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# An Assessment of Inclusive Growth Policy as a Determinant of Unemployment Reduction in Nigeria: an Application of Autoregressive Distributed (ARDL) Bound Test Approach

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### ABSTRACT

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*This study investigated the relationship between inclusive growth and unemployment rate for the period 1970 to 2018. Autoregressive Distributed Lag (ARDL) bounds test approach was adopted for estimation. The study established the long-run relationship between measures of inclusive growth and unemployment. The inclusive growth was accounted for by measuring the influence of inclusive growth policies or programmes on growth in agricultural, manufacturing and industrial sectors within the periods of the study. Hence, estimating the short and long-run dynamics, agricultural, manufacturing and industrial sectors serves as measures of inclusive growth proxied with real agricultural output, real manufacturing output and real industrial output respectively. Also, we accounted for the influence of removal of trade restriction on unemployment with openness, measured by export as percentage of real gross domestic product to unemployment rate. From the empirical findings, the results revealed that growth in agricultural and industrial sector exert negative and significantly relationship with unemployment rate. This suggests that policy initiatives or programmes targeted at promoting inclusive growth will result to growth in agricultural and industrial sector and increase in job creation, economic activities and output. Further investigation show that growth in manufacturing sector and openness has no significant relationship with unemployment. From the findings, this study therefore inferred that inclusive growth is a panacea for unemployment as well as an incentive for job creation. To this effect, the study suggests that the government authorities should initiate and implement policies that will promote entrepreneurial development, skill acquisition and empowerments programmes in the country.*

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## INTRODUCTION

In most developing countries and particularly Nigeria, unemployment is becoming an increasingly alarming and worrisome socio-economic malaise looming the fortunes of the country. The unemployment rate in Nigeria is quite deleterious growing consistently every year at the rate of 23.8% (World Development Indicator, WDI, 2015). Unemployment has become a major problem bedeviling the lives of Nigerian youths causing frustration, dejection and dependency on family member<s and friends, who also have their own lots of problems to grapple with. The piercing rate of unemployment among the youths in Nigeria has contributed to the high rate of heinous practices such as militancy, Boko Haram insurgency, drugs trafficking, kidnapping, armed robbery, prostitution, smuggling and insecurity of all kinds. Thus, Productive and decent job creation is a vital means of income and security. However, curbing unemployment becomes crucial to achieving an inclusive growth in Nigeria by creating largely mutual chance to everyone employable in the agricultural, manufacturing and industrial sectors of the economy. According to WDI (2015), unemployment is awfully high in Nigeria among the youths reaching 14% in spite the considerable increase in economic growth. However, in order to create self-dependency and gainful employment that can leads to inclusive growth in Nigeria, certain governmental programmes and policies were inaugurated such as the introduction of vocational courses in the educational curriculum in 1997, the creation of the National Directorate of Employment in 1986 solely for skills acquisition; industrialization programmes and policies; the National Economic Empowerment and Development Strategy designed in 2004 with one of its goal tuned towards fighting unemployment and the Agricultural programmes and policies geared at generating employment for graduates, non-graduates and school leavers in the Agricultural sector coupled with election promises (Nkwatoh, 2012; Udo, 2014). In all these measures, unemployment rate have not declined rather it continues to surge. Hence, many studies (Onwachukwu, 2015; Salami, 2013; Adawo, Essien & Ekpo, 2012; Umaru, Donga & Salihu, 2013; and Njoku & Ihugba, 2011) have been carried out to establish the relationship between unemployment and growth or pro-poor growth, but with little or no attention to the role of inclusive growth as a remedy to high rate of unemployment in Nigeria. Base on this premise, this study investigated the relationship between inclusive growth and unemployment. However, our approach to inclusive growth in this study differs from previous studies such as the above mention. While other studies directly measured Inclusive growth, this study is particularly interested in the influence of inclusive growth policy initiatives or programs on growth of agricultural, manufacturing and industrial sector, and the effect of these sectors on unemployment. The paper is organized as follows: Section two discusses the review of related literature, while the method for the study is presented in section three. In section four, we present analysis of empirical results, while conclusion and recommendations is presented in section five.

## 1. LITERATURE REVIEW

Under this section, we discussed conceptual issues as it relates to the study, review of related empirical literature and as well, examined the attempt the Nigerian government has made in curbing the high rate of unemployment which have caused a serious challenge to economic growth despite different policies or programmes that have been implemented to ensure improvement in the standard of living.

### 1.1 Conceptual issues

Unemployment is an important determinant of the level of economic growth and development in which every country strives to remedy. According to Bello (2003), unemployment from time immemorial has been a subject of great concern to the economists, policy makers and managers alike leaving the devastating effect of this phenomenon on individuals, the society and the economy at large. Adebayo (1999) defined unemployment as a state in which people who can work are without jobs and are seeking for pay or profit. Unemployment occurs when people are without jobs and they have actively sought for job within the past four weeks (International Labour Organization, ILO, 2009). Thus, unemployment refers to a situation where people who are willing and capable of working could not find suitable paid employment. By implication, this definition described unemployment as a situation in which people who are willing to work at the prevailing wage rate are unable to find jobs. On the other hand, Inclusive growth is one of the most conceptualized term in recent time, even though, there seems not to be a

common definition, this concept however is largely understood to be growth coupled with equal opportunities. Existing studies revealed that Gross Domestic Product (GDP) and GDP per capita are inadequate in estimating the wellbeing of its citizens. According to Kraay (2004) and Berg and Ostry (2011), growth is inclusive if it is sustainable and efficient in reducing poverty and income inequality. In line with lanchovichina and Lundstrom (2008), inclusive growth involves a long-term perspective and focuses on generating decent employment in order to increase the income of excluded groups. Ali and Zhuang (2007) described inclusive growth as growth allowing every individual of the society to actively participate in and contribute to the growth process on an equal footing regardless of their individual circumstances. In keeping with Rauniyar and Kanbur (2009), inclusive growth is one which emphasizes available economic opportunities to all as created by growth, mostly to the poor. Hence, growth is inclusive if the benefits will reach the poor, marginalized and socially excluded groups in the society.

## 1.2 Attempt at curbing Unemployment in Nigeria

Nigerian government over time has made the acquisition of requisite skills pivotal as part of its initiative in promoting self-reliance and contentment in creating meaningful employment opportunities. It commenced with acquiring of vocational skills due to credence given to the educational system that functioned since post-independence placing more emphasis on academic excellence rather than skill acquisition which can put the individuals in order for more useful and rewarding life adventures within the society. This made development of a country essential and dependent particularly on Vocational skills acquisition. Thus, Emeh (2012) argued that, vocational courses in educational curriculum emerged as a result of the new national policy on education decree of 1977. According to Omoruyi and Osunde (2004), the intrinsic goal of setting Chukwuma Committee on March 26, 1986 was to reduce the ineffectiveness of the vocational courses in the school curriculum purposely to address unemployment especially among youths by the federal government which has assumed a frightening magnitude. This committee led to the creation of the National Directorate of Employment (NDE) in November 22, 1986 saddled with the sole task of advancing skills acquisition; expedite creative attitude, self-sufficiency and independence. Furthermore, in 2004 National Economic Empowerment and Development Strategies (NEEDS) were drawn in 2004 mainly to fighting unemployment and poverty (NEEDS, 2004; Nkwatoh, 2012). These Programmes involves among others Community Bank, Directorate of Food Roads and Rural Infrastructure (DFRRI), National Directorate of Employment (NDE), People's Bank, Better Life for Rural Women/Family Support Programme, the Development of Small and Medium Scale Enterprises (SMSE) and the Raw Materials Research and Development Council (RMRDC). The current poverty alleviation programme also focuses on the unemployed in which some of these projects aimed at addressing various manifestations of poverty. This led to the establishment of several government parastatal whose primary objective was to generate employment opportunities in addition to the creation of institutions such as the Industrial Training Fund (ITF), YOU-Win among others.

The agricultural sector is not left behind in this stride. In Nigeria, the Agricultural sector has contributed immensely to unemployment reduction by initiating some programmes and policies capable of generating employment for graduates, non-graduates and school leavers in the Agricultural sector. The Agricultural sector within the last two decades operated under a number of policy measures and programmes designed to strengthen the economic position of the independent farmers. These programmes and policies as corroborated by Anyanwu, (1997) includes the National Accelerated Food Production Project (NAFPP) established in 1973, the Nigerian Agricultural and Co-operative Bank (NACB) founded in 1973, the Nigerian Agricultural and Co-operative Bank (NACB) founded in 1973, the River Basin Development Authorities (RBDAs) of 1963, Operation Feed the Nation (OFN) launched in 1976; the Agricultural Credit Guarantee Scheme (ACGS) created by an act in 1977; the National Agricultural Land Development Authority (NALDA) formed in 1991. The sole aim of these programmes and policies were to boost agricultural production and self-sufficiency; Creation of more agricultural and rural employment opportunities to increase the income of farmers as well as rural dwellers and to productively absorb an increasing labour force in the nations; to improve the quantity of credit to all aspect of agricultural production; to easy mobilization of savings that would be invested in the agricultural sector and to moderate the chronic problem of low utilization of abundant farm land.

The industrial sector on the other hand have strived to curb unemployment through Import Substitution Industrialization Strategy (ISI) adopted in 1960 and existed till 1985. The ISI aimed at intensifying domestic production of manufactured goods for domestic markets by encouraging the survival of home industries through imposing restrictive tariffs such as import quotas and exchange controls to protect the home industries from unhealthy competition making the entry of foreign firms expensive (Bushari, 2005). Export Promotion Strategy (EPS) was another policy tool used in generating more foreign exchange from non-oil sources to meet the country's rising import bills, mounting external debt obligations, rising fiscal responsibilities of the government and to attend to socio-economic responsibilities. As a result, having more access to foreign market as contended by Obioma and Ozughalu, (2005) can be provided by reducing unemployment through increase in private sector participation in the industrial sector. Finally, Foreign Private- Investment Led Industrialization Strategy (FPLIS) emerged in 1999 to repose confidence to business associates due to the past military experience of Nigeria. Thus, marking the beginning of foreign private-investment led industrialization into Nigeria's industrial policy. This new policy involves in building new facilities, merging and acquisitions, reinvesting profits earned from overseas operating and intra company loan (Udo, 2014). Hence, inclusive growth can be attained through the growth and development of agricultural, manufacturing and industrial sector. Though, in Nigeria, these sectors are still in its infancy stage. In addition, to promote growth in these sectors and encourage inclusive growth, suitable policies should be made and implemented, and improvement of business environment should also be considered important (McKinley, 2010).

### 1.3 Review of Related Empirical Literature

From the empirical front, the relationship between unemployment and Economic growth over the period 1985 to 2009 in Nigeria was conducted by Njoku and Ihugba (2011). The study confirms that the workforce directly impacts on a country's GDP. Thus, the economy grew by 55.5% between 1991 and 2006 as the population rose by 36.4%. The study revealed further that the average contribution of the oil sector to the GDP between 1991 and 2006 was 30.5% while agriculture that is the main source of job creation in the country contributed 36.7%, a difference of 6.1 percent from that of oil that employs less than 10% of the labour force. Onwachukwu, (2015) investigated if unemployment significantly impacted on Economic growth in Nigeria over the period 1985 and 2010. Estimation results from OLS and Augmented Dickey Fuller (ADF) confirmed that, unemployment negatively influenced economic growth though not statistically significant probably as a result of ghost workers that might have been counted among the employed citizens that are not contributing to output.

The ties between entrepreneurial development and unemployment with its implication for economic growth in Nigeria were investigated by Nkwatoh, (2015) in Nigeria within 1982 and 2013. The study used Ordinary least square (OLS) with particular interest in heteroskedasticity in which its estimation results created the occurrence of a twin effect. Entrepreneurial development therefore curbed future unemployment and also unemployment engenders entrepreneurship development. Thus, education can be identified as a stimulant for the negative relationship between unemployment and inclusive growth. The relationship between unemployment and economic growth was argued by Acemoglu (1997) as resulting from the links between unemployment levels, employer expectations and worker productivity. When high unemployment is experienced through loose labour market, firms anticipate that the likelihood of finding an unskilled worker is strong. This implies less willingness to hire because such conditions call for workers to be trained in order to develop target qualifications. As a consequence, growth dynamics are lower and an unemployment rate increases, which means that an agent's expectations are inadequately met. In explaining unemployment and its solution in Nigeria, Mike (2015) used descriptive analysis to offer solutions to curbing unemployment in Nigeria such as improving agricultural sector of the economy, improving our mindset, promoting quality education among others.

Similarly, Oji-Okoro (2011) confirmed the agricultural sector as the largest sector in the Nigerian economy with its dominant share of the GDP that can absorb over 70% of the active labour force and the generation of about 88% of non-oil foreign exchange earnings. Its share of the GDP frog-leaped from an annual average of 38% during 1992 to 40% in 1996 during 1977-2001 compared to crude oil the GDP from which it nose-dived from an annual average of 13% to 12% in 1992 and 1996. The major role agriculture plays in developing countries particularly Nigeria for overall economic development was recog-

nized by Ogbalubi and Wokochha (2013) in their study on Agricultural Development and employment generation. The study describes the agricultural sector as the most critical and basic sector that has significant potentials for the revolution of the Nigerian economy. The findings of the research indicated that, the potentials of the sector are yet to be fully optimized. Analogously, Olajide, Akinlabi & Tijani (2012) analyzed the relationship between Agricultural resource and economic growth in Nigeria using OLS over the period 1970 to 2010. The estimation results revealed a positive cause and effect relationship between gross domestic product (GDP) and agricultural output in Nigeria. Agricultural sector was found to have contributed 34.4% to economic growth though it suffered neglect during the prime days of the oil boom in the 1970s.

## 2. METHODOLOGY

The theoretical underpinning of this study lies on Okun's law which establishes the relationship between economic growth and the rate of change in unemployment. Okun's (1962) treats unemployment in declining rate as against the actual or potential growth rate attained by an economy. Thus, in order to reduce unemployment rate, Okun's assumed the economy's growth rate to exceed the natural growth boundary. The association between unemployment (U) and growth rate (Y\*) according to Okun's law is demonstrated as shown below:

$$U = a + b(Y - Y^*) \text{-----} (3.1)$$

In determining the actual rate of growth (Y\*) and how it changes over time, a dynamic analysis of Okun's law can be reestablished as:

$$Y + \Delta U = a + b\Delta\varepsilon \text{-----} (3.2)$$

Where  $\Delta U$  = is the change in the unemployment rate, Y; economic growth rate, Y\*; the actual growth rate, and  $b$  denotes flexibility between growth and unemployment rate, while  $\varepsilon$  = is the error term. From equation 3.2.,  $a$  and  $b$  described the extent to which the percentage change in natural growth rate reflects rate of unemployment when there is a fall. On the other hand, if the rate of unemployment could not change ( $\Delta U = 0$ ) the growth rate will keep on expanding at the actual or natural rate as shown in equation 3.3 below:

$$Y^* = -\frac{a}{b} \text{-----} (3.3)$$

The stability of unemployment rate is ensured if the growth rate foreseen to keep the unemployment rate is fixed or constant. Thus, the influence of growth rate on unemployment rate is initiated when growth rate exceeded the actual or natural rate. The nexus is done between the rising rate of growth and the declining rate of unemployment to show that, in an event of growth rate, there is no change in unemployment rate. This can be depicted below as:

$$b = \Delta U / \Delta Y \text{-----} (3.4)$$

From equation 3.4 above,  $b$  described the relationship involving unemployment and the growth rate determined by the magnitude of change induced at every change in the constant economic growth.

### 2.1 Data Sources and Variable Definitions

This study used annual dataset obtained for the period 1970 to 2018. The period is chosen due to the availability of relevant data required for the study and its adequacy to capture both the short- and long-run dynamics. The dataset was drawn from Central Bank of Nigeria (CBN) 2018 Statistical Bulletin, Annual Report and Statements of Account, the National Bureau of Statistics (NBS) and the World Bank Development Indicators (WDI, 2019) online database. The variables used in the study include Unemployment Rate (UEMR), inclusive growth to be proxied by real Growth in agricultural, manufacturing and industrial sectors which were measured by real agricultural output (AGRIC), real manufacturing output (MANUF) and real industrial output (INDUS) respectively. We also capture trade openness by looking at the influence of export as percentage of real GDP (OPNX).

## 2.2 Estimation Technique

The study employed the Autoregressive Distributed Lag (ARDL) bound test approach to determine the short- and long-run dynamics between unemployment rate and inclusive growth in Nigeria. Unlike other conventional co-integration tests such as Engle and Granger (1987) and Johansen and Juselius (1990), the ARDL bound test approach can be applied to variables of different order of co-integration being I (0) or I (1) process (Pesaran & Shin, 1997). Second, the ARDL approach is applicable to small or finite sample size and therefore conducting bound test will be appropriate to this study (Pesaran, Shin & Smith, 2001; Narayan, 2011). Third, the short and long-run parameters of the model are estimated simultaneously removing problems associated with omitted variables and autocorrelation (Huag, 2002). The ARDL technique generally provides unbiased estimates of the long-run model and valid t-statistics even when some of the regressors are endogenous. Finally, this approach can accommodate structural breaks in time series data. To this effect, the study utilize the ARDL bound approach to examine the extent at which the inclusive growth in reducing unemployment by creating more opportunities. The study also examined the statistical properties of the data by subjecting the data stationarity test using Augmented Dickey Fully (ADF) and the Phillips-Perron (PP) techniques to ward off any tendency of having a spurious result after determining its maximum lag length via Akaike Information Criterion (AIC). If unit root is confirmed in more than one variable including the dependent variable, the ARDL bound test will be conducted to affirm if exist long run relationship among the variables. Following the model specifications, the statistical properties of the data can be verified with the unrestricted error correction model (UECM) of the bound used in restoring equilibrium in the long run.

## 2.3 Model Specifications

Firstly, the functional form of the model is presented in eqn. (3.5) shown below. The sectors and other policy variables through which jobs can be created to curb unemployment in Nigeria are substituted in equation 3.1 to have

$$UEMR_t = f(GPC_t, AGRIC_t, MANUF_t, INDUS_t, OPNX_t) \text{-----} (3.5)$$

The functional relationship of the model specified above can be expressed in an estimable form as shown in equation 3.6 below:

$$UEMR_t = \beta_0 + \beta_1 GPC_t + \beta_2 AGRIC_t + \beta_3 MANUF_t + \beta_4 INDUS_t + \beta_5 OPNX_t \text{-----} (3.6)$$

Where UEMR; Unemployment rate, GPC; Inclusive growth to be measured via real Gross Domestic product per capita, AGRIC; Agricultural sector to be proxied by real agricultural output, MANUF; Manufacturing sector to be proxied by real manufacturing output, INDUS; Industrial Sector to be measured by real industrial output and OPNX; Openness proxied by export as percentage of real GDP. According to a priori expectations, real agricultural output, real manufacturing output, real industrial output, real gross domestic product per capita as proxy of inclusive growth, openness proxied by export as measure of real GDP exhibits a negative relationship with unemployment rate ( $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5 < 0$ ). The higher the real output obtainable from these sectors, the lesser the number of unemployment rate. Also, when the degree of trade openness in a country is enormous, the rate of economic growth will increase since trade openness facilitates greater integration into the global economy and promotes growth through the channels of better resource allocation, greater competition, innovation, transfer of technology and access to foreign savings which invariably reduce the soaring unemployment rate in the Country by creating job openings. However, in order to incorporate both the short run and long run dynamics of unemployment rate and sectors via which it can be harnessed with the intention of creating job opportunities are expressed using ARDL bound test procedure as demonstrated below:

$$\begin{aligned}
 UEMR_t = & \alpha + \phi_1 UEMR_{t-1} + \phi_2 \Delta \ln GPC_{t-1} + \phi_3 \Delta \ln AGRIC_{t-1} + \phi_4 \Delta \ln MANUF_{t-1} + \phi_5 \Delta \ln INDUS_{t-1} \\
 & + \phi_6 \Delta \ln OPNX_{t-1} + \sum_{m=1}^q \theta_m \Delta UEMR_{t-m} + \sum_{n=1}^q \varpi_n \Delta \ln GPC_{t-n} + \sum_{r=1}^q \psi_r \Delta \ln AGRIC_{t-r} + \sum_{x=1}^q \omega_x \Delta \ln MANUF_{t-x} \\
 & + \sum_{z=1}^q \beta_z \Delta \ln INDUS_{t-z} + \sum_{h=1}^q \phi_h \Delta \ln OPNX_{t-h} + \ell_t \text{-----} (3.7)
 \end{aligned}$$

Where  $\alpha$  describes the intercept, Ln denotes the natural log operator,  $\phi = 1 - 6$  are the long run multipliers of the model,  $\theta_m, \varpi_n, \psi_r, \omega_x, \beta_z, \varphi_h$  denotes the short-run dynamic coefficients of the parameters While  $\Delta$  is the first difference operator and  $q$  is the optimal lag length to be decided by Akaike Information Criterion (AIC) and  $\ell_t$  as the disturbance term. The next step is to estimate the ARDL bounds testing on equation 3.7 to establish if long run relationship exists among the variables by conducting the F-test (Wald test) for the joint significance of the coefficients of the lagged levels of the variables:

$$H0: \phi_1 = \phi_2 = \phi_3 = \phi_4 = \phi_5 = \phi_6 = 0$$

$$H1: \phi_1 \neq \phi_2 \neq \phi_3 \neq \phi_4 \neq \phi_5 \neq \phi_6 \neq 0$$

However, the computed F-statistic will be compare with the critical value developed by Pesaran et al (2001) and modified by Narayan (2011) to suit small sample size ranging from 31 to 80 observations which is found relevant in this study with 45 number of observations. The presumed critical values are I(0) for lower bounds and I(1) for upper bounds. If the F-calculated exceeds the upper bounds, then the null hypothesis (H0) should be rejected while it should not be rejected if the F-calculated value falls below the lower bounds. Consequently, if the F-calculated statistic lies in between the upper and the lower bounds value, it is an indication that the result is indecisive (Pesaran et al, 2001; Narayan, 2011). If a long-run and stable relationship is endorsed by equation 3.7, then the conditional ARDL (v, n, c, t, k, r) model will be set up using:

$$UEMR_t = \beta + \sum_{j=0}^v \pi_1 UEMR_{t-j} + \sum_{j=0}^n \pi_2 LnGPC_{t-j} + \sum_{j=0}^c \pi_3 LnAGRIC_{t-j} + \sum_{j=0}^t \pi_4 LnMANUF_{t-j} + \sum_{j=0}^k \pi_5 LnINDUS_{t-j} + \sum_{j=0}^r \pi_6 LnOPNX_{t-j} + \mu_t \text{-----} (3.8)$$

All the variables retained their previous explanation and v, n, c, t, k and r are the optimal lag length to be decided by AIC while  $\pi = 1 - 6$  are the long run parameters. Once estimation of the related long-run multipliers are fulfilled, the short-run dynamic coefficients is investigated using error correction model (ECM) of ARDL (v, n, c, t, k, r) as expressed in equation 3.9 below:

$$\Delta UEMR_t = \phi_0 + \sum_{i=0}^v \Omega_{1i} \Delta UEMR_{t-i} + \sum_{i=0}^n \Omega_{2i} \Delta LnGPC_{t-i} + \sum_{i=0}^c \Omega_{3i} \Delta LnAGRIC_{t-i} + \sum_{i=0}^t \Omega_{4i} \Delta MANUF_{t-i} + \sum_{i=0}^k \Omega_{5i} \Delta INDUS_{t-i} + \sum_{i=0}^r \Omega_{6i} \Delta OPNX_{t-i} + \delta ECM_{t-1} + \varepsilon_t \text{-----} (3.9)$$

From equation 3.9,  $ECM_{t-1}$  denotes the Error Correction Model (ECM) towards long-run equilibrium after short-run shock and while  $\delta$  explains the speed by which the parameters converges back to equilibrium. The coefficient of the error term must be negative and significant to ensure convergence of the long-run dynamics towards equilibrium. The value of  $\delta$  fluctuates between -1 and 0. When the coefficient is -1, there is a sudden and complete convergence while 0 implies no meeting after experiencing the shock. The goodness of fit of the model can be checked through post-diagnostic test like serial correlation, heteroscedasticity test, functional form, normality test and stability test such as Cumulative sum of Recursive Residuals (CUSUM) and Cumulative Sum of squares of Recursive Residuals (CUSUMSQ).

### 3. ANALYSIS OF EMPIRICAL RESULTS

#### 3.1 Descriptive Statistic

The study employed the use of time series variables specified using unemployment rate (UEMR), real per capita output to proxy inclusive growth (LnGPC), manufacturing sector proxied by real manufacturing output (LnMANUF), industrial sector to be measured by real industrial output (LnINDUS), agricultural sector proxied by real agricultural output (LnAGRIC) and Trade openness as measure of the percentage of GDP (OPNX). However, the mean, median, standard deviation, minimum, maximum, skewness as well as the Jarque-Bera statistics of each variable used in this model and their relevant characteristics are as

described in table 1 below. The validity of the variables in this research are supported by the mean, Median, skewness and as well as the minimum and maximum magnitude of the variables. The variables are normally distributed as indicated by Jarque-Bera statistic as demonstrated below.

**Table 1.** Results of Descriptive Statistic

	UNEMP	OPNX	LnMANUF	LnINDUS	LnGPC	LnAGRIC
Mean	8.071111	0.295796	9.410690	11.14460	7.125313	11.18639
Median	6.100000	0.277599	9.543867	11.59139	7.334191	11.40027
Maximum	18.10000	0.497284	15.71526	16.43954	12.84545	16.54860
Minimum	1.900000	0.129009	5.729125	6.708206	3.170323	7.500364
Std. Dev.	4.823693	0.105088	2.104696	2.090400	2.121113	2.123481
Skewness	0.609076	0.212300	1.169042	0.221822	0.638107	0.422020
Kurtosis	1.812715	1.900377	5.958517	4.434478	4.717348	3.901230
Jarque-Bera	5.425393	2.605228	26.66150	4.227276	8.583761	2.858658
Probability	0.066358	0.271820	0.000002	0.120798	0.013679	0.239470
Sum	363.2000	13.31083	423.4811	501.5072	320.6391	503.3877
Sum Sq. Dev.	1023.792	0.485912	194.9088	192.2699	197.9613	198.4035

Source: Author's Computation

Accordingly, the value of the mean and median of the variables as observed from the table are not too far from each other except that of unemployment (UEMR). This is an indication of no extreme outliers and hence, making the variables normal for analysis. The value of standard deviation of each variable is a cursory advancing towards normal distribution. Moreover, the skewness, Kurtosis and Standard deviation statistics denotes that the differences in the variables are not too significant. This analysis indicates that variables capable of curbing unemployment in order to enhance inclusive growth in Nigeria over the period 1970 to 2014 can be significant after being normalized.

### 3.2 Unit Root Test

From table 2 below, the unit root tests using the ADF and PP techniques are recounted. The essence of employing ADF and PP is to examine the null hypothesis of non-stationarity which is rejected if the ADF and PP is more negative or greater than the critical values in absolute sense at 1%, 5% and 10% level of significance. Thus, both the ADF and the PP results indicated that all the variables are non-stationary at levels. However, all the series became stationary after taking their first differences except trade openness as percentage of real GDP which is stationary at level.

**Table 2.** Results of Unit Root Test

	<i>Augmented Dickey Fuller (ADF) test</i>		<i>Order of Integration</i>	<i>Phillips-Perron</i>		<i>Order of Integration.</i>
	<i>t-stat</i>	<i>Critical Val</i>		<i>t-stat</i>	<i>Critical Val</i>	
UEMR	-5.8887	-3.5966***	I(1)	-7.1959	-4.1865***	I(1)
LnAGRIC	-6.6981	-3.5924***	I(1)	-6.7543	-3.5925***	I(1)
LnMANUF	-6.3852	-3.5925***	I(1)	-6.3852	-3.5925***	I(1)
LnINDUS	-6.7706	-3.5925***	I(1)	-6.7084	-4.1865***	I(1)
LnGPC	-6.6250	-3.5924***	I(1)	-6.6242	-4.1865***	I(1)
OPNX	-2.8057	-2.6030*	I(0)	-2.6537	-2.6031*	I(0)

Note: \*\*\*, \*\* and \* denotes level of significance at 1%, 5 % and 10 %, respectively. Also, unemployment rate and export as a percentage of GDP are not log form because the variables are in percentage.

The unit root results fulfilled the underlying assumptions that necessitate the use of ARDL-bound test to affirm if long-run associations exist among the variables in Nigeria as extracted from Narayan (2004, 2011) procedure. The results of the ARDL bounds testing are as demonstrated below in table 3.

**Table 3.** ARDL-Bound Test of Cointegration

t-Statistic	Value	K	Level of Sig	Bound critical Values	
				I(0)	I(1)
F-Statistic	4.257280	5	1%	3.93	5.23
	4.257280	5	5%	3.12	4.25
	4.257280	5	10%	2.75	3.79

Source: Author's computation

Given that unemployment rate is integrated of order one or is an I(1) process, it is crystal clear that there is a cointegrating relationship streaming from agricultural output, manufacturing output, industrial output, export output measured as percentage of GDP and real per capita output to Unemployment rate. However, the calculated F-test statistic (4.26) from table 4.3 above is greater than the upper critical bound values of Narayan at 5% and 10% level of significance i.e( $4.26 > |4.25| |3.79|$ ). This bound result affirmed that, the null hypothesis of no cointegration cannot be accepted for Nigeria over the period 1970 to 2014. Since the variables are cointegrated, the long run model will be estimated using ARDL of the sample period as described below.

### 3.3 Estimated Long-run coefficients of the Relationship

Having confirmed the existence of cointegration among the variables involved, it become appropriate to evaluate the long-run elasticities among the variables using equation 3.8 following ARDL (v, n, c, t, k, r) specification as thus:

**Table 4.** Coefficients of Long Run Parameters

ARDL (v, n, c, t, k, r) decided by AIC with UEMR as the dependent variable

Variable	Coefficient	t-Statistic	Probability
C	45.21862	2.042919	0.0479
LNGPC	-13.84395	-2.266435	0.0290
LNAGRIC	-0.264209	-6.288294	0.0000
LNMANUF	4.183946	1.586098	0.1208
OPNX	1.418627	0.243752	0.8087
LNINDUS	-8.954231	-4.473595	0.0001

Source: Author's Computation

The long run coefficients from table 4. can be expressed in equation form as demonstrated below:  

$$UEMR_t = 45.21862 - 13.84395 * LNGDP - 0.264209 * LNAGRIC + 4.183946 * LNMANUF + 1.418627 * OPNX - 8.954231 * LNINDUS$$
(3.10)

The estimated results of the long-run relationship suggests the agricultural, manufacturing and industrial sectors as the key driving forces of curbing unemployment via job creation forming the basis of adjudging inclusive growth in Nigeria. From table 4.3 above, inclusive growth proxied by real output per capita exhibits a statistically significant negative relationship with the rate of unemployment and is appropriately signed. This implies that, any 1% increase in real output per head leads to a reduction in unemployment by 13.84% supporting the results of empirical studies conducted in Pakistan by Hussain, Siddiqi and Iqbal (2010); Khan, Khattak and Hussain (2012); and Onwachukwu, 2015 in Nigeria. The coefficient of Agricultural sector proxied by real agricultural output (LNAGRIC) is -0.264209. Thus, a negative and statistically relevant relationship exists between Unemployment rate and the agricultural sector in enhancing inclusive growth in Nigeria. If real agricultural output increases by 1%, unemployment rate fall by 0.26% creating a higher prospect for investment in the sector and consequently resulting to an improvement in the development of the economy which is in line with the findings of Olajide, Akinlabi and Tijani (2012) in Nigeria.

On the other hand, the manufacturing sector as well as trade openness is positively signed and statistically insignificant in its link with unemployment rate in Nigeria which failed to conform to a priori reasoning. By implication, any 1% increase or decrease in real manufacturing output and export proceeds results to a 4.18% and 1.41% rise or fall in unemployment rate. Therefore, manufacturing sector and openness have no impact in curbing employment rate in Nigeria due to the deplorable and ineffective state of its performance over time. Finally, industrial sector proxied by real industrial output is positive and statistically significant in determining the rate of unemployment in Nigeria. The long run tie suggests that, any 1 percent expansion or contraction in industrial output will lead to 8.95 percent contraction or expansion in the rate of unemployment in Nigeria invariably driving the economy towards achieving inclusive growth. This result contradicted the study of Njoku and Ihugba (2014) in Nigeria who claimed that, the performance of industrialization is below expectations. Thus, inclusive growth is feasible when the unemployment rate can be reduced to the barest minimum to absorb the teeming unemployed Nigerians in the agricultural and industrial sectors.

### 3.4 The Short-run Dynamic Relationships

Since all the variables are cointegrated after the first difference, the need to restore any likely deviation capable of influencing the model in its drive to equilibrium become expedient. In applying the short-run dynamics of the ARDL error correction model, four (4) was chosen by Akaike Information criterion as the optimal lag length to be used in estimating the bounds tests. To be consistent with Pesaran and Shin (1999), the SBC is largely preferred to other criteria because it tends to define more parsimonious specifications, although, Lutkepohl (2005) argued that AIC is better for small sample size which necessitates its use in this study. However, the estimated results from equation 3.9 are depicted below in table 4.

**Table 4.** Dynamics of Short run Error Correction

ARDL (3, 4, 2, 1, 4, 1) as Selected by AIC with UEMR as the Dependent Variable

Variable	Coefficient	t-Statistic	Probability
D(UEMR(-1))	0.423968	2.438967	0.0247
D(UEM(-2))	0.238684	1.253296	0.2253
D(LNGPC)	-84.626674	-2.747151	0.0128
D(LNGPC(-1))	39.434776	3.175522	0.0050
D(LNGPC(-2))	4.177844	0.483232	0.6345
D(LNGPC(-3))	-17.579982	-2.080981	0.0512
D(LNAGRIC)	34.380314	2.811045	0.0112
D(LNAGRIC(-1))	-20.166623	-2.639681	0.0162
D(LNMANUF)	26.178747	3.1977081	0.0047
D(LNINDUS)	22.818306	1.807984	0.0865
D(LNINDUS(-1))	-20.702319	-2.701800	0.0141
D(LNINDUS(-2))	-0.385775	-0.050416	0.9603
D(LNINDUS(-3))	19.942864	2.484363	0.0225
D(OPNX)	-4.835661	-0.747182	0.4641
D(@TREND)	1.255404	4.243176	0.0004
ECM(-1)	-0.804151	-4.417460	0.0003
<i>ECM=UEMR*(-62.4560*LNGPC+32.1928*LNAGRIC+9.4937*LNMANUF+11.1296*LNINDUS-37.3457*OPNX-147.6531+1.5612*@TREND)</i>			
R <sup>2</sup> = 0.600590		Durbin-Watson Stat = 0.801334	
ADJUSTED R <sup>2</sup> = 0.549384		F-Statistic= 11.72882	
Prob (F-statistic)= 0.000001			

Source: Author's Computations

Table 4. describes the dynamics of the short-run adjustment process evaluated by the error correction model which expressed how fast variables respond to shock in its return to equilibrium. The coefficient estimate for the  $ECM_{t-1}$  (-0.804151) term is negative and statistically significant (-4.417460) suggesting that, any alteration in an attempt to curb unemployment in Nigeria will be restored at a speed of

80% in the next year by agricultural and industrial sectors. In other words, the negative and statistically significant ECM term is an indication that, the feedback mechanism is effective in restoring any external imbalances. The statistical significance of the error correction model reassures the presence of long-run relationship streaming from real gross domestic product per capita, agricultural sector, manufacturing sector, industrial sector and trade openness to unemployment rate in Nigeria.

The coefficient of determination  $R^2$  (0.600590) explains the joint influence of the explanatory variables in taking notes of the flux in the dependent variable (unemployment rate). Therefore, changes in the unemployment rate are explained by 60 percent variation in the explanatory variables while 40 percent come from other variables outside the model. The F-statistic (11.72882) is greater than 5% and whose probability (0.000001) is significant and robust in explaining the reliability of the model. Hence, the F-statistic explained the joint statistical significance of the explanatory variables at 5% level of significance. More remarkably, the Durbin-Watson statistic though weak at (0.801334) but greater than the coefficient of determination  $R^2$  (0.600590) indicating that, there is no serial correlation in the model utilized.

### 3.5 Post Diagnostic Test

One major hurdle with time series regression is the fact that the parameter estimates change over time. In an event of volatile parameters, model misspecification become inevitable if left unidentified giving rise to a biased estimate (Narayan & Smiyth, 2005). To justify this, the relevance of the dynamic results was examined to ensure that the models employed did not suffer from the problems of non-normality of error term, auto-correlated residuals and heteroscedasticity. The results are presented in Table 5.

**Table 5.** Post diagnostic test

	<i>LM test statistic</i>	<i>Chi-Statistic <math>X^2</math></i>	<i>Probability</i>
1.	Serial Correlation (*)	2.343091	0.5258
2.	Heteroskedasticity (**)	29.32849	0.7063
3.	Functional form (***)	0.014047	0.9057
4.	Normality test (****)	J-B (0.795295)	0.671899

Note: where (\*), (\*\*), (\*\*\*) and (\*\*\*\*) describes Breusch-Godfrey LM test for serial correlation, Breusch-Pagan Godfrey heteroscedasticity test, Ramsey RESET test for omitted variables and Jarque-Bera Normality test

The robustness tests of the model revealed that Breusch-Godfrey serial correlation LM test, heteroscedasticity test, Jarque-Bera normality test and Ramsey RESET specification test had correct functional form and the model's residuals were serially unrelated, normally distributed and homoskedastic. Also, Parameter stability verified via CUSUM and CUSUMSQ statistic indicates absence of instability of the coefficients since the plots of the two statistics were restricted within the 5% critical bounds related to the parameter stability. The normality and stability test are represented in appendix vi (d and e) respectively.

## CONCLUSION

This study employed autoregressive distributed lag model to ascertain if curbing unemployment via job creation can serve as panacea to attaining inclusive growth in Nigeria over the period 1970 to 2014. Estimated results from the research uncovered that improvement in the agricultural, manufacturing and industrial sectors will considerably reduce the problems of unemployment and poverty in Nigeria. Even though the manufacturing sector shows no contribution to reducing unemployment, this could be as a result of the use of modern machineries in most manufacturing companies that rendered the use of labour redundant in most cases. Nevertheless, if the teeming unemployed populace is adequately trained in the right direction, the manufacturing sector can still absorbed them. The findings also shows that, curbing unemployment precipitate inclusive growth in the long run because the impact of these sectors in reducing unemployment might not be felt instantaneously in the short run. Thus, it can be submitted by this study that, Government should give utmost priority to the key indicators of inclusive growth that

are needful at a given period of time in order to ascertain the right combination of the sectors in which these scarce resources should be directed to with the intention of enhancing inclusive growth. Also, a safe and conducive environment should be provided by the government for these sectors to thrive in order to attract not only residence of the country but foreign investors too. These sectors will end up recruiting the unemployed massively if they have a good environment to operate. Consequently, in order to improve the agricultural sector, special incentives should be given to farmers by the government in form of adequate funding as well as provision of infrastructural facilities such as good roads, pipe borne water, health care and electricity.

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