Effect of Population Growth and Poverty on Economic Growth in Nigeria

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Abstract
The study examined the effects of population growth and poverty on economic growth in Nigeria from 1990 to 2023. Annual time series data on Real gross domestic product, Population Growth Rate and Poverty were collected from secondary sources. The dependent variable was economic growth which was proxied by Real gross domestic product. The independent variable – population growth was disaggregated into rural and urban population growth rate and poverty rate. Data collected for the study were analyzed using the Autoregressive Distributed Lags. The result indicated that urban population growth rate has significant impact on real gross domestic product both in the long-run and short-run. Why rural population growth rate only impacted on real gross domestic product in the long-run. It thus means that population growth rate has effect on economic growth in Nigeria. The study therefore concludes that population and poverty reduce economic growth and development in Nigeria within the period of study. This study therefore recommended amongst others that government should ensure that Nigeria's human resources are channeled into areas of the economy where they are needed to be fully utilized in bringing about high rates of economic growth and development for the country. There is need to evolve policies and programmes that will enhance industrialization, reduce unemployment and increase per capita income which will in turn reduce poverty and enhance economic growth and development in Nigeria.

Key Words: Urban population growth rate, Rural population growth rate, Poverty rate, Nigeria.

INTRODUCTION

The decomposition of population growth, poverty and economic growth in Nigeria present a multifacetedly research outcome. It examines the importance of population growth in relation to the development of the country and its influence at large especially at the rural areas which depends mainly on subsistence economy. Nigeria is arguably the most populous country in Africa since independence. Nevertheless, the remarkable rise in population growth in the country has led to unemployment, lack of basic health care facility, inadequate infrastructure and poverty.

According to the IMF (2013) report, it was surprising that the Nigeria economy improved significantly at an annual average of 6 percent over the last ten years despite the impact of the global financial crises that affected most developed countries negatively (IMF, 2013, as cited in

Arndt, et al. 2016). Also poverty persisted from 42.7 percent in 1992 to 65.6 percent in 1996 and 69 percent in 2010 notwithstanding the positive growth experienced, based on the data provided by the National bureau of Statistics (NBS, 2012, as cited in Arndt et al, 2016). This is indicative of the fact that population growth in Nigeria has impacted negatively on employment opportunities, access to health care facilities, education from primary to tertiary institution and other infrastructural benefits.

In order to tackle poverty in Nigeria, the first pointt of call is to eradicate corruption or to bring it to the barest minimum. This has been a menace for so many years in Nigeria and different Governments in the past and present have made countless effort to knit it in the bud but no headway yet as this problem still persists. In line with the research carried out by Price water house coopers (PwC) on the setback of Nigeria's economy as a result of corruption, it was envisaged that this problem could cause a further decline on the economy of the country by 2030 eating up to 37 percent of the nation's GDP if something drastic is not done about it (Kumar, 2019).

The known ten most populous countries in the world are; China, India, United States, Indonesia, Brazil, Pakistan, Nigeria, Bangladesh, Russia and Mexico (World Population, 2021). This suggests that Nigeria is the 7th most populous country in the world, means population growth has not been to the nation's advantage and has also led to unemployment rate hitting 30.7 percent (National Bureau Statistics, 2021).

However, the impact of population growth and poverty on health in Nigeria can be measured with several proxies. For this study, Life expectancy at birth, Rural population growth rate, Urban population growth rate and poverty rate were used as measures of the dependent and the independent variables. This paper therefore, seeks to investigate the impact of population growth and poverty on health in Nigeria. It is Interesting to know that, no study has investigated the impact of population growth and poverty on health in Nigeria using the above measures and dimension at the same time. These issues give credence to this study.

The organization of the article goes thus; the abstract, the introductory part, the literature reviewed which includes conceptual clarifications, theoretical framework and empirical review. The methodology, which contains the model design, model specification and empirical result explanations. The paper is concluded with the conclusion and recommendations.

LITERATURE REVIEW

Conceptual Clarification

Population Growth

Population growth is the increase in the number of individuals in a population. Global human population growth amounts to around 83 million annually (World Population Prospects, 2017) or 1.1% per year. The global population has grown from 1 billion in 1800 to 7.8 billion (World Population, 2017). It is expected to keep growing, and estimates have put the total population at 8.6 billion by mid-2030, 9.8 billion by mid-2050 and 11.2 billion by 2100 (World Population

Prospects, 2017). Many nations with rapid population growth have low standards of living, whereas many nations with low rates of population growth have high standards of living (WPP, 2017).

The "population growth rate" is the rate at which the number of individuals in a population increases in a given time period, expressed as a fraction of the initial population. Specifically, population growth rate refers to the change in population over a unit time period, often expressed as a percentage of the number of individuals in the population at the beginning of that period. This can be written as the formula, valid for a sufficiently small-time interval:

$$population\ growth = \frac{p(t_2) - p(t_1)}{p(t_1)(t_2 - t_1)}$$

A positive growth rate indicates that the population is increasing, while a negative growth rate indicates that the population is decreasing. A growth ratio of zero indicates that there were the same number of individuals at the beginning and end of the period—a growth rate may be zero even when there are significant changes in the birth rates, death rates, immigration rates, and age distribution between the two times (WPP, 2008).

Poverty

The terms poverty have become major slogans in international developmental agenda, in terms of development goals as well as for new instruments in international finance (Guobao, 2010). While the causes of poverty seem consensual, the definition is not yet universal and the remedies are still in want. The difficulty in defining poverty stems from the different perspectives in which the subject is seen. This is because what may be termed poor by one may not be considered poor by another; besides; there is always the difficulty in deciding where to draw the line between the poor and the non-poor (Obayelu & Uffort, 2007).

According to the United Nations Statistical Division (UNSD, 2015) the earliest definitions of poverty centered on the inability to obtain adequate food and other basic necessities, the contemporary focus continues to be on material deprivations, i.e., the failure to command private resources. The World Bank Report (1990) and Aigbokhan (2010) considered poverty simply as the inability to achieve a certain minimal standard of living. But standard of living in itself is determined by several factors of which income is chief. This presupposes that defining poverty in terms of standard of living is invariably defining it in terms of income.

Economic Development

Ojo (2018) sees development as a process that creates growth, progress, positive change or the addition of physical, economic, environmental, social and demographic components. The purpose of development is a rise in the level and quality of life of the population, and the creation or expansion of local regional income and employment opportunities, without damaging the resources of the environment. Development is visible and useful, not necessarily immediately,

and includes an aspect of quality change and the creation of conditions for a continuation of that change.

Economic development encompasses progress in providing livelihood on a sustainable basis, access to education and basic healthcare for the majority of the population (Belshaw & Livingstone, 2002). Though other measures can be used, output is most conveniently measured by the gross national product (GNP). This implies that economic growth is measured by the increase in a country per capita GNP.

Economic growth is thus sustained expansion of production possibilities measured as an increase in the real GDP over a given period. Rapid economic growth maintained over a number of years can transform a poor nation into a rich one, as has been the experiences of Hong Kong. South Korea, Taiwah and other Asian economies (Bade & Parkin 2002), According to Malizia and Feser (2000), growth and development is complementary, because one makes the other possible. They also are alternating processes that occur sequentially. Growth in an increase in output, development is a structural change, for example technological or legal. Growth expands to more equal distribution of income and wealth. Overall growth and development lead to a greater range of economic choice.

Theoretical Literature

The Malthusian Theory of Population

Thomas Robert Malthus enunciated his views about population in his famous book, Essay on the Principle of Population as it affects the future improvement of society, published in 1798. Malthus revolted against the prevailing optimism shared by his father and Godwin that a perfect state could be attained if human restraints could be removed.

Malthus objection was that the pressure of increasing population on food supply would destroy perfection and there would be misery in the world. Malthus was severely criticized for his pessimistic views which led him to travel on the continent of Europe to gather data in support of his thesis.

He incorporated his researches in the second edition of his Essay published in 1803. The Malthusian theory explains the relationship between the growth in food supply and in population. It stated that population increases faster than food supply and if unchecked leads to vice or misery. The Malthusian doctrine is stated as follows:

(i)   There is a natural sex instinct in human beings to increase at a fast rate. As a result, population increases in geometrical progression and if unchecked doubles itself every 25 years. Thus starting from 1, population in successive periods of 25 years will be 1, 2, 4, 8, 16, 32, 64, 128, 256 (after 200 years).

(ii)   On the other hand, the food supply increases in a slow arithmetical progression due to the operation of the law of diminishing returns based on the supposition that the supply of land is constant. Thus, the food supply in successive similar periods will be 1, 2, 3, 4, 5, 6, 7, 8, and 9 (after 200 years).

(iii)   Since population increases in geometrical progression and the food supply in arithmetical progression, population tends to outrun food supply.

METHODOLOGY

Research Design

The study adopted the Ex-post facto research design to examine the relationship between population growth, poverty and economic development in Nigeria.

Model Specification

The model specification for this study aligned with the work of Ali. *et al*. (2018) with further modification. Ali, *et al*. (2018) analyzed the nexus between population, poverty and economic development in some selected developing countries between 2002 and 2015.

The Model

RGDP = *f*(RPGR, UPGR, PVT)   3.4

Where

RGDP = Real gross domestic product

RPGR = Rural population growth rate

UPGR = Urban population growth rate

POVR = poverty rate

For the purpose of estimation, it is necessary to re-write the model in the form of equation as;

$$RGDP = \beta_0 + \beta_1 RPGR_t + \beta_2 UPGR + \beta_3 POVR_t + \mu_{1t}$$ 3.5

Where: RGDP = Real gross domestic product

β_0 = Constant term

β_1, β_2, β_3 = the coefficient of rural population growth, urban population growth and poverty rate to be determined.

μ_{1t} = error or stochastic term.

β_1, β_2, $\beta_3 > 0$ = the apriori expectation.

Empirical Results and Discussions

Table 1. Augmented Dickey Fuller Unit Root test

Variables	Level	Critical Value	1st Diff.	Critical Value	Decision
POVR	-2.933	-3.597	-	-	I(0)
RGDP	-2.933	-2.231	-2.957	-2.413	I(1)
RPGR	-2.933	-1.662	-2.935	-6.658	I(1)
UPGR	-2.933	-1.915	-2.957	-5.650	I(1)

Source: *Author's Computation using E-views 9*

In table 1 above, the ADF unit root test was conducted in order to ensure that the variables used corresponded to the right model. In addition, the test provided verification of findings and ensured the results were robust. More so, the unit root test was conducted to satisfy the pre-conditions for the econometric techniques adopted for the study. The variables were tested at levels and 1st difference. The PP tests rejected the existence of unit roots in the variables since all of the probabilities were less than 5%.

The outcome of the PP test indicated all the variables except POVR, were integrated at order 1. In view of the fact that the variables attained stationarity at level and 1st difference, the null hypothesis that the variable has unit root is rejected.

Table 2: Bound Test Co-integration Result for RGDP Model

ARDL Bounds Test
Date: 01/21/25   Time: 20:04
Sample: 1982 2023
Included observations: 42
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	6.999897	3

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	3.47	4.45
5%	4.01	5.07
2.5%	4.52	5.62
1%	5.17	6.36

Source: *Author's Computation using E-views 9*

The bound test cointegration test result presented in Table 2, shows that the calculated F-statistic value of 6.999897 is greater than the theoretical critical value for the upper bound I(1) at 5 percent level. This means that there is a co-integration; hence, a long run relationship exists between POVR, RPGR, UPGR and RGDP in Nigeria within the study period. Since there is existence of long run relationship among the variables, both short run and long run estimate of the model was performed using the ARDL approach.

4.3: Long-run ARDL Estimation for RGDP Model

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POVR	-0.001407	0.001502	-0.936679	0.3587
RPGR	-0.974283	0.341309	-2.854551	0.0090
UPGR	-0.937568	0.166937	-5.616294	0.0000
C	4.101706	1.201045	3.415116	0.0024

Source: *Author's Computation using E-views 9*

The result of the long-run estimation in Table 3, RPGR and UPGR which are independent variables, were negatively significant in explaining the changes in RGDP while POVR was insignificant in the study period. The result shows that POVR has a coefficient value of 0.001407 with a p-value of 0.3587 which is greater than 5% level of significant. RPGR has a coefficient of -0.974283 with a p-value of 0.0090 which is less than 0.05 alpha. A unit increase in the coefficient

of RPGR will reduce real gross domestic product by 0.974283. This is an indication that RPGR significantly impact RGDP. Also, UPGR was found to significantly impact on RGDP since the p-value is less than 5%. A unit increase in UPGR result in a decrease in the coefficient of UPGR will reduce RGDP by -0.937568. It is also an indication that UPGR significantly impact RGDP.

The finding can be attributed to fact that Nigeria has not been able to harness the potential of her population or develop her teaming youths to explore the abundant natural resources with which the country is blessed because of excessive corruption, nepotism, non-implementation of vibrant economic policies and leadership ineptitude that has bedeviled the country for a long time.

In addition, Nigeria's population is majorly people who are mainly dependent rather than working. The finding is against apriori expectation given that population growth should be an asset the country can leverage on to boost economic growth and development. Nigeria as a country is blessed with so many natural resources such as gold, bitumen, coal, natural gas etc. that has not been fully tapped, if the human resources is harnessed and developed to adequately tap these resources, it may improve economic development in Nigeria.

This finding is in tandem with that of Lawanson (2016), Sinding (2009) and Ali, et. al. (2018) who in their separate study reported that population growth has not significantly contributed to economic growth and development. On the other hand however, the finding contradicts the report of Song (2013), Nwosu, et al. (2014), and Olusogo & Oluwarotimi (2018) who found a positive and significant impact of population growth on economic growth and development.

Table 4: Short Run Estimation Results for RGDP Model

Error Correction Regression

ARDL Cointegrating And Long Run Form
Dependent Variable: LOG(RGDP)
Selected Model: ARDL(1, 0, 2, 1)
Date: 01/23/25   Time: 04:58
Sample: 1990 2023
Included observations: 32

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POVR)	-0.000298	0.000340	-0.875501	0.3904
D(RPGR)	-0.228387	0.160187	-1.425755	0.1674
D(RPGR(-1))	-0.024665	0.029140	-0.846416	0.4060
D(UPGR)	-0.015855	0.005058	-3.134732	0.0046

CointEq(-1)	-0.211528	0.056744	-3.727770	0.0011

Cointeq = LOG(RGDP) - (-0.0014*POVR + 0.9743*RPGR + 0.9376*UPGR +
4.1017 + 0.0750*

R-squared	0.999337	Mean dependent var	10.61193
Adjusted R-squared	0.999106	S.D. dependent var	0.497534
S.E. of regression	0.014877	Akaike info criterion	-5.345801
Sum squared resid	0.005090	Schwarz criterion	-4.933563
Log likelihood	94.53281	Hannan-Quinn criter.	-5.209155
F-statistic	4331.360	Durbin-Watson stat	1.871250
Prob(F-statistic)	0.000000		

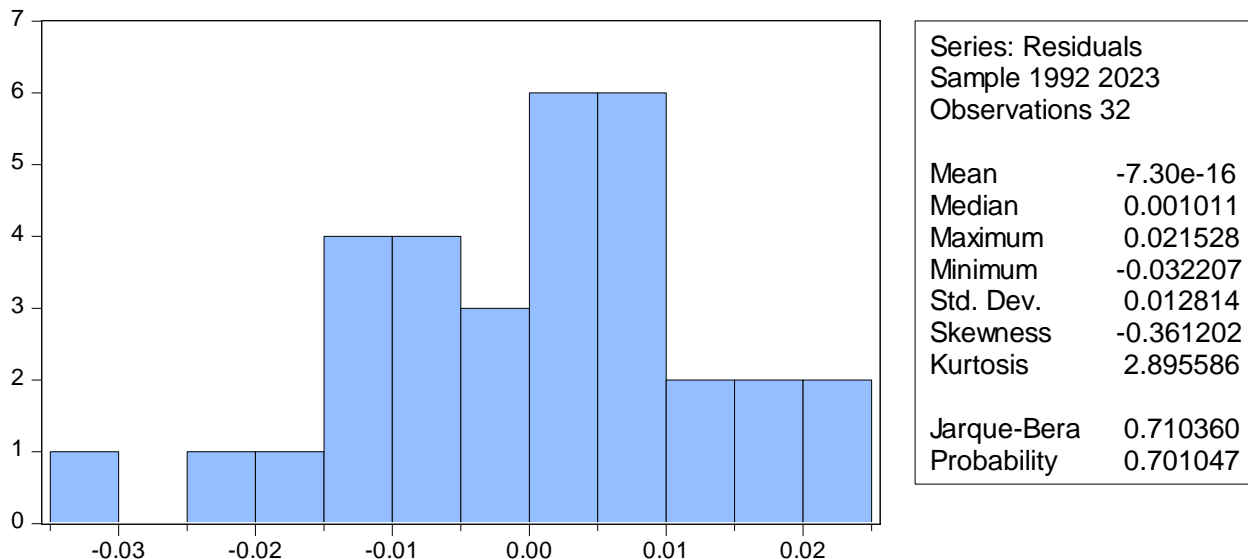**Source:** *Author's Computation using E-views 9*

Table 4, shows that the calculated Adjusted-R square is 0.999337, indicating that the regressors in the model account for about approximately 100 percent of the total variation in RGDP. Also, the entire regression result of the model is significant at 5 percent level as shown by the F-calculated of 4331.360 with a p-value of 0.000000 which is less than 0.05 Alpha (P<0.05). The error correction term (CoinEq(-1)) shows the speed of adjustment to restore equilibrium in the dynamic model. In particular, the ECM coefficients show how quickly or slowly the variables converge to equilibrium. The result of the error correction model indicates that it is well specified and the diagnostic statistics are good. The ECM variable has the correct apriori sign and statistically significant (p-value <0.05). The speed of adjustment of -0.211528 shows the level of convergence. In particular, about 21 percent of disequilibrium or deviation from long run of RGDP in the previous period is corrected in the current year, since the data employed are annual.

It was observed that all the coefficients negatively insignificantly impacted on RGDP in the short run of this study except Urban population growth rate (UPGR) coefficient which was found to be negative and statistically significant in the short run. A unit increase in the coefficient of UPGR will reduce RGDP by -0.015855 in the short run all things being equal.

Diagnostic Testing of RGDP Model
The diagnostic test is conducted to determine if the series fulfill the assumption of normality of distribution, autocorrelation (Breusch-Godfrey Serial Correlation LM Test) and heteroscedasticity (Breusch-Pegan-Godfrey Test). The result of the diagnostic test is presented below.

Figure 1: Residual Diagnostic Test Analysis for RGDP Model

Source: *Author's Computation using E-views 9*

It could be seen in figure 1 above that the null hypothesis that the variables are normally distributed cannot be rejected since the probability value of Jarque-Bera is greater than 0.05, at 0.701047. This means that the residuals are normally distributed and has not violated the assumption of normality. The histogram-normality test further showed that the model is largely skewed to the left given the skewness statistic value of 0.361202 and possessed a normal tail than the normal distribution given a kurtosis statistic value of 2.895586.

Serial Correlation LM Tests of Model 1

Residual Test

Table 5: The Serial Correlation Test Result for RGDP Model

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.321363	Prob. F(2,21)	0.1228
Obs*R-squared	5.793738	Prob. Chi-Square(2)	0.0552

Source: *Author's Computation using E-views 9*

The null hypothesis of no serial correlation is rejected in the LM testing approach, if the probability value (p-value) is smaller than the level of significance which 0.05. From the result in Table 5 the null hypothesis cannot be rejected at 5% level of significance because the LM-Stat corresponding to 2 lags used in this study is 2.321363 and the p-value is 0.1228 (12%) which is more than 5%.

Table 6: The Heteroscedasticity Test Result for RGDP Model

Heteroskedasticity Test: Breusch-Pagan-Godfrey

|			
F-statistic	0.356628	Prob. F(8,23)	0.9327
Obs*R-squared	3.531379	Prob. Chi-Square(8)	0.8967
Scaled explained SS	1.729073	Prob. Chi-Square(8)	0.9882

Source: *Author's Computation using E-views 9*

The null hypothesis of no heteroscedasticity cannot be rejected if the p-value of the Breusch – Pagan statistic is greater than the specified 5% levels of significance. The result in Table 6 Shows p-value greater than 0.05 indicating our model is devoid of heteroscedasticity.

Stability Test using CUSUM and CUSUM of Squares

Figure 2: *Plot of Cumulative CUSUM Recursive Residuals (CUSUM)*
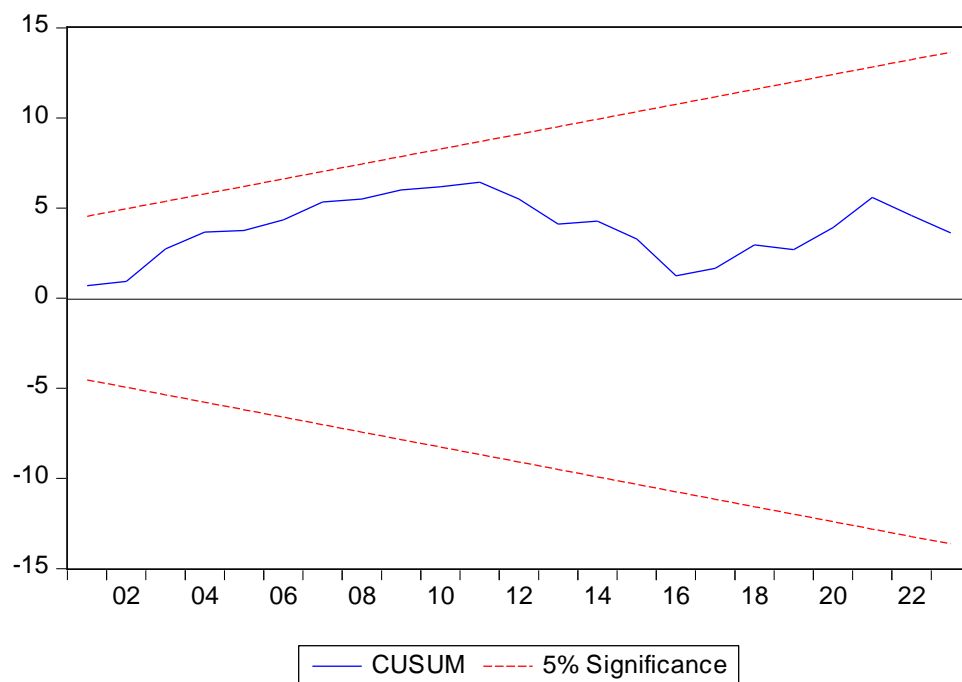
Figure 3 *Plot of Cumulative Sum of Square Recursive Residuals (CUSUMQ)*
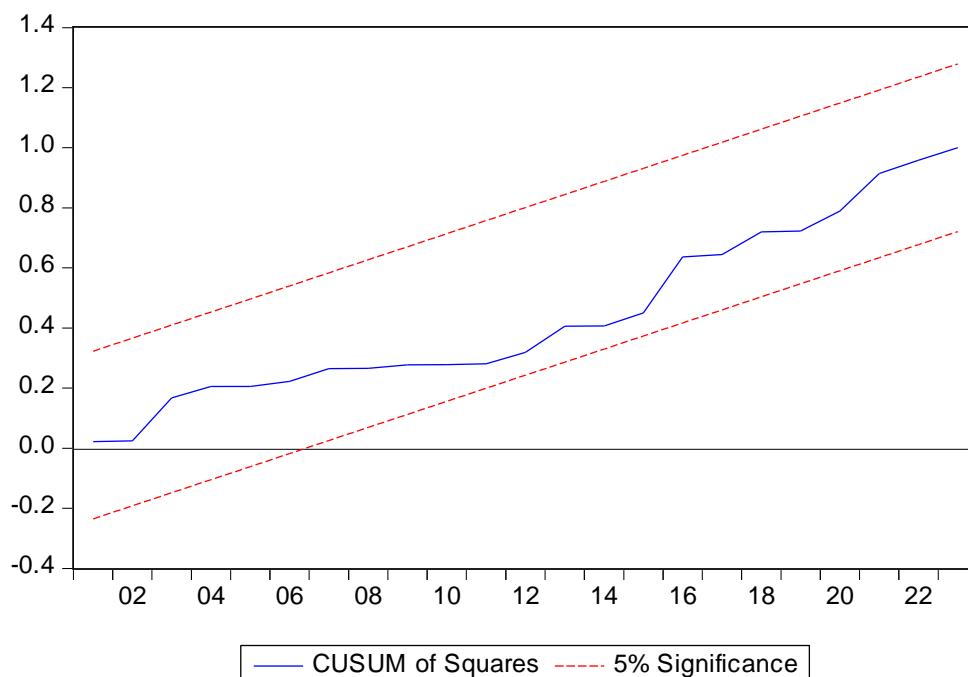
Finally, the stability condition of the estimated model is validated by the use of cusum test and cusum sum of squares. The recursive plot shows that, the model is trable and falls withing the expectred 95% confidence intervals. From the figure above, the dotted red lines also represented the critical bounds. The figure also shows that the sum of squares of the recursive residuals of the RGDP is relatively stable especially for the period of under examination. RGDP has remained within the critical bounds. The results imply that the null hypothesis of no stability of the short-run RGDP can be rejected at 5% significance level.

Conclusions

Population growth in less developed countries like Nigeria is linked to many problems, including poverty, hunger, high infant mortality and inadequate social services and infrastructure (transportation, communication etc.) Population growth may intensify the rate of poverty which may in turn affect savings and investment. Poor savings and investment affect economic growth and development while economic growth and development in turn affect the population growth. This is an indication that population growth, poverty and economic growth and development are linked. This study is to further explore the linkage in the Nigerian context. The study findings indicated that a long-run relationship exists among the variable, the independent variables also have significant impact on the dependent variable. It is therefore concluded that population growth, poverty rate has negative significant impact on economic growth and development in Nigeria within the period of study.

Recommendations

i. Government should ensure that the human resources in the country are properly harnessed, developed and channeled into areas of the economy where they can be fully utilized in bringing about high rates of economic growth and development for the country.

ii. Government should introduce policy that will make it compulsory for working age population who had no formal education to enroll in any government training centre across this country to learn a trade. This will help reduce level of unemployment and poverty rate in the society.

iii. Governments should raise minimum wage, create more employment opportunities, invest in quality and universal education, expand health and medical care, and provide easy access to the political process to reduce the poverty rate in the country.

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