

Does Okun's Law Explain the Relationship between Economic Growth and Unemployment in Nigeria?

(Adakah Hukum Okun Menjelaskan Hubungan antara Pertumbuhan Ekonomi dan Pengangguran di Nigeria?)

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ABSTRACT

The issue of unemployment remains the fulcrum of any economic policy because of its attendant effects such as low GDP, increase social ills, etc. Thus, this paper attempts to verify if Okun's law holds in Nigeria by investigating the dynamic effect of unemployment on economic growth using time-series data for Nigeria covering 22 years from 1996-2017. In examining this matter, this study uses an autoregressive distributed lag (ARDL) approach. The paper sheds light on whether Okun's law can be applicable outside the US economy to explain the relationship between unemployment and economic growth, with the inclusion of some governance indicators, namely corruption and political instability. The findings revealed that there is a long-run association between economic growth, unemployment, corruption, and political instability. However, unemployment and corruption do not impact economic growth, but only political stability was found to be negatively significant. This outcome implies that in Nigeria, Okun's law does not explain the connection between unemployment and economic growth. This paper recommends the government to create employment opportunities through its increase in expenditures in the form of subsidies and loans with less interest, thereby reducing unemployment, increasing productivity, and lastly increasing the growth of the economy.

Keywords: Okun's law; economic growth; unemployment; corruption; political instability

ABSTRAK

Isu pengangguran merupakan tumpuan utama dasar ekonomi kerana kesannya terhadap KDNK yang rendah, meningkatkan masalah sosial, dan lain-lain lagi. Maka, kertas ini bertujuan untuk mengesahkan sama ada hukum Okun di Nigeria berlaku dengan mengkaji kesan dinamik antara pengangguran dan pertumbuhan ekonomi dengan menggunakan data siri masa yang meliputi 22 tahun iaitu dari tahun 1996-2017. Dalam memeriksa perkara ini, kaedah autoregresif lat bertabur (ARDL) telah digunakan. Kajian ini dapat memberikan pencerahan sama ada hukum Okun tersebut berlaku di luar ekonomi Amerika Syarikat dengan mengambilkira beberapa indikator tadbir urus seperti rasuah dan pertumbuhan ekonomi, pengangguran, rasuah, dan ketidakstabilan politik. Walau bagaimanapun, pengangguran dan rasuah tidak memberi kesan yang signifikan kepada pertumbuhan ekonomi, sebaliknya ketidakstabilan politik mempunyai hubungan yang signifikan dan negatif ke atas pertumbuhan ekonomi. Penemuan kajian ini menunjukkan hukum Okun tidak berlaku di Nigeria dalam menjelaskan hubungan antara pengangguran dengan pertumbuhan ekonomi. Kajian ini mencadangkan supaya kerajaan mencipta peluang pekerjaan melalui peningkatan perbelanjaan dalam bentuk subsidi dan memberikan pinjaman pada kadar bunga yang rendah, yang mana dapat mengurangkan kadar pengangguran, meningkatkan produktiviti, dan akhirnya meningkatkan pertumbuhan ekonomi negara.

Kata kunci: Hukum Okun; pertumbuhan ekonomi; pengangguran; rasuah; ketidakstabilan politik

INTRODUCTION

In trying to understand the functionality of an economy, economic growth and unemployment are two important

macroeconomic variables used by economists. GDP is an indicator used to measure the health of an economy that captures the total money (dollar) value of all goods and services produced in a country over a specified period



of time, typically one year. Unemployment, on the other hand, refers to the portion of the labour force that are available and searching for a job, but could not find one (World Bank 2018b).

The aftermath of the 2007-2008 global financial crisis, which originated in the United States of America, has remained a scar on the flesh of the world's economies, and is still affecting both developed and developing countries, irrespective of their levels of industrialization. In fact, European countries and the US were faced with thoughtful structural challenges emanating from this long standing effect. This has in turn affected the structure of their production, which is shown in low productivity (i.e. low GDP), a lack of competition and high levels of unemployment.

For instance, the unemployment rate in Greece before the crisis in 2007 was 8.4%, but was 19.0% in 2018. Spain, Italy, France, UK and Croatia had rates of 14.9%, 10.1%, 9.3%, 5.3% and 8.2% respectively before the crisis in 2007, but in 2018, the rate fell to 8.2% in Spain, 6.08% in Italy, 9.3% in France, 4.0% in UK and 8.2% in Croatia. On the other hand, countries such as the United States, had a 5% unemployment rate in 2007, but a 4.0% rate in 2018 (Statista 2018; AMECO 2018). The same trend can be seen in African countries, whose economies are vulnerable and dependent on the affluence of the European countries and the US.

In Africa, countries such as South Africa, Nigeria, Ghana, Botswana, Cote d'Ivoire and Zambia recorded unemployment rates of 22.3%, 4.13%, 4.04%, 17.39%, 3.3% and 9.19 % respectively in 2007. But, by 2017, the unemployment rate for South Africa and Nigeria increased to 27.72% and 7.04% respectively, while other countries experienced a fall to 2.36% in Ghana, 17.36% in Botswana, 2.6% in Cote d'Ivoire and 7.79% in Zambia (Statista 2018). This is because unemployment causes loss of well-being through cuts to output which in turn leads to falls in people's incomes. This means that output is positively affected by the quantity of labour used in production. Unemployment is therefore detrimental to the economic growth of a country.

A renowned economist, Athur Okun, was the first to discuss the issue in the 1960s, and since then his work has come to be known as Okun's Law (Okun 1962). Okun investigated the statistical relationship between economic growth and the rate of unemployment in a country. According to the Federal Reserve Bank of St. Louis, America, Okun's Law "is intended to tell us how much of a country's Gross Domestic Product (GDP) may be lost when the unemployment rate is above its natural rate of between 4.5 and 5.0 percent". Knowing that output is a function of labour in the process of production, then there is a positive relationship between output and employment. However, employment is the difference between the labour force and the unemployed, so a negative relationship therefore exists between unemployment and output. Okun's Law

is now a rule of thumb that is mostly used to examine the relationship between growth and jobs. Bernanke (2012) summarizes Okun's basic concepts as: "the rule of thumb that defines the relationship between variations in GDP growth rate and unemployment rate". Okun observed that, due to the continuous increase in the quantity of labour and the level of productivity, real GDP growth must be near the potential rate of growth in order to maintain the unemployment rate. Therefore, to reduce unemployment, the economy's growth rate must be higher than its potential rate. Furthermore, Okun's Law states that: "to achieve a 1 percent decline in unemployment rate in a year, real GDP must grow approximately 2 percent points faster than the rate of growth of potential GDP over that period. For example, assuming GDP growth rate is 2%, the law says, the GDP must grow at 4% rate in a year in order to achieve 1% reduction in unemployment rate" (Okun 1962).

Nigeria is endowed with abundant untapped natural and human resources, yet it cannot achieve the required growth rate commensurate to it. Due to bad governance, especially corruption (Dankumo et al. 2019), bad policies and negligence by government officials, these resources fail to be efficiently translated into increasing well-being and increases to GDP. However, economic growth is not the only solution to the problem; education, training and good governance would also increase people's skills and help to alleviate the problem. Nigeria's GDP is determined by two major sectors of the economy- oil and agriculture. Once the oil sector is affected, government activities that focus on creating an enabling environment and on providing jobs would also be affected due to sharp falls in revenue. This, in turn, will affect aggregate demand, as well as output and employment.

Between 1996 and 2008 the unemployment rate in Nigeria averaged 4.33%, whereas GDP averaged \$206.2 billion per annum. By 2009-2013, unemployment dropped to an average of 3.83% but GDP increased to \$385.5 billion. 2017 witnessed an increase in unemployment to 7.04% (from 4.31% in 2015), which is a sharp and worrisome increase. Conversely, GDP decreased from \$464.3 billion in 2015 to \$460.5 billion (World Bank 2018a). This relationship between unemployment and GDP seems to be negative, which is in line with Okun's law, but we cannot conclude absolutely, until empirical evidence is established. This study focused on some components of governance that play a causal role in the relationship between unemployment and economic growth. According to The World Bank (2018a), both corruption and political instability indexes have remained negative (-1.17 and -1.69 respectively) throughout the period of study, which clearly qualify Nigeria as a corrupt and politically unstable country. Moreover, according to a report by the Institute of Economics and Peace on Global Terrorism Index, Nigeria is ranked as the third most terror-

prone country in the world after Iraq and Afghanistan (Reliefweb 2018). This rating was attributed to the rising activities of Fulani herdsmen and Boko Haram extremists. Hence, corruption and political instability are included in the model to explain further factors that affect economic growth.

Okun's law is a statistical relationship that is based on the regression of unemployment on economic growth. As such, the coefficients derived from the regression can be used to forecast unemployment as the economy grows. However, it also depends on the inputs and time periods used, which are historical to GDP and employment. The law has indeed grown over time to suit changing economic situations and unemployment tendencies. Another version of the law states that, "when unemployment falls by 1%, GNP rises by 3% and GDP by 2%. However, some studies show a different result, especially in industrialized economies such as Germany and France, where there is less flexibility in the labour market than there is in countries such as the US. In such countries, the same change in unemployment has a little effect on GNP. Just like any other law in science, whether that is economics or any other discipline, it is important to investigate whether Okun's law truly holds in the case of Nigeria, which is a different environment entirely from the US. There are contradicting empirical outcomes on the relationship between unemployment and economic growth. Whereas, some would say that the relationship is negative (e.g Bakare 2012; Dritsakis & Stamatiou 2016; Mohsenia & Jouzaryan 2016; Ogueze & Odim 2015; Onwachukwu 2015), others suggest that it is positive (e.g Aliyu 2012; Ditimi & Ifeakachukwu 2013; Enejoh & Tsauni 2017), whereas, others still say that there is no relationship (Mosikari 2013).

The essence of this study therefore is to add to this inconclusive debate on the relationship between unemployment and growth and at the same time verify the relevancy and applicability of Okun's law, especially in a developing country like Nigeria, which is bedeviled by poor governance. Moreover, this study incorporated a number governance indicator, such as indexes measuring corruption and political instability, to see whether they are also significant in explaining variations in economic growth in Nigeria. The justification for their inclusion is that Nigeria has a record of high level of corruption and an unstable political environment. The paper is structured in such a way that section two reviews the literatures, section three discusses methodology, section four discusses the results, while section five concludes the paper and lays out recommendations.

LITERATURE REVIEW

The global crisis in 2007/2008 had a serious impact on economies around the world, especially those in developing countries such as Nigeria, who are still

learning how to crawl towards attaining economic growth. Most global economies suffered a setback in their quest to attain economic affluence and suffered adverse schisms to their GDP, due to rises in unemployment and because of the relationship already established by Okun in the 1960s. According to Villaverde and Adolfo (2008), who examined the relationship between unemployment and output in Spain between 1980 and 2004, a negative relationship exists between unemployment and productivity in Spain. They concluded that Okun's law holds for the entire country. Another study was conducted in Turkey by Tiryaki & Ozkan (2011) to investigate the same relationship. They used quarterly data for the period between 1998 and 2010 and found a single directional causal relationship between a decline in output and unemployment, but that after the crisis period, when the economy seems to have picked up, unemployment did not fall. In Iran, Mohsenia and Jouzaryan (2016), carried out a similar study, although they also focused on the role of inflation, they found that between 1996 and 2012, there was a negative relationship between unemployment, inflation and economic growth. They concluded that inflation should be controlled and unemployment reduced in order to achieve maintainable economic growth. Dritsakis and Stamatiou (2016) focused on the period between 1995 and 2015 in Greece and showed a unidirectional relationship between unemployment and growth, both in the short and long run. Noor et al. (2007), carried out a similar study in Malaysia, and also highlighted the negative impact of unemployment on growth using OLS.

In a similar study by Soyulu, Cakmak & Okur (2018) they investigate the relationship between economic growth and unemployment in some countries of Eastern Europe for the period 1992-2014 in the context of Okun's law. The result shows evidence of cointegration among the variables, while unemployment is positively affected economic growth, simply put, a 1% GDP rise will fall unemployment by 0.08% due to the Okun's coefficient for the countries of Eastern Europe. Similarly, Pal'ová & Vejačka (2018) analyzed and evaluated the successes in achieving the Europe 2020 strategy of a 75% employment rate among the working population (24-60) in all EU countries with data from 2004 to 2016. The result shows a positive impact of GDP on employment. Recently, Fil-alana, Skare & Buri (2019) investigated the unemployment-GDP nexus using data for 24 countries in order to test the underlying Okun's assumption taking cognizance of current economic circumstance with new methodological specifications. They found that unemployment and output growth show some degree of a long-run relationship for most of the countries while challenging the stability of Okun's coefficient since the variation is drastically.

Nigeria was also hard hit by the crisis, which has continued to impact the economy, as shown in previous

studies. *Yelwa et al. (2015)* studied the same relationship, but with the inclusion of inflation, for the period between 1987 and 2012. The results were not that different from previous studies, which showed a negative impact on output. Their conclusion was that, for domestic output to increase, the government should improve its macroeconomic policy tools so as to foster a stable economic atmosphere. In the same vein *Bakare (2012)*, *Ogueze and Odim (2015)* and *Onwachukwu (2015)*, all suggested that unemployment is negatively related to economic growth in Nigeria.

However, *Enejoh and Tsauni (2017)* uncovered contrary findings in their study of Nigeria between 1970s and 2016, they showed a long run positive relationship between unemployment and output and that unemployment rate had a positive impact on growth in the country. This was in line with a previous study conducted by *Aliyu (2012)*, which employed Okuns' model, and which showed a negative relationship in the short run, but that in the long run, the relationship became positive. *Ditimi and Ifeakachukwu (2013)* uncovered similar results of the positive relationship between unemployment and growth. Also, *Omitogun & Longe (2017)* investigated the impact of unemployment on the economic growth of Nigeria using secondary data in order to examine the dynamic effect of unemployment on growth. They observed that the impact of unemployment varies with time due to the effort made by the government to eradicate it in the country. But, in South Africa, *Mosikari (2013)*, reached different conclusions, showing that there is no relationship between unemployment and growth.

These variations in outcomes may be attributed to the quality of governance and infrastructures and the nature of the domestic economy. The nature of governance is seen in the country's level of corruption and stability of the political system. Corruption is defined as any form of fraudulent attitude exhibited by government officials to take advantage of their office for some gains. *Mauro (1997)* was the first to conduct a study on corruption, when he tried to investigate whether corruption spurs growth and investment. He found that corruption lowers economic growth. Since then, several studies (e.g *Aigheyisi 2015; Mauro 1997; Méon & Sekkat 2005; Olarewaju 2016; Osei-Tutu et al. 2010; Ovat & Basse 2014; Timofeyev 2011; Treisman 2000*) have also been conducted. Their results were consistent and confirmed those of *Mauro*, that is to say, they found that, corruption is negatively linked to the level of investment and economic growth, i.e. it "sands the wheels" of economic growth. According to these studies, corruption takes the form of kickbacks, bribery, tender manipulation, embezzlement and conflicts of interest, which influence the allocation of projects and selection of contractors. On the contrary, *Mallik and Saha (2016)* showed that corruption is not always an inhibitor of growth, instead the argued that it

can be supportive of growth in some countries, thereby supporting the "greasing the wheels" hypothesis. Several researchers (e.g *Aluko 2009; Dukku 2012; Duru 2012; Ikubaje 2014*) examined policies designed by governments to tackle corruption, and concluded that all efforts have failed to curb corruption and have aggravated poverty. This was also corroborated by *Fokuoh (2008)* and *Omagbon et al. (2016)*, who argued that corruption directly impedes economic growth and that an insignificant positive relationship exists between corruption and unemployment in Nigeria. In terms of political stability, the country is unstable due to the activities Niger Delta militants, Boko Haram, cattle rustlers and herdsmen activities who have crippled much of the economic activity in the agricultural and mineral sectors, which together constitute a significant percentage of GDP (*Ibrahim & Cheri 2013*).

METHODOLOGY

The variables used in this study are gross domestic product (GDP) in constant 2010 \$US, unemployment total (UENMP) as a percentage of total labour force (modelled using ILO estimates), the control of corruption estimate (CCORR), which shows the country's score when it comes to perceptions of corruption and the extent which public office is used for personal gain. The control of corruption ranges from -2.5 to 2.5 (with -2.5 being the most corrupt and 2.5 the most clean). Lastly, political stability and absence of violence (PSV), which is a measure of the probability of political instability, terrorism and politically driven crisis, which also ranges from -2.5 to 2.5 (with -2.5 being the most unstable and 2.5, the most stable). All of the data were sourced from World Development Indicators (WDI) and World Governance Indicators (WGI), both from the World Bank Group (World Bank 2018a). The inclusion of CCORR and PSV is to measure the impact of institutional quality on the supposed relationship that ought to exist between unemployment and economic growth in Nigeria. The simple reason is that, Nigeria faces these two serious problems. The variables GDP and UEMP were logged directly, while CCORR and PSV, because they can have negative values, were first converted to positive numbers before being logged using the formula $\log(x+3)$ (*Wicklin 2011*). This is a simple mathematical technique applied when dealing with negative numbers that doesn't affect variance, R^2 or elasticity.

The model used was an adapted form of *Okun's (1962)* model. It was modified to include control of corruption and political stability as independent variables. This model assumes a linear relationship between unemployment, corruption (control of corruption) and political instability (political stability and absence of violence).

The original Okun's law thus states:-

$$(\Delta G/G)_t = \beta_0 - \beta_1 \Delta UEMP + \varepsilon_t \quad (1)$$

Where:

$(\Delta G/G)_t$ is the change in output at period t , $-\beta_1$ is the Okun's coefficient that shows a negative association between unemployment and growth, whereas $\Delta UEMP$ is the change in unemployment (Noor et al. 2007).

Thus, the modified Okun's model of the relationship is:

$$GDP_t = f(UEMP, CCORR, PSV) \quad (2)$$

Equation (2) above shows that GDP is the function of unemployment and control variables, such as control of corruption and political stability, which can be explicitly described as: a change in the economic growth brought about by a change in unemployment, control of corruption and political stability.

The above equation (2) can thus be transformed into a regression function as shown below:

$$IGDP_t = \alpha_0 + \beta_1 IUEMP_t + \beta_2 ICCORR_t + \beta_3 IPSV_t + \varepsilon_t \quad (3)$$

Where: GDP is the gross domestic product, UEMP is the unemployment rate, CCORR is the control of corruption, PSV the political stability, and ε_t as the error term. α_0 , β_1 , β_2 , and β_3 , are the coefficients of the explanatory variables with a priori expectation; $\beta_1 < 0$, while β_2 and β_3 should be > 0 .

The implication of this expectation is that an increase in unemployment leads to fall in GDP and vice versa, while an increase in the control of corruption and political stability will lead to an increase in GDP, and *vice versa*.

The main objective of this study is to ascertain whether Okun's law holds in Nigeria, in terms of the variation in output that may result from a reduction in unemployment over a period of 22 years (1996-2017). We used Pesaran et al. (2001) ARDL bound tests, bearing in mind the period edge and the reliability of long run coefficient estimators, even if the sample size is small. Narayan (2005) was also able to compute critical values for smaller samples of between 30 and 80 that can be used to test a long run relationship.

The ARDL model of long run relationship therefore takes the following form:

$$\begin{aligned} \Delta IGDP_t = & \alpha_0 + \beta_1 \Delta IGDP_{t-1} + \beta_2 \Delta IUEMP_t + \\ & \beta_3 \Delta ICCORR_t + \beta_4 \Delta IPSV_t + \phi_1 IGDP_{t-1} + \\ & \phi_2 IUEMP_{t-1} + \phi_3 ICCORR_{t-1} + \phi_4 IPSV_{t-1} + \\ & \varepsilon_t \end{aligned} \quad (4)$$

In this equation, $\beta_{i's}$ are the short-run coefficients, $\phi_{i's}$, represents the ARDL long-run coefficients, while ε_t is an error term (pure white noise). However, the GDP and UEMP were logged directly, but CCORR and PSV were negative integers, so they were first converted to positive integers by rebasing them before they were logged. This was done by adding 3 to all the values, so as to have the positive integers. The study started by

TABLE 1. Descriptive Statistics of the Variables of Interest

| | GDP (USD Billion) | UEMP (%) | CCORR | PSV |
|------------------------|-------------------|----------|--------|--------|
| Mean | 297 | 4.47 | -1.170 | -1.691 |
| Maximum | 464.28 | 7.06 | -0.891 | -0.586 |
| Minimum | 152 | 3.70 | -1.431 | -2.211 |
| Std. Dev | 114 | 0.86 | 0.120 | 0.448 |
| Skewness | 0.177 | 2.418 | -0.102 | 1.134 |
| Kurtosis | 1.575 | 7.770 | 2.875 | 3.249 |
| Jacque-Bera Statistics | 1.975 | 42.259 | 0.052 | 4.771 |
| Probability | 0.372 | 0.000 | 0.974 | 0.0920 |

Source: Author's computation using E-views 10

conducting a unit root test to make sure that none of the variables are $I(2)$, or else the ARDL cannot be used. Augmented Dickey Fuller (ADF) and Philips Perron (PP) tests were applied for this purpose and to ensure that all the variables were stationary at $I(0)$ or $I(1)$, after which ARDL was used to ascertain the long run relationship as well as the estimation of both the short run and the long run coefficients. This was followed by a residual diagnostics tests of serial correlation, heteroscedasticity, normality and a stability test - CUSUM. Lastly, the Error Correction Model (ECM) was estimated to ascertain the speed of adjustment of the dependent variable, should there be a change in any of the explanatory variables.

RESULTS AND DISCUSSION

This section discusses the result of the study. It describes the nature of the relationship between unemployment and economic growth in Nigeria over the period between 1996 and 2017, and the effect of corruption and political instability on economic growth.

The data presented in Table 1 shows how GDP in Nigeria increased between 1996 and 2017, reaching a high of \$464 billion in 2015 when it was rebased, making it the largest economy in Africa, surpassing that of South Africa. The lowest GDP during this time period was in 1996 when it was \$141 billion. It averaged \$293 billion over the entire period. During the same time unemployment averaged 4.47%, reaching a peak of 7.06% in 2016 and a trough of 3.70% in 2013. Control of corruption has lingered between -1.431 and -0.891 , which qualifies Nigeria as corrupt, as the estimate remains negative throughout the entire period. Political stability, just like control of corruption, has remained within the -2.211 and -0.586 range, which also portrays Nigeria as a politically unstable country.

Similarly, all the variables except CCORR are distributed normally, because the probability values, as shown by Jacque-Bera statistics, are greater than

TABLE 2. Results of the Unit Root Test

| Variable | ADF | | PP | |
|------------------------------|--------------|----------------|--------------|----------------|
| | Constant | Const. & Trend | Constant | Const. & Trend |
| <i>Levels I(0)</i> | | | | |
| LGDP | -0.803736 | -0.972713 | -0.791624 | -1.214106 |
| LUEMP | -3.644718** | -2.085936* | -0.566344 | -0.342435 |
| LCCORR | -1.582793 | -4.110398** | -1.848539 | -2.065349 |
| LPSV | -1.554688 | 0.240476 | -1.602485 | -1.581013 |
| <i>First Difference I(1)</i> | | | | |
| LGDP | -3.512890** | -3.529106* | -3.512890** | -3.513374* |
| LUEMP | -3.538435 | -3.092280 | -5.060587*** | -5.852989*** |
| LCCORR | -3.854968*** | -3.777128** | -3.851639*** | -3.772865*** |
| LPSV | -4.993519*** | -6.117805*** | -5.249959*** | -9.645995*** |

Note: The numbers show the t-statistics value of the variables, whereas ***, ** and * denotes significant at 1%, 5% and 10% significance level, respectively. It is therefore obvious that all the variables are stationary at the 5% levels and with a restricted constant for both the ADF and PP unit root test.

Source: Author's computation using E-views 10

the conventional statistical levels of significance. This suggests the notion that the null hypothesis of the series is normally distributed cannot be rejected, that is, that the series is normally distributed. This outcome was further affirmed by the skewness and kurtosis values of the series. All the variables are positively skewed, except CCORR, which has a negative skewness. Variables such as gross domestic product and control of corruption are platykurtic, while unemployment and political stability, whose kurtosis value are greater than three, are leptokurtic.

In order to assess the eligibility of employing ARDL by Pesaran et al (2001) to ascertain the long run relationship, the study must test for the stationarity of the variables to ensure that they are stationary at either $I(0)$ or $I(1)$, but none is at $I(2)$. To do this, the Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) unit root tests were employed. The ADF and PP tests results are shown in Table 2.

From Table 2, we can see that the results of the unit root tests showed a mixed integration order, thereby indicating a possible long-run relationship. At levels $I(0)$, only LUEMP and LCCORR are stationary at the 5% significance level according to the ADF test. But, at $I(1)$, LGDP, LCCORR and LPSV are stationary using the ADF technique, whereas LUEMP is stationary using the PP technique. According to this outcome, the use of the ARDL model to estimate and establish the long-run relationship between unemployment, corruption, political instability and economic growth in Nigeria is vindicated.

ARDL BOUNDS TEST

Table 3 below shows the computed value of the F-statistic to be 6.120, which is more than the upper bound value of Narayan (2005) critical value at 1 percent level of significance; this depicts a long-run cointegrated

TABLE 3. F-Statistics for Testing Presence of Long-Run Cointegration

| Model | F-Statistics | |
|---------------------------------|------------------|------------------|
| GDP=f(UEMP, CCORR, PSV) | 6.120*** | |
| (n=21, k=3) | | |
| Narayan (2005)'s Critical Value | Lower Bound I(0) | Upper Bound I(1) |
| 1% | 4.614 | 5.966 |
| 5% | 3.272 | 4.306 |
| 10% | 2.676 | 3.586 |

Note: *, **, *** depicts 10%, 5% and 1% levels of significant, respectively. Critical values of Narayan (2005) was used (Table of Case II: restricted intercept and no trend at 5% level; pp. 27).

relationship between GDP and its determinants, namely unemployment, control of corruption and political stability. Hence, we reject the null hypothesis of no levels relationship and then proceed to estimate the long-run coefficients and short-run model.

DETERMINATION OF LAG STRUCTURE

In Table 4 below, lag 1 was selected at the 5% level of significance. This selection is done automatically, and included 21 observations after adjustments. This gives us the ARDL (1, 0, 0, 0). Thus:

TABLE 4. Lag Order Selection Criteria

| Lag | LR | FPE | AIC | SC | HQ |
|-----|---------|-----------|--------|--------|--------|
| 0 | NA | 3.75e-06 | -1.14 | 0.94 | -1.09 |
| 1 | 101.14* | 3.22e-08* | -5.94* | -4.94* | -5.72* |

Note: * indicates the lag structure selected by the criterion and each test at 5% level.

LONG-RUN COEFFICIENTS

Table 5 explains the coefficients of the long-run relationship between GDP, unemployment, control of corruption and political stability. The result shows that unemployment, is negatively related to GDP, with a coefficient of -0.08 , which is far less than Okun's -0.5 , and is not significant. Control of corruption and political stability are all negatively related with GDP, which is contrary to the theory's proposed direction, though only political stability is statistically significant at 1 percent, whereas control of corruption is not.

TABLE 5. Results for Long-Run Coefficients

| Dependent variable: LGDP | | |
|--------------------------|--------------|-------------------|
| Independent variables | Coefficients | t-ratio (Prob.) |
| C | 12.14841 | 11.33088(0.000) |
| LUEMP | -0.084190 | -0.102901(0.919) |
| LCCORR | -1.202050 | -0.497336 (0.625) |
| LPSV | -1.571728 | -3.297946 (0.004) |

Note: numbers in parenthesis are the probability value.

SHORT RUN COEFFICIENTS

TABLE 6. Results for Short-Run Coefficients

| Dependent variable: DLGDP | | |
|---------------------------|--------------|--------------------|
| Independent variables | Coefficients | t-ratio (Prob.) |
| DLUEMP | -0.009051 | -0.106278 (0.9167) |
| DLCCORR | -0.129234 | -0.613830 (0.5480) |
| DLPSV | -0.168978 | -1.996626 (0.0632) |
| CointEq(-1)*** | -0.107511 | -1.661753 (0.0000) |

Note: *** indicates 1 percent level significance

The above table depicts the short run coefficient and the error correction term. The result shows that, in the short run, the relationship with the explanatory variables is still negative, but only political stability is significant at the 10 percent level. The most interesting aspect of this short run result, is the negative sign of the ECT coefficient, which is in line with the theory and shows evidence of convergence should the long run equilibrium get distorted. The ECT's value of -0.107511 , means that the model will adjust at a speed of 10.75% back to equilibrium. This adjustment will take 9 years and 3 months (i.e. $1/0.107511 = 9.34$), since the speed is very slow, due to the ECT's low value. In other words, the higher the ECT value, the shorter the period of adjustment, and *vice versa*.

DIAGNOSTIC TEST

The LM test result of serial correlation, shows that the residuals are not serially correlated, since the p-value

TABLE 7. Results of the Diagnostic Test

| Test statistics | (Prob.) |
|--------------------|----------|
| Serial Correlation | (0.3259) |
| Heteroscedasticity | (0.4123) |
| Normality | (0.2534) |
| CUSUM Test | Stable |

(0.3259) is greater than the 0.05 level of significance. Meanwhile, the test for Heteroscedasticity, also shows that the residuals are Homoscedastic, because the p-value (0.4123) is also more than 0.05. The variables are normally distributed, as confirmed by the p-value (0.2534), which is greater than 0.05. All these tests are done at the 5% level of significance. The CUSUM SQ Test also shows that the variables are stable.

CONCLUSION

The paper investigated the impact of unemployment on economic growth, using GDP as a proxy for economic growth and the unemployment rate as computed by ILO (and available on the WDI database from The World Bank) in order to investigate whether or not Okun's law holds in Nigeria. Considering the nature of governance in Nigeria, the study included measures of governance (namely, control of corruption and political stability and absence of violence) to investigate whether they can explain the relationship further, banging on the fact that governance has always been an antagonist of economic growth. The findings shows a negative relationship between unemployment and economic growth, but that this relationship is not significant. This means that unemployment does not explain changes in GDP, as postulated by Okun's law, which is in line with the findings by (Mosikari 2013). Control of corruption and political stability are also negatively related with economic growth, but only political stability is significant, whereas corruption is not. However, this variation may be due to differences in data types and sources, other inputs and even the time periods used, which are historical and common to GDP and employment.

In conclusion, it is therefore clear that, in Nigeria, unemployment does not have significant impact on GDP. This result is contrary to Okun's law which states that a 1% decrease in unemployment will lead to 2% increase in GDP, even though the relationship is negative, the coefficient was less than 0.5, and it was also insignificant. Nonetheless, Okun's law is seen as the most suitable and direct system of investigating the association between unemployment and economic growth. However, relying on it to predict unemployment on the basis of a given rate of growth may be inappropriate. But, that does not mean it should be disregarded, because it can assist in

establishing a framework for studying the influence of unemployment on economic growth.

Thus, we can lay out a number of recommendations: - the Nigerian government should intensify efforts to corruption, irrespective of ethnic or religious affiliation. Also, it should make the country more stable by adopting both security and political measures that will reduce the activities of cattle rustlers, devise a means of settling herdersfarmers disputes, curtailing to the barest minimum the Boko Haram terrorist attacks on farmers and, finally, engaging the Niger Delta youths in meaningful employment. This is because corruption and political instability increases unemployment in a country. Once these are in place, the country will experience stable and beneficial economic growth. Further studies can be conducted on this topic using different data and analysis techniques to substantiate this result

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REFERENCES

- Aigheyisi, O. S. 2015. Corruption, Government Expenditures and Economic Performance: Nigeria's Experience in the New Democratic Era (1999-2012). *African Journal of Sustainable Development*, 5(1), 17-38. Retrieved from <https://www.ajol.info/index.php/ajsd/article/view/121714>
- Aliyu, R. S. 2012. Macroeconomic Policy, Output and Unemployment Dynamics in Nigeria: Is there Evidence of Jobless Growth? In *53th Annual Conference of the Nigerian Economic Society*. (Vol. Aliyu, R.). Abuja: Nigerian Economic Society.
- Aluko, Y. 2009. Corruption in Nigeria: Concept and Dimensions. Anti-Corruption Reforms in Nigeria since 1999, Issues, Challenges and the Way Forward. In *IFRA Special Research Issue*. Retrieved from <https://www.academia.edu/21412993>.
- AMECO. 2018. European Commission Economic and Financial Affairs.
- Bakare, A. 2012. Stabilization Policy, Unemployment Crisis and Economic Growth in Nigeria. *Universal Journal of Management and Social Sciences* 2(4).
- Bernanke, B. S. 2012. Recent Developments in the Labor Market. Retrieved November 24, 2018, from <https://www.federalreserve.gov/default.htm>
- Dankumo, A. M., Ishak, S., Bani, Y. & Hamza, H. Z. 2019. The Relationship between Public Expenditure, Corruption and Poverty in Nigeria. *Jurnal Ekonomi dan Studi Pembangunan* 10(4). Retrieved from <http://journal2.um.ac.id/index.php/JESP/issue/view/521>
- Ditimi, A. & Ifeakachukwu, N. P. 2013. The impact of unemployment rate on productivity growth in Nigeria: An Error Correction Modelling Approach. *International Journal of Economic and Management Sciences* 2(8): 01-13.
- Dritsakis, N. & Stamatiou, P. 2016. The effects of unemployment on economic growth in Greece. An ARDL Bound Test Approach. *Romanian Journal of Economic Forecasting* 19(62): 53-72. Retrieved from https://www.researchgate.net/publication/312133807_The_Effects_of_Unemployment_on_Economic_Growth_in_Greece_An_Ardl_Bound_Test_Approach
- Dukku, A. M. 2012. Anti-corruption strategies in Nigeria: A sociological discourse in *Corruption, Governance and Development in Nigeria: Perspectives and Remedies* edited by Mohammed, H. Aluigba, M.T. and Kabir. A. First Edition. Kano: Mambayya House.
- Duru, E. J. C. 2012. Nigeria's anti-graft agencies: The journey so far in *Corruption, Governance and Development in Nigeria: Perspectives and Remedies* edited by Mohammed, H. Aluigba, M.T. and Kabir. A. First Edition. Kano: Mambayya House.
- Enejoh, S. Y & Tsauni, A. M. 2017. An Analytical Study of the Impact of Unemployment on Economic Growth in Nigeria (1970-2016). *IOSR Journal of Humanities and Social Science (IOSR-JHSS)* 22(11): 2279-0837.
- Fokuoh, A. E. 2008. The fight against corruption and its implications for development in developing and transition economies. *Journal of Money Laundering Control* 11(1): 76-87.
- Gil-alana, L. A., Sakere, M., & Buric, S. B. 2019. Testing Okun's law. Theoretical and empirical considerations using fractional integration. *Applied Economics* 52(5): 459-474.
- Ibrahim, A. A. & Cheri, L. 2013. Democracy, Political Instability and the African Crisis of Underdevelopment. *Journal of Power Politics & Governance* 1(1): 59-67.
- Ikubaje, J. 2014. Nigeria Anti-Corruption Initiatives and the Constitution. In *Centre for Democracy and Development*. Lagos. Retrieved from <https://www.academia.edu/5806946>
- Mallik, G. & Saha, S. 2016. Corruption and growth: a complex relationship. *International Journal of Development Issues* 15(2): 113-129. <https://doi.org/10.1108/IJDI-01-2016-0001>
- Mauro, P. 1997. Why worry about Corruption. *Economic Issues, International Monetary Fund* retrieved from [https://doi.org/10.1016/0277-9536\(94\)90455-3](https://doi.org/10.1016/0277-9536(94)90455-3)
- Méon, P.G. & Sekkat, K. 2005. Does corruption grease or sand the wheels of growth? *Public Choice* 122(1-2): 69-97. <https://doi.org/10.1007/s11127-005-3988-0>
- Mohsenia, M. & Jouzaryan, F. 2016. Examining the Effects of Inflation and Unemployment on Economic Growth in Iran. *Procedia Economics and Finance* 36: 381-389.
- Mosikari, T. 2013. The Effect of Unemployment Rate on Gross Domestic: Case Study of South Africa. *Mediterranean Journal of Social Science* 4(6).
- Narayan, P. K. 2005. The saving and investment nexus for China: evidence from cointegration tests. *Applied Economics* 37(17): 1970-1990. <https://doi.org/10.1080/00036840500278103> · Source: RePEc
- Noor, Z. M. Nor, N. M & Ghani, J. 2007. The Relationship between Output and Unemployment in Malaysia; Does Okun's law exist? *International Journal of Economics and Management* 1(3): 337-344.
- Ogueze, V. C & Odim, O. 2015. The cost of Unemployment and its effects on GDP Growth in Nigeria. *World Applied Science Journal* 33(1): 86-95.

- Okun, A. 1962. Potential GNP: Its Measurement and Significance. In *Business and Economic Statistics Section* (pp. 98-104). American Statistical Association.
- Olarewaju, F. O. 2016. Government Spending, Corruption and Output Growth in Nigeria. *European Scientific Journal* 12(16): 291-312. <https://doi.org/10.19044/esj.2016.v12n16p291>
- Omagbon, A. O., Enofe, C. L. & Oriafioh, P. 2016. Poverty and Unemployment and Corruption in Nigerian Public Sector 2(2): 79-90.
- Onwachukwu, C. I. 2015. Does Inflation Significantly Impact on Economic Growth in Nigeria? *Global Journal of Human Social Science*: 15(8).
- Osei-Tutu, E., Badu, E. & Owusu-Manu, D. 2010. Exploring corruption practices in public procurement of infrastructural projects in Ghana. *International Journal of Managing Projects in Business* 3(2): 236-256. <https://doi.org/10.1108/17538371011036563>
- Ovat, O.O. & Bassey, E. E. 2014. Corruption, Governance and Public Spending in Nigeria: Implications for Economic Growth. *British Journal of Economics, Management & Trade* 4(11): 1679-1699. Retrieved from http://www.journalrepository.org/media/journals/BJEMT_20/2014/Jun/Ovat4112014BJEMT10531_1.pdf
- Omitogun, O., & Longe, A. E. 2017. Unemployment and economic growth in Nigeria in the 21st century: *VAR Approach* 13(5): 155-168.
- Pal'ová, D., & Vejačka, M. 2018. Analysis of employment in 2020. Strategy targets. *Economics and Sociology* 11(3): 96-112.
- Pesaran, M. H., Shin, Y. & Smith, R. J. 2001. Bounds testing approaches to the analysis. *Journal of Applied Econometrics* 16(February): 289-326. <https://doi.org/10.1002/jae.616>
- Reliefweb. 2018. Global Terrorism Index 2018: Measuring the Impact Terrorism. Retrieved from <https://reliefweb.int/report/world/global-terrorism-index-2018> (accessed on 15 March 2019)
- Soylu, O. B. I., Cakmat, I., & Okur, F. 2018. Economic growth and unemployment issue. Panel data analysis in Eastern European Countries. *Journal of International Studies* 11(1): 93-107.
- Statista. 2018. The Statistics Portal Statistics and Studies from more than 22,500 Sources. Retrieved November 23, 2018, from <https://www.statista.com/statistics/226141/unemployment-rate> (accessed on 15 March 2019)
- Timofeyev, Y. 2011. How corruption affects social expenditures:evidence from Russia. *Global Journal of Business Research* 5: 39-51.
- Tiryaki, A. & Ozkan, H. 2011. Economic Activity and Unemployment Dynamics in Turkey. *Eskişehir Osmangazi Üniversitesi İİBF Dergisi* 6(2): 173-184.
- Treisman, D. 2000. The causes of corruption: A cross-national study. *Journal of Public Economics* 76. [https://doi.org/10.1016/S0047-2727\(99\)00092-4](https://doi.org/10.1016/S0047-2727(99)00092-4)
- Villaverde, J. and Adolfo, M. 2008. The Robustness of Okun's Law in Spain, 1980-2004 Regional Evidence. *Journal of Policy Modeling* 31: 289-297.
- Wicklin, R. 2011. Log transformations: How to handle negative data values? <https://blogs.sas.com/content/iml/2011/04/27/log-transformations-how-to-handle-negative-data-values.html> (accessed on 23 August 2019)
- World Bank. 2018a. *World Development Indicators*. Washington D.C. Retrieved from <http://databank.worldbank.org/data/source/world-development-indicators#> (accessed on 20 May 2019)
- World Bank. 2018b. World Development indicators:GDP per capita (current US\$). Retrieved from <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=NG> (accessed on 20 May 2019)
- Yelwa, M., David, O. O. K. & Awe, E. 2015. Analysis of the relationship between inflation, unemployment and economic growth in Nigeria: 1987-2012. *Applied Economics and Finance* 2(3).

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