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### Accounting implications of oil price, interest rate and unemployment on Nigeria economic growth

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#### Abstract

Holding other variables constant, Exchange rate and unemployment is supposed to have an inverse relationship, is this really the case in Nigeria economy? Do oil price affect unemployment in Nigeria? Our study analyzed the accounting implications of oil price, interest rate and unemployment on Nigeria economic growth using data from 1981 to 2019 using ARDL and VEC model, our finding revealed that all variables have a short and long term association and are statically significant, hence we recommended Better economy policy should be put in place by government to curb unemployment because this have a long and short run implication on GDP, and if not properly managed can lead to economic and social vices; The government should formulate policy that are economically friendly in order to encourage local production to boost our export and improve our local currency (Naira) such that as exchange rate increase local production and firms, this will create employment opportunities for our teaming populations; and Increased in the oil price has really helped in boosting our GDP, however the economy should be diversify because any drastical drop in our oil price will definitely affect our GDP drastically both in the short and long run.

**Keywords:** Efficient wage model, unemployment, interest rate, oil price, accounting implication, gross domestic product, economic policy

#### 1. Introduction

The number one priority of any government of the world is to improve her economy and Nigeria is not left out, this cannot be done without sufficient fund. Prior the discovery of crude-oil in commercial quantity in 1958 in Nigeria, Nigeria major source of revenue has been from agriculture which was a major source of income and employment. Crude-oil income contributing over 70% of government revenue and 95% of foreign exchange earnings (Odusola, 2006) <sup>[13]</sup>. Nigeria has been seen to be the largest oil producing country in African and the eleventh in the world (Khadijat & Taophic, 2018) <sup>[7]</sup>. Meanwhile, contrary to the expectations of the positive effect of rising oil prices to economic growth of Nigeria, unemployment has been on the rise. Unemployment is one of the major macroeconomic problem that every economies is trying to reduce to an acceptable level, because if it is not properly tame can lead to social and economic implications for all economies, Hence every government of the world try to put measures and policies in place that help in reduce the unemployment rate (Ahmad, 2013) <sup>[1]</sup>.

Doğrul and Soytaş (2010) <sup>[4]</sup> studied Turkey economy from 2005-2009 and revealed that oil price and interest rate improve the forecasts of unemployment in the long run. However Ahmad (2013) <sup>[1]</sup> in studying the Pakistan economy revealed that interest rate have no influence on unemployment, this has prompted us to delve into the research due to the contrary views. The surge in the price oil price has affected drastically any economy that depend on oil as a major sources of revenue and Nigeria is not left out, to the best of our knowledge from literature reviewed thus far, the accounting implication of oil price, interest rate and unemployment has not been applied to the Nigeria economy using recent data 1991 to 2019. Mellquist and Femermo (2007) <sup>[11]</sup> in their study of Sweden economy with respect to the oil price and unemployment using the Granger causality could not assert whether an increase in the price of oil will lead to a positive or negative impact on unemployment. Karlsson, Li and Shukur (2018) <sup>[5]</sup> the top 20 major oil exporters are Saudi Arabia, Russia, Iran, United Arab Emirates, Kuwait, Nigeria, Iraq, Norway, Angola, Venezuela, Algeria, Qatar, Canada, Kazakhstan, and Mexico, Brazil, Colombia, and the United Kingdom.

Most of these countries have fixed exchange rate and Nigeria was not left out until 2016 when she adopted a floating exchange rate.

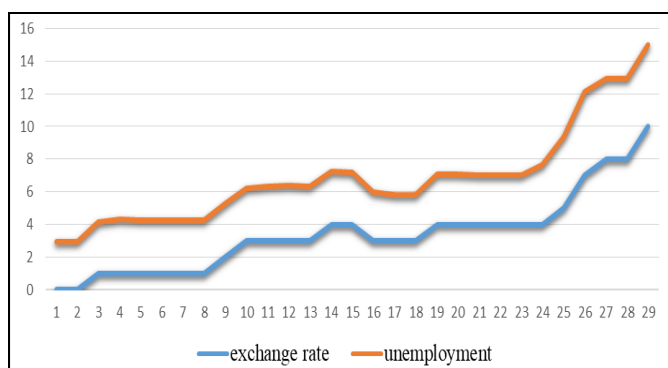
Unemployment in Nigeria has been on the rise despite the macro economy policies put in place by government and with the current floating exchange rate and surge in oil price we have deem it necessary to know the accounting implication on the economy. Nigeria is a country that has a population of more 180 million people, and we she is endowed with crude oil which ought to have been prosperous and engaged the teaming populace that have the required acumen, willing and able to work, looking at the values of the natural resources and the generated revenue, it is expected that the inflows from the oil ought to have been sufficient enough to provide an enabling industry and working environment for the populace (Manasseh *et al.*, 2019) <sup>[9]</sup>.

The rest of this paper is arranged as follows: section two review of related literature, section three discussed the methodology and the fourth section discusses the presentation of data, data analysis, and test of hypotheses and discussion of findings. While in section five is the conclusion and recommendations.

## 2. Review of related literature

### 2.1. Theoretical framework

Uri (1996) <sup>[14]</sup> Oil price and exchange rate can affect the productivity of any economy and in turn affect unemployment, this does not only affect manufacturing, agriculture dependent economy alone but affect economy like Nigeria that her major sources of revenue comes from crude. Löschel and Oberndorfer (2009) <sup>[8]</sup> until real wages drop by the same proportion in labor productivity, firms will continue lay off workers, which will lead to a rise in unemployment and cause a further loss to the economic growth of a nation. With adoption of the floating exchange rate, increase in the rate will help to reduce unemployment although that of Nigeria economy the reverse was the case as shown below.



Source: Researchers' computations from statistical bulletin

Fig 1: Graphical relationship of unemployment and Exchange rate of Nigeria

### 2.2 Unemployment theory

Keynes (1936) opined that in order to reduce unemployment government most provide enabling environment and provide social and economic policies that will engage the populace productively, further revealed that there is an inverse relationship between unemployment and inflation.

Looking at the demand and supply framework of unemployment, it can be deduce that the level of

employment depends on factors of productions such as labor, wages, price level, and prices of other factors of production. On a broad economic level (Macro), unemployment rate is also influence by the local factors such as economic state, business cycles, the technology level, and population demographics, as well as global factors which are the external factors beyond the control of the employer of labor (Doğrul & Soytaş, 2010) <sup>[4]</sup>.

### 2.3 Exchange rate theory

Exchange rate play a great role in an economy, Akujinma, Chijindu and Theodora (2017) <sup>[2]</sup> the life-wire of any economy is determine by the exchange rate policy put in place and Nigeria is not left out, with the introduction of structural adjustment programme (SAP) in 1986, has made our local currency to loss value in the international market. Prior to the introduction and adoption of SAP which made used of the floating exchange rate, in the sixties and seventies the fixed exchange rate was used by the regulatory system. Akujinma, Chijindu and Theodora (2017) <sup>[2]</sup> cited Cassel (1981) propounded the purchasing power parity (PPP) theory, as a result of the failure of the fixed exchange rate system, the PPP states that the forces of demand and supply of the market should determine the prevailing exchange rate the rule the transaction.

### 2.4 Empirical studies

Manasseh *et al.* (2019) <sup>[9]</sup> used time series data from 1981 to 2014 to investigate the impact of oil price fluctuation and oil revenue on well-being in Nigeria using multiple regression techniques, revealed that oil price fluctuations have no significant impact on well-being, while oil revenue is observed to have a significant and positive impact on well-being. Although there is long term relationship between the variables, therefore if any of the variable increase so does the other.

Bassey *et al.* (2016) <sup>[3]</sup> examined the relationship between unemployment and monetary policy in Nigeria, they used data from 1983 to 2014, vector autoregressive (VAR) was used to analysis the data and found out that a positive shock to policy rate raises unemployment over a 10 quarter period. Hence there study conclude that there is a relationship between monetary policy and unemployment in Nigeria.

Ahmad (2013) <sup>[1]</sup> used data ranging from 1991 to 2010 of Pakistan economy to investigate the relationship between oil prices and unemployment, making 238 observations of each variable for analysis and employed Toda Yamamoto causality test revealed a significant impact of oil prices on unemployment but found no significant relationship between real interest rate and unemployment.

Löschel and Oberndorfer (2009) <sup>[8]</sup> analyzed oil price impacts on unemployment of Germany economy, their data covered from 1973 to 2008, using a vector auto regression (VAR) and revealed that oil price increases help increase unemployment in the German labor market. However this contrary to Manasseh *et al.* (2019) <sup>[9]</sup>.

## 3. Methodology

### 3.1 Data source

We used the vector autoregression (VAR) to addresses accounting implications of oil price, interest rate and unemployment on Nigeria economic growth, which is a more recent employed in literature. This is because the model is useful in an analyzing financial, time series as well

as for forecasting, the data employed in this study are Real Gross domestic product (GDP), Exchange rate (EXR), Oil price (OILP) and Unemployment rate (UNE).

**3.2 Econometric model (ARDL)**

The model for this study is restated below:

$$GDP = f(EXR, OILP, UNE) \dots \dots \dots (1)$$

In order to agree with our Autoregressive distribution lag (ARDL) model, another equation is stated below:

$$\Delta Y_t = \beta_0 + \underbrace{\sum_{i=1}^n \beta_i \Delta y_{t-i}}_{\text{Short-run}} + \underbrace{\sum_{i=0}^n \delta_i \Delta X_{t-i}}_{\text{Long-run}} + \Phi_1 y_{t-1} + \Phi_2 x_{t-1} + \mu_i$$

**Where**

- Short-run coefficients:  $\beta_0, \delta_i$
- Long-run coefficients:  $\Phi_1, \Phi_2$
- Disturbance (White noise) term:  $\mu_i$

**3.3. The error correction model**

$$ECM = \Delta Y_t = \beta_0 + \sum_{i=1}^n \beta_i \Delta y_{t-i} + \sum_{i=0}^n \delta_i \Delta X_{t-i} + \Phi Z_{t-1} + \mu_i$$

Where:  $Z_{t-1} = y_{i-1} - b_0 + b_1 x_{t-1}$  are the lagged residuals.

**4. Data Presentation and analysis**

**4.1 Descriptive statistics**

**Table 1:** Show the value of GDP

	GDP	EXR	OILP	UNE
Mean	34664165	95.53026	48.13667	4.113333
Median	23688280	101.7000	40.76000	3.950000
Maximum	70354216	361.0000	109.4500	6.240000
Minimum	13779255	0.620000	12.28000	3.420000
Std. Dev.	20189072	96.41795	29.61875	0.752135
Skewness	0.669514	0.957833	0.653477	1.940672
Kurtosis	1.870775	3.339030	2.249708	5.581713
Jarque-Bera	4.985731	6.150167	3.690482	35.31138
Probability	0.082673	0.046186	0.157987	0.000000
Sum	1.35E+09	3725.680	1877.330	160.4200
Sum Sq. Dev.	1.55E+16	353264.0	33336.27	21.49687
Observations	39	39	39	39

Source: Authors computations using eview 10+

**4.2 Lag selection criteria**

**Table 2:** VAR Lag and GDP variables

VAR Lag Order Selection Criteria						
Endogenous variables: D(GDP)						
Exogenous variables: C D(EXR) D(OILP) D(UNE)						
Date: 06/23/20 Time: 21:35						
Sample: 1981 2019						
Included observations: 30						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-465.3001	NA	2.27e+12	31.28667	31.47350	31.34644
1	-455.0168	17.13883*	1.22e+12*	30.66779*	30.90132*	30.74249*
2	-454.9630	0.086122	1.31e+12	30.73086	31.01110	30.82051
3	-454.8251	0.211418	1.39e+12	30.78834	31.11528	30.89293
4	-453.7316	1.603754	1.39e+12	30.78211	31.15576	30.90164
5	-453.7230	0.011984	1.49e+12	30.84820	31.26856	30.98268
6	-453.3006	0.563253	1.56e+12	30.88671	31.35377	31.03613
7	-453.0667	0.296252	1.66e+12	30.93778	31.45155	31.10214
8	-453.0480	0.022479	1.79e+12	31.00320	31.56368	31.18250

Source: Authors computations using eview 10+  
 \* indicates lag order selected by the criterion  
 LR: sequential modified LR test statistic (each test at 5% level)  
 FPE: Final prediction error  
 AIC: Akaike information criterion  
 SC: Schwarz information criterion  
 HQ: Hannan-Quinn information criterion

The above showed that are variables all settle for one lag, which is used in our analysis

**4.3 Serial Correlation**

**Table 3:** The Serial Correlation

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 1 lag			
F-statistic	0.310305	Prob. F(1,12)	0.5877
Obs*R-squared	0.857036	Prob. Chi-Square(1)	0.3546

Source: Authors computations using eview 10+

The above showed that there is no serial correlation, the valued associated with the Chi-Square statistic (0.3546) is more than 5%

### 4.4 Stability analysis

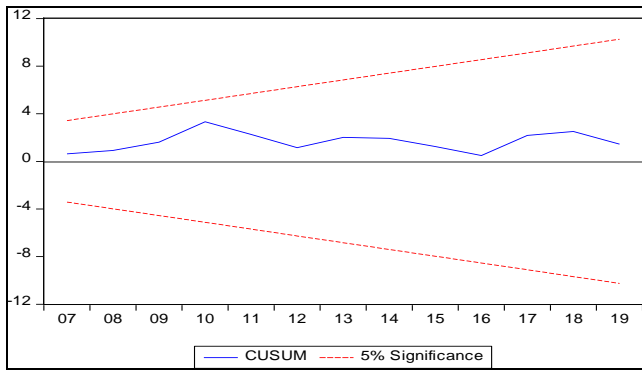


Fig 2: The above showed that Stability analysis

The above showed that our model is stable, since the above line is within the bound region

### 4.5 Bound Test

Table 4: The table of bound test

Test Statistic	Value	df	Probability
F-statistic	8.454323	(3, 23)	0.0006
Chi-square	25.36297	3	0.0000

Source: Authors computations using eview 10<sup>+</sup>

The pesaran table (unrestricted intercept and no trend) at 5% lower bound 4.94 and upper bound 5.73 with respect to our F-statistic showed that there is long term elation between our variables and our model is significant.

### 4.6 Error correction model (ECM)

Table 5: Error correction model

Dependent Variable: D(GDP)				
Method: Least Squares				
Date: 06/22/20 Time: 16:04				
Sample (adjusted): 1985 2019				
Included observations: 35 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	40975.06	260185.4	0.157484	0.8764
D(GDP(-1))	1.144879	0.324956	3.523178	0.0020
D(EXR(-1))	12613.68	11570.26	1.090181	0.2880
D(OILP(-1))	14938.74	11525.93	1.296098	0.2090
D(UNE(-1))	273001.3	842089.9	0.324195	0.7490
ECT(-1)	-0.905637	0.398109	-2.274846	0.0335

Source: Authors computations using eview 10<sup>+</sup>

Our correction term (ECT) is the speed of adjustment to equilibrium which -0.905637 and statistical significant at 0.0335.

### 4.7 ECM (Serial Corrolation)

Table 6: Serial Corrolation ECM

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 1 lag			
F-statistic	0.896143	Prob. F(1,18)	0.3564
Obs*R-squared	1.565013	Prob. Chi-Square(1)	0.2109

Source: Authors computations using eview 10<sup>+</sup>

The above showed that there is no serial correlations among the variables used in the analysis.

### 4.8 ECM (Stability Analysis)

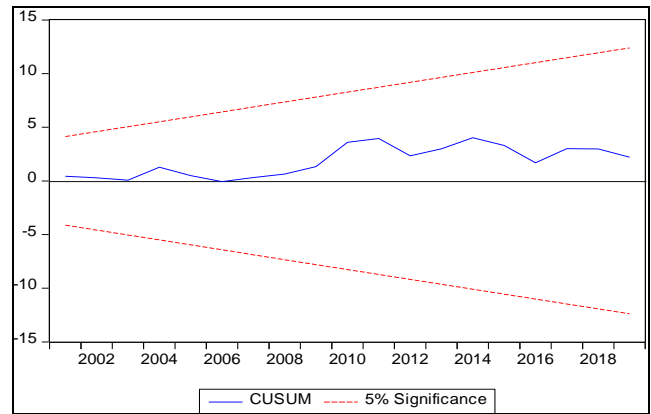


Fig 3: The above showed ECM Stability Analysis

The above showed that our model is stable, since the above line is within the bound region

### 5. Conclusion and recommendations

The study analyzed accounting implications of oil price, interest rate and unemployment on Nigeria economic growth using data from 1981 to 2019 Index mundi and statistical bulletin of Nigeria by employing the ARDL model and ECM. Our findings revealed there is a long and short run relationships between our variables, which imply that exchange rate, oil price and unemployment have a great impact on our GDP.

Therefore we recommended that

- Better economy policy should be put in place by government to curb unemployment because this have a long and short run implication on GDP, and if not properly managed can lead to economic and social vices;
- The government should formulate policy that are economically friendly in order to encourage local production to boost our export and improve our local currency (Naira) such that as exchange rate increase local production and firms, this will create employment opportunities for our teaming populations; and
- Increased in the oil price has really helped in boosting our GDP, however the economy should be diversify because any drastical drop in our oil price will definitely affect our GDP drastically both in the short and long run.

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