

**IMPACT OF POPULATION GROWTH ON POVERTY RATE IN
NIGERIA**

BY

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**DEPARTMENT OF ECONOMICS
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**A PROJECT SUBMITTED TO THE DEPARTMENT OF ECONOMICS,
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CERTIFICATION

This is to certify that this project titled **“IMPACT OF POPULATION GROWTH ON POVERTY RATE IN NIGERIA”** was carried out by **Kelechi Glory MBACHU** with matriculation number **SSC1909377** in the Department of Economics, Faculty of Social Sciences, University of Benin, Benin City, Edo state.

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DEDICATION

I humbly dedicate this research work to God Almighty from whom all wisdom, understanding, love and strength which came through diverse forms to me throughout the period of this course in this great institution and to my beloved and caring parents; Mr. and Mrs. Mbachu whose sacrifice and benevolence had made my education a success and a possibility.

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ABSTRACT

The study” the impact of population growth on poverty rate in Nigeria” seeks to examine how population growth influences the rate of poverty in Nigeria. The study utilized data covering the period from 1981 to 2022. The model is logged and estimated and the data stationary is obtained using ADF test for unit root. The empirical findings shows that population growth has a negative and insignificant impact on poverty rate while Unemployment rate, Real Gross Domestic Product and inflation rate has a positive and insignificant impact on poverty rate in Nigeria. This study therefore recommends that there should be a more comprehensive approach to poverty reduction, by addressing the multiple dimensions of poverty and promoting inclusive and sustainable development. Resources should be provided and directed strategically in order to make meaningful progress in the reduction of poverty rate and improving the lives of the growing population in Nigeria.

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Poverty over time has become a universal phenomenon, which has led the government of many countries, especially developing countries like Nigeria to seek for ways to eradicate it (poverty) completely. The World Development Report 2000/2001 (World Bank, 2001) summarizes the various dimensions as a lack of opportunity, lack of empowerment, lack of security and inability to afford basic necessities of life. Most developing countries has recorded high level of poverty, this means that a large number of the population are poor and this makes them practically inactive in the society. Their inability to have access to quality resources which is necessary to pull them out from poverty, limits their choices in almost everything, and their lack of security makes them vulnerable to diseases and violence. Poverty has been widely acknowledged as a major global development challenge as evidenced by the influential Brundtland commission in a sentence that captures widely held belief (Ime, 2022).

Poverty tends to make people to exploit and degrade their surrounding environment for survival which can lead to dire consequences such as pollution and flooding which are assumed to cause the most inimical danger to natural resources, and consequently result to environmental degradation. The current situation of Nigeria is a significant rural-urban economic disparity existing alongside chronic

rate of poverty, inequality, deprivation to basic amenities, poor educational funding, increase in the level of illiteracy and lack of proper health and sanitation facilities.

According to a report from World Bank (2022) on poverty in Nigeria, as many as 4 in 10 Nigerians live below the national poverty line which is 1.90 dollar per day. Many Nigerians especially in the northern part of the country, also lack basic education and access to basic infrastructure, such as electricity, safe drinking water, and improved sanitation. The world bank report further notes that jobs do not translate Nigerians' hard work into an exit from poverty, as most workers are engaged in small-scale household farm and non-farm enterprises; just 17 percent of Nigerian workers hold the wage jobs best able to lift people out of poverty (Lawal et al., 2022). In Nigeria, despite the country being a lower-middle income economy, many Nigerians are living in abject poverty, this could be due to low per capital income or uneven distributions of that income among the masses. In 2011, the United Nations Development Program ranked Nigeria as the 159th country out of 165th poorest countries in the world. Nigeria was also placed at the bottom 152 in a ranking of 157 countries on the World Bank's Human Capital Index in 2018. In the global competitiveness report, Nigeria was ranked the 125th poorest country out of 137 economies (World Economic Forum, 2018). Furthermore, the report from the World Poverty Clock (2020), showed that poverty has risen in Nigeria with 105 million people living in extreme poverty. These individuals struggle to survive on an average of \$1.90 per day or lower per person, and this figure

represents 50% of the Nigeria's estimated population of about 205 million (Chinaza & Ikeafe, 2022).

However, population growth can be said to be a change or increase in the size of the population or dispersed group of people in a state, city or country. Population growth is also the summary parameter of trends in population abundance. It tells us the rate of increase and how fast population is changing. Population growth describes the per capita rate of growth of a population, as the factor by which population size increases per year (Efuntade et al., 2020). When population change occurs in such a way that it reduces the size of population, it is referred to as a negative growth but when it adds to the size of the population, it is then regarded as a positive one. What is gotten from this discourse is that population growth can be positive or negative depending on whether there is an increase or decrease in the size of a given population. Population whether positive or negative is determined by three demographic variables such as birth, death and migration rates.

According to research, Nigeria is the seventh-largest populated country in the world and the most populated country in Africa – with a population of over 200 million people growing at 2.62% per annum (NBS, 2020). Several policies and programs have been introduced over the last three decades to address Nigeria's rapid population growth and the challenges it poses for economic development. Nigeria's sustained population growth rate may continue for the foreseeable future

because Nigerians have not been able to space births and control a high fertility rate. This is a result of cultural preferences, religious inclinations, poverty, and declining mortality (Samuel, 2021). These, amongst other factors, can have future implications for sustainable economic development in Nigeria. Population increase has become a stumbling block to a lot of countries' economic growth and development. This is because the rapid expansion of population increases dependency burden (that is, the number of people who are considered to be economically unproductive, such as children and elder people) (Samuel, 2021). The negative views on the population growth have been prevailing over the positive opinions since Thomas Malthus warned about the danger of "overpopulation" (Malthus, 1798).

1.2 Statement of Research Problem

The continuous growth in population would mean or imply increase in the labor force, this would invariably lead to increase in supply of labor in Nigeria. Given that the available jobs (demand for labor) are insufficient (relative to the amount of labor force in Nigeria), there tend to be high level of unemployment in Nigeria. This would lead to continuous increase in unemployment rate (Sylvester 2020). For example, the unemployment rate in 1990 Nigeria was 9.2 percent when its population growth rate was 2.628599 percent and 2000 the unemployment rate was 9.47 percent when its population growth rate was 2.602869 percent while in 2010 its unemployment rate was 9.63 percent when its population growth rate was

2.744379 and the in 2020 the unemployment rate became 14.35 percent when the population growth rate of Nigeria was 2.440609 percent (World Development Indicators, 2022).

Given the increase in the level of unemployment, Nigerians who are unemployed would no be able to afford the basic necessities of life such as food, clothing and shelter. The inability to afford these basic necessities is a clear indication of poverty. This means that an increase in the level of population may not matched with the increase in the level of employment or decrease in the level of unemployment will generate an unavoidable increase in the level of poverty in Nigeria.

The impact of population growth on poverty rate in Nigeria is of great importance and it is tormenting to see a growing number of Nigerians struggling and battling in hardship to meet their daily needs without any coordinated support from the Nigerian government. It is alarming to see many of our graduates still unemployed after all the many years of studies. This has led to the development of a large number of poor people in the country. The Nigerian government has failed to realize the benefits and potential of population growth on the country's economic development and providing an excellent human capital for the society (Ismail, 2010).

There are so many problems in Nigeria which are associated with high population growth especially in urban areas. Rapid Increases in growing population

causes high level of unemployment in the urban area, environmental pollution, high rise in inflation and low standard of living which ultimately leads to poverty. Most of the populated area has deficiency in acquiring basic human need and social amenities. It had been seen over the years in history that population increase is brought about by several social-economic factors which in turn is seen to have adverse effects in many areas of the Nigerian economy. The major problem of low developing countries such as Nigeria is that there is low productivity output accompanied with rapid population growth which gives rise to poverty among it masses (Adedoyin 2021).

Many studies and empirical analysis have been conducted in order to explore the impact of population growth on poverty rate, employed the use of quantitative methodologies, such as econometric modelling and analysis, to examine the effect of these variables such as population growth, unemployment rate and inflation on the poverty. Population growth and poverty rate are closely related because a growing number of Nigerians are unemployed and there is also persistent rise in the prices of goods and services making it difficult for the average Nigerian man to afford (Babatunde et al, 2020).

1.3 Objectives of the Study

The main objective of this research work is to ascertain the impact of population growth on poverty rate in Nigeria. Its specific objectives are stated as follow;

1. To examine the impact of population growth on poverty rate in Nigeria.
2. To examine the impact of unemployment on poverty rate in Nigeria.

1.4 Research Questions

This research is poised to answer the following research questions;

1. Does population growth have impact on poverty rate in Nigeria?
2. What is the impact of unemployment on poverty rate in Nigeria?

1.5 Hypotheses of the Study

The null hypotheses formulated for this study are:

Ho₁: There is no relationship between population growth and poverty rate in Nigeria.

Ho₂: There is no relationship between in unemployment and poverty rate in Nigeria.

1.6 Scope of Study

This research is to focus on the impact of population growth rate on poverty rate in Nigeria. The research will be limited to the available data and literature from 1981 to 2022. This research will make use of research methods, which will include data analysis of existing secondary data from national reports and databases, in order to examine the relationship between population growth and poverty rate indicators.

This study also focuses on the effects of population growth on poverty rate in Nigeria in a bid to analyze the choices taken to curb them in order to increase economic growth and development, taking into account other factors influencing

population growth on poverty rate in Nigeria. The entirety of the data was sourced from CBN Statistical bulletin (2022) and world development indicators (WDI) (2022).

1.7 Significance of the Study

Apart from most empirical studies on poverty this research tries to highlight on the effect of population growth on Nigeria's poverty rate. Thus, this research is aiming to point out the paramount and unavoidable outcome of continuous increase in human population on poverty rate in Nigeria. Which usually results in depletion of resources, human congestion, persistent inflation, high unemployment rate, environmental degradation and so on.

Based on research findings, this study will provide a significant and practical recommendations for policy creation and organization. This study's conclusions would have immediate policy formations particularly for population and poverty control decisions, which are important for determining if the reduction in poverty rate will help in the improvement of the standard of living of Nigerians. The findings will likely help policymakers and researchers devise the best population controls and poverty alleviation strategies for the welfare of Nigerians.

1.8 Limitations of the Study

The study employed four independent variables as the factors that influence poverty rate and assumed that all other factors that may affect poverty rate are captured by the stochastic error term. The researcher had challenges in assessing

some materials online as some internet sites were secured and required a subscription before gaining access to relevant materials.

1.9 Structure of the Study

This research work will consist of five chapters. Chapter one provides a well written and detailed introduction on the study. Chapter two addresses literature review containing both empirical, conceptual and theoretical literature. Chapter three presents the theoretical framework, model specification and research methodology. Chapter 4 focuses on data presentation, analysis of data and its interpretation. Chapter five is concerned with the summary and conclusion of the study as well as its recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In order to achieve the objective of the study, this chapter proceeds to review other relevant works related to the subject matter of this research that will provide us with significant conceptual, theoretical and empirical background for assessing the pertinence and contributions of this research study. In this section contains the conceptual review, theoretical literature, review of relevant empirical literature and the definition of terms.

2.2 Conceptual Review

- **The Concept of Population Growth**

Population is the total number of people living within a geographical area or country at a particular time. Population growth is the increase in the number of people that reside within a geographical or political boundary within a given period (Samuel, 2021). The formula used to determine whether there has been population growth is $(\text{Birth Rate} + \text{Immigration}) - (\text{Death rate} + \text{Emigration})$.

The continuous population growth in Nigeria is equally associated with unemployment with figures ranging from 17 percent per annum for the entire population to 60 percent for the youths because job opportunities are fewer than the number seeking for them, and stagnating economic performance because a large

proportion of available resources is consumed instead of being invested to generate growth (Federal Republic of Nigeria, 2004).

Features of a Rapidly Growing Population

1. An increased population is mostly associated with low child and infant mortality.
2. Countries with a rapidly growing population most at times engage in intensive agriculture. This is done to support the country's high population, although this act is a threat to humans because of the effect it has on humans through diseases.
3. There is high chance of frequently experiencing the emergence of new epidemics in rapidly growing populated countries. This is as a result of overcrowded living conditions, exposure to diseases, social factor, environmental conditions and malnutrition.
4. There is also the presence of poverty and inflation in countries with high population caused by bad policies and unstable government.
5. Low life expectancy is also a feature seen in most fast-growing population.
6. There seem to be high theft and criminal activities, accompanied by drug cartels in countries with high population.

Reasons for Nigeria's Increasing Population

1. The first and major factor causing an increased population is the birth rate. Birth rate has influenced the population growth rate in so many ways and it is as a result of good and improved medical services and facilities and services. Child mortality

has drastically reduced because unlike ages ago that there was not advanced health service like better drugs and immunization that will reduce child mortality.

2. Secondly, the matter of early marriages mostly in the Northern Part of Nigeria poses a big problem. Due to the fact that women marry at an early age leads to increased birth rate and prolong their child bearing years, which makes them give birth to many children.

3. The third reason is based on the increase in material welfare given to citizens. When people are materially well off, they begin giving birth to as many children as they wish without giving any thought to the implication of their actions since they are thriving well. This is also based on the arguments of Thomas Malthus on the poor laws in England, which they suggested that relief materials should not be discouraged because an increase in material welfare makes them have more babies. At a point in time, it was observed that an increase in a family's wealth or income causes them to have large families given that they have more capacity to cater for them. Old-age security is another factor that contributes to large families given that parents have the mentality that having many children gives them security by guaranteeing that the children will provide for them and give them a better life when they are old and unable to do productive activities.

4. Religion beliefs: There are three major religions in Nigeria, namely, Christianity, Islam and Local tradition. In Islam, men were allowed to marry more than one wife and also the same to the Local traditional religion. According to Oramah (2006),

Islamic religion encourages large families and early marriages that associated with polygamous family system. In addition, Osam (2019) reported that such men were polygamist in nature and they believed that they have the capacity to sustain such large families without taking into consideration that they are contributing to the population explosion in Nigeria

5. High rate of illiteracy among Nigerians: Illiteracy is a disease that in most cases is not noticeable by the person concerned. The person concerned felt that what she or he is doing is right, but in the actual sense, is not right. This is the exact behavior of some of the men who are polygamist in nature. The illiteracy as used in this paper means those people that lack the knowledge of population and sex educations.

Implications of High Population Growth in Nigeria

- **Positive Effects of High Population**

1. High population represents a strong army and available people for defense in terms of security, war and emergencies in the country when the need arises.

2. A large population tends to attract foreign investors. This is because investors tend to have cheap labor in a high populated country. Although this can be bad for the country, it still helps young unemployed graduates to have jobs which they can support their selves and also, more investments in the country contributes to the GDP of the country.

3. In the case of high population, there is an increase in demand for food, shelter etc. which increases consumption, and high consumption in turn stimulate high

production of goods and services. This leads to an increase in GDP which in turn leads to an increase in the country's economic output.

- **Negative Effects of High Population**

The first and crucial effect of overpopulation is the fact that it causes environmental degradation. In 1798, Thomas Malthus propounded his theory of population which he states that as population increases geometrically, it will reach a point where the country will reach its carrying capacity. Carrying capacity is the number of people that the environment and other elements of the environment can support. At present, Nigeria has reached and exceeded its carrying capacity and if proper measures are not taken, the country has to go back to a subsistence level (Dao M. Q., 2012). Nigeria has reached a point where the environments can only render little support to the enormous population of the country. It was projected by the U.N report that Nigeria's population will be 397 million people, which implies that Nigeria will be the 3rd largest country in the world. The projected population is quite huge and demands that government should start planning towards that period, so that the country can efficiently sustain and provide for its population (Nwosu, 2014).

The first step in doing this is by ensuring a stable government in the country. The government on the other hand can embark on projects that will help establish more health centers, financial institutions, and schools. The government can also impose proper measures towards encouraging environmental sustainability (Nwosu,

2014). The IPAT model describes how the increasing population is correlated with the environment. The model asserts that population growth affects the environment. It is claimed that technological advances will lead to an increased and massive production of goods, but the problem with this is that technological advances cannot balance both production and the effects of an increased consumption. Also, in the presence of high population, there is an increased use of natural resources which leads to depletion and scarcity of natural resources (McKenna, 2015).

A high population increases the dependency ratio in a country, therefore increasing the burden of the employed individuals. A fast-growing population means that there will be more children and old people to take care of which increases the number of people that depend on the working-class population. This situation also reduces the rate of savings; when an employed individual receives his/her income; he provides for his own needs and also provides the needs of his dependents, the individual will be left with no or little income to save or invest with. This in turn decreases capital creation in the country and also obstructs the country's socio-economic development of various sectors of the economy. This is the reason why capital formation and socio-economic development has decreased over the years in the country.

A high population leads to a low income per head and causes a low per capita income. This lowers the general standard of living and consumption of goods and services. It also increases the consumption of inferior goods. This situation also

forces people to live in slumps which are not conducive and healthy for individuals. As a result, it increases the outbreak of diseases, epidemics and other contagious diseases. This condition is seen rapidly in places like Lagos and some northern states in Nigeria due to the congestion and overpopulation (Nwosu, 2014).

An increased population tends to increase man power in the country in the long run. Although, this leads to a higher supply of labor, but at the same time, the Census report of 1991 revealed that 51.7% of the population will fall under 15-64 age group. The problem with these is that, this situation creates a high unemployment and poverty as there are many people in the country who are willing and capable to work but only fewer persons are able to secure a job (Oduşina, 2006).

Other negative effects of overpopulation include; it leads to social vices like fraud, bribery and prostitution. It also brings about an increase in government spending, as they have more people in the country to cater for (Dao M. Q., 2012).

- **The Concept of Poverty**

The common verity is that poverty has no universally accepted definition. But it has also gone beyond the mere description of lack or inability to earn more (above 1.90 dollars per day). As a multifaceted concept, it encompasses both social, economic, and political elements. The United Nations Children's Fund considered this fact and gave a more detailed, and broadened definition of poverty. Poverty is a denial of human dignity and human rights. Poverty is insecurity exclusion from the

mainstream of society, discrimination, and exposure to violence (Chinaza and et al, 2022). Poverty is not having a good basic school and a good health center to receive treatment. As well as, not having access to adequate sanitation, and safe drinking water. Poverty is also being stigmatized and constrained vocally to influence decision-making (United Nations Children's Fund 2000).

It is also defined as pronounced deprivation in well-being, and comprises many dimensions as low incomes and the inability to acquire the basic goods and services necessary for survival with dignity, low levels of health and education, poor access to clean water and sanitation, inadequate physical security, lack of voice, and insufficient capacity and opportunity to better one's like (World Bank 1999).

United Nation Development Project, (1999) defines poverty as a denial of choices and opportunities, a violation of human dignity, which implies lack of basic capacity to participate effectively in society, not having enough to feed and clothe a family, not attaining literacy of good health, not having security of food or a job to earn one's living. Poverty is a world-wide phenomenon, but its incidence is more severely felt in the developing countries than in the developed ones. Thus, poverty can be classified into relative and absolute poverty. Absolute poverty is a state of destitution, is the lack of basic human needs, such as clean water, nutrition, health care, education, clothing, and shelter (Ime, 2022).

In Nigeria, available evidence tends to suggest that more than 40% of the Nigerian population live in extreme poverty, spending less than N320 per capita per month. At the individual level, poverty could be seen as the determinant of income whose absence or inadequacy incapacitates him/her from acquiring the necessities for good living (Efuntade, 2020).

Some Key Factors Contributing to Poverty in Nigeria

- 1. Unemployment:** Unemployment is a major factor contributing to poverty in Nigeria. There is a strong correlation between unemployment and poverty. When people are unemployed, their source of livelihood depletes over time. The cost of living becomes high and the standard of living goes down. There are many people in Nigeria who lack the opportunity of being employed. The formal unemployment rate in Nigeria as estimated by the World Bank in 2007 was 4.9 percent and Nigeria ranked 61st across the worlds countries (CIA Factbook). Many graduates in Nigeria wander the streets without anything reasonable to do for a living. The government is capable but unwilling to provide jobs for them. Employment in Nigeria is usually not based on merit but depends on how connected you are with people that have power (Chimobi 2010). This leaves many highly qualified people in poverty as seemingly no one cares to know what they are capable of achieving. These people are missing out on the income they would have gotten if they were employed. The number of quality jobs in the economy is low and many government resources

are misallocated, Unemployment-induced poverty tends to increase the crime rate and violence in the country. The reservation wage they get from these activities is typically barely enough to take care of their basic necessities.

- 2. Corruption:** Transparency International defines corruption as “the abuse of entrusted power for private gain. “This has become a common act in Nigeria and it has destabilized the political system drastically. Government funds are being misappropriated on a daily basis by the leaders, who only put the interest of their family and friends at heart while ignoring the masses. The corruption has eaten so deeply into the government and economy that everyone seems to be blinded by it. Corruption has almost become an accepted way of life in Nigeria. In Nigeria, the government’s income is generated mostly from natural resource revenues. This income, instead of being used for developmental purposes, is then circulated among the political office holders and their families, leaving the rest of the people to wallow in poverty. Political leaders practically ignore the affairs and wellbeing of their people who elected them into office. They mismanage and embezzle funds. There are several issues involved with bad governance in Nigeria, use of wrong policies, adaptation to wrong policies and implementation of those wrong policies. In any case, it is clear that Nigeria’s corruption has increased poverty and inequality as well as contributed to high crime rates.

3. Inequality: Inequality implies a concentration of a distribution, whether one is considering income, consumption or some other welfare indicators or attributes. There was an increase in income disparity after the economic growth which Nigeria experienced between 1965-1975, and this income inequality has increased the dimension of poverty in the country. The income inequality between the people in rural and urban areas in Nigeria is remarkably high, as those who live in the rural areas base all their income on agriculture which is today not a thriving sector in Nigeria as oil has taken over the economy. They do not invest their money to acquire skills as people in the urban areas would and this makes them more vulnerable to poverty and leads to some social and economic problems such as violence, corruption and so on. A more equal distribution of Nigeria's income would go a long way in reducing the rate of poverty, but because it is typically the rich people who hold political offices or are related to those holding political office, income remains concentrated among the rich.

4. Lack or inadequate access to assets such as land and capital by the poor.

This is often attributed to the absence of land reform and minimal opportunities for small-scale credit.

- **The Concept of Unemployment**

Unemployment can be explained as the number of people or people in the workforce who are willing, able and capable to work but do not have a paid job.

Unemployment is mostly used as a tool to measure the health of the economy. The unemployment rate is often used as a measure to unemployment. Unemployment is often defined by the classical economists as the excess supply of labor over the demand for labor which is caused by adjustment in real wage. The Classical or real-wage unemployment occurs when real wages for jobs are set above the market clearing level, causing the number of job-seekers to exceed the number of vacancies (Ademola and Abdulsalam 2016). Unemployment as defined by the International Labor Organization (2009) is a state of joblessness which occurs when people are without jobs and they have actively sought work within the past four weeks. The unemployment rate is a measure of the prevalence of unemployment and it is calculated as a percentage by dividing the number of unemployed individuals by the number of individuals currently in the labor force. In a 2011 news story, Business Week Reported, "More than two hundred million people globally are out of work, a high record, as almost two-thirds of advanced economies and half of developing economies are experiencing a slowdown in employment growth. According to Jhingan (2003), unemployment can be conceived as the number of people who are unemployed in an economy, often given as a percentage of the labor force. Unemployment is also defined as the number of people who are willing and able to work as well as make themselves available for work at the prevailing wage but no work for them.

2.3 Theoretical Review

Progressive Social Theory

Proponents of this theory do not view individuals as the source of poverty but economic, political and social distortions as well as discrimination, which limit opportunities and resources to create wealth and overcome poverty. The 19th century social theorists waged a full attack on the individual theory of poverty by exploring how social and economic systems overrode and created individual poverty situations. They analyze how the economic system of capitalism created a reserve army of the unemployed as a deliberate strategy to keep wages low (Bradshaw, 2005). They argue that people may work hard and have acceptable attitudes but still be in the poverty trap because of dysfunctional social and economic systems. The theory ascribes poverty to economic, social and political structures that make the poor fall behind regardless of how committed they may be. Another category of system flaws associated with poverty relates to groups of people being discriminated against based on personal attributes such as race, gender, disability and religion, which limit their opportunities in spite of their personal capabilities. In Nigeria, government policies and actions exacerbate poverty. These may be adopted in pursuit of good intentions, but poor implementation could impoverish the citizens. The SAP and its various fallouts in the form of massive devaluation of the Naira, high inflation, factory closures, privatization, commercialization, appropriate pricing of petroleum products and unlimited free market contributed to the poverty situation. The structure of Nigeria's economy has also worsened the poverty situation. Its productive base is narrow and undiversified

with the economy largely dependent on oil revenue while other critical sectors are neglected. This situation has hampered economic growth and capacity utilization leading to macroeconomic instability and poverty. Misplacement of priorities by governments at all levels manifesting in wasteful expenditure rather than investment in critical sectors that have direct bearing on the standard of living, has aggravated poverty in Nigeria. Bias, discrimination on the basis of ethnicity and religion, and non-adherence to principles of true federalism and federal character in appointments and projects distribution have led to many ethno-religious conflicts and social unrests in Nigeria resulting in wanton destruction of lives and property thereby worsening the poverty situation of the country (Ime, 2022).

Malthusian theory of population

The Malthusian perspective derives from the writings of Reverend Thomas Malthus, an English clergyman and college professor. His first Essay titled on the principle of population as it affects the future improvement of society and was published in the year 1798. Malthus was of the opinion that food is necessary to the existence of man. He also said that the passion between sexes is necessary and will remain nearly in its present state. The power of population is indefinitely greater than the power in the earth to produce subsistence for man. Population, when unchecked, increases in a geometrical ratio while food increases only in an arithmetical ratio. By the law of nature which makes food necessary to the life of man, the effect of these two unequal powers must be kept equal. This implies a

strong and constantly operating check on population from the difficulty of subsistence. Malthus believed that human beings, like plants and non-rational animals, are impelled to increase the population of the species by what he called the powerful instinct, the urge to reproduce. Further, if there were no checks on population growth, human beings would multiply to an incalculable number, filling millions of the worlds in a few thousand years (Malthus 1872). According to Malthus, the ultimate check to population growth is lack of food (the means of subsistence). In turn, the means of subsistence are limited by the amount of land available, the 'arts or technology that could be applied to the land, and the social organization or land ownership patterns. A cornerstone of his argument is that population tend to grow more rapidly than the food supply does, since population has the potential for growing geometrically, two parents could have four children, sixteen grandchildren, and so on, while he believed that food production could be increased only arithmetically.

Marxist Theory

Marx was a socialist writer who disagrees with Malthusian theory of population growth. Marx and Engels saw that the theory of Malthus was outrageous and against humanity. This led to their writing called Marxist theory. The highpoint of opposition to Malthus ideas come in the middle of the nineteenth century with the writings of Karl Mark (capital, 1867) and Friedrich Engels (outlines of a critique of political economy, 1844), who argued that what Malthus saw as the

problem of the pressure of the means of production on population? They thus viewed in terms of their concept to the labor reserve army. In other words, the seemingly excess of population that Malthus attributed to the seemingly innate disposition. The poor to reproduce beyond their means was actually a product of the very dynamic of capitalist economy. Karl Marx went one step further and argued that starvation was caused by the unequal distribution of the wealth and its accumulation by capitalists. It has nothing to do with the population. Population is dependent on economic and social organization. The problems of overpopulation and limits to resources, as enunciated by Malthus, are inherent and inevitable features associated with the capitalist system of production. Hence Engels called Malthus's hypothesis "the crudest, most barbarous theory that ever existed, a system of despair which struck down all those beautiful phrases about love thy neighbor and world citizenship.

2.4 Empirical Review

In this section, relevant empirical works related to poverty rate, population growth, unemployment rate, economic growth, inflation rate in Nigeria and other countries are reviewed.

Onyeoma (2020) studied the influence of the rising population on Poverty and Unemployment in Nigeria using Autoregressive Distributed Lag Bounds (ARDL) approach on annual data from 1980-2018. It explores the dynamic relationship between population growth and selected macroeconomic variables of

economic growth, poverty, and unemployment as well as the direction of causality between them. The study also found that population growth and its components exerted a negative impact on the overall economic conditions in Nigeria.

Okonkwo, Kalu & Nwosu (2019), the study adopted the political economy methodology in their study on restructuring for economic diversification in Nigeria. It stated that the Nigerian political economy has unfortunately centralized its economic resources making it impossible for active economic participation of the ever-increasing populace. Findings of the study revealed that the devolution of economic resource is a sine qua non for sustainable growth and development that can support the rising population growth.

Olusogo, Oluwarotimi & Muazu (2018) explored the effect of population growth on the economic growth of Nigeria from 1981 to 2015. Data used were GDP and exchange rate, Population growth rate, fertility rate, and crude death rate. Ordinary least squares regression was used to analyze these data. The findings of the study revealed that population growth has a positive and significant effect on the economic growth of Nigeria, while fertility was negative and significant for economic growth in Nigeria. The exchange rate and crude death rate are however insignificant for the economic growth of Nigeria.

Using Error Correction Model (ECM) technique within an Auto Regressive Distributed Lag (ARDL) framework, Chude, Anah, Chude and Chukwunulu (2019) examined the relationship between government expenditure, economic growth and

poverty reduction in Nigeria. Using time series data covering the period, 1980 – 2013, it was found from the study that government spending and economic growth has a positive relationship. This is caused by the increase in real private investment, and fixed capital accumulation. The study recommended that the government should extend its role to ensure that the quality and the volume of private investment in Nigeria is very high, as it is a contributing factor to poverty reduction

Iyoboyi (2020) investigates the long run impact of institutions on economic growth, using the Dynamic Ordinary Least Squares technique. There was empirical evidence of a statistically significant and positive relationship between property rights and growth. Law and order was also statistically significant and positively associated with growth, while political terror exerted a negative impact on growth in the period of investigation.

Keghter, Ogbonna, & Afamefuna (2020) this paper examined the role of institutional quality in economic growth enhancement and the precise role it plays through the channel of health expenditure. The ARDL model was employed and there was evidence that the long-run effects of health expenditure and institutional quality on economic growth are both surprisingly negative, with only institutional quality having a statistically significant relationship.

Efuntade, Olubunmi Omotayo and Alani Olusegun (2020) explored the effect of population growth on the economic growth of Nigeria over the period of 1994 to 2019. Time Series data on gross domestic product (GDP), mortality rate,

fertility rate, and immigration rate, were obtained from the Central Bank of Nigeria (CBN) and world development indicators. This study utilized the co-integration and vector error correction model to analyse the data. The findings of the study revealed that mortality rate has a negative significant effect on GDP in Nigeria's perspective, while it can be concluded that fertility rate has a significant positive effect on GDP. International migration (IM) has a positive effect on economic growth in Nigeria. The study recommends that the Nigeria government should ensure that Nigeria's rising population should be channeled into areas of the economy where they may be fully, effectively and efficiently utilized in bringing about high rates of economic growth for the country. In addition, the Nigeria government should increase access to affordable health care services so as to reduce death rates in order for Nigeria to achieve increased economic growth.

Ogunleye et al. (2018) explored the effect of population growth on the economic growth of Nigeria over the period of 1981 to 2015. Using the OLS regression, their findings of the study showed that population growth has a positive and significant effect on economic growth of Nigeria, while fertility was negative and significant for economic growth in Nigeria. Exchange rate and crude death rate are however insignificant for economic growth of Nigeria.

Chowdhury and Hossain (2019) did a study on Population Growth and Economic Development in Bangladesh: Revisited Malthus. A simple linear regression analysis was undertaken to determine the relationship between

population growth and economic development. The result indicated that population growth is adversely related to per capita GDP growth, which means rapid population growth is a real problem for the development of Bangladesh.

Umar, Aminu and Nazeef (2020) explores the impact of population growth, poverty and unemployment on economic growth in Nigeria using Auto Regressive Distributed Lag (ARDL). The study employed an econometric procedure; unit root test which involved the use of Augmented Dickey Fuller test (ADF) and Phillip-Perron test (PP). The cointegration test technique used in the study is Auto Regressive and Distributed Lag (ARDL). The study variables are real GDP, population, poverty, unemployment and foreign direct investment has control variable. The null hypothesis stated that there is presence of a unit root was failed to be rejected at levels but rejected at first difference according to the two tests (ADP and PP) employed. The study found that some of the variables are stationary at level $I(0)$ while others are stationary at first difference $I(1)$. The results of the cointegration test showed that there exist cointegrating equation between explanatory variables and economic growth. The ECT speed of adjustment to the normal equilibrium confirms their long run relationship of the variables. Finally, the study found that population and FDI have a positive impact while poverty and unemployment has negative impact on GDP. Based on these findings recommend that policy makers should grow the real economic sectors to improve and enhance productivity, exports, job creation, curb inflation and reduce poverty and rapid

economic growth and substitute the non-productive imports with domestic products and develop enabling environment to attract foreign private investors.

Adelowokan, Maku, Babasanya, and Adesoye (2019) investigated the links between unemployment, poverty and economic growth in Nigeria, between the period, 1985 – 2015. Having utilized the Error Correction Model (ECM) in establishing the short-run relationship between the variables, it was found that an absence of causality exists between poverty, unemployment, and growth in Nigeria. The short-run parameter estimates also revealed that unemployment, and poverty have an inverse – significant relationship with economic growth. The study recommended that the government should implement quality macroeconomic policies that will ensure equitable distribution of income, so that the poor can also benefit from economic growth.

Omoniyi (2018) specifically explored the relationship between poverty and economic growth, the determinants of economic growth and poverty, spanning from 1980 – 2013. Having adopted the Error Correction Model (ECM), the result showed a negative relationship between poverty and economic growth in Nigeria. It revealed that investment was insignificant, while inflation, economic growth, and life expectancy showed significant and a positive relationship with poverty. Contrariwise, poverty, debt, corruption, mortality, and unemployment have an inverse relationship with economic growth. The study recommended that the

government should create an establishment of quality institutions and antipoverty programs to better the level of growth in Nigeria.

Utilizing the Ordinary Least Square (OLS) analysis, Gangas (2017) explored the relationship between economic growth and poverty in Nigeria, covering the period, 1980 – 2013. The study discovered the existence of an inverse relationship between poverty index and economic growth in Nigeria. Also, an inverse relationship between unemployment and GDP was found in the study. However, the study conclusively recommended that the government should enforce strong fiscal policies that are capable of promoting productivity and private investment.

Ebunoluwa and Yusuf (2018) examined the effects of economic growth on poverty reduction in Nigeria, from the period of 1980 – 2016. The study employed the Vector Auto Regression Estimate (VAR), which showed from its analysis that government expenditure is directly related to poverty incidence. Connoting that an increase in government expenditures increases poverty levels in Nigeria. The study however, further revealed a positive relationship between unemployment and poverty, and as such, recommended that the government should focus in creating avenues for gainful employment by strengthening the labor-intensive sectors (agricultural and Industrial sectors) in Nigeria. dependent variable. This does not give a reliable result because it increases the margin of error, and as a result, the methodology could not accurately determine the overall fit of the model.

Akiri et al. 2016 argued that Unemployment occurs as a result of the insufficiency of jobs to commensurate with the rapid population growth, even those who are already employed are afraid of being rendered unemployed due to the insecurity of the job, economic recession and retrenchment of workers.

2.5 Definition of Terms

Economic growth: Economic growth as the increase in the capacity of an economy to produce goods and services required to improve the wellbeing of individuals, in increasing numbers, and in diversity over time (Nnam, 2022).

Gross domestic product (GDP): Gross Domestic Product may be defined as the market value of the gross output obtained for a designed geographical area or country in a given year.

Population growth: Population growth is the increase in the number of people that reside within a geographical or political boundary within a given period.

Poverty rate: The World Development Report 2000/2001, sees poverty to connote lack of a range of material needs of life as food, shelter, water, clothing and non-material needs as security, employment and literacy. According to the United Nations Human Development Report (1998), poverty is defined as a complex phenomenon that generally refers to inadequacy of resources and deprivation of choices that would enable people to enjoy decent living conditions.

Inflation: inflation is a condition in which there is a continuing overall increase in the cost of goods and services. It could be characterized as a persistent increase in

prices as determined by an index, such as the consumer price index (CPI), or by the implicit price deflator for Gross National Product (GNP). The value of the currency decreases when there is inflation

Unemployment: Unemployment can either be voluntary or involuntary voluntary in the sense that one chooses not to work because he or she has means of support other than employment. On the other hand, involuntary unemployment exists when persons who are eligible and willing to work at the prevailing rate of pay are unable to find work or employment

CHAPTER THREE

THEORETICAL FRAMEWORK, MODEL SPECIFICATION AND RESEARCH METHODOLOGY

3.1 Theoretical Framework

The Malthusian Theory of Population

The theoretical model for this work stems from the theoretical underpinning of the Malthusian population theory. The Malthusian perspective derives from the writings of Reverend Thomas Malthus, an English clergyman and college professor. His first Essay titled on the principle of population as it affects the future improvement of society and was published in the year 1798. Malthus was of the opinion that food is necessary to the existence of man. He also said that the passion between sexes is necessary and will remain nearly in its present state. The power of population is indefinitely greater than the power in the earth to produce subsistence

for man. Population, when unchecked, increases in a geometrical ratio. Subsistence increases only in an arithmetical ratio. By the law of nature which makes food necessary to the life of man, the effect of these two unequal powers must be kept equal. This implies a strong and constantly operating check on population from the difficulty of subsistence. Malthus believed that human beings, like plants and non-rational animals, are impelled to increase the population of the species by what he called the powerful instinct, the urge to reproduce. Further, if there were no checks on population growth, human beings would multiply to an incalculable number, filling millions of the worlds in a few thousand years (Malthus 1872). According to Malthus, the ultimate check to population growth is lack of food (the means of subsistence). In turn, the means of subsistence are limited by the amount of land available, the 'arts or technology that could be applied to the land, and the social organization or land ownership patterns.

A cornerstone of his argument is that population tend to grow more rapidly than the food supply does, since population has the potential for growing geometrically, two parents could have four children, sixteen grandchildren, and so on, while Malthus believed that food production could be increased only arithmetically. He argued that unchecked population growth will outstrip the ability of agriculture to produce enough food to feed everyone. Malthus was aware that starvation rarely operates directly to kill people, since something else usually intervenes to kill them before they actually die of starvation. This something else is

what Malthus calls “positive checks”, primarily those measures whether of a moral or physical nature, which tend prematurely to weaken and destroy the human frame. There also preventive check that is limit to birth. In theory, the “preventive checks” would involve all possible means of birth control, including abstinence, contraception, and abortion. However, to Malthus the only acceptable means of preventing a birth was to exercise moral restraint; that is to postpone marriage, remaining chaste in the meantime, until a man feels secure that, should he have a large family, his utmost exertions can save them from rags and squalid poverty, and their consequent degradation in the community.

Consequently, Malthus believed that the urge to reproduce always forces population pressure to precede the demand for labor. Thus, “overpopulation” would force wages down to the point where people could not afford to marry, and raise a family. At such low wages, with a surplus of labor and the need for each person to work harder just to earn a subsistence wage, cultivators could employ more labor, put more acres into production, and thus increase the means of subsistence. Malthus believed that this cycle of increased food resources leading to population growth leading to too many people for available resources leading back to poverty was part of the natural law of population.

Malthus found out that there exists an inverse relationship between population growth and economic development. Therefore, Malthus took into cognizance the effect of increasing fertility and declining mortality on income per

head. In other words, his analysis empirically investigated how population growth, increasing fertility, and declining mortality affect per capita income. Therefore, the Malthusian theoretical postulation provides a suitable basis for the study in analyzing the impact of population growth on poverty rate in Nigeria.

3.2 Model Specification

The specification of an acceptable model, according to Koutsoyiannis (1997), is dependent on the economic circumstances or situation(s) and the availability of economic data relating to the variables under consideration. This model takes population growth, real gross domestic product, unemployment rate and inflation rate as the independent variables and poverty head count ratio as the dependent variable. The model to be used is stated as follows:

$$PHCR = f(\text{POP}, \text{RGDP}, \text{UNE}, \text{INFL})$$

Where:

Dependent variable:

Poverty Head Count Ratio (PHCR): It is a measure of poverty calculated by dividing the number of individuals or households living below a certain poverty line (which is 1.90 dollars per day) by the total population of a country or region. It is expressed in percentage and used to assess the extent of poverty in given area.

Independent variables:

Population growth (POP): it refers to the rate of increase in the total number of people living in a given area over a specific period of time. It is typically measure as percentage change in population over a given period of time.

Real Gross Domestic Product (RGDP): It is a measure of a country's monetary value of all goods and services produced within that country which takes inflation into account to reflect constant prices.

Unemployment Rate (UNE): It is a proportion of the labor force that is not employed but actively seeking for jobs. It calculated by dividing the number of unemployed individuals by the total labor force and it is usually expressed in percentage.

Inflation Rate (INFL): It is a measure of average change in the prices of goods and services over a specific period of time, usually one year. It is expressed as percentage change and it is used to measure how fast prices are rising (or falling) in an economy over a given period of time.

The natural log of the variables will be obtained for the purpose of this study.

$$\text{LNPHCR} = f(\text{LNPOP}, \text{LNRGDP}, \text{LNINFL}, \text{LNUNE}) \text{----- (1)}$$

Where:

LNPHC = Log of Poverty head count ratio

LNPOP = Log of Population growth rate

LNRGDP = Log of real gross domestic product

LNINFL = Log of Inflation rate

LNUNE = Log of unemployment rate

The variables are logged so that they can be stationary at level or first difference.

The rationale for logging data is that it can help with transforming non-stationarity data into stationary data and also reduce the skewness or non-normality in the data series, in order to make the data more amenable to standard statistical analysis.

Logging data can make the results to be make intuitive and easier to interpret.

Particularly when dealing with multiplicative relationships or data expressed in percentage terms

- **Econometric Model Specification**

$$\text{LNPHCR} = \beta_0 + \beta_1 \text{LNPOP} + \beta_2 \text{LNRDGP} + \beta_3 \text{LNINFL} + \beta_4 \text{LNUNE} + \mu \text{ -----(2)}$$

Where:

β_0 = Intercept

β_1 = parameter coefficient of population growth rate

β_2 = parameter coefficient of real gross domestic product

β_3 = parameter coefficient of inflation

β_4 = parameter coefficient of unemployment ratio

μ represents the error term, accounting for the factors omitted or not explicitly included in the model.

3.3 Estimation Techniques and Result Valuation

The estimation procedure here would be that of Ordinary Least Squares (OLS) method. The emphasis would be to note whether the variable is well behaved or not. The ordinary least squares (OLS) method will be adopted because it gives satisfactory results that is unbiased, efficient and have minimum variance. This study aims to ascertain whether the variables are significant or otherwise, the result of the model will be evaluated on the basis of three (3) criteria namely: economic a priori expectation, statistical test of significance and economic test.

- **The Econometric Criteria**

The economic a priori expectation will evaluate the parameter in terms of their meeting the standard economic theory expectations.

- **a priori specification**

$$\beta_1 > 0, \beta_2 < 0, \beta_3 > 0, \beta_4 > 0$$

$\beta_1 > 0$, there is a positive relationship between poverty rate and Population growth.

This implies that an increase in population growth will lead to an increase in poverty rate. population growth can strain resources such as food, water and housing and lead to increased competition for jobs, which can drive down wages and increase unemployment, leading to an increase in poverty rate.

$\beta_2 < 0$, there is negative relationship between poverty rate and real gross domestic product. this implies that an increase in GDP will lead to a decrease in poverty rate.

Economic growth creates more job opportunities, higher wages and increased government revenue which can be used to fund programs and policies that can help reduce the level of poverty.

$\beta_3 > 0$, there is a positive relationship between poverty rate and inflation. This implies that an increase in inflation will lead to an increase in the level of poverty.

This is because inflation led to higher prices for goods and services, which makes it difficult for low-income households to afford basic necessities such as food, housing and healthcare.

$\beta_4 > 0$, there is a positive relationship between poverty rate and unemployment rate.

This implies that an increase in unemployment rate will lead to an increase in poverty rate. This is because when people are unable to get jobs, they struggle to afford or meet their basic needs thus leading to an increase in poverty.

- **The Statistical Criteria**

Statistical test is done to evaluate reliability of the estimated parameter in accordance with statistical theory and expectation. The statistical test carried out includes:

a) The T-test: this is used to test the significance of the individual parameters of the regression model. The decision to accept null hypothesis is based on the value of the test statistics from the data at hand.

b) The F-test: this would be carried out to ascertain whether,

i. An individual regression co-efficient is statistically significant.

ii. All partial slope co-efficient are zero.

iii. Two or more co-efficient are statistically equal.

iv. There is structural stability of the regression model.

v. Co-efficient satisfies some linear restrictions.

c) Co-efficient of determination (R^2): The goodness of fit test is done using the R square of the correlation co-efficient. It shows or explains the percentage in total variation of the endogenous variable being explained by the change in the explanatory variables. It measures the extent to which the explanatory variables are responsive for judging the explanatory power of the regression.

- **Econometric Criteria**

The test will be performed on the regression result in order to evaluate it according to the classical assumptions of OLS. These tests are discussed briefly below:

a) Test for multi-collinearity: This will be used to test the linear collinearity among the explanatory variables and correction matrix would be employed in this test.

b) Auto-correlation test: This is used to test if the errors corresponding to different observation are uncorrelated, testing for the randomness of error term. The Durbin-Watson (DW) method would be employed for this test, since according to Koutsoyiannis (1997) D.W, provides estimates which have properties and are more efficient for all sample of all sizes.

c) Heteroscedasticity test: This is used to know whether error term of the explanatory variables of the estimated model have equal variance.

d) Normality test: This will be used to know whether the error term of the estimated model is normally distributed.

3.4 Methodology

The study employed the ordinary least squares method to the subject matter of this study before estimation of the model, the properties of the variables under this study were tested to know their levels of stationarity. The econometric techniques used are the ADF (augmented Dickey-Fuller) test tests for stationarity.

The t-statistic and f-statistic test were used to evaluate the whole set of parameters. The error correction model (ECM) was adopted to correct any dis-equilibrium in the study. Serial correlation, normality and heteroscedasticity will also be checked further in order to empirically validate that the findings of this study are provided.

- **Unit Root Test**

A unit root test is a test conducted to determine the stationarity in time series model data. The results for a unit root test are usually expressed as ‘p-value’. A p- value is a number between 0 and 1 that tells us whether the variable is stationary or not. Unit root is one of the many tools that help economist determine whether a time series is suitable for forecasting.

The augmented dickey fuller method (ADF) tests the null hypothesis for the presence of unit root against the alternate hypothesis for the absence of a unit root. Failure to accept the null hypothesis means that the time series is stationary but failure to reject the null hypothesis means that the time series is non-stationary. When testing for stationarity the variable, it can be integrated in order of $I(1)$ which means it needs to be differenced once to become stationary, Similarly, an integration of order $I(2)$ means that the series needs to be differenced twice for it to be become stationary. If it is integrated in order of $I(0)$, then no differencing is required as it is stationary at level.

- **Co-integration Test**

Co-integration test is used to test for the long-run equilibrium or relationship and stationarity among the time series data (variables). The concept was first introduced by Nobel laureates Robert F. Engle and Clive W. J. Granger in 1987 after British economist Paul Newbold and Clive Granger published the spurious regression concept.

Co-integration tests identify scenarios where two or more non-stationary time series are integrated together in a way that they cannot deviate from the equilibrium in the long run. The test is used to identify the degree of sensitivity of two variables in to predict the average price over a specified period of time.

- **The Error Correction Model**

Given that the existence co-integration is established amongst the series, then an error correction mechanism (ECM) which was first adopted and applied by the economists James J. Sargan (1982) and later popularized by Engel and granger (1987) is carried out to correct for disequilibrium in the short-run. The ECM uses the error correction term to remove autocorrelation in a times series in order to produce more accurate estimates. The ECM is a type of econometric model that is used to estimate the speed of adjustment of a dependent variable to its long-run equilibrium value and it can also be used to forecast future values of a times series.

Model

$$\Delta PHCR = \phi_0 + \phi_1 \Sigma \Delta POP + \phi_2 \Sigma \Delta LN RGDP + \phi_3 \Sigma \Delta INFL + \phi_4 \Sigma \Delta LNUNE + \Psi$$

$$ecm(-1) + \Omega_t$$

ΔPHCR = first difference of poverty head count ratio

ΔPOP = first difference of population growth rate

ΔRGDP = first difference of real gross domestic product

ΔINFL = first difference of inflation rate

ΔUNE = first difference of unemployment rate

$\text{ecm}(-1)$ = lagged of the error correction coefficient

Ω_t = the error term

While ϕ_1 , ϕ_2 , ϕ_3 and ϕ_4 represents the parameter coefficients of each of the variables.

3.5 Sources of Data

The data used for this study is the time series data form the period 1981-2022. They were gotten from reliable sources to ensure that the results obtained credible and can be used for forecasting and analytic purposes. These sources are the central bank of Nigeria (CBN) statistical bulletin (2022) and world development indicator (WDI) (2022).

CHAPTER FOUR

ANALYSIS AND PRESENTATION OF RESULTS

4.1 Introduction

This chapter contains the analysis and representation of data. It shows the empirical analysis of the study which examines the econometric impact of population growth on poverty rate in Nigeria from 1981-2022.

4.2 Descriptive Statistics

Descriptive statistics is the process of using and analyzing the summary statistic which statistically describes or summarizes features from the collection of data. Table 1 shows the summary statistics for poverty head count ratio (LNPHCR), population growth rate(LNPOP), real gross domestic product(LNRGDP), unemployment rate(LNUNE) and inflation rate(LNINFL) of the study.

Table 1: Summary Statistics for the Variable

	LNPHCR	LNPOP	LNRGDP	LNUNE	LNINFL
Mean	1.963642	0.416543	3.855500	0.995685	1.105746
Median	1.963788	0.414111	3.988195	0.978181	1.031230
Maximum	1.973128	0.477554	5.306135	1.156852	2.340450
Minimum	1.951823	0.376578	2.143984	0.931458	-0.16361
Std. Dev.	0.005167	0.020705	1.069760	0.054550	0.412292
Skewness	-0.27641	0.549245	-0.29214	1.583949	0.079676
Kurtosis	2.727394	3.556756	1.652567	4.680065	5.108132

Jarque-Bera	0.664875	2.654155	3.774667	22.50184	7.821821
Probability	0.717173	0.265251	0.151475	0.000013	0.020022
Sum	82.47297	17.49480	161.9310	41.81876	46.44133
Sum Sq. Dev.	0.001095	0.017577	46.91983	0.122003	6.969365
Observations	42	42	42	42	42

Source: Authors Computation (2024) using E-views 9.0

From the table above, it can be seen that the average value of poverty head count ratio for the period is 1.963, with a maximum value of 1.973128 and minimum value of 1.951823. The standard deviation of 0.005167. The results also show that negatively skewed indicating that poverty rate is low during peak period.

The results above also show the mean value of population growth which is given as 0.416543 with maximum value of 0.477554 and minimum value is 0.376578. The rate at which population growth deviates from the mean is given as 0.020705 and it is positively skewed indicating high chances of population growth during the peak period.

The average mean value for real GDP is 3.855500 with a maximum value of 5.306135 and a minimum value of 2.143984. The standard deviation is given as 1.069760 and it is negatively skewed indicating low economic growth during peak period.

The average mean value for unemployment rate is given as 0.995685 for the period with a maximum value of 1.156852 and a minimum value of 0.931458. The standard deviation is given as 0.054550 and it is positively skewed indicating more instances of high unemployment rate during the peak period.

The average mean value for inflation rate is given as 1.105746 for the period with a maximum value of 2.340450 and a minimum value of -0.16361. The rate at which inflation rate deviates from the mean is given as 0.412292 and it is positively skewed indicating more instances of high inflation rate during the peak period.

4.3 Unit Root Test

- At Level

Table 2

Variables	ADF Statistics (level)	Probability at 5 % level of significance	Order of Integration	Remarks
LNPHCR	-2.50022	0.1228	I (0)	Not Stationary
LNPOP	-1.55773	0.4928	I (0)	Not Stationary
LNRGDP	-1.45494	0.5460	I (0)	Not Stationary
LNUNE	0.507868	0.9850	I (0)	Not Stationary
LNINFL	-5.20334	0.0001	I (0)	stationary

Source: Author's Computation (2024) using E-views 9.0

The unit root shows that at 5% level of significance only one of the variables is stationary at level. From the above it can be seen that inflation rate is stationary at level while poverty head count ratio, population growth rate, real gross domestic product and unemployment rate are not stationary at level.

- At First Difference

Table 3

Variables	ADF Statistics	Probability at 5 % level of	Order of Integration	Remarks
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	(level)	significance		
LNPICR	-6.85091	0.0000	I (1)	Stationary
LNPOP	-4.76692	0.0004	I (1)	Stationary
LNRGDP	-3.50035	0.0131	I (1)	Stationary
LNUNE	-6.71135	0.0000	I (1)	Stationary
LNINFL	-9.69595	0.0000	I (1)	stationary

Source: Author's Computation (2024) using E-views 9.0

The unit root test result shows that at 5% level of significance and obtaining the first differencing of the series, all the variables are stationary.

4.4 Co-Integration Test

Table 4: Johansen Co-integration (Trace statistic)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.708275	90.32324	69.81889	0.0005
At most 1	0.447258	41.04545	47.85613	0.1872
At most 2	0.264479	17.33093	29.79707	0.6156
At most 3	0.091125	5.043871	15.49471	0.8041
At most 4	0.030087	1.221958	3.841466	0.2690
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* Denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Author's Computation (2024) using E-views 9.0

Table 5: Johansen Co-integration (Maximum Eigen Value)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.708275	49.27779	33.87687	0.0004
At most 1	0.447258	23.71452	27.58434	0.1450
At most 2	0.264479	12.28706	21.13162	0.5196
At most 3	0.091125	3.821913	14.26460	0.8777
At most 4	0.030087	1.221958	3.841466	0.2690
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				

* Denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Author’s Computation (2024) using E-views 9.0

From the results presented in the two tables above, it shows that the trace statistic indicates one co-integrating relationship between the variables and there is a long run relationship between the variables. Also from the second table, the max-eigen value statistic indicates that there is one co-integrating relationship between the variables. With this we can proceed to obtain the short and long run coefficients.

4.5 Short Run Estimates

Table 6

Dependent Variable: D(LNPHCR)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.00046	0.00143	-0.31977	0.751
D(LNPOP)	-0.07887	0.04745	-1.66221	0.1054
D(LNRGDP)	0.004124	0.01496	0.275699	0.7844
D(LNUNE)	0.026499	0.049144	0.539214	0.5932
D(LNINFL)	0.000145	0.001541	0.093874	0.9257
ECM(-1)	-0.2975	0.149612	-1.98849	0.0546
R-squared	0.231344	Mean dependent var		0.00024
Adjusted R-squared	0.121536	S.D. dependent var		0.004191
S.E. of regression	0.003928	Akaike info criterion		-8.10679
Sum squared resid	0.00054	Schwarz criterion		-7.85602
Log likelihood	172.1891	Hannan-Quinn criter.		-8.01547
F-statistic	2.106801	Durbin-Watson stat		1.901804
Prob(F-statistic)	0.087767			

Source: Author’s Computation (2024) using E-views 9.0

From the result obtained above, it shows that in the short run population growth (LNPOP) is negative and not significant. The population growth (LNPOP)

coefficient which is given as -0.07887 means that a 1% increase in population growth (LNPOP) will lead to a 0.079% decrease in poverty head count ratio (LNPHCR). This means that a 100% increase in the population growth will lead to an 0.079% decrease in poverty rate in Nigeria.

From the short run result given above, the unemployment rate (LNUNE) coefficient is given as 0.026499 it also shows that unemployment rate is positively related to poverty head count Ratio (PHCR) and not statistically significant.

From the result given above, it can be seen that both inflation (LNINFL) and real RGDP (LNGDP) are positive to poverty head count ratio (PHCR) and not statistically significant.

The error correction parameter (ECM) indicates that if there is any deviation, the long-run equilibrium is adjusted moderately where about 29.75% of the disequilibrium may be removed in each period. This shows that the speed of adjustment to where the poverty head count ratio will equilibrate even when there is initial disequilibrium is at the rate of 29.75%.

4.6 Long Run Estimates

Table 7

Dependent Variable: LNPHCR				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.988378	0.043494	45.71642	0
LNPOP	-0.05086	0.053498	-0.95071	0.3479
LNRGDP	-0.00121	0.001277	-0.94305	0.3518
LNUNE	-0.00114	0.029073	-0.0393	0.9689
LNINFL	0.002019	0.002114	0.954899	0.3458

R-squared	0.131167	Mean dependent var	1.963642
Adjusted R-squared	0.037239	S.D. dependent var	0.005167
S.E. of regression	0.00507	Akaike info criterion	-7.61946
Sum squared resid	0.000951	Schwarz criterion	-7.4126
Log likelihood	165.0087	Hannan-Quinn criter.	-7.54364
F-statistic	1.396467	Durbin-Watson stat	0.715198
Prob(F-statistic)	0.254204		

Source: Authors Computation (2024) using E-views 9.0

From the table above, it can be seen that population growth (LNPOP) has a negative relationship with poverty head count ratio (LNPHCR) and it is not statistically significant at 5% level of significance. With a value of -0.05086 it means that a 1% increase in population growth will decrease poverty rate by 0.051%.

From the result obtained above, it can be seen that Real Gross Domestic Product (LNRGDP) exhibits a negative relationship with poverty head count ratio (LNPHCR) in the long run though it does not significantly impact on poverty head count ratio at 5% level of significance. From the result above it shows that a 1% increase in Real Gross Domestic Product will lead to a 0.001% decrease in poverty rate.

From table 7 above, it can be seen that unemployment rate (LNUNE) and poverty head count ratio (LNPHCR) exhibited an inverse relationship and that Unemployment rate does not have significant impact on poverty rate. A 1% increase in Unemployment rate will lead to a 0.001 % decrease in poverty head count ratio (LNPHCR).

The relationship between inflation rate (LNINFL) and poverty head count ratio (LNPHCR) is positive and also significant. This means that inflation significantly impacts on poverty rate. A 1% increase in exchange rate will lead to a 0.002% increase in poverty rate. This conforms to the a priori expectation

From the result obtained above, the coefficient of determination (R^2) shows that 13.1% of the total variation in poverty head count ratio can be explained by variation in population growth, Real Gross Domestic Product, unemployment rate and inflation rate.

From the long-run result shown in the table above, the D.W statistic which is 0.715 shows the existence of positive autocorrelation, however in the short-run result. The D.W statistic which is 1.901, shows the absence of autocorrelation.

The p-value of the F-statistic in the long run is given as 0.254204 shows that the entire model is not statistically significant, however the short run result the p-value of the f- statistic is given as 0.087767 show that the entire model is statistically significant at 10% level of significance.

4.7 Policy Implication

From the long run result obtained above in table 7, it was discovered that population growth, unemployment rate, real GDP and inflation rate has no significantly impact on poverty head count ratio. Therefore, the relationship between population growth, unemployment, economic growth, inflation, on

poverty rate is complex and multifaceted. Here are some policy implications to consider:

1. Policymakers should prioritize policies that promote economic growth by investing in infrastructure and education, in order to reduce poverty rates. Unemployment benefits and job training programs should be provided in order support those who are unable to find work. family planning programs should be promoted to the masses in order to address the challenges associated with rapid population growth.

2. Inflation can negatively impact poverty rates by eroding the purchasing power of low-income households, so policymakers may need to implement monetary policies to keep inflation under control.

3.It's important to note that these are general policy implications, and the specific policies that are most effective will depend on the unique economic and social conditions of a particular country or region. Hence, the Nigerian government should promote Income redistribution policies, such as progressive taxation and social welfare programs which may be necessary to address poverty and inequality.

4.Government investments in public goods, such as healthcare and transportation infrastructure, can help reduce poverty and promote economic growth. policies should also be brought about to that promote entrepreneurship and small business development can create jobs and reduce poverty.

5. Encouraging foreign direct investment can also create jobs and stimulate economic growth, but policymakers need to ensure that the benefits of investment are shared equitably. Education and skill development programs should be adequately provided in order to improve the employability of workers and reduce poverty on the Nigerian people.

Ultimately, a comprehensive approach that addresses the complex and interconnected factors that contribute to poverty is needed to make meaningful progress in reducing poverty rates.

CHAPTER FIVE

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter contains the summary of findings from the analysis of the study, conclusions and recommendations.

5.2 Summary of Findings

This study examines the relationship between various economic indicators and poverty rate in Nigeria, covering data from 1981 to 2022. The dataset employed critical variables, including Real Gross Domestic product (RGDP), Poverty head count ratio (PHCR), Population growth rate (POP), Unemployment rate (UNE) and Inflation rate (INFL). Throughout the analysis, a range of statistical methods, such as descriptive statistics, stationarity tests, cointegration tests, and

regression modelling are harnessed to scrutinize the impact of Population growth, Real GDP, Unemployment rate and Inflation on poverty rate. Based on the OLS results there is no significant relationships between population growth, unemployment, Real GDP, inflation on poverty rate in Nigeria.

5.3 Recommendation

Based on the findings of this study, these recommendations can help policymakers and stakeholders adopt a more comprehensive approach to poverty reduction, even when economic indicators do not show significant correlations with poverty rates. By addressing the multiple dimensions of poverty and promoting inclusive, sustainable development, we can make meaningful progress in reducing poverty and improving the lives of the most vulnerable populations.

1. The government of Nigeria should adopt measures or initiate programs that will increase the level of productivity in Nigerians. This can be achieved through improvement in both the education sector and the health sector.
2. The Nigerian government should Focus on inclusive growth i.e. Emphasize policies that will promote equitable distribution of resources and opportunities to ensure that economic growth benefits all members of society, particularly the most vulnerable.
3. Social protection programs, strengthen safety nets, such as cash transfers, public works programs, and social security systems, should be provided in

order to help mitigate the adverse effects of economic shocks and unemployment on the poor.

4. Promoting foreign direct Investment in human capital development, education, skills training, and healthcare in Nigeria helps to improve the employability and productivity of the workforce.
5. The Nigerian government should Encourage entrepreneurship and small business development, create an enabling environment for small businesses and entrepreneurs, as they play a vital role in job creation and poverty reduction.
6. The financial systems in Nigeria should be enhanced to Promote access to financial services, improve access to affordable and inclusive financial services, such as credit, savings, and insurance, to enable poor households to manage their finances and invest in their future.

5.4 Conclusion

Having examined the effect of rapid population growth on the poverty rate Nigeria, the conclusion is that the lack of significant relationships between population growth, unemployment, Real GDP, inflation on poverty rate in Nigeria suggests that addressing poverty requires a comprehensive and multifaceted approach. The economic indicators alone may not provide sufficient insight into the root causes of poverty, and policies focusing solely on these factors may not effectively reduce poverty rates.

Policymakers should instead prioritize inclusive and sustainable development strategies that address the needs and challenges of vulnerable populations. This includes investing in human capital, promoting inclusive economic growth, enhancing social protection programs, and improving access to quality education, healthcare, and financial services. Additionally, addressing regional disparities, improving governance, encouraging sustainable population growth, and fostering resilience to climate change are crucial aspects of a comprehensive poverty reduction strategy.

Furthermore, the active involvement of various stakeholders, including government, civil society, the private sector, and local communities, is crucial in designing and implementing effective poverty reduction strategies. By working together, these actors can bring diverse perspectives, expertise, and resources to the table, enhancing the potential for sustainable and inclusive development.

Lastly, continuous monitoring and evaluation of poverty reduction efforts are vital to assess their effectiveness and make necessary adjustments. This involves collecting reliable and up-to-date data, conducting rigorous research, and fostering a culture of learning and adaptation to ensure that interventions remain relevant and impactful.

In summary, reducing poverty requires a comprehensive, multidimensional, and collaborative approach that addresses the root causes of poverty and promotes inclusive, sustainable development. By working together and committing to

evidence-based policies and long-term strategies, we can make meaningful progress in the fight against poverty.

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APPENDICES

DESCRIPTIVE STATISTICS

	LNPHCR	LNPOP	LNRGDP	LNUNE	LNINFL
Mean	1.963642	0.416543	3.855500	0.995685	1.105746
Median	1.963788	0.414111	3.988195	0.978181	1.031230
Maximum	1.973128	0.477554	5.306135	1.156852	2.340450
Minimum	1.951823	0.376578	2.143984	0.931458	-0.16361
Std. Dev.	0.005167	0.020705	1.069760	0.054550	0.412292
Skewness	-0.27641	0.549245	-0.29214	1.583949	0.079676
Kurtosis	2.727394	3.556756	1.652567	4.680065	5.108132
Jarque-Bera	0.664875	2.654155	3.774667	22.50184	7.821821
Probability	0.717173	0.265251	0.151475	0.000013	0.020022
Sum	82.47297	17.49480	161.9310	41.81876	46.44133
Sum Sq. Dev.	0.001095	0.017577	46.91983	0.122003	6.969365
Observations	42	42	42	42	42

UNIT ROOT AT LEVEL

LNPHCR

Null Hypothesis: LNPHCR has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-2.50022	0.1228
Test critical values:	1% level		-3.60099	
	5% level		-2.935	
	10% level		-2.60584	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNPHCR)				
Method: Least Squares				
Date: 05/08/24 Time: 13:33				
Sample (adjusted): 1982 2022				
Included observations: 41 after adjustments				

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNPHCR(-1)	-0.30852	0.123397	-2.50022	0.0167
C	0.605999	0.242283	2.501202	0.0167
R-squared	0.138143	Mean dependent var		0.00024
Adjusted R-squared	0.116044	S.D. dependent var		0.004191
S.E. of regression	0.003941	Akaike info criterion		-8.18746
Sum squared resid	0.000606	Schwarz criterion		-8.10387
Log likelihood	169.843	Hannan-Quinn criter.		-8.15702
F-statistic	6.2511	Durbin-Watson stat		1.882367
Prob(F-statistic)	0.016725			

LNPOP

Null Hypothesis: LNPOP has a unit root				
Exogenous: Constant				
Lag Length: 7 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-1.55773	0.4928
Test critical values:	1% level		-3.63941	
	5% level		-2.95113	
	10% level		-2.6143	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNPOP)				
Method: Least Squares				
Date: 05/08/24 Time: 13:37				
Sample (adjusted): 1989 2022				
Included observations: 34 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNPOP(-1)	-0.11618	0.074583	-1.55773	0.1319
D(LNPOP(-1))	1.042053	0.181101	5.753987	0
D(LNPOP(-2))	-0.59065	0.216153	-2.73256	0.0114
D(LNPOP(-3))	0.447675	0.167867	2.666848	0.0132
D(LNPOP(-4))	-0.02628	0.124251	-0.21147	0.8342
D(LNPOP(-5))	0.238112	0.107361	2.217868	0.0359
D(LNPOP(-6))	-0.12588	0.079403	-1.58533	0.1255
D(LNPOP(-7))	0.128633	0.070316	1.829362	0.0793
C	0.048197	0.031201	1.544706	0.135
R-squared	0.624039	Mean dependent var		-0.00106
Adjusted R-squared	0.503731	S.D. dependent var		0.005775

S.E. of regression	0.004069	Akaike info criterion	-7.94911
Sum squared resid	0.000414	Schwarz criterion	-7.54508
Log likelihood	144.1349	Hannan-Quinn criter.	-7.81133
F-statistic	5.187027	Durbin-Watson stat	2.106159
Prob(F-statistic)	0.000688		

LNRGDP

Null Hypothesis: LNRGDP has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-1.45494	0.5460
Test critical values:	1% level		-3.60099	
	5% level		-2.935	
	10% level		-2.60584	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNRGDP)				
Method: Least Squares				
Date: 05/08/24 Time: 13:43				
Sample (adjusted): 1982 2022				
Included observations: 41 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRGDP(-1)	-0.01051	0.007225	-1.45494	0.1537
C	0.117284	0.028615	4.098672	0.0002
R-squared	0.051484	Mean dependent var		0.077126
Adjusted R-squared	0.027163	S.D. dependent var		0.049011
S.E. of regression	0.048341	Akaike info criterion		-3.17352
Sum squared resid	0.091138	Schwarz criterion		-3.08993
Log likelihood	67.05713	Hannan-Quinn criter.		-3.14308
F-statistic	2.116863	Durbin-Watson stat		0.970256
Prob(F-statistic)	0.153687			

LNUNE

Null Hypothesis: LNUNE has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=9)		

			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			0.507868	0.9850
Test critical values:	1% level		-3.60099	
	5% level		-2.935	
	10% level		-2.60584	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNUNE)				
Method: Least Squares				
Date: 05/08/24 Time: 13:51				
Sample (adjusted): 1982 2022				
Included observations: 41 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNUNE(-1)	0.023702	0.046669	0.507868	0.6144
C	-0.01872	0.046376	-0.40364	0.6887
R-squared	0.00657	Mean dependent var		0.004803
Adjusted R-squared	-0.0189	S.D. dependent var		0.014907
S.E. of regression	0.015047	Akaike info criterion		-5.50767
Sum squared resid	0.008831	Schwarz criterion		-5.42408
Log likelihood	114.9072	Hannan-Quinn criter.		-5.47723
F-statistic	0.25793	Durbin-Watson stat		2.232993
Prob(F-statistic)	0.614406			

LNINFL

Null Hypothesis: LNINFL has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-5.20334	0.0001
Test critical values:	1% level		-3.60099	
	5% level		-2.935	
	10% level		-2.60584	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNINFL)				
Method: Least Squares				
Date: 05/08/24 Time: 13:55				
Sample (adjusted): 1982 2022				
Included observations: 41 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNINFL(-1)	-0.68583	0.131805	-5.20334	0
C	0.727834	0.155698	4.674659	0
R-squared	0.409759	Mean dependent var		-0.03139
Adjusted R-squared	0.394625	S.D. dependent var		0.447125
S.E. of regression	0.347889	Akaike info criterion		0.773685
Sum squared resid	4.720049	Schwarz criterion		0.857274
Log likelihood	-13.8606	Hannan-Quinn criter.		0.804124
F-statistic	27.07475	Durbin-Watson stat		1.937685

Prob(F-statistic)	0.000007			
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**UNIT ROOT
AT FIRST DIFFERENCE
LNPHCR**

Null Hypothesis: D(LNPHCR) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-6.85091	0.0000
Test critical values:	1% level		-3.60559	
	5% level		-2.93694	
	10% level		-2.60686	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNPHCR,2)				
Method: Least Squares				
Date: 05/08/24 Time: 13:36				
Sample (adjusted): 1983 2022				
Included observations: 40 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNPHCR(-1))	-1.11569	0.162853	-6.85091	0
C	0.000227	0.000675	0.335793	0.7389
R-squared	0.552599	Mean dependent var		6.92E-05
Adjusted R-squared	0.540825	S.D. dependent var		0.006298
S.E. of regression	0.004267	Akaike info criterion		-8.02689
Sum squared resid	0.000692	Schwarz criterion		-7.94244

Log likelihood	162.5377	Hannan-Quinn criter.	-7.99636
F-statistic	46.935	Durbin-Watson stat	1.985024
Prob(F-statistic)	0		

LNPOP

Null Hypothesis: D(LNPOP) has a unit root				
Exogenous: Constant				
Lag Length: 2 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-4.76692	0.0004
Test critical values:	1% level		-3.61559	
	5% level		-2.94115	
	10% level		-2.60907	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNPOP,2)				
Method: Least Squares				
Date: 05/08/24 Time: 13:40				
Sample (adjusted): 1985 2022				
Included observations: 38 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNPOP(-1))	-1.18346	0.248265	-4.76692	0
D(LNPOP(-1),2)	0.263845	0.131642	2.004256	0.0531
D(LNPOP(-2),2)	-0.15784	0.11064	-1.42661	0.1628
C	-0.00086	0.001289	-0.66717	0.5092
R-squared	0.71419	Mean dependent var		2.86E-05

Adjusted R-squared	0.688971	S.D. dependent var	0.013774
S.E. of regression	0.007682	Akaike info criterion	-6.80057
Sum squared resid	0.002006	Schwarz criterion	-6.62819
Log likelihood	133.2108	Hannan-Quinn criter.	-6.73924
F-statistic	28.32	Durbin-Watson stat	1.624176
Prob(F-statistic)	0		

LNRGDP

Null Hypothesis: D(LNRGDP) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-3.50035	0.0131
Test critical values:	1% level		-3.60559	
	5% level		-2.93694	
	10% level		-2.60686	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNRGDP,2)				
Method: Least Squares				
Date: 05/08/24 Time: 13:49				
Sample (adjusted): 1983 2022				
Included observations: 40 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNRGDP(-1))	-0.47667	0.136178	-3.50035	0.0012
C	0.037739	0.012487	3.022363	0.0045

R-squared	0.243818	Mean dependent var	0.000777
Adjusted R-squared	0.223918	S.D. dependent var	0.047845
S.E. of regression	0.042149	Akaike info criterion	-3.44651
Sum squared resid	0.067508	Schwarz criterion	-3.36207
Log likelihood	70.9302	Hannan-Quinn criter.	-3.41598
F-statistic	12.25245	Durbin-Watson stat	2.160238
Prob(F-statistic)	0.001204		

LNUNE

Null Hypothesis: D(LNUNE) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-6.71135	0.0000
Test critical values:	1% level		-3.60559	
	5% level		-2.93694	
	10% level		-2.60686	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNUNE,2)				
Method: Least Squares				
Date: 05/08/24 Time: 13:53				
Sample (adjusted): 1983 2022				
Included observations: 40 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNUNE(-	-1.09236	0.162763	-6.71135	0

1))				
C	0.005318	0.002546	2.088447	0.0435
R-squared	0.542401	Mean dependent var		-0.00024
Adjusted R-squared	0.530359	S.D. dependent var		0.02222
S.E. of regression	0.015227	Akaike info criterion		-5.48274
Sum squared resid	0.008811	Schwarz criterion		-5.3983
Log likelihood	111.6549	Hannan-Quinn criter.		-5.45221
F-statistic	45.04222	Durbin-Watson stat		1.973267
Prob(F-statistic)	0			

LNINFL

Null Hypothesis: D(LNINFL) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-9.69595	0.0000
Test critical values:	1% level		-3.60559	
	5% level		-2.93694	
	10% level		-2.60686	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNINFL,2)				

Method: Least Squares				
Date: 05/08/24 Time: 13:57				
Sample (adjusted): 1983 2022				
Included observations: 40 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNINFL(-1))	-1.33606	0.137796	-9.69595	0
C	-0.01414	0.061758	-0.22887	0.8202
R-squared	0.712146	Mean dependent var		0.030449
Adjusted R-squared	0.704571	S.D. dependent var		0.716626
S.E. of regression	0.389511	Akaike info criterion		1.000856
Sum squared resid	5.765308	Schwarz criterion		1.0853
Log likelihood	-18.0171	Hannan-Quinn criter.		1.031388
F-statistic	94.0114	Durbin-Watson stat		2.036295
Prob(F-statistic)	0			

CO-INTEGRATION

Date: 05/22/24 Time: 15:32				
Sample (adjusted): 1983 2022				
Included observations: 40 after adjustments				
Trend assumption: Linear deterministic trend				
Series: LNP HCR LNPOP LNR GDP LNUNE LNINFL				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical	Prob.**

			Value		
None *	0.708275	90.32324	69.81889	0.0005	
At most 1	0.447258	41.04545	47.85613	0.1872	
At most 2	0.264479	17.33093	29.79707	0.6156	
At most 3	0.091125	5.043871	15.49471	0.8041	
At most 4	0.030087	1.221958	3.841466	0.269	
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level					
* denotes rejection of the hypothesis at the 0.05 level					
**MacKinnon-Haug-Michelis (1999) p-values					
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)					
Hypothesized		Max-Eigen	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**	
None *	0.708275	49.27779	33.87687	0.0004	
At most 1	0.447258	23.71452	27.58434	0.145	
At most 2	0.264479	12.28706	21.13162	0.5196	
At most 3	0.091125	3.821913	14.2646	0.8777	
At most 4	0.030087	1.221958	3.841466	0.269	
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level					
* denotes rejection of the hypothesis at the 0.05 level					
**MacKinnon-Haug-Michelis (1999) p-values					
Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):					
LNPBGR	LNPOP	LNRGDP	LNUNE	LNINFL	
-91.1612	67.21174	-0.73682	22.51812	2.552259	
-49.7323	47.57	-1.19749	28.9779	-4.94818	
-211.301	-32.0244	0.209241	-2.92431	0.713905	
-24.891	4.310015	1.326885	-25.7637	0.099765	
121.6493	16.83436	0.389037	19.47503	0.696005	
Unrestricted Adjustment Coefficients (alpha):					
D(LNPBGR)	0.001391	-0.00012	0.001254	-0.00077	0.000177
D(LNPOP)	-0.00966	-0.0031	-1.90E-05	-0.00041	-9.39E-05
D(LNRGDP)	-0.00391	0.000576	-0.00564	-0.00738	-0.00522
D(LNUNE)	0.000963	0.001307	0.006125	0.00142	-0.00079
D(LNINFL)	-0.09289	0.166656	-0.01885	-0.05343	-0.02808
1 Cointegrating		Log	495.5573		

Equation(s):		likelihood			
Normalized cointegrating coefficients (standard error in parentheses)					
LNPBHR	LNPOP	LNRGDP	LNUNE	LNINFL	
1	-0.73728	0.008083	-0.24701	-0.028	
	-0.11035	-0.00239	-0.06001	-0.00693	
Adjustment coefficients (standard error in parentheses)					
D(LNPBHR)	-0.12677				
	-0.06007				
D(LNPOP)	0.880827				
	-0.12498				
D(LNRGDP)	0.356615				
	-0.64079				
D(LNUNE)	-0.08779				
	-0.2181				
D(LNINFL)	8.468107				
	-5.60008				
2 Cointegrating Equation(s):		Log likelihood	507.4145		
Normalized cointegrating coefficients (standard error in parentheses)					
LNPBHR	LNPOP	LNRGDP	LNUNE	LNINFL	
1	0	-0.04571	0.88181	-0.45675	
		-0.02252	-0.47593	-0.07906	
0	1	-0.07296	1.531057	-0.58154	
		-0.02964	-0.62649	-0.10407	
Adjustment coefficients (standard error in parentheses)					
D(LNPBHR)	-0.12088	0.087827			
	-0.06839	-0.05423			
D(LNPOP)	1.034862	-0.79676			
	-0.1309	-0.10379			
D(LNRGDP)	0.327986	-0.23554			
	-0.72987	-0.57874			
D(LNUNE)	-0.1528	0.126914			
	-0.24732	-0.19611			
D(LNINFL)	0.179936	1.684402			
	-5.62304	-4.45875			
3 Cointegrating Equation(s):		Log likelihood	513.5581		

Normalized cointegrating coefficients (standard error in parentheses)					
LNPHCR	LNPOP	LNRGDP	LNUNE	LNINFL	
1	0	0	-0.01966	-0.01298	
			-0.02722	-0.00593	
0	1	0	0.092179	0.126791	
			-0.09847	-0.02145	
0	0	1	-19.7207	9.708013	
Adjustment coefficients (standard error in parentheses)					
D(LNPHCR)	-0.38593	0.047656	-0.00062		
	-0.14629	-0.0549	-0.00088		
D(LNPOP)	1.038878	-0.79615	0.010824		
	-0.29677	-0.11137	-0.00179		
D(LNRGDP)	1.520032	-0.05488	0.001013		
	-1.63855	-0.61488	-0.00989		
D(LNUNE)	-1.44705	-0.06924	-0.00099		
	-0.5014	-0.18815	-0.00303		
D(LNINFL)	4.162144	2.287938	-0.13507		
	-12.7253	-4.77529	-0.07683		
4 Cointegrating Equation(s):		Log likelihood	515.469		
Normalized cointegrating coefficients (standard error in parentheses)					
LNPHCR	LNPOP	LNRGDP	LNUNE	LNINFL	
1	0	0	0	0.542295	
				-0.14242	
0	1	0	0	-2.47679	
				-0.65921	
0	0	1	0	566.7176	
				-144.365	
0	0	0	1	28.24499	
Adjustment coefficients (standard error in parentheses)					
D(LNPHCR)	-0.36676	0.044337	-0.00164	0.044048	
	-0.14364	-0.05367	-0.00118	-0.02726	
D(LNPOP)	1.049044	-0.79791	0.010282	-0.29675	
	-0.29795	-0.11132	-0.00245	-0.05655	
D(LNRGDP)	1.703685	-0.08668	-0.00878	0.135181	
	-1.61938	-0.60504	-0.0133	-0.30735	

D(LNUNE)	-1.48239	-0.06312	0.00089	0.005081	
	-0.50078	-0.1871	-0.00411	-0.09505	
D(LNINFL)	5.492037	2.05766	-0.20596	4.169215	
	-12.6053	-4.70965	-0.10353	-2.39244	

SHORT RUN ESTIMATES

Dependent Variable: D(LNPHCR)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.00046	0.00143	-0.31977	0.751
D(LNPOP)	-0.07887	0.04745	-1.66221	0.1054
D(LNRGD P)	0.004124	0.01496	0.275699	0.7844
D(LNUNE)	0.026499	0.049144	0.539214	0.5932
D(LNINFL)	0.000145	0.001541	0.093874	0.9257
ECM(-1)	-0.2975	0.149612	-1.98849	0.0546
R-squared	0.231344	Mean dependent var		0.00024
Adjusted R-squared	0.121536	S.D. dependent var		0.004191
S.E. of regression	0.003928	Akaike info criterion		-8.10679
Sum squared resid	0.00054	Schwarz criterion		-7.85602
Log likelihood	172.1891	Hannan-Quinn criter.		-8.01547
F-statistic	2.106801	Durbin-Watson stat		1.901804
Prob(F-statistic)	0.087767			

LONG RUN ESTIMATES

Dependent Variable: LNPHCR				
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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.988378	0.043494	45.71642	0
LNPOP	-0.05086	0.053498	-0.95071	0.3479
LNRGDP	-0.00121	0.001277	-0.94305	0.3518
LNUNE	-0.00114	0.029073	-0.0393	0.9689
LNINFL	0.002019	0.002114	0.954899	0.3458
R-squared	0.131167	Mean dependent var		1.963642
Adjusted R-squared	0.037239	S.D. dependent var		0.005167
S.E. of regression	0.00507	Akaike info criterion		-7.61946
Sum squared resid	0.000951	Schwarz criterion		-7.4126
Log likelihood	165.0087	Hannan-Quinn criter.		-7.54364
F-statistic	1.396467	Durbin-Watson stat		0.715198
Prob(F-statistic)	0.254204			

DATA

YEAR	PH CR	LNPH CR	POP	LNPOP	UNE	LNUNE	RGDP	LNRGDP	INFL	LNINFL
1981	91.7	1.962369	3.002988	0.477554	8.54	0.931458	139.31	2.1439839	219.0028	2.34045
1982	92	1.963788	2.900872	0.462529	8.6	0.934498	149.05	2.1733355	14.80255	1.170337
1983	93.67	1.971601	2.505584	0.398909	8.77	0.943	158.75	2.2007142	19.56895	1.291568
1984	92.6	1.966611	2.471938	0.393038	8.65	0.937016	165.85	2.2197265	5.653664	0.75233
1985	91.88	1.963221	2.725926	0.435514	8.85	0.946943	187.83	2.2737664	6.927769	0.840593
1986	92	1.963788	2.62007	0.418313	9.1	0.959041	198.12	2.2969352	5.415453	0.733635

1987	93. 5	1.970 812	2.577 103	0.411 132	9.8 8	0.994 757	244.68	2.3885 989	19.66 948	1.293 793
1988	92. 65	1.966 845	2.586 844	0.412 77	8.8 9	0.948 902	315.62	2.4991 581	20.17 713	1.304 859
1989	91. 17	1.959 852	2.613 645	0.417 247	9	0.954 243	414.86	2.6179 025	28.96 967	1.461 944
1990	90. 8	1.958 086	2.628 599	0.419 724	9.2	0.963 788	494.64	2.6942 925	6.668 942	0.824 057
1991	91. 81	1.962 89	2.562 201	0.408 613	9.4	0.973 128	590.06	2.7708 96	18.86 391	1.275 632
1992	91. 81	1.962 89	2.523 728	0.402 043	9.4 6	0.975 891	906.03	2.9571 422	46.75 236	1.669 804
1993	92. 13	1.964 401	2.555 768	0.407 521	9.5 1	0.978 181	1,257.1 7	3.0993 957	41.63 906	1.619 501
1994	92	1.963 788	2.574 829	0.410 748	9.5 1	0.978 181	1,768.7 9	3.2476 766	43.29 646	1.636 452
1995	92. 11	1.964 307	2.557 19	0.407 763	9.4 9	0.977 266	3,100.2 4	3.4913 946	75.40 165	1.877 381
1996	92. 7	1.967 08	2.526 853	0.402 58	9.4 2	0.974 051	4,086.0 7	3.6113 053	26.49 109	1.423 1
1997	92. 19	1.964 684	2.522 965	0.401 911	9.4 4	0.974 972	4,418.7 1	3.6452 954	5.055 346	0.703 751
1998	91. 57	1.961 753	2.516 034	0.400 716	9.4 6	0.975 891	4,805.1 6	3.6817 075	6.009 344	0.778 827
1999	92. 4	1.965 672	2.542 62	0.405 281	9.5 1	0.978 181	5,482.3 5	3.7389 671	13.43 057	1.128 094
2000	93. 2	1.969 416	2.602 869	0.415 452	9.4 7	0.976 35	7,062.7 5	3.8489 739	22.67 374	1.355 523
2001	93	1.968 483	2.651 265	0.423 453	9.4 7	0.976 35	8,234.4 9	3.9156 369	10.07 648	1.003 309
2002	92. 9	1.968 016	2.682 89	0.428 603	9.3 4	0.970 347	11,501. 45	4.0607 526	21.10 905	1.324 469
2003	94	1.973 128	2.692 768	0.430 199	9.5	0.977 724	13,556. 97	4.1321 628	9.804 324	0.991 418
2004	93. 8	1.972 203	2.695 503	0.430 64	9.5	0.977 724	18,124. 06	4.2582 555	22.36 834	1.349 634
2005	92. 4	1.965 672	2.693 693	0.430 348	9.5 7	0.980 912	23,121. 88	4.3640 231	19.85 849	1.297 946
2006	92. 4	1.965 672	2.695 926	0.430 708	9.5 9	0.981 819	30,375. 18	4.4825 188	23.86 438	1.377 75
2007	91.	1.960	2.709	0.432	9.6	0.982	34,675.	4.5400	7.099	0.851

	4	946	627	91		271	94	283	731	242
2008	91. 82	1.962 937	2.719 687	0.434 519	9.6 2	0.983 175	39,954. 21	4.6015 626	7.921 387	0.898 801
2009	92. 6	1.966 611	2.727 385	0.435 746	9.6 2	0.983 175	43,461. 46	4.6381 043	0.686 099	0.163 61
2010	90. 8	1.958 086	2.744 379	0.438 444	9.6 3	0.983 626	55,469. 35	4.7440 531	16.34 277	1.213 326
2011	90. 29	1.955 64	2.764 062	0.441 548	9.6 8	0.985 875	63,713. 36	4.8042 305	9.778 458	0.990 27
2012	91. 5	1.961 421	2.749 289	0.439 22	9.7 9	0.990 783	72,599. 63	4.8609 344	9.947 637	0.997 72
2013	90. 1	1.954 725	2.697 474	0.430 957	9.8 3	0.992 554	81,009. 96	4.9085 384	4.964 746	0.695 897
2014	90. 5	1.956 649	2.628 124	0.419 646	10. 3	1.012 837	90,136. 98	4.9549 03	4.662 623	0.668 63
2015	89. 5	1.951 823	2.541 187	0.405 037	10. 82	1.034 227	95,177. 74	4.9785 354	2.863 665	0.456 922
2016	89. 7	1.952 792	2.507 034	0.399 16	11. 34	1.054 613	102,57 5.42	5.0110 433	9.543 67	0.979 715
2017	91. 3	1.960 471	2.527 317	0.402 66	11. 74	1.069 668	114,89 9.25	5.0603 172	11.11 892	1.046 063
2018	90. 8	1.958 086	2.496 645	0.397 357	12. 16	1.084 934	129,08 6.91	5.1108 822	10.22 849	1.009 812
2019	91. 4	1.960 946	2.448 201	0.388 847	12. 59	1.100 026	145,63 9.14	5.1632 781	10.38 478	1.016 397
2020	92. 17	1.964 59	2.440 609	0.387 498	14. 35	1.156 852	154,25 2.32	5.1882 317	7.849 142	0.894 822
2021	92. 9	1.968 016	2.406 363	0.381 361	13. 65	1.135 133	176,07 5.50	5.2456 989	10.13 103	1.005 654
2022	93. 8	1.972 203	2.380 007	0.376 578	13. 44	1.128 399	202,36 5.03	5.3061 355	11.31 133	1.053 514

Source: CBN Statistical Bulletin (2022) and World Development Indicators (2022)