Empirical Evaluation of the Causality between Real GDP and Unemployment Rate in Nigeria

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***Abstract*: This study examined the causality between Real GDP and unemployment rate in Nigeria. The hypothesis of this study is anchored on Okun's law. Data from the Central Bank of Nigeria statistical bulletin and National Bureau of Statistics was collected on Real GDP and unemployment rate from 1981-2019. This study employed the correlation test and pairwise causality test to determine the relationship-causality between Real GDP and the Unemployment rate in Nigeria. This study found a 65.93 percent correlation between Real GDP and the unemployment rate. The pairwise causality result shows that there is unidirectional causality between the unemployment rate and Real GDP. The transmission of causality asserts that unemployment granger causes Real GDP. This implies that employment of factor resources brings about high productivity that leads to an increase in Real GDP hence growth. This paper recommends the adoption of fiscal and easing monetary policy to boost firm's absorptive capacity in the country. This policy will stimulate job creation which will in turn accelerate growth.**

***Keywords*: Real GDP, Economic growth, Unemployment rate, Okun's Law, Pairwise Causality test.**

I. INTRODUCTION

The worrisome dynamics of the rising unemployment brings to question the new reality in Nigeria. The unemployment trend from 10.44% in 2015Q4, 14.23% in 2016, 16.20% in 2017 Q2, 20.42% in 2017Q4, to 23.13 in 2018Q3 raises questions about the inclusiveness of the Nigerian economy. Nigeria's total labour force is estimated at 69,675,468 million. Out of this number, 33.3% are unemployed and 22.8% are underemployed. The total number of unemployed is put at 23,187,339 million. Nigeria's unemployment rate is higher than the international unemployment rate of 17.5% (NBS, 2021). The situation has worsened despite the several interventionist programme of Buhari's government e.g., N-power, NIRSAL loan, trader money, etc. The issue of inclusiveness and sustainable growth has been canvassed by policymakers as a means to stimulate economic activity and productivity. But the rising rate of unemployment, therefore, questioned the pro-job capacity of the Nigerian growth rate. The motivating question, therefore, is to what extent does economic growth granger cause unemployment in Nigeria? Does economic growth have a decreasing relationship with unemployment? Does a 1% increase in growth rate necessarily refers to a 1% decline in unemployment? This study, thus, brings to front burner whether Nigeria's growth trajectory of 2.1% in 2015Q4 to -6.1% in 2020Q2 is presently put at 0.11% 2020Q4 which implies the country is out of recession. The non-oil sector grew by 1.7%. But oil sector remained in recession with a negative growth of 19.8% in Q4 (NBS, 2021). Then does the increase in GDP implies a reduction in unemployment based on apriori expectation?

The question on the sustainability of an inverse relationship between economic growth (proxy by GDP growth rate) and unemployment rate in the post-COVID 19 era forms the motivation for this paper. This study is built on the long-dated debate that unemployment and economic growth are negatively related (Okun law, 1962). Notwithstanding, the apriori relationship the disagreement in the state of causality between economic growth rate and unemployment rate clearly concretizes the rationale for further study to estimate the direction of causality for policymaking.

Recent shreds of evidence about the dampening nature of unemployment in Nigeria squares for deepening study to understand whether the unemployment rate account for the GDP growth rate.

In 2020, the COVID 19 disruption raised questions about the link between the unemployment rate and GDP growth rate owing to the health-related shock. Global per capita declined about 90% in 2020, this fall is the lowest since 1870. The global disruption generated by COVID 19 caused a lot of damages to global productivity. The lockdown of businesses and shutdown of international business affected global business frontiers. But the causality between the unemployment rate and growth rate in the midst of this travesty remains weak. However, prior to the COVID-19 pandemic, the disagreement in the relationship between GDP growth rate and unemployment rate persists. Ademola & Badiru (2016) found a long-run positive relationship between Real GDP, unemployment, and inflation. On the other hand, Ogueze & Odim (2015) using the OLS technique found a negative relationship between unemployment and real GDP in a study titled "the cost of unemployment and its effects on GDP growth in Nigeria." Due to the COVID-19 pandemic, one tends to wonder about the nature of GDP and unemployment. Studies towards reconciling this prevailing disagreement about the decreasing function between economic growth and unemployment in economic literature have questioned and have remained inconclusive even with Nigeria as a case study. The literature is inconclusive about the true nature of the growth-unemployment nexus. This

necessitates the imperative to deepen further studies in order to determine the consistency of apriori expectation with the real economic trend in Nigeria.

For a long time, the issue of unemployment of the less developing countries (LDCs) has dominated the most economic debate. Since the late 80's, economists and other policymakers maintained that unemployment has become a major issue confronting the Nigerian economy and the trend has to be on the increase for decades now. The foregoing rationalizes the justification to conduct this study. The aim of this study is to examine the causality between the unemployment rate and economic growth rate in Nigeria from 1980-2019. Specifically, this study seeks to; investigate the trends of unemployment and economic growth rates. Examine the pairwise causality between unemployment and economic growth rates. Thus, the research hypothesis for this study is anchored on Okun's law of 1962. The study is guided by the following hypotheses. They are viz; There is no presence of a cyclical trend. Also, there is no causality between economic growth and unemployment. This paper is divided into viz; I. Introduction II. Literature Review III. Data and Methodology IV. Results and Discussion of findings, and V. Conclusion, Policy implication, and Recommendation.

II. LITERATURE REVIEW

There are several theories on unemployment as related to the growth of the economy but this study is limited to theories such as Okun's law, Classical and Keynesian theories of unemployment.

2.1 Theoretical Literature

Okun's Law provides the theoretical framework for this study. The law holds that ceteris paribus, economic growth, and unemployment are inversely rated. Statistically, the stable negative relationship is modelled in this paper. Thus, Okun's law provides the baseline model for this paper.

Okun Theory

The theory states that a possibility occur for a one percent cyclical unemployment be leveraged on the two percent negative growth in the Real GDP. The foregoing underpins the fact that there is an inverse relationship between unemployment rate and economic growth. Furthermore, the law confirms that a country's GDP must grow at about a 4% per annum to achieve a 1% reduction in the rate of jobless labelled as unemployment.

Classical Theory of Unemployment

The classical was the school of thought that emphasized the role of money in explaining short-term changes in national income.

Traditionally, this theory has been that unemployment is seen or looked at on the ground of aggregate income. Their thought was that involuntary unemployment was a short-term phenomenon resulting from a discrepancy between the price level and the wage level. Unemployment was the result of too high real wages.

Often, the money level in the classical perspective would see it that redact and there would be no unemployment except for frictional search unemployment caused by the time delay between quitting one job and starting another. This school poses that the problem of urban unemployment is traceable to the fault of workers and the various trade union powers. They believed strongly in the theory of demand and supply. Therefore, it insists that urban unemployment is caused by a low supply of labour of more than the capacity of the economy.

Consequently, the school argued that the demand for too high wages of a worker without a corresponding increase in productivity renders product costly thereby discouraging competitiveness among local industries and foreign industries. The implication of this trend is the reduction of sales, which further leads to mass retrenchment of workers resulting in unemployment.

Keynesian Theory of Unemployment

The concept of British economist, John Maynard Keynes in the 1930s rationalized in different areas of macroeconomics which includes unemployment, wages supply, and high cost of things which is the view in his publication of 1936 as a comprehensive theory of unemployment interest and money.

Cyclical or Keynesian unemployment also known as demand deficient unemployment happens as a result of a lack of separate demand in the economy. The business arena changes because of the name, though can also be persistent as during the great depression of the 1930s. The Keynesian framework, as examined by Thirlwal (1979), postulates that rises in employment, capital stock, and technological change are greatly endogenous. Hence, the advancement of employment is needed, and that the basic determinants of long-term growth of output also influence the growth of employment.

In the Keynesian theory, employment is based upon strong demand which will create rising output, output brings income and income creates employment. He takes employment as a result of income. Effective demand is measured by strong equal supply and demand functions. The equal supply function relies on physical or technical conditions which do not change in the short run, hence it maintained balance. Keynes focused on equal demand function to fight depression and unemployment. Thus, employment relied on equal demands which in turn are driven by consumption demand and investment demand. According to Keynes, employment can be high by rising demands. On income C(y) and when income rises, savings rises.

Empirical Literature

A lot of literature has come out with different thoughts on the true relationship between output and unemployment. For instance,

Omitogun & Longe (2017) using a VAR approach found an unstable and varying impact of unemployment on economic growth in Nigeria. Ademola & Badiru (2016) in a paper titled "the impact of unemployment and inflation on economic growth in Nigeria" in an OLS environment found a long-run positive relationship between RGDP, unemployment, and inflation. Ogueze & Odim (2015) using the OLS technique found a negative relationship between unemployment and real GDP in a study titled "the cost of unemployment and its effects on GDP growth in Nigeria."

Kemi and Dayo (2014) In Nigeria they explore the unemployment rate and economic advancement. (ECM) and Johansen cointegration test was carried out to ascertain the short run and long run ties that hold the two in the work. In Nigeria, true search indicates that short and long-run ties exist that hold the unemployment rate and output advancement in the country. Thus, it becomes necessary to bring together fiscal plans and heightens (FDI) and to minimize the rising level of unemployment in Nigeria. Oloni (2013) examines the effects of economic advancement on employment in a country using the Johansen vector-Error correction model. The search shows that economic advancement entails a good relationship with employment, the friendship is not important.

Lee (2000) measures Okun's ideology on OECD countries and pointed out that the ties are not constant and are not applicable in other countries around the world, but ended up saying that the effects of growth on employment maintain its vitality. Freeman (2001) a panel of ten industrial countries was set up to test Okun's law using the new advanced trend-cycle decomposition. Alanana, (2003) claims that unemployment is a strong problem confronting the country as it posed a dangerous concern to all quarters of Nigerian Society. Unemployment among the teeming youths is on the high side in the country. This also reflects in the old good days of economic normalcy, that I mean during the period of the oil boom of the 1970s (6.2%); 1980s (9.8%), and the 1990s (11.5%). Obayori (2014) examined in Nigeria the issue of unemployment and economic growth. This work used the ordinary least squares (OLS) and the cointegration approach to ascertain the impact and also the ties between unemployment and economic growth. The ECM claims show that unemployment affects economic growth. It further shows that unemployment is badly connected to economic growth. Arthur Okun (1962) the true relation between unemployment and economic advancement in Nigeria was given due attention by him the first economist. His ideas were 1% high in the advancement rate of the real rate of advancement is likely to head to 0.3% in minimizing unemployment. Thinking otherwise in this issue will mean that a 1% increase in unemployment entails clearly that there will be more than a 3% loss in GDP growth. Thus, it, therefore, means that the rate of Gross Domestic Product must be the same as its energy growth in order to maintain or ensure that the unemployment rate stable.

What is the causality existing between unemployment and economic growth? True research indicates that there exist close ties between the unemployment rate and output growth exists in the country. According to Walterskirchen (1999) the easy, but negative assertion is: Bad relationship can never exist between the two variables because Gross Domestic Products and unemployment are both heading to a long run. Obviously, it is clear that employees will continually be on the rise if Gross Domestic Product is growing faster than productivity. On the same veil, the bigger the chunk of goods manufactured, the larger the manpower will be needed for production; because they both go hand in hand. According to Calmfors and Holmlund (2000) often times disappointments take place in an attempt to separate between the rises in output that happens because of the rise in capacity utilization and because of those that happen due to long-term growth. Labor-market reforms reduce money costs and hence raise the height of employment opportunities; this as well enhances output to increase even during the adjustment process. The adjustment procedures are carried on and on until capital is restored or positioned to its normal state. (Bean, 1998). There is a measure on the ground that rotates taxation and dissuades the activities of the business and this as well minimized the need for labor. This particularly poses strong effects on smaller businesses; this exposes them to minimal access to capital markets than larger enterprises. Another hypothesis is that unemployment is generally a factor that limits long-term growth. Hence, labour-market reform that minimized unemployment would also lead to higher growth. This happens in theoretical fashions of originality growth. According to (Daveri and Tabellini, 2000): Rise employment connotes the whole income in the economy. This causes the coming back to capital and savings rate also. Big sum income and higher savings rate imply capital accumulation and this will lead to growth.

Hence, one can oppose that higher employment in this category of low-skilled labours leads to higher growth since it leads to more benefits to invest in human capital when this is involved with the low-skilled workers. Higher employment means more human capital gathering if it happens in the process of acquiring the job (Aghion and Howitt, 1994; Daveri and Tabellini, 2000). The unemployment rate in Nigeria has risen over the years, (see appendix I) what this implies, is that, as unemployment was rising, the economy was at the same time developing. This is a paradox that this paper analytically examines.

Evaluation of Literature Reviewed /Justification of Study

From the theoretical and empirical literature review in the study, there is no one approach deemed most suitable to explaining unemployment and economic growth. However, since no one theory is adequate enough, various approaches will be adopted in course of this study. For instance, Oloni (2013) examines the effects of economic advancement on employment in the country using the Johansen Vector- Error Correction Model. The research shows that economic

advancement has a good relationship with employment, the relationship is not significant.

Kemi and Dayo (2014) explore the ties that hold the unemployment rate and economic growth in Nigeria. (ECM) and Johansen cointegration test was used to ascertain the two variables relationship. True search indicates that the relationship between the two variables exists between the unemployment rate and output growth in the country. Thus, it is important to bring together fiscal plans and uplift the height of (FDI) to minimize the rate of job seekers in Nigeria.

Moreover, while appreciating studies carried out on this issue, it is therefore necessary to ponder on the question; does the unemployment rate granger cause economic growth rate in Nigeria? In order to answer this question data on the unemployment rate and GDP growth rate were collected and the econometrics methods of OLS and cointegration were used to analyze the data.

III. DATA AND METHODOLOGY

This paper employed quasi-experimental research design approach. This study examines the unemployment and economic growth in Nigeria from 1981-2019. The study employed the Granger causality test (1969) to determine the nature of pairwise causality between unemployment and growth in Nigeria. Quasi-experimental research design is a type of research design that is robustly concerned with establishing a cause-and-effect relationship in a given control experiment. It permits the construction of dependent and independent system for explaining the impact of one variable (X)on another variable (Y) holding other factors constant.

Model Specification

The model specification is cast in line with the explanation proposed by Kemi and Dayo (2014) whose model is in the form;

$$RGDP = f(UEM) \quad (3.1)$$

$$RGDP = f(UEM, U_t) \quad (3.2)$$

$$RGDP_t = \beta_0 + \beta_1 UEM_t + U_t \quad (3.3)$$

This paper modified 3.1 by examining Real GDP hence;

$$RGDP_t = \beta_1 \sum UEM_{t-1} + \beta_2 \sum RGDP_{t-j} + \mu_{1t} \quad (3.4)$$

$$UEM_t = \beta_3 \sum UEM_{t-1} + \beta_4 \sum RGDP_{t-j} + \mu_{1t} \quad (3.5)$$

Where: β_0 = Intercept Parameter, $\beta_{1\text{-}4}$ = slopes Parameter, RGDP = Real Gross Domestic Product, UEM = Unemployment Rate

A priori expectations

On the apriori;

(i) β_1 is expected to have a negative sign (i.e., $\beta_1 < 0$), since an increase in the rate of unemployment will reduce economic growth.

Real GDP: This implies the constant value of the monetary benefits of goods and services produced yearly in a country. Real GDP is expected to be negatively related to unemployment rate but positively related with both capacity utilization and government capital expenditure.

Unemployment Rate (UEM) – According to Gbosi (2007) unemployment is situations whereby people that are willing and able to work are at the prevailing wage rate without any work. It also implies the percentage of the total labour force that is unemployed in a year but actively seeking employment and desiring to put ones work at the dominance wage rate. Unemployment rate is expected to be negatively related with economic growth.

Sources of Data Collection

The necessary information (data) on the above variables is obtained from CBN Statistical Bulletin, and National Bureau of statistics, 1981-2019

Data Analysis and Estimation Techniques

The statistical tools to be employed in analyzing the data of this study are; correlation and Granger causality test. The choice of these econometric approaches is premised on the fact that time series data are sometimes pronged to fluctuation that may cumulate into spurious regression result.

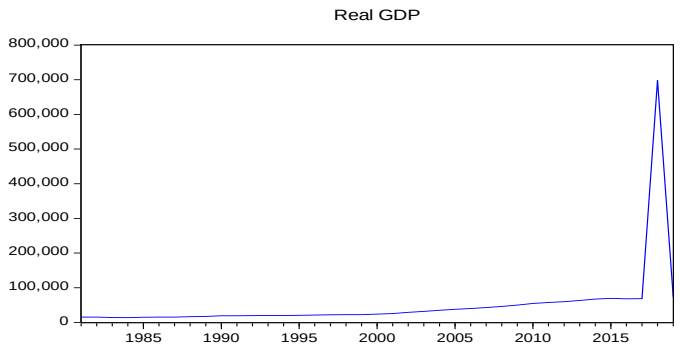
IV. RESULT AND DISCUSSION OF FINDINGS

Trend Analysis

The study utilized the graphical approach to test the nature of trends amongst the hypothesized variables. Fig 1 and 2 depicts the graphical representation of unemployment rate and Real GDP in Nigeria. The trend in the Fig. 1 and Fig. 2 therefore require that the data is subjected to further test to determine the suitability of the data for empirical analysis.

Fig 1: Unemployment Rate in Nigeria

Fig 2: Real GDP in Nigeria



Before the unit root test is considered it is pertinent to determine the appropriate lag length criteria that would enable this study perform stationarity test. In table 1, the appropriate lag length selected by the criteria is lag 3.

Table 1: VAR Lag Length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-570.4357	NA	2.22e+11	31.80198	31.88995	31.83269
1	-532.5540	69.44965	3.38e+10	29.91967	30.18359	30.01178
2	-527.4800	8.738621	3.20e+10	29.86000	30.29987	30.01352
3	-518.2176	14.92278*	2.40e+10*	29.56764*	30.18346*	29.78258*

Source: EViews 10, * indicates lag length selected by the criterion

The first stage of co-integrated technique is the unit root test, otherwise called test of stationarity. The verification of stationarity which is largely known and accepted for the past years is the unit root test (Gujarati, 2007). The assertion of stationarity of been regressors and regressands is important for the belongings of the OLS estimators. Hence, the normal statistical results for the linear regression model and stable of estimators hold. Thus, when their differences are non-stationary, then the normal statistical results may not hold. From table 2, the variables were stationary at order 1 i.e. I*(1).*

Table 2 Augmented Dickey-Fuller Test Equation at 5%

Variables	t-Statistic	Prob.*	Decision
Real GDP	-5.221527	0.0008	*I(1)*
Unemployment Rate	-6.222958	0.0000	*I(1)*

Source: EViews 10

Correlation

The result in table 3 shows that there is a positive correlation between unemployment rate and Real GDP. This implies that overtime unemployment rate has grown with the population. Real GDP is decomposed into two channels the GDP and population channels. The empirical meaning of the result depicts that population growth correlates with unemployment rate that in turn weakens Real GDP.

Table 3 Correlation Result

	D(UNEMPLOYMENT_RATE)	D(REAL_GDP)
D(UNEMPLOYMENT_RATE)	1	0.06593696842494654
D(REAL_GDP)	0.06593696842494654	1

Source: EViews 10

Granger Causality Test

In eq. 3.4 and 3.5 this paper formed a classic pairwise granger causality test. This test was used to investigate the cause-and-effect association that occur between the Real GDP and unemployment rate in Nigeria. The underpinning idea is to observe the channels of impact existing between Real GDP and unemployment rate. The hypothesis which underpins this empirical analysis is that Real GDP grows negatively with unemployment.

Table 4 Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
D(REAL_GDP) does not Granger Cause D(UNEMPLOYMENT_RATE)	35	1.29470	0.2957
D(UNEMPLOYMENT_RATE) does not Granger Cause D(REAL_GDP)		5.58802	0.0039*

Source: Eviews 10

From table 4 this study accepts the null hypothesis that real GDP do not granger cause unemployment rate in Nigeria because the Pvalues is greater than 5%. The pvalue is 29%. However, from table 4 the hypothesis that unemployment does not granger cause RGDP is rejected. We accept the alternative hypothesis that unemployment rate granger causes RGDP is less than 5%.

Summary of Major Findings

The major findings in the study are:

1)There is a positive correlation between unemployment rate and real GDP in Nigeria.

2) The study observed there is unidirectional causality between unemployment rate and RGDP in Nigeria. The result reveals that best approach to achieve RGDP growth is to develop improve employment of factor input. Thus, the best strategy to grow Nigeria's economy is to pursue job creation agenda.

V. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This study examined the causality that exist between unemployment and economic growth (proxy by RGDP) in Nigeria. The study is necessitated by high rate of unemployment put at 33.3% and the erratic growth rate which

in its rate is 0.5%. Thus, we reject the hypothesis that unemployment rate does not granger cause Real GDP. Furthermore, this study accepts the null hypothesis that Real GDP does not granger cause unemployment rate. This implies that a percentage growth in Real GDP do not implies a decline in unemployment. This result is consistent with the economic reality in Nigeria.

5.2 Policy Implication

The policy implication from the study is that Nigerian government must focus on job creation to grow the Nigerian economy and improve welfare.

The study found out that there is an indirect and significant relationship between unemployment rate and economic growth in Nigeria within the period of study. The policy implication of this finding is that Nigeria's unemployment rate is capable of negatively affecting GDP significantly. Meaning that unemployment rate is a major determinant of economic growth in Nigeria during the period of study.

5.3 Recommendation

Based on the findings, government should provide enabling environment that will usher in a private sector driven economy that is the engine room for job creation. Government should strengthen legislation that would attract foreign investment that would expand the job creation capacity of the real sectors. Also, government should create more entrepreneurial skill acquisition programmes to aid self-employment and self-reliance. Government must increase the competitiveness frontier of the economy by enhancing ease of doing business in the country and provide capital base for SMEs in the country.

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DATA PRESENTATION

Year	Real GDP	Unemployment rate
1981	15,258.00	7.100000
1982	14,985.08	4.700000
1983	13849.73	10.20000
1984	13779.26	7.300000
1985	14953.91	6.100000
1986	15237.99	5.300000
1987	15263.93	7.000000
1988	16215.37	5.300000
1989	17294.68	4.000000
1990	19305.63	5.500000
1991	19199.06	5.700000
1992	19620.19	7.500000
1993	19927.99	7.200000
1994	19979.12	6.800000
1995	20353.20	6.400000
1996	21177.92	6.400000
1997	21789.10	8.500000
1998	22332.87	7.600000
1999	22449.41	8.500000
2000	23688.28	11.50000
2001	25267.54	9.600000
2002	28957.71	8.800000
2003	31709.45	10.80000
2004	35020.55	10.20000
2005	37474.95	9.400000
2006	39995.50	9.900000
2007	42922.41	10.90000
2008	46012.52	12.80000
2009	49856.10	11.20000
2010	54612.26	11.53600
2011	57511.04	14.60000
2012	59929.89	12.40000
2013	63218.72	12.2000
2014	67152.79	7.841

2015	69023.93	10.44
2016	67931.24	14.23
2017	68490.98	20.42
2018	697999.94	23.13
2019	71387.83	27.1

Source: CBN and NBS