Empirical Study of the Effects of Population Growth on Standard of Living in Nigeria from 1980 To 2025

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DOI: https://doi.org/10.47772/IJRISS.2026.100701009

Received: 28 July 2026; Accepted: 18 August 2026; Published: 19 August 2026

ABSTRACT

Rapid population growth can have serious consequences for the well-being of all of humanity if development entails the improvement in people's levels of living -their incomes, health, education, and general well-being. This study investigates the effect of population on the standard of living in Nigeria from 1980 to 2025. The study specifically: examine the effects of population growth rate on standard of living in Nigeria; identify the impact of fertility rate on standard of living in Nigeria; and determine the relationship between net migration and standard of living in Nigeria. The unit root tests employed Phillips-Perron Test and revealed that all variables under study were stable at level and first difference leading to the use of ARDL as the model for estimation. The results of the study showed that both in the short run and long run there exists positive relationship between population growth rate (PGR) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria; there exists negative and significant relationship between fertility rate (FR) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria; and there exists negative and significant relationship between net migration (NEM) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria. The study therefore recommends that government should focus on building capacity of the productive population among the youth for a continuous improve in standard of living in Nigeria; that government should create more awareness on family planning so as to moderate numbers of child birth per woman; that government should discourage net migration so as to reduce the brain drains in Nigeria.

Keywords: Fertility rate, net migration, population growth, and standard of living.JEL Classification: J13, F22, J10, I31

INTRODUCTION

Background to the study

According to the United Nations World Population Prospects 2024, the estimated population of the World is 8,376,082,867, growing at an annual rate of 0.85%. That works out to a net change of approximately 190,795 people per day or 7,949 per hour. The population change in the World is driven by three components: approximately 132,399,173 births per year and 63,135,984 deaths per year, plus net migration. Together these components produce the overall growth rate of 0.85% per year. The total fertility rate stands at 2.24 children per woman. Since this is above the replacement level of 2.1, the population of the World is growing through natural increase. (Index Mundi, 2024).

According to Todaro and Smith (2011), problem of population growth is not simply a problem of numbers but also a problem of human welfare as well as development. Rapid population growth can have serious consequences for the well-being of all of humanity if development entails the improvement in people's levels of living - their incomes, health, education, and general well-being. An increasing productive population means an increase in the number of working populations, who can function as active participants in the process of economic growth and development. It is to be noted that labour, assisted by necessary tools and implements, was always and still is the greatest productive asset of nations. A growing population leads to an increase in total

output. A growing population means a growing market for most goods and services and we know that division of labour is limited by the extent of the market. A potentially expanding market may stimulate entrepreneurs to invest more and more in capital goods and machinery. Business activity will be spurred as a consequence. And more income and employment will be created in the process. Moreover, it will provide an outlet for the products of efficient, large scale, mass- production industries. The net effect may be favourable to the country.

Migration is a complex and multidimensional process which involves different motivations, with far-reaching impacts or consequences to the individual and the places of origin and destination. International Migration is a sensitive issue in discussions and debates in the international system. Bye and large, the most common form of migration found in the entire world is migration within a nation (Nanzip, 2020).

In Nigeria, high levels of unemployment, migrant remittances, population growth (Darkwah & Verter, 2014), unstable politics, ethno-religious conflicts and poverty (Adepoju, 2009; Young 2013) are the major factors promoting the massive movement of both men and women across and outside the country (Darkwah & Verter, 2014). Poor economic conditions and high level of poverty also force people to move as they search for better living conditions, especially the youth and young adults (Bezu & Holden, 2014). Migration in most cases does not only empower the migrant, but is also known for its relationship with the geographical and occupational mobility of labour, as the probability of moving within occupations is often higher with migration (Ghebru et al, 2018).

The Total Fertility Rate (TFR) is the average number of children a woman would have by the end of her childbearing years if she bore children at the current age-specific fertility rates. The high childbearing rate in Nigeria underscores the opportunities available to Nigerians as this creates unfavorable demographic conditions that may hinder accelerated economic growth. The prevailing high fertility rate in Nigeria has raised the curiosity of researchers in this field to increase their search for its underlying mechanisms. In this regard, numerous factors like education, religion, place of residence, sex preference, and cultural environment have been identified as being associated with fertility in Nigeria (Akpa and Ikpotokin, 2012).

Statement of the Problem

The total population in Nigeria was estimated at 182.2 million people in 2015, according to the estimated figures. Looking back, in the year of 1960, Nigeria had a population of 45.2 million people. The world population will reach 9.9 billion in 2050, rose up by 33 percent from an estimated 7.4 billion in 2016 *(*World Population Data Sheet from the Population Reference Bureau, 2016). The annual population growth estimates from the United Nations are in the millions - estimating that over 80 million new lives are added each year. (United Nations, 2019). Also, some countries measured by the International Monetary Fund to be less developed - having not attained a high degree of industrialization relative to their populations, and where the population typically has a medium to low standard of living, have sizeable populations, including Nigeria (over 190 million), Bangladesh (almost 165 million) and Mexico (around 129 million), indicating that the problems affecting less developed countries cut across various continents. However, in some areas, growth is slowing or even declining (World Population Review, 2019).

The ten known 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 but population growth has not been to the nation's advantage and has also led to unemployment rate hitting 30.7 percent (NBS, 2021). The health of an economy is determined by its gross domestic product (GDP) and other key economic indicators. A country with good infrastructure, improves literacy amongst the populace, unrestricted access to health care, standard of living, poverty reduction and other parameters which are elements of economic development. It is against this background that this study is set to investigate the impact of population growth and poverty on standard of living in Nigeria. Population growth has remained the most controversial issue in global development debate in history and in recent times. According to the pessimists' school of thought, population growth negatively affects economic growth and development to the extent that population growth, be it by natural growth or (net) immigration, puts pressure on the natural resources and the environment This pressure hampers economic growth and development The pessimists also emphasized that population growth worsen income inequality and decrease in quality of life. On the contrary, the optimists'

school of thought considers population growth a bonus for economic growth and development. Indeed, by increasing mass production and specialization, population growth gives rise to improved human capital which facilitates technological advancements which leads to economic expansion (Klasen & Nestmann, 2006). Another group, the mitigated view is held by the revisionists or neutralists school of thought. They believe that there is little evidence which indicates that population growth and economic growth is linked (Bloom, et al. 2003). The combination of these factors provoked many questions than answers and further stimulates the need for this study.

Objectives of the Study

The broad objective of this study investigates the effect of population on the standard of living in Nigeria. The study specifically:

1. examine the effects of population growth rate on standard of living in Nigeria
2. identify the impact of fertility rate on standard of living in Nigeria
3. determine the relationship between net migration and standard of living in Nigeria.

Research questions

This research study seeks answers for the following questions

1. What are the effects of population growth rate on standard of living in Nigeria?
2. To what extent does fertility rate affect standard of living in Nigeria?
3. What is the relationship between net migration and standard of living in Nigeria?

Hypotheses of the study

This study tests the following hypotheses:

Ho (1): population growth rate has no effect on standard of living in Nigeria

Ho (2): Fertility rate does not affect standard of living in Nigeria

Ho (3): There is no relationship between net migration and standard of living in Nigeria

Following this section is the review of relevant literature in section two, while section three presents the methodology of the study. Section four analyses the data, and discuss the results. Finally, section five presents summary, conclusion and makes recommendations.

LITERATURE REVIEW

Conceptual Review

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 or 1.1% per year. The global population has grown from 1 billion in 1800 to 7.8 billion. 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. 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 (Ritchie and Rodés-Guirao, 2024).

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:

$$population\ growth = \frac{p(t2) - p(t1)}{p(t1)(t2 - t1)}$$

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.

Below is a careful review of Nigeria's population growth rate:

The population of Nigeria in 2023 was 223,804,632, a 2.41% increase from 2022

The population of Nigeria in 2022 was 218,541,212, a 2.41% increase from 2021

The population of Nigeria in 2021 was 213,401,323, a 2.44% increase from 2020

The population of Nigeria in 2020 was 208,327,405, a 2.47% increase from 2019

The population of Nigeria in 2019 was 203,304,492, a 2.48% increase from 2018. (Macro trends, 2024).

From 2017 to 2050, it is expected that half of the world's population growth will be concentrated in just nine countries: India, Nigeria, the Democratic Republic of the Congo, Pakistan, Ethiopia, the United Republic of Tanzania, the United States of America, Uganda and Indonesia (ordered by their expected contribution to total growth). The group of 47 least developed countries (LDCs) continues to have a relatively high level of fertility, which stood at 4.3 births per woman in 2010-2015. As a result, the population of these countries has been growing rapidly, at around 2.4 % per year. Although this rate of increase is expected to slow significantly over the coming decades, the combined population of the LDCs, roughly one billion in 2017, is projected to increase by 33 % between 2017 and 2030, and to reach 1.9 billion persons in 2050. Similarly, Africa continues to experience high rates of population growth. Between 2017 and 2050, the populations of 26 African countries are projected to expand to at least double their current size. The concentration of global population growth in the poorest countries presents a considerable challenge to governments in implementing the 2030 Agenda for Sustainable Development, which seeks to end poverty and hunger, expand and update health and education systems, achieve gender equality and women's empowerment, reduce inequality and ensure that no one is left behind.

Total fertility rate and population ageing

Total fertility rate (TFR) refers to the amount number of children born during reproductive years by an average woman – from puberty to menopause. This rate is, in other words, the number of children a woman would have if she were susceptible to prevalent fertility rates at all ages (Todaro and Smith, 2011). The report highlights that a reduction in the fertility level results not only in a slower pace of population growth but also in an older population. Compared to 2017, the number of persons aged 60 or above is expected to more than double by 2050 and to more than triple by 2100, rising from 962 million globally in 2017 to 2.1 billion in 2050 and 3.1 billion in 2100.

In Europe, 25% of the population is already aged 60 years or over. That proportion is projected to reach 35% in 2050 and to remain around that level in the second half of the century. Populations in other regions are also projected to age significantly over the next several decades and continuing through 2100. Africa, for example, which has the youngest age distribution of any region, is projected to experience a rapid ageing of its population. Although the African population will remain relatively young for several more decades, the percentage of its population aged 60 or over is expected to rise from 5% in 2017 to around 9% in 2050, and then to nearly 20% by the end of the century. Globally, the number of persons aged 80 or over is projected to triple by 2050, from

137 million in 2017 to 425 million in 2050. By 2100 it is expected to increase to 909 million, nearly seven times its value in 2017 (Ritchie and Rodés-Guirao, 2024).

Net migration

Net migration refers to the difference between the number of people entering a country (immigrants) and those leaving it (emigrants) over a specific period. It is expressed as either a positive or negative figure. A positive net migration rate indicates more people are entering than leaving, while a negative rate shows more people are leaving than entering. According to the World Bank (2023), net migration is calculated as: "The number of immigrants minus the number of emigrants, including citizens and noncitizens, for a given period." Several factors contribute to net migration patterns:

Economic Opportunities

Countries with stronger economies often experience positive net migration as individuals seek better job prospects and living standards. For instance, the United States and Germany have long been net recipients of migrants due to robust labor markets (Dustmann & Frattini, 2014).

Conflict and Instability

War, persecution, and political instability are key push factors. Countries like Syria and Venezuela have experienced significant emigration, resulting in negative net migration (UNHCR, 2022).

Environmental Changes

Climate change has become a growing cause of displacement. Rising sea levels and extreme weather events have forced many to relocate, particularly in regions like the Pacific Islands and Sub-Saharan Africa (IOM, 2021).

Demographic Trends

Aging populations in developed countries lead to labor shortages, increasing demand for migrant labor. Japan and many European nations have responded with more open migration policies to offset demographic decline (OECD, 2022).

There continue to be large movements of migrants between regions, often from low- and middle-income countries toward high-income countries. The volume of the net inflow of migrants to high-income countries in 2010-2015 (3.2 million per year) represented a decline from a peak attained in 2005-2010 (4.5 million per year). Although international migration at or around current levels will be insufficient to compensate fully for the expected loss of population tied to low levels of fertility, especially in the European region, the movement of people between countries can help attenuate some of the adverse consequences of population ageing (Ritchie and Rodés-Guirao, 2024).

Standard of living

Standard of Living (Gross National Income per capita) The standard of living of a country is mainly measured by gross national income (GNI) per capita (formerly GNP per capita). GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. GNI, calculated in national currency, is usually converted to U.S. dollars at official exchange rates for comparisons across economies, although an alternative rate is used when the official exchange rate is judged to diverge by an exceptionally large margin from the rate actually applied in international transactions. To smooth fluctuations in prices and exchange rates, a special Atlas method of conversion is used by the World Bank (Index Mundi, 2024).

Nigeria Economy-An overview

Nigeria has been pursuing bold reforms since the inception of the new administration in May 2023, to re-establish macroeconomic conditions for stability and growth. The gasoline subsidy has been completely eliminated, and the exchange rate has been unified and allowed to be market-reflective, eliminating the parallel market premium and generating large fiscal and broader economic benefits. The Central Bank of Nigeria has appropriately tightened monetary policy and refocused on its price stability mandate, and ended deficit monetization. While these measures are helping Nigeria's economy turn the corner, inflation remains high, making it vital for the authorities to stay the course with tight monetary policy, exchange rate flexibility, and fiscal discipline. Poverty and hardship levels remain high following years of slow growth and high inflation. To support the poorest and most economically at-risk households, the government has been implementing targeted, temporary cash transfers, an effort that should be accelerated and expanded (CBN, 2024).

THEORETICAL REVIEW

The Malthusian theory is the most prominent theory applicable to the effect of population growth on standard of living. It posits that population growth, if unchecked, will eventually outpace the ability to produce food and resources, leading to a decline in per capita living standards and eventually a Malthusian catastrophe. Thomas Malthus (1766–1834) was an English clergyman who made dire predictions about earth's ability to sustain its growing population. According to Malthusian theory, three factors would control human population that exceeded the earth's carrying capacity, or how many people can live in a given area considering the amount of available resources. Malthus identified these factors as war, famine, and disease (Malthus 1798). He termed them "positive checks" because they increase mortality rates, thus keeping the population in check. They are countered by "preventive checks," which also control the population but by reducing fertility rates; preventive checks include birth control and celibacy. Thinking practically, Malthus saw that people could produce only so much food in a given year, yet the population was increasing at an exponential rate. Eventually, he thought people would run out of food and begin to starve. They would go to war over increasingly scarce resources and reduce the population to a manageable level, and then the cycle would begin anew.

Empirical review

Adenugba and Adesanya (2026) assessed the impact of migration on sustainable human development in Nigeria from 2015 to 2023, focusing on the socio-economic drivers of skilled workers' emigration, the implications of migration opportunities for sustainable development, and the role of remittances. Employing a qualitative research design, in-depth interviews were conducted with five officials in migration-focused organisations. The findings indicate that remittances are primarily used for family sustenance and that diaspora networks significantly enhance migrants' capabilities. The study concluded that migration profoundly affects Nigeria's sustainable development and recommended government collaboration with the diaspora to bolster opportunities for Nigerians worldwide.

Okon et-al (2026) examined the relationship between human fertility and economic growth in Nigeria and Ghana, utilizing annual time series data from 1980 to 2023. The study employed the ARDL estimation technique and found that the impact of the total fertility rate (measured by number of children per woman) on economic growth (measured by real gross domestic product growth rate) differs between the two countries. In Nigeria, the total fertility rate has a negative but not statistically significant effect on economic growth in the short run (-26.6782; P-value 0.1045), but a positive and statistically significant impact in the long run (17.9225; P-value 0.0380). In contrast, Ghana experiences a statistically significant negative effect on economic growth from its total fertility rate in both the short (-8.4670; P-value 0.0005) and long run periods (-10.5597; P-value 0.0028). The study recommends that policymakers in Nigeria focus on long-term economic growth by improving the quality of education and access, implementing family planning programs, and promoting vocational training. In Ghana, policymakers should implement family planning programs, integrate family planning education into school curricula, empower women, and allocate resources for family planning programs and human capital development.

Iheze, Okoro, and Chinatu (2025) examined the migration and remittance on economic growth in Nigeria. The specific objectives were to: ascertain the impact of migration on economic growth in Nigeria and determine the impact of remittance on economic growth in Nigeria. The research design was ex post-facto method. The variables consist of real Gross domestic Product (RGDP), net migration rate (NMG), international migration stock (IMG), diaspora remittance (REM), trade openness (TRADE) and exchange rate (EXCH) for the period of 1990 to 2024 The method of data analysis was divided into three phases namely: pre-estimation, estimation and post-estimation. The method of data analysis was Dynamic ordinary least square (DOLS). The empirical results showed that international migration has 10 percent negative and insignificant impact on economic growth (t-statistics; -0.3335; *p*-value; 0.7450 > Sig-value: 0.005) and diaspora remittance has positive and significant impact on economic growth (t-statistics; 7.7346; *p*-value; 0.0000 < Sig-value: 0.005). This study concludes that migration has 10 percentage negative and insignificant impact on economic growth in Nigeria while remittance has 60 percentage positive and significant impact on economic growth in Nigeria.

Geng (2024) explores the socioeconomic impact of Nigeria's high fertility rate and its influence on the country's economic development. With a fertility rate of 5.14 children per woman in 2022, far exceeding the global average, Nigeria faces significant demographic challenges. The analysis focuses on three critical data points: fertility rate, female tertiary education rate, and female labor force participation rate. The findings highlight how cultural factors, educational attainment, and labor market participation contribute to sustained high fertility rates, particularly in rural areas. Additionally, the paper examines how these factors exacerbate gender inequality and limit economic opportunities for women, thereby hindering Nigeria's overall economic progress. Policy recommendations include promoting female education and workforce participation to help manage population growth and stimulate economic development.

Omolua and Koru (2024) examined empirically the impact of population growth and poverty on standard of living in Nigeria from 1981 to 2023. The dimensions that were used to proxy the independent variables are population growth rate and poverty rate while gross national income per capita was used to proxy standard of living which is the dependent variable. The independent variables – population growth (was disaggregated into rural and urban population growth rate) and poverty rate. Data used were sourced from secondary sources which includes; World Bank development indicators for various years and the Central Bank of Nigeria annual statistical bulletin. The Statistical Software employed for the study was the e-views 9. The data collected were analyzed using the econometrics technique of Autoregressive Distributed Lags. The result indicated that population growth and poverty rate have effect on standard of living. The study therefore concludes that population growth rate and poverty reduce economic development in Nigeria within the period of study. The study therefore recommends that policies that would improve the share of working age population in the country in order to improve economic growth which in turn will improve standard of living should be encouraged especially in the rural areas. At micro level, households especially in the rural areas should also focus on children capacity building by ensuring children are well educated and trained across the endeavors of human life as this will alleviate poverty and brings about improvement in standard of living.

Obani and Odalonu (2023) examined the impact of migration on socio-economic development of Nigeria from 2015 to 2021. The study relied on secondary sources of data collection and data collected were analyzed using content analysis. The study is anchored on relative deprivation theory and argued that, poverty is the major driving force for migration of Nigerians to developed countries. The security, economic and political conditions in Nigeria have worsened the surge for people to migrate in search of better living conditions and safety. The study revealed that, Nigeria has lost skilled personnel with capacity of transforming the economy through the wealth of knowledge in their disposal to developed countries. The study concludes and recommended that, government should expedient efforts in tackling insecurity confronting the nation, create more job opportunities and improve the environment to stop people from migrating. Furthermore, good economic policies should be formulated and implemented to revamp the Nigeria economy to compete with developed world.

Adebowale et-al (2020) examined the relationship between household wealth and fertility in Nigeria with focus on women from poor and rich households. The study used national representative and cross-sectional design study involved analysis of four rounds (20 03, 20 08, 2013, 2018) of Nigeria Demographic Health and Survey data . The outcome variable was fertility measured from the full birth history information reported by women of reproductive age. Data were analyzed using descriptive statistics, direct and Gompertz-relational demographic

methods, logistic regression and negative binomial re- gression models (α= 0.05). Across the survey years, the mean number of children ever born (CEB), the total fertility rate and the percentage of women who had high fertility were consistently higher among the women from poor households than those from the rich households.

Duru (2021) examined the leading causes and consequences of international migration in Nigeria. A survey research design was utilized for the study. The data was collected through a structured questionnaire. The opinions of 100 respondents selected through the purposive sampling technique were obtained on the principal causes and consequences of international migration in Nigeria. The findings revealed that the principal causes of international migration in Nigeria were job opportunities, unemployment, wealth prospects, safety and security, better conditions of service, low salaries and higher standards of living.

Akinbode, et al. (2017) studied the dynamics of population and economic growth in Nigeria using Statistical Bulletin from 1970 to 2014. With the help of ADF test the study found that the two series were only difference stationary and Johansen co-integration test revealed that both variables had long –run relationship. VECM revealed that economic growth adjusts to its long –run equilibrium.

Olusogo and Oluwarotimi (2018) studied population growth and economic growth in Nigeria: An appraisal from 1981 to 2015 with the use of ordinary least squares regression to analyze the data from 1981 to 2015 with the use of ordinary least square regression to analyze the data. Population growth has positive and significant effect on economic growth of Nigeria and fertility is of negative impacted but significant to economic growth.

Lawanson (2016) examined rapid population growth and economic development in Nigeria. The study shows that the recent population growth in all regions of the world is the consequence not of increased birth rates per se, but of unprecedented worldwide decrease in the death rate in most case in developed economies. And emphasized that population of most LDC's are generally characterized by high dependency ratio, high urbanization, low income per capita and serious environmental problems caused as a result of urban congestion and pollution.

Asogwa and Ugwunta (2013) isolated the determinants of population growth in Nigeria as caused by uncontrolled fertility, and ascertained the relationship between the population growth offshoot and economic growth in Nigeria. The study employed data downloaded from the World Bank databank for a period of 51 years (1961-2011). Findings of the study determined that high fertility and birth rate contributes positively to high population growth while further findings revealed that high population growth rate in Nigeria exerts negative consequences on the Nigeria's economy. These negative consequences can be appreciated by high poverty, inadequate housing, poor sanitation, low standard of living, high unemployment rate and inflation, high pressures on existing infrastructural facilities etc.

Summary Of The Literature

Adenugba and Adesanya (2026) assessed the impact of migration on sustainable human development in Nigeria from 2015 to 2023 using in dept interview and found that remittances are primarily used for family sustenance and that diaspora networks significantly enhance migrants' capabilities. Okon et-al (2026) examined the relationship between human fertility and economic growth in Nigeria and Ghana, utilizing annual time series data from 1980 to 2023 using ARDL and found that in Nigeria, the total fertility rate has a negative but not statistically significant effect on economic growth in the short run but a positive and statistically significant impact in the long run. In addition, Iheze, Okoro, and Chinatu (2025) examined the migration and remittance on economic growth in Nigeria using Dynamic ordinary least square (DOLS) and found that international migration has 10 percent negative and insignificant impact on economic growth and diaspora remittance has positive and significant impact on economic growth. However, Geng (2024) explores the socioeconomic impact of Nigeria's high fertility rate and its influence on the country's economic development and the findings highlight how cultural factors, educational attainment, and labor market participation contribute to sustained high fertility rates, particularly in rural areas. Omolua and Koru (2024) examined empirically the impact of population growth and poverty on standard of living in Nigeria from 1981 to 2023. The result indicated that population growth and poverty rate have effect on standard of living. The study therefore concludes that population growth rate and poverty reduce economic development in Nigeria within the period of study. Adebowale et-al (2020) examined

the relationship between household wealth and fertility in Nigeria with focus on women from poor and rich households and found that the total fertility rate and the percentage of women who had high fertility were consistently higher among the women from poor households than those from the rich households. Furthermore, Akinbode, et al. (2017) studied the dynamics of population and economic growth in Nigeria using Statistical Bulletin from 1970 to 2014, and revealed that economic growth adjusts to its long –run equilibrium. In addition, Olusogo and Oluwarotimi (2018), studied population growth and economic growth in Nigeria: An appraisal from 1981 to 2015, and the result indicates that population growth has positive and significant effect on economic growth of Nigeria and fertility is of negative impacted but significant to economic growth. Asogwa and Ugwunta (2013) isolated the determinants of population growth in Nigeria as caused by uncontrolled fertility, and ascertained the relationship between the population growth offshoot and economic growth in Nigeria, and findings revealed that high population growth rate in Nigeria exerts negative consequences on the Nigeria's economy. The foregoing result concluded that these negative consequences can be appreciated by high poverty, inadequate housing, poor sanitation, low standard of living, high unemployment rate and inflation, high pressures on existing infrastructural facilities etc.

Contribution to the study/research gap

The reviews of the works of the previous authors shown that they dwelled more on the relationship between population and economic growth. The focus of this research study made a difference by investigating the effects of population growth, fertility rate and life expectancy at birth on standard of living in Nigeria. The study used gross national income per capita as proxy for standard of living, while some of the previous works reviewed used human development index, poverty rate etc. Also, the study employed the recent data along with the old ones in order to elucidate the current information about the research outputs.

METHODOLOGY

Research Design

The study adopted the Ex-post facto research design to examine the effects of population growth: birth rate, fertility rate and net migration on standard of living in Nigeria. Ex-post facto study or after the-fact research is a category of research design in which the investigation starts after the fact has occurred without interference from the researcher. Here the effect of two or more independent variable is investigated. This method allows the researcher to determine the effects of independent variables and also whether they interact in some way as they influence the dependent variable. The present study adopted the Ex-post facto research design because the fact has already occurred, and secondly it involves the investigation of the effects of two or more independent variables on the dependent variable.

Model Specification

This model specification was based on the modification of the work of Omolua and Koru (2024) which used standard of living proxy by gross national income per capita as dependent variable and independent variables were proxy by urban population growth, rural population growth and poverty rate. In addition, the study was based on the Mathusians theory.

Mathematical Model:

GNIPC = f(PGR, FR, NEM) ----------eq 1

GNIPC = Gross national income per capita (Source: WDI)

PGR = Population growth rate (Source: WDI)

FR = Fertility rate (Source: WDI)

NEM = Net Migration (Source: WDI)

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

GNIPC = β0+β1PGR+ β2FR+β3NEM + μ1t ----------eq 2

where: GNIPC = Gross National Income Per Capital a proxy for standard of living

β0 = Constant term,

β1, β2, β3 = the coefficient of population growth, fertility rate and net migration to be determined.

μ1t = error or stochastic term.

Apriori expectation: β1<0, β2<0, β3 <0

Null Hypotheses (Ho): β1= β2 = β3 = 0

Source of data

Secondary data for this study were obtained from the World Development Indicators for the year 2024 published by the World Bank. The secondary data represent the existing data upon which the statistical inferences can be computed. The study employed three years moving average statistical method in order to adjust for the missing data of the variables under study, which are gross national income per capita, population growth rate, fertility rate and net migration.

Data analysis techniques and estimation methods

The data analysis techniques depend on the result of the unit root tests – which revealed the order of integration among the variables. Thus, the choice of estimation techniques shall follow the output of the unit roots tests.

ANALYSIS, RESULTS AND DISCUSSION

Descriptive statistics

Table 1: Standard of living and population growth variables

	GNIPC	PGR	FR	NEM
Mean	3752.437	2.611030	5.921258	30170.40
Median	2800.688	2.657389	6.086000	62838.50
Maximum	5527.086	3.120664	6.847000	198672.0
Minimum	2450.536	2.092817	4.482000	-507539.0
Std. Dev.	1200.348	0.254348	0.688911	108008.8
Skewness	0.313752	-0.750612	-0.840769	-2.726094
Kurtosis	1.272694	3.210832	2.646954	14.42476
Jarque-Bera	6.473252	4.404737	5.658401	307.1488
Probability	0.039296	0.110541	0.059060	0.000000
Sum	172612.1	120.1074	272.3779	1387838.
Sum Sq. Dev.	64837638	2.911173	21.35690	5.25E+11
Observations	46	46	46	46

Source: Author's computation from E-view 10

Table 1 indicates that the mean gross national income per capita in Nigeria from 1980 to 2025, stands at N2752.437. The maximum of the gross national income per capita stands at N5527.06 and was attained in the year 2015, while the minimum gross national income per capita stands at N2450.536 and was recorded in the year 2000. Thus, the foregoing result shows a declined in the gross national income per capita, this is an

indication of a reduction in the standard of living in Nigeria comparing the value of gross national income per capita in 2015 with that of 2000. The average mean values of population growth rate (PGR), fertility rates (FR) and net migration are 2.611030, 5.921258 and 30170.40 respectively. The population growth rate, fertility rates and net migration were negatively skewed, while the gross national income per capita was positively skewed. The values of kurtosis for gross national income per capita and fertility rate are less than 3, and refer to as platykurtic while values of kurtosis for population growth rate and net migration are greater are greater 3, and refer to as leptokurtic. The normality test based on Jarque-Bera test with the probability values showed that only population growth is normal with probability greater than 5% level of significance.

Test for correlation among independent variable

Table 2: Correlation coefficient analysis

	PGR	**FR**	**NEM**
PGR	1.000000		
FR	0.867459	1.000000	
NEM	0.413985	0.342621	1.000000

Source: Authors computation from E-view 10 software

Table 2 shows that fertility rate and population growth are positively correlated. Also there exists a positive correlation between net migration and population growth. In addition, there exists a positive correlation between net migration and fertility rate. Since the maximum value of correlation coefficient among the independent variables was approximately 0.9, then the variables are freed from multicollinearity.

Unit root test

Table 3: Phillips-Perron Test @ 5% critical value

Variables	Level	1st Difference	2nd Difference	Integration of Order
GNIPC	-1.779582	-6.255044***	–	I(1)
PGR	-1.681258	-5.482597***	–	I(1)
FR	-3.137129***	–	–	I(0)
NEM	-6.401242***	–	–	I(0)

Source: Author's computation from E-view 10. (*** represent 1% probability level)

Table 3 shows that fertility rate and net migration (NEM) are stable at level while gross national income per capita (GNIPC) and population growth (PG) are stable at first difference. Thus, the foregoing results with integration order between 0 and 1 suggest the use of Autoregressive Distributed L ag ARDL as the model for the estimations of the variables under study. Pesaran and Shin (1999), developed ARDL framework for estimating dynamic relationships among variables with the order of integration fallen between 0 and 1. The model incorporates both lagged dependent variables (autoregressive terms) and lagged explanatory variables (distributed lag terms), making it suitable for capturing dynamic adjustment. In 2001, Pesaran, Shin and Smith introduced ARDL bounds test for cointegration.

ARDL F-Bound Test for the model

Having obtained the results of unit roots for all variables to be stationary at levels and first differences, we conduct bound co-integration test in order to know if there is a long run relation among the variables within the model.

Table 4: F-Bound Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)

			Asymptotic: n=1000	
F-statistic	5.868340	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: Author's computation from E-view 10.

Table 4 shows that F-statistic is greater than lower and upper bound critical values at 5% and 1% respectively, therefore we can state that there exists a long run relationship among the variables. Thus, the variables will eventually attain a state of equilibrium or stable state.

Optimal Lag length

Table 5: Lag length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-841.0967	NA	3.53e+12	40.24270	40.40819	40.30336
1	-634.6479	363.7431	4.08e+08	31.17371	32.00117	31.47701
2	-577.7407	89.42564	59484444	29.22575	30.71518 *	29.77168*
3	-564.1595	18.75498	70659206	29.34093	31.49233	30.12950
4	-540.9687	27.60810*	56150825*	28.99851 *	31.81188	30.02972
* indicates lag order selected by the criterion						

Source: Author's computation from E-view 10.

Table 5 shows that the maximum lag for the model is 4, owing to the fact that high numbers of lag selection criterion supported lag 4, which is indicated by (*).

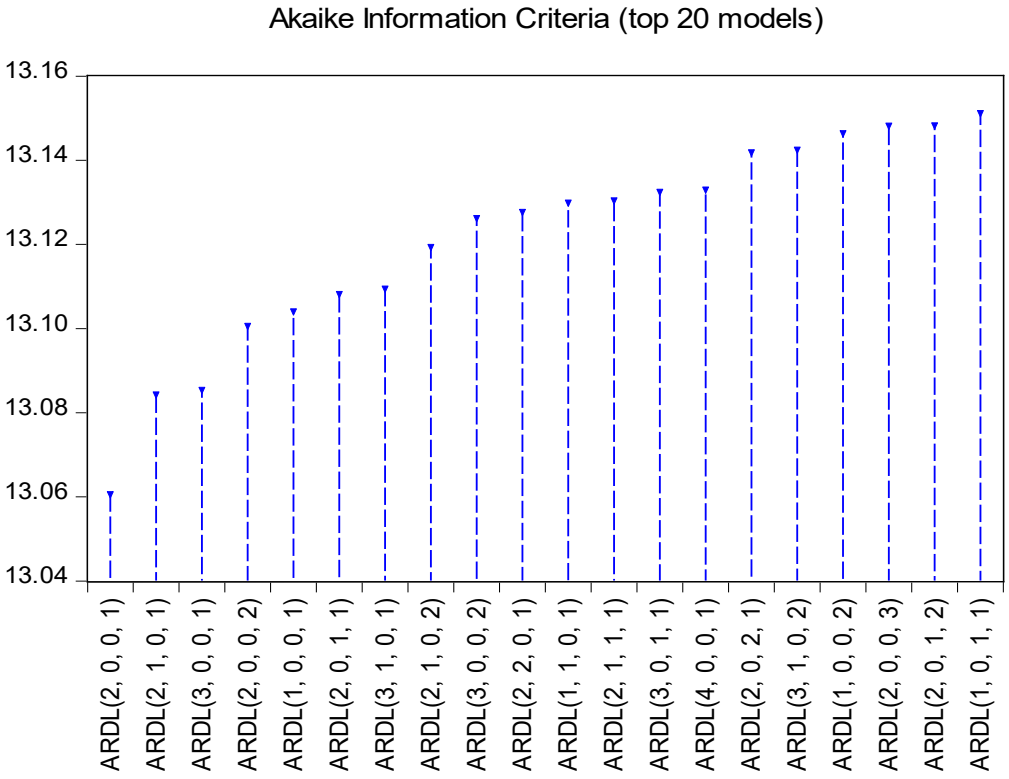

Figure 1: Criteria graph

Source: Computation by the Author using E-view 10 software

ARDL Result and Interpretation

Table 6: ARDL Result with GNIPC as dependent Variable

Selected Model: ARDL(2, 0, 0, 1)				
Note: final equation sample is larger than selection sample				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GNIPC(-1)	0.623649	0.156325	3.989427	0.0003
GNIPC(-2)	0.236778	0.148411	1.595424	0.1191
PGR	1440.855	294.5392	4.891897	0.0000
FR	-556.8110	140.3410	-3.967557	0.0003
NEM	-0.000682	0.000267	-2.550981	0.0150
NEM(-1)	-0.000713	0.000268	-2.657519	0.0116
C	173.6179	544.0727	0.319108	0.7514
R-squared	0.986131	Mean dependent var		3798.689
Adjusted R-squared	0.983882	S.D. dependent var		1207.272
S.E. of regression	153.2698	Akaike info criterion		13.04719
Sum squared resid	869190.3	Schwarz criterion		13.33103
Log likelihood	-280.0381	Hannan-Quinn criter.		13.15245
F-statistic	438.4790	Durbin-Watson stat		1.988176
Prob(F-statistic)	0.000000			
*Note: p-values and any subsequent tests do not account for model selection.				

Source: Author's computation from E-view 10

Table 6 shows the dynamics and short run relationship among the variables. The R-square is 0.986131and adjusted R–square is 0.983882, the foregoing results show that 98.6% of the explanatory variables explain the dependent variable – gross national income per capita (GNIPC) While the F-statistic value is 438.4790 at 1 % level of probability. The Durbin-Watson value is1.988 176 (approximately 2.0), which showed that the equation is not spurious and devoid of serial correlation.

The coefficient of one year lag gross national income per capita (GNIPC) is 0.623649 and significant at 1% level of probability. A unit increase in one year lag gross national income per capita (GNIPC) is associated with an increase of approximately 0.624 units in the current gross national income per capita (GNIPC). Thus, there exists positive relationship between one year lag gross national income per capita (GNIPC) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria.

The coefficient of two years lags gross national income per capita (GNIPC) is 0.236778 and insignificant. A unit increase in two years lags gross national income per capita (GNIPC) is associated with an increase of approximately 0.238 units in the current gross national income per capita (GNIPC). Thus, there exists positive relationship between two years lags gross national income per capita (GNIPC) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria.

The coefficient of population growth rate (PGR) is 1440.855 and significant at 1% level of probability. A unit increase in population growth rate (PGR) associated with an increase of approximately 1441 units in current gross national income per capita (GNIPC). Thus, there exists positive relationship between population growth rate (PGR) and current gross national income per capita (GNIPC). This foregoing result implies that population growth rate directly related to the current gross national income per capita - proxy for standard of living in Nigeria.

The coefficient of fertility rate (FR) is -556.8110 and significant at 1% level of probability. A unit increase fertility rate (FR) is associated with a decrease of approximately 557 units in current gross national income per capita (GNIPC). Thus, there exists negative relationship between fertility rate (FR) and current gross national income per capita (GNIPC). The foregoing result specified that fertility rate (FR) is indirectly related to gross national income per capita (GNIPC) - proxy for standard of living in Nigeria.

The coefficient of net migration (NEM) is -0.0000267 and significant at 5% level of probability. A unit increase in net migration (NEM) is associated with a decrease of approximately 0.00003 units in gross national income per capita (GNIPC). Thus, there exists negative relationship between net migration (NEM) and current gross national income per capita (GNIPC). The foregoing result specified that net migration (NEM)is indirectly related to gross national income per capita (GNIPC) - proxy for standard of living in Nigeria.

The coefficient of one year lag net migration NEM (-1) is -0.000713 and significant at 5% level of probability. A unit increase in one year lag net migration (NEM) is associated with a decrease of approximately 0.0007 units in gross national income per capita (GNIPC). Thus, there exists negative relationship between one year lag net migration (NEM) and current gross national income per capita (GNIPC). The foregoing result specified that one year lag net migration NEM(-1) is indirectly related to gross national income per capita (GNIPC) - proxy for standard of living in Nigeria.

Coefficient Diagnostics:

Table 7: Error Correction Model

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GNIPC(-1))	-0.236778	0.134295	-1.763123	0.0861
D(NEM)	-0.000682	0.000196	-3.483448	0.0013
CointEq(-1)*	-0.139573	0.024478	-5.702085	0.0000
R-squared	0.401376	Mean dependent var		57.33711
Adjusted R-squared	0.372175	S.D. dependent var		183.7580
S.E. of regression	145.6014	Akaike info criterion		12.86537
Sum squared resid	869190.3	Schwarz criterion		12.98702
Log likelihood	-280.0381	Hannan-Quinn criter.		12.91048
Durbin-Watson stat	1.988176			
* p-value incompatible with t-Bounds distribution.				

Source: Author's computation from E-view 10

Table 7 reveals that co-integration coefficient is – 0.139573 which confirm that the speed of adjustment between short run and long run equations is approximately 14 with the expected negative value and significant at 1% probability level. The R–square and adjusted R-square are 0.401376 and 0.372175 respectively. Thus, the foregoing value of adjusted R-square indicated that 37% of the explanatory variables explain the dependent variable. The value of Durbin Watson is 1.988176 (approximately 2), which indicated no linear serial correlation and that the equation is not spurious.

Table 8: Long run Coefficient with Dependent variable – GNIPC

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PGR	10323.29	3022.755	3.415191	0.0016
FR	-3989.380	801.9058	-4.974874	0.0000
NEM	-0.009993	0.003290	-3.037511	0.0044

C	1243.919	3538.956	0.351493	0.7272
EC = GNIPC - (10323.2867*PGR -3989.3802*FR -0.0100*NEM + 1243.9195)				

Source: Author's computation from E-view 10

Population growth rate (PGR)

Table 8 shows that in the long run the coefficient of the population growth rate is 10323.29 and significant at 1% level of probability. A unit increase in population growth rate is associated with an increase of approximately 10323.3 units in current gross national income per capita (GNIPC). Thus, there exists a positive and significant relationship between population growth rate and current gross national income per capita within the periods of study. This foregoing result implies that population growth rate is directly related to the current gross national income per capita - proxy for standard of living in Nigeria.

Fertility rate (FR)

The coefficient of the fertility rate is (-3989.38) and significant at 1% level of probability. A unit increase in fertility rate is associated with a decrease of approximately 3989.4 units in gross national income per capita (GNIPC). Thus, there exists a negative and significant relationship between fertility rate and gross national income per capita within the periods of study. This foregoing result implies that fertility rate is inversely related to gross national income per capita - proxy for standard of living in Nigeria.

Net migration (NEM)

The coefficient of the net migration is (-0.009993) and significant at 1% level of probability. A unit increase in net migration is associated with a decrease of approximately 0.00999 units in gross national income per capita (GNIPC). Thus, there exists a negative and significant relationship between net migration and gross national income per capita within the periods of study. This foregoing result implies that net migration is inversely related to gross national income per capita - proxy for standard of living in Nigeria.

Residual Diagnostic:

Table 9: Correlogram Q Statistic

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	-0.011	-0.011	0.0059	0.939
. |*. |	. |*. |	2	0.090	0.089	0.3920	0.822
.*| . |	.*| . |	3	-0.183	-0.183	2.0484	0.562
**| . |	**| . |	4	-0.292	-0.314	6.3741	0.173
.*| . |	.*| . |	5	-0.130	-0.128	7.2455	0.203
.*| . |	.*| . |	6	-0.084	-0.085	7.6194	0.267
. |*. |	. | . |	7	0.104	0.006	8.2126	0.314
. |*. |	. | . |	8	0.081	-0.041	8.5817	0.379
. |*. |	. | . |	9	0.094	-0.023	9.0897	0.429
. | . |	. | . |	10	0.017	-0.032	9.1072	0.522
.*| . |	.*| . |	11	-0.110	-0.114	9.8471	0.544
**| . |	***| . |	12	-0.327	-0.376	16.615	0.165
.*| . |	**| . |	13	-0.118	-0.209	17.530	0.176
. | . |	. | . |	14	0.009	-0.049	17.535	0.229
. |*. |	.*| . |	15	0.104	-0.109	18.284	0.248
. |** |	.*| . |	16	0.227	-0.100	22.007	0.143
. |*. |	.*| . |	17	0.084	-0.161	22.531	0.165
. |*. |	. | . |	18	0.108	-0.050	23.432	0.175
. | . |	.*| . |	19	-0.052	-0.066	23.650	0.210

. | . |	. | . |	20	0.023	0.032	23.696	0.256
*Probabilities may not be valid for this equation specification.						

Source: Author's computation from E-view 10

Table 9 indicates the correlograms of Q statistic which can be used to check autoregressive conditional heteroskedasticity (ARCH) in the residuals. We confirmed that in the estimated equation/model there is ARCH in the residuals, the autocorrelations and partial autocorrelations are not zero at all lags and the Q-statistics are significant.

Table 10: Correlogram of Residual Squared

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. | . |	. | . |	1	-0.029	-0.029	0.0392	0.843
. |** |	. |** |	2	0.239	0.239	2.8001	0.247
. | . |	. | . |	3	-0.023	-0.011	2.8256	0.419
. |** |	. |** |	4	0.270	0.225	6.5116	0.164
.*| . |	.*| . |	5	-0.079	-0.069	6.8352	0.233
. | . |	.*| . |	6	0.033	-0.081	6.8936	0.331
.*| . |	.*| . |	7	-0.100	-0.075	7.4454	0.384
.*| . |	.*| . |	8	-0.067	-0.138	7.6966	0.464
.*| . |	. | . |	9	-0.110	-0.052	8.3933	0.495
. | . |	. |*. |	10	0.046	0.103	8.5166	0.579
.*| . |	. | . |	11	-0.116	-0.047	9.3390	0.591
. | . |	. | . |	12	0.009	0.033	9.3439	0.673
.*| . |	. | . |	13	-0.111	-0.065	10.145	0.682
. | . |	.*| . |	14	-0.023	-0.101	10.179	0.749
.*| . |	.*| . |	15	-0.125	-0.083	11.276	0.733
.*| . |	.*| . |	16	-0.072	-0.112	11.648	0.768
.*| . |	.*| . |	17	-0.121	-0.067	12.745	0.753
.*| . |	.*| . |	18	-0.109	-0.071	13.663	0.751
.*| . |	. | . |	19	-0.103	-0.049	14.526	0.752
.*| . |	.*| . |	20	-0.098	-0.067	15.342	0.757
*Probabilities may not be valid for this equation specification.						

Source: Author's computation from E-view 10

Table 10 shows the correlogram of the residual square and we confirmed that in the estimated equation/model there is ARCH in the residuals, the autocorrelations and partial autocorrelations are not zero at all lags and the Q-statistics are significant

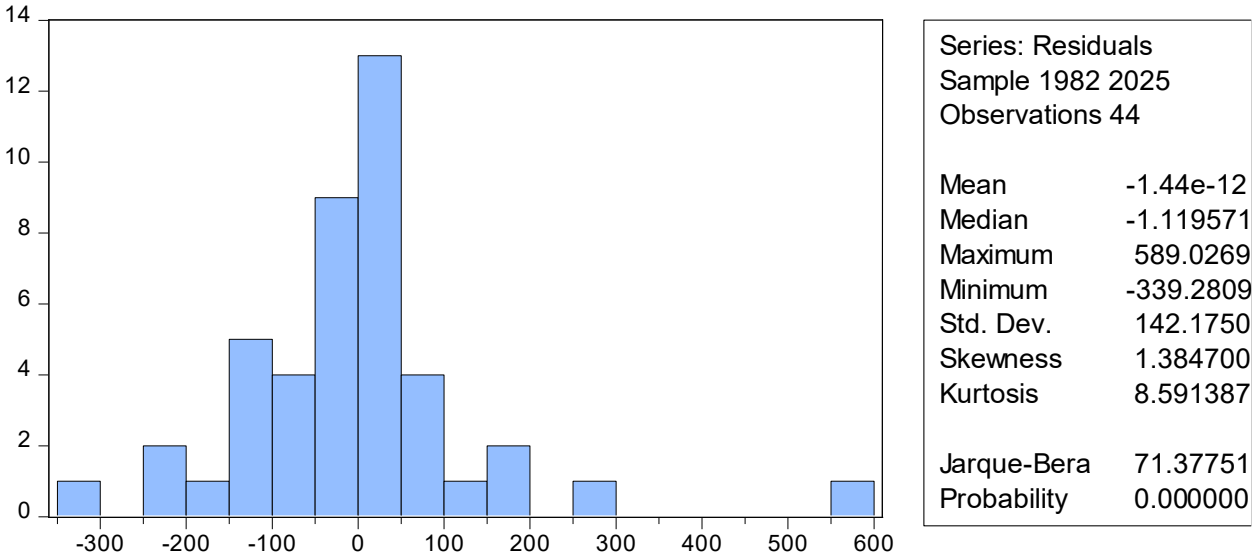

Figure 2: Histogram for the model

Source: Author's Computation from E-View 10.

Figure 2 displays a histogram and descriptive statistics of the residuals, including the Jarque-Bera statistic for testing normality. If the residuals are normally distributed, the histogram should be bell-shaped and the Jarque-Bera statistic should not be significant. Thus, the residuals of this model are not bell shaped and not normally distributed since the probability of Jarque-Bera statistic is significant.

Table 11: Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.514910	Prob. F(2,35)	0.6020
Obs*R-squared	1.257628	Prob. Chi-Square(2)	0.5332

Source: Author's Computation from E-View 10

In Table 11, the Breusch-Godfrey Serial Correlation LM Test was conducted to examine the presence of serial correlation in the residuals. The results show an F-statistic of 0.514910 with a probability value of 0.6020 and Obs*R-square statistic of 1.257628 with a probability value of 0.5332. Since both probability values are greater than the 5% significance level, the null hypothesis of no correlation is accepted. Thus, it is concluded that the residuals exhibit no serial correlation.

Table 12: Heteroskedasticity Test: Breusch-Pagan-Godfrey

Null hypothesis: Homoskedasticity			
F-statistic	2.074466	Prob. F(6,37)	0.0799
Obs*R-squared	11.07572	Prob. Chi-Square(6)	0.0861
Scaled explained SS	29.72770	Prob. Chi-Square(6)	0.0000

Source: Author's Computation from E-View 10

Table 12 above shows that there is no evidence of the presence of heteroscedacity and no serial correlation since their p-values of F-statistics are considerably in excess of 0.05 (i.e. 5%).

Stability Diagnostic

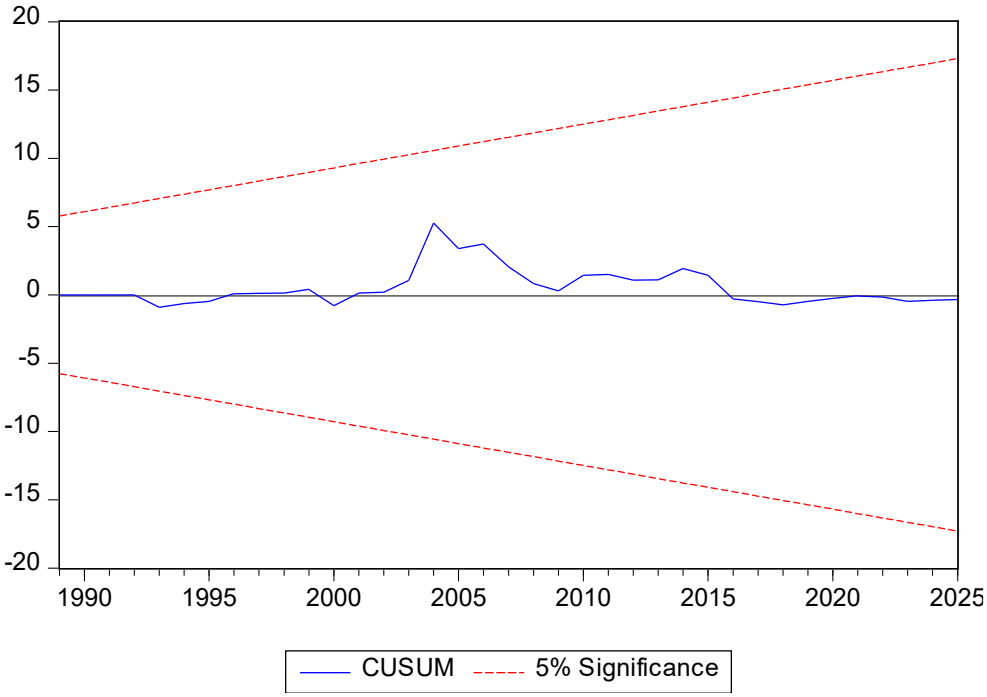

Figure 3: Stability Test – used Cusum Test after recursive estimate

Source: Author's Computation from E-View 10

It can be seen from the above view in figure 3 that the plot of CUSUM stays within the critical 5% bounds that confirms the long-run relationships among variables and thus showed the stability of coefficients.

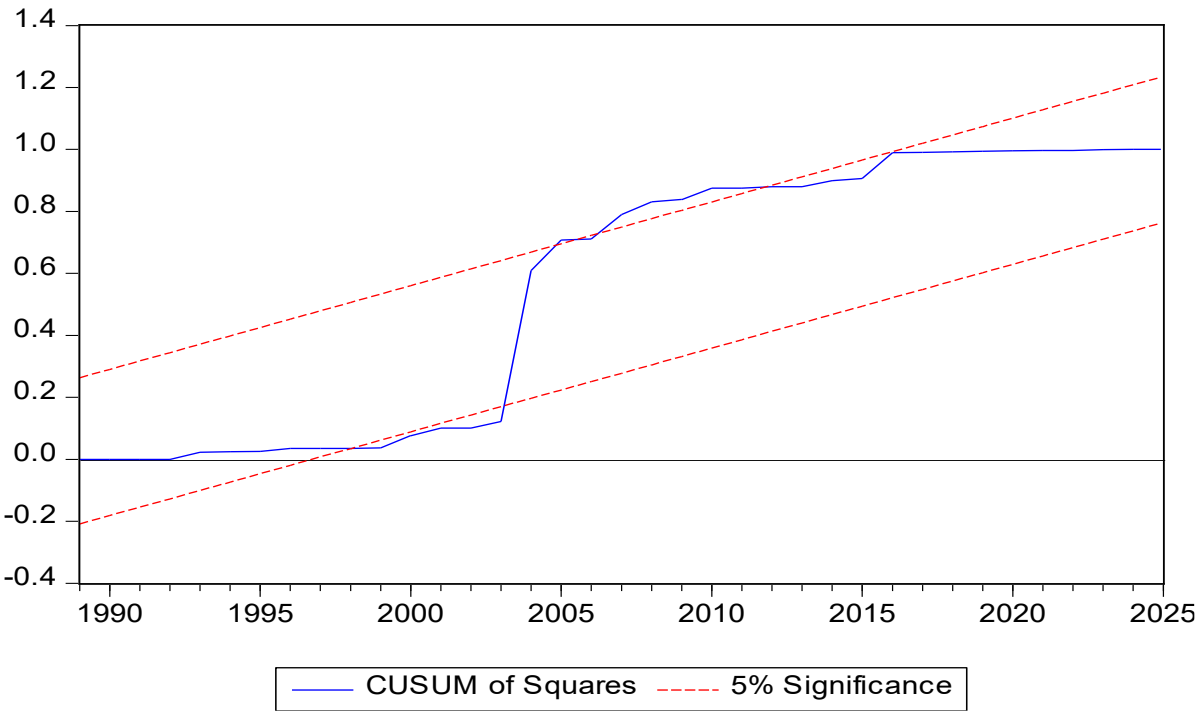

Figure 4: Cusum of Square

Source: Computation by the Author using E-view 10 software

It can also be seen from figure 4 that the plot of cusum of square stays within the critical 5% bounds that further confirms the long-run relationships among variables, and thus showed the stability of the coefficients within the model.

Hypothesis Testing and Interpretation

Having done all the diagnostic tests and confirmed the stability of the coefficients of the variables in the long run equation, we therefore attempted to test the stated hypothesis as follows:

To ascertain if the population growth rate variables have significant effect on gross national income per capita. The decision rule is that we reject the null hypothesis if t-statistic (computed value) is greater than the critical value (i.e. table value); otherwise, we accept the null hypothesis. Therefore, from the estimated result for long run form shown in table 7, the t-statistic for population growth in absolute term is (3.415191), greater than critical value 2.017 (i.e. area with df = 46-3 = 43; p=0.025. Thus, we reject the null hypothesis which stated that population growth rate has no significance effect on the standard of living proxied by gross national income per capita.

The t-statistic for fertility rate in absolute term is (-4.974874), greater than critical value 2.017 (i.e. area with df = 46-3 = 43; p= 0.025. Thus, we reject the null hypothesis which stated that fertility rate has no effect on the standard of living proxied by gross national income per capita

The t-statistic for net migration in absolute term is (-.037511), greater than critical 2.017 (i.e. area with df = 46-3 = 43; p=0.025. Thus, we reject the null hypothesis which stated that there is no relationship between net migration and standard of living proxied by gross national income per capita.

DISCUSSION

In the short run:

The finding of this study shows that there exists a positive and significant relationship between one year lag gross national income per capita (GNIPC) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria. Thus, there is a positive ripple effect of the previous year gross national income per capital on the current year gross national income.

The finding of this study reflects that there exists a positive and significant relationship between two years lags gross national income per capita (GNIPC) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria. Thus, there is a positive ripple effect of the two previous years gross national income per capital on the current year gross national income.

The finding of this study indicates that there exists positive and significant relationship between population growth rate (PGR) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria. This is contrary to apriori expectation ($\beta 1<0$), which sated that there is negative relationship between population growth and standard of living. Thus, the foregoing findings agreed with the work of Olusogo and Oluwarotimi (2018) their study concluded that population growth has positive and significant effect on economic growth and standard of living in Nigeria. This study is an indication of population dividend among the youths which constituted over 70% of the population in the Nigeria. In contrary, the foregoing finding disagreed with the works of Omolua and Koru (2024) and Lawanson (2016), which conclude that population growth rate and poverty reduce economic development in Nigeria within the period of study. This finding also disagreed with the Malthusians theory which posits that population growth, if unchecked, will eventually outpace the ability to produce food and resources, leading to a decline in per capita living standards and eventually a Malthusian catastrophe.

The finding of this study signifies that there exists negative and significant relationship between fertility rate (FR) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria. This finding agreed with aprori expectation ($\beta 2<0$). Thus, the foregoing result agreed the work of Okon et-al (2026) and

Asogwa and Ugwunta (2013), which stated that in Nigeria, the total fertility rate has a negative but not statistically significant effect on economic growth, while the finding disagreed with the work of Geng (2024).

The finding of this study shows that there exists negative relationship between net migration (NEM) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria. This finding agreed with the apriori expectation ($\beta 3 < 0$). Thus, the foregoing result agreed with the work of Obani and Odalonu (2023) which, revealed that Nigeria has lost skilled personnel with capacity of transforming the economy through the wealth of knowledge in their disposal to developed countries. Thus, the foregoing contributed to increase in the brain drains in Nigeria. While the finding disagreed with the work of Iheze (2026), Adenugba and Adesanya (2026) which stated that diaspora remittance has positive and significant impact on economic growth.

In the long run:

The finding revealed that there exists a positive and significant relationship between population growth rate and current gross national income per capita within the periods of study. Thus this finding is in contrary to apriori expectation ($\beta 1 < 0$), which sated that there is negative relationship between population growth and standard of living. Thus, the foregoing findings agreed with the work of Olusogo and Oluwarotimi (2018) their study concluded that population growth has positive and significant effect on economic growth and standard of living in Nigeria. This study is an indication of population dividend among the youths which constituted over 70% of the population in the Nigeria. In contrary, the foregoing finding disagreed with the works of Omolua and Koru (2024) and Lawanson (2016), which conclude that population growth rate and poverty reduce economic development in Nigeria within the period of study. This finding also disagreed with the Malthusians theory which posits that population growth, if unchecked, will eventually outpace the ability to produce food and resources, leading to a decline in per capita living standards and eventually a Malthusian catastrophe.

The findings shown that there exists a negative and significant relationship between fertility rate and gross national income per capita within the periods of study. This finding agreed with aprori expectation ($\beta 2 < 0$). Thus, the foregoing result agreed with the work of Okon et-al (2026) and Asogwa and Ugwunta (2013), which stated that in Nigeria, the total fertility rate has a negative but not statistically significant effect on economic growth, while the finding disagreed with the work of Geng (2024).

The findings indicated that there exists a negative and significant relationship between net migration and gross national income per capita within the periods of study. This finding agreed with aprori expectation ($\beta 2 < 0$). Thus, the foregoing result agreed with the work of Okon et-al (2026) and Asogwa and Ugwunta (2013), which stated that in Nigeria, the total fertility rate has a negative but not statistically significant effect on economic growth, while the finding disagreed with the work of Geng (2024).

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

Summary of findings

This study empirically investigated the effect of population on standard of living in Nigeria, and the following results were obtained in both short and long runs.

In the short run, the following were found:

- 98.6% of the explanatory variables explain the dependent variable – gross national income per capita (GNIPC) While the F-statistic value is 438.4790 at 1 % level of probability. The Durbin-Watson value is approximately 2.0, which showed that the equation is not spurious and devoid of serial correlation.
- there exists positive and significant relationship between one year lag gross national income per capita (GNIPC) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria.
- there exists positive and significant relationship between two years lags gross national income per capita (GNIPC) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria.
- there exists positive and significant relationship between population growth rate (PGR) and current gross national income per capita (GNIPC)- - proxy for standard of living in Nigeria.

- there exists negative and significant relationship between fertility rate (FR) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria.
- there exists negative and significant relationship between net migration (NEM) and current gross national income per capita (GNIPC) - proxy for standard of living in Nigeria.

While, in the long run the following were found:

- there exists a positive and significant relationship between population growth rate and gross national income per capita - proxy for standard of living in Nigeria within the periods of study.
- there exists a negative and significant relationship between fertility rate and gross national income per capita - proxy for standard of living in Nigeria within the periods of study.
- there exists a negative and significant relationship between net migration and gross national income per capita - proxy for standard of living in Nigeria. within the periods of study.

CONCLUSION

In an attempt to study the effect of population on standard of living in Nigeria, three objectives were set, which are: examine the effects of population growth rate on standard of living in Nigeria; identify the impact of fertility rate on standard of living in Nigeria; and determine the relationship between net migration and standard of living in Nigeria. We therefore concluded that population growth rate has positive effect on the standard of living in Nigeria; that fertility rate has negative and significant effect on standard of living in Nigeria; and finally, there exists a negative and significant relationship between net migration and standard of living in Nigeria.

RECOMMENDATION

Based on the findings of this study, the following recommendations are suggested:

- That due to positive relationship between population growth rate and gross national income per capita – proxy for standard of living, government should focus on building capacity of the productive population among the youth for continuously improve in standard of living in Nigeria.
- That due to negative and significant relationship between fertility rate and gross national income per capita– proxy for standard of living, government should create more awareness on family planning so as to moderate numbers of child birth per woman.
- That due to a negative relationship between net migration and gross national income per capita, government should discourage net migration so as to reduce the brain drains in Nigeria.

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Appendix

POPULATION AND STANDARD OF LIVING VARIABLES				
YEAR	GNIPC	PGR	FR	NEM
1980	2734.684	3.120664	6.847	198672
1981	2735.097	3.074953	6.82	106723
1982	2735.33	2.992319	6.799	101116
1983	2733.624	2.593771	6.775	-507539
1984	2736.338	2.562883	6.701	113758
1985	2736.028	2.833145	6.616	61514
1986	2728.506	2.716633	6.557	29682
1987	2744.478	2.664631	6.504	64418
1988	2735.101	2.674406	6.498	93510
1989	2705.941	2.692105	6.494	99588
1990	2792.392	2.702888	6.459	135959
1991	2706.97	2.641103	6.426	42760
1992	2618.46	2.625288	6.391	138412
1993	2505.767	2.650148	6.354	90200
1994	2539.845	2.641357	6.319	128134
1995	2568.873	2.636629	6.273	73243
1996	2652.382	2.614297	6.217	84448
1997	2669.43	2.603087	6.138	96885
1998	2645.037	2.613376	6.069	145575
1999	2672.198	2.635929	6.082	97195
2000	2450.536	2.674398	6.124	74535
2001	2637.644	2.716395	6.128	64163
2002	2644.969	2.741471	6.116	69594
2003	2808.983	2.756735	6.1	33857
2004	3685.942	2.77054	6.09	46370
2005	3669.013	2.768834	6.063	-17146
2006	4229.296	2.761247	6.053	-12093
2007	4210.624	2.771801	6.027	-9162
2008	4349.397	2.784534	6.024	-13646
2009	4475.747	2.787308	5.993	-18422
2010	4861.65	2.795149	5.948	47966
2011	4969.915	2.802785	5.893	67808
2012	5065.762	2.774229	5.797	71138
2013	5205.294	2.71469	5.694	40201
2014	5480.201	2.642214	5.622	-19376
2015	5527.086	2.536173	5.503	-116162
2016	5325.569	2.471832	5.343	75265
2017	5289.653	2.431709	5.182	78685
2018	5212.337	2.312173	5.021	-76565
2019	5275.853	2.194402	4.861	-99722
2020	5259.281	2.130297	4.7	-14497
2021	5249.157	2.096187	4.636	-86115
2022	5261.43	2.092817	4.552	-51680
2023	5256.623	2.098389	4.482	-57936
2024	5255.737	2.095798	4.556667	-35202
2025	5257.93	2.095668	4.530222	-48272.7

Source: Author Computatison from the World Development Indicators.