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DYNAMIC EFFECT OF POPULATION GROWTH ON UNEMPLOYMENT RATE IN NIGERIA

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ABSTRACT

The paper examined the dynamic effect of population growth on unemployment rate in Nigeria. The paper is of the highest import as it discourses one of the strategic phases of the Nigerian economy and also bearing in mind that the country has been subjected to a slow growth rate and alarming unemployment rate. A dynamic ordinary least square (DOLS) was used to analyze the link between population growth and unemployment rate. Meanwhile, both the Augmented Dickey-Fuller unit root test and Johansen cointegration preceded the DOLS test in order to ascertain both the stationarity and long run equilibrium relationship of the variables. The empirical results showed that the variable was stationary at $I(0)$ and $I(1)$ and have long run equilibrium relationship. It was hypothesized from the DOLS result that the coefficient of determination is 61%, thus, the model is a good fit. Also, a direct relationship exists between population growth and unemployment rate. While an indirect relationship exists between per capital income and unemployment rate. Based on these findings, the study recommended amongst others that there should be population control in such a way that the population matches the available resources. Also, government should use the available resources with a well-coordinated fiscal and monetary policies in a manner to engage the teeming population that will make them be efficient in productivity which in the long run will trigger growth of the Nigerian economy as a result of reduction in unemployment.

1.0 INTRODUCTION

The unemployment rate is a key determinant of growth and development of a nation. Thus, unemployment can be explained as the number of people who are willing, able and capable to work at the prevailing wage rate but do not have a paid job (Gbosi, 2015). Unemployment is mostly used as a tool to measure the health of the economy. Unemployment means that an economy is not utilizing its human resources efficiently, and it is the largest single cause of poverty worldwide (Gbosi, 2007). A rising level of unemployment could be brought about by population growth in an economy. This is because as birth rate increase without fundamental measures to checkmate it, the population of a given nation also increase. Thus, population according to Smith (2015) is the number of individuals living in a country at any given time. In lieu of the above, there is a direct link between population

growth and unemployment rate. This is because increase in population without corresponding job creation, will increase the rate of unemployment and unemployed people are the most likely to be living in poverty and the least likely to get new jobs. But paid employment provides an income that is sufficient to lift households out of poverty as unemployed households have a higher risk of being poor and corrupt (Okowa, 1997).

Meanwhile, the world's population has clocked 7.7 billion people today and is estimated to be growing at an annual rate of about 1.8% which exceed the growth rate of 1.10% in 2016, 1.12% in 2017 and 1.14% in 2018 (United Nation, 2018). Nigeria is currently ranked the 7th most populous country in the world and the most populous in Africa with a population of about 200,963,599 people and is estimated to be growing at an annual rate of 2.6%. Nigeria has 2.61 % of the world's total population (World Bank, 2018). Little wonder did a UN report projected that by 2050, Nigeria will become the world's third-largest country by population and one of the six nations with a population of over 300 million.

It is clear that Nigeria population is growing at a very fast pace and there is no proper population policy in place to check the trend as well as corresponding per capita income. It is alarming to know that despite the growing population, Nigeria per capita income is less than 5 US dollar per day. Population explosion leads to unemployment, poverty, poor human capital development, environmental degradation, violence and crimes. All these vices are present in the present-day Nigeria even at an alarming rate. According to the honourable minister of Labour and Employment (Chris Ngige), Nigeria has an unemployment rate of 23.1% in the year 2018 and is estimated to hit 33.5% by 2020 (Vanguard News, 2018)

The Brookings Institution in its report on Nigeria in 2018 reported that Nigeria has overtaken India as the world's poverty capital (Vanguard News, 2018). The report has it that the number of Nigerians leaving in extreme poverty measured by per capita income (below \$1.9 a day) increases by six persons every minute while that of India continues to fall. Poverty is a direct function of unemployment. When people are unemployed they do not earn income and the life in misery.

According to CBN (2018), youth unemployment in Nigeria today stands at 55.1%. Consequently, criminal activities and insecurity are on the rise in Nigeria as a result of the unemployment problem. Crime and insecurity create further unemployment problems in the economy because a business does not thrive well in a society with high crime rate and serious security challenges. In Nigeria today there is insurgency in the North East, banditry in the North West, militancy kidnapping in the South. There is internet scam popularly known as "yahoo yahoo" rampaging the country.

The population explosion witnessed in Nigeria since independence is one that has outgrown all the life-sustaining resources and the economy is not able to keep pace with the growth in population. For instance, in 1969, Nigeria had a population of about 45, 138, 458 and 59 years later the population has grown to about 200,969,599 people and this rise in the population has been accompanied by rising unemployment and its attendant consequences. For these reasons, it is expedient to investigate the dynamic effect of population growth on unemployment in Nigeria from 1970 to 2018. The paper is guided by two objectives which are; to examine the effect of population growth on unemployment in Nigeria; examine the effect of per capita income on unemployment in Nigeria.

2.0 LITERATURE REVIEW

2.1 The Concept of Population and Unemployment.

Generally, the population is the sum total of people living in a certain topographical region in a precise period of time. In statistics and economics, population is the total group from which a statistical sample is drawn. In another word, a population may refer to a whole assembly of persons, objects, or

measurements. A population can thus be said to be a summative reflection of subjects congregated together by a collective feature. Scholars argue that population growth has been problematical to the economy as more people without doubt use more of the available limited resources, thereby reducing long-term potential growth ([Linden, 2017](#)). Similarly, population growth affects the age structure of a country's population, global migration, economic inequity, and the size of a country's workforce. These factors both affect and are affected by overall economic growth.

Meanwhile, World Bank defines the unemployed as the records of the economically dynamic inhabitants who are devoid of work but are available for and seeking for work, including those who have lost their jobs and who have voluntarily left work. To the International Labour Organization (ILO), unemployment is simply seen as the share of labour force without work but are available for and seeking employment (ILO, 2010). Similarly, Gbosi (2015) averred that unemployment is a situation whereby those who are willing and able to work cannot find jobs at the prevailing wage rate. In other words, it is a situation whereby some people who fall within the ages of the working population, capable and willing to work, are unable to obtain befitting work to do. In the words of Tamuno and Kalu (2009), the unemployment rate as the proportion of the labour force (or working population) which is not employed at any given period of time. There are *financial, mental and physical under-employment*. It is financial when the workers are not getting equal pay from the work they are doing, but mental when there is mismatch between the work and qualification; and physical when the workers are not well-utilized. The problem of unemployment is one of the worst problems of the less developed countries.

2.2 Theoretical Literature

Keynesian Theory of Unemployment

Keynes (1939) credited the bane of unemployment to inadequate total demand. In the Keynesian model, total employment depends on total demand in the entire economy. If total spending is low, then, employers will not be willing to produce a large quantity of good in order to avoid unsold commodities. Therefore, few workforce is a function of low production. If a few workers are hired, then the aggregate income will be low, and this can become a vicious cycle. It can be inferred that Keynes' focus was on the level of aggregate demand in the economy, and business expectations about future profitability. Keynes believed that even if wages did fall quickly in a number of labour markets, this might do more harm than good. Workers who have lower wages will have less to spend. If they do not buy as much, this reduces demand for the goods being produced by businesses in the economy. If businesses cannot sell their goods, they will tend to cut back on their investments as well as the number of employed workforce. Prices, as well as wages, may fall as observed during the Great Depression, keeping real wages constant and thus providing employers no incentive of unemployment, low incomes and low spending in the economy as a whole.

Malthusian Theory of Population

Thomas Robbert Malthus studied philosophy, mathematics and theology at Cambridge and entered the church in 1791. Malthus' contributions came at a time when the high level of agricultural affluence experienced in England start to decline, resulting in a dearth of food and increasing price level. As a result of prevalent famine in bordering Ireland due to reappearance of bad crop. The harsh-consequences of the industrial revolution were being noticed in form of riots, unemployment, disease and prevalence of poverty. Malthus, therefore, believed that the economic system, as it was needed some corrective actions. On the one hand there was imbalance between the population and the means of subsistence, as well as the need to remedy the shortage of effective demand.

Malthus' economic thought was centred on the idea that "there is something like the law of nature which forces the population to increase at a rate faster than the increase in food supply" and that if population growth is not checked through preventive checks nature will curb it through positive checks, otherwise population will outstrip food supply. According to Malthus "An increase of population cannot take place without proportionate increase of wealth". Population growth increases wealth only if it increases effective demand. Therefore, if wages are increased beyond existence it will lead to increased population through higher rate of procreation. This is because to earn more income labourers will want to increase their family's workforce through procreation. Thus, increase in population is only associated with poor families. The increase in population results in excess supply of labour which in turn forces wages back to subsistence level. Hence, the increase in wages (income of the working class) will only help in increasing the population and the level of poverty.

2.3 Empirical Literature

Review of existing literature shows that there are no many scholarships that specifically examine the dynamic effect of population growth on unemployment in Nigeria. Thus, the empirical review which focuses on evidence of related existing kinds of literature around the globe were reviewed. Maijama, Musa, Yakubu and Muhammed (2020) used dynamic OLS to examine the impact of population growth on unemployment in Nigeria from 1991 to 2017. The stationaty and long run tests revealed that all the variables were stationary and co-integrated. The Dynamic Ordinary Least Squares (DOLS) results disclosed that population and exchange rate have direct impact on unemployment. But other instrumental variables such as consumer price index, GDP per capita and FDI have indirect impact on unemployment in the long-run. Also, Orumie (2016) used multiple regression to examine the effect of unemployment rate and population growth on gross domestic product in Nigeria. The results showed that rate of unemployment and population has been on the increase amidst declining gross domestic product. The result also revealed that unemployment and population growth contribute commensurable to gross domestic product.

Bhally, Muhammad and Tahir (2013) used ARDL to analyze the determinants of unemployment in Pakistan from 1976 to 2012 using secondary data on unemployment, population, FDI, GDP, inflation and external debt. The short and long-run results revealed that GDP, population, inflation and FDI are significant determinants of unemployment in Pakistan. Laku and Deda (2013) researched on unemployment and population in Kosovo. While presenting Kosovo labour policies and employment, they revealed that urban and rural unemployment is increasing; at an alarming rate and it poses threat to the younger generation as well as barrier to development. Also, population is increasing unemployment.

Imiosi, Amba and Okon (2017) investigated the impact of unemployment on economic growth in Nigeria using ordinary least squares multiple regression to analyze annual data on the gross domestic product, unemployment rate, minimum wage, labour force and population for the period of 1980 to 2016. The result revealed that unemployment, population and labour force have significant impact on the country's economic growth, while minimum wage rate does not have a significant impact on the country's economic growth. Also, Adekola, Allen, Olawole-Isaac, Akanbi and Adewumi (2016) investigated the challenges of demographic change and unemployment in Nigeria. A comparative analysis of the population and unemployment structure of three positively selected and heavily populated countries in the three different Continents-Nigeria, China and USA were undertaken. The results revealed that population growth is not the sole factor responsible for unemployment, but the reverse is the case for Nigeria as both population and unemployment is growing.

Imiosi, Olatunji and Ubi-Abai (2013) studied population and the problem of unemployment in LDCs with Nigeria in focus. The economies of the LDCs are described by high population growth. They are facing great challenge in generating adequate job opportunities for their teeming population. The factors responsible for the increase in the level of unemployment in Nigeria include: rural-urban migration, wrong government policies, urban bias, lack of population control, lack of mental skill and practicability, corruption and Inspired Entrepreneur drive. Ademola and Badiru (2016) investigate and determine the effects of unemployment and inflation on economic performance in Nigeria using secondary data on real gross domestic product, unemployment and inflation rate for period spanning 1981 to 2014. Co-integration relationship was established among the variables using Johansen Juselius test for co-integration and the OLS result shows that unemployment and inflation rate are positively related to economic growth. Thus, government should encourage local production and consumption to encourage domestic industries in order to reduce unemployment.

2.4 Implications of a Fast-Growing Population on Nigeria

i. Increases in the dependency ratio: A high population increases the dependency ratio in a country, therefore increasing the burden of the employed individuals. A fast-growing population means that there will be more children and old people to take care of which increases the number of people that depend on the working-class population. This further creates social and economic liability on the working-class population (Odusina, 2006).

ii. High population causes a rise in the aggregate demand: If an increase in demand is not equivalent to a rise in production, it will lead to an increase in the cost of living. This will then cause competition among people in the country as people will struggle over few goods (Evans, 2011). This further stimulates a rise in prices of goods and services which results in a high cost of living.

iii. A high population leads to a low income per head and causes a low per capita income. This lowers the general standard of living and consumption of goods and services. It also increases the consumption of inferior goods. This situation also forces people to live in slumps which are not conducive and healthy for individuals. As a result, it increases the outbreak of diseases, epidemics and other contagious diseases. This condition is seen rapidly in places like Lagos and some northern states in Nigeria due to the congestion and overpopulation (Nwosu, 2014).

3.0 METHODOLOGY

The study adopted the ex-post facto research design as data for the study were fully established data. All the variables for this study were extracted from World development indicators and CBN statistical bulletin for the period of 1970 to 2018 and were also converted into growth rate. The paper used the Dynamic Ordinary least Squares (DOLS) proposed by Stock and Watson (1993) to analyze the data. The DOLS is more advantageous than OLS because it has the ability to; eliminate endogeneity problem and simultaneity bias; it is robust to autocorrelation problem. It is also appropriate to estimating variables that are stationary at I(0) and I(1) or combination of the two since the dependent variable is integrated at I(1). In addition, both the descriptive statistics and the Augmented Dickey-Fuller unit root test preceded the DOLS test in order to ascertain both the characteristics and stationarity of the variables in order to fit them for regression analysis. Meanwhile, Unemployment data was measured as the percentage of total labour force, Population is measured as the total population, Per capita is measured in current US\$.

Model Specification

The specified model adapted the multiple regression model proposed by Maijama, Musa, Yakubu and Mohammed (2020) by extending the time frame and used two independent variables that are has the

direct effect on unemployment instead of five. The Maijam et al (2020) defined Unemployment as a function of Total population, Consumer price index, GDP per capita, GDP and FDI. In line with Keynesian theory, the paper specified the DOLS model as follows:

$$UER = f(PGR, CGR)$$

(1)

$$UER = \lambda_0 + \lambda_1 PGR_t + \lambda_2 CGR_t + \sum_{i=1}^n \Delta \lambda_1 PGR_{t-1} - 1 + \sum_{i=1}^n \Delta \lambda_2 CGR_t + \mu_t \quad (2)$$

Where; UER is the unemployment rate, PGR is Population growth, CGR is per capita income, u is Error Term, λ_1 and λ_2 are Slope Parameters, λ_0 is Intercept Parameter and \sum is summation

4.0 RESULTS AND DISCUSSION

Table 1: Descriptive Statistics of the Time Series

Measurement	UER	PGR	CGR
Mean	7.404082	2.993878	7.467347
Std. Dev.	4.985394	0.373278	8.870513
Skewness	0.753921	0.009654	1.595809
Kurtosis	2.333196	1.360495	9.036401
Jarque-Bera	5.549686	5.488714	95.19183
Probability	0.062359	0.064290	0.000000
Observations	49	49	49

Source: Authors Computation from E-view 9 Statistical Package

The descriptive statistics in Table 1 showed that the approximate average growth rate of population (POP) unemployment (UER) and per capita income (CGR) are 7.7, 3.0 and 7.5percents respectively. The standard deviation of population unemployment and per capita income is approximately; 5.0, 0.4 and 8.9 respectively. Thus, the standard deviation of variables was within their mean except per capita income. The skewness results showed the variables were positively sloped. All the variables were normally distributed except per capita income as indicated by the p-value of Jarque-Bera statistic at 5%. Given the scenario above, there variables were not completely stable and normally distributed to give a best-fit regression line. Thus, the need for stationarity test to stabilize the data.

Table 2. Result of Augmented Dickey Fuller Unit Root Test at Level and First Difference

Variable s	ADF @ Level	5% Critical Value	Decision	ADF @ 1 st Diff	5% Critical Value	Decision
UER	-2.5514	-2.9237	Not stationary	-8.5724	-2.9251	Stationary I(1)
PGR	-1.4878	-2.9237	Not stationary	-6.1975	-2.9251	Stationary I(1)
CGR	-6.0727	-2.9237	Stationary			Stationary I(0)

Source: Author's Computation from E- view 9

The unit root test for stationarity of each of the series via the ADF test as presented in Table 2 showed that only the independent variable (per capita income) was stationary at a level I(0). Thus, the remaining two variables (population growth and unemployment rate) were differenced once to attain

stationary at first difference prior to estimation of the DOLS test to prevent false regressions results.

Table 3: Johansen Test for Cointegration

Eigen value K=4, r=1	Trace Statistics	5% critical value	Prob. **	Hypothesis of CE(s)
0.456277	31.13763	29.79707	0.0348	None *
0.087154	4.327794	15.49471	0.8754	At most 1
0.007145	0.315521	3.841466	0.5743	At most 2

Note: r=number of co-integrating vectors and k = number of lags in the model. * rejection of the H0

Source: An Extract from (E- view 9)

The results of the Johansen test of co-integration showed via the Trace statistics revealed the existence of one co-integrating equation in the model. This is because the computed values of the Trace test statistics was greater than their corresponding critical values at 5% level. Thus, the null hypothesis (H0) of no co-integration among the variables was rejected. Based on this result, the study concludes that there is a long run equilibrium relationship amongst the variables in the model.

Table 4: Analysis of DOLS Result

Dependent Variable: Unemployment (UER)			
Variables	Coefficients	t-statistics	Probability
C	-10.2319	-0.7531	0.4606
PGR	6.8129	1.4616	0.1602
CGR	-0.3687	-0.4320	0.6706
R-Squared	0.6071	F-statistics	17.5568
		Prob(F-statistic)	0.0000

Source: Authors' Computation from E- view 9

From the DOLS regression result above, the variable population growth (PGR) is positively signed and statistically not significant with the unemployment rate (UER) in Nigeria. Thus, there is a direct link between increase in population and unemployment rate as a percentage rise in population growth rate will lead to an increase in the level of unemployment by 6.8%. The finding is in line with the empirical finding of Maijama et al (2020) as well as Bhalli et al (2013). Given the Nigeria scenario, the major reasons for the rise in population include increase in birth rate, socio-cultural and religious beliefs as well as a little improvement in welfare and medical facilities. Meanwhile, the variable per capital income (CGR) is negatively signed but statistically not significant with unemployment rate in Nigeria. Thus, any percentage increase in per capital income will bring about corresponding decrease in unemployment rate by approximately 0.4%. This result conforms to economic theory which posited negative relationship. The finding is in line with the empirical finding of Maijama et al (2020).

The coefficient of determination, R^2 at (0.6071), showed that approximately, 61% variation in the unemployment rate was explained by the explanatory variables in the model, while the remaining 39% was explained by other factors not captured in the model. The F-test which is used to determine the joint significance of the explanatory variables in the model showed that the P-value of F-statistics (0.0000) is less than critical p-value at 0.05 level of significance. Thus, the model is considered to be good and adequate for forecasting and policy analysis.

The Wald test measures the significance of the explanatory variables in explaining the dependent variable in an estimated model. Thus, for the explanatory variables to be significant in explaining the dependent variable, the p-value of the F-statistics must be less than 0.05 critical p-value. Given the

result in Table 5, the two explanatory variables are significant in explaining the estimated mode since the p-value of 0.0000 of the f-statistics value of 17.5568 is less than the critical p-value of 0.05.

Table 5: The Wald Test

Test Statistic	Value	df	Probability
F-statistic	17.55688	(3, 19)	0.0000
Chi-square	52.67063	3	0.0000

Source: Authors' Computation from E- view 9

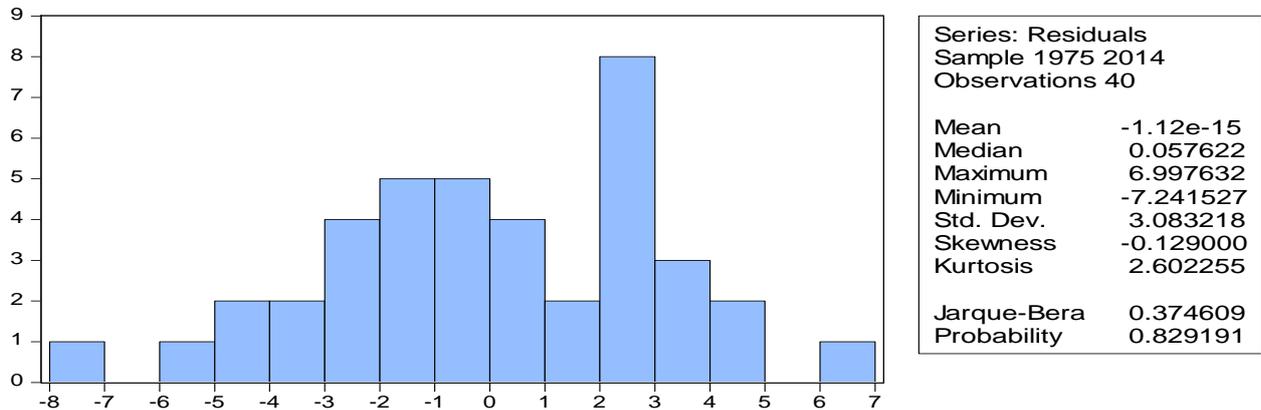


Figure 1: Normality Test Result

The normality test as shown in Figure 1 showed that the error terms are normally distributed. This is because the probability values of the Jerque-Bera statistic (J-B stat) which is 0.82919 is greater than 0.05 critical value. Thus, it was concluded that the sample data fit a standard normal distribution.

From the analyses in both Table 5 and Figure 1, the result of the post estimation tests are welcoming as they meet the statistical criteria and authenticate the reliability of the estimated model for policy formulation and recommendation.

5.0 CONCLUSION

The empirical analysis was carried out in testing the dynamic effect of population growth on unemployment rate in Nigeria from 1970-20218 using the DOLS analytical method. The empirical result established that unemployment and population growth rate have positive relationship in Nigeria. But per capita income has negative effect on unemployment rate in Nigeria. The underlying principle for such a result is rooted in the Keynesian theory of unemployment as well as some scholarship which is applicable to the Nigerian economy. The outcome of this result is in harmony with and strongly upheld the Keynesian's view that an improve government fiscal and monetary stimulus such as per capital income reduces unemployment rate. In like manner, the finding from the paper validates the theoretical claim of Robert Malthus that increase in population is a function of macroeconomic aggregates such as unemployment. Based on the findings, the paper recommended that; there should be population control in such a way that the population matches the available resources. Also, since it is evidence that increase in population will not reduce unemployment rate, government should use the available resources with a well-coordinated fiscal and monetary policies in a manner to engage the teeming population that will make them to be efficient in productivity which in the long run will trigger growth of the Nigerian economy as a result of reduction in unemployment.

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