Applicability of Okun's Law in Nigeria: A Critical Evaluation: An Autoregressive Distributed Lag (ARDL) Model

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Abstract
The research focused on evaluating the relevance of Okun's Law in Nigeria's economy. Okun's law suggest that a 3:1 negative relationship exists between output growth (GDP) and unemployment rate. The theory suggests that increases in GDP will automatically leads to a reduction in unemployment rate. We made use of recent data set between 1980 – 2017 obtained from the Central Bank of Nigeria's (CBN) Statistical Bulletin and extracts from National Bureau of Statistics (NBS). Having ascertained that the data set were fractionally integrated of order-zero I(0) and order-one I(1), we applied the Autoregressive Distributed Lag Model. The Bounds Test conintegration result indicates that a longrun relationship exists between the variables. Bearing in mind the influence of oil in Nigeria's economy, we introduced oil revenue as a check variable to align with realities. The result emanating from the estimated shortrun coefficients indicate that with passage of time, a positive and significant relationship emerge between output growth and unemployment rate in Nigeria. As Nigeria witnessed substantial increases in GDP, her unemployment rate was equally growing. Our finding is at variance with Okun's law and by implication invalidates its application in Nigeria. The findings provided evidence that output growth in Nigeria is non-inclusive and such demonstrates the attributes of "Jobless" growth syndrome. Based on the findings, we suggest that policy makers should shift attention from GDP growth as such could be misleading; rather they should pay attention to structural transformations that will enhance job creation and reduction of poverty.
Keywords: *Okun's Law, Output Growth, Unemployment, Autoregressive, Cointegration, Jobless Growth.*

1. Introduction:

In 1962, the late Prof. Arthur Melvin who was a professor at Yale University and a fellow of Brooklyn Institution in Washington DC introduced into economic literature and codified an empirical relationship between unemployment and output levels over the business circle. His findings states that when unemployment is reduced by 1 percent, output (GDP) increases by approximately 3 percent point (Abbas, 2014).

As he aptly puts it,

> "how far we stand from target of full employment; output is important information in formatting fiscal and monetary policy. Thus, quantification of potential output offers one of the guides of stabilization policy and one indicator of its success" (Okun, 1962).

Since Okun made this in-road in 1962, so many scholars and researchers have studied the relationship between these two important macroeconomic variables (unemployment and output). Some scholars have regressed output on unemployment rate, while some have regressed unemployment rate on output rate (Abu, 2017). As Abu (2017) succinctly puts it, Okun's Law can be explained as follows: as aggregate demand changes, firms/producers change their output plans and this invariably leads to changes in the demand for labour and subsequently changes in unemployment rate. The study of the existing relationship between these variables by many researchers had given conflicting and contradicting results. These mixed results are inevitable because some have used different datasets, various estimation techniques, different time period, and different countries with unique characteristics. Some studies showed that Okun's law exists and stated that output growth has a negative impact on unemployment rate (Ball, Leigh & Loungani, 2013; Silvapulle, Moosa & Silvapulle, 2004; Segner, 2001). Their results imply that increases in output are a necessary factor to the reduction of unemployment. Some studies have refuted the existence of Okun's law. They rather suggest based on their findings a revised relationship between unemployment rate and output growth (Khemraj, Madrick and Semimlar, 2006; Kagi, 2014; Zaglar, 2003).

Furthermore, so many researchers have studied the applicability and relevance of Okun's law in Nigeria as unemployment rate has become almost unpredictable. Some of these studies confirm the existence of the Okun's law in Nigeria through their empirical results (Ayinde, Adekunle & Mauritala, 2018; Adeyeye, Odeleye & Aluko, 2018; Sodipe & Oluwatobi, 2014). Their results suggest that increased output rate will bring about a reduction in unemployment rate. In some other studies equally conducted for Nigeria, some of the researchers confirm that Okun's law is not applicable in Nigeria (Abu, 2017; Ochoche, 2014; Bankole & Fatai, 2013; Babalola, Saka & Adenuga, 2013). Their results indicate that output growth does not bring about a reduction in unemployment rate in the Nigerian context.

The major objectives of macroeconomic policies are the attainment of high growth rate and full employment. It has taken a higher dimension lately both in the developed and developing countries as the rate of unemployment is one of the key indexes for measuring economic performance of any country in the world. Unemployment is one major economic menace that every nation makes effort to reduce to the barest minimum as there could be no zero unemployment. Therefore, countries made efforts to tackle the problems of unemployment and its attendant

challenges (Babalola, Saka & Adenuga, 2013). Recently, both the developed and developing countries have witnessed unemployment rate increasing even in the midst of growth rate of output, though such varies from country to country. The developed countries have been controlling their unemployment rates, while in the developing countries especially in Africa; unemployment has continued to surge upwards, culminating into reduction of household income, living standard and continuous rise in poverty level (Kareem, 2006).

1.2 Motivation

There are conflicting and varying evidences/results from different researchers about the applicability of Okun's law. In Nigeria, so many researchers found that Okun's law is applicable, while many have equally provided non-conformity evidences. Equally, the Nigerian economy had witnessed several years of positive growth in output (though recently negative), in the midst of these years of growth in output, the country had been battling with uncontrollable rises in unemployment rate. The prevalence of rising unemployment rate in the very midst of high growth level of output had given impetus to what Economists tagged "Jobless growth". This evidence obviously contradicts the traditional Okun's law. These prevailing conflicts among several researchers and contradicting evidences in Nigeria makes it essential to evaluate the applicability of the Okun's law in Nigeria.

1.3 Objectives / Relevance of the Study

The main objective of this research is to empirically ascertain the nature of the relationship that exists between unemployment rate and output (GDP) in Nigeria. Specifically, we seek to determine if:

i. unemployment rate is a negative function of output growth in Nigeria.

The study will serve as another follow-up to the existing literature in regarding unemployment rate-output growth nexus in Nigeria. It will serve and provide a rule-of-thumb for structural and stabilization policies of government in Nigeria. The paper will extend the scope of the existing research as it focuses on the period 1982 to 2017. Consequently, the findings of this research would provide first-hand information to the government of Nigeria on policy direction in her relentless efforts to generate economic growth with enough labour absorption capacity. Most of the available researches on the relationship between these two factors ended in 2014 and this creates a lacuna in literature as such, this study seeks to fill the identified lacuna in literature.

The remaining parts of this research are organized as follows: section two provides a review of existing literature and trends of unemployment rate and GDP growth rate in Nigeria. Section three provides the methodology adopted in the work, section four provides the results and findings, while section five concludes and makes appropriate recommendations.

Theoretical framework:

2.1 *The Okun's hypothesis*

Okun (1962) built about three separate models to illustrate the relationship that exists between unemployment and output (GDP). Basically the Okun law can be succinctly explained in this framework: as aggregate demand changes, firms/producers change their output plans, and then, this brings about variations in the demand for labour and subsequently, changes in the level of unemployment (Abu, 2017). As Adeyeye, Odeleye and Aluko (2017) put it, the three model of Okun's law include the difference model, the gap model and the dynamic model.

The Difference Model

The difference model indicates the effects of movements in output on changes in unemployment rate. Categorically, it shows empirically the relationship that exists between unemployment and economic growth. The model is specified as:

$$U_t - U_{t-1} = \sigma + \beta(Y_t - Y_{t-1}) + \mu_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

In simpler form, equation (1) becomes:

$$\Delta u = \sigma + \beta \Lambda Y + \mu_t \quad \ldots\ldots\ldots\ldots (2)$$

U_t is the unemployment rate of the current period; U_{t-1} is the unemployment rate at the pervious period; Y_t is output at the current period; Y_{t-1} is output in the previous period; $u_t - u_{t-1}$ is the change in unemployment rate, $Y_t - Y_{t-1}$ is the change in output level; β is the Okun's coefficient or the change in output level; σ is intercept; u_t is the error term; Δu is change in unemployment; ΔY is change in output while Δ is difference operator.

The Gap model

The gap model reveals how variations between potential output and actual output affects current unemployment rate. The model explains the output the economy can produce when there is full employment and no inflationary pressure (Adeye, Odeleye and Aluko, 2017). Arshad (2011) concludes that the model assumes that economy attains full employment when unemployment is 4%. The gap model is specified as:

$$U_t = \sigma + \beta(Y^*_t - Y_{t-1}) + \mu_t$$

U_t is unemployment rate at current period; Y^*_t is the potential output, Y_t is the actual output; Y_t^* - Y_t is the output gap.

The Dynamic Model

The dynamic model assumes that current rate of unemployment is determined by current output level, the previous output and previous changes in unemployment. As Knotek (2007) explains, the model is distinctive in its nature, it does not only reveal the relationship between changes in unemployment rate and output growth but it equally illustrates how past unemployment rate impacts on the present unemployment level. The model explains that unemployment rate can reinforce itself. The specification of the model:

$$U_t = \sigma + \beta_1 Y_t + \beta_2 Y_{t-1} + aU_{t-1} + \mu_t$$

$\underline{U}_t$ is unemployment rate at current period; Y_t is output at the current period; Y_{t-1} is output at previous period; u_{t-1} is unemployment rate at previous period;

β_1 and β_2 are Okun's coefficients.

2.2 Empirical literature

Since Okun propounded this theory in 1962 using the case of US and discovered that an inverse relationship exist between unemployment rate and output between $1947Q_2$ and $1961Q_1$, several researchers have made much inputs in this direction. Sadiku, Ibraimi and Sadiku (2015) made use of quarterly data between 2000 and 2010 in evaluating the relationship between economic growth and unemployment rate in Macedonia and found that Okun's law is not tenable.

Elshamy (2013) evaluates the relationship between unemployment rate and output in Egypt between 1970 and 2010. The study discovered that Okun's coefficient is negative and statistically significant in both short and long-run. Moroke, Leballo and Mello (2014) explored the relationship existing between unemployment and economic growth in South Africa from $1990Q_1$ to $2013Q_4$. Their result showed that Okun's coefficient did not conform to the expected sign: thereby confirming that Okun's law is not applicable in South Africa.

Kargi (2014) in his sturdy of 23 Organization for Economic and Cooperation Development (OECD) countries discovered that unemployment and growth do not move in the same direction. He therefore confirms the applicability of Okun's law in the OECD countries. Bankole and Fatai (2013) in their work – empirical test of Okun's law in Nigeria, made use of data between 1980 – 2008. The result from Engle-Guanger co-integration and fully modified OLS shows a positive relationship between unemployment rate and GDP growth rate thereby implying that Okun's interpretation is not applicable in Nigeria.

Babalola, Saka and Adenuga (2013) while working on the validity of Okun's law in Nigeria, adopting the difference model approach, made use of data from 1980 – 2012. The results from their Block Erogeneity Wald and Error Correction model shows that Okun's law is not valid in Nigeria. Ochoche (2014) tests the effects of output shock on unemployment in Nigeria using Bounds Testing approach. Time series data covering 1985 – 2013 were analysed and the result from the ARDL model indicates that output change had no significant effect on unemployment rate. This equally proves that Okun's law does not hold in Nigeria.

Abu (2017) in his work: Does Okun's law exist in Nigeria? Evidence from ARDL Bounds Testing Approach; made use of data from 1970 – 2014. His findings points to the fact that in the long term, unemployment has a negative and significant effect on economic growth. He discovered that the Okun's coefficient is 0.18% which is far less than that reported by Okun. He concludes that Okun's law is unstable and varies from country to country. Equally. Adeyeye, Odeleye and Aluko (2017) investigating Okun's law in Nigeria through the Dynamic Model 1985 – 2015: The result

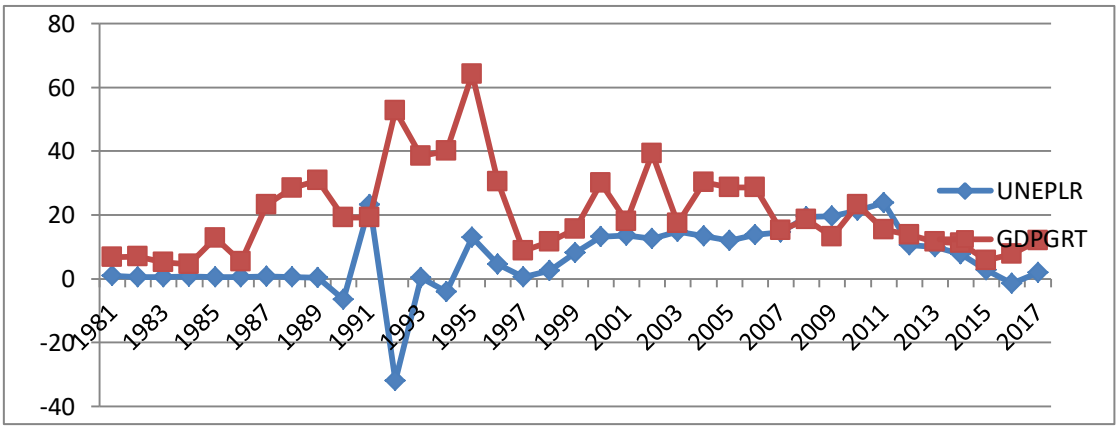
from the Generalized Method of Movement's (GMM) estimation reveals that present and past output growth negatively related to unemployment rate. The result equally demonstrates that past unemployment rate is significantly and positively related with present unemployment rate. The study concludes that Okun's law is applicable in Nigeria.

Ayinde, Adekunle and Muritala (2018) in their study – Economic Growth and Sustainable Employment Generation: Empirical Validation of Okun's law in Nigeria: Data from 1980 to 2015 was analyzed with multivariate regression techniques. Their result reveals that a negative relationship exists between output and unemployment rate, therefore confirming that Okun's law is obtainable in Nigeria.

Summary of Literature and Identified Gap

There are prevalent contradictions and conflicting results from the studies revealed both in Nigeria and some other countries. Some authors confirm the existence of Okun's law while so many do not confirm the existence. It means that Okun's law varies from country to country. The works revealed show that most authors who considered data from Nigeria limited their research to 2015 not considering the recent data as Nigeria plunged into recession in 2016 and 2017. Therefore this calls for extending the frontier of such research to 2017 to check the actual position – prevailing in the most recent time. This research has extended the frontier of knowledge in the analysis of growth-unemployment rate nexus as it considers current data and equally incorporate data on oil revenue as one of the control variables considering that Nigeria depends almost 100% on revenue from oil which contributes a greater percentage to the output growth rate in Nigeria. This research adopted the idea of Farsie and Quade (2003) as cited by Abu (2017), it equally extended the frontier of knowledge as it considers current data in Nigeria (2017) considering that the country plummeted into recession in 2016.

2.3 Trend Analysis



Source: Authors computation

3. Research Methodology

3.1 Source of Data:

The data used in this study are annual time series data of Nigeria between 1981 to 2017, data for unemployment rate was obtained from National Bureau of Statistics (NBS), while that of Gross Domestic Product (GDP) converted to rates (GDP growth rate) and data for oil revenue were obtained from the Central Bank of Nigeria (CBN) statistical bulletin of 2017.

3.2 Model Specification:

The study adopted the Difference Model approach of Okun's law to determine the applicability of the law in Nigeria. The difference model indicates the effects of movements in output on changes in unemployment rate.

$$U_t - U_{t-1} = \sigma + \beta(Y_t - Y_{t-1}) + \mu_t \ldots\ldots\ldots\ldots (1)$$

In our model, we took cognizance of the overwhelming effects of oil revenue on output growth in Nigeria. Thereby we introduced oil revenue as a control variable in out model.

The model now becomes:

$$U_t - U_{t-1} = \sigma + \beta(Y_t - Y_{t-1}) + + \beta(X_t - X_{t-1}) + \ldots + \mu_t \ldots\ldots. (1)$$

Specifically: GDPgrw + u_n + oil

Unemps = $b_0 - b_1 GDP_{grwt} + b_2 LogOilRev + \ldots u_t$

Where: GDPa = $b_0 - u_n$
Uemp = unemployment rate

GDPgrw = Growth rate of GDP calculated

LogOilRev = Natural logarithm of oil rev
U_t = the disturbance term
GDP = Unem + oil

This research adopted the idea of Farsie and Quade (2003) as cited by Abu (2017) and it is stated as follows: a decrease in unemployment rate will bring about an increase in output vice-versa. This demonstrates that an inverse relationship exist between output and unemployment rate.

The relationship is as expressed below:

$\Delta GDP_r = b_0 - b_1 \Delta UNEM + u_t$

Having identified that Nigeria is heavily dependent on oil revenue, we incorporate oil revenue into our mode. The model is re-specified to include the effects of oil revenue on growth.

$\Delta GDP_r = b_0 - b_1 \Delta UNEM + b_2 \Delta OILR_t + u_t$

3.3 Model Estimation Procedure/Data Analysis Techniques

Unit Root Tests

The first step in any robust econometrics time series analysis is to subject the dataset to unit-root (stationarity) test to reveal the time series properties of the variables. This is done most importantly to avoid working with a spurious result that will eventually mislead the policy directions. We employed three types of unit-root analysis techniques in this study and considered that adopting these three methods will give more credence to our analysis and result and this will lead to a much more reliable result. The methods adopted are: Augmented Dickey-Fuller (ADF), the Phillips-Perron (PP) test and the Elliot-Rothenberg-Stock DF-GLS test statistics.

Cointegration Test:

The next step is to ascertain if any longrun relationship exists among the variables of interest. Taking a clue from the result emanating from the stationarity test, the choice of the appropriate cointegration technique becomes obvious. If the unit-root test reveals that the variables were integrated of the same order, we will adopt the Johansen cointegration test. In the other hand, if the variables are integrated fractionally of order-zero I(0) and order-one I(1), we will adopt the Auto Regressive Distributed Lag model developed by Pesaran, Shin and Smith (2001). In the absence of cointegration among the variables, the next step is to apply VAR model.

4. Data Analysis and Discussions of Findings

4.1. Unit Root Tests Results

Table 1: Summary of various types of Stationarity Test.

	ADF		**PP**		**DF-GLS**	
Variable	Level	1st Diff	Level	1st Diff	Level	1St Diff
GDPGR	-3.234*	-	-3.298622*	-	-3.028511*	-
Unemp	-	-13.18689**	-	-4.69073**	-	-13.38200**
Oilrev	-	-6.301795**	-	-6.301795**	-	-6.388073**

Note: *, ** denote integration at levels and 1st different respectively, all at 5% levels of significance.

Source: Author's computation.

From the Unit-Root tests results above, it is obvious that the variables were fractionally integrated of order zero I(0) and order one I(1). From all the unit-root tests techniques adopted (ADF, PP and DF-GLS) the variable GDPGRW was integrated at level I(0), while unemployment rate (UNEMP) and OILREV were integrated of order-one I (1). As the variables were not integrated of the same order, i.e, they are fractionally integrated; we therefore adopt the Autoregressive Distributed Lag (ARDL) Model in our study to evaluate the longrun and shortrun properties of the variables. The ADRL model bounds test as developed by Pesaran, Shin and Smith (2001) is used for cointegration analysis. It is equally used to reveal the cointegrating equation of the long and short run relationship. The ARDL model can only handle variables that are fractionally integrated of order-zero and order-one, but the ARDL breaks down or does not have the capacity to handle variables that are integrated of order-two I(2) (Narayan and Smith, 2005).

The ARDL can be applied when the variables are purely 1 (0) and 1 (1). The ARDL uses the conventional significance levels such as 10%, 5% and 1% in the analysis. If the statistic from Wald test falls outside the critical bound level (lower and upper), we can make a conclusive inference without taking cognizance of the order of integration of explanatory variables. If the result of the f-statistic is higher than the upper critical band, then we can reject the null hypothesis of no cointegration among the variables. Conversely, if the f-statistic is less than the value of the lower critical bound, we accept the null hypothesis of no cointegration among the variables. If the f-statistic falls in-between the upper and lower bounds, the result becomes inconclusive. The second aspect of ARDL approach is to evaluate the coefficients of the longrun cointegrating relationship of variables and the attendant shortrun coefficients.

4.2 ARDL Bounds Test

The ARDL model makes use of a single reduced form equation to evaluate simultaneously the long run and short run parameters of a model.

The general ARDL model is expressed as: the ARDL (p : q) is

$$y_t + \lambda_1 y_{t-1} + \lambda_2 y_{t-2} + \dots \lambda_p y_{t-p} = \alpha + \beta_{oxt} + \beta_{1xt-1} + \dots \beta_{qxt-q} + \mu_t$$

or $\lambda(L)y_t = \alpha + \beta(L)_{xt} + \mu_t$

We firstly compute the usual Wald test or the F-statistic test for evaluating the hypothesis of no cointegration against the null hypothesis of cointegration.

$H_o: d_1 = d_2 = d_3 = 0$

The distribution of the test statistic is non-standard and the relevant critical value bounds have been tabulated by Pesaran, Shin and Smith (2001). The F-statistic computed is compared with the upper and lower critical value bounds for a given level of significance which is normally denoted by F_U and F_L respectively.

If $F > F_U$, the null hypothesis of no cointegration is rejected for the acceptance of the alternative hypothesis of cointegration.

If $F < F_L$, the null hypothesis cannot be rejected rather we conclude that there is no cointgeration among the variables.

If $F_L < F < F_U$, then we have an inconclusive result.

Table 2: Bounds Tests Results for cointegration

Test Statistic	Value	DF	Probability	Upper Critical bounds value
F-statistic	8.057732**	2	5%	4.85
		2	1%	6.36
		2	10%	4.14

Source: Author's computation

The result emanating from the ARDL Bounds tests in table 2 above lends credence to the fact that a longrun relationship exist between the variables of interest. That means that a cointegration exist between GDP growth rate, unemployment rate and oil revenue in Nigeria within the years under investigation. Our F-statistic is 8.058 which

greater-than both the lower and upper critical bounds value (8.0576 > 4.85; 8.0576 > 6.36; and 8.0576 > 4.14) at various levels of significance – 5%, 1% and 10% respectively.

4.3 ADRL Longrun and Shortrun Coefficient Result

Table 3: Longrun Estimation of the coefficients:

Dependent Variable: GDPGRW				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
D(UNPLR)	-1.561807	0.564786	-2.765307	0.0103
LOG(OILREV)	3.717076	1.838093	2.022246	0.0536
C	7.697059	9.578130	0.803608	0.4289

Source: Author's computation

Having established the existence of a longrun relationship among our variables of interest, there is the need to ascertain if any shortrun equilibrium exist among the variable and identify the speed at which any short-run disequilibrium (deviations) is returned to equilibrium.

Table 4: Short-run Estimation of the coefficients:

Dependent Variable: GDPGRW				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
D(UNPLR)	-0.218981	0.202966	-1.078905	0.2905
D(UNPLR(-1)	0.364342	0.223837	1.627714	0.1156
D(UNPLR(-2)	0.567768	0.236282	2.402919	0.0237
DLOG(OILREV)	9.313311	4.867028	1.913552	0.04667
ECT-1	-0.694428	0.144466	-4.806859	0.0001

Source: Author's computation

The estimated short-run result of the ARDL model is presented in table 4. The optimal lag-length was automatically chosen as suggested by Akaike Information Criteria (AIC). The result emanating from the short-run estimation is inline with the result obtained from the estimated longrun coefficients. The result shows that contemporaneously, the coefficient of unemployment rate has a negative but insignificant effect on gross domestic product. The result indicates that with the passage of time, the relationship between output growth and unemployment rate becomes positive and insignificant at lag 1, but it becomes significant and positive at lag 2. The coefficient is 0.567768 with probability value of 0.0237. This means that after two years, a 1% increase in unemployment rate brings approximately 57% increase in output in Nigeria. This is a clear case of where gross domestic product is growing and at the same time unemployment rate is equally growing. Such outcome is what Altman (2003), Ajakaiye, Jerome, Nabena and Alaba (2016) described as "Jobless Growth".

The result further indicates that oil revenue has a positive and significant effect on GDP growth in Nigeria. It shows that a 1% increase in oil revenue brings about more-than 100% increases in output growth in Nigeria. The result gave a clear picture of the situation in Nigeria and it further buttressed the fact that Nigeria depends heavily on oil revenue as a major source of her revenue. The result is inline with the findings of Abu (2016) who shows that about 99% increase in GDP growth in Nigeria was brought about by 1% increase in oil prices and it is also in tandem with the findings of Osunubi (2005).

The coefficient of the CointEq is negative and significant and this meets the a priori expectations. The coefficient is -0.694 with probability value of 0.0001. This shows that about 69% short-run disequilibrium is corrected annually. That means that about 69% deviations from equilibrium are re-established every year.

Stability and Diagnostic Tests

Table 5: Output of ARDL Model Diagnostics Tests

Test	F-Statistic/Prob
Normality: Jarque-Bera	0.357700 (0.8362)
Serial Correlation: Breusch-Godfrey LM	0.359212 (0.7019)
Heteroskedasticity: Harvey	1.463280 (0.2238)
Normality: Ramsey-RESET	1.519282 (0.2292)

Source: Author's computation

Fig. 3: CUMUM Plots

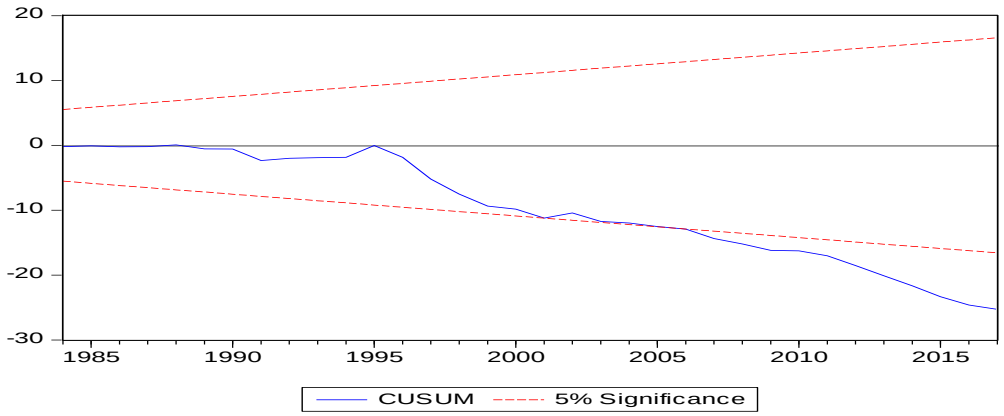
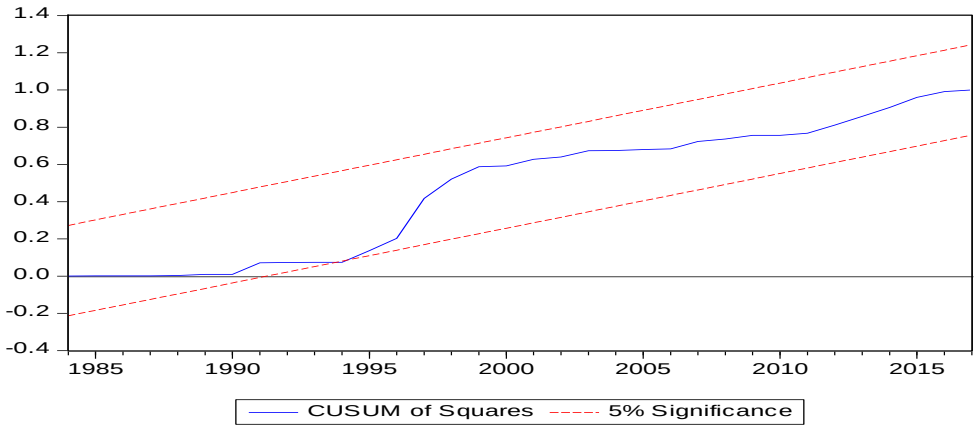


Fig. 4: CUMUM of Square Plots



Source: Author's computations

5. Results of the Diagnostics Tests and Stability Plots Tests:

The Diagnostics tests results as presented in table 5 shows that the model passed the normality test, the serial correlation test, the heteroskedasticity test and the specification test as demonstrated by the F-statistic and their respective probability values in the table. Equally, the model passed the stability test as demonstrated by the plots of the CUSUM and CUSUMSQ plots of figures 3 and 4 above. The plots were plotted against the 5 percent critical bound and it shows that the 5% critical bounds fell between the two 5 percent lines. The plot of the CUSUM indicates some levels of instability but the stability level was re-established and solidified by the CUSUMSQ stability plot.

The results from both the diagnostics and stability tests imply that the results from the model are appropriate and can be used for policy moderations.

6. Discussions of Findings

The empirical analysis and the attendant evidences from this research is at variance with the Okun's hypothesis. This means that the Okun's law does not apply in Nigeria rather it could be country specific. Our findings show that contemporaneously, there exists a negative relationship of -0.218 between unemployment rate and economic growth but the relationship is not significant and also it is less-than the Okun's coefficient of 3:1 relationship. It further reveals that with passage of time, a positive rather-than negative relationship exists between the two variables. This

implies that as Nigeria's gross domestic products grows, her unemployment rate grows likewise. This outcome is totally at variance with the Okun's law.

At lag-two (2), unemployment rate has a positive and significant effect on output growth (see table 4). This means that as unemployment rate increases by 1%, output grows at approximately 57%. This being the case, shows that Nigeria is suffering from the "Jobless Growth" syndrome as hypothesised by Altman (2003) and in line with the findings of Ajakaiye, Jerome, Nabena and Alaba (2016) in the case of Nigeria. Conclusively, this research justifies that the Okun's law is not applicable in Nigeria within the years under investigation rather what exists is an non-inclusive growth. Such situation triples down to the existing paradox of poverty and hunger in the midst of plenty. That is high economic growth existing alongside rising poverty, inequality and unemployment rate.

Our finding is in line with the findings of Babalola, Saka and Adenuga (2003), Arewa and Nwakanma (2012), Ochoche (2014) and Abu, (2016) whose results demonstrate that Okun's law does not apply in Nigeria. Conversely, our findings contradict the findings of Ayinde, Adekunle and Muritala (2017), Adeyeye, Odeleye and Aluko (2018) who affirm that Okun's law does apply in Nigeria. Our findings are equally at variance with the findings of Olusegun (2015) who demonstrated that Okun's law is applicable in United Kingdom. It equally corroborates the findings of Bankole and Fatai (2013) who discovered a positive and significant relationship between GDP growth and unemployment rate in Nigeria and concludes that the rising unemployment rate experienced in Nigeria was not as a result of lack of growth and vice-versa. His finding corroborates the findings of Lal et al (2010) and Kreisham (2011) for the economy of Pakistan.

7. Conclusion

Our concern in this study was to evaluate the applicability of Okun's Law in Nigeria with recent data. We made use of most recent data of Nigeria to consider whether Okun's prescription of negative relationship between output growth and unemployment rate is obtainable in Nigeria. We made use of data set of 1980 to 2017 and used oil revenue as a check variable on GDP growth taking cognizance of the relevance oil revenue to GDP growth in Nigeria as oil accounts for about 50% of Nigeria's GDP. The empirical evidence emanating from the ARDL model shows that Okun's prescription does not hold in Nigeria within the period investigated. Our result showed that as Nigeria output grows, her unemployment rate was equally growing. That is, a positive relationship exists between the two variables.

Invariably, the scenario throws weight to what some Economists described as "Jobless Growth" or a non-inclusive output growth. We observed that the output growth in Nigeria within the years investigated was mainly a product of revenue from oil. The empirical findings indicates that output growth in Nigeria is insensitive to unemployment rate and this been the case, it shows that the situation of Nigeria in this regards seem to defy the prevailing economic principles. Such case raises more concern of the existence of structural disintegration in the system.

8. Policy Recommendations

Our investigation suggests that a structural break exist within Nigeria's system. A situation where output is growing steadily and at the same time unemployment rate is equally growing points to the fact that there is a mismatch and such situation in a bye-product of absolute misappropriation of available revenue. This been the case, we therefore suggest among the following that;

i. government should appropriately channel the revenue from oil and other resources to sectors that can create jobs for the teeming population,

ii. policy makers should place less emphasis on growth as our findings showed that such could be misleading,

iii. there is the need to improve the labour absorption capacity of the Nigerian economy.

iv. lastly, but not the least, a concerted effort should be made to develop a framework or model that will actually make Nigeria's output growth an inclusive one that is sensitive to unemployment rate.

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