The Cost of Unemployment and its Effects on Gdp Growth in Nigeria

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Abstract: Majority of the works done on the relationship between unemployment and output growth focused on the development economies relativity, few have focused on unemployment and output growth in developing countries. In view of that, the most recent of these works was done by Orji U.(2011) but he failed to capture the effect of structural adjustment programme in his work. He equally included inflation and real gross domestic product which are not supposed to enter into his model at the same time. As a result, this study tends to find out the magnitude of the impact of unemployment on output growth as well as capture the effect of structural adjustment programme. To effectively achieve these objectives, the ordinary least square techniques will be employed. The sample size used in this regression analysis is 40 observations. The technique of data collection was purely secondary from the Central Bank of Nigeria, 2012 version. The result of the analysis showed that unemployment has a negative relationship with the real gross domestic product in Nigeria. This result was in line with the postulation of Arthur Okun (1962). This work equally shows that structural adjustment programme has inverse relationship with unemployment in Nigeria.

Key words: Unemployment · Interest Rate · Investment · Import · Money Supply

INTRODUCTION

Unemployment has been a universal problem with which the political leadership of almost every country has to wrestle and a symptom of economic illness and macroeconomic disequilibrium. To most people, the lose of job is a signal of reduced living standard and psychological distress [1]. [1], demonstrated a strong statistical relationship between the real gross domestic product (RGDP) and unemployment on annual basis in the United Kingdom. The question of unemployment is a significant consideration in countries in the developed world.

It is axiomatic however that a considerable amount of this job losses occurred as a result of politically driven initiatives such as disinvestment in the different sectors of the economy. It is equally true that the political transformation of Nigeria occurred. This recession, was exacerbated by a world wide phenomenon referred to as globalization from which the highly developed and technological advanced countries benefited faster as a result of their ability to produce consumer goods at very competitive prices and from which emerging nations including Nigeria lost economically due to their need to address the economic and social issues such as: gender, unemployment equity, problems of disease, poverty and other consequential inability to compete economically [2-4].

The relationship between unemployment and output growth is negative in nature. This simply means that as the rate of unemployment measured by the proportion of those willing and able to work who cannot find job increases, the real gross domestic product of that country decreases. It is the inverse relationship between unemployment and output growth that is termed Okun’s law. The law was named after the discoverer, Professor Arthur Okun in 1962.

Unemployment whether voluntary or involuntary in nature has significant impact on a nation’s Real Gross Domestic Product (RGDP) [5,6]. Therefore, unemployment can be said to be on a massive scale [5]. Although, reduction of unemployment has been the policy objective of every government, achievement of this objective has remained futile.

Statement of the Problem: Unemployment has been a problem in Nigeria especially since 1980, when the nation’s economy took a turn for the worse as world
petroleum prices tumbled, the Nigerian currency became devalued, corruption became rampant and the population of Nigeria ballooned at a breath taking pace.

Unemployment in a country drains the economic performance of that country and poses a threat to the entire economy in general and to the individuals in particular. Unemployment in Nigeria is one of the most critical problems the country is facing. The years of corruption, civil war, military rule and mismanagement have hindered economic growth of the country. Nigeria is endowed with diverse and infinite resources, both human and material. However, years of negligence and adverse policies have led to the under-utilization of these resources. The resources have not been effectively utilized in order to yield maximum economic benefits.

Unemployment in Nigeria has resulted in more and more people who do not have purchasing power. Less consumption has led to lower production and economic growth has been hampered. Unemployment also has social consequences such as increase in rate of crime in the nation, graduates that were equipped with knowledge and zeal to work and earn their living are presently hired into committing crimes like arm robbery, assassinations and ritual killings, sometimes for their individual self satisfaction.

In this modern market economy, many factors contribute to unemployment such as; poverty, ability to look for employment, rapid changes in technology, recession, inflation, disability, undulating business cycle, changes in taste as well as alterations in climatic conditions, attitude towards employer, perception of employees, employee values, discriminating factors in the place of work (may be on the basis of age, class, ethnicity, colour and race). In passing, since we have known what Okun’s law is all about, our next question will then be; does this law hold in Nigeria? If yes, can it hold when a long run time series data is applied?

**Objectives of the Study:** The objectives of this research work by matter of one to one relationship go in tandem with the stated problems. Specifically, the research work intends:

- To ascertain the relationship between unemployment and the real gross domestic product in Nigeria.
- To determine whether or not Okun’s law holds for a long run time series data.
- To know whether other factors other than unemployment are responsible for the real gross domestic product in Nigeria.

**Research Hypothesis:** To effectively and efficiently bring down to earth and to lay bare the answers to the problems stated above. The following hypothesis shall be considered.

$H_0$: There is no relationship between unemployment and the real gross domestic product in Nigeria.

$H_1$: Okun’s law does not hold when long run time series is applied.

$H_2$: Unemployment is the only factor responsible for the fluctuations in the real gross domestic product of Nigeria.

**Literature:** The clear cut method of researching on any topic is to first carry out a review of related literature. This was why [6] pointed out that literature review does not only help to avoid researching on already researched work but also help to add to the existing stock of knowledge. It helps to direct a research towards particular focus. In this regard we shall consider the case of theoretical and empirical review of related works. The theoretical review will help to pinpoint the theoretical works of different researchers and authors concerning the relationship between unemployment and output growth in Nigeria. On the other hand, the empirical review will help to trap down the empirical findings or investigations of different researchers.

**Theoretical Review:** Unemployment in Nigeria has been on the increase giving the teeming population and the inability to create new jobs. The increase in unemployment goes a long way to influence a nation’s output growth measured by the Gross Domestic Product (GDP). It was this influence that motivated Arthur Okun, 1962 to investigate the link between unemployment and growth otherwise known as Okun’s law. Thus, a mention of Okun’s laws is synonymous to the statistical link between unemployment and growth.

The law related decrease in unemployment rate to increase in output overtime. The level of unemployment tends to fall when growth in output is high, rise when growth is low or negative. Thus, to keep unemployment from rising, the GDP growth rate has to come to more than two percent. When workers are unemployed, a nation’s output drops and the economy’s productive potential are not realized [7,8]. In recession, the gross domestic product falls far below the potential output that the nation is capable of producing. The loose in output is the major cost of unemployment. More than this, [6], argues that higher unemployment contributes to social distress, increase poverty and rising crime rate.
[11,12] in their research work on “should we worry about unemployment”, came to terms with Okun in the area of correlation between unemployment and growth rate (output growth). Okun’s inability to include inflationary tendency into his work marked their opposing views. They noted that although Okun’s law does generally capture the shape of the time series of output, there are several instances in which the prediction of GDP growth was inconsistent with the models predictions. In 1993, for instance, Okun’s law would have had GDP growth increasing substantially, whereas, it in fact fell relative to 1992. The reverse occurred in 1996 where the GDP growth was higher than in the prior year, despite the decline predicted by the Okun’s equation. This short “mistake” in the model occurred for precisely the same reasons that the relationship between output growth and unemployment does not remain constant over long period. Although Okun’s law expresses relationship between unemployment and output growth. It is appropriate to think of it as immutable law derived from theory. This [13] pointed out that the outputs of an economy does not depend directly on the employment rate but through the channel of labour services it relates to GDP growth.

[7] assert that unemployment above the natural rate leads to a fall in the GDP gap since actual GDP falls short of potential GDP. This indicates the close correlation between the actual employment rate and GDP gap. In view of this, Michael C. [14] opines that although there is correlation between unemployment and output growth, the direction of causality can be bi-directional such that decline in potential output in a nation can produce a major cause of unemployment.

[15] in his work on potential output and productivity asserts that there is a close link between productivity and potential output. He further suggests increase in the full employment/ unemployment rate above those estimated by Perry and the Council of Economic Advisers (CEA). Michael L. W. more recent estimate was about one half of the estimate of Perry. In his remark on [15], Otto Eckstein opines that it remains as true today as it was a decade ago that Okun’s law is the best predictor of aggregate unemployment. Also, the unemployment rate in the St. Louis model has been determined by an Okun’s law relationship relating the unemployment rate to current and one quarter lagged values of the Gross National Product (GNP) gap [5, 7, 8]. On the contrary [7, 8] observed that the cross sectional patterns of OLS Okun’s Coefficient estimates on changes in regular employment legislation was positive. They reveal that the positive coefficient indicates that a relaxation of regular employment legislation since the late 1980’s in EU regions tends to increase the impact of growth on unemployment. The result of Dornbusch and Fisher [7] points to relatively weak marginal effects of output growth on unemployment in regions specialized in manufacturing and business services. In the light of productivity differences across industries, one might expect higher unemployment intensities of output variation in regions that are characterized by high share of technological less developed branches. Edwald Walterskirchen [8] argue that stricter employment protection reduces both hiring and firings. This suggests that the employment intensity of growth might be lower in countries marked by strict labour market institutions. Firms have incentives to use other means of adjustment, such as overtime and thereby dampen aggregate employment fluctuations in response to output growth. Legislation that increases the cost of unemployment adjustment is likely to reduce not only inflows into unemployment but also outflows into work. Altogether a more flexible setting of labour market institutions is supposed to increase the responsiveness of labour demand and unemployment to growth [9].

However, Joseph Schumpeter (1883 - 1950) has clearly outperformed the United States in terms of productivity growth. These raised the question of a possible trade-off between unemployment and productivity growth [10]. Is low productivity growth, the price the United States had to pay for its “employment miracle”? In view of the inter connection between the productivity of labour and level of wages, such a trade-off would also imply a conflict between employment and real wage growth. On the other hand, no such conflict is suggested by the strong positive correlation of employment and labour productivity over the business cycle.

Also, in his employment strategy papers on employment, productivity and output growth [10] asserts that employment, productivity of labour and aggregate output are linked by the so called “fundamental indentity”. While this identity can place a useful role in organizing our thinking about the links between the three variables, it cannot justify any inferences about cause and effect. Perhaps, the best-known misuse of the “fundamental identity” is the widely held assumption that too high a rate of productivity growth can crowd out employment growth and thereby become a resource of unemployment. This assertion is based on a “lump of labour” fallacy and has no empirical support.
Empirical Review: The underlying empirical relationship embodied in what has come to be called “Okun’s Law”, was originally intended to provide a means of identifying the loss of national output associated with unemployment. More detailed methods have been developed for this purpose, the simplicity of Okun’s law, as well as its purported success in explaining and forecasting the unemployment rate, have led to its widespread acceptance. Although, Okun’s law has provided some insights for the analysis of aggregate economic activity, unquestioned acceptance of the original empirical specification of the relationship has been unwarranted.

Okun’s investigation reveals that changes in the unemployment rate for the civilian labour force age; fourteen and over, were used in the real GNP growth for the period third-quarter of 1947 to fourth-quarter of 1960. The initial test yield 0.30 and the output growth coefficient were -0.31. Essentially, Okun’s result (-0.44) is appropriately the size of the gap coefficient found. The constant in such an equation was 0.42, while the $R^2$ was 0.70, Durbin Watson equal to 1.80, standard error was markedly lower than when only current output growth of 0.40 included. Okun made use of linear logarithmic equation to estimate the relationship between unemployment output and crime. This relationship indicates that every percentage point of output growth in excess of 3.2 percent per year is associated with a drop in the unemployment rate of half a percentage point. In that, an output growth of 4.2 percent would coincide with a 0.5 percentage point decline in the jobless rate. The 3.2 percent here refers to the potential GDP growth in Okun’s law formulation. Campbell, Connel and Stanley Brue [6] carries, out an empirical investigation on the relationship between growth, employment and unemployment in Europe and finds out that there is very close relationship between growth and unemployment in time series as well as a cross country analysis. The coefficients were highly insignificant. In cross country analysis (1988-1998), the employment elasticity vis-à-vis GDP growth was 0.65 while in time series analysis the employment elasticity in the EU was 0.8 for the period of 1988-1998 and highly significant. The elasticity of unemployment rate of employment changes ranges in most regressions for individual countries between 0.5 and 0.7. It is however pertinent to know that increase in employment does not indicate decrease in unemployment at the same rate. The reason behind this is that a better labour market situation will attract workers who had no job before and foreign workers if the labour market is liberalized. Looking at cross country analysis, the correlation between GDP growth and unemployment is measured by an $R$-square of 0.8 and that of employment to be $R$-square of 0.5. It is evident to note that employment will only increase if the GDP is increasing faster than productivity. In the EU, during the 90s, a GDP growth rate of 1.8% was necessary to keep employment constant and as labour supply increased to a rate of 2.3% was necessary to keep employment constant at existing labour market regime. Over the years, the coefficient of Okun’s law has been reported to be on the increase. In view of this, R. J. Gordon expected an increase in the Okun coefficient over time with rising unemployment and Blanchard showed such an increase using many countries data in the 80s. Also, Arthur M. Okun [4] shows increase in Okun coefficient in the EU over time. The value of Okun’s coefficient increases from 0.2 in the 70s to 0.5 means that as GDP grows by one percentage point (above the normal point), unemployment rate reduces by 0.5 percentage points.

The consequence of the size in Okun’s coefficient is that the chance for cutting unemployment by stronger growth has increased. They have never been better in the 90s. [7] further noted that East Germany is the only country revealing no relationship between growth and unemployment at all.

Fedderke and Simkins [9] made use of a bivariate correlated unobserved components model to investigate the relationship between the permanent and transitory movement in US output and the unemployment rate. The result shed light on a number of important debates. First, regarding the importance of permanent versus transitory movements in real GDP, the results were consistent with the finding by Aghino and Howith [1] and Altig, Terry and Rupert [2] and Anyanwu and Oaikhinan[ 3] the movements in US real GDP were largely permanent. Including the unemployment rate as an additional variable does not qualitatively change the real GDP results from MNZ’s univariate model. Arthur M. Okun [5] observes the relationship between transitory unemployment and output growth to be negative with a coefficient of -1.4. This is a marked departure from the initial of the transitory unemployment. Tara’s work equally differs with that of Edwald Walterskirchen [8] which was reported to be 0.67. Also, the work of Tara indicates that there is strong statistical relationship between unemployment and output growth with an absolute value of the test statistics of 14.0.

Herwartz and Niebuhr [13] used the CEA data to estimate an Okun’s law equation and concluded that it explains unemployment from 1973 through 1977 quite well. The equation used contains only the current gap.
A replication of his equation yield a rho value of 0.88 and Durbin Watson statistics of 1.40. Although, there was the problem of misspecification introduced by omitting a significant lagged value of the gap, it is useful to consider the size of the forecast errors using the equations. On average, the unemployment forecast is 0.75 percentage points above the actual rate during 1974 and 0.75 percentage points below the actual rate observed from the second-quarter of 1975 through the beginning of 1977.

However, it is pertinent to know that John A. Tatom agrees with Okun’s assertion of the presence of constant in the Okun’s law equation but has a deviating view of the value of unemployment rate at a full employment as stated by Okun. In Okun’s result, the value of unemployment rate at full employment was given as 4%. This value as stated by Okun was seriously weakened by the empirical evidence of the Council of Economic Advisers and that of the Rashche Tatom measure which were given as 4.58% and 4.99% respectively.

Dornbusch and Fisher [7] investigated the short run cyclical fluctuations of employment and productivity of US economy and found out that the US economy went through nine (9) recessions during post-war period of 1947 to 1999. In all of these recessions, employment fell. In eight of nine cases, outputs per-hour in non-agricultural business also fell. In an average recession, output falls by 4.7% relative to its long term growth rate, employment falls by 3.6% and non-agricultural output per-hour falls by 1.9%. Thus, output growth fluctuates more widely than employment growth.

Dornbusch and Fisher [7] and Fedderke and Simkins [9] investigated the determinant of the (un) employment intensity of growth across section of Europe regions and found out that there were small effects of output variations on unemployment and labour demand given by the median OLS estimate of 0.10. Thus, at the regional level, one percent of output growth reduces unemployment rate by 0.1% points. Arthur M. Okun [4], reported for a cross section of OECD countries as an average effect of 0.25% points, whereas, the estimates in Campbell, Connel and Stanley Brue [6] and Dornbusch and Fisher [7] vary between -0.12 and -0.82. However, evidence provided by Herwartz and Niebuhr [13] and Oliver Landmann [15] points to an impact, of output growth even below 0.1% points for regional labour markets in Germany. The median GLS slope estimated was -0.02. Regarding the employment intensity of growth, Dornbusch and Fisher [7] arrived at a median OLS estimate of 0.35. [9], also obtained a rather weak employment response with an average output elasticity of 0.20 for German regions.

**MATERIALS AND METHODS**

Researchers adopt different procedures in an attempt to drive home their various research objectives. However, despite the different methods open to researchers [9] pointed out that although several schools of thought on econometrics methodology exist, the classical or traditional methodology dominates empirical research in economics and other social and behavioural sciences. In that, we shall adopt the classical methodological approach in this research work.

**Model Specification:** The models of this research work will be specified mathematically and econometrically.

**Mathematical Specification:** The mathematical model used in this research work can be specified as

\[
\text{LOG (RGDP)} = f(\text{UNP}, \text{INT}, \text{INV}, \text{IMP}, \text{M2}) \quad (1)
\]

\[
\text{LOG (RGDP)} = \beta_0 + \beta_1 \text{LOG (UNP)} + \beta_2 \text{LOG (INV)} + \beta_3 \text{LOG (INT)} + \beta_4 \text{LOG (IMP)} + \beta_5 \text{LOG (M2)} \quad (2)
\]

Where

\[
\text{UNP}_t = \text{Unemployment rate per year}
\]

\[
\text{INT}_t = \text{Interest rate (the cost of borrowing)}
\]

\[
\text{INV}_t = \text{Investment}
\]

\[
\text{IMP} = \text{Import}
\]

\[
\text{M2} = \text{Money supply}
\]

\[
t = \text{time}
\]

Also,

\[
\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5 \text{ are the parameters to be estimated.}
\]

However, there is the possibility that the links between unemployment and output may be affected by structural change resulting from structural adjustment programme. To capture this, we specify the model shown below.

\[
(\text{UNPt}) = \beta_0 + \beta_1 \text{LOG (RGDP)} + \beta_2 \text{LOG (INV)} + \beta_3 \text{LOG (M2)} + \beta_4 \text{DM} \quad (3)
\]
**Econometrics Specification:** The purely mathematical model of the output growth rate and unemployment in model 1 is of limited interest to the econometricians, for it assumes that there is an exact or deterministic relationship between the outcome and the covariate variables.

Fedderke and Simkins [9], argues that the relationships between economic variables are generally inexact. This is because there could be other variables which are likely to influence the output growth rate. To allow for the inexact relationships between economic variables, the econometricians would modify the deterministic model 1 and 2 as can be seen in equation 4 and 5 below;

\[
\text{LOG (RGDP)}_t = \beta_0 + \beta_1 \text{LOG (UNP)}_t + \beta_2 \text{LOG (INV)}_t + \beta_3 \text{LOG (INT)}_t + \beta_4 \text{LOG (IMP)}_t + \beta_5 \text{LOG (M2)}_t + \mu_t \quad (4)
\]

\[
\text{(UNP)}_t = \beta_0 + \beta_1 \text{LOG (RGDP)}_t + \beta_2 \text{LOG (INV)}_t + \beta_3 \text{LOG (IMP)}_t + \beta_4 \text{LOG (DM)}_t + \mu_t \quad (5)
\]

Where \(\mu_t\) represents the error term following the assumptions of the error term \((\mu_t)\), it implies that; \(\mu_t \sim N(0, \delta^2)\) meaning that the error term is normally and independently distributed with mean zero and variance \(\delta^2\).

Thus, \(\mathbb{E}(\text{u}_t) = 0\)

\[
\text{Var}(\text{u}_t) = \mathbb{E}(\text{u}_t - \overline{\text{u}_t})^2 = \delta^2
\]

Note: Equation (4) is now our model of interest.

**Sources of Data:** The data for this analysis was purely secondary data. It was sourced from Central Bank of Nigeria statistical bulletin 2012 edition. The data span from 1970 to 2010.

**Data**

**Evaluation of the Results**

**Economic Theoretical Test:** From the regression result above, it can be seen that most of the parameters of model 4 conforms to a priori expectation except Log of Investment and interest rate. In that, the bedrock of this empirical investigation lies on theory postulation. The expected and the obtained sign of the parameters of model 4 can be seen in Table 2.

From the table above it can be seen that Log of Investment and the interest rate did not follow theory postulate. This could be attributed to poor quality of data collected.

Lastly, the result of model 5 indicates that structural adjustment programme has an inverse relationship with unemployment. However, the impact of structural change is not statistically different from zero. This could be that the initiated programme was not properly executed.

**Table 1:** Summary of the regression result of model 4 obtained.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-statistics</th>
<th>Probability value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.663068</td>
<td>0.849457</td>
<td>5.489470</td>
<td>0.0000</td>
</tr>
<tr>
<td>UNPR</td>
<td>-0.091143</td>
<td>0.026310</td>
<td>-3.464263</td>
<td>0.0015</td>
</tr>
<tr>
<td>LOG (INV)</td>
<td>-0.530225</td>
<td>0.872811</td>
<td>-0.607491</td>
<td>0.5477</td>
</tr>
<tr>
<td>INT</td>
<td>0.037375</td>
<td>0.018989</td>
<td>1.968241</td>
<td>0.0575</td>
</tr>
<tr>
<td>LOG (M2)</td>
<td>2.070182</td>
<td>1.022701</td>
<td>2.024230</td>
<td>0.0511</td>
</tr>
<tr>
<td>LOG (IMP)</td>
<td>-0.960954</td>
<td>0.232933</td>
<td>-4.125453</td>
<td>0.0002</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.897110 \quad \text{R}^2 = 0.881520 \]

\[ \text{F-statistics} = 57.54604 \quad \text{Prob (F-statistics)} = 0.0000 \]

**Table 2:** Summary of the result of model 5 obtained.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-statistics</th>
<th>Probability value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>9.123108</td>
<td>5.903865</td>
<td>1.545277</td>
<td>0.1315</td>
</tr>
<tr>
<td>LOG (RGDP)</td>
<td>-2.605360</td>
<td>0.765987</td>
<td>-3.401309</td>
<td>0.0017</td>
</tr>
<tr>
<td>LOG (INV)</td>
<td>5.169599</td>
<td>1.228692</td>
<td>4.207401</td>
<td>0.0002</td>
</tr>
<tr>
<td>LOG (IMP)</td>
<td>-2.102937</td>
<td>0.959334</td>
<td>-2.192081</td>
<td>0.0353</td>
</tr>
<tr>
<td>DM</td>
<td>-3.336796</td>
<td>1.705596</td>
<td>-1.955958</td>
<td>0.0587</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.61528 \quad \text{R}^2 = 0.57 \]

\[ \text{F-statistic} = 13.5940 \quad \text{Prob (F-statistics)} = 0.0000 \]
Table 3. The expected and the obtained sign of the parameters of model 4.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Expected sign</th>
<th>Obtained Signs</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNPR</td>
<td>Negative</td>
<td>Negative</td>
<td>Conforms</td>
</tr>
<tr>
<td>LOG (INV)</td>
<td>Positive</td>
<td>Negative</td>
<td>Did not conform</td>
</tr>
<tr>
<td>INT</td>
<td>Negative</td>
<td>Positive</td>
<td>Did not conform</td>
</tr>
<tr>
<td>LOG (M2)</td>
<td>Positive</td>
<td>Positive</td>
<td>Conforms</td>
</tr>
<tr>
<td>LOG (IMP)</td>
<td>Negative</td>
<td>Negative</td>
<td>Conforms</td>
</tr>
</tbody>
</table>

Table 4: The result of the t-test

<table>
<thead>
<tr>
<th>Variables</th>
<th>t-statistic</th>
<th>Critical Value</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>5.489470</td>
<td>± 1.684</td>
<td>Statistically significant</td>
</tr>
<tr>
<td>UNPR</td>
<td>-3.464263</td>
<td>± 1.684</td>
<td>Statistically significant</td>
</tr>
<tr>
<td>LOG (INV)</td>
<td>-0.607491</td>
<td>± 1.684</td>
<td>Statistically significant</td>
</tr>
<tr>
<td>INT</td>
<td>1.968241</td>
<td>± 1.684</td>
<td>Statistically significant</td>
</tr>
<tr>
<td>LOG (M2)</td>
<td>2.024230</td>
<td>± 1.684</td>
<td>Statistically significant</td>
</tr>
<tr>
<td>LOG (IMP)</td>
<td>-4.125453</td>
<td>± 1.684</td>
<td>Statistically significant</td>
</tr>
</tbody>
</table>

Table 5: Correlation matrix for multicollinearity

<table>
<thead>
<tr>
<th>Variables</th>
<th>Correlation Coefficient</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNPR and INV</td>
<td>0.587180</td>
<td>No multicollinearity</td>
</tr>
<tr>
<td>UNPR and INT</td>
<td>0.248155</td>
<td>No multicollinearity</td>
</tr>
<tr>
<td>UNPR and IMP</td>
<td>0.666278</td>
<td>No multicollinearity</td>
</tr>
<tr>
<td>INV and INT</td>
<td>0.200729</td>
<td>No multicollinearity</td>
</tr>
<tr>
<td>INV and M2</td>
<td>0.997357</td>
<td>Presence of multicollinearity</td>
</tr>
<tr>
<td>INV and IMP</td>
<td>0.971623</td>
<td>Presence of multicollinearity</td>
</tr>
<tr>
<td>INT and M2</td>
<td>0.223228</td>
<td>No multicollinearity</td>
</tr>
<tr>
<td>INT and IMP</td>
<td>0.288689</td>
<td>No multicollinearity</td>
</tr>
<tr>
<td>M2 and IMP</td>
<td>0.980720</td>
<td>Presence of multicollinearity</td>
</tr>
</tbody>
</table>

Table 6: Results of autocorrelation

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Decision Rule</th>
<th>Condition (If)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No positive autocorrelation</td>
<td>Reject</td>
<td>0 &lt; d &lt; dl</td>
</tr>
<tr>
<td>No positive autocorrelation</td>
<td>No decision</td>
<td>Dl = d = du</td>
</tr>
<tr>
<td>No positive autocorrelation</td>
<td>Reject</td>
<td>4 - dl &lt; d &lt; 4</td>
</tr>
<tr>
<td>No positive autocorrelation</td>
<td>No decision</td>
<td>4 - du = d = 4 - dl</td>
</tr>
<tr>
<td>No autocorrelation positive or negative</td>
<td>Do not reject</td>
<td>du &lt; d &lt; 4 - dl</td>
</tr>
</tbody>
</table>

Table 7: Result of specification error

<table>
<thead>
<tr>
<th>Variable</th>
<th>F-Statistics</th>
<th>F-tabulated</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fitted ^ 2</td>
<td>26.09778</td>
<td>2.53</td>
<td>Well specified</td>
</tr>
</tbody>
</table>

F-Ratio: F-ratio is applied to check the overall significance of the model. The hypothesis is;

\[ H_0 : \beta_0 = \beta_1 = \beta_2 = \ldots = \beta_k = 0 \quad vs \quad H_1 : \sigma \beta_0 \neq \beta_1 \neq \beta_2 \neq \ldots \neq \beta_k \neq 0 \]

Decision Rule: Reject \( H_0 \) if \( F_{cal} > F_{cal} \) at \( \alpha = 0.05 \). Accept otherwise. \( F_{0.05} (5,34) = 2.53 \) and \( F_{cal} = 57.54604 \). Since \( 57.54604 > 2.53 \), we may reject \( H_0 \). Thus, the model has goodness of fit and is statistically different from zero.

\( R^2 \) and \( R^2 \) Adjusted: The coefficient of determination (\( R^2 \)) from our regression of model 4 is given as; \( R^2 = 0.897110 \). This implies that about 89.75% of the total variations in the real GDP are explained by the model. The \( R^2 \) adjusted value for loss of degree of freedom is given as 0.881520.

The value of the \( R^2 \) adjusted is treated as another statistic. It is also a measure of the goodness of fit. In that, about 88% of variation in the model is explained by the predictors.

Economic Criteria (Second Order Test): These criteria test whether the assumptions of the classical linear regression truly hold in our analysis. In order to pin down the assumptions we shall consider the following.

Normality Test: It is pertinent to recall that in chapter three we made an assumption that the residual follows normal distribution. This assumption can be tested using the Jarque Bera (JB) test; this follows chi-square with 2 degree of freedom. The hypothesis will be;

\[ H_0 : \mu \text{ are normally and independent distributed.} \quad vs \quad H_1: \mu \text{ are not normally distributed.} \]

Decision Rule: Reject \( H_0 \) if \( x^2_{cal} > x^2 \text{critical value at } \alpha = 5\% \). Accept otherwise. The result of the estimation shows that the value of Jarque Bera (JB) \( = 2.805126 \) and \( x^2_{0.05} (2) = 5.99142 \). Since \( 2.805126 < 5.99147 \) we do not reject \( H_0 \). Thus, the errors (\( \mu \)) are normally distributed.

Multicollinearity Test: The test for multicollinearity will be conducted using the pair-wise correlation matrix.

Decision Rule: If the r2 from the correlation matrix is in excess of 0.8, we conclude that there is presence of multicollinearity. However, if otherwise, there is no multicollinearity.
It is pertinent to know that the existence of multicollinearity between INV and M2, between INV and IMP and lastly between M2 and IMP do not affect our work because there are less than perfect.

**Heteroscedasticity Test:** This test will be conducted using the White’s general heteroscedasticity test (with no cross terms). The test follows a chi-square distribution with degree of freedom equal to the number of the explanatory variables (excluding the constant).

**Hypothesis:** The hypothesis shall be stated as

\[ H_0: \ Ω_1 = Ω_2 = Ω_3 = … Ω_{n-1} = 0 \ Vs \ H_1: \ Ω_1 ≠ Ω_2 ≠ Ω_3 ≠ … Ω_{n-1} ≠ 0 \]

**Decision Rule:** Since \( x_{cal} (4.628637) < x_{tab} (18.30) \), we do not reject \( H_0 \). Thus, there is no heteroscedasticity in the model.

**Autocorrelation Test:** Here, we shall test for the presence of autocorrelation is the estimated model. The conventional Durbin - Watson test is used. In that, we shall compare the Durbin Watson lower limit (dl) and the Durbin Watson upper limit (du) based on 5% level of significance and k-degree of freedom. Where \( k \) = number of explanatory variables excluding the constant.

**Hypothesis:**

\[ H_0: \ p = 0 \ (No \ autocorrelation) \ Vs \ H_1: \ p ≠ 0 \ (Positive \ autocorrelation) \]

At \( \alpha = 5\% \)

**Decision Rule:** Reject \( H0 \) if \( du < d < 4 - dl \) which implies autocorrelation. Accept otherwise. From the Durbin Watson table \( dl = 1.218, du = 1.789, d^* = 1.9866 \). Since \( du < d^* < 4 - dl \) of no autocorrelation, implies that; \( 1.1789 < 1.9866 < 2.782 \). We thus conclude that there is no autocorrelation, positive or negative.

**Specification Error:** The test of specification will be conducted using Ramsey Reset test.

**Hypothesis**

\[ H_0: \ \hat{β}_1 = 0 \ (meaning \ that \ model \ is \ not \ correctly \ specified) \]

**Against:**

\[ H_1: \ \hat{β}_1 ≠ 0 \]. At 5% level of significance. That is \( \alpha = 0.05 \)

**Decision Rule:** Reject \( H_0 \) if \( F_{cal} > F_{tab} (k-1/n-k) \) df. Accept otherwise

\( F_{cal} = 26.09778 \) and \( F_{0.05} (5/34) = 2.53 \)

Where \( n = 39 \) and \( k = 6 \)

**Decision Rule:** From the table above, it can be seen that \( 26.09778 > 2.53 \). Thus, we conclude that there is no specification error in the model.

**Summary of the Findings:** The rate of unemployment has been fluctuating over the years. The number of people entering into the labour market today has been outstripping the number of jobs available. People lose their jobs daily and few gain new employment. The differential between those that are jobless and those that acquire new jobs determine the rate of unemployment in Nigeria. But the question before us is, “what effect will the annual fluctuation in unemployment rate have on the growth rate of Nigeria’s economy? The answer to the above puzzle boils down to knowing the effect of unemployment on the economy of Nigeria. Unemployment occurs when people who are able and willing to take up paid employment are left without job. The rate of unemployment has a negative link with the growth rate of Nigeria’s economy. This relationship between unemployment and output growth rate of a nation is known as “the Okun’s law”. Arthur Okun [4] was the first to put forward the negative link between unemployment and output growth. Although before the postulation of Arthur Okun, many researchers have asserted the tendency of the link but their assertion was not widely known.

In this research work, unemployment was modeled along with interest rate, investment, money supply and import to check their combined effect on the growth rate of Nigerian economy. The technique of analysis adopted was ordinary least square. The model for the analysis was a double log model with the exception of two variables which already existed in rate value.

The results of analysis showed that in Nigerian economy, unemployment exhibits an inverse relationship with output growth rate. This is no surprise because it goes in line with theory postulate. The result indicates that an economy needs one hundred percent decrease in unemployment rate to achieve an economic growth rate of 9.1 percent. The poor magnitude of the impact of unemployment on growth is a clear indication that there are some other variables that combine with unemployment to affect economic growth of Nigeria.
Among the explanatory variables included in the model, interest rate was found to exhibit positive link with output growth. That is, the cost of borrowing was seen to contradict theory postulation. The reason could be that most investors used their personal saved money to invest. It could also be that the future benefit of the present sum borrowed exceeds the rate of interest and the principal of the borrowed fund. In that, it is not gainsaying that investors evaluate the future worth of a naira borrowed today and ascertain whether investment projects are feasible or not.

Meanwhile, investment in our regression showed an inverse relationship with output growth. The reason for this behaviour is not far fetched. It could be that the effects of other variables exact much influence on the gross domestic product of Nigeria. The influence of these variables may have offset the impact that investment would have caused on Nigeria’s economic growth rate. The problem of data collection could also contribute to the behaviour of investment. Import and money supply are other factors seen to be statistically different from zero. Thus, the exact much influence on the gross domestic product of Nigeria.

Furthermore, the influence of structural adjustment programme on unemployment in Nigeria was measured along with key determinant of unemployment such as real gross domestic product, investment and import. The result of the analysis showed that structural adjustment programme has negative link with unemployment in Nigeria. The result although statistically insignificant shows that the introduction of structural adjustment programme reduces unemployment rate by 3.34 units. In conclusion, this research work goes in line with the postulation of Arthur Okun and the structural adjustment programme introduced reduces unemployment in an insignificant manner.

**CONCLUSION**

So far, we have critically analyzed the research findings and can at this juncture lay bare the economic implications or the policy implications of the results. The statistical significance of unemployment rate indicates that under the assumptions that other factors remain constant, to increase economic growth, the rate of unemployment has to fall. The fall in unemployment rate has to be high enough to create a substantial increase in the growth rate. The result above indicates that for economic growth to change by 9.1%, unemployment has to change by 100% or else equal.

However, since all else can also be equal, policy makers must consider other factors along with reduction in the rate of unemployment. Unemployment alone cannot create the substantial change that is required to trigger off economic growth. Also, growth should be embraced in all ramifications and not only in terms of employment level.

The result above also indicates that import greatly affect the economic growth of Nigeria negatively. This is of no surprise because it conforms to theory postulate. The result of import indicates that a one percent increase in import decreases economic growth by a value equal to 0.960.

The cost of borrowing money is the interest rate. Interest rate in this result behaves in a strange manner. It shows a positive relationship with economic growth. This could be that most people invest out of their saved income. Thus, increase in the cost of borrowing does not affect their investment plans.

**Recommendations:** The result of the link between unemployment and output growth in Nigeria has so far been analysed. We have also seen that structural adjustment programme plays an important role in the reduction of unemployment in Nigeria. In line with the findings of this research work, the researcher hereby recommends that policy programmes meant to reduce unemployment should be introduced and implemented to yield fruitful results.

However, policies meant to reduce unemployment rate are not the major factors responsible for rapid growth rate of Nigeria’s gross domestic product. Policy combinations and more consistent economic programmes are hereby recommended. There should be combination of policies that would reduce import and as well boost investment. Also, policies that will lower income taxes will increase the amount of savings available to the business firms and thus help to stimulate investment because with lower taxes, people will work longer and harder and thereby invest more, output will rise and unemployment will decline.

More so, Nigeria labour market should be made more competitive as it is with their counterparts in developed nations. With the labour market being competitive, an emerging excess supply of labour would quickly drive real wages down and clear the market.

Government employment agencies should disseminate information about job vacancies in order to match jobs and workers, more efficiently. Also,
government should provide unemployment benefit to the unemployed as it is in countries such as United States of America, Libya etc to help cover measures of counselling the unemployed.

Furthermore, there should be policy designed to incorporate entrepreneurship training in schools starting from secondary schools to tertiary institutions. When that is done, graduates should be given a lump sum amount after their National Youth Service Corps to enable them start up business. Although, some graduates may not utilize the money in the desired objective but there could still be a monitoring and advisory body that would see to proper utilization of this fund. The monitoring and advisory body could perform this function on each batch of young entrepreneurs for two to three years after the business was established.

REFERENCES