

# EMPIRICAL ANALYSIS OF THE CAUSAL LINKAGE AMONG POPULATION GROWTH, URBANIZATION AND ECONOMIC GROWTH IN NIGERIA

(1961-2013)

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## **Abstract**

*This study is an empirical investigation of the causal relationship among population growth, urbanization and economic growth in Nigeria from 1961 to 2013. The main objective is to determine the causal linkage that exists among population growth, urbanization and economic growth in Nigeria for the same period. Secondary annual data obtained from the World Development Indicators data of the World Bank (2014) was used. The data were analyzed using granger causality test adopted as the tool for data analysis. The results reveal that there is a unidirectional causality running from economic growth (GDPG) to population growth (POP) in Nigeria but there is no causal relationship between urbanization (URB) and economic growth (GDPG). This connotes in a nutshell that the only causal linkage found was the one running from economic growth to population growth during the period studied among the variables analyzed (economic growth, population growth and Urbanization rate). Hence, the study recommends among others that population control policy of Nigeria, urban planning laws and regulations as well as National Economic Empowerment and Development Strategies (NEEDS) should be implemented strictly to achieve the goals for which they were set to achieve.*

**Key Words:** Causality, Economic Growth, Urbanization, Population, Population Growth.

## **1.0 Introduction**

The world population as at 2013 stood at 6.7 billion which is roughly 7 billion (United Nations, 2013). The more developed regions as defined by the UN as "all regions of Europe plus Northern America, Australia/New Zealand and Japan" accounted for 19.5% of this world population. The less developed regions which the UN (2013) defined as "all regions of Africa, Asia (excluding Japan), Latin America and the Caribbean plus Melanesia, Micronesia, and Polynesia", accounted for 80.5% of the world population. Africa accounted for 13.2%, Asia 60.7%, Europe 11.8%, Latin America and the Caribbean 8.6%, North America 5.2% and lastly Oceania 0.5% of the world population (UN, 2013).

Jack (2006) opined that almost 3 billion people live in urban areas across the world – equivalent to 48% of the world's total population. Overman and Venables (2005:1) as reported by Jack (2006) opined that urbanization rates are strongly correlated with per capita income, productivity tends to be high in cities, and urban job creation is an important driver of economic growth. The performance of the urban sector bears on overall economic growth. Jack went further to state that in general, the more rapid a country's economic growth, the faster it urbanizes – urbanization both reflects and contributes to economic growth and economic development patterns.

Population growth and its relation to economic growth has been a matter of debate for over a century. The early Malthusian view was that population growth is likely to impede economic growth because it will put pressure on the available resources, result in reduction in per capita income and resources; this, in turn, will result in deterioration in quality of life. Contrary to the Malthusian predictions, several of the East Asian countries have been able to achieve economic prosperity and improvement in quality of life in spite of population growth. This has been attributed to the increase in productivity due to development and utilization of innovative technologies by the young educated population who formed the majority of the growing population. These countries have been able to exploit the dynamics of demographic transition to achieve economic growth by using the human resources as the engine driving the economic development; improved employment with adequate emoluments has promoted saving and investment which in turn stimulated economic growth (Pritchett, 1996).

More so, population growth and production were positively correlated two thousand years ago as more people meant greater productivity and security (Latimer and Kulkarni, 2008). They went further to say that population booms were positive indicators of the potential for long term economic growth, and currently, global fertility rates far outweigh mortality rates, forcing the world to confront serious population growth issues.

Although there are studies such as Otto (2008), Afzal (2009), Shabu (2010) and Adewale (2012) on the relationship between population growth, urbanization and economic growth, most of the researches in this field are short-run analysis that employed little or no econometric models in their works and are not very current. To fill this gap, this research will use correlation matrix test, unit root test, co-integration tests, Vector Error Correction Mechanism test vis-à-vis granger Causality tests as tools for data analysis and would cover the period spanning 1961 to 2013. This will make it current and robust. Additionally, since most of these researches dwelled on the impact of population growth on economic growth or the impact of urbanization on economic growth, this paper centers on the causal linkage that exists among population growth, urbanization and economic growth in Nigeria from 1961 -2013 as the case may be.

Following this introduction, the rest of the paper is organized as follows; section two dwells on literature review and theoretical framework, section three dwells on methodology, section four dwells on results and discussion, whereas section five focuses on conclusion and policy recommendations.

## **Literature Review**

### **Concept of Population**

A population is the summation or total number of persons inhabiting a country, city or any district or area at a particular period of time ((Todaro and Smith, 2006). Human population growth is around 75 million annually, or 1.1% per year. An increase in the number of people that reside in a country, state, or city is defined as population growth (Horizon, 2009).

### **Concept of Population Growth**

Population growth rate is quantitatively measured as the percentage yearly net relative increase (or decrease, in which case it is negative) in population size due to natural Increase and net international migration (Todaro and Smith, 2006).

Human population growth is perhaps the most significant cause of the complex problems the world faces; climate change, poverty and resource scarcity (Horizon, 2009).

### **Factors Influencing Population Growth**

Fertility, which demographers express as the total fertility rate, the number of births that can be expected to occur to a typical woman in a given society during her childbearing years. Fertility is a function of a woman's fecundity (her physiological ability to conceive and bear children and of social, cultural, economic, and health factors that influence reproductive choices in the country in question. The most important non-physical factors influencing a country's total fertility rate include relationship status (the fraction of women who are married or in a relationship that exposes them to the possibility of becoming pregnant); use of contraception; the fraction of women who are in fecund -for example, because they are breastfeeding a child; and the prevalence of induced abortion (Horizon, 2009).

Mortality is the second major variable that shapes population trends. A population's age structure is an important factor influencing its death rate. Death rates are highest among infants, young children, and the elderly, so societies with many elderly people are likely to have more deaths per 1,000 people than those where most citizens are young adults. Developed countries with good medical services have more people in older age brackets than developing countries, so the developed societies can have higher death rates even though they are healthier places to live overall(Horizon, 2009).

The third major factor that drives population trends is migration, which includes geographic population shifts within nations and across borders. Migration is less predictable over long periods than fertility or mortality, since it can happen in sudden waves-for example, when refugees flee a war-or slowly over many years. Immigration often changes host nations' or regions' ethnic mixes and strains social services. On the positive side, it can provide needed labor (both skilled and unskilled). For source countries, however, immigration may drain away valuable talent, especially since educated and motivated people are most likely to migrate in search of opportunities (Hartmann, 2010).

### **Concept of Economic Growth**

An increase in the capacity of an economy to produce goods and services, compared from one period of time to another is called economic growth. Economic growth can be measured in nominal terms, which include inflation, or in real terms, which are adjusted for inflation. For comparing one country's economic growth to another, GDP or GNP per capita should be used as these take into account population differences between countries (Ben-Ami, 2003).

### **Determinants of Economic Growth**

#### **(i) Fertility Rate**

Fertility is a factor that determines the rate of economic growth. Earlier researches in the area of population-growth have concluded that economic growth is negatively related to total fertility rate. However, recent researches in this area have proved that assertion fallacious. The Chinese experience is a clear example that refutes the earlier assumptions. There is currently a consensus as to the role of fertility rate in economic growth the world over (Barro, 2003).

(ii) **Investment Ratio**

In the neoclassical growth model for a closed economy, the saving rate is exogenous and equal to the ratio of investment to output. A higher saving rate raises the steady state level of output per effective worker and thereby raises the growth rate for a given starting value of GDP. Some empirical studies of cross-country growth have also reported an important positive role for the investment ratio; see, for example, DeLong and Summers (1991) and Mankiw, Romer, and Weil (1992). Reverse causation is, however, likely to be important here. A positive coefficient on the contemporaneous investment ratio in a growth regression may reflect the positive relation between growth opportunities and investment, rather than the positive effect of an exogenously higher investment ratio on the growth rate. This reverse effect is especially likely to apply for open economies (Ndambiri, Ritho, Ng'anga, Kubowon, Mairura, Nyangweso, Mairuri and Cherotwo, 2012).

(iii) **Democracy and Rule of Law Index**

Democracy, good governance and rule of law now appears in literatures as a strong determinant of growth. This is based on the presumption that democracy is the only form of government that supports growth. The general idea is to gauge the attractiveness of a country's investment climate by considering the effectiveness of law enforcement, sanctity of contracts and state of other influences on the security of property rights. Although the data are usually subjective, they are vital determinants of growth (Ignazio, 2003).

(iv) **Terms of Trade**

Changes in the terms of trade have often been stressed as important influences on developing countries, which typically specialize their exports in a few primary products. The effect of a change in the terms of trade-measured as the ratio of export to import prices on GDP is, however, not mechanical. If the physical quantities of goods produced domestically do not change, then an improvement in the terms of trade raises real domestic income and probably consumption, but would not affect real GDP. Movements in real GDP occur only if the shift in the terms of trade stimulates a change in domestic employment and output. For example, an oil-importing country might react to an increase in the relative price of oil by cutting back on its employment and production (Ayres and Benjamin, 2004).

(v) **Factor Accumulation: Capital, Labour and Human Capital**

The simple idea behind the factor accumulation theory is that higher inputs can mean higher outputs. Capital is the oldest known determinant of economic growth: accumulate more capital and grow faster. During the 1960s and 1970s, before the opening of global economy, several developing countries including India, China, Russia demonstrated that investment without openness, or investment without competition would produce some immediate growth but would be disastrous for growth in the long-run (Ignazio, 2003).

(vi) **Reallocation of Labour**

Agriculture is always the starting point for economic growth, whether for western economies on the eve of industrial revolution or for developing countries at their independence. A transition of the economy from agriculture to non-agriculture is a *sin qua non* of economic

transformation and economic growth. One of the factors that ensure reallocation of labour is technology. Technological growth, either within or outside agriculture releases labour. If the growth is outside the economy, then outward migration causes the supply of domestic agricultural labour to decline (Barro, 2003).

### **Concept of Urbanization**

Urbanization, simply defined, is the shift from a rural to an urban society, and involves an increase in the number of people in urban areas during a particular year. Urbanization is the outcome of social, economic and political developments that lead to urban concentration and growth of large cities, changes in land use and transformation from rural to metropolitan pattern of organization and governance (Nsiah-Gyabaah, 2000).

Like many other demographic changes, urbanization has both positive and negative effects. Cities and towns have become the engines of social change and rapid economic development. Urbanization is associated with improved access to education, employment, health care; these result in increase in age at marriage, reduction in family size and improvement in health indices (Tarver, 1996).

### **Factors Influencing Urbanization**

Of the major causes of urbanization in Africa, Natural population increase (high births than death) and migration are significant factors in the growth of cities in the developing countries. The natural increase is fuelled by improved medical care, better sanitation and improved food supplies, which reduce death rates and cause populations to grow. In many developing countries, it is rural poverty that drives people from the rural areas into the city in search of employment, food, shelter and education. In Africa, most people move into the urban areas because they are 'pushed' out by factors such as poverty, environmental degradation, religious strife, political persecution, food insecurity and lack of basic infrastructure and services in the rural areas or because they are 'pulled' into the urban areas by the advantages and opportunities of the city including education, electricity, water etc. Even though in many African countries the urban areas offer few jobs for the youth, they are often attracted there by the amenities of urban life (Tarver, 1996).

### **Empirical Literature Review**

Dao (2012) studied population and economic growth in developing countries, 43 countries were sampled with data ranging from 1990 to 2008. He applied the least squares estimation technique to analyze the data. The result indicates that the growth rate of per capita GDP is linearly dependent upon population growth. However, his study used only economic growth and population growth as well as OLS only and did not use Granger causality technique to check the line of causality between population growth, urbanization and economic growth, and the period covered is highly inadequate

Afzal (2009) investigates Population Growth and Economic Development in Pakistan from 1981 to 2005. He used the least squares estimation technique in a multivariate regression. The coefficient for population is negative and significantly different from zero, meaning that population growth adversely affects the economic growth. This does not support the view that population growth is not a real problem. High population growth has become an important limiting factor for achieving the overall development goals. To say the least, if the 24 years

covered by this study had been much longer, a better and more reliable result would have been realized.

Adewale (2012) examined effect of population on economic Development in Nigeria from 1981 to 2007. The study adopted Ordinary Least Squares (OLS) method of analysis. The study revealed that population growth has positive and significant impact on economic sustainability proxied as Real Gross Domestic Product (RGDP) and per -capita income. This research covers a period of 26 years and utilized only one independent variable (population). This is not adequate in terms of time and in-depth analysis that makes use of more variables.

Kothare (1999) studied India's population growth and economic growth, from 1988 to 1998. He used descriptive statistics in analyzing the data. He found out that India has become one of the World's fastest growing economies, primarily due to the rise in population growth creating a positive effect on its long run economic growth. No econometric model was utilized for the analysis which covers the period 1988 – 1998, and a ten years analysis cannot give a true picture of a country's economic performance. A long-run analysis would have been better.

Dociu and Dunarintu (2012) studied the socio-economic impact of urbanization. Their work used global urban population covering all the continents (1952 -2050) subjecting them to descriptive analysis in the forms of graphs, tables, and charts for visual impression and analysis. The study found out that urbanization is widely accepted as a process with several consequences, such as social, economic or environmental and it usually occurs in developing countries. This study should have employed econometric models to analyze the situation.

Henderson (2000) investigates how urban concentration affects economic growth from 1960 – 1995 in five year intervals using panel data of 80 to 100 countries. The research adopted the use of Ordinary Least Squares (OLS) and the Generalized Method of Moments (GMM) in the analysis of data. The study found out that urbanization and economic growth in developing countries go hand-in-hand. The study found out that the simple correlation coefficient across countries between the percent urbanized in a country and GDP per capita (in logs) is about 0.85. He further found that close spatial proximity, or high density, promotes information spillovers amongst producers, more efficiently functioning labour markets, and savings in the transport costs of part and components exchange among producers and sells to local residents. The existence and considerable magnitude of localized scale externalities is well documented empirically.

Otto (2008) investigates the implications of urbanization for socio-economic development in Nigeria, using urban population growth in developed and developing countries for the years 1950, 1960, 1970, 1980, 2000, and 2005 as well as some selected economic indicators [GDP growth rate, capacity utilization, unemployment (urban), and inflation rate]the results showed that Nigeria Urban growth is informed by natural population increase in the urban areas, rural-urban migration, creation of administrative towns and population concentration in towns blessed with natural resources. This high concentration of people beyond the facilities necessary to sustain the growth creates unhealthy competition for the available facilities and opportunities.

## **Theoretical Framework**

There are different theories of population, and urbanization that presents the relationship existing among population, urbanization and economic growth. Some of these theories suggest negative or inverse relationships among population and economic growth, while others suggests positive or direct relationships among population and economic growth. However, this study adopts the optimistic theory of population as well as the Modernization Theory of Urbanization as the basis of its theoretical framework.

### **The "Optimistic" Theory: Population Growth Can Fuel Economic Growth**

Promoters of the optimistic theory are of the idea that population growth can be an economic asset. Kuznets (1967), for example, argued (separately) that as population increase, so does the stock of human ingenuity. Larger societies- with the capacity to take advantage of economies of scale- are better positioned to develop, exploit, and disseminate the increased flow of knowledge they receive (Kuznets, 1967). Simon in his influential book - *The Ultimate Resource* (1981) showed that rapid population growth can actually lead to positive impacts on economic development (kuznet, 1967). The optimists, while refuting the alarmists' tendencies of the pessimists' theory, were not dogmatic about the positive impacts of population growth. Instead, they took a broader view, suggesting that a multiplicity of external factors was responsible for the consequences of population growth. "Many of these consequences result more from inappropriate policies and institutions than from rapid population growth" (Bloom, Canning and Sevilla, 2003).

### **The Modernization Theory of Urbanization**

The urbanization theories may be analyzed along a continuum with two extremes, namely; modernization theory and world system theory—both are subordinate theories within economic development theories. The modernization theory is basically evolution theory which seeks to explore how societies transform from traditional and primitive status to what we call the modern or highly urbanized status (Morgan, 1877).

The modernization theory ensuing the functionalist's approach from biological sciences (Durkheim, 1892), and the laissez-faire approach from economics (Rostow, 1960), claims that the growth and development of towns and cities is a self regulatory and evolutionary mechanism. The theory believes that just as the size and growth of villages had never been a problem because of distance-decay and threshold demand factors within agricultural era; therefore, agricultural landscape automatically controlled the growth and development of villages. Similarly, following the same trend, within industrial era or even within information age, human settlements will always transform in a befitting way.

## **Methodology**

### **Sources and type of data**

The data used for this study is annual time series data sourced from World Bank World Development Indicators 2014.

### **Model Specification**

The study made use of Granger Causality model to check the line of causality among population growth, urbanization and economic growth in Nigeria from 1961 to 2013. The test was done to

achieve objective of the study. This is actually the common way to test the causal relationship between two variables is the Granger - causality proposed by Granger (1969).

$$X_t = \sum_{j=1}^n \alpha_j Y_{t-1} + \mu_1 t \text{ -----eqn (3.1)}$$

$$Y_t = \sum_{i=1}^m \beta_i Y_{t-i} + \mu_2 t \text{ -----eqn (3.2)}$$

The specific granger causality functions are presented as follows;

$$POP_t = \sum_{j=1}^n \alpha_1 POP_{t-1} + \sum_{j=1}^n \alpha_2 GDPG_{t-1} + U_{t1} \text{ -----eqn( 3.3)}$$

$$GDPG_t = \sum_{j=1}^n \beta_1 GDPG_{t-1} + \sum_{j=1}^n \beta_2 POP_{t-1} + U_{t2} \text{ -----eqn (3.4)}$$

$$URB_t = \sum_{j=1}^n \delta_1 URB_{t-1} + \sum_{j=1}^n \delta_2 GDPG_{t-1} + U_{t1} \text{ -----eqn (3.5)}$$

$$GDPG_t = \sum_{j=1}^n \eta_1 GDPG_{t-1} + \sum_{j=1}^n \eta_2 URB_{t-1} + U_{t2} \text{ -----eqn (3.6)}$$

$$URB_t = \sum_{j=1}^n \delta_1 URB_{t-1} + \sum_{j=1}^n \delta_2 POP_{t-1} + U_{t1} \text{ -----eqn (3.7)}$$

$$POP_t = \sum_{j=1}^n \eta_1 POP_{t-1} + \sum_{j=1}^n \eta_2 URB_{t-1} + U_{t2} \text{ -----eqn (3.18)}$$

Where;

GDPG<sub>t</sub>= current economic growth proxied by GDP growth Rate

POP<sub>t</sub>= current population growth rate

URB<sub>t</sub> = current Urbanization Rate

GDPG<sub>t-1</sub>= past economic growth proxied by GDP growth Rate

POP<sub>t-1</sub>= past population growth rate

URB<sub>t-1</sub> = past Urbanization Rate

U<sub>t</sub>= error term

## Variables and Measurement

**POP = Population Growth Rate:** Population growth (annual %) is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage (World Bank, 2014).

**GDPG= Gross Domestic Product Growth:** (Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of



natural resources (World Bank, 2014).

**URB = Urbanization Rate:** Urban population refers to people living in urban areas as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects (World Bank, 2014).

### Estimation Technique

This research work employed the use of Augmented Dickey-fuller unit root test, Co-integration test, Vector error Correction Mechanism test as well as the pair wise Granger causality technique as the tools for data analysis.

### Result and Discussion

#### Correlation Matrix of the Variables on the Growth Trends

This test was run in order to check the level relationships among economic growth proxied by real GDP growth, population growth rate and urbanization rate for the years reviewed. The result can be observed in table 4.1.

**Table 4.1: Result of Correlation Matrix of the Variables**

	GDPG	POP	URB
GDPG	1.00000	-	-
POP	-	1.00000	-
URB	-	0.72145	1.00000

**Source: Author's Computation using E-views 8.0, 2016.**

The result of the correlation matrix of the data analyzed reveals that a weak negative correlation was established between GDPG and population (-0.04). The correlation between GDPG and urbanization is also a weak negative one (-0.13). Population also has a strong positive correlation with urbanization. This is consistent with the finding of Shabu (2010) in his study on the relationship between urbanization and economic development in developing countries. Shabu (2010) also found a weak relationship (correlation) between urban growth and economic development in developing countries.

#### Unit Root Test (Test of Stationarity)

This test was conducted to check the stationary status of the time series used in this research work.

**Table 4.2: Unit Root Test (ADF Unit Root Test)**

Variable	ADF statistics			Critical Value at 5% level of Significance			Order of Integration
	Level	First Difference	Second Difference	Level	First Difference	Second Difference	
GDPG	-5.1248	-7.7100	-7.1700	-	-2.5004	-2.5100	I(0)

POP	-2.7552	-1.8372	-3.7225	-3.5155	-3.5155	-3.5155	I(2)
URB	-6.5849	-18.8455	-10.1432	-3.4986	-3.5004	-3.5043	I(0)

**Source: Authors' computation Using E-views 8.0, 2016.**

Based on the results of the Unit Root Test, with summary presented in table 4.2, using 5% level of significance, the variable Population Growth Rate (POP) was not stationary at levels and at first difference, but became stationary at second difference. However, Economic Growth proxied by Gross Domestic Product Growth (GDPG), and Urbanization Rate (URB) were stationary at levels.

### Co-integration Technique

Ideally, co-integration of two or more time series suggests that there is long-run relationship, or equilibrium relationship between them. Johansen co-integration test was used to check for the possible long run equilibrium relationship between the variables. This became necessary because some of the Population growth (POP) have been found to have unit root from the test of stationarity carried out using the Augmented –Dickey Fuller Unit Root test;

**Table 4.3: Result of Johansen and Joselius Co-integration Test**

Date: 05/01/16 Time: 11:19  
Sample (adjusted): 1964 2013  
Included observations: 50 after adjustments  
Trend assumption: Linear deterministic trend (restricted)  
Series: GDPG POP URB

Lags interval (in first differences): 1 to 1 Unrestricted

### Cointegration Rank Test (Trace)

Hypothesized No. of	Eigenvalue	Trace	0.05 Critical Value	Prob.**
None *	0.951521	358.672	117.7082	0.0000
At most 1	0.849951	207.341	88.80380	0.0000
At most 2	0.585721	112.501	63.87610	0.0000
At most 3	0.497215	68.4407	42.91525	0.0000

Trace test indicates 3 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 Cointegrating Eq(s)	Eigenvalue	Max-Eigenvalue	0.05 Critical Value	Prob.**
None *	0.951521	151.331	44.49720	0.0000
At most 1	0.849951	94.8396	38.33101	0.0000
At most 2	0.585721	44.0607	32.11832	0.0011
At most 3	0.497215	34.3796	25.82321	0.0029

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

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

**Source: Authors' Computation using E-Views 8.0, 2016.**

The results of the Johansen co-integration test suggest that the Trace and Max-Eigen value indicate five (3) co-integrating equations at 5% level of significance. This means that there is long-run equilibrium relationship among population, urbanization and economic growth in Nigeria from 1961 to 2013.

### Vector Error Correction Mechanism Reduced Form Estimated Results

Because of the presence of evidence of the equilibrium relationship among the variables, by the results of the co-integration test, the error correction modeling was carried out to examine the co-movements of the variables or to examine the short-run dynamics and long-run equilibrium.

**Table 4.4: Summary of Vector Error Correction Mechanism Reduced Form Results**

Error Correction:	D(GDPG)	D(POP)	D(URB)
CointEq1	-0.07060	-0.06405	-0.00190

**Source: Authors' Computation using E-Views 8.0, 2016.**

Based on the results of the error correction mechanism presented in table 4.4, it is obvious that the results shows that about 8% of short-run disequilibrium has been corrected by economic growth (GDPG) annually. Though it is not statistically significant in correcting for the deviations from the long run equilibrium relationship, meaning that the adjustment process takes a longer time. Population Growth rate (POP) have adjusted for the deviations from the long term paths by negative and statistically significant at 5 percent level of significance. Also urbanization rate, though correctly signed (negative) is not statistically significant in correcting for the short-run disequilibrium. In addition Crude Death rate is not correctly signed (by being positive), which indicates that it is above the equilibrium level.

The R-squared ( $R^2$ ) suggest that all the variables in the model have explained 26 percent, 98 percent, and 27 percent, of the total variation in economic growth, population growth, and Urbanization rate in Nigeria from 1961 to 2013. Yet the standard errors of all the equations are consistently low, except for economic growth equation which is high (10.47).

### Granger Causality Test

**Table 4.3: Result of Granger Causality Test**

Pairwise Granger Causality  
 Tests Date: 05/01/16 Time:  
 11:54 Sample: 1961 2013  
 Lags: 5

Null Hypothesis:	O	F-	Pro	Decisi
POP does not Granger Cause GDPG	4	0.4592	0.80	Acce
GDPG does not Granger Cause POP		2.6513	0.03	Reje
		0.86		ct
URB does not Granger Cause GDPG	4	0.8988	0.49	Acce
GDPG does not Granger Cause URB		0.6823	0.63	Acce
		1.00		ct
URB does not Granger Cause POP	4	1.0482	0.40	Acce
POP does not Granger Cause URB		0.6486	0.66	Acce
		0.42		pt

**Source: Authors' Computation using E-Views 8.0, 2016.**

Based on the results of the granger causality test, population growth does not granger cause growth in economic growth (GDPG) at 5% level of significance. However, economic growth (GDPG) granger causes population growth at 5% level of significance. Thus, there is a unidirectional causality from economic growth (GDPG) to population growth (POP) in Nigeria.

Urbanization (URB) does not granger causes economic growth (GDPG) at 5% level of significance. Similarly, economic growth (GDPG) does not granger cause urbanization at 5% level of significance. Therefore, there is no causal relationship between urbanization (URB) and economic growth (GDPG).

There is no causality running from urbanization neither to population growth nor from population growth to urbanization at 5% level of significance.

## Conclusion and Recommendations

### Conclusion

The study found that there is a unidirectional causality from economic growth (GDPG) to population (POP) in Nigeria at 5% level of significance, but there is no causal relationship between urbanization (URB) and economic growth (GDPG). There is no causal relationship between Urbanization rate (URB) and population growth (POP).

## Policy Recommendations

The study recommends the following among others based on the findings arrived at;

- (i) Since there is a unidirectional causality from economic growth (GDPG) to population growth (POP) in Nigeria over the study period from 1961 to 2013, the National Economic Empowerment and Development Strategy policy should be geared towards economic growth and development. This will end up in population growth that will help sustain further economic growth.
- (ii) Urban planning commissions in Nigeria should keep making provisions for additional populations in terms of social and economic infrastructures to avoid over-stretching them. This will reduce the emergence of urban slums, crime rate and other social vices.
- (iii) High dependency should be reduced through the creation of jobs for youths, or a deliberate economic policy so as to increase economic growth in Nigeria

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