

# The Growth Effect Of Unemployed Resources And Inflation In Nigeria

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## Abstract

This paper investigates the growth effect of human resource unemployment, natural resource unemployment and inflation in Nigeria between 1986-2010 through the application of ordinary Least Square (OLS) technique and Augmented Dickey-Fuller technique in testing the unit root property of the series. The results of unit root suggested that all the variables of the model were stationary. The Johansen cointegration result shows that there existed 2 cointegrating equation, implying the existence of long run relationship between economic growth, unemployment (human and natural resources) and inflation (total, headline, core, and food inflation). The results further revealed that unemployment (both human and natural resources), total inflation and core inflation impacted positively on economic growth while headline and food inflation impacted negatively on economic growth in Nigeria. The result also shows that unemployment does not significantly affect economic growth, but inflation does. Hence, a good performance of an economy in terms of per capita growth may therefore be attributed to the rate of inflation in the country. A major policy implication of this result is that concerted effort should be made by policy makers to increase the level of output in Nigeria by diversifying the economy to including exploitation and exploration of natural resources in order to reduce unemployment and the prices of goods and services (inflation) so as to boost the growth of the economy. Another policy implication of this study is that government should adjust its production techniques to be labour intensive as against capital intensive and also close the border to some extent which is the likely measure to reduce unemployment and Inflation and increase domestic output level (GDP). The study found that when natural resources which Nigeria is blessed with were harness unemployment, inflation, poverty and income inequality will be a history.

**Key words:** Unemployment, Inflation, tapped natural resources, economic growth (RGDP), and cointegration.

## 1.0 Introduction

The Nigerian economy has remained largely underdeveloped despite the huge human and natural resources. The country is richly endowed with various mineral types that manifest in multiple occurrences all over the country, every state of the country and the federal capital territory has the presence of solid minerals, however, many of these resources are still untapped. More than 40 types of solid minerals have been identified in over 500 locations in the country (see Musa, 2010). The per capita income is low, unemployment and inflation rates are high. There are many socio-economic challenges. The economy has continued to witness economic recovery which is immediately followed by economic recession and depression.

The situation in Nigeria is disturbing. The various macroeconomic policies by government have been unable to achieve sustained price stability, reduction in unemployment and sustained growth. The fluctuations in the economy have confirmed the need to manage the economy effectively. The essence of macroeconomic management underlines the rationale of the government as a vital economic agent. However, it appears that government intervention has not been able to cure the ills in the economy.

The continued economic crisis, with the associated problems of high inflationary pressure, high exchange rate, and debt overhang, adverse balance of payment and high inflation rates is difficult to explain. Against a high rate of unemployment and underemployment, a large public sector, low wages and poor working conditions has been persistent high inflation rate in Nigeria. Also, underemployment and unemployment is a prominent feature of the informal labour market as well. Consequently, the full potentials of labour-surplus economy have not been fully exploited.

In the 1960s and 1970s, the Nigerian economy provided jobs for almost all job seekers and absorbed considerable imported labour while inflation rates were low. The wage rate compared favourably with international standards and there was relative industrial peace in most of the years. Following the oil boom of the 1970s, there was mass migration of people, especially the youth, to the urban areas seeking for jobs. Following the downturn in the economy in the early 1980s, the problems of unemployment and inflation increased, precipitating the introduction of the Structural Adjustment Programme (SAP). The rapid depreciation of the naira exchange rate since 1986 and the inability of most industries to import the raw materials required to sustain their output levels fuelled inflation. A major consequence of the rapid depreciation of the naira was the sharp rise in

the general price level, leading to a significant decline in real wages and increased poverty. The low wages in turn contributed to a weakening of the purchasing power of wage earners and declining aggregate demand. Consequently, industries started to accumulate unintended inventories.

Unemployment and inflation are two intricately linked economic concepts. Over the years there have been a number of economists trying to interpret the relationship between the concepts of inflation and unemployment. There are two possible explanations of this relationship – one in the short term and another in the long term. In the short term there is an inverse correlation between the two. As per this relation, when the unemployment is on the higher side, inflation is on the lower side and the inverse is true as well.

The relationship between unemployment and inflation was first of all studied by A.W. Phillips(1958) and found a stable and inverse relationship between unemployment and inflation in UK. In the short term the Phillips curve happens to be a declining curve. The Phillips curve in the long term is separate from the Phillips curve in the short term. It has been observed by the economists that in the longrun the concepts of unemployment and inflation are not related.

As per the classical view of inflation, inflation is caused by the alterations in the supply of money. When money supply goes up the price level of various commodities goes up as well. The increase in the level of prices is known as inflation. According to the classical economists there is a natural rate of unemployment, which may also be called the equilibrium level of unemployment in a particular economy. This is known as the long term Phillips curve. The long term Phillips curve is basically vertical as inflation is not meant to have any relationship with unemployment in the long term.

It is therefore assumed that unemployment would stay at a fixed point irrespective of the status of inflation. Generally speaking if the rate of unemployment is lower than natural rate, then the rate of inflation exceeds the limits of expectations and in case the unemployment is higher than what is the permissible limit then the rate of inflation would be lower than the expected levels.

Okun (1962) studied short-term changes in GDP and unemployment rate and noticed certain social expenses caused by unemployment, which additionally hinder output growth in US. The results have shown that his law can be applied to most countries (Popovic and Popovic, 2009). Is it then applicable within the context of the Nigerian economy?. Okun claimed that the ratio between unemployment and the shift in output is the law through which GDP shift from the trend is enlarged by approximately 3percent if unemployment rate grows by 1percent above the natural rate level (see McConnel and Brue,1996). Okun's law is a reduced version of Phillips regularity, more precisely, of the segment pertaining to the research of the relation between unemployment and output. Okun's law has been used for specific projections of economic growth (see Popovic and Popovic, 2009). Both the Phillips and the Okun's law postulate a positive link between inflation and output while negative link between unemployment and output. Inflation growth is followed by unemployment drop and output growth. This hypothesis is the bases of Okun's law, from which it can infer that it, represent the addition to Phillips regularity and particularly to the segment which defines output-unemployment ratio (see Popovic and Popovic, 2009). In macroeconomic terms unemployment creates new expenses (both economic and non-economic). If inflation and unemployment are negatively linked as postulated by Phillips and as well output and unemployment are negatively linked as postulated by Okun, it then follows that inflation will affect output positively. This will provide the basis for linking unemployment, inflation and output (economic growth) through modification of the Okun's type growth model to incorporate inflation. For several years now in Nigeria, both GDP growth rate, unemployment rate and inflation rate are on the increase, which shows a likelihood of idle resource and welfare less growth in the country. This situation in Nigeria is a-theoretical and also a call for concern.

Unemployment and Inflation are issues that are central to the social and economic life of every country. The existing literature refers to inflation and unemployment as constituting twin problems that explains the endemic nature of poverty in developing countries. It has been argued that continuous improvement in productivity is the surest way to reduce inflation. Growth in productivity provides a significant basis for adequate supply of goods and services thereby improving the welfare of the people and enhancing social progress.

Undoubtedly, parts of the macroeconomic goals which the government strives to achieve economic growth through stable domestic price level and full-employment. These goals are pursued in order to promote mass welfare. The fluctuation in growth rates that follows price instability and high rate of unemployment is very high. The effects of inflation and unemployment on economic growth could be disturbing.

## 2.0 Conceptual Literature

Here meaning of the basic concepts is review couple with the causes, types, effects and remedies of the two phenomenons (unemployment and inflation) within and outside the Nigerian context.

### **The concept of unemployment**

Balami (2006) unemployment is conceptualised as a situation where in a worker or workers are involuntarily out of work. This means that workers are willing and able to work but could not find any work.

Unemployment is often defined by the classical economists as the excess supply of labour over the demand for labour which is caused by adjustment in real wage. The Classical or real-wage unemployment occurs when real wages for jobs are set above the market-clearing level, causing the number of job-seekers to exceed the number of vacancies.

Unemployment as defined by International Labour Organization (2009) is a state of joblessness which occurs when people are without jobs and they have actively sought work within the past four weeks. The unemployment is a measure of the prevalence of unemployment and it is calculated as a percentage by dividing the number of unemployed individuals by individuals currently in the labour force. In a 2011 news story, Business Week Reported, "More than two hundred million (200) people globally are out of work, a record high, as almost two-third of advanced economies and half of developing economies are experiencing a slowdown in employment growth.

Sikirulahi (2008) unemployment can be conceived as the number of people who are unemployed in an economy, often given as a percentage of the labour force.

Unemployment is also defined as numbers of people who are willing and able to work as well make themselves available for work at the prevailing wage but no work for them.

### **The concept of inflation**

Balami (2006) inflation is a situation of a rising general price level of broad spectrum of goods and services over a long period of time. It is measured as the rate of increase in the general price level over a specific period of time. To the neo-classical and their followers at the University of Chicago, inflation is fundamentally a monetary phenomenon. In the words of Friedman, "inflation is always and everywhere a monetary phenomenon and can be produced only by a more rapid increase in the quantity of money than output." Hicks, "inflation is a continuous rise in general price level." Johnson, "inflation is a sustained rise in prices of goods and services." Brooman, "inflation is continuing increase in the general price level." Dernberg and McDougall are more explicit when they write that "the term inflation usually refers to a continuing rise in prices as measured by an index such as the consumer price index (CPI) or by implicit price deflator for gross national product." Keynes and his followers emphasise the increase in aggregate demand as the source of demand-pull inflation.

## **3.0 Theoretical framework**

Here various theories of growth and growth models were reviewed.

### **Classical growth theory**

The classical economists like Adam Smith, David Ricardo and Mill who were the exponents of the classical growth theory assigned the rate of investment as the main factor for fostering growth. Growth is a function of the share of profits in the national income. There exists a positive relationship between higher rates of profit and higher rates of growth. Higher growth is achieved via profits effective on the rate of investment. According to the classical economists, the increased division of labour and specialization made possible by increase in growth rate of capital would result in increase in both profits and wages. However, it is argued that such increase may trigger off income and population growth that may lead to diminishing returns given that land is fixed. Classical models like Ricardian growth model emphasised the limits to growth imposed by the ultimate scarcity of land. The major short-comings of this theory of growth are the failure to provide for the possibility of the role of technical progress in the growth process Balami (2006).

### **Rostow's stages of growth theory**

This is also known as the linear stages model. According to Rostow (1990), countries must pass through five stages in the growth process. These stages include the following:-

Traditional society where economic decision making is based on obligation, culture and traditions. The traditional society is like a feudal society. It is not monetized; therefore, most income does not enter the national income.

The second stage is the pre-condition for take-off where advances in agriculture and jettisoning of uneconomic culture as well as the emergence of leading sectors which will assist to pull along other sectors. It is similar to a primitive capitalist stage. There is a presence of market leading to the realization of sustained growth.

The third stage is the take-off stage where economic activities are now taking place; the society will now take-off on the path to economic growth.

The fourth stage is the drive to maturity. This stage is characterized by the consolidation of industrial revolution. Leading sectors of the economy, having attained the critical minimum speed to be in the growth process.

The fifth stage is the high mass consumption stage. In this stage the economy is deemed to have matured, making it possible for the citizens to enjoy appreciable levels of living standard. All industries are in full operation and there are enough goods and services, and as such the society consume massively.

Based on Rostow's theory, where can we situate Nigeria?

#### **The big push theory**

According to Balami (2006), this theory states that all that LDCs require to take off into a period of self-sustaining economic growth is a massive investment programme, in technically interdependent industries, designed to promote rapid industrialization and the building up of economic infrastructure. The theory further contended that proceeding bit-by-bit will not launch the economy successfully on the development path. The big push theory is based on the assumptions of indivisibilities and non-appropriabilities in the production functions.

#### **The Solow growth model**

This is an economic growth model in which the growth of total GDP is explained by population increase, technical progress, and investment. In this model there is full employment, with an aggregate production showing constant returns to scale. In analysing the process of economic growth Balami (2006), Solow (2002) combined the supply and demand sides of the economy together to generate economic growth. He argued that economic growth can best be understood from neo-classical point of view (supply side) which says  $Q = f(AK^\alpha L^{1-\alpha})$ . Hence, the Solow model can also be referred to as the neo-classical growth model. He assumed that savings is a linear function of income, that capital does not depreciate so that investment is simply the rate of increase of capital stock, that savings is equal to investment, and that labour grows at an exogenous constant proportion, the rate of growth or level of technology is exogenously given.

#### **Macroeconomic Policy Implication of Solow's Model**

In the long run, the rate of growth of (per capita) GDP is determined by population growth and the rate of technical progress. Higher investment can speed up growth temporarily, but as the capital-output ratio rises, an increased proportion of GDP needs to be invested to equip the increasing labour force, and the capital-output ratio converges towards a finite limit, however high a proportion of GDP is invested. Low investment slows down growth, but the capital-output ratio falls towards a lower limit which is always positive for positive investment.

### **4.0 Empirical literature**

Here empirical literature on the relationship between economic growth, unemployment and inflation were reviewed. For example, Stock and Watson (1999) used the conventional Phillips curve (unemployment rate) to investigate forecasts of U.S. inflation at the 12-month horizon. These authors focused on three questions. First, has the U.S. Phillips curve been stable? If not, what are the implications of the instability for forecasting future inflation? Second, would an alternative Phillips curve provide better forecasts of inflation than unemployment rate Phillips curve? Third, how do inflation forecasts from Phillips curve stack up against time series forecasts made using interest rate, money, and other series? They found that inflation forecasts produced by Phillips curve generally had been more accurate than forecasts based on other macroeconomic variables, including interest rates, money and commodity prices but relying on it to the exclusion of other forecasts was a mistake. Forecasting relations based on other measures of aggregate activity could perform as well or better than those based on unemployment, and combining these forecasts would produce optimal forecasts. Williams and Adedeji (2004) examined price dynamics in the Dominican Republic by exploring the joint effects of distortions in the money and traded-goods markets on inflation, holding other potential influences constant. They captured the remarkable macroeconomic stability and growth for period 1991 to 2002. Using a parsimonious and empirically stable error-correction model, they found that the major determinants of inflation were changes in monetary aggregates, real output, foreign inflation, and the exchange rate. However, there was an incomplete pass-through of depreciation from the exchange rate to inflation. They also established a long-run relationship in the money and traded-goods markets, observing that inflation was influenced only by disequilibrium in the money market. Popovic (2009) conducted a research on inflation and unemployment in the EU: comparative analysis of Phillips regularity through correlation analysis of unemployment and inflation in EU for the 1998-2007 periods and was found that the simple linear correlation coefficient between them is negative. They concluded that the relation between unemployment and inflation is moderate and inverse (negative). Fakhri (2011) conducted research on the relationship between inflation and economic growth in Azerbaijan, he used Threshold model and found that there is a nonlinear relationship between inflation and economic growth with the threshold level of 13%. Chang-Shuai Li and ZI-Juan Liu (2012) conducted a study on the relationship among Chinese unemployment rate, economic growth and inflation; they employed Granger causality test, unit root, cointegration, VAR and VEC model. The study revealed that unemployment impacted negatively on growth while inflation impacted positively on growth in China. The study also revealed no causation between unemployment and inflation, but

there is causation between unemployment and growth, while two way causation existed between inflation and growth. Abachi (1998) conducted a research on inflation-unemployment trade-off in less developed countries (LDCs); a case study of Nigeria, he used OLS model and found no trade-off between inflation and unemployment; the results revealed stagflation in Nigeria. He also found that there is causation between inflation and unemployment in Nigeria. Omoke and Ugwuanyi (2010) tested the relationship between money, inflation and output by employing cointegration and Granger-causality test analysis. The findings revealed no existence of a cointegrating vector in the series used. Money supply was seen to Granger cause both output and inflation. The results suggest that monetary policy can contribute towards price stability in Nigerian economy since the variation in price level is mainly caused by money supply. This shows that inflation in Nigeria is to much extent a monetary phenomenon. They find empirical support in context of the money-price-output hypothesis for Nigerian economy. M2 appears to have a strong causal effect on the real output as well as prices. Aminu and Anono (2012) conducted a study on the relationship between unemployment and inflation. They used OLS, ADF for unit root, Granger causality, Johansen cointegration, ARCH and GARCH techniques. The study revealed negative relationship between unemployment and inflation and no causation between unemployment and inflation; though they found that there is long-run relationship between the two phenomena in Nigeria. Aminu and Anono (2012) investigated the effect of inflation on economic growth and development in Nigeria. They employed OLS, ADF and Granger causality and found that there is a positive correlation between inflation and economic growth in Nigeria, though the results revealed that the coefficient of inflation is not statistically significant, but is consistence with the theoretical expectation, causation runs from GDP to inflation implying that inflation does not Granger cause GDP but GDP does. Bakere (2012) conducted a study on stabilization policy, unemployment crises and economic growth in Nigeria. He used OLS and found that the nexus between inflation, unemployment and economic growth in Nigeria were negative. Rafindadi (2012) conducted a study on the relationship between output and unemployment dynamics in Nigeria; he used OLS and Threshold model and found a negative nonlinear relationship between output and unemployment.

#### **Expected result of the study**

This study captured economic growth as increase in output, unemployment as mis-match between unemployed and the available jobs due to lack of skill, while inflation is captured as cost-push i.e. increase in cost of production. The dominant manifestation of unemployment in Nigeria is structural/technological, advancement in technology tends to increase output, therefore, is expected that increase in structural/technological unemployment would increase output. The dominant manifestation of inflation in Nigeria is cost-push, when cost of production increases, prices would also increase and producers will be encourage to increase production, hence output will increase; therefore, is expected that, rise in inflation rate would raise output. It is also expected that improvement in the production of natural resources would increase growth, hence increase in unemployment of natural resources may likely increase unemployment of human resources as well as reducing economic growth. This is attributed to the fact most of the mining activities in Nigeria are manually done, hence, is labour intensive. This implies that, the relationship between unemployment, inflation and economic growth is positive but negative in respect of natural resource unemployment.

#### **5.0 Econometrics models specification**

Here various models of the study were specified.

##### **Linear Regression Analysis**

This study adopted the Okun's type Growth model and modifies it to incorporate inflation and the contribution of solid minerals to serve as a proxy for tapped resources which can later be used to measuring the effect of untapped resources on the growth of the Nigerian economy.

The Okun's type model was specified base on two variables output growth and unemployment. Okun's law (1962) claimed that the ratio between unemployment and the shift in output is the law through which GDP shift from trend is enlarged by approximately 3percent if unemployment rate grows by 1percent above the natural rate level (see McConnell and Brue, 1996). Okun's law is a reduced version of the Phillips regularity, more precisely, of the segment pertaining to the research of the relation between unemployment and output (see Popovic and Popovic, 2009). This study decomposes unemployment into human unemployment, natural resource unemployment as well capital resource unemployment while inflation rate is decomposed into core inflation, headline inflation and food inflation. This is presented in the Okun's type model with unemployment and inflation as the independent variables as:  $Q = f (UN (human, natural and capital), IN (core, headline and food))$ . Assuming a linear relationship between the rate of growth of GDP, unemployment rate and inflation rate. The general model of welfare less and idle resource growth is thus specified as:  $RGDP = f (UNh, UNn, UNc, INt, INC, INh, INF) \text{-----}(1)$

Therefore  $RGDP = \beta_1 + \beta_2 UNh + \beta_3 UNn + \beta_4 INt + \beta_5 INC + \beta_6 INh + \beta_7 INF + \mu \text{-----}(2)$

Where RGDP is the rate GDP growth, UNh is unemployed human resources (labour), UNn unemployed natural resources, INt is total inflation, INc is core inflation, INh is headline inflation and INF is food inflation.

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6,$  and  $\beta_7$  - Parameters

$\mu$  - Error term (white noise)

### A' PRIORI EXPECTATION

It is expected that:  $\beta_1 > 0, \beta_2 > 0, \beta_3 < 0, \beta_4 > 0, \beta_5 > 0, \beta_6 > 0$  and  $\beta_7 > 0$

The general model above is further specified into welfare less model and idle resource model separately and was estimated independently.

### Idle resource growth model

$$RGDP = \alpha_1 + \alpha_2 UNh + \alpha_3 UNn + \mu \text{-----} \quad (3)$$

$\alpha_1, \alpha_2,$  and  $\alpha_3$  - Parameters

$\mu$  - Error term (white noise)

### A' PRIORI EXPECTATION

It is expected that:  $\alpha_1, \alpha_2 > 0$  and  $\alpha_3 < 0$ .

### Welfare less growth model

$$RGDP = \phi_1 + \phi_2 INt + \phi_3 INc + \phi_4 INh + \phi_5 INF + \mu \text{-----} \quad (4)$$

$\phi_1, \phi_2, \phi_3, \phi_4$  and  $\phi_5$  - Parameters

$\mu$  - Error term (white noise)

### A' PRIORI EXPECTATION

It is expected that:  $\phi_1, \phi_2, \phi_3, \phi_4$  and  $\phi_5 > 0$

### Human resource unemployment and natural resource production model

$$UNh = \Omega_1 + \Omega_2 UNnt + \mu \text{-----} \quad (5)$$

$\Omega_1,$  and  $\Omega_2,$  - Parameters

$\mu$  - Error term (white noise)

### A' PRIORI EXPECTATION

It is expected that:  $\Omega_1 > 0$  and  $\Omega_2 < 0$

## 6.0 Diagnostic Test

The diagnostic tests which this thesis can employ are Augmented Dickey-Fuller (ADF) and Johanson cointegration test.

### Augmented Dickey-Fuller Test.

ADF test was developed first Dickey-Fuller (1976) to test for the existence of unit root in a given time series data. The basis for this test is when the assumption of non-autocorrelation between the disturbance terms is violated.

**Decision Rule:** The null hypothesis  $\delta = 0$  or  $P = 1$ , i.e. a unit root exist in Y (Y is non-stationary). The decision rule to accept the null hypothesis is that ADF statistics should be less than critical t-value at certain percent level, and hence unit root exist; but if ADF statistics is greater than the critical t-value at certain percent, then the null hypothesis is reject, hence, there is no unit root and Y is stationary.

### Johansen cointegration test

Cointegration is a diagnostic test in order to determine whether there is a long run relationship between two or more variables in a model. When time series variables are non-stationary, it is interesting to see if there is a certain common trend between those non-stationary series. If two non-stationary series  $X_t \sim I(1)$  has a linear relationship such that  $Z_t = m + \alpha X_t + \beta Y_t$  and  $Z_t \sim I(0)$ , ( $Z_t$  is stationary), then the two series  $X_t$  and  $Y_t$  are cointegrated. It is always employed when simple causality test fail to establish such relationship in the short run. Whenever the variables are found to be related in the long run, it then follows that the variables can affect each other in the long run. There are two broad approaches to test for the cointegration, Engel and Granger (1987) and Johanson (1988). Broadly speaking, cointegration test is equivalent to examine if the residuals of regression between two non-stationary series are stationary. This thesis employed a simple test of cointegration: the Johanson Test. Johanson develops maximum likelihood estimators of cointegrating vectors.

**Decision Rule:** The decision rules upon which to accept or not that there exist a long run relationship between variables is thus. The Likelihood Ratio (L.R) and the critical value at an appropriate level of significance determine whether to accept or to reject the null hypothesis. If Likelihood Ratio (L.R) is greater than the critical value, the null hypothesis is rejected; on the other hand, if Likelihood Ratio (L.R) is less than the critical value, the null hypothesis is accepted. The hypothesis indicates the number of cointegrating equation(s) and the usual levels of significance are 1 and 5 per cents.

### 7.0 Discussion of results

**Table 1 General growth regression equation**

Dependent Variable: RGDP

Method: Least Squares

Date: 05/14/13 Time: 20:27

Sample: 1986 2010

Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.775080	10.97231	0.799748	0.4343
UHR	1.234960	0.937559	1.317208	0.2043
RNP	0.007463	0.016432	0.454163	0.6551
INT	2.244257	0.523692	4.285454	0.0004
HLIN	-1.467237	0.494894	-2.964748	0.0083
COIN	0.212695	0.454915	0.467550	0.6457
FODIN	-1.302203	0.684717	-1.901812	0.0733
R-squared	0.613757	Mean dependent var		29.70800
Adjusted R-squared	0.485010	S.D. dependent var		26.44348
S.E. of regression	18.97658	Akaike info criterion		8.955784
Sum squared resid	6481.991	Schwarz criterion		9.297070
Log likelihood	-104.9473	Hannan-Quinn criter.		9.050442
F-statistic	4.767140	Durbin-Watson stat		2.060076
Prob(F-statistic)	0.004491			

### SOURCE: COMPUTER OUTPUT

Table 1 contains general regression results for the growth model. The results indicate that the constant, coefficient of human unemployment, rate of growth of natural resource production, core inflation, and food inflation are statistically insignificant while the coefficient of total inflation, headline inflation are found to be statistically significant. Precisely, the coefficient of human unemployment, rate of growth of natural resource production, core inflation, and food inflation are found to be statistically insignificant at 43.43percent level, 20.43percent, 65.51percent, 64.57percent and 7.33percent level respectively as indicated by their probability values in table 1. The coefficient of human unemployment rate, rate of growth of natural resource production, total inflation rate, core inflation are rightly signed (positive), and the coefficient of headline inflation and food inflation are wrongly signed (negative). The coefficients of total inflation and core inflation are found to be statistically significant at 1percent level as indicated by its probability value 0.0004 and 0.0083 respectively. This therefore, implies that 1percent increase in human resource unemployment will increase rate of growth by 1.235percent, 1percent increase in the rate of growth of natural resources production will increase the rate of

growth by 0.0075percent, this also implies that increase in the rate of growth of untapped natural resources may likely reduce the rate of growth, 1percent increase in total inflation will increase rate of growth by 2.2443percent, 1percent increase in headline inflation will decrease rate of growth by 1.4672percent, 1percent increase in core inflation will increase rate of growth by 0.2127percent and 1percent increase in food inflation will decrease rate of growth by 1.3022percent respectively. The coefficient of human resource unemployment, rate of production of natural resources, and core inflation though not statistically significant but is consistent with the theoretical expectation and found to be positive (i.e.  $B_1 > 0$ ). This high probability value implies that the presence of that effect that can invalidate the parameter is very high. The coefficient of food inflation is not statistically significant and not consistent with the theoretical expectation but the coefficient of total is statistically significant and consistent with theoretical expectation and headline inflation is statistically significant but a-theoretical. The F-statistics 4.767140, which is a measure of the joint significance of the explanatory variables, is found to be statistically significant at 5percent level as indicated by the corresponding probability value 0.004491. This implies that at least one of the parameter is statistically significant.

The  $R^2$  0.6138 (61.38%) implies that 61.38percent total variation in RGDP is explained by the regression equation. While, the goodness of fit of the regression remained low after adjusting for the degree of freedom as indicated by the adjusted  $R^2$  ( $R^2 = 0.485010$  or 48.50%). The Durbin-Watson statistic 2.0601 in table 1 is observed to be higher than  $R^2$  0.6138 indicating that the model is non-spurious (meaningful). The Durbin-Watson statistics 2.0601 is very high and greater than 2 indicating the absence of/or negative autocorrelation.

**TABLE 2: Idle resource growth equation**

Dependent Variable: RGDP  
 Method: Least Squares  
 Date: 05/14/13 Time: 20:44  
 Sample: 1986 2010  
 Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	40.16271	9.775644	4.108446	0.0005
UHR	-1.150963	0.879789	-1.308226	0.2043
RNP	-0.004836	0.022602	-0.213952	0.8326
R-squared	0.072191	Mean dependent var		29.70800
Adjusted R-squared	-0.012155	S.D. dependent var		26.44348
S.E. of regression	26.60370	Akaike info criterion		9.512144
Sum squared resid	15570.65	Schwarz criterion		9.658410
Log likelihood	-115.9018	Hannan-Quinn criter.		9.552712
F-statistic	0.855890	Durbin-Watson stat		2.017521
Prob(F-statistic)	0.438575			

**SOURCE: COMPUTER OUTPUT**

Table 2 contains idle resource regression results for the growth model. The results indicate that coefficient of human unemployment, and the rate of growth of natural resource production, are found to be statistically insignificant while the constant is found to be statistically significant. Precisely, the coefficient of human unemployment, rate of growth of natural resource production are found to be statistically insignificant at 20.43percent level, and 83.26percent level respectively as indicated by their probability values in table 2. The coefficient of human unemployment rate is rightly signed (negative) and consistent with theoretical expectation but not consistent with the expectation of this study, and rate of growth of natural resource production are wrongly signed (negative), hence not consistent with theoretical expectation. This therefore, implies that 1percent increase in human resource unemployment will decrease the rate of growth by 1.151percent, and 1percent increase in the rate of growth of natural resources production will reduce the rate of growth by 0.0048percent, this also implies that increase in the rate of growth of untapped natural resources may likely reduce the rate of growth. The F-statistics 0.8559, which is a measure of the joint significance of the explanatory variables, is found to be statistically insignificant at 43.86percent level as indicated by the corresponding probability value 0.4386. This implies that none of the parameter is statistically significant.



The  $R^2$  0.0722 (7.22%) implies that 7.22percent total variation in RGDP is explained by the regression equation. Coincidentally, the goodness of fit of the regression remained very low (even negative) after adjusting for the degree of freedom as indicated by the adjusted  $R^2$  ( $R^2 = -0.0122$  or -1.22%). The Durbin-Watson statistic 2.018 in table 2 is observed to be higher than  $R^2$  (0.0722) indicating that the model is non-spurious (meaningful). The Durbin-Watson statistics 2.0175 is very high and greater than 2 indicating the absence of/or negative autocorrelation.

**TABLE 3: WELFARE LESS GROWTH EQUATION**

Dependent Variable: RGDP

Method: Least Squares

Date: 05/14/13 Time: 20:46

Sample: 1986 2010

Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.33368	8.785990	1.972877	0.0625
INT	2.053243	0.500734	4.100465	0.0006
HLIN	-1.355984	0.484967	-2.796033	0.0112
COIN	0.336057	0.435671	0.771354	0.4495
FODIN	-0.774160	0.553783	-1.397948	0.1774
R-squared	0.575641	Mean dependent var		29.70800
Adjusted R-squared	0.490769	S.D. dependent var		26.44348
S.E. of regression	18.87018	Akaike info criterion		8.889899
Sum squared resid	7121.673	Schwarz criterion		9.133674
Log likelihood	-106.1237	Hannan-Quinn criter.		8.957512
F-statistic	6.782469	Durbin-Watson stat		2.177231
Prob(F-statistic)	0.001280			

**SOURCE: COMPUTER OUTPUT**

Table 3 contains welfare less regression results for the growth model. The results indicate that coefficient of core inflation and food inflation is found to be statistically insignificant, while the coefficient of total inflation and head line inflation is found to be statistically significant. Precisely, the coefficient of core inflation and food inflation are found to be statistically insignificant at 44.95percent level and 17.74percent level respectively as indicated by their probability values in table 3. While the coefficient of total inflation and head line inflation is found to be statistically significant at 1percent and 5percent level respectively as also indicated by their probability values in table 4.5.3. The coefficient of total inflation and core inflation are rightly signed (positive) and consistent with theoretical expectation. The coefficient headline inflation and food inflation rate are wrongly signed (negative), hence not consistent with theoretical expectation. This result implies that 1percent increase in total inflation, headline inflation, core inflation and food inflation may likely increase rate of growth by 2.05percent, reduce rate of growth by 1.356percent, increase rate of growth by 0.338percent and decrease rate of growth by 0.774percent respectively. The F-statistics 6.7825, which is a measure of the joint significance of the explanatory variables, is found to be statistically significant at 1percent level as indicated by the corresponding probability value 0.0013. This implies that all the parameters of the model are statistically significant.

The  $R^2$  0.5756 (57.56%) implies that 57.56percent total variation in RGDP is explained by the regression equation. The goodness of fit of the regression is low after adjusting for the degree of freedom as indicated by the adjusted  $R^2$  ( $R^2 = 0.4908$  or 49.08%). The Durbin-Watson statistic 2.18 in table 4.5.3 is observed to be higher than  $R^2$  (0.5756) indicating that the model is non-spurious (meaningful). The Durbin-Watson statistics 2.18 is very high and greater than 2 indicating the absence of/or negative autocorrelation.

**4.Human resource unemployment and natural resource production regression equation**

Dependent Variable: UHR

Method: Least Squares

Date: 05/14/13 Time: 17:47

Sample: 1986 2010

Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.052750	1.343418	6.738597	0.0000
RNP	-0.003850	0.005296	-0.727025	0.4745
R-squared	0.022465	Mean dependent var		8.716000
Adjusted R-squared	-0.020037	S.D. dependent var		6.242975
S.E. of regression	6.305209	Akaike info criterion		6.597248
Sum squared resid	914.3801	Schwarz criterion		6.694758
Log likelihood	-80.46560	Hannan-Quinn criter.		6.624293
F-statistic	0.528565	Durbin-Watson stat		0.380763
Prob(F-statistic)	0.474546			

#### SOURCE: COMPUTER OUTPUT

Table 4 contains the human resource unemployment and the rate of growth of natural resource production regression results. The results indicated that coefficient of rate of growth of natural resource production is found to be statistically insignificant while the constant is found to be statistically significant. Precisely, the coefficient of rate of growth of natural resource production is found to be statistically insignificant at 47.45percent level, as indicated by the probability value in table 4. The coefficient of rate of growth of natural resource production is rightly signed (negative) and consistent with theoretical expectation. This therefore, implies that 1percent increase in the rate of natural resource production will decrease the unemployment of human resources by 0.0039percent; this also implies that increase in the rate of growth of untapped natural resources may likely increase the unemployment of human resources. The F-statistics 0.5286, which is a measure of the joint significance of the explanatory variables, is found to be statistically insignificant at 47.46percent level as indicated by the corresponding probability value 0.4746. This implies that none of the parameters of the model is statistically significant.

The  $R^2$  0.022 5(2.25%) implies that 2.25percent total variation in RGDP is explained by the regression equation. Coincidentally, the goodness of fit of the regression remained very low (even negative) after adjusting for the degree of freedom as indicated by the adjusted  $R^2$  ( $R^2 = -0.020037$  or  $-2.0037\%$ ). The Durbin-Watson statistic 0.3808 in table 4 is observed to be higher than  $R^2$  (0.025) indicating that the model is non-spurious (meaningful). The Durbin-Watson statistics 0.3808 is very low and less than 2 indicating the presence of/or positive autocorrelation. This therefore, provides the basis for conducting the unit root test.

#### Table 5 Correlation coefficients Results

	RGDP	UHR	RNP	INT	INH	INC	INF
RGDP	1.00000000						
UHR	-0.265067272	1.000000000					
RNP	-0.00371214	-0.149882743	1.000000000				
INT	0.629248956	-0.480709474	-0.0126462	1.000000000			
INH	0.436295898	-0.431841608	-0.0017393	0.92069734	1.000000000		
INC	-0.223730558	0.472249333	-0.1234559	-0.394342	-0.3284715	1.000000000	
INF	-0.323546725	0.653362683	-0.0032582	-0.3580497	-0.4013428	0.33968201	1.000000000

#### Source: Computer Output

Table 5 contains the correlation coefficients which show the extent or degree of relationship between the variables of the model. The simple correlation between rate of GDP growth and unemployment of human resources, rate of natural resource production, core inflation and food inflation is negative; but positively correlated with total inflation and headline inflation. The simple correlation between unemployment of human resources and rate of natural resource production is negative, which implies that as rate of natural resource production increases, unemployment of human resources decrease which confirmed the regression result of table 5. This result is invariably saying as unemployment of natural resources increases, unemployment of human resources may likely increase (i.e. unemployment of natural resources may trigger the unemployment of human resources). The correlation results further revealed that, the correlation between rates of natural resource production and total inflation, headline inflation, core inflation and food inflation is negative, implying that as

the rates of natural resource production increases, both total, headline, core and food inflation may likely fall. This further implies that when unemployment of natural resource increases, total, headline, core as well as food inflation may increase.

**TABLE 6: UNIT ROOT TEST FOR RATE OF GROWTH OF GDP**

Null Hypothesis: RGDP has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.350603	0.0024
Test critical values:		
1% level	-3.737853	
5% level	-2.991878	
10% level	-2.635542	

\*MacKinnon (1996) one-sided p-values.

**SOURCE: COMPUTER OUTPUT**

**TABLE 7: Unit root test for unemployment of human resources**

Null Hypothesis: D(UHR) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.930789	0.0001
Test critical values:		
1% level	-3.752946	
5% level	-2.998064	
10% level	-2.638752	

\*MacKinnon (1996) one-sided p-values.

**SOURCE: COMPUTER OUTPUT**

**TABLE 8: Unit root test for the rate of growth natural resource production**

Null Hypothesis: D(RNP) has a unit root

Exogenous: Constant

Lag Length: 3 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.206947	0.0000
Test critical values:		
1% level	-3.808546	
5% level	-3.020686	
10% level	-2.650413	

\*MacKinnon (1996) one-sided p-values.

**SOURCE: COMPUTER OUTPUT**

**TABLE 9: Unit root test for total inflation rate**

Null Hypothesis: D(INT) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.239588	0.0033
Test critical values:		
1% level	-3.752946	
5% level	-2.998064	
10% level	-2.638752	

\*MacKinnon (1996) one-sided p-values.

**SOURCE: COMPUTER OUTPUT**

**TABLE 10: Unit root test for headline inflation rate**

Null Hypothesis: D(HLIN) has a unit root  
 Exogenous: Constant  
 Lag Length: 3 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.035301	0.0062
Test critical values:		
1% level	-3.808546	
5% level	-3.020686	
10% level	-2.650413	

\*MacKinnon (1996) one-sided p-values.

**SOURCE: COMPUTER OUTPUT**

**TABLE 11: Unit root test for core inflation rate**

Null Hypothesis: COIN has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.267759	0.0030
Test critical values:		
1% level	-3.737853	
5% level	-2.991878	
10% level	-2.635542	

\*MacKinnon (1996) one-sided p-values.

**SOURCE: COMPUTER OUTPUT**

**TABLE 12: Unit root test for food inflation rate**

Null Hypothesis: D(FODIN) has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.363212	0.0003
Test critical values:		
1% level	-3.788030	
5% level	-3.012363	
10% level	-2.646119	

\*MacKinnon (1996) one-sided p-values.

**SOURCE: COMPUTER OUTPUT**

### Discussion of unit root test results

The results of unit root test are contained in table 6, 7, 8,9,10, 11, and 12. The results revealed that all the variables of the model are found to be stationary at, 1percent, 5percent, and 10percent. Rate of growth of GDP and core inflation rates are found to be stationary at level (d(0)), while unemployment of human resources, rate of natural resource production, total inflation, headline inflation, and food inflation rates are both found to be stationary at first difference (d(1)), which is indicated by ADF results at all levels less than the critical values in negative direction. Precisely, the unemployment of natural resources, the rate of natural resource production, total inflation rate, headline inflation, core inflation and food inflation are all found to be stationary at 1percent level as indicated by their probability values of 0.0024, 0.0001, 0.0000, 0.0062, 0.0030 and 0.0003 respectively.

### DISCUSSION OF COINTEGRATION RESULTS

The Johansen cointegration test results contain in table 1in appendix confirm the existence of long-run relationship between RGDP, unemployment, and inflation as indicated by the TRACE-Statistic. The TRACE-statistics results revealed that there is 2 cointegrating equation at 5 percent level. Overall, these results are in agreement with similar study on Nigeria conducted by Aminu and Anono (2012) on the long run relationship between unemployment, and inflation in Nigeria.

### 8.0 Findings of the study

The findings of this study are that both unemployment human resources, rate of natural resource production (i.e. rate of tapped resources), total inflation and core inflation has impacted positively on the rate of economic growth in Nigeria; but headline inflation and food inflation has impacted negatively on the rate of growth of the Nigerian economy for the period under review. The results of unit root revealed that all the variables of the model are found to be stationary at 1percent, 5percent, and 10percent. Rate of growth of GDP is found to be stationary at level (d(0)) while unemployment human resources and total inflation are both found to be stationary at first difference (d(1)), which is indicated by ADF results at all levels less than the critical values in negative direction. The Johansen cointegration test results confirm the existence of long-run relationship between RGGDP, unemployment, and inflation as indicated by the TRACE-Statistic. The TRACE-statistics results revealed that there is 2 cointegrating equation at 5 percent level.

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## APPENDIX

Sample (adjusted): 1988 2010  
Included observations: 23 after adjustments  
Trend assumption: Linear deterministic trend  
Series: RGGDP UNEMPLO INFLA  
Lags interval (in first differences): 1 to 1

### Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.570024	36.58859	29.79707	0.0071
At most 1 *	0.526001	17.17597	15.49471	0.0277
At most 2	0.000230	0.005298	3.841466	0.9413

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

### Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.570024	19.41261	21.13162	0.0855
At most 1 *	0.526001	17.17068	14.26460	0.0169
At most 2	0.000230	0.005298	3.841466	0.9413

Max-eigenvalue test indicates no cointegration at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values