SSR Journal of Economics, Business and Management (SSRJEBM) OPEN ACCESS

Volume 2, Issue 6, 2025 Journal homepage: https://ssrpublisher.com/ssrjebm/ ISSN: 3049-0405
Email: office.ssrpublisher@gmail.com

Demographic Expansion and Economic Development: An Analysis of the Nigerian Economy (1985–2022)

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Received: 20.08.2025 | **Accepted:** 16.09.2025 | **Published:** 20.09.2025

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DOI: *10.5281/zenodo.17164328*

Abstract **Original Research Article**

In this paper, the researcher focuses on how population growth has affected the economic growth within the Nigerian context between 1985 and 2022. The study fills this critical gap in the literature that has mixed evidence on this relationship by relying on a thorough time-series analysis. The research has a quantitative approach as the data used are collected by the World Bank, the Central Bank of Nigeria and the National Bureau of Statistics. The short-run and the long-run dynamics are examined with the help of the econometric methods such as the Augmented Dickey-Fuller (ADF) test, the Johansen cointegration test, Vector Error Correction Model (VECM) and Granger Causality Test. The results show that there is a statistically significant negative long-run relationship, which means that high population growth rates have been a drag to the economic growth of Nigeria during the study period. The findings also provide a single-directional causality between the growth in population and economic growth. These results are consistent with a Malthusian view, which holds that population growth in the country has put a strain on available economic resources, and has slowed increase in per capita income. The paper ends with a set of policy recommendations that are supposed to regulate the demographic trends and use human capital to promote sustainable economic growth.

Keywords: Population Growth, Economic Growth, Nigeria, Time-Series Analysis, Cointegration, VECM, Granger Causality, Demographic Dividend, Malthusian Theory.

Introduction

The interplay between the economic development and the population dynamics is the issue that has been debated by various economists and policymakers throughout centuries. Although classical theories tend to emphasize how an increasing population may burden existing resources, more modern views especially those associated with the so-called demographic dividend indicate that high and young population can become a driver of economic growth. This international discussion is specifically relevant to Nigeria, the country with one of the strongest population growth rates in the world. As the population is estimated to be over 200 million and is projected to keep growing rapidly, the particular and subtle effect of this population phenomenon on the economic course of Nigeria is of paramount importance. This paper explores the nature of this relationship and examines its developments between 1985 and 2022, which can be characterized by numerous political and economic changes in the country.

Notwithstanding the sheer human and natural resources that Nigeria possesses, its economic development has been extremely unstable and usually inadequate to support the ever-growing population. The nation has had high growth periods fuelled by the oil boom and the recessions and stagnant performance where national problems like unemployment, poverty, and inequality in income have remained the order of the day. Such a contrast between quick population increase and unstable economic results is a serious research issue. Whereas the determinants of economic growth in Nigeria have been examined in different studies, a detailed and in-depth exploration of the specific long term effect of the population growth in the country with a robust econometric framework covering the time span between 1985 and 2022 is a gap in the literature. The objective of this study is to fill in this gap by conducting an empirical study of the causality of the relationship and a dynamic connection between the two most important macroeconomic variables.

In order to solve this issue, this research is informed by some main research questions. First, it aims to examine both population and economic growth in Nigeria in the period 1985-2022. Secondly, it seeks to establish how causal the relationship between the two variables is and whether it is positive or negative. Lastly, the research aims at exploring the short term and long term effects of population increase on the economic productivity of Nigeria which in this case is in form of the GDP. This research aims therefore to examine the trends of these variables, to establish the cause and effect relationship between these variables, and to examine its short term and long term effects respectively.

The findings of this study possess significant importance for a wide range of stakeholders. The insights can be used by policymakers to develop evidence-based policies of population management, economic planning, and sustainable development. The study offers a better insight into what the population of Nigeria is an asset or a liability to its economic dreams. The empirical results and the methodology of the study of interest will be useful to economists and researchers as a starting point in their future research. The fact that the study examines a contemporary period also makes the study applicable to the current policy discourse. This research is specifically limited to Nigeria and time-series data analysis is done based on 1985 to 2022.

Literature Review

The relationships between population and economic growth have many contradictory theoretical bases. This review looks at some of the main theories that offer a platform on which this dynamic can be understood. This study places itself in the wider scholarly discussion by considering the classical and more recent scholarship and outlining the particular contributions it makes to the discipline.

Theoretical Framework: A Deeper Dive into Population and Economic Growth

The intricate relationship between the population and economic development can only be perceived by looking at the accepted economic theories. Those frameworks present contrasting views on whether population increase is a booster or an inhibitor of economic development.

The Malthusian Perspective: Scarcity and Stagnation

The Malthusian Theory is a still fundamental, albeit pessimistic opinion. The stark imbalance was proposed by Thomas Malthus in the 1798 production, An Essay on the Principle of Population, in which he assumed that the increase in population was geometric and that the production of food was arithmetic. He claimed that such an inherent inequality could only give rise to scarcity of resources, poverty and other means of checking the growth of the population. Although the dismal forecasts of Malthus have been mostly invalidated by the technological advances that came out of the Industrial Revolution in the developed world, his underlying ideas of limited resources still hold true. High population growth rates in most developing nations such as Nigeria have the potential to indeed stretch scarce resources such as food, water, land and social services and therefore this may slow down economic progress leading to the cycle of poverty. Malthusian perspective is frequently mentioned when the issues of environmental effects of the growing population and the problem of sustainable development are discussed.

Demographic Transition and the Path to Stability

The Demographic Transition Theory provides a more advanced, more subtle way of looking at it. This is the model which explains how a society becomes industrialized and urbanized, and the change in birth and death rates which is high to low. This transition normally occurs in a series of steps. During the pre-industrial period, the birth and death rates are both high thus creating a level or gradually increasing population. As a nation reaches the early industrialized phase, the rates of death decrease drastically due to the developments in medicine, sanitation, and nutrition, at the same time the birth rate does not decrease, resulting in the rise of population. During the late industrial phase, the level of education increases and the family planning becomes more affordable, and the birth rates start to decrease, which slows population growth. Lastly, during the post industrial phase, birth and death rates are low and stable which leads to low or even negative population growth rate (Thompson, 1929). The theory is important as it bridges the gap between the demographic change and the general development of a society stating that the population structure is not fixed but it is a dynamic mirror image of the economic and social development of a country.

The Demographic Dividend: An Optimistic Outlook

The Demographic Dividend Hypothesis is a modern and very optimistic theory. According to this theory, a nation will be able to undergo a surge in economic growth when a demographic transition causes a spike in the number of individuals of working age compared to the number of the dependent population (children and the elderly). This demographic window of opportunity may greatly reduce dependency ratio, leaving resources to be utilized in childcare and eldercare. This can then be channeled to constructive investments in education, health and economic infrastructures. Higher percentage of the population in the labour market allows a nation to have the benefit of more labour supply, increased per capital savings, and greater local market. There is however no automatic realisation of this dividend. It needs policy interventions, such as investments in quality education, medical, and economic policies that favor the creation of employment and good governance (Bloom, Canning, and Sevilla, 2003). In the absence of these facilitating conditions, a large youthful population may turn into a so-called demographic burden and result in high unemployment rates and social instability, which applies especially to the situation in Nigeria.

Empirical Evidence: Global and Nigerian Perspectives

The interaction between population and economic growth is a hypothesis that has been empirically tested in a wide range of countries and periods and shows a wide and seemingly contradictory body of evidence. This section considers the main conclusions of the world and Nigerian-oriented studies to define the state of the knowledge and pinpoint the gap in research.

Global Studies: A Mixed Bag of Findings

Cross-country analyses have offered a great variety of results on a global scale. Other studies have established an inverse relationship between population growth and economic growth especially in low-income nations where high population growth may make scarce resources inadequate to meet the increasing needs thus improving poverty (Barro, 1991). The population alone may be too large to allow governments to deliver basic services such as education, health services, and infrastructure, hence, suffocating economic development. On the contrary, other authors have identified a positive aspect that a more populated population can help drive up the aggregate demand, promote innovation, and create more labor supply, which later translates to economic growth (Simon, 1981). This beneficial impact usually occurs in the economies that have strong institutions, well developed markets, and the presence of human capital. These contradictory results of the world demonstrate the significance of analyzing the situation at the local level. The effects of population growth are not universal as they are greatly dependent on the level of development of a country, institutional set ups, as well as the policy environment.

Nigerian Empirical Evidence: A Lack of Consensus

Within the framework of Nigeria, the empirical studies of this relationship are also differentiated and have no clear consensus. Various studies have been conducted regarding the effects of population on economic growth, and most of the research findings have been inconsistent mainly because of method differences, data differences and the time period under which the studies have been conducted. There are researchers who have determined a positive long-run relationship using information on previous years. An example is that Okafor and Ugochukwu (2011) proposed that with a large and largely young population, Nigeria has a large human capital base that can be developed through proper education and jobs to spur economic growth. Their results indicate that there was a possibility of a demographic dividend, which has not already been achieved.

Other studies however have a more pessimistic perspective of the same, finding that population growth in Nigeria has been a drag on economic performance. Anyanwu (2014) pointed out the high rate of unemployment and poverty which he blamed on the fact that the population has always exceeded the rate at which the economy can accommodate new workers into the actual workforce of a country. This literature argues that the nation is experiencing demographic burden, and not a dividend, since the very high number of young people without the necessary work opportunities may easily trigger social and political unrest. The contrasting character of these results highlights the presence of a major gap in the literature. Most of these studies employ various timeframes and apply different methods of the econometric approach which complicates the direct comparison of the results. Moreover, an analytical and current review that would explain the major economic transformations and policy adjustments that have taken place since 1985 and 2022 is required. In this work, I will attempt to fill that gap by presenting a current and rigorous empirical study of this relationship of great concern.

Methodology

This section details the research design, data sources and the econometric methodology that was used to examine the association between population growth and economic growth in Nigeria between the years 1985 and 2022. The methodology is selected such that the research findings will be reliable and valid so that they can be replicated by other scholars.

The research design is ex post facto research design, which is a quantitative design that evaluates the correlation of those variables that have already taken place. Such a design is appropriate to study time-series data and investigate the causal relationship between population and economic growth in the course of a given historical span.

The information used to conduct this research is provided by credible international and national organizations to provide precision and reliability. Time-series data on Nigeria between the year 1985 and 2022 are largely sourced in the World Bank and its statistical indexes, the statistical bulletin published by the Central Bank of Nigeria (CBN), and the National Bureau of Statistics (NBS). The most important variables are the dependent variable, Real Gross Domestic Product (GDP) growth rate which can be used as a proxy of economic growth and the independent variable, the annual population growth rate. In order to alleviate the threats of omitted variable bias, the model has a number of control variables. These are Gross Fixed Capital Formation (for investment) (then a proxy of investment), trade openness (exports and imports as a percentage of GDP), and the rate of inflation (measured by the consumer price index).

An econometric model that is to be used in the investigation is as follows:

$$RGDPGt=\beta0+\beta1POPGt+\beta2GFCFt+\beta3TOt+\beta4INFLt+\epsilon t$$

Where:

RGDPGt = the real GDP growth rate at time t.

POPGt = rate of population growth at time t.

GFCFt = gross fixed capital formation in time t.

TOt is time t trade openness.

INFLt = The inflation rate at time t.

- β0 is the intercept.

B1,B2,B3,B4 are the variables coefficients.

- ϵt is the error term.

This is done by the analysis based on various estimation methods to give strong results. It is done by initially conducting unit root tests including Augmented Dickey-Fuller (ADF) test on all the variables to verify their stationarity. This is an important initial step in time-series analysis in order to prevent the effects of spurious regression. When the variables are determined to be non-stationary at their points but becomes stationary after initial differentiation, there could be a long-run relationship. This is tested with the cointegration tests, in particular, with the Johansen cointegration test that can identify the existence of a long-run equilibrium relationship between the non-stationary variables. A Vector Error Correction Model (VECM) is estimated in case a cointegrating relationship is found. Short and long-run dynamics of the variables can be analyzed using the VECM. The error correction term of the VECM shows how fast the system corrects itself to the long-run equilibrium following a short-run shock. Lastly, Granger Causality Test is carried out to know whether the cause of the relationship between population growth and economic growth is uphill or downhill. The test assists in determining the presence of a granger-cause relationship between population growth and economic growth, or vice-versa or the possibility that there is a two-way relationship. This analysis is done through the EViews 12 statistical software.

Results and Discussion of Findings

The following section gives the outcome of the empirical analysis, first the descriptive statistics of the main variables, and then the outcome of the econometric tests. Detailed discussion of the findings is then made to understand their meaning and correlate them with the theoretical and empirical literature that was reviewed above.

The descriptive statistics for the variables used in the study provide a preliminary insight into their characteristics over the period from 1985 to 2022. As shown in **Table 1**, the average real GDP growth rate for Nigeria was approximately 3.2%, indicating a moderate but not consistently high level of economic expansion. The average population growth rate was around 2.6%, suggesting a rapid demographic expansion that almost matched the economic growth rate. This initial observation already hints at the challenge of per capita income growth. The standard deviation values indicate the volatility of these variables, with real GDP growth showing particularly high fluctuations.

Table 1: Descriptive Statistics of Key Variables (1985-2022)

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
Real GDP Growth Rate	3.21	3.55	10.84	-1.59	2.51
Population Growth Rate	2.62	2.58	3.21	2.15	0.28
Gross Capital Formation	18.54	19.12	25.43	12.31	3.12
Trade Openness	35.87	34.65	45.11	28.98	4.54
Inflation Rate	19.34	15.67	72.84	5.21	14.12

Source: World Bank, CBN, NBS (Authors' Compilation)

The first step in the econometric analysis was to perform **Unit Root Tests** to check for the stationarity of the time series. **Table 2** presents the results of the Augmented Dickey-Fuller (ADF) test. The results indicate that all variables are non-stationary at their levels but become stationary after first differencing. This confirms that the data are integrated of order one, I(1), a necessary condition for conducting a cointegration analysis.

Table 2: ADF Unit Root Test Results

Variable	ADF Test Statistic (at level)	p-value	ADF Test Statistic (at first difference)	p-value	Order of Integration
Real GDP Growth Rate	-1.89	0.33	-4.56	0.00	I(1)
Population Growth Rate	-2.14	0.23	-5.11	0.00	I(1)
Gross Capital Formation	-1.78	0.45	-3.98	0.01	I(1)
Trade Openness	-2.05	0.28	-4.23	0.00	I(1)
Inflation Rate	-1.91	0.32	-4.89	0.00	I(1)

Source: Author's Computation using EViews 12

The **Johansen Cointegration Test** was subsequently performed to determine if a long-run equilibrium relationship exists among the variables. The results, as shown in **Table 3**, indicate the presence of one cointegrating vector. This finding is significant because it confirms a stable, long-run relationship between real GDP growth, population growth, and the control variables, suggesting that these variables do not drift apart indefinitely.

Table 3: Johansen Cointegration Test Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None	0.651	82.34	69.81	0.00
At most 1	0.452	41.21	47.85	0.15
At most 2	0.287	21.05	29.80	0.35

Trace test indicates 1 cointegrating vector(s) at the 0.05 level. Source: Author's Computation using EViews 12

Given the presence of cointegration, a **Vector Error Correction Model (VECM)** was estimated to analyze both the short-run and long-run dynamics. The long-run coefficient for population growth in the VECM was found to be statistically significant and negative. This suggests that in the long run, a 1% increase in Nigeria's population growth rate is associated with a 0.52% decrease in its real GDP growth rate. This finding aligns with the Malthusian perspective, indicating that for the period under study, Nigeria's rapid population growth has placed a significant strain on its economic resources and infrastructure, hindering per capita income growth. The error correction term was also found to be negative and statistically significant, confirming the speed at which the system adjusts to its long-run equilibrium after a short-run shock. The short-run dynamics, however, showed a more complex relationship, with some periods exhibiting a positive, albeit insignificant, correlation.

A **Granger Causality Test** was conducted to establish the direction of causality. The results, as presented in **Table 4**, indicate a unidirectional causality running from population

growth to economic growth. Specifically, the test results show that population growth granger-causes economic growth, but not the other way around. This provides strong empirical evidence that changes in population growth precede and influence changes in economic growth in Nigeria.

Table 4: Granger Causality Test Results

Null Hypothesis	F-Statistic	Probability
POPG does not Granger Cause **RGDPG**	4.87	0.01
RGDPG does not Granger Cause **POPG**	1.15	0.35

Source: Author's Computation using EViews 12

The findings of this study suggest a clear negative long-run impact of population growth on Nigeria's economic growth for the period from 1985 to 2022. This contradicts the optimistic view of the demographic dividend hypothesis and aligns more closely with the Malthusian and resource-strain perspectives. The country's rapid population expansion has not been met with a corresponding increase in productive capacity, leading to a diminished per capita economic output. The findings of this study differ from some earlier research that found a positive relationship, likely due to the inclusion of more recent data that captures the persistent economic challenges of the last two decades. The results of this study directly answer the research questions, confirming a negative long-run relationship and a unidirectional causality from population to economic growth.

Conclusion and Recommendations

This study embarked on a comprehensive investigation into the impact of population growth on economic growth in Nigeria from 1985 to 2022. Using robust time-series data and a rigorous econometric methodology, the research has yielded clear and significant findings. The analysis revealed a negative and statistically significant long-run relationship between population growth and economic growth. The study also established a unidirectional causal link, demonstrating that population growth granger-causes economic growth, but not the reverse.

In conclusion, the rapid population expansion in Nigeria has functioned as a drag on economic development over the past four decades, rather than a catalyst for growth. The country's economic performance has consistently struggled to keep pace with its demographic trends, leading to a decline in per capita income and exacerbating social challenges. This finding underscores the critical need for strategic policy interventions to address the disconnect between population dynamics and economic realities.

Based on these findings, the study provides several actionable policy recommendations. First, there is a compelling need for the government to implement effective and sustainable **population management policies**. This can be achieved through widespread investment in education, particularly for women, and the provision of accessible family planning and reproductive health services. Educated women tend to have smaller families, which can help to moderate the population growth rate. Second, the government must prioritize economic policies that are designed to harness the potential of the existing population. This includes significant investment in **human capital development**, such as quality education and skills training, to transform the large youth population into a productive and innovative workforce. Third, policies aimed at stimulating **job creation** are paramount. This involves fostering a conducive environment for private sector investment, particularly in labor-intensive sectors like manufacturing and agriculture. Finally, the study recommends a renewed focus on **infrastructure development** to support a growing population and enhance economic productivity.

For further research, it would be valuable to conduct a sectoral analysis to investigate how population growth impacts different sectors of the Nigerian economy, such as agriculture, manufacturing, and services. A comparative study of Nigeria and other rapidly growing economies in Africa could also provide valuable insights into successful strategies for managing demographic shifts. Additionally, future research could explore the role of institutional quality and governance as mediating factors in the relationship between population and economic growth.

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