examined trade affect and equilibrium rate of unemployment. Having incorporated firm-union bargaining considerations into a model with a booming external sector and a stagnating manufacturing sector, they found out that a sustained improvement in the terms of trade lowers unemployment. To empirically investigate the predicted determinants of the unemployment rate, they used data for Australia (a country whose prosperity had always depended on the value of its exports), to find strong evidence that higher export prices, capital accumulation in tradeable goods industries and a lower unemployment benefit replacement rate each reduce the equilibrium unemployment rate.

Guido (2005) estimated the impact of world agricultural trade liberalization on wages, employment and unemployment in Argentina, a country with positive net agricultural exports and high unemployment rates. In the estimation of these wage and unemployment responses, my empirical model allows for individual labor supply responses and for adjustment costs in labor demand. It was found that a 10 percent increase in the price of agricultural exports would cause an increase in the Argentine employment probability of 1.36 percentage points, matched by a decline in the unemployment probability of 0.75 percentage points and an increase in labor market participation of 0.61 percentage points. Further, the unemployment rate would decline by 1.23 percentage points (by almost 10 percent). Expected wages would increase by 10.3 percent, an effect that is mostly driven by higher employment probabilities.

Scholarships are limited in the area of evaluating external sector variables and unemployment as shown above. Therefore this study tends to add to the existing literature between external sector variables and unemployment of the Nigerian economy.

3.0 METHODOLOGY

Time series data for the study was collected from CBN statistical bulletin. The study employed Error Correction Method as the main analytical tool. Before the estimation of ECM, the model was subjected to descriptive statistics, ADF unit root test and Johansen co-integration test in stability of the data, stationarity of the variables and the long run relationship of the variables under consideration respectively. The model specification of the ECM was stated in log-linear form as follow;

$$\text{LnUEP}_t = \alpha_0 + \alpha_1 \text{Ln}\Sigma \text{UEP}_{t-1} + \alpha_2 \text{Ln}\Sigma \text{EXR}_{t-1} + \alpha_3 \text{Ln}\Sigma \text{EXD}_{t-1} + \alpha_4 \text{Ln}\Sigma \text{EPP}_{t-1} + \pi_1 \text{ECM}_{t-1} + U \quad (3.1)$$

Where; UEP is Unemployment Rate, EXR is Exchange rate, EXD is External Debt, EPP is Export, U is Error Term, t = Time Frame, α_0 = Autonomous components of unemployment, α_2 - α_4 is slopes of external sector variables (Exchange rate, external debt and export), Ln is Logarithm and π is the coefficient of ECM.

Apriori Expectation: On the apriori, it is expected that, $\alpha_1 < 0$, $\alpha_2 < 0$, $\alpha_3 < 0$ and $\alpha_4 < 0$

Post Estimate Test

These tests were carried out as a post estimate test to ascertain if the statistical criteria of the estimated model are met, authenticate if parameters are reliable and as well as certain if the general model is good for policy recommendation. Thus, the Wald Test for coefficient of restrictions of the estimated model, heteroskedasticity test via ARCH, normality test via Jarque-Bera were conducted.

4.0 RESULTS AND DISCUSSION

The empirical analysis focused mainly on descriptive statistics, estimation of the regression result model and post estimate test amongst others.

4.1 Descriptive Statistics for Underlying Series

The essence of the descriptive statistics is to ascertain stability of the time series

Table 1: Descriptive Statistics for Underlying Series

	UEP	EXR	EXD	EPP
Mean	8.994595	78.75919	1015181.	4536.662
Median	8.500000	22.05000	617320.0	1241.700
Maximum	14.60000	376.8600	4890270.	16677.19
Minimum	4.000000	0.540000	1866.800	7.500000
Std. Dev.	3.030030	83.02453	1324814.	5937.146
Skewness	0.335733	1.227037	1.704585	1.022148
Kurtosis	2.011952	5.258998	4.697200	2.448015
Jarque-Bera	2.200119	17.15189	22.35868	6.912580
Probability	0.332851	0.000189	0.000014	0.031547
Sum	332.8000	2914.090	37561714	167856.5
Sum Sq. Dev.	330.5189	248150.6	6.32E+13	1.27E+09
Observations	37	37	37	37

Source: Authors' Computation from (E- view 9)

The descriptive statistics reported in Table1 indicated that unemployment rate (UEP), exchange rate (EXR), external debt (EXD) and export (EPP) averaged ₦444885.9million,

8.994595%, ₦ 78.75919million, ₦1015181million and ₦ 4536.662million respectively. The standard deviation showed that the dependent variable (unemployment rate) converged around its mean. While the independent variables (exchange rate, external debt and export) did not converge around their respective mean. The skewness test result showed positive values for all the series, meaning that they have high tails. More so, the kurtosis test showed that exchange rate has a large tail, while the remaining variables (unemployment rate, external debt and export) have thin tails. The probability of Jarque-Bera statistics suggest that the null hypothesis of normal distribution for exchange rate, external debt and export are rejected at 5% level while that of the dependent variable unemployment rate cannot be rejected.

4.2 Unit Root Test

The Augmented Dickey Fuller (ADF) test was used to investigate stationarity and the order of integration of the variables.

Table 2 Augmented Dickey Fuller Unit Root Test at First Difference

Variable	ADF Test @ Level	Critical Value			ADF Test @ 1 ST Diff	Critical Value			Order of Integration
		1%	5%	10%		1%	5%	10%	
UEP	0.1268	-3.6394	-2.9511	-2.6143	-7.77451	-3.6394	-2.9511	-2.6143	1(1)
EXR	-1.5380	-3.6329	-2.9484	-2.6129	-5.14901	-3.6329	-2.9484	-2.6129	1(1)
EXD	-2.4468	-3.6329	-2.9484	-2.6129	-4.06289	-3.6329	-2.9484	-2.6129	1(1)
EPP	1.4034	-3.6268	-2.9458	-2.6115	-5.41828	-3.6329	-2.9484	-2.6129	1(1)

Source: Authors' Computation from (E- view 9)

The stationarity of each of the series is presented in Table 2 using the ADF tests depicted that all the variables were not stationary at level. Therefore, they were differenced once and they became stationary at first difference prior to subsequent estimations to forestall spurious regressions. This therefore means that the best regression result was obtained when the above variables were used in model estimation.

4.3 Co-integration Test

The Johansen co-integration test was used to examine the long run relationship among the variables at 5% level

Table 3 Johansen Co-integration Test Result for UEP Model

Eigen value K=4, r=4	Trace Statistics	5% critical value	Prob. **	Hypothesis of CE(s)
0.855768	144.2110	47.85613	0.0000	None *
0.788256	82.24841	29.79707	0.0000	At most 1 *
0.540053	32.57229	15.49471	0.0001	At most 2 *
0.214347	7.719674	3.841466	0.0055	At most 3 *

Note: r= number of co-integrating vectors and k = number of lags in model. * rejection of the H0

Source: Authors' Computation from (E- view 9)

The results of the Trace statistics in the estimated model showed that there are four co-integrating vectors respectively in the model. This is because the computed values of the Trace test statistics are greater than their corresponding critical values at 5% level. Thus, the null hypothesis (H0) of no co-integration among the variables was rejected. Based on these findings, it is concluded that the variables have long run relationship. Thus, necessitating the estimation of co-integration regression model reflects the long run behaviour of the regressors (explanatory variables).

4.4 The Error Correction Method

According to Iyoha and Ekanem (2004), error correction model (ECM) involves using lagged residual to correct for deviations of actual values from the long-run equilibrium values. In order to capture the short-run deviations that might have occurred within the period of the study, the general-to-specific rule was followed. The estimated result of the parsimonious ECM was showed below.

Table 4: Parsimonious Error Correction Mechanism for UEP Model

Variables	Coefficient	T-Statistics	T-Table	Probability
C	-0.046093	-0.172515	1.6924	0.8644
D(UEP(-1))	-0.071622	-0.483776	1.6924	0.6328
D(UEP(-2))	1.52E-05	1.704584	1.6924	0.1007
D(UEP(-3))	0.096227	0.925230	1.6924	0.3637
D(EXR(-2))	0.022832	1.465814	1.6924	0.1552
D(EXD(-2))	-9.09E-07	-3.054772	1.6924	0.0053
D(EPP(-2))	-0.000509	-2.622307	1.6924	0.0147
ECM(-1)	-0.600755	-2.726816	1.6924	0.0115
R ² =0.6302 DW-Stat= 1.7138 F-Stat.=6.0868 Prob(F-statistic) = 0.000322				

Source: Author's Computation from (E- view 9)

The results of the parsimonious error correction model presented in Table 4 showed that the value of exchange rate (EXR) has a positive and insignificant impact on unemployment rate. Thus, a unit increase in exchange rate causes an increase in unemployment by 0.022832%. Also, t-stat; 1.4658 < t-tab, 1.6924. Thus, the null hypothesis, which states that there is a significant relationship between exchange rate and unemployment rate, was accepted. Moreover, the value of external debt (EXD) has a negative and significant impact on unemployment rate. Thus, a unit increases in external debt will decrease unemployment rate by 0.000000909%. Also, in absolute term the t-stat; 3.0547 > t-tab, 1.6924. Thus, the alternative hypothesis which states that there is a significant relationship between external debt and unemployment rate is accepted. Similarly, the value of export (EPP) has a negative and significant impact on unemployment rate. Thus, a unit increases in export decreases unemployment rate by 0.000509%. Also, in absolute terms, the t-stat; 2.6223 > t-tab, 1.6924. Thus, the alternative hypothesis which states that there is a significant relationship between export and unemployment rate is accepted.

The coefficient of ECM has the hypothesized negative sign and statistically significant at 5% level. Thus, the long run equilibrium position can be achieved instantaneously in the case of the short run disequilibrium in the system. Meaning that the speed of adjustment of unemployment in the long run depicted by the coefficient of ECM is (-0.600755), implies that about 60% of the disturbance in the short run is corrected each year. Also, the R² of 63% shows that the model is a good fit. The Durbin Watson statistics value of 1.7138 which is very close to 2.0, based on rule-of-thumb, implies that there exists a lesser degree of serial autocorrelation in the model.

4.5 Post Estimation Test

The diagnosis tests are employed to examine the reliability of the estimated models for prediction or policy purposes. Specifically, the Wald test for coefficient of restriction, Breusch-Godfrey (B-G) Lagrange Multiplier (LM) tests for serial correlation and normality tests were applied as diagnostics or post-estimation tests. The results of these tests are reported as follows:

Table 5: Wald Test for Coefficient of Restrictions

Test Statistic	Value	Df	Probability
F-statistic	2.19E+10	(4, 25)	0.0000
Chi-square	8.77E+10	4	0.0000

Source: Authors' Computation from (E- view 9)

The result of the Wald test in the unemployment model as presented in Table 5 showed that the F-statistic is 219. Also, given the f-probability value of (0.0000) which is less than 0.05 at 5% level, it is thus concluded that all the independent variables in the estimated model are jointly significant in explaining the rate of unemployment in Nigeria over the study period.

Table 6: Breusch-Godfrey test for Serial Correlation Test

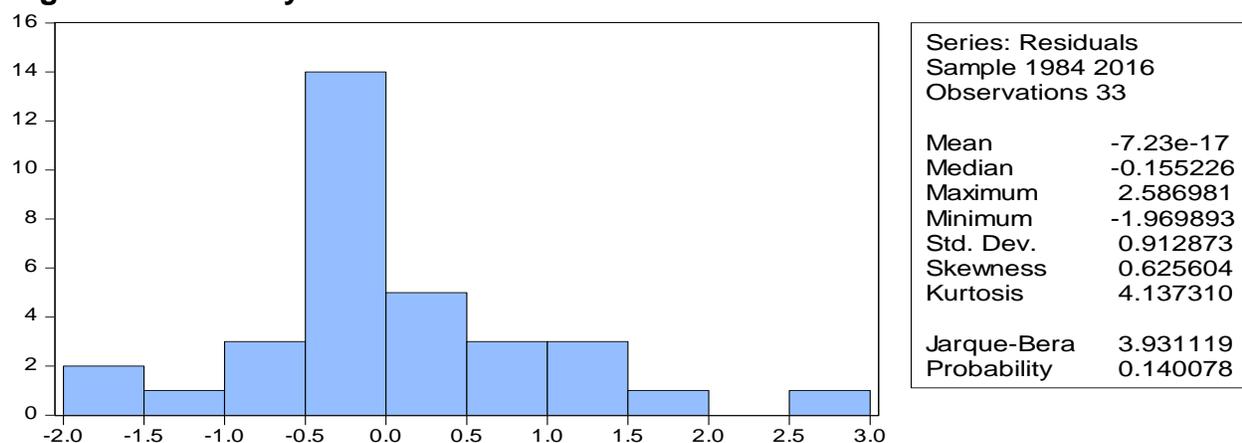
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.576640	Prob. F(2,23)	0.5697
		Prob. Chi-	
Obs*R-squared	1.575695	Square(2)	0.4548

Source: Authors' Computation from (E- view 9)

The serial correlation LM test result presented in Table 6 showed that in the unemployment model, serial autocorrelation is not a problem in the parsimonious error correction model. This is because the chi-square value of 1.575695 and the corresponding probability value of (0.4548) of the chi-square statistic exceed the 0.05. Thus, the null hypothesis of no serial autocorrelation is upheld.

Figure 1: Normality Test for Estimated Model



Source: Authors' Computation from (E- view 9)

The result presented in Figure 1 showed that in the estimated model, the error term is normally distributed at the conventional 5 percent level. This is because the probability value of the Jarque-Bera statistic of 0.14 is greater than the 0.05 percent conventional level. This therefore affirms that the estimated is valid for policy implementation.

5.0 CONCLUSION AND RECOMMENDATIONS

The study examined external sector variables and unemployment in Nigeria during the period of 1980-2016. To this end, the objectives of the study were to; examine the impact of exchange rate on unemployment in Nigeria, analyze the impact of external debt on unemployment in Nigeria and determine the impact of export on unemployment in Nigeria. Secondary data on gross domestic product, unemployment rate, exchange rate, external debt and exports were collected from CBN statistics bulletin. Data on the variables were subjected to unit root test using Augmented Dickey Fuller (ADF) in order to test for the order of integration of the variables; Johansen co-integration test used in order to test for the long run equilibrium relationship amongst the variables; and parsimonious ECM used in order to capture the short-run deviations that might have occurred and test for the speed of adjustment in the estimated model within the period of the study.

The empirical results showed that all the explanatory variables have the hypothesized signs and did significantly impacted on unemployment rate, except that the exchange rate is not significant and does not impact on unemployment rate. Also, the coefficient of ECM has the hypothesized negative sign and statistically significant at 5% level. The Durbin Watson statistics value suggests that there is no serious serial autocorrelation in the model. Thus, the model is good for policy implementation. The post estimate test to ascertain if the statistical criteria of the estimated models are met, authenticate if parameters are reliable, and as well as ascertain if the general model is good for policy recommendation. The tests result showed that the estimated models are reliable and stable. Thus, the models are good for policy recommendation. Given that the models are free from serial autocorrelation, the coefficient of the explanatory variables are jointly equal to zero (significant) and the model is normally distributed at 5 percent level.

Based on the findings, the following policy recommendations were made: government should have an exchange rate policy that encourages local production and hence reduction in unemployment rate. Also, government macroeconomic policy geared towards improving the real sector output to promote greater exchange rate stability and domestic production in the economy, in order to increase employment rate and economic growth. External borrowings should be well utilized with a view to increasing the rate of employment and economic growth.

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