ECONOMIC GROWTH AND SUSTAINABLE EMPLOYMENT GENERATION: EMPIRICAL VALIDATION OF OKUN'S LAW IN NIGERIA

Taofeek Olusola AYINDE, Oluwatobi Ahmed ADEKUNLE, Adewale Taiwo MURITALA

Fountain University, Nigeria

JOMEINO ISSN: 2521-7054 Torain Publications

Received 12 September 2017
Revised 04 October 2017
Accepted 17 November 2017

Abstract

This study harps on the Okun's law to examine the patterns of economic growth in Nigeria. The study employs an augmented employment demand equation and time-series data 1980-2015. The multivariate regression techniques were used for the study. Given a one-to-one relation, our results confirm the Okun's (1962) propositions between the growth rate and the level of employment with 0.317 elasticities. Introducing other control variables to align with reality, the R-squared indicates that real GDP accounts for 78 percent movement in the level of employment in the country. It is evident that Nigerian economy is tending towards a service driven economy with much drive from the infrastructural development. For government to reduce the level of unemployment, focus must be placed on both the population growth and compensation to workers in the country, the growth should be made sectoral enterprising that both the industrial and agricultural sector will serve as the sine qua non of inclusive growth in Nigeria.

***Keywords*:** Economic Growth, Unemployment, Okun's Law

Copyright: © 2018 by the authors. This article is an Open Access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY 4.0) license (https://creativecommons.org/licenses/by/4.0/).

Corresponding author:
tobiahamed@yahoo.com

Introduction

It is a widely accepted view in economics that the growth rate of the GDP of an economy increases employment and reduces unemployment. For Germany, France, and the United Kingdom the growth rate of GDP from the 1960s to the middle of 1970s was roughly 3.5 percent and the unemployment rates fell to a range of roughly 3–4 percent. The United States over this period experienced a lower growth rate and a higher unemployment rate of about 6–7

percent. But from the beginning of the 1980s to the current time period, the growth rate of Germany and France has been on average about or below 2 percent. Their unemployment rate has risen to 8–9 percent. In contrast, the US growth rate has moved up to roughly 3.5 percent on average since the 1990s, and the unemployment rate has moved down to roughly 5 percent on average. So, economists and politicians alike agree: economic growth is good for employment (see Khemraj, Madrick and Semmler, 2006).

Although the relationship between economic growth and job creation seems to have loosened during last decades, this cannot be considered as a new phenomenon. The U.S. economy's activity has been examined by the institute of the National Bureau of Economic Research (NBER) and in the 1970s it was found that during recoveries, right after recessions, unemployment decreased a lesser extent than one would expect based on the growth of output. This phenomenon was determinate by economist as jobless growth. This obviously contradicts the traditional Okunian postulate about the negative relation between output and unemployment (Okun; 1962). Okun's law has been checked empirically many times, and this negative correlation still seems to exist. This is also confirmed by Knotek (2007), who estimated the coefficient between growth of output and unemployment through several decades and found that the current unemployment rates (from the middle 1980s on) respond less to the changes of output than they did (from the 1960s until 80s).

Although there is large retinue of studies addressing the sectoral patterns of GDP growth rates in Nigeria but to the best of our knowledge; there is practically no empirical work betting on Okun's law to investigate the potency of economic growth to reducing unemployment problem in Nigeria; this study, thus, basically covers this void. Consequently, this study would have far-reaching effects as it aims to provide policy dimension to government in her efforts to generating economic growth that would be strong and resilient enough to curtail the problem of unemployment; which has become a major macroeconomic 'nightmare' to the attainment of macroeconomic objectives. Also, this issue of unemployment-growth nexus is important for many developing countries, like Nigeria, where recent changes in the use of capital- based foreign technology has resulted in substitution of labour with non-labour inputs such as capital and information, communication technology (ICT) recently witnessed barely at the beginning of twenty-first century.

Literature Review

The study of Khemraj, Madrick and Semmlar (2006) was the first comprehensive but concise study on the Okun's law and Jobless growth. They updated the Okun's results with a recent data set (1961-2000) and obtained GDP and employment elasticities under a panel model analyses. In their paper, Khemraj et. al., (2006) interpreted the phenomenon of jobless growth in the United States of America in terms of Okun's theory and they demonstrated that a declining response of job

growth stems from a decline in the Okun coefficient. They also showed that in other countries – for example, Germany and France, this coefficient has not been falling but rising. They concluded, the previous higher response of job growth to economic growth in the US has thus been reversed.

Besides, Haider (2010) examined the sectoral analysis of employment demand (jobless growth) in Pakistan. He employed an augmented employment demand equation in which employment was expressed as a function of output (GDP) under a pooled data analysis for the period 1974-2008 with estimations of threshold level of economic growth for seven (7) sectors of Pakistan economy. The results obtained by Haider (2010) indicated that jobless growth exists only in the manufacturing sector of the Pakistan economy and that sector required a high threshold level of economic growth. Lending credence to the study of Khemraj et. al., (2006) for the United States' case; Mate (2010) undertook a theoretical and growth accounting approach of jobless growth. He analysed data on OECD countries and concludes that the link between labour and output has changed. More so, Sahar (2011) enunciated tackling the paradox of (national) jobless growth in Jordan. He observed an inverse relation between FDI and unemployment, on the one hand, and GDP growth and unemployment, on the other hand. He concludes that while conventional economic reforms brought some economic stability, they did not reduce national employment and that the peculiarities of labour market and structural features of the economy affect macroeconomic policy than the other way around.

Nonetheless, the study of Swane and Vistrand (2006) took a descriptive study on jobless growth in Sweden examined the relationship between employment and GDP and selected macroeconomic variables and also made a cross-sectional comparison. They developed two models on the basis of Okun's law and their results showed that employment elasticity with respect to GDP was about 0.7 percent for Sweden and does not change much over time. The relationship between employment and GDP was found to be strongly positive and this, together with the relatively constant employment elasticity over time, suggested that the previous situation in Sweden was due to temporary discrepancy and not fundamental change in the relationship. More so, Ingham and Ingham's (2009) extrapolated the jobless growth in Poland. In their study, it was observed that Poland's post-communist economic performance has been generally good but for many years, its growth was jobless; it exhibited very high unemployment rates and concomitantly made little progress in approaching the targets set for European Union member states under the Lisbon strategy.

Finally, Islam (2010) investigates the challenges of jobless growth in developing countries under cross-section data structure. By using cross-country data on manufacturing industries in developing countries, the paper showed that the relationship between employment and output growth weakened during the 1990s compared to the 1980s. In addition, there were countries where positive output growth had been found to be associated with zero or negative employment growth,

thus pointing to situations of jobless growth in a literal sense. He posited that for a number of Asian countries for which estimates of elasticity of employment with respect to output growth in manufacturing was found for the 1990s and the 1980s, the figures for the 1990s were found to be lower, thus indicated a decline in the employment intensity of growth in the sector. Interestingly, those were those countries where surplus labour existed, so that a decline in the employment intensity of growth could not be explained by the labour market situation.

Methodology and Stylized Facts

Methodology

In this study, we employed the first measure of jobless growth proposed by Altman (2003) where he relates the relationship between the level of employment and the growth rate of Gross Domestic Product (GDP). This measure is found appropriate as it directly seek to address the Okunian proposition as earlier emphasised. Using the Ordinary Least Square (OLS) technique to obtain the coefficient estimates and following Haider (2010), we employed an augmented employment demand showing both aggregate and sectoral effects of economic growth.

$$InE_t = \beta_o + \beta_1 InX_t + \beta_2 InH_t + \beta_3 InPOP_t + \beta_4 t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where; E_t = Employment; X_t =Gross Domestic Products (GDP); H_t = Hour; POP_t = Population; t = Time.

In our study, we decided to modify (mainly to cater for autocorrelation problems inherent in a study as this) the above model in line with the empirical study of Swane and Vistrand (2006) where they employed two model equations to investigate the employment-growth rates nexus. The models are as thus specified;

$$InEMP_t = \beta_o + \beta_1 InGDP\mathrm{r}_t + \beta_2 InPOP_t + \beta_3 InLABOUR\_\cos t_t + \beta_4 InEMP_{-1} + \varepsilon_t \ldots\ldots\ldots(2)$$

We decided to express the other equation (see equation 2 above) in logarithmic relation so as to cater for the linear and non-linear relationships existing between the variables in the model (see Swane and Vistrand, 2006). More so, we use the compensation of employees as a proxy for the cost of labour and we further decomposed the aggregate growth rates into sectoral growth rates in order to adequately account for the direction as well as patterns of economic growth in Nigeria. Consequently, the below specified model results;

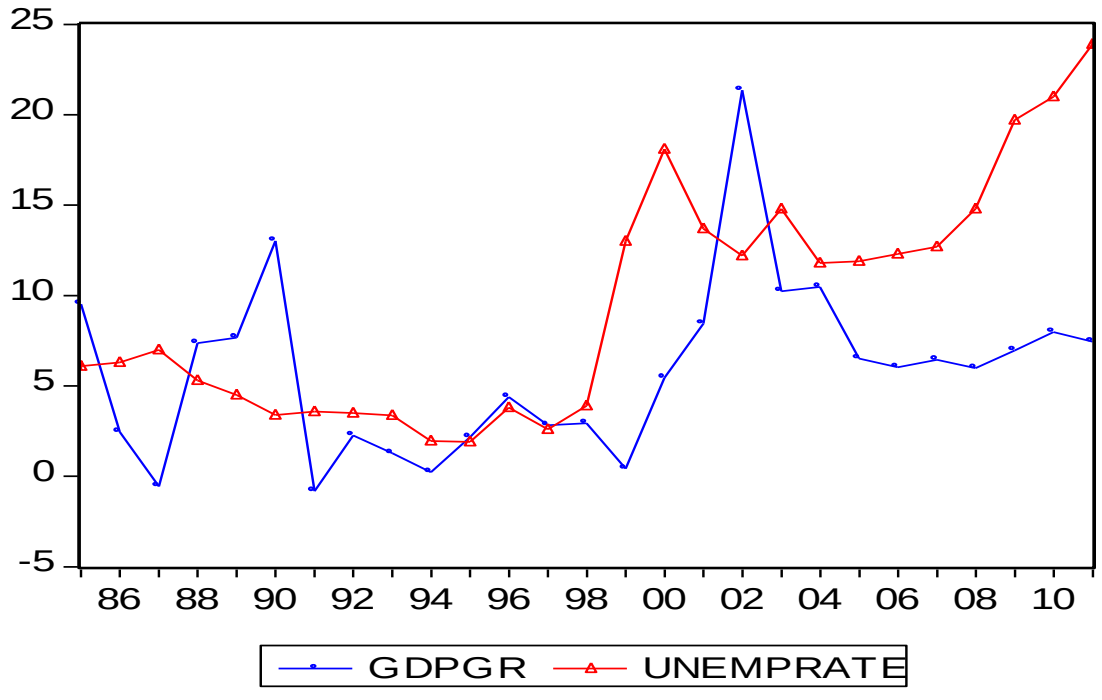
$$\begin{aligned} InEMP_t &= \beta_o + \beta_1 InGDP_t + \beta_2 InAgricGDP_t + \beta_3 InIndustGDP_t + \beta_4 InServGDP_t + \beta_5 InBuildGDP_t + \\ &\beta_6 InWholesalGDP_t + \beta_7 InPOP_t + \beta_8 InLABOUR\_\cos t_t + \beta_9 InEMP_{-1} + \varepsilon_t \end{aligned} \quad (4)$$

Where; EMP_t is the level of employment; GDP_t is the real GDP; $AgricGDP$ is the contribution of agriculture to the real GDP; $IndustGDPGR_t$ is the contribution of the industrial sector to real GDP; $ServGDP_t$ is the contribution of the service sector to real GDP; $BuildGDP$ is the contribution of the building and construction sector to the real GDP; $WholesalGDP_t$ is the contribution of Wholesales sector to the real GDP; POP is the total population; $LABOUR\_cost_t$ is the labour cost (proxied as compensation to workers); EMP_{-1} is the lagged level of employment rate while ε_t is the white-noise residual. Also, EMP_POP_t is the ratio of employment to the total population while GDP_Per_cap is the GDP per capita. Data collection begins from 1980 through 2011 for most of our analyses. The choice for this period is predicated on the understanding that analyses prior to this date may be considered fraught with un-usual business activities; especially going by the reconstruction that followed the civil war post-1970.

Besides, this period is considered long enough to conduct sufficient investigation between economic growth and the level of employment in Nigeria and concomitantly capable of tracing the patterns of economic growth across various sectors.

Trend Analyses of Employment-Growth Nexuses in Nigeria

Chart 1: Trends of Unemployment and GDP Growth Rates in Nigeria (1985-2011)



Source: Author Compilation, 2017

As observed above (see Chart 1 above), except for 1986 and 1987; there have been positive relationship between unemployment rate and the growth rate of GDP until 2005; where negative relationship exists. The increase in the growth process of the Nigerian economy has necessitated an increase in the rate of unemployment since 1988 up until 2005 when the interaction changes in contrast. From 2005 henceforth, a reduction in the growth rates results in a further increase in the rate of unemployment. In effect, the contrasting interpretation is that an increase in the rate of unemployment in Nigeria depresses the growth process of the economy. By implication, the situation of growth-unemployment nexus in Nigeria is that of jobless growth except for the periods 1986-1987 and 2005-2011. The extent as well as the degree to which unemployment depresses growth, on the one hand, and growth and employment, on the other hand, is left for further discussion in relation to the estimates obtained in the models specified for this study.

Table 1: Trends of Unemployment and GDP Growth rates (1980-2016)

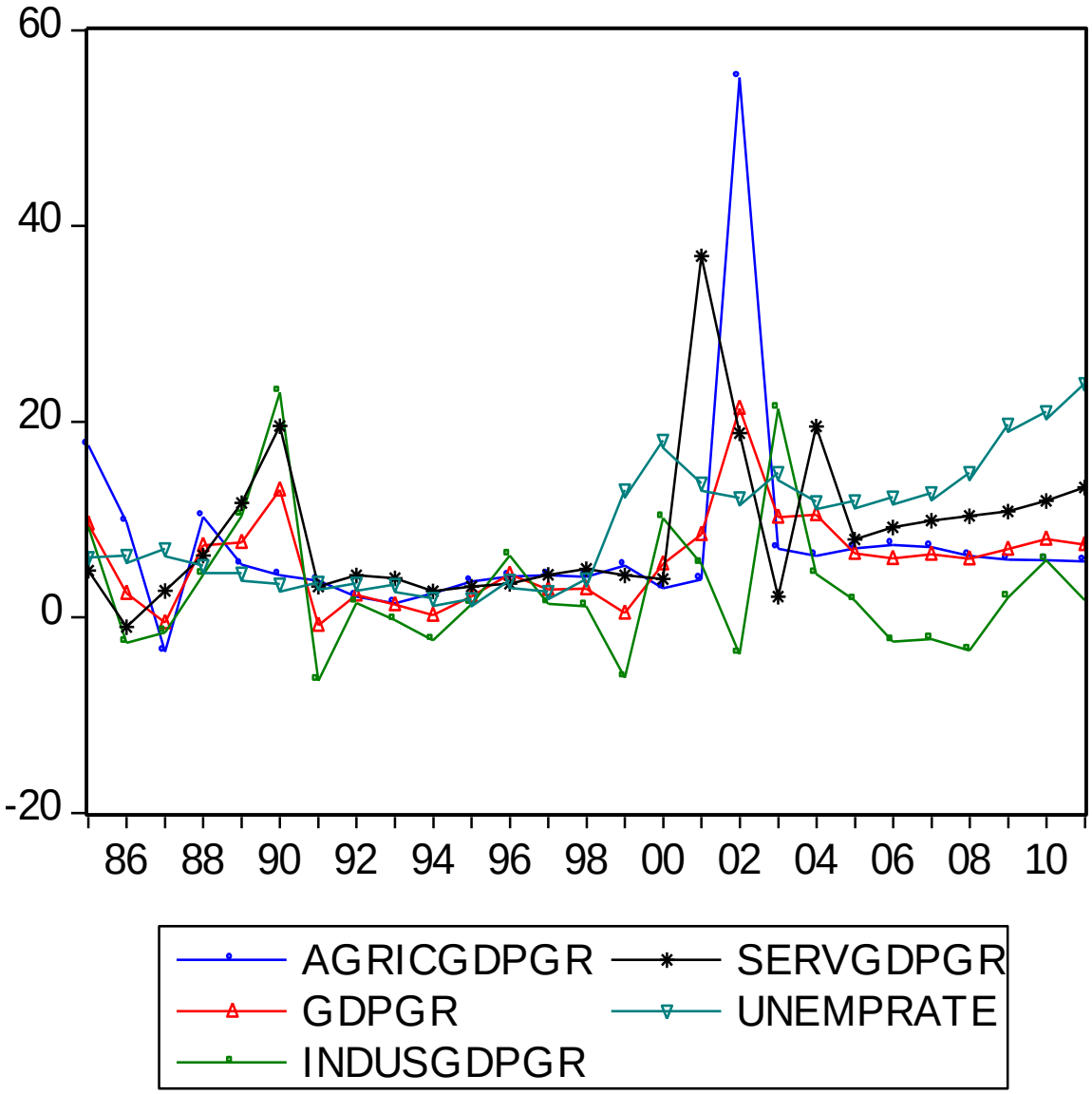
Year	GDP Growth rates	Unemployment Rates
1980	5.34	6.4
1985	9.52	6.1
1990	13.02	3.38
1995	2.16	1.90
2000	5.44	18.1
2005	6.51	11.9
2010	7.98	21.0
2016	7.45	23.90

Source: CBN Statistical Bulletin (2011); NBS Labour Survey (Various Issues)

In absolute terms, the trend relation displayed in table 1 above is highly instructive. There exists an inverse relationship between the rate of unemployment and the the GDP growth rates. The more the economy posed impressive performance, the higher the rate of unemployment. As observed, unemployment rate maintains a relatively sustainable increase throughout the period between 1980 and 2011; except in the 1990s when it declines drastically to a barely negligible rate of 1.90 in 1995. Beginning immediately in year 2000, it settles at 18.1 percent and by 2016; it has increase to 23.90 percent (see Table 1 above). In tandem with Okun's law, the corresponding growth rates during this period has been generally inconsistent. Theoretically, we expect an inverse relation between the growth rates of GDP and the rate of unemployment. However, estimates obtained suggest erratic behaviour. While the Okun's law could be said to hold in Nigeria between 1980-1990 as an increase in GDP growth rate from 5.34 to 9.52; by an additional 4.18 growth; the rate of unemployment manage to decline by 0.3; that is, from 6.4 in 1980 to 6.1 percent in 1985, and a further increase in the growth rate from 9.52 in 1985 to 13.02 percent in 1990 leads to a further

decline in the rate of unemployment from 6.1 percent to 3.38 percent. However the same relation could not be said to hold immediately after 1990. While the growth rate decline from 13.02 percent in 1990 to 2.16 percent in 1995; the rate of unemployment further falls from 3.38 to 1.90; thus resulting in a positive relationship. This similar thread is also observed between the years 2005 and 2010. While growth rates of GDP move from 6.51 percent in the year 2000 to 7.98 percent in 2010; the unemployment rate increases from 11.9 percent to 21.0 percent in the same period. As such, the Nigerian growth patterns did not follow any defined patterns with no definite relation with unemployment rate.

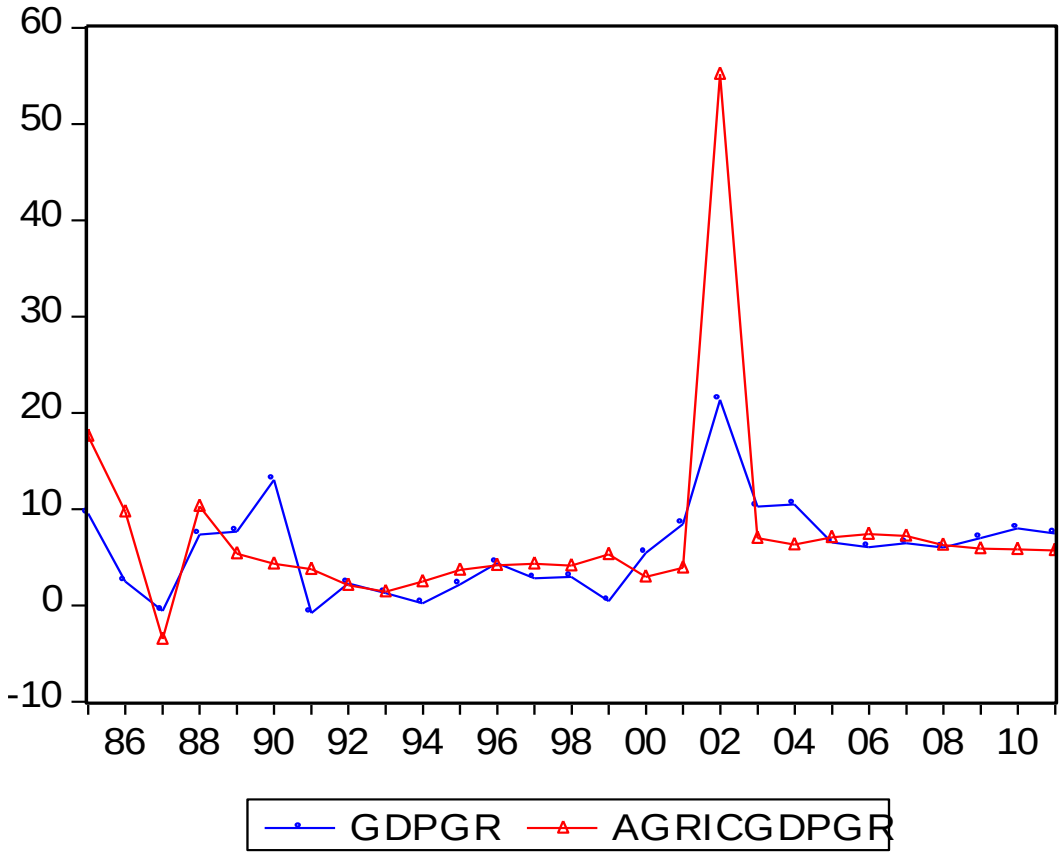
Chart 2: Trends of GDP Growth rates for Major Sectors in Nigeria (1985-2011)



Source: Author Compilation, 2017

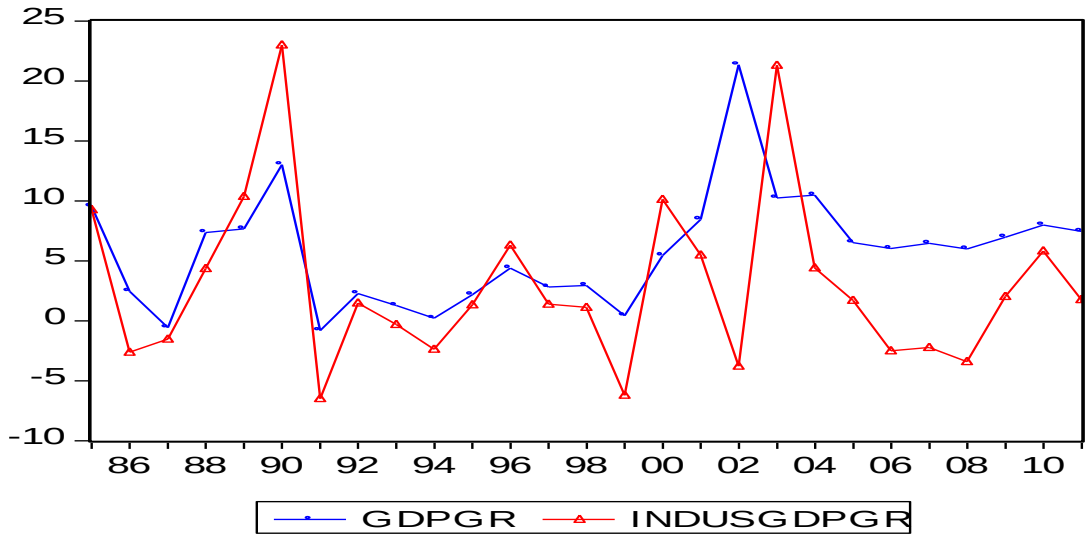
We find it explicable to relate the sectoral contributions of GDP growth rates to the aggregate growth process of the Nigerian economy. The following sub-sections (see Charts 2-5 and Table 2). As graphically depicted above, the agricultural sector patterned the aggregate GDP growth rates and closely followed by the service sector while the industrial sector widely departs from the aggregate trend and even most of negative growths for most of the periods. The implication of this trend shows that the Nigerian economy is still largely driven by primary products and service-oriented activities which often demand high-skilled knowledge and sometimes foreign expertise. This trend is also a pointer to the fact that the industrial sector has not been usually considered in growth-oriented policies of the government and has been the worst hit of all the sectors.

Chart 3: Aggregate and Agric Sectors' GDP Growth Rates (1985-2011)



Source: Author Compilation, 2017

Chart 4: Aggregate and Industrial Sectors' GDP Growth Rates (1985-2011)



Source: Author Compilation, 2017

Table 2 below complements the graphical trends (see Charts 2 and 3) above. While all growth estimates (both for the aggregate and the sectoral growths) are erratic in nature, the contributions of both the agricultural and service sectors are more significant and relate to the aggregate GDP growth rate.

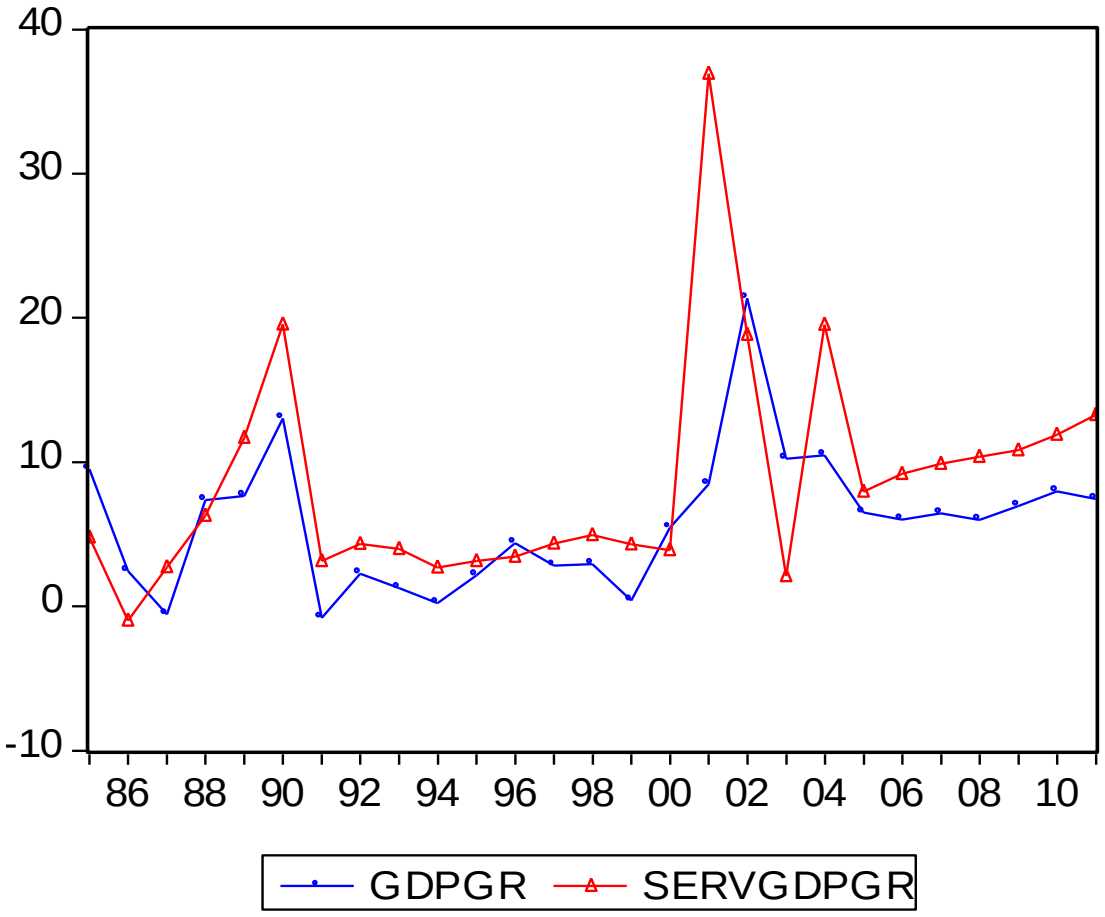
Table 2: Trends of Sectoral GDP Growth Rates in Nigeria (1980-2016)

Year	Aggregate GDP	Agric. GDP	Industry GDP	Service GDP	Build. & Cons GDP	Wholesale Trading
1980	5.34	7.76	0.55	5.74	9.97	9.27
1985	9.52	17.58	9.26	4.79	-31.11	3.95
1990	13.02	4.29	23.01	19.54	5.00	3.00
1995	2.16	3.65	1.33	3.14	2.70	0.07
2000	5.44	2.95	10.13	3.90	4.00	1.60
2005	6.51	7.06	1.71	7.96	12.10	13.51
2010	7.98	5.82	5.82	11.90	11.85	11.22
2016	7.45	5.71	1.76	13.26	12.26	11.33
Average*	5.40	7.28	1.87	8.06	5.25	7.10

Source: CBN Statistical Bulletin (2011); NBS Labour Survey (Various Issues).

Note: * The average values are mean values of 1985-2016

Chart 5: Aggregate and Service Sector's GDP Growth Rates (1985-2011)



For better clarification, we relate the employment rate to the GDP per capital of the Nigerian economy (see Chart 6 below). As evidenced, the erratic behavior of the growth rate of GDP only yields a declining employment rate and this continues up until the 14th series; that is, by the year 2000. However since 2001, a declining growth rate of GDP results in an upward swing in the employment rate; thus yielding negative relationship. This empirical evidence for Nigeria defies Okun's law while the patterns of economic growth remain indeterminate.

Chart 6: Trend of GDP Per Capita and Employment-to-Population Ratio in Nigeria (1991-2010)

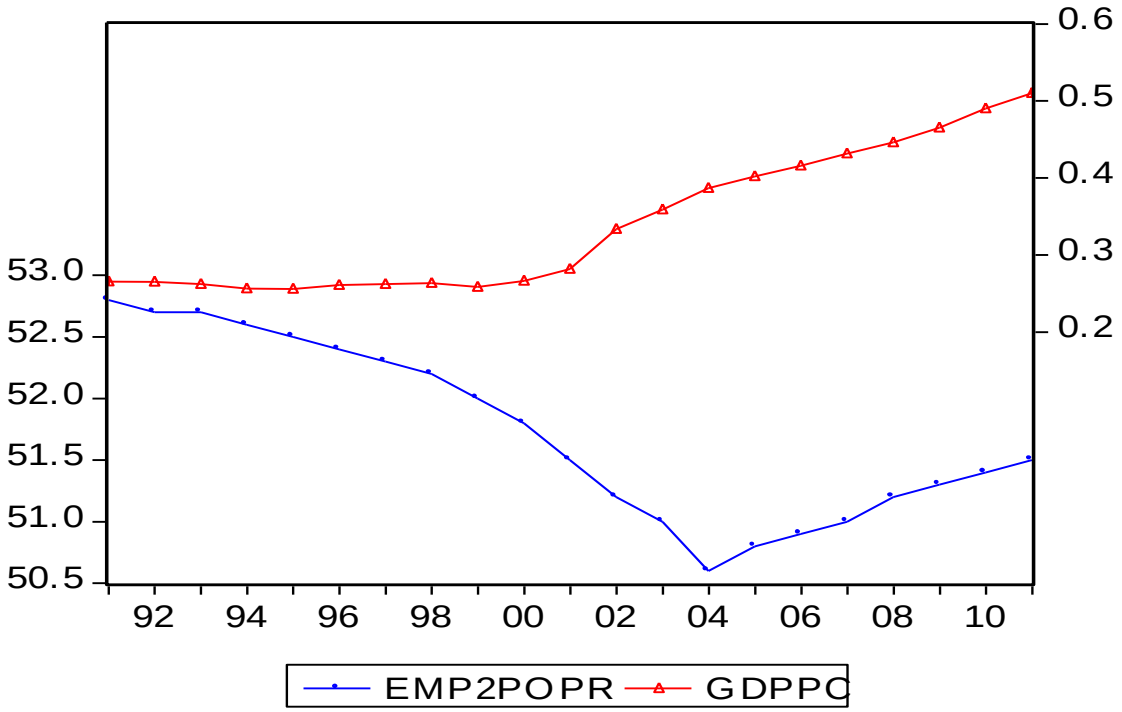
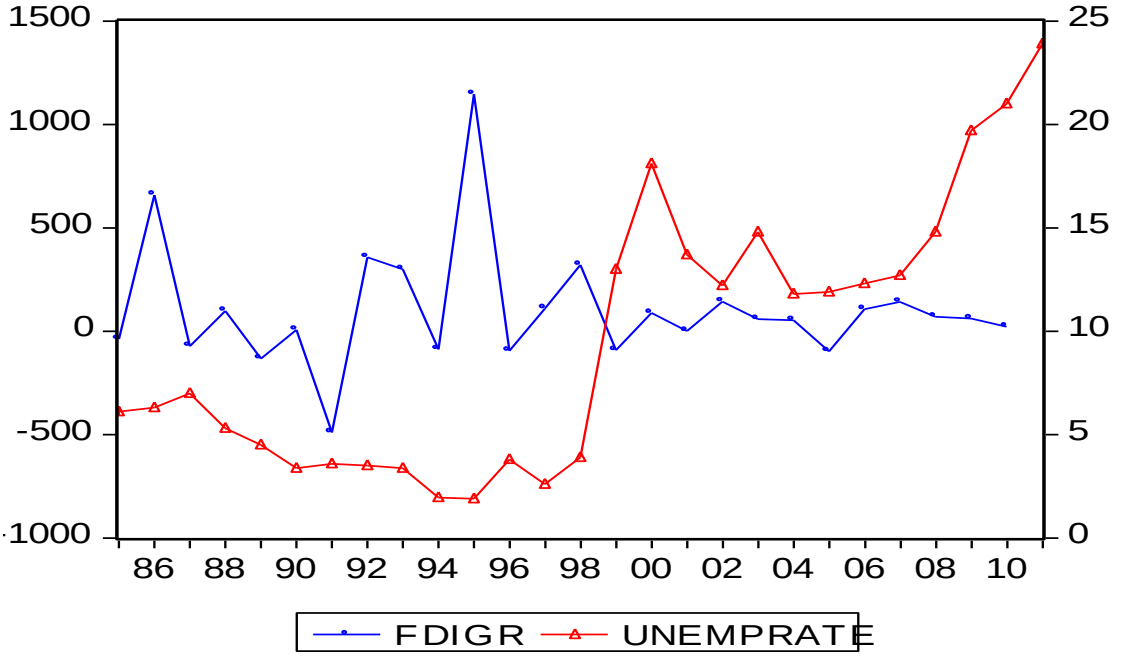


Chart 7: Trends in FDI Growths and Unemployment Rates in Nigeria (1985-2010)



Model Estimations and Discussion of Findings

Table 3: Model Estimation Results

Variables	Model 1: InEMP	Model 2: InEMP	Model 3: InEMP
C	0.089	6.439*	-2.045*
LOG(GDP)	-0.010	0.317*	-
LOG(POP)	-0.006	-	0.275
LOG(Labour_cost)	0.001	-	0.001
Log(EMP_1)	1.011*	-	0.736*
LOG(AgricGDP)	-	-	-0.004
LOG(BCGDP)	-	-	0.012*
LOG(IndustryGDP)	-	-	-0.022*
LOG(ServGDP)	-	-	0.005
LOG(WRTGDP)	-	-	-0.015
R^2	-	0.78	-
Adj. R^2	0.99	-	0.99
Durbin Watson stat.	1.08	0.97	2.175
F-stat. ratio	43580	106.89	60441.23

Note: * 5% level of significance; ** 10% level of significance

On a one-to-one basis (as specified in Model 2), the relationship between the growth processes of the Nigerian economy behaves true to the Okun's (1962) proposition as it has a positive relationship with the employment level at 0.317 coefficients. This suggests that a one percent increase in the GDP results in about 0.32 percent increase in employment level. Inversely, a hundred percent increase in the GDP translates to an approximately 32 percent decrease in the rate of unemployment in Nigeria. In reality and in tandem with the augmented demand equation, however, other control variables as well as factors considered fundamental such as the total population; compensation to workers and inclusion of lagged dependent variable; (as depicted in the estimates of Model 1) reveals interesting results. The elasticities obtained for these estimates show that there really exist an inverse relationship between the level of employment and real GDP with a -0.01 coefficient. This implies that a one percent increase in GDP translates to 0.01 reductions in employment level; suggesting that a 100 percent increase in GDP denotes 1 percent increase in the rate of unemployment in Nigeria. This is revealing since it indicates that growth has not been inclusive in Nigeria but has rather worsened the level of unemployment. This is the

case of jobless growth. The explanation for this finding can be inherently observed in the population size of Nigerian in relation to the level of employment. The elasticity connotes a negatively related interaction with -0.006 coefficients. This indicates that a one percent increase in population size reduces the level of employment by 0.006 percent; indicating that a 10 percent increase in population denotes a 0.06 percent increase in the level of unemployment in Nigeria. The coefficient of compensation to workers (as proxied by the labour_cost variable) follows theoretical expectations (but insignificant) with a positive elasticity of 0.001.

Considering the sectoral decomposition of this interaction between the level of employment and the GDP (see Model 3 above), it is evident that most sectors in Nigeria such as the Agriculture, industrial and wholesale and retail trading also portray non-inclusive growth with negative elasticities of -0.004; -0.022 and -0.015 respectively. The implications are that these sectors worsen the level of unemployment in the country with 0.4; 2.2 and 1.5 additions for every 100 percent increase in the real GDP. By implications, growth in these sectors also tarried with the jobless growth phenomenon. Only the service and building and construction industries that meaningfully relate to the employment level by reducing the rate of unemployment by 1.2 and 0.5 percentages respectively for every 100 percent increase in the real GDP.

The R-squared statistics is 0.78 for Model 2. These suggest that the growth process of the Nigerian economy accounts for 78 percents movement in the employment rate and the remaining 22 percent is due to some control factors which are excluded to observe a one-to-one interaction between the real GDP and the level of employment in Nigeria. For the sake of clarity, these factors are considered in Models 1 and 3 respectively. As such, the adjusted R-squared obtained is 0.99; meaning that after the model is properly fitted and that; variables such as population, compensation to workers, gross domestic products and contemporaneous effect of previous level of employment; accurately explain for the movement in the level of employment in Nigeria with a 99 percent explanation. This trend still holds in Model 3 where there is sectoral decomposition of the real GDP. For all cases, the durbin Watson statistics have ratios of 1.08, 0.97 and 2.175 which indicates the absence of first order serial correlations and the F-statistics are all significant at the 5 percent level with ratios of 43580; 106.89 and 60441.23 for Models 1, 2 and 3 respectively. As such, estimates obtained are good for analyses and conclusions reached are valid for policy suggestions.

Conclusion and Recommendation

Putting all these together, we reach conclusions that the Nigerian economy is fast becoming a service-driven one with a complementary support from the building and construction industry. Given a one-to-one relation, our results confirm the Okun's (1962) propositions between the growth rate and the level of employment with 0.317 elasticities. This suggests that a one percent increase in real GDP in Nigeria translates to about 0.32 percent increase in the rate of employment

in the country. Although, we decided to introduce other control variables to align with reality; the R-squared indicates that real GDP accounts for 78 percent movement in the level of employment in the country and that the inclusion of these variables improve on the adjusted R-squared by 21 percent. Despite these trends, the inclusion of other variables shows that growth has been non-inclusive in Nigeria; amounting to a case of jobless growth. The elasticities for the sectoral decompositions conform to that of aggregate. In fact, it is evident that Nigerian economy is tending more towards a service driven economy with much drive from the building and construction sector. For government to reduce the level of unemployment, therefore, focus must be placed on both the population size and compensation to workers in the country and the growth should be made sectoral enterprising that both the industrial and agricultural sector will serve as the sine qua non of inclusive growth in Nigeria.

References

Alexandrini, M. (2009). Jobless Growth in India Manufacturing: A Kaldorian Approach. Centre for Financial and Management Studies, Discussion Paper 99. CBN (2011), Statistical Bulletin, Central Bank of Nigeria

Don-Patinkin, M. (1949). Involuntary Unemployment and the Keynesian Supply Function. *The Economic Journal* Vol. 59, pp360-384.

Edwards, E. O. (1979). Employment in Developing Countries. World Development Vol. 2 No 7, 1974.

Haider, A. (2010). Sectoral Analysis of Employment Demand (Jobless Growth) in Pakistan. Department of Economic, Saints Mary's University, Canada.

Ingham, H. and Ingham, M. (2009). Poland's Jobless Growth: A Temporary Cure? Lancaster University Management School, Working Paper 2009/017, Lancaster, United Kingdom

Islam, R. (2010). The Challenges of Jobless Growth in Developing Countries: An Analysis with Cross-country Data. Bangladesh Institute of Development Studies, BIDS Occassional Paper Series, No. 1

Jhingan, M. L. (2000): Macroeconomic Theory: Vrinda Publication (P) Ltd.

Khemraj, T., Madrick, J and Semmler, W. (2006). Okun's Law and Jobless Growth" Policy Note, Schwartz Centre for Economic Policy Analysis, the New School, New York

NBS (2015). Annual Statements" National Bureau of Statistics

Mate, D. (2010). A Theoretical and Growth Accounting Approach of Jobless Growth. Periodica Oeconomica, October 2010, pp. 67-76.

Okun, A. (1962). Potential Output: Its Measurements and Significance. Proceedings of the Business and Economic Statistics Sections of the American Statistical Society.

Pigon A. C. (1933). The Theory of Unemployment Macmillan, London.

Sahar, T. R. (2011). Jordan: Tackling the Paradox of (national) Jobless Growth. International Labour Organisation, Geneva.

Swane, A., and Vistrand, H. (2006). Jobless Growth in Sweden – A Descriptive Study Stockholms School of Economics