

Innovations

The Nigerian Puzzle: Decoding Population Dynamics for Sustainable Economic Growth

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Abstract: Nigeria, Africa's most populous nation, faces significant challenges due to its rapid population growth, characterised by a fertility rate of 5.1 and population doubling every 29 years. These demographic trends have contributed to high poverty (over 40%), youth unemployment (33%), maternal mortality (1,047 per 100,000), low literacy (62%), and unequal resource distribution. These challenges may likely put significant pressure on Nigeria's resources and infrastructure. Without early policy interventions, these pressures could impede sustainable economic development. This study explores Nigeria's population dynamics, focusing on historical trends, current patterns, and future impacts on economic development. The research employs autoregressive distributed lag (ARDL) models, error correction estimation (ECM), and statistical forecasting to analyse the short- and long-term impacts of demographic factors on Nigeria's GDP growth. The findings reveal that population factors significantly influence economic performance, with inflation playing a variable role depending on management strategies. Notably, labour force participation and foreign direct investment (FDI) are essential drivers of growth, while past economic trends also shape future performance. The ARDL/ECM models explain 95.13% of GDP growth variation, confirming the importance of addressing long-term demographic and economic factors. The study concludes that proactive policy interventions are necessary to leverage demographic trends for sustainable economic benefits. Recommendations include controlling inflation, investing in human capital, developing infrastructure, and promoting stable domestic and foreign direct investment. Policymakers must incorporate past economic dynamics into their strategies to ensure sustainable growth and effectively manage Nigeria's demographic transitions.

Keywords: Population Dynamics, Economic Development, Nigeria, Impacts, ARDL/ECM, Forecast Analysis, Demographic trends.

1.0. Introduction

1.1. Introduction

In recent years, there has been a growing recognition of the significant link between population dynamics and economic development in Nigeria. According

to the World Bank (2021), Nigeria's population is projected to reach around 400 million by 2050. This is expected to put substantial pressure on the country's resources and infrastructure, which are critical for energy, food production, and security, potentially impeding economic development. Additionally, the United Nations (2022) highlighted that Nigeria's population growth rate is among the highest in the world. This growth is expected to significantly impact the country's labour force, urbanization, savings and investments, and overall economic development.

The impact of population dynamics on economic growth in Nigeria has been a subject of considerable interest, given Nigeria's fast-growing population and its implications for economic development. Several studies have examined different aspects of Nigeria's population dynamics, such as growth rates, age distribution, migration, and fertility patterns (see: Alimi et al., 2021; Ogbonna, 2022; Orji et al., 2019; Statista, 2023; United Nations, 2022). Yet, there is an evident gap in the literature regarding an in-depth and up-to-date understanding of how these population dynamics directly impact sustainable economic development in Nigeria. While some studies have touched upon this subject, a holistic and comprehensive analysis is still lacking. Moreover, the existing literature mainly focuses on population challenges, whereas a distinct investigation of the potential opportunities that a well-managed population can offer for economic development in Nigeria remains largely unexplored.

The pressing need for Nigeria to address its population dynamics challenges and maximise the available opportunities in the context of sustainable economic development, and the urgency to inform policymakers, researchers, and other stakeholders about the intricate relationship between population dynamics and sustainable economic development motivate this study.

This study aims to provide an in-depth analysis of the interplay between population dynamics and economic development in Nigeria, and answer the following research questions: (i) How do historical and current population dynamics impact Nigeria's economic development? (ii) What are the long-term effects of demographic trends on Nigeria's economic growth? (iii) How can policymakers harness demographic dividends to promote sustainable economic development? (iv) What are the long-term impacts of inflation, foreign direct investment and labour force participation on Nigeria's economic performance? (v) What strategies are effective in managing inflation, labour force participation and attracting stable long-term foreign direct investment in Nigeria?

Specifically, this study examines the patterns, trends, and trajectory of Nigeria's population dynamics, assesses the impact of population dynamics on economic development in Nigeria, and identify strategy and policy interventions for harnessing the demographic dividend that will ultimately lead to sustainable economic development in Nigeria. Given the above, this study offers valuable insights for policymakers and relevant stakeholders to make informed decisions

regarding economic and population-related policies and strategies that can stimulate sustainable economic development in Nigeria.

1.2. Background

Nigeria, the most populous country in Africa, has experienced remarkable population growth. From circa 60 million people in 1960, the population surged to approximately 215 million in 2022, making it the seventh most populous nation globally. In 2022, its population growth rate was 2.41%, implying a doubling every 29 years. Estimates suggest its population will reach 223.8 million in 2023 and over 546 million by 2100. Nigeria's population is remarkably youthful, with a median age of 18.4 years, and about 62% of the population is under 25. There is significant regional variation in population density across its 36 states and the Federal Capital Territory (NPC, 2016; Statista, 2023; World Bank, 2022; United Nations, 2021; Worldometer, 2023).

Nigeria's significant population growth, with a fertility rate of 5.1 and a population doubling every 29 years, has given rise to an array of challenges, including a 40% poverty rate, 33% unemployment, a maternal mortality ratio of circa 1047, a 62% literacy rate, and disparities in resource distribution. Since the discovery of oil, the oil and gas sector has largely driven economic progress (Statista, 2023; World Bank, 2022; United Nations, 2022; Worldometer, 2023). Notably, little research has focused on the interplay between population dynamics and economic development in Nigeria.

Population dynamics, encompassing size, structure, and distribution, significantly influence factors such as natural resources, infrastructures, public services, and human capital. This relationship's intricacies can either stimulate or hinder economic growth, contingent on context and policies.

The debate on whether Nigeria's large, youthful population can drive economic development through investment in education, health and governance (Alimi, et al., 2021; Ogbonna, 2022; Oyinlola, et al., 2021; UNFPA, 2019), or if the high population growth impedes growth by straining resources, services, and stability (Cristea, 2023; Maja and Ayano, 2021; Orji et al., 2019; United Nations, 2021; Vanguard, June 2023; Adebayo and Özkan 2024; World Bank, 2021), remains ongoing.

Historically, Nigeria population transitioned from a stable, agrarian society to rapid urbanization driven following the oil discovery in the 1970s (Adenola and Saibu, 2017; Campbell, 1993; Owoo, 2021; This Day, Nov 2021). Also, with the advent of colonial rule, urbanization and migration patterns emerged, ushering in significant shifts in the population distribution (Alimi, et al., 2021; Orji et al., 2019; Tupy and Pooley, 2022;). These changes led to concentrated urban populations, exacerbating challenges in infrastructures and employment (Ahmed, et al., 2020; Maja and Ayano, 2021; Orji et al., 2019).

Nigeria's population was projected to reach 223.8 million in 2023 and possibly become the world's third most populous country by 2050. Rapid urbanization

continues, presenting both opportunities for economic growth, such as innovation and entrepreneurship, and challenges such as infrastructural strain and rising inequality (Statista,2023; United Nations,2022; Adebayo and Özkan 2024; Worldometer,2023). Recently concluded COP 28 highlight the urgent need for improving socioeconomic conditions, environmental protection, sustainable and inclusive development. Study by Adebayo and Özkan (2024) shows that socioeconomic conditions, political and financial risk contribute to CO₂. The results reinforce the significance influence of socioeconomic conditions, political and financial risk, and renewable energy on sustainable economic development. Thus, Policymakers should implement policies that address these challenges and harness opportunities to ensure Nigeria's population growth contributes positively to sustainable economic development.

Currently, Nigeria witnessing one of the world's highest population growth rates, and is set to become the third most populous country by 2050 (United Nations, 2022). This growth is closely link to urbanization, particularly in cities like Lagos, Kano, Ibadan, Oyo, Rivers, and Abuja. While urbanization can drive economic development through innovation and productivity growth (Alimi,2021; Liu, and McKibbin,2022), it also brings challenges such as infrastructure deficits, housing shortages, and growing inequality (Adeoti et al., 2020; Maja and Ayano,2021; Yang and Khan,2022). This necessitates the need for an in-depth examination of the implications of population dynamics on Nigeria's economic development.

Despite the significance of population dynamics, there is a scarcity of up-to-date, comprehensive empirical research on the interaction between population dynamics and economic development in Nigeria. Understanding this complex relationship is pivotal for formulating effective policies to harness Nigeria's demographic potential and foster sustainable economic growth. This research paper aims to bridge this gap by investigating the historical and current trends in Nigeria's population dynamics and their impact on economic development. The ultimate goal is to provide insights for policymakers to navigate these complexities and promote sustainable economic growth.

As Africa's most populous nation, this study is of significant importance as it addresses a crucial and timely issue facing the country. With an estimated population of around 223.8 million people in 2023, Nigeria needs to effectively leverage this demographic advantage for economic development. This research seeks to provide a comprehensive understanding of how population dynamics impacts economic development in Nigeria and offer evidence-based policy guidance for the country. Its findings will be useful to policymakers and stakeholders tasked with shaping the nation's economic development strategies, allowing them to address the challenges posed by population dynamics and promote sustainable growth and development.

2.0. Literature Review

Population dynamics and economic development are intricate and interrelated concepts that have undergone extensive scrutiny over the years. Population dynamics encompasses the study of how populations change over time, including entwined factors such as fertility, mortality, migration, and age structure. Conversely, economic development encompasses the process by which a society enhances the economic, political, and social well-being of its inhabitants, gauged through indicators such as gross domestic product (GDP), income per capita, poverty rate, inequality index, and human development index (HDI).

The link between population dynamics and economic development is a convoluted and multidimensional web. Population dynamics can impact economic development by affecting the supply and demand for human capital, natural resources, public services, and infrastructure. A large and youthful population can potentially provide a source of labour, innovation and entrepreneurship, fostering economic development. But this potential depends on levels of education, health., employment, and empowerment. Conversely, a growing youthful population can challenge economic growth and development without adequate support, increasing pressure on resources, services, infrastructure, social and political stability (Adeosun and Popogbe, 2021; Adenola and Saibu, 2017; IMF, 2020; Orji et al, 2019; Ogunniyi, et al. ,2023; World Bank, 2021).

Equally, economic development can impact population dynamics by influencing factors such as fertility, mortality, and migration (Oyinlola et al., 2021; Ogbonna, 2022; Yakubu et al., 2020). Economic development can reduce fertility rates by improving women's education and empowerment, and expanding access to family planning. It can reduce mortality rates through better healthcare, poverty reduction, and enhanced environmental quality. Furthermore, economic development can influence migration patterns by creating factors that sway people's decision to move within or across countries. (Dimnwobi, et al. 2021; Hosan et al. 2022; Laura ,2023; Mahtta et al. 2022; UNFPA, 2021; World Bank 2021). These two dynamic variables are deeply intertwined, and their interaction is key to understanding a society's growth and well-being.

Several theoretical frameworks explain the relationship between population dynamics and economic development. The Malthusian theory, proposed by Thomas Malthus in 1798, posits that the population growth tends to outpace sustenance creation, leading to poverty and famine. The demographic transition theory, developed by Frank Notestin in 1945, describes how historical population transformations pattern impact economic development. The neoclassical growth theory, posited by Robert Solow in 1956, explains economic growth as a function of capital accumulation, technological progress, and population growth. Paul Romer's endogenous growth theory (1986), an extension of the neoclassical theory, incorporate technological progress as an endogenous variable that relied on human capital, innovation, and knowledge spillovers.

The unified growth theory, developed by Oded Galor (2005) integrates Malthusian, demographic transition, and endogenous growth theories into a single framework. It explains the historical evolution of population dynamics and economic development. The theory asserts that population dynamics and economic development are governed by three pivotal factors: the Malthusian mechanism, the demographic transition mechanism, and the innovation mechanism. The theory contends that population growth is a transitional phenomenon that reflects the changes in income per capita, human capital, and technological progress over time.

The interplay between population dynamics and economic development remains a tangled web of uncertainty, contingent on a myriad of contextual factors, with various research revealing a range of findings. Some studies indicate a positive interaction, suggesting that population growth can serve as a catalyst for economic expansion by increasing the workforce, stimulating innovation and the creation of economies of scale. Other studies show a negative correlation, pointing to rapid population growth as a barrier to economic growth via reduced per capita income, savings and investment, intensified pressure on resources and infrastructure. Moreover, some studies revealed a nonlinear relationship, where population growth having positive effects on economic growth up to a certain threshold, beyond which the effects become negative. These outcomes depend on various factors, such as the level of development, the quality of institutions, the structure of the economy, natural resources, openness and the policies implemented (Cristea, 2023; Oshora, et al., 2021; Suryanto et al., 2023; Tupy and Pooley, 2022).

Population structure, specifically age composition and dependency ratios, and economic growth are generally found to have significant impacts on each other. A higher share of working-age population or a lower dependency ratio can boost economic growth by increasing labour force participation, productivity, and savings, known as the demographic dividend. However, the demographic dividend realization depends on factors like the quality of education, health, employment, and empowerment of the working-age population and quality social protection for the aging population (See: Cristea, 2023; Hosan, et al., 2022; Ionel, et al., 2023; Liu and McKibbin, 2022; Tupy and Pooley, 2022).

The intricate interplay between population distribution, whether concentrated or urbanised, and economic growth is less explored and exhibits mixed results. Some studies have discovered that population concentration or urbanization can stimulate economic growth by catalysing agglomeration economies, and improving access to markets and services. Conversely, urbanization can impede economic growth due to congestion costs, environmental degradation, inequality and instability. The net effect of these outcomes on economic growth hinges on myriad factors, like magnitude, density and heterogeneity of urban areas, infrastructure quality, governance quality, the degree of integration, and policies

implemented (Acemoglu and Robinson,2021; Cristea,2023; Hosan, et al. ,2022; Liu and McKibbin, 2022; Mahtta, et al. ,2022; World Bank, 2021).

In Nigeria, the interaction between population dynamics and economic development is widely debated. Some argued that Nigeria's burgeoning and youthful population is a veritable goldmine that can galvanize economic growth and development if properly harnessed through investments in education, health, employment, and governance (Alimi, et al. ,2021; Adeosun, and Popogbe,2021; Ogbonna,2022; UNFPA, 2021). Others contend that Nigeria's population growth rate is a millstone that threatens resources, services, infrastructure, and social and political stability (Adenola and Saibu,2017; Orji et al., 2019; Oyinlola, et al.,2021; Vanguard, June 2023; This Day, Nov 2021).

Studies from institutions like United Nations, IMF, NPC have found that Nigeria's population growth rate could have a positive short-term effect on economic growth but may overburden resources and infrastructure in the longterm. However, World Bank indicates that population growth has had a negative impact on economic development in Nigeria, making it difficult for the government to meet the needs of a growing population (IMF, 2020; NPC,2016; World Bank,2021; United Nations, 2022).

Summarily, the interplay between population dynamics and economic development in Nigeria is complex and empirical results inconclusive. The growth of the population can yield varying outcomes contingent upon contextual factors, and a more comprehensive analysis with current data and approaches is needed. policies and initiatives should focus on improving human capital, infrastructure, and public services, taken into account Nigeria's unique dynamics and challenges in analysing this dynamic interaction.

2.1 The Nigerian Case

Nigeria faces the task of balancing its population dynamics with economic development. Population dynamics encompasses the changes in size, structure, and dispersion of the population, while economic development measures the quality of life. Nigeria's population has grown from circa 60 million in 1960 to over 215 million in 2022, and is projected to reach circa 546 million by 2100. The country's population is predominantly young, with roughly 43% of the populace under the age of 15 years and less than 5% above 65 years in 2022 (BBC, 2020; Statista,2023; United Nations, 2022; Worldometer,2023; World Bank, 2022). This has implications for the country's resources, infrastructure, and well-being. In Nigeria, the relationship between population dynamics and development is complex and influenced by historical factors such as colonialism and the discovery of oil (Mahtta et al., 2022; NPC, 2016; O'Sullivan, 2023; Statista, 2023; Tupy and Pooley,2022; Udo,1993; United Nations, 2022; Worldometer, 2023; World Bank, 2022).

Nigeria's rapid population growth, poised to make it the third most populated countries by 2050, has brought about urbanization, driving both economic growth

and infrastructure challenges (Adeosun and Popogbe,2021; Adenola and Saibu,2017; Acemoglu and Robinson, 2021; Alimi et al. ,2021; O’Sullivan,2023; World Bank, 2021). Human capital and labour market dynamics are significantly affected by this growth, presenting opportunities and challenges (Cristea, 2023; Luca,2022; United Nations, 2022; Uddin and Rahman,2023; Yakubu et al., 2020). The demographic dividend theory proposes that economic growth is possible if supported by quality education and job creation investments. The urbanization-led growth theory highlights the potential of well-managed urbanization for economic development (Adenola and Saibu,2017; Befikadu and Tafa, 2022; Galor, 2005; Luca, 2022; Oshora et al., 2021). The Nigeria’s historical analysis reveals the transformative impact of colonial rule and oil discovery on population dynamics and urbanization (Dimnwobi, et al., 2021; Liu and McKibbin,2022; Merchant, 2021; Ogbonna, 2022; Uddin and Rahman, 2023). In summary, understanding this population-economic development nexus and its intricacies is crucial for Nigeria’s future well-being and requires comprehensive research (Adeoti et al., 2020; O’Sullivan, 2023).

2.2. Research Gaps

Research on the interplay between population dynamics and economic growth has been extensive, yet gaps remain in understanding how these dynamics uniquely impact sustainable economic growth in Nigeria. Extant studies have primarily focused on broad, global impacts without delving into how specific demographic factors interact with Nigeria’s economic variables. Moreover, the opportunities that a well-managed population could provide for Nigeria’s development are underexplored, despite theoretical proposals like the demographic dividend, urbanization-led growth, and unified growth hypothesis (Adeosun and Popogbe, 2021; IMF, 2020; Orji et al., 2019; Adenola and Saibu, 2017; Oded Galor, 2005; Befikadu and Tafa, 2022).

Many studies treat population growth either as an opportunity or a burden but often lack the integration of up-to-date data and advanced methodologies to analyse Nigeria’s evolving demographic and social-economic landscape (Ogbonna, 2022; UNFPA, 2021;Oyinlola et al.,2021; World Bank, 2021;Acemoglu and Robinson, 2021; Alimi et al., 2021). Empirical studies within Nigeria’s specific context, particularly around theories such as the unified growth hypothesis, is limited.

This study addresses these research gaps by employing current data and advanced analytical techniques to explore the nuanced interplay between population dynamics and sustainable economic growth in Nigeria. It seeks to provide clear, evidenced-based insights for policymakers, focusing on integrating demographic factors into strategic frameworks to harness Nigeria’s

demographic trends for long-term sustainable economic stability and development.

3.0. Research methodology

In recent years, there has been increasing recognition of the significant link between population dynamics and economic development globally. This paper examines how population dynamics affect economic development in Nigeria from 1985 to 2022 using secondary data and controlling for other factors such as inflation, foreign direct investment (FDI) as a percentage of GDP, and labour force participation rate. The data were collected from various sources, including the World Bank (WDI), United Nations database, Macrotrends, the National Bureau of Statistics of Nigeria, National population commission, and the Central Bank of Nigeria.

The paper uses the Autoregressive Distributed Lag (ARDL) model to capture the long-run and short-run interactions among the variables. This estimation technique was chosen due to its flexibility for the type of data used and suitability for the study (Pesaran et al., 2001). The analysis follows several steps, including data cleaning, descriptive statistics analysis, stationarity and cointegration tests, ARDL estimation, diagnostic tests, forecast analysis, and result interpretation. The aim is to provide insights into the intricate relationship between population dynamics and economic development in Nigeria.

The empirical model is specified as follows:

$$GDP_t = \beta_0 + \beta_1 POP_t + \beta_2 INFL_t + \beta_3 FDI_t + \beta_4 LFP_t + \mu_t \quad (1)$$

Where:

GDP_t represent the gross domestic product per capita in Nigeria in year t , POP_t is the Total Population growth rate in Nigeria in year t , $INFL_t$ is the inflation rate in Nigeria in year t , FDI_t is Foreign direct investment in Nigeria in year t , LFP_t is the Labour force participation rate in Nigeria in year t , β_0 is the intercept term, and β_1 to β_4 are the coefficients of the variables POP_t , $INFL_t$, FDI_t , and LFP_t . while μ_t is the error term.

The estimation of the model was conducted using E-Views 12 software, and the statistical significance of the coefficients was tested using t-tests at a 5% significance level. The analysis tests the hypothesis that there is a significant relationship between population dynamics and economic development in Nigeria. The paper reports the long-run and short-run coefficients and their significance. additionally, it provides policy implications and forecasts for the future.

The study is unique in that it incorporating future forecast analysis (upper, average, and lower bounds) in addition to traditional data analysis. The findings will help policymakers understand the intertwined relationship between population dynamic and economic growth in Nigeria and inform policy decisions

relating to effective population growth management, infrastructural development, social welfare, and sustainable economic development.

4.0. Results and discussions

4.1. Descriptive statistics results

	GDP	POP	INFL	FDI	LFP
Mean	3.94	2.64	19.17	1.57	59.02
Median	6.63	2.63	12.72	1.27	60.25
Maximum	32.13	2.8	72.84	5.79	60.71
Minimum	-43.4	2.41	5.39	0.18	55.27

Source: Author's EViews Computations

The descriptive statistics reveal key insights into Nigeria's economic variables. GDP growth is positively skewed, with an average growth rate approximately 3.94% and a median of 6.63%. This suggests occasional large positive shocks amidst small recessions, indicating that policymakers should prepare for both upside benefits and downside risks. Investors can expect frequent small losses and occasional large gains, while consumers and businesses may face income and spending uncertainty in the future.

The population growth rate is relatively stable, with an average of 2.64% and a median of 2.63%, showing a symmetric distribution. Inflation exhibits high fluctuations, averaging 19.17% with a median of 12.72%, indicating potential economic volatility. Foreign direct investment (FDI) shows an average of 1.57% and a median of 1.27%, while labour force participation rate average 59.02% annually with a median of 60.25%). Both FDI and labour force participation rate display skewness, offering policymakers guidance on focus areas for sustainable growth and stability measures.

4.2. Augmented Dickey-Fuller Unit Root Tests Results

VARIABLES	ADF. LEVEL	ADF. 1ST DIFF.	ADF. 2ND DIFF.	ORDER	REMARK
GDP	-4.5248	-	-	I(0)	Stationary @
P-Value	(0.0009)				Level
POP	-1.0087	-3.8578	-	I(1)	Stationary @
P-Value	(0.7398)	(0.0055)			1st Difference
INFL	-2.5347	-4.5111	-	I(1)	Stationary @
P-Value	(0.1177)	(0.0013)			1st Difference
FDI	-3.8778	-	-	I(0)	Stationary

					@
P-Value	(0.0051)				Level
LFP	-2.5179	-4.0471	-	I(1)	Stationary
P-Value	(0.1197)	(0.0034)			@ 1st Difference

Source: Author’s EViews Computations

The Augmented Dickey-Fuller test in table 2 shows that the study variables have mixed integration orders, some being stationary at level I(0) and others at first difference I(1). This supports the use of ARDL estimation method for co-integration analysis.

4.3. ARDL Bounds Test of Co-integration

Table 3: F-Bounds Test Result for Co-integration				
Null Hypothesis: No level relationship				
Test Statistics	Value	Significance	I(0)	I(1)
F-Statistic	6.990726	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Author’s EViews Computations

The bounds test method estimates long-run relationships among variables and tests the significance of lagged level variables. Results in table 3 reveal a significant long-run relationship between the study variables, implying they co-move and return to equilibrium in the long run.

4.4. Long-run Impact of Population Dynamics on economic growth in Nigeria

Table 4: ARDL Long-run Estimated Results			
Dependent variable: GDP			
VARIABLES	Coefficients	t-ratio	P-Value
POP	311.7977	2.2766	0.0438
INFL	1.8042	1.7639	0.1055
FDI	-64.4737	-2.2354	0.0471
LFP	24.9201	2.7126	0.0202
C	-2223.931	-2.5751	0.0258

Source: Author’s EViews Computations

The long-run results presented in Table 4 highlight the significant relationships between population growth (POP), inflation rate (INFL), foreign direct investment (FDI), labour force participation (LFP), and economic growth (GDP) in Nigeria.

The positive and significant impact of population growth (P-value = 0.0438) on GDP supports the endogenous growth theory, which emphasizes the role of an expanding population in fostering innovation, increasing market size, and driving

economic growth. this result contrasts with the Malthusian hypothesis, which posits that rapid population growth can strain resources and hinder development. the findings of the current study align with studies across various regions that highlight population growth as a catalyst for economic progress (Alimi, et al.,2021; Cris ,2023; Ahmed et al. ,2020; Chan and Tan, 2019; Khan et al., 2021; Liu and McKibbin,2022; Nwachukwu, et al. ,2021; Suryanto, et al., 2023; Tafa, et al., 2022).

Inflation, although showing a positive coefficient (1.8042), does not significantly influence economic growth at 5% level (0.1055). this aligns with structuralist perspectives, viewing moderate inflation as part of economic development driven by structural shifts, though it contradicts the monetarist view, which sees inflation as a detriment to growth. Previous research by (Batayneh et al., 2021; Carvalho et al., 2018; Uddin and Rahman, 2023) also explored the link between inflation and economic growth in various countries.

The negative and statistically significant relationship between FDI and GDP (-64.4737, P-value = 0.0471) challenges the belief that FDI inherently promotes economic growth. instead, it aligns with the dependency hypothesis, suggesting FDI may sometimes lead to exploitation and stunted development. This contrasts with the endogenous growth model’s optimistic view of FDI as a driver of technological advancement and competition. Previous studies by (Alfaro et al., 2004; Khan et al., 2021; Wang et al., 2021) have also examined the impact of FDI on economic growth in both developed and developing countries.

Labour force participation (LFP) has a strong positive impact on GDP, confirming its crucial role in driving long-term economic growth (P-value = 0.0202). this supports the endogenous growth hypothesis, which sees an active labour force as key to sustained economic development. Cris, 2023; Martin, 2018 and Yakubu et al., 2020 have also examined effect of labour force participation on economic growth in United State and Nigeria respectively.

The significant negative constant term reflects unmodeled factors hindering long-term growth, highlighting the complexity of Nigeria’s economic landscape. Overall, these findings suggests that Nigerian policymakers should prioritize strategies that enhance labour force participation, manage population growth effectively, control inflation, and attract beneficial foreign direct investment while mitigating potential adverse impacts.

4.5. Short-run Impact of Population Dynamics on economic growth in Nigeria

Table 5: ARDL Short-Run ECM Estimated Results			
Dependent variables: GDP			
VARIABLES	Coefficients	t-ratio	P-Value
ΔGDP_{t-1}	-0.3073	-2.8103	0.017

ΔGDP_{t-2}	-0.2581	- 2.2877	0.0429
ΔPOP_t	-38.8307	- 0.6284	0.5426
ΔPOP_{t-1}	-207.2955	- 2.3042	0.0417
ΔPOP_{t-2}	-128.5817	- 1.6579	0.1255
ΔPOP_{t-3}	-163.1643	- 3.4669	0.0053
$\Delta INFL_t$	0.0753	0.3971	0.6989
$\Delta INFL_{t-1}$	-0.5231	- 3.3588	0.0064
$\Delta INFL_{t-2}$	-0.0862	- 0.5832	0.5715
$\Delta INFL_{t-3}$	0.5743	3.8968	0.0025
ΔFDI_t	-10.7504	- 5.5267	0.0002
ΔFDI_{t-1}	35.2752	8.1418	0.0000
ΔFDI_{t-2}	21.5583	7.7117	0.0000
ΔFDI_{t-3}	15.7447	8.5107	0.0000
ΔLFP_t	3.9158	2.0832	0.0614
ΔLFP_{t-1}	-11.7986	- 5.4698	0.0002
ΔLFP_{t-2}	-7.1099	- 3.9908	0.0021
ECM_{t-1}	-0.8388	- 7.8109	0.0000
R-squared	0.9513		
Adjusted R-squared	0.8995		
Durbin-Watson	2.4		

Source: Author's EViews Computations

The ARDL short-run regression results for Nigeria, presented in Table 5, provide crucial insights into the country's economic dynamics. The error correction term (ECM_{t-1}) is negative (-0.8388) and highly significant at the 1% level, confirming a rapid adjustment back to equilibrium after economic disruptions. This reflects Nigeria's economy's ability to correct imbalances swiftly.

The short-run coefficients for GDP lagged one and two periods (ΔGDP_{t-1} , and ΔGDP_{t-2}) are negative and significant at 5%, suggesting that economic growth in the current year is strongly influenced by the negative effects of the previous two years' growth. This highlights the volatility and lingering impacts of past

economic shocks in Nigeria, potentially reflecting the country's fluctuating macroeconomic conditions, such as oil price instability and policy inconsistencies.

Contrary to long-run results, population growth (ΔPOP) has mixed short-term impacts. While ΔPOP_{t-1} and ΔPOP_{t-3} are significant at 5%, suggesting that population growth can both drive and hinder short-term growth, this inconsistency echoes the complexity of managing Nigeria's rapidly growing population, particularly regarding infrastructure and resource allocation.

Inflation (ΔINFL) also shows mixed short-term impacts. While ΔINFL_{t-1} negatively affects growth significantly, ΔINFL_{t-2} is insignificant. This aligns with Nigeria's inflationary challenges, where fluctuating inflation rates – driven by currency depreciation, supply chain disruptions, and food prices – can unpredictably influence short-term economic performance.

Foreign direct investment (FDI) has a negative impact on current GDP growth, but lagged FDI differences (ΔFDI_{t-1} , ΔFDI_{t-2} , ΔFDI_{t-3}) positively influence short-term growth. This suggests that the immediate impacts of FDI may be disruptive due to capital outflows or adjustments, but its benefits materialize over time, aligning with the delayed positive impacts seen in many emerging economies.

Labour force participation (LFP) shows a marginal positive impact in the short term, though past LFP differences negatively influence current GDP, reflecting labour market inefficiencies and underemployment, which continue to challenge Nigeria's economy.

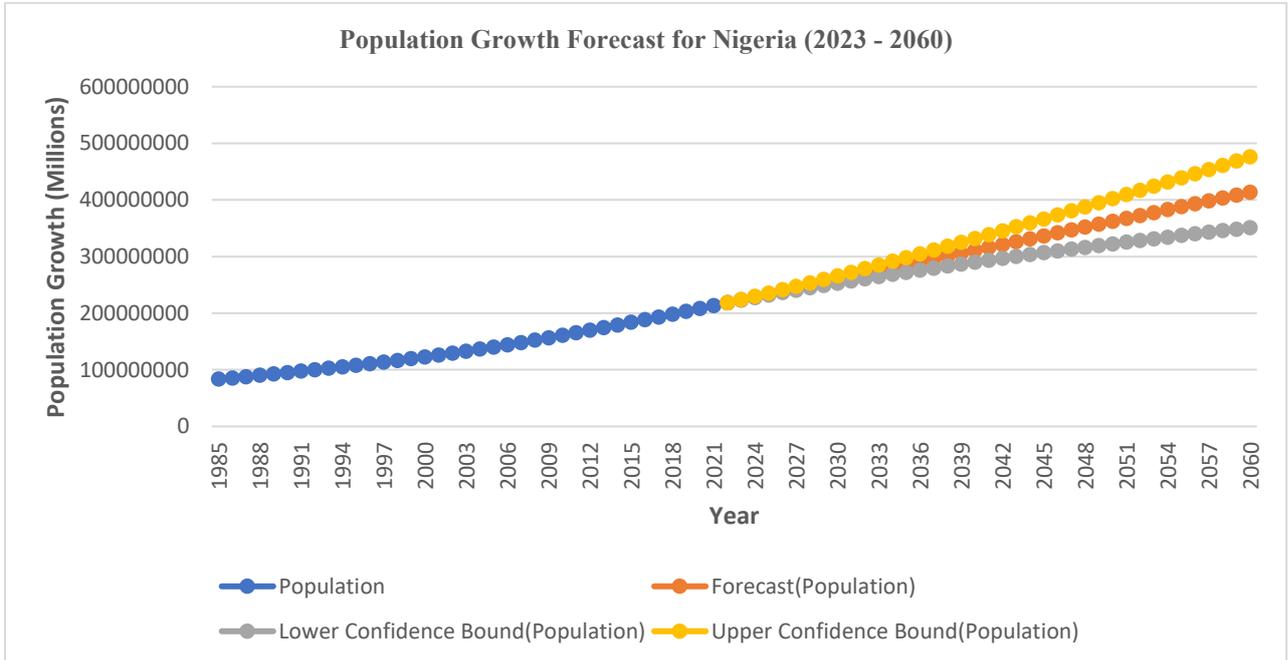
The model explains 95.13% of GDP growth variation, indicating its robustness, the Durbin-Watson statistic shows no significant autocorrelation, further confirming the model's validity. Other diagnostic tests also support the model's validity. Overall, the short-run results highlight that past economic shocks and policy inconsistencies have significant implications for Nigeria's current economic performance, supporting the need for consistent policy interventions to manage population growth, inflation, FDI, and labour force participation effectively.

4.6. Future Outlook and Forecast for GDP Per capita and Population Growth in Nigeria

Future forecasts were conducted for the study's dependent and independent variables to provide insights into the variable's future trends. The statistical model used parameters such as Alpha, Beta, Gamma, MASE, SMAPE, MAE, and RMSE to estimate trend, seasonality, and error components. Also, the model provides confidence bounds for the projections, reflecting the range of

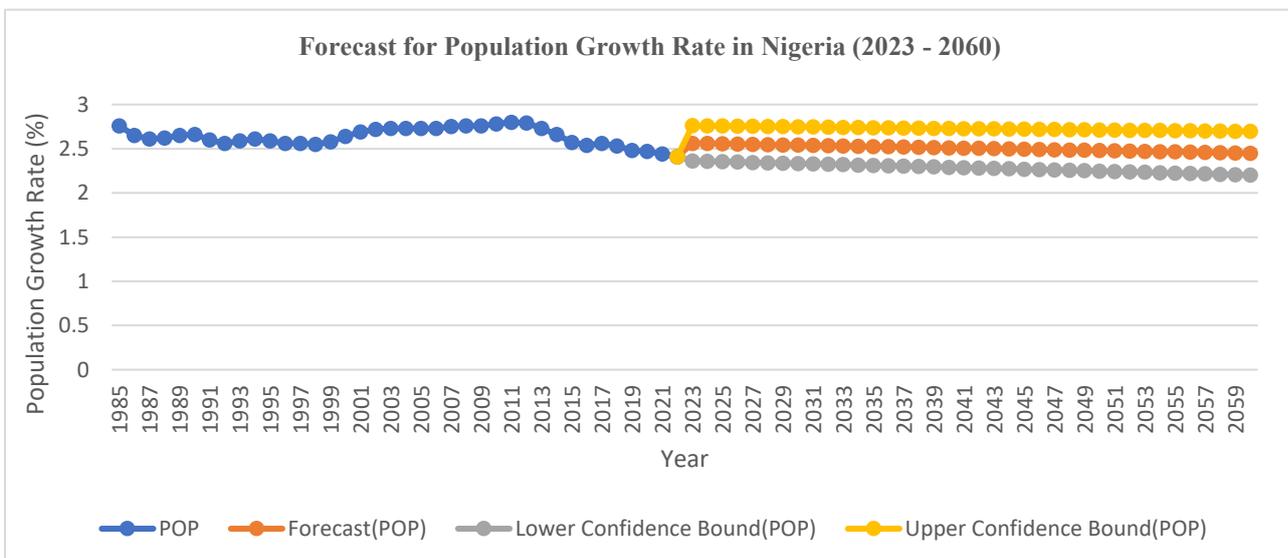
uncertainty around forecasted values due to various influencing factors. Below are the forecast analysis results.

Figure 1: Population growth Forecast for Nigeria (2023 – 2060)



Source: Authors Computation

Figure 2: Population Growth rate Forecast for Nigeria (2023 – 2060)

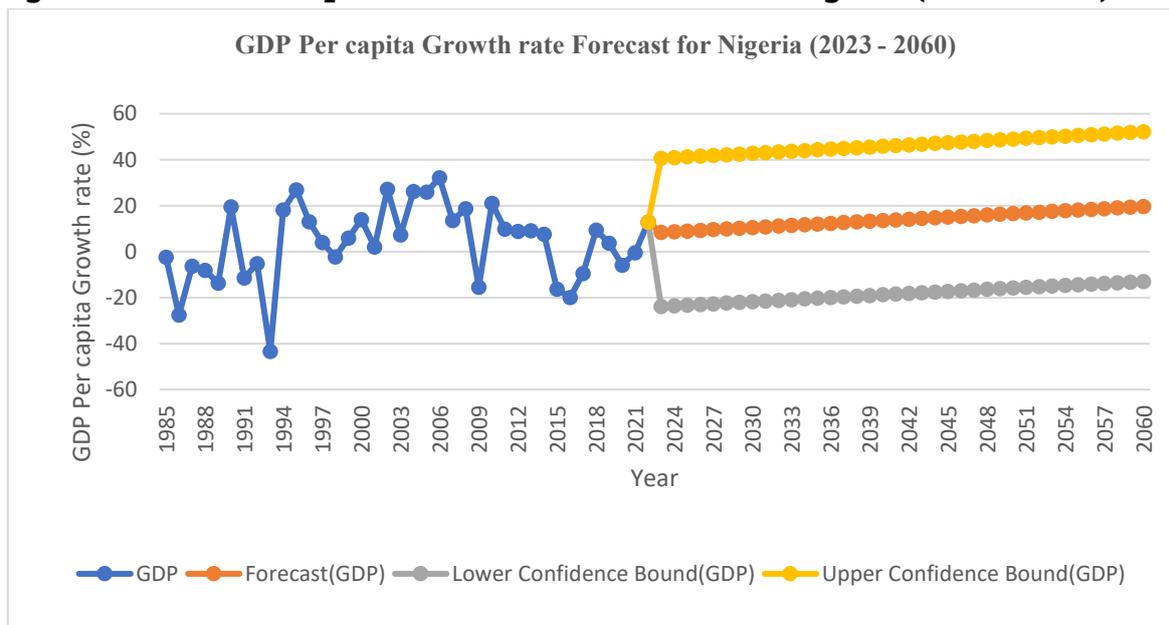


Source: Authors Computations

Figures 2 and 3 reveal projections for Nigeria’s population growth and growth rate from 2023 to 2060, including the minimum, average, and maximum expected values for each year. On average, Nigeria is projected to experience significant long-term population growth, averaging approximately 413.8 million people with a population growth rate of about 2.45% by 2060. The projected population is expected to range between 476.4 million and 351.2 million, with growth rates between 2.76% and 2.20%. by 2060.

The sizable variation in confidence bounds indicates that multiple factors, including fertility, mortality, health, education, migrations, and environmental conditions, could affect population growth. Nigerian policymakers should actively address demographic challenges like high fertility and maternal mortality, improve access to family planning and reproductive health services, enhance education quality, reduce poverty and inequality, invest in human capital, job creation, social protection measures, and promote economic growth and innovation to harness demographic dividend.

Figure 3: GDP Per capita Growth rate Forecast for Nigeria (2023 – 2060)



Source: Author’s Computations

The per capita GDP growth forecast for Nigeria shows a positive and steady long-term trend, averaging around 19.67% growth rate by 2060. This suggests potential improvements in living standards and well-being for Nigerians if accompanied by the right policies. Figure 4 displays the projected per capita GDP growth rate from 2023 to 2060, including minimum, average, and maximum anticipated values. Projections indicate a per capita GDP growth rate of approximately 8.72% in 2024, increasing to 19.67% by 2060.

The variation in confidence bounds emphasises that several factors, including security, inflation, political stability, exchange rates, fiscal policies human capital development, and external shocks could impact actual per capital GDP growth. It is pertinent for the Nigerian government to diversify the economy away from oil dependence, strengthen other sectors like agriculture, manufacturing, and services, and address security and governance issues by bolstering institutions, accountability, transparency, and human rights. Additionally, Policymakers should use this forecast analysis for informed policy planning.

4.7. Policy Implications

The ARDL ECM regression results reveal crucial insights for policymakers in Nigeria. The significant and negative coefficient of ECM_{t-1} suggests a stable long-term relationship between GDP growth and explanatory variables like population growth (POP), inflation (INFL), foreign direct investment (FDI), and labour force participation (LFP). This indicates that deviations from this equilibrium will be corrected over time. Policymakers can use long-run coefficients to assess how changes in these variables impact economic development. The significant coefficients of the first differences of these variables indicate that fluctuations in the variables have short-term impacts on GDP. Policymakers can use these coefficients to understand the short-term dynamics and adjust policies in response to shocks.

The F-bounds test results suggest a long-term causal relationship between GDP and the explanatory variables. Policymakers should use this to understand the direction and strength of causality among these variables, as well as to find potential sources of growth or volatility for economic growth (GDP) in Nigeria.

The coefficients of population growth in the long-run and short-term, highlight the critical role of population growth as one of the drivers of economic development. Thus, policies and strategies that promote human capital development are crucial for sustainable economic development. The results show that the effects of inflation on GDP are diverse, depending on management. Thus, effective monetary and fiscal policies are necessary for sustainable economic growth and price stability.

Given the results, promoting sustainable economic growth and attracting sizable FDI is crucial for Nigeria, as these have significant effects on GDP. So, measures to stimulate investment in productive sectors, improve business environment, and foster economic growth should be implemented. The coefficient of LFP suggests that changes in labour force participation have significant impact on GDP growth. Thus, policymakers should implement labour market reforms that encourage higher labour force participation, and ensure productive employment opportunities for the workforce.

The high R-squared value indicates that the selected variables explain a significant portion of economic growth variability in Nigeria, highlighting the importance of stable and predictable economic policies for long-term and short-term investment and economic development.

In summary, the estimated results underscore the importance of managing population growth, controlling inflation, promoting long-term investment, and encouraging higher labour force participation. Policymakers should consider the impacts of past economic dynamics, understand the implications of short-term and long-term variables, and embark on early planning and policy designs to meet future needs. Stable and predictable economic policies are essential for sustained economic growth and development.

5.0. Conclusions and recommendations

This paper investigates the impact of population dynamics on Nigeria's economic growth, using ARDL and forecast analysis (SMFAT) methods with data from 1985 to 2022. The findings suggest that population growth significantly influences Nigeria's economic growth. Inflation has mixed short-term impacts but is positive in the long-run. Foreign direct investment exhibits significant mixed short-term effects and a significant negative long-term impact on GDP growth. Labour force participation shows significantly positive short-term impacts, significantly negative influence in the last two preceding years. In the long-term, it has a positive and significant effect on economic development. The forecast analysis provides insights into future growth patterns for population and per capita GDP.

In terms of policy recommendations, policies that promote sustainable long-term economic growth, investment in modern infrastructures, quality education, and healthcare, and effective population management through family planning and education are crucial. In addition, controlling inflation, attracting stable foreign investments, labour market reforms, promoting economic diversifications, and strategic investment in infrastructures and human capital development are highly recommended. A mix of short-term and long-term policies is essential for economic stability, with a comprehensive approach to addressing immediate challenges and long-term structural issues for sustainable and inclusive economic development in Nigeria.

References

1. Alimi, O.Y., Fagbohun, A.C. and Abubakar, M. (2021). Is population an asset or a liability to Nigeria's economic growth? Evidence from FM-OLS and ARDL approach to cointegration. *Future Business Journal*, Cairo, 7(1). (www.futurebusinessjournal.com)
2. Adeosun, O.T. and Popogbe, O.O. (2021). Population growth and human resource utilization nexus in Nigeria. *Journal of Humanities and Applied Social Sciences*, 3(4), 281-298. (www.emerald.com)
3. Acemoglu, D. and Robinson, J.A. (2021). *Why nations fail: The origins of power, prosperity and poverty* (Revised ed.). London: Profile Books.
4. Adebayo, S.T. and Özkan O. (2024). Investigating the influence of socioeconomic conditions, renewable energy and eco-innovation on environmental degradation in the United State: A Wavelet quantile-based analysis. *Journal of Cleaner Production*, 434, 140321. (www.sciencedirect.com)
5. Asongu, S.A. and Odhiambo, N.M. (2021). Foreign direct investment, information technology and economic growth dynamics in Sub-Saharan Africa: New insights from simultaneous-equation models. *Journal of International Financial Markets, Institutions and Money*, 71.

6. Ahmed, A., Bussolo, M., Cruz, M., Go, D.S. and Osorio-Rodarte, I., (2020). Global Inequality in a more educated world. *The Journal of Economic Inequality* 18, 585-616.
7. Adeoti, O., Oluyombo, O., and Ajetomobi, O. (2020). Urbanization and Housing Challenges in Nigeria. *African Journal of Social Sciences*, 10(4), 104-118.
8. Agarwal, A., Lubet, A., Mitgang, E., Mohanty, S. and Bloom, D.E. (2020). Population Aging in India: Facts, issues and options. In *Population change and impacts in Asia and the Pacific* (pp. 289-311). Springer Singapore.
9. Adenola, F. and Saibu, O.M. (2017). Does population change matter for long run economic growth in Nigeria? *International Journal of Development and Sustainability*, 6 (12), 1955-1965.
10. Alfaro L., Chanda A., Kalemli-Ozcan S. and Sayek S. (2004). FDI and economic growth: The role of local financial markets, *Journal of International Economics*, 64(1), 89-112. (www.sciencedirect.com)
11. Befikadu, T.A. and Tafa, B.A. (2022). An Empirical Analysis of the Effects of Population Growth on Economic Growth in Ethiopia Using an Autoregressive Distributive Lag (ARDL) Model Approach. *Discrete Dynamics in Nature and Society*, New York. 2022. (www.hindawi.com)
12. Batayneh K., Al Salamat W. and Momani M.Q.M. (2021). The impact of inflation on the financial sector development: Empirical evidence from Jordan, *Cogent Economics & Finance*, 9(1), 1970869. (www.tandfonline.com)
13. Baltagi B.H. (2021). *Econometric analysis of panel data* (6th ed.). Chichester: John Wiley & Sons.
14. BBC (2020). Seven countries with big (and small) population problems. (www.bbc.com)
15. Bloom, D.E. and Finley, J.E. (2009). Demographic Change and Economic Growth in Asia. *Asian Economic Policy Review*, 4(1) 45-64. (www.wiley.com)
16. Bloom, D.E. and Canning, D. (2004). Global Demographic Change: Dimensions and Economic Significance. *Proceedings - Economic Policy Symposium - Jackson Hole*, Federal Reserve Bank of Kansas City, Aug, 9-56.
17. Cristea, V.G. (2023). Urban Population Dynamics in USA and the Economics. *Challenges of the Knowledge Society*, Bucharest, 632-639.
18. Cris, C. (2023). Population growth spurs economic growth, *Trade Journal*, Lehigh Valley Business, Bethlehem.
19. Central Bank of Nigeria. (2021). Economic and Financial Data. (www.cbn.gov.ng)
20. Center for Development and Population Activities (2021). *Population Policy Implementation in Nigeria: Challenges and Opportunities*. (www.popcouncil.org)
21. Chan, K. and Tan, K. (2019). The relationship between population growth and economic growth in Malaysia: An empirical analysis. *Journal of Asian Economics*, 61, 1-11.

22. Carvalho, A.R., Ribeiro, R.S.M. and Marques, A.M. (2018). Economic development and inflation: a theoretical and empirical analysis. *International Review of Applied Economics*, 32(4), 546-565. (www.tandfonline.com)
23. Cohen, J., Cohen, P., West, S.G., and Aiken, L.S. (2003). *Applied multiple regression/correlation analysis for the behavioural sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
24. Dimnwobi, S.K., Ekesiobi, C., Madichie, C. V. and Asongu, S.A. (2021). Population dynamics and environmental quality in Africa. *Science of the Total Environment*, 797, 149172.
25. Demographic and Health Survey (DHS) Nigeria. (2019). Final Report. (www.dhsprogram.com)
26. Engle, R. F., and Granger, C.W.J. (1991). *Long-run economic relationships: Readings in cointegration*. Oxford University Press.
27. Galor, O. (2005). From stagnation to growth: Unified growth theory. *Handbook of Economic Growth*, 1, 171-293.
28. Granger, C.W. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica: Journal of the Econometric Society*, 424-438.
29. Hosan, S., Karmaker, S.C., Rahman, M.M., Chapman, A.J. and Saha, B.B. (2022). Dynamic links among the demographic dividend, digitalization, energy intensity and sustainable economic growth: Empirical evidence from emerging economies. *Journal of Cleaner Production*, 330, 129858.
30. Hayes A.F. (2021). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3rd ed.). New York, NY: Guilford Press.
31. Hassan, O.M. (2006). The Nigerian oil economy and its implications for the Nigerian polity, *African Journal of Political Science and International Relations*, 1(1), 1-9.
32. Ionel, M., Marinela, I., Haralambie, A. and Alexandru, B. (2023). An Overview of Population Dynamics in Romanian Carpathians (1912–2021): Factors, Spatial Patterns and Urban–Rural Disparities. *Land*; Basel Vol. 12(9), 1756. (www.mdpi.com)
33. International Monetary Fund (2020). *Nigeria - Selected Issues*. (www.imf.org)
34. Johansen, S. and Juselius, K. (1995). Identifying restrictions of linear equations with applications to simultaneous equations and cointegration. *Journal of Econometrics*, 69(1), 111–132. (www.sciencedirect.com)
35. Khan, I., Hou, F., Irfan, M., Zakari, A. and Le, H. P. (2021). Does energy trilemma a driver of economic growth? The roles of energy use, population growth, and financial development. *Renewable and Sustainable Energy Reviews*, 146, 111157.

36. Luca, S., (2022). Endogenous Population Dynamics and Metropolitan Cycles: Long-Term Evidence from Athens, an Eternally Mediterranean City. *European Journal of Population*, 38(5), 835-860. (www.springer.com)
37. Laura, P. (2023). Soaring demand and rent regime add to strain on Berlin housing: Population growth and efforts to help tenants boost accommodation costs. *Financial Times*, London (UK), 6.
38. Liu, W., & McKibbin, W. (2022). Global macroeconomic impacts of demographic change. *The World Economy*, 45(3), 914-942.
39. Mahtta, R., Fragkias, M., Burak, G., Mahendra, A., Reba, M. and et al. (2022). Urban land expansion: the role of population and economic growth for 300+ cities. *npj Urban Sustainability*, 2(1). (www.nature.com)
40. Mason, A., Lee, R., and NTA Network. (2022). Six ways population change will affect the global economy. *Population and Development Review*, 48(1), 51-73.
41. Maja, M.M. and Ayano, S.F. (2021). The impact of population growth on natural resources and farmers' capacity to adapt to climate change in low-income countries. *Earth Systems and Environment*, 5, 271-283.
42. Merchant, E.K. (2021). *Building the population bomb*. Oxford University Press.
43. Martin, F.M. (2018). GDP, Labor Force Participation and Economic Growth. *Economic Letter*, Federal Reserve Bank of St. Louis. (www.stlouisfed.org)
44. Mason, A., Lee, R., Tung, A.-C., Lai, M.-S. and Miller, T. (2009). Population aging and intergenerational transfers: Introducing age into national accounts. In *Development in the Economics of Aging* (pp.89–122). University of Chicago Press.
45. Malthus, T.R. (1798). *An essay on the principle of population*. London: J. Johnson.
46. Nwachukwu T.E., Ogbuabor J.E. and Orji A., (2021) Population Growth and Economic Growth in SubSaharan Africa: A Panel ARDL Approach. *International Journal of Economics and Financial Issues*, 11(1), 1-8. (www.econjournals.com)
47. National Bureau of Statistics. (2021). GDP by Economic Activity. (www.nigerianstat.gov.ng)
48. National Population Commission of Nigeria. (2019). National Population Policy. (www.population.gov.ng)
49. National Population Commission of Nigeria. (2016). Nigeria Population Census: 2006. (www.population.gov.ng)
50. Notestein, F.W. (1945). Population: The long view. In T. W. Schultz (Ed.), *Food for the world* (pp. 36-57). Chicago, IL: The University of Chicago Press.
51. Ogbonna, A.J. (2022). Examining the Success Factors for Sustainable Development in Nigeria's Economic Growth and Development. IOP Conference Series. *Earth and Environmental Science*, Bristol 1044(1). (www.iopscience.iop.org)

52. Ogunniyi, O.R., Okunlola, A.F., Alatise, M.A., and Aregbesola, R.A. (2023). Socio-economic inclusion and sustainable economic growth: Empirical analysis of Nigeria and South Africa. *Cogent Economics & Finance*, 11(1). (www.tandfonline.com)
53. O'Sullivan, J. N. (2023). Demographic Delusions: World Population Growth Is Exceeding Most Projections and Jeopardising Scenarios for Sustainable Futures. *World*, 4(3), 545. (www.mdpi.com)
54. Oshora, B., Nguse, T., Fekete-Farkas, M. and Zeman, Z. (2021). Economic Growth, Investment, Population Growth and Unemployment in Ethiopia. *SHS Web of Conferences*, 90. (www.shs-conferences.org)
55. Oyinlola, Mutiu A., Adedeji, A. and Onitekun, O. (2021). Human capital, innovation, and inclusive growth in sub-Saharan African Region. *Economic Analysis and Policy*, 72(C), 609-625.
56. Owoo, N.S. (2021). Demographic considerations and food security in Nigeria. *Journal of Social and Economic Development*, 23(1), 128-167.
57. Orji, A, Ogbuabor, J. E., Nwanosike, D.U., and Anthony-Orji, O.I. (2019). Demographic Changes and Economic Performance in Nigeria: An Empirical Investigation. *Ashers Publishing*, 10(1). (www.publishing.ashers.com)
58. Pesaran, M.H., Shin, Y., and Smith, R.J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289–326. (www.journals.wiley.com)
59. Romer, P.M. (1986). Increasing returns and longrun growth. *Journal of Political Economy*, 94(5), 1002–1037. (www.journals.uchicago.edu)
60. Suryanto, S., Irwan, T., Fitri, S., Baptiste, A.J., Hapsari and Yuaninda (2023). The Impact of Climate Change, Economic Growth, and Population Growth on Food Security in Central Java Indonesia. *Nature Environment and Pollution Technology*, 22(2), 1017-1022. (www.neptjournal.com)
61. Solow, R.M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70(1), 65–94. (www.jstor.org)
62. Swan, T.W., (1956). Economic growth and capital accumulation. *Economic Record*, 32(2), 334–361. (www.onlinelibrary.wiley.com)
63. The Daily Trust (July 2023). Effect of Slowing, Ageing Population Growth on China's Economic Growth. Newspaper, Abuja.
64. The Spectator (2023). Signs of economic softening grow: Unemployment rate climbs to 5.5 per cent as population growth outpaces job creation, *The Spectator*, Hamilton, Newspaper, A.11.
65. Tupy, M.L., and Pooley, G.L, (2022), “Superabundance: The Story of Population Growth, Innovation, and Human Flourishing on an Infinitely Bountiful Planet”, Cato Institute, Washington, D.C.

66. The Lancet (July, 2022). The UN reports global asymmetries in population growth. The Lancet, 400(10347), 148. (www.thelancet.com)
67. This Day (Nov. 2021). FG: "Nigeria Economic Growth Must Outpace Its Population Growth", This Day Newspaper, Lagos.
68. Uddin, I. and Rahman, K.U. (2023). Impact of corruption, unemployment and inflation on economic growth evidence from developing countries. Quality & Quantity, 57(3), 2759-2779.
69. United Nations Population Fund (2023). World Population Dashboard – Nigeria. (www.unfpa.org)
70. United Nations, Department of Economic and Social Affairs, Population Division. (2022). World Population Prospects 2022: Summary of Results. (www.un.org)
71. United Nations Development Programme (2021). Human Development Report 2020. (www.hdr.undp.org)
72. United Nations Economic Commission for Africa. (2021). Economic Report on Africa 2020. (www.uneca.org)
73. United Nations Development Programme (2020). Nigeria: Human Development Report 2020. (www.undp.org)
74. United Nations (2019). World Population Prospects 2019: Highlights (ST/ESA/SER.A/423). United Nations Department of Economic and Social Affairs, Population Division.
75. United Nations (2021). World Population Prospects: The 2021 Revision. (www.un.org)
76. Udo, R.K. (1993). Geographical perspectives on Nigeria's population distribution and rural development. The Professional Geographer, 45(4), 446-457.
77. Vanguard (June 2023). World Bank: Nigeria's economic growth too slow to reduce poverty. Vanguard Newspaper, Lagos.
78. World Bank. (2023). World Bank Global Economic Prospects. (www.worldbank.org)
79. World Bank (2021). World Development Report 2021: Data for Better Lives. (www.worldbank.org)
80. World Bank (2021). Nigeria Urbanization Review: Leveraging the Economic and Social Opportunities of Cities. World Bank Group.
81. World Bank (2021). Nigeria - Political Stability and Absence of Violence. (www.worldbank.org)
82. Wooldridge, J.M. (2010). Econometric analysis of cross section and panel data. Cambridge: MIT Press.
83. Yang, X. and Khan, I. (2022). Dynamics among economic growth, urbanization, and environmental sustainability in IEA countries: the role of industry value-added. Environmental Science and Pollution Research, 29(3), 4116-4127.

84. Younas, Z.I., Qureshi, A. and Al-Faryan, M.A.S. (2022). Financial inclusion, the shadow economy and economic growth in developing economies. *Structural Change and Economic Dynamics*, 62, 613-621.
85. Yakubu, M.M., Akanegbu, B. and Jelilov, G. (2020). Labour force participation and economic growth in Nigeria. *Advances in Management and Applied Economics*, 10(1), 1-16. (www.researchgate.net)