



The Effect of Rapid Population Growth on Economic Development in Nigeria

Babatunde Binuyo*

Economics Department, Babcock University, Ilisan-Remo, Ogun State, Nigeria

Azuka Odinye

Economics Department, Babcock University, Ilisan-Remo, Ogun State, Nigeria

Gideon Olanrewaju

Economics Department, Babcock University, Ilisan-Remo, Ogun State, Nigeria

Olawumi Osundina

Economics Department, Babcock University, Ilisan-Remo, Ogun State, Nigeria

Abstract: Nigeria is currently on the brink of experiencing a population explosion, as projected by the United Nations, positioning the nation to become one of the world's most populous countries by 2050. However, Nigeria faces the challenge of having a predominantly unproductive population that is growing at a rate faster than its national output. To enhance the standard of living for its citizens, it is imperative for economic growth to outpace population expansion. This way, each passing year brings the potential for greater contributions from its people. A burgeoning population can lead to the overuse of resources, a reduction in the average standard of living, and labor force congestion, all of which pose obstacles to development. The study spanned 32 years, utilizing time series data from 1990 to 2021, with information on HDI, population growth rate, FDI, and labor force participation rate sourced from the United Nations Human Development Report and the World Bank. The Augmented Dickey-Fuller (ADF) test was employed to assess the stationarity of the variables used, revealing that they were stationary at the first difference, indicating I(1). Consequently, the study employed the Vector Error Correction Model (VECM) technique for parameter estimation. The findings demonstrated a negative relationship between population growth and economic development, whereas foreign direct investment and labor force participation rate exhibited positive relationships with economic development. As a result, the study offers recommendations, including the need for policymakers in the health sector to intensify awareness efforts on family planning, especially in rural Nigeria. Additionally, promoting on-the-job training for workers, particularly the youth, is encouraged to develop skills, which, in turn, can boost production, wages, and the overall standard of living.

Keywords: *Population, economic development, foreign direct investment, labor force participation rate.*

Received: 10 July 2022; **Accepted:** 05 September 2022; **Published:** 05 December 2022

INTRODUCTION

The connection between population and sustainable economic development is a topic of widespread interest among economists and scholars globally, including both developed and developing nations. However, a consensus has not yet been reached on whether population growth positively or negatively impacts a country's economic performance.

*Correspondence concerning this article should be addressed to Babatunde Binuyo, Economics Department, Babcock University, Ilisan-Remo, Ogun State, Nigeria E-mail: binuyob@babcock.edu.ng

The role of population growth in the economy is significant, as it presents challenges such as an aging society and workforce shortages in developed countries, while less developed nations grapple with rapid population expansion, influencing their economic performance. Consequently, differing opinions exist regarding the desirability of population growth, with some viewing it as a major concern; while others argue it is not a significant issue (Ochinyabo, 2021); (Furuoka et al., 2009); (Afzal, 2009).

Economists hold three distinct economic theories on the relationship between population growth and economic development. One theory, championed by Marx, contends that population growth can boost a nation's economy by stimulating growth and development. In contrast, another theory, based on Malthus' research, argues that population growth can be detrimental due to issues like overpopulation and resource strain, leading to various problems as a nation expands. The third perspective suggests that population growth has no impact on economic development. These theoretical differences have led to empirical studies, resulting in a consensus view that combines elements of these theories. However, this hybrid perspective has produced mixed results.

The experiences of East Asian nations, especially China and India, suggest that a growing population may not be inherently problematic, with other non-demographic factors playing a significant role. Nonetheless, the persistent development challenges in African countries, despite their substantial global population share, indicate that there is still no consensus on the relationship between population growth and economic development. In Nigeria, there has been a significant population growth rate of about 3.02% per year since 2006, which could potentially lead to a population doubling in less than 23 years. This rapid population expansion presents a dual challenge: the nation's economic growth rate has not kept pace with its population growth for nearly a decade. Consequently, living standards have declined compared to previous decades as the gains in income have been absorbed by the growing population. Despite the implementation of population policies, other factors such as low life expectancy, periodic famines, insurgency, and terrorism have had a more substantial impact on population dynamics. Therefore, high population growth remains a significant concern for sustainable economic development and poverty in Nigeria (Ochinyabo, 2021).

As of 2022, Nigeria's population has reached approximately 216.7 million, with an average growth rate of two percent between 1965 and 2022. In 2021, the population increased by 2.6% compared to the previous year. Nigeria is now the most populous nation in Africa, contributing to Africa's status as the continent with the highest global population growth rate (Sasu, 2022).

Nigeria only began seriously considering the need for a population policy in the 1980s, primarily driven by a drop in oil prices, which highlighted the challenges posed by the country's growing population. Before this, various international programs aimed to control birth rates in developing countries, but Nigeria paid little attention to them. These programs proposed that countries adopt population policies to reduce birth rates and promote development. With Nigeria on the verge of a population explosion, the United Nations predicts that it will become one of the world's most populous nations. Therefore, it is crucial to assess the impact of rapid population growth on economic development in Nigeria.

LITERATURE REVIEW

Nigeria is currently on the brink of experiencing a population explosion, with projections from the United Nations indicating that it will become one of the world's most populous nations. Unfortunately, Nigeria's population is predominantly large but largely unproductive, and it is growing at a faster rate than the country's national output. The existing theories do not provide a straightforward generalization about the impact of population growth on developing countries like Nigeria. As a result, it is challenging to make a definitive statement about Nigeria's future economic growth prospects concerning its expanding population (Ogunleye, Owolabi, & Mubarak, 2018).

Peter and Bakari (2018) conducted a study that explored the influence of population growth on economic growth in Nigeria from 1980 to 2010. The study used secondary data from World Development Indicators and employed descriptive statistics and regression analysis for analysis. The results indicated a positive relationship between economic growth (proxied by GDP growth) and population fertility and export growth. Conversely, negative relationships were observed between economic growth life expectancy, and the crude death rate.

Ayinde and Egbetunde (2015) investigated the persistence of unemployment in Nigeria and examined the impact of population growth on the persistence of unemployment. The study analyzed data from 1970 to 2012, employing the Auto-Regressive Distributed Lag Bounds Test for long-term impacts and equilibrium conditions, with re-parameterization for short-term impact analysis. Their findings revealed evidence of persistent unemployment, but population growth did

not play a significant role in the persistence of unemployment in Nigeria.

[Ochinyabo \(2021\)](#) delved into the issues of rapid population growth and economic development in Nigeria from 2006 to 2019. The study adopted an Ex-post facto research design and utilized secondary data from sources such as CBN publications, the National Bureau of Statistics, and the World Bank. Analytical and descriptive tools were used to analyze the data. The findings indicated that population, remittances, gross domestic product, and unemployment had negative and significant effects on the Human Development Index in Nigeria. In contrast, foreign direct investment and effective governance had positive and significant effects. The study recommended the formulation and implementation of policies to control the rapidly growing population, emphasizing the need for policies supportive of inclusive population growth.

[Onyeoma \(2020\)](#) conducted a study examining the impact of increasing population on poverty and unemployment in Nigeria. The study employed the Autoregressive Distributed Lag Bounds (ARDL) approach using annual data from 1980 to 2018. It explored the dynamic relationship between population growth and various macroeconomic variables, including economic growth, poverty, and unemployment, as well as the causal links among them. The findings of the research indicated that population growth and its components have a detrimental effect on Nigeria's overall economic conditions. [Bala, Ibrahim, and Hadith \(2020\)](#) investigated the influence of population growth, poverty, and unemployment on economic growth in Nigeria using the Auto-Regressive Distributed Lag method. The study employed econometric techniques, including unit root tests such as ADF and PP tests, and co-integration tests. The variables used included real GDP, population, poverty, unemployment, and foreign direct investment. The research revealed that population and foreign direct investment positively impacted GDP, while poverty and unemployment had a negative effect on economic growth. [Maijamaa, Musa, Yakubu, and Mohammed \(2019\)](#) studied the impact of population growth on unemployment in Nigeria using annual time series data spanning from 1991 to 2017. Various data, including population, unemployment, consumer price index, foreign exchange rate, and foreign direct investment, were subjected to unit root tests like ADF, PP, and KPSS. The dynamic ordinary least squares analysis indicated that population and exchange rate had a positive association with unemployment, while the consumer price index, GDP per capita, and foreign direct investment negatively influenced unemployment, reducing its rate in the long run.

[Ogunleye et al. \(2018\)](#) explored the effect of population growth on Nigeria's economic growth over the period from 1981 to 2015. Data on GDP and exchange rates were sourced from the Central Bank of Nigeria Statistical Bulletin, while population growth rate, fertility rate, and crude death rate data came from the World Bank. Ordinary least squares regression was used for data analysis. The study found that population growth had a positive and significant impact on Nigeria's economic growth, while fertility had a negative and significant effect on economic growth. Exchange rates and crude death rates, however, were found to be insignificant factors for economic growth in Nigeria. [Hakeem, Chisom, and Ikenna \(2018\)](#) aimed to elucidate the relationship between population growth and economic growth in Nigeria. The study utilized annual time series data covering the period from 1970 to 2013 and relied on the Granger-Causality technique to achieve its objectives. The results indicated an absence of a causal link between the variables of interest. [Lawanson \(2016\)](#) employed a multivariate time series model to analyze the impact of population growth on the development of the Nigerian economy. The research incorporated various statistical tests, including ADF unit root tests, Johansen & Juselius co-integration tests, and the Error Correction Model. The findings revealed that population had a positive and significant effect on economic growth, while unemployment negatively impacted economic growth, and total government expenditure had a positive impact.

[Afzal \(2009\)](#) examines Pakistan's case of population growth and economic development from 1981 to 2005 using multivariate analysis from the Pakistan economic survey and from the international financial statistics yearbooks. The results demonstrated that rapid population growth is a real problem in Pakistan because it contributes to lower investment growth and diminishes the savings rate. Foreign investment and export promotion have only a small impact on Pakistan's economic growth owing to its rapid population growth.

[Yao, Kinugasa, and Hamori \(2013\)](#) conducted an empirical examination of the relationship between economic development and economic growth in China, utilizing time series data covering the period from 1953 to 2007. They employed a variety of statistical tests and analytical techniques, including the Augmented Dickey-Fuller test, LM test, VECM, and Johansen-cointegration test. The results revealed that population had a notably adverse impact on GDP per capita, while the savings rate, total factor productivity, and the level of industrialization significantly contributed to higher GDP per capita. [Mahmood et al. \(2014\)](#) delved into the determinants of unemployment in Pakistan from 1990 to 2010. Their research encompassed a broad array of statistical tests, including the Durbin-Watson Test, Jarque-Bera

Test, Breusch-Godfrey Test, White Heteroscedasticity Test, and the Multiple Linear Regression Model (MLRM). The findings unveiled that foreign direct investment and inflation were statistically significant factors associated with reduced unemployment rates, exhibiting negative relationships, whereas the labor force was identified as a statistically significant factor with a positive relationship contributing to higher unemployment. [Degu \(2019\)](#) examined the link between population growth and economic growth in Ethiopia spanning from 1981 to 2018. The study applied unit root tests (Augmented Dickey-Fuller and Phillips-Perron), the Autoregressive Distributed Lag co-integration approach, and the Toda-Yamamoto causality test for the analysis. The results showed a consistently negative and significant impact of population growth on economic growth, both in the short and long run. Additionally, the study found a positive and significant effect of GDP growth on population growth in both the short and long run. [Obere, Thuku, and Gachanja \(2013\)](#) aimed to establish the connection between population growth and economic growth in Kenya, utilizing time series data spanning from 1963 to 2009. Their analysis involved the application of the Vector Auto Regression Estimation technique, Augmented Dickey-Fuller test, and Granger-causality test. The results indicated a positive correlation between population growth and economic growth, suggesting that an increase in population positively influenced economic growth in the country. [Wahyuningrum and Soesilowati \(2021\)](#) investigated the impact of economic growth, population growth, and unemployment on the Human Development Index (HDI) in Indonesia. The study employed a combined approach using time series data from 2014 to 2018 and a cross-sectional dataset from 38 districts or cities in East Java Province. The analysis was conducted using the ordinary least squares method with multiple regression analysis. The findings demonstrated that population had a positive and significant effect on HDI, while economic growth and open unemployment rates did not significantly affect the Human Development Index.

[Anah \(2009\)](#) investigated the correlation between population growth and poverty in Africa by making projections from 1980 to 2100 regarding the populations of eleven African countries (Cameroon, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Niger, Nigeria, Tanzania, Uganda, and Zaire). This study employed a descriptive method of analysis. The findings of the research suggest that the source of poverty in Africa extends beyond the increase in population. In fact, population growth should be perceived as an advantage to the African economy, especially in regions where machines have not replaced manual labor.

[Furuoka et al., \(2009\)](#) examined the relationship between population growth and economic development in Thailand from 1961 to 2003. The study utilized various statistical tests and analyses, including the Augmented Dickey-Fuller unit root test, bounds test for co-integration, Granger causality test, and the Unrestricted Error Correction Model. The results revealed the presence of a long-term equilibrium relationship between population growth and economic development in Thailand. The study identified a unidirectional causality from population growth to economic development in Thailand. Notably, population growth in Thailand was found to have a positive impact on the country's economic performance, aligning with the population-driven economic growth hypothesis, which posits that population growth promotes economic development.

[Peter and Bakari \(2018\)](#) explored the impact of population growth on the economic growth of African countries using a panel data approach from 1980 to 2015. The research relied on annual secondary data from fifty-three African countries, sourced from the World Development Indicators database. Data encompassed economic growth, represented by GDP, as well as population growth, fertility rate, crude death rate, and inflation rate. The study employed the Generalized Method of Moments (GMM) technique for analysis, revealing that population growth had a positive influence on the economic growth of Africa, while fertility exhibited a negative impact on the economic growth of the continent.

[Antwi, Mills, Mills, and Zhao \(2013\)](#) studied the impact of foreign direct investment on the economic growth of Pakistan between 1981 and 2010 using the ordinary least squares technique, the co-integration test showed a long-term relationship and in the long run, Pakistan's economic performance was negatively affected by foreign direct investment.

[Haque, Kibria, Selim, Smrity, et al. \(2019\)](#) researched on labor force participation rate and economic growth in Bangladesh using annual time series data from 1991 -2017. Using the ARDL bounds testing approach, the study finds out that both total labor force participation and female labor force participation have short-run positive effects on the economic development of Bangladesh but negative effects in the long run.

METHADODOLOGY

The study utilized an ex-post facto research design, which examines past events and relied on published and unaltered data from reputable sources.

Its main objective was to explore the connection between population growth and economic development in Nigeria. This investigation involved using the Human Development Index as the independent variable and assessing its relationship with other variables, such as the population growth rate, foreign direct investment, and labor force participation rate.

To analyze the influence of population growth on economic development, the study employed a model expressed in its functional form.

$$HDI = f (POP, FDI, LFP)..... (1)$$

Econometrically, the model is re-written as:

$$\ln HDI_t = \beta_0 + \beta_1 POP_t + \beta_2 \ln FDI_t + \beta_3 LFP_t + \mu_t..... (2)$$

Where: HDI = Human Development Index

POP = Population growth

FDI = Foreign Direct Investment

LFP= Labor Force Participation Rate

i= error term

β_0 = intercept

t = time trend

$\beta_1, \beta_2, \beta_3$ and are the slope coefficients for each independent variable. The VECM model is expressed thus:

The long-run model:

$$\ln HDI_t = \beta_0 + \beta_1 POP_{t-1} + \beta_2 \ln FDI_{t-1} + \beta_3 LFP_{t-1} + \varepsilon_t$$

The short-run model:

$$\Delta \ln HDI_t = \beta_0 + \sum_{i=1}^{k-1} \beta_i \Delta POP_{t-i} + \sum_{j=1}^{k-1} \beta_j \Delta \ln FDI_{t-j} + \sum_{m=1}^{k-1} \beta_m \Delta LFP_{t-m} + \lambda ECT_{t-1} + \varepsilon_t$$

RESULTS AND DISCUSSION

The unit root tests check for the presence of unit root (non-stationarity) in a time series variable. The test is conducted in order to avoid spurious regressions which could occur among non-stationary variables. In carrying out this test, the Augmented Dickey-Fuller test has been employed in the two tests equations intercept and trend and intercept. This test is carried out based on two hypotheses, the null and the alternative hypothesis. The null states that the variable has a unit root while the alternative states that the variable is stationary. The decision is made based on the criteria which state that the null hypothesis should be rejected if the absolute test statistic is greater than the absolute critical value, and the null should be accepted if the absolute critical value is greater than the absolute test statistic. Tables 4.1 and 4.2 below display the test results.

Table 1 Augmented Dickey-Fuller test results

	Augmented Dickey-Fuller Test									Order of Integration
	At Levels				At First Difference					
	Intercept		Trend and Intercept		Intercept		Trend and Intercept			
	ADF	5% Critical Value	ADF	5% Critical Value	ADF	5% Critical Value	ADF	5% Critical Value		
Value POP	-1.06	-2.96	-0.86	-3.57	-3.07	-2.96	-3.77	-3.57		I(1)
LFP	-0.67	-2.96	-2.68	-3.57	-3.66	-2.97	-3.67	-3.57		I(1)
lnHDI	-0.79	-2.96	-2.82	-3.56	-7.19	-2.97	-8.11	-3.57		I(1)
lnFDI	-2.49	-2.96	-3.14	-3.56	-6.61	-2.96	-6.51	-3.57		I(1)

Source: Authors computation using E-views 9 (2022)

From the ADF test, it is observed that all the variables are stationary at first difference I(1). This is because the decision criteria are met at those points, resulting in the acceptance of the alternative hypothesis. The result of the stationarity test makes it inappropriate to use the OLS method, therefore the tests to determine the long-run relationship

can be achieved with the aid of the Johansen co-integration test but the optimal lag length has to be determined first. Johansen co-integration test based on maximum-Eigen statistic showed that only one equation has co-integration because none has a maximum-Eigen statistic value higher than the critical value meaning that they are significant at 5%. The results led to the acceptance of the alternative hypothesis that there was a long-run relationship among the variables. The Johansen co-integration test revealed only a long-run relationship between the variables. Therefore, it led to the application of the vector error correction model in order to examine the short-run relationship among the variables.

Table 2 Long run relationship

Variable	coefficient	Std. error	t-statistic
POP	-0.416544	0.18157	-2.29418
FDI	0.01161	0.0355	0.32731
LFP	0.033976	0.00752	4.51943
C		-0.153719	

$\ln\text{HDI} = -0.153719 - 0.416544\text{POP} + 0.011618\ln\text{FDI} + 0.033976\text{LFP}$ The long-run estimates of the VECM model yield somewhat unexpected results. The population growth rate exhibits a coefficient of -0.416544, implying a positive association between population growth rate and economic development in the long run. This finding is contrary to the anticipated outcome. Notably (Furuoka et al., 2009) and (Michael & Odeyemi, 2017) also found positive long-run relationships between population growth and economic development in their respective studies. This contrasts with the results of (Ayinde & Egbetunde, 2015) and (Degu, 2019), which both identified negative long-run relationships. In practical terms, a 1% increase in the population growth rate is expected to boost economic development by an average of 0.416544%, with other independent variables held constant.

In the case of the log of foreign direct investment, it exhibits a coefficient of 0.011618, revealing a surprising negative relationship between foreign direct investment and economic development in the long run. This outcome differs from initial expectations but aligns with the findings of (Antwi et al., 2013) in their respective analyses. However, it contrasts with the results of (Ochinyabo, 2021) and (Bala et al., 2020) which examined the long-run relationship between foreign direct investment and growth in various African countries. A 1% increase in foreign direct investment is projected to reduce economic development by an average of 0.011618%, holding other independent variables constant.

As for the labor force participation rate, it demonstrates a coefficient of 0.033976, indicating an unexpected negative relationship. This finding contradicts the initial expectations but aligns with the results of Haque et al. (2019) in their study of the labor force participation rate in Bangladesh. In contrast, it differs from the findings of (Paudel & Perera, 2009), who examined the relationship between foreign debt, trade openness, labor force, and economic growth, and identified a positive long-run relationship between labor force participation rate and growth in Sri Lanka. 1% increase in the labor force participation rate is projected to decrease economic development by an average of 0.033976%, with other variables held constant.

Table 3 Short-run relationship

Variables	coefficient	Std. error	t-statistic
POP	-0.100558	0.14644	-0.68669
FDI	0.004858	0.00633	0.76788
LFP	0.016616	0.00599	2.77322
C	0.015534	0.00365	4.2551
CointEq1	-0.369247	0.07793	-4.738
Adjusted R ₂		0.56455	
F-statistic		5.03348	

$\ln\text{HDI} = 0.015534 - 0.100558\text{DPOP} + 0.004858\text{DlnFDI} + 0.016616\text{DLFP}$ The population growth rate exhibits a coefficient of -0.100558, indicating a negative relationship between population growth and the Human Development Index, which serves as a proxy for economic development. This aligns with the anticipated expectation that population growth would have a negative impact. This outcome is also consistent with the findings of (Ochinyabo, 2021),

(Onyeoma, 2020), and (Fullerton Jr, Walke, & Villavicencio, 2015) who all observed negative relationships between population growth and economic development in their respective studies. However, it contrasts with the results of (Wahyuningrum & Soesilowati, 2021) and (Nyoni & Bonga, 2017) who reported positive relationships between population growth rate and economic development. In practical terms, a 1% increase in the population growth rate is expected to reduce economic development by an average of 0.100558%, while other independent variables remain constant.

The log of foreign direct investment displays a coefficient of 0.004858, indicating a positive relationship between foreign direct investment and economic development. This finding aligns with the expected outcome and is also in line with the results of (Ochinyabo, 2021), (Nyoni & Bonga, 2017) and (Bala et al., 2020). However, it contrasts with the findings of (Bass et al., 2010), who identified a negative relationship between foreign direct investment and economic growth in the primary sector in 47 developing countries. In practical terms, a 1% increase in foreign direct investment is projected to increase economic development by an average of 0.004858%, with other independent variables held constant.

As for the labor force participation rate, it exhibits a coefficient of 0.016616, indicating a positive relationship between the labor force participation rate and economic development. This finding aligns with the expected outcome and is consistent with the results of (Haque et al., 2019). However, it differs from the findings of Mahmood et al. (2014), who identified a contrasting relationship in their research. In practical terms, a 1% increase in the labor force participation rate is expected to increase economic development by an average of 0.016616%, while other independent variables remain constant.

The intercept value is 0.015534, representing the dependent variable (lnHDI) when all independent variables are at zero. The adjusted R_2 value is 0.564550, indicating that 56.4550% of the variation in the dependent variable is explained by the independent variables, while the remaining 43.545% is influenced by other unaccounted factors. The coefficient of the error correction term is -0.37, suggesting that the deviation from the long-run relationship is corrected at an approximate rate of 37% in the current period.

DISCUSSIONS OF FINDINGS

As evident from the findings, there is an adverse long-term association between population growth and the Human Development Index, serving as a proxy for economic development. This negative relationship also extends to the short term.

Regarding the interpretation of the model estimates, a favorable connection is established between foreign direct investment and long-term economic development. This positive effect remains consistent in the short term as well. According to the results derived from the model estimation, the labor force participation rate has a constructive causal impact on economic development over the study period.

This study investigated the connection between population growth and economic development in Nigeria from 1990 to 2021, utilizing annual time series data. The study assessed variables such as population growth rate, foreign direct investment, and labor force participation rate. To ensure the stationarity of the variables, the Augmented Dickey-Fuller test was initially conducted, confirming that they were stationary at the first difference. Consequently, the Vector Error Correction Model (VECM) was applied.

The Akaike lag length criteria were employed to determine an optimal lag length of two for estimation. The Johansen co-integration test was utilized to ascertain the long-term relationships between the variables, and the VECM was employed to analyze short-term relationships. The VECM's error correction coefficient revealed a speed of adjustment of approximately 37% per year, signifying a substantial rate of re-establishing equilibrium in response to deviations. Thus, the adjustment process is rapid.

In the long term, it was observed that population growth exhibited a positive correlation with economic development, aligning with the findings of (Nyoni & Bonga, 2017) and (Wahyuningrum & Soesilowati, 2021). Foreign direct investment, on the other hand, displayed a negative relationship, consistent with the results of (Antwi et al., 2013), who examined Pakistan's economic performance and found a negative impact of foreign investment in the long run. Their research indicated that domestic investment benefited the economy. Regarding labor force participation, a negative long-term relationship was observed, in line with the results of (Haque et al., 2019), who studied the labor force participation rate and economic growth in Bangladesh. While the study found that both total labor force participation and female labor force participation had short-term positive effects on development in Bangladesh, they exhibited

adverse effects in the long run.

SUMMARY OF FINDINGS

This research aimed to empirically assess the association between population growth and economic development in Nigeria over a 32-year period spanning from 1990 to 2021. Economic development was proxied by the Human Development Index (HDI), and the study considered independent variables such as the population growth rate, foreign direct investment (FDI), and labor force participation rate.

The findings revealed a negative relationship between population growth rate and economic development, whereas positive relationships were observed between labor force participation rate and foreign direct investment in the short term. However, in the long run, a positive relationship emerged between population growth rate and economic development, while both foreign direct investment and labor force participation rate exhibited negative effects on economic development.

For model estimation, the Vector Error Correction Model (VECM) technique was employed. This choice was informed by the results of the unit root test, which indicated that the variables were stationary at the first difference. An optimal lag length of 2 was selected based on the Akaike information criterion. The Johansen co-integration test was conducted to confirm the presence of a long-term relationship (co-integration) among the variables, supporting the alternative hypothesis.

Moreover, post-estimation tests demonstrated that the sample data's distribution in the model was normal and stable. The CUSUM test indicated stability, and the CUSUM of squares test suggested partial stability. The data were found to be free from serial correlation, and linear, and showed no signs of heteroscedasticity or multicollinearity.

CONCLUSION

After conducting an analysis of the impact of rapid population growth on economic development in Nigeria, the findings suggest that population growth has an adverse effect on economic development in the short term. This implies that the swift increase in Nigeria's population is a key factor contributing to the sluggish growth in the Human Development Index (HDI) in the short term. This rapid population growth has led to the overexploitation of resources, a decline in the average standard of living, and overcrowding in the labor force, all of which act as impediments to development.

It's worth noting that Nigeria's population is predominantly composed of youth. The rapid expansion of the population makes it exceedingly challenging for economically disadvantaged nations like Nigeria to address the issue of unemployment, which in turn results in a reduced quality of life for the country's citizen.

Recommendations

Health policymakers need to increase their efforts to raise awareness about the significance of family planning, particularly in Nigeria's rural regions. This is crucial for reducing the country's annual population growth rate. Policymakers should ensure that the growing population is directed toward sectors of the economy where their contributions can be effectively harnessed, such as the manufacturing sector. This will enable them to make productive contributions and lead Nigeria towards industrialization. Direct foreign investment should be allocated to vital sectors of the economy like health and education to enhance Nigeria's Human Development Index. Encourage the promotion of on-the-job training for workers, particularly among the youth. This will help in skill development, leading to increased productivity and wages, thereby improving their standard of living.

REFERENCES

- Afzal, M. (2009). Population growth and economic development in Pakistan. *The Open Demography Journal*, 2(1).
- Anah, C. (2009). The relationship between population growth and poverty in Africa: a view from the south. *International Journal of Development and Management Review*, 4(1), 14-24.
- Antwi, S., Mills, E., Mills, G. A., & Zhao, X. (2013). Impact of foreign direct investment on economic growth: Empirical evidence from Ghana. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 3(1), 18-25.
- Ayinde, T., & Egbetunde, T. (2015). Population growth, hysteresis and development outcomes in sub-Saharan African economies—a case of Nigeria. *University of Mauritius Research Journal*, 21, 525-552.

- Bala, U., Ibrahim, A., & Hadith, N. B. (2020). Impact of population growth, poverty and unemployment on economic growth. *Asian Business Research Journal*, 5, 48-54.
- Bass, N. M., Mullen, K. D., Sanyal, A., Poordad, F., Neff, G., Leeve, C. B., ... others (2010). Rifaximin treatment in hepatic encephalopathy. *New England Journal of Medicine*, 362(12), 1071-1081.
- Degu, A. A. (2019). The nexus between population and economic growth in ethiopia: An empirical inquiry. *International Journal of Business and Economic Sciences Applied Research (IJBESAR)*, 12(3), 43-50.
- Fullerton Jr, T. M., Walke, A. G., & Villavicencio, D. (2015). An econometric approach for modeling population change in doña ana county, new mexico.
- Furuoka, F., et al. (2009). Population growth and economic development: New empirical evidence from thailand. *Economics Bulletin*, 29(1), 1-14.
- Hakeem, A., Chisom, E., & Ikenna, N. (2018). Population and economic growth in nigeria: is there an empirical evidence of causality?. Retrieved from <https://api.semanticscholar.org/CorpusID:202317284>
- Haque, A. U., Kibria, G., Selim, M. I., Smrity, D. Y., et al. (2019). Labor force participation rate and economic growth: Observations for bangladesh. *International Journal of Economics and Financial Research*, 5(9), 209-213.
- Lawanson, O. (2016). Rapid population growth and economic development in nigeria.
- Mahmood, T., Ali, A., Akhtar, N., Iqbal, M., Qamar, S., Nazir, H. Z., ... Sana, I. (2014). Determinants of unemployment in pakistan: a statistical study. *International Journal of Asian Social Science*, 4(12), 1163-1175.
- Maijamaa, R., Musa, K., Yakubu, M., & Mohammed, N. (2019). Impact of population growth on unemployment in nigeria: Dynamic ols approach. *Journal of Economics and Sustainable Development*, 10(22), 79-89.
- Michael, T. O., & Odeyemi, M. A. (2017). Nigerias population policies: issues, challenges and prospects. *Ibadan Journal of the Social Sciences*, 15(1), 104-113.
- Nyoni, T., & Bonga, W. G. (2017). Population growth in zimbabwe: a threat to economic development? *DRJ-JEF (ISSN, 2520-7490)*.
- Obere, A., Thuku, G. K., & Gachanja, P. (2013). The impact of population change on economic growth in kenya.
- Ochinyabo, S. (2021). Rapid population growth and economic development issues in nigeria. *Journal of Economics and Allied Research*, 6(3), 1-13.
- Ogunleye, O. O., Owolabi, O. A., & Mubarak, M. (2018). Population growth and economic growth in nigeria: An appraisal. *International Journal of Management, Accounting & Economics*, 5(5).
- Onyeoma, S. (2020). The influence of rising population on poverty and unemployment in nigeria. *Journal of Economics and Allied Research*, 5(1), 106-122.
- Paudel, R. C., & Perera, N. (2009). Foreign debt, trade openness, labor force and economic growth: evidence from sri lanka.
- Peter, A., & Bakari, I. (2018). Impact of population growth on economic growth in africa: A dynamic panel data approach (1980-2015). *Pakistan Journal of Humanities and Social Science (PJHSS)*, 6(4), 412-427.
- Sasu, D. D. (2022). *Population of nigeria 1950-2023*. Retrieved from <https://www.statista.com/statistics/1122838/population-of-nigeria/>
- Wahyuningrum, F., & Soesilowati, E. (2021). The effect of economic growth, population and unemployment on hdi. *Efficient: Indonesian Journal of Development Economics*, 4(2), 1217-1229.
- Yao, W., Kinugasa, T., & Hamori, S. (2013). An empirical analysis of the relationship between economic development and population growth in china. *Applied Economics*, 45(33), 4651-4661.