

ECONOMIC GROWTH, DEMOGRAPHY AND SOCIAL CHANGE IN NIGERIA: AN ARDL ANALYSIS

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Abstract: Nigeria is estimated to have over 200 million people, this make it necessary for Nigerian government to be very watchful of demographic transition. There are various theories that try to explain the relationship between population growth and economic growth; all of them believe in the effect of population on economic growth. Effect of population on economic growth is relative; it depends on the nature of the country and its economic potentials. In a country with small population and abundance of economic resources, population growth tends to be positive. But, in a country with overpopulation problem, population growth usually resulted in negative or very slow economic growth. Nigeria found herself in between the two extreme positions, thus it needs to (very well) be mindful of how its population growth. This paper has tested two models that try to explain the relationship between social change, population growth and economic growth, using the econometric techniques of ARDL cointegration and Multiple regression analysis. Its findings show that population growth affect economic growth in Nigeria; while birth rate affects economic growth positively, death rate affects economic growth negatively. It also shows that net migration, health expenditure and labour force affect economic growth. Population growth is affected by economic growth, labour force and health expenditure.

Keywords: Economic Growth, Demography, Social Change, Population, ARDL, Nigeria

INTRODUCTION

Nigeria is the largest economy in Africa with crude oil as its main export; over the years Nigerian authorities have tried to move the economy away from oil dependence in order to diversify the economy (Abdullahi, 2018). A number of problems that are complex and interlocking are at the heart of Nigeria's problem. Most prominent among these problems is corruption where corruption is responsible for slow economic growth

experienced by Nigeria over the decades (Abdullahi, et al, 2023). In the last few years, incidences of suicide in Nigeria have increased, raising a lot of concerns among policy makers. Nigeria is facing a serious threat from the rising cases of suicide among its youth (Mukhtar and Abdullahi, 2020). In Nigeria, there are relationships between food insecurity and food price inflation, per capita income, economic growth and education (Mukhtar and Abdullahi, 2020b). Economic development in Nigeria has been inconsistent over the years. Economic growth and development of Nigeria is inevitable for a better and prosperous living of its citizens. In studying economic growth and development, a lot of predictors or determinants must be studied as well to have a comprehensive grip on the socio economic development of the nation. A cardinal factor that influences the socio economic development of any nation, Nigeria inclusive is rate of population growth. The performance of economy of a nation to a very large extent hinges on this factor. Increases or decreases in rate of population growth have implications on socio economic development of a country.

The effects of economic development on population growth are many. In a developing country, the birth and death rates will be rather high. The birth rates will be steep due to a number of factors such as the early marriage of girls, more home centered role with fewer working women, social beliefs and customs, and the expectation that the children will generate an income for their families. The death rate will be high due to the consumption of less nutritious food, poor sanitary conditions, accidents, and non-availability of advanced medical facilities. But for an economically developed country, more nutritious food will be consumed by the people, there is high adherence to traffic regulations, and advanced medical care will also improve the life expectancy of the people (Peterson, 2017). Due to the medical advances, ample supply of food items, and better sanitation brought forth by economic development there will be a sharp drop in the death rate. But, the birth rate will continue to remain at a high level due to increase in health care. As a result of all these factors, the growth of population will speed up and there will be a less chaotic situation caused by the sharp rise in the number of people. But, when a country builds up a more robust economy, the birth rate begins to decline. That happens because economic progress makes people to go for smaller families and also drives them to take an interest in planning their families.

High population growth can be a source of capital formation in underdeveloped countries; because underdeveloped countries suffer from disguised unemployment on a mass scale. Thus labour force can be put to work on capital projects like irrigation, drainage, roads, railways, houses etc. Economic development takes place when capital accumulates with the withdrawal of surplus labour from the rural sector and its employment in the industrial sector. Population growth leads to mass consumption. W. Rostow has shown in his stages of Economic growth that during the “take-off

stage” when the growth rate of population was high, the rate of net investment rose by 5-10 percent of national income (Burch, 2003). This led to the development of “leading sectors” due to the increase in the effective demand for their products. This also paved the way for the age of high mass consumption through which almost all developing countries are passing through (Jhingan, 2005). But, the effect of population growth on per capita incomes is not desirable. The growth in population tends to retard per capita income. It increases the pressure of population on land. It leads to rise in cost of consumption of goods because of the scarcity of the needed inputs to increase their supplies; it also leads to a decline in the accumulation of capital because with increase in family members, expenses increase. This is in addition to the adverse effect that population growth has on standard of living, employment, capital formation, environment, social infrastructure, and agricultural development (Jhingan, 2005). According to the latest empirical research, the potential negative consequences of population growth for economic development are its impact on economic growth, poverty and inequality, education, health, food, the environment, and international migration.

EMPIRICAL LITERATURE REVIEW

Shuaibu, et al, (2021) investigated factors that explained economic growth in Nigeria during the period 1989 to 2019. They used ARDL model for the analysis of the data. The results show that population growth, physical capital, agriculture, saving and government size have positive effects on economic growth in Nigeria. Onwuka (n.d.), empirically tests the association between population growth and economic development in Nigeria between 1980 and 2003 and found that growth in population outweighs that of output and this has hindered the capacity of successive governments to efficiently provide social services to the people, thereby negatively affecting development. He argued that curbs on population growth through appropriate policies that would integrate the country’s population programmers into the mainstream development efforts are necessary. That way, higher per capita consumption of social services by the citizens would be facilitated and which ultimately would boost their access to the benefits of development.

Bloom, Finlay, Humair, Mason, Olaniyan, and Soyibo (2015), quantify the potential for economic growth created by Nigeria’s demographic transition. Using a cross-country economic growth model, they first estimate the size of the demographic dividend Nigeria could enjoy under appropriate enabling conditions. Then, using an original analysis of the economic lifecycle of Nigeria’s population, they explore the conditions needed to realize the dividend, focusing particularly on labor productivity and investments in health and education. They conclude with a policy discussion on the

challenges Nigeria must overcome to realize its full potential for economic growth. Several studies provide empirical evidence for the effects of the demographic dividend. In Asian countries, an increase in the working-age share of the population was a significant driver of economic growth in the years between 1960 and 2005 (Bloom and Finlay, 2009). In East Asia, demographic change may account for one-quarter to one-third of the region's economic "miracle" (Bloom et al., 2000; Mason, 2001). In Ireland, a similar process followed the legalization of contraception (Bloom and Canning, 2003). Similar evidence is emerging in African countries, as well (Canning 2015; Ashraf et al., 2013).

In general, countries only reap a demographic dividend if young people have the benefit of good health and education, and if the economy offers opportunities to earn and save. In the absence of these factors, countries face potential social unrest caused by an underemployed generation of adults (Cincotta et al., 2003). Several researches have been conducted on the impact of population growth on economic growth. The results from cross-country and panel regressions mostly show a negative impact of population growth (or related variables) on economic growth. Some observers attributed nearly all of the world's maladies to excessive population growth. They claim that rapid population growth has at least three adverse effects on human wellbeing. First, it increases poverty the number of people that are impoverished, the proportion of the community that is impoverished, and the severity of the impoverishment. Secondly, it increases environmental degradation – the misuse of natural resources with adverse consequences on many dimensions of human well-being. Finally, it presents environmental enhancement by holding back the savings and investment that would permit environmentally sustainable economic growth and retards the agricultural productivity that would encourage environmentally friendly agriculture and conservation (Ahlburg 1994, Kelly and McGreevy 1994).

THEORETICAL FRAMEWORK

The nature of the relationship between population growth and economic growth has attracted the attention of a large number of the world's most influential thinkers that most of them have propounded theories to explain the relationship (Burch, 2003). Most of the early writers on population growth were very much concerned with the need to balance population with available resources. According to Okafor (2004), population is a critical factor in the development plans of any civilized society. For effective planning for the development of developing countries, it is necessary to have an actual count of the population i.e. in form of an accurate census. This will enable government to know how many people to whom they should distribute amenities and social services.

According to Udabah (2002), rapid population is a central problem of economic development. When population expands rapidly, a country may make great effort to raise the quantity of capital only to find that a corresponding rise in population has occurred so that the net effect of its “growth policy” is that larger populations now maintained at the original low standard of living. Much of the problem of developing nations like that of Nigeria is due to population growth. Most developing nations have made appreciable gains in income, like Nigeria do in exporting crude, but most of the gains have been eaten up (literally) by the increasing population.

According to Keynes (Amaral, 2018), the growth of population cause strong demand for goods making it possible to establish a good market as well as increase the demand for capital. Optimists have declared that population growth will speed up economic development. Demographers have concluded that slower population growth benefits economic development in developing countries. They also observed that relationship between population and development is contextual. Study by Kelly and Schmidt (1995) noted that population size and density have a transitional impact on economic growth. Other studies have observed that change in age distribution pattern has had a significant impact on economic growth through savings and investments (Bloom and Williamson, 1997).

It has been observed that an economy based on agriculture shows high mortality and fertility rates; and due to disasters and floods, the rate of mortality is high. Other factors responsible are poor nutrition, bad health habits, limited public health programs and inadequate sanitary facilities, all contributed to the high mortality rate. But, nations that moved from agriculture to industrial and technological products increased their production capacity (Coale and Hoover, 1958). Newer generation of job-seekers who enter the workforce will have better education than the previous generation of workers, and so the former will be more productive than the later, leading to greater economic development. A number of studies have shown that the overall rate of population growth had little effect on economic growth, but changes in life expectancy, age structure and population density had a significant impact on economic growth.

The consequences of population changes on the economic growth of the low-income countries have attracted much attention in recent years, partly because of the rise in aspirations and plans to raise the per capita output in these economies (Peter and Bakari, 2019). But the social, political and economic consequences of rapid population growth are only dimly understood. Reasonable quantitative judgments about the presumed burden of population growth in general, or for specific countries, are not easily found. Needless to say, a lot of empirical studies have shown recent scholarly attempts to estimate, at least in broad terms, the impact demographic factors could exercise on an economy given reliable data (Peterson, 2017). The long-run burden of

rapid population growth, from the economic standpoint, is its constraining effect on the rate of structural transformation needed to raise labor productivity and personal income in a dual economy. Clearly, the higher the rate of population growth, the more capital accumulation is needed just to hold labor productivity constant.

Many factors have been identified as influencing the increase or decrease of the population of a country such as Nigeria. Some of these factors are natural; some are socio-cultural, while others are inbuilt. Most demographers agreed that birth rate has positive effects on the population of a country like Nigeria where the birth rate is very high. Second, is the culture of polygamy; the effect of polygamy on fertility is complex. By definition, each polygamous household has at least two wives. In Nigerian, data has revealed that 35% of all currently married women are in polygamous households, of which 17.2 percent have two or more co-wives (World Bank, 2016). The result is that a much larger percentage of women are in polygamous households than there are monogamous households. Another characteristic of the African household that has direct bearing on demand for children is its durability or perpetuity. Consequently, there is need to ensure that fertility levels remain higher than mortality levels if the lineage is not ultimately to disappear. Considerable expansion of membership enhances the power and prestige of the lineage and reduces the likelihood of extinction through death. The desire to perpetuate the lineage results in large kinship networks and population growth.

Third, Quest for Male Children: in a family where there are only females, the father and even the mother of such families are never happy until they get a male child. This practice increases population growth of a place. Fourth, Low status of women; the extent to which women enjoy any decision-making is powerfully shaped by social institutions (Mason, 1988). Consequently, most women cannot exert much, if any, control over their lives in the families within which they love. Hence, population is increased as women must abide to their husbands desire for bigger family. In recent years, the rate of mortality in Nigeria has reduced while the birth rates have continued to grow. The reduction in child mortality has been attributed to improved Medicare. Reduce mortality rate means increased population growth. War is a typical example of man-made factor which can drastically affect the population of a place. In modern times, the outbreak of either inter local, tribal or continental wars has resulted in the use of sophisticated weapons which can result in loss of life and property, hunger and starvation resulting from the war can also lead to death. Finally, people may choose to migrate from the war zone to a more peaceful zone. All these and more can lead to reduction in a populated place (Peterson, 2017).

There are many academic discussions about the danger of population explosion in Nigeria and its implication on available food supply and social infrastructures.

Olusegun and Eke (2019) noted that population has been pointed at as the reason for high level of illiteracy, wide spread unemployment, poverty, violent crime, environmental hazards, malnutrition and other infectious diseases. While other countries of the world like China and India with increasing rate of population like Nigeria are making serious efforts through Laws and legislation to combat population increase, Nigerian leaders are not putting much effort to fight this menace. There is need for reduction in early marriages which leads to increase in child bearing, corruption and poverty. Government should encourage the people to do away with outdated customs and traditions which make it possible for people to lay more emphasis on male children to the extent that unless they have male children, they will not be satisfied.

The rate of population increase in Nigeria has become very alarming. Nigeria is now seen as the fastest growing country in the world with an estimated population of over 200 million people. Most observers are of the opinion that if nothing drastic is done time will come when the population will grow to the extent that the Nigerian leaders will be very confused and will not know what to do about it. As it stands now, Nigeria is the most populous country in the sub-Saharan Africa (Peter and Bakari, 2019).

Evidence shows that rapid population growth lowers per capita income growth in most LDCs, especially those that are already poor, dependent on agriculture, and experiencing pressures on land and natural resources. The Solow model is the theoretical benchmark for most studies of long –run growth of output (typically measured by growth real gross domestic product (GDP)). The value of all the goods and services produced in an economy during a year and it explains how saving, investment and growth respond to population growth and technical change. The model is characterized by a production function that explains the level of output and includes two input factors: labour and capital (physical and human capital). Economic growth is the determined by the amount of available capital in the economy, the efficiency with which the capital is used and the degrees of its employment. Population growth and increases in physical capital lead to growth if the new resources are employed in the productivity process of the country (Peterson, 2017). Improvements in the productivity of the human capital and physical capital stocks lead to increased efficiency and enhanced growth. Growth and investments in human and physical capital increase the capital stock, provided that the investments and growth are greater than the depreciation. Human capital investment consists of education attainment, training and better health. Since the available resources of the economy are not employed all times, the rate of employment is directly related to economic growth (Peter and Bakari, 2019).

The model predicts a stable steady-state output growth which is limited to population growth (in equilibrium), meaning that per capita output is constant over

time. Steady State equilibrium is an equilibrium in which each variable is either constant or growing at a constant rate). Growth is also influenced; however, by rates of saving and technical change which explain growth in per capita output, i.e. technical changes of total factor productivity determine changes in output growth with unchanged input of labour and capital. Population growth, savings and technical change are exogenous variable. The model also predicts “conditional convergence”. Which states that economy with low initial per capita output (poor countries) grow faster than countries with predictions follow from the basic assumptions of a constraint returns to scale of production function with diminishing returns to capital and labour. This means that increases in, for example, the amount of capital (input of labour unchanged) lead successively to smaller increases in output the lower the ratio of capita); the higher the return to investing in capita. Using this model, Solow shows that the rates of saving and population growth determine the steady – state level income per capita across countries reach different steady- states because of variations in the key factors that determine the level of steady- state.

DATA AND METHODOLOGY

Research design helps to determine the best research design, data collection method and selection of subjects. The primary ways of study which are Literature review, field research, and secondary data collection, talking to experts in the area of study and interview method were also employed where possible.

Data Collection Method

Data from secondary source was employed in the research; data is from Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS) and The World Bank (WB). The data is analyzed using Eview 10 statistical software package.

Method of Data Analysis

Data collected is summarized and analyzed using frequencies and percentages. Frequencies and percentages enable researchers to clearly represent data characteristics and findings with a great deal of accuracy. Regression analysis is employed to test the relationships in the models. The estimation method that is most commonly used with regression models is least squares. It is derived by using the method of moments, which is a very general principle of estimation that has many applications in econometrics (Davidson and MacKinnon, 1999). Generally, regression analysis has remained the most commonly used method in estimating econometric relationship. The data collected for this research is further analysed using Pesaran and Shin (1999) Autoregressive Distributed Lag (ARDL) Bounds Testing approach. Indeed, there are many different methods used in testing for

causal relationship between two or more time series variables. Such methods include: Engle-Granger (1987) 2-step procedure; Johansen (1988) and Johansen and Juselius (1990) Full Information Maximum Likelihood approach; Toda-Yamamoto (1995) augmented VAR approach; Davidson and Hinkley (1997); and Pesaran et al. (2001). For this reason, this study adopts Autoregressive Distributed Lag (ARDL) Bounds Testing approach.

An ARDL approach as introduced by Pesaran et al. (1996) is adopted to explore the long-run relationship among the variables. An ARDL model is a regression of one variable on its own past and on the present and past values of a number of other variables. The ARDL has various practical advantages: first, this approach to testing the existence of a relationship between the variables is applicable regardless whether the underlying regressors are stationary. The variables are not required to be $I(0)$ or $I(1)$ or fractionally integrated. The ARDL model does not require a unique level of integration of the variables (no unit root test is required). (A stochastic process is said to be stationary if its mean and variance are constant over time, i.e. time invariant. By contrast, a non-stationary time series will have a time-varying mean or a time-varying variance or both which renders many alternative statistical tests invalid). Second, the ARDL model takes sufficient numbers of lags into consideration to capture the data generating process in a general-to-specific modeling framework. In addition to the above two mentioned advantages, the ARDL co-integration model is efficient and unbiased and at the same time, is able to capture the short-run and long-run components of the model simultaneously. A dynamic ECM can be derived from the ARDL through a simple linear transformation (Banerjee et al., 1993). The ECM integrates the short-run dynamics with the long-run equilibrium, without losing the long-run information. In order to determine the optimal lag-length incorporated into the model and select the ARDL model to be estimated, the study employs the Akaike information criteria.

Models Specification

The study is going to test two models in order to be able to put the study in a proper perspective. The models for the study comprises of two different equations as described below:

Model 1

The variables that are included in this model are annual net migration (difference between immigration and emigration), annual health expenditure in Nigeria, total labour force and corruption perception. These are added because one, the level of development of the health sector in Nigeria has significant impact on what happen to death and birth rates; two, the level of corruption which is sign of poor governance level in Nigeria has significant impact on what happen to annual health expenditure (budget) and by

extension what happen to development of the health sector. Corruption and poor governance have detrimental impacts to what happen to the entire economy. Labour force potential is affected by the size of the total population and labour force is also related to GDP, as active labour force contributes to the growth of GDP. Here in the study labour force potential is the entire working age population. There are also the usual death and birth rates as control variables:

$$gdp = \beta_1 + \beta_2 br + \beta_3 dr + \beta_4 nm + \beta_5 lf + \beta_6 he + \beta_7 cp + e \quad (1)$$

Where,

gdp = gross domestic product

br = birth rate

dr = death rate

nm = net migration (difference between immigration and emigration)

lf = labour force potential means working age population

he = annual health expenditure

cp = corruption perception

Model 2

Model 2 tests the effects of changes in annual GDP, labour force, annual health expenditure and corruption level on annual changes in population. This will show how Nigerian population changes in relation to these variables. This is very important for demographic analysis by policy makers.

$$pg = \beta_1 + \beta_2 gdp + \beta_3 lf + \beta_4 he + \beta_5 cp + e \quad (2)$$

Where,

pg = population growth

gdp = gross domestic product

lf = labour force potential means working age population

he = annual health expenditure

cp = corruption perception

RESULTS AND ANALYSIS

Model 1

To measure the effect of other variables such as net migration, labour force, health expenditure and corruption on economic growth, model 1 is regressed. The dependent

variable is economic growth while the independent variables are birth rate, death rate, net migration, labour force, health expenditure and corruption. The result shows that in addition to death rate and birth rate which we found statistically significant, labour force is also statistically significant with a P-value of 0.0052 which is below the required 0.05 for validation in statistical analysis. Labour force negatively affects economic growth. This can be interpreted to mean economic growth is more favorably to use of modern technology and less labour force. This has important implication for the use of modern technology in our work places. Other variables were not found to be statistically significant.

Table 1: results of regression analysis on model 1

<i>GDP is the dependent variable</i>				
		<i>Coefficient</i>	<i>t-test</i>	<i>P-value</i>
1	Birth Rate	1.79E+11	4.881816	0.0001
2	Death Rate	-1.87E+11	-5.027583	0.0001
3	Net Migration (NM)	158133.5	0.422057	0.6783
4	Labour Force (LF)	-3.26E+10	-3.207386	0.0052
5	Health Expenditure (HE)	-3.20E+10	-1.397365	0.1803
6	Corruption Perception (CP)	-6.74E+08	-0.659497	0.5184

Source: author's calculation using Eview

Model 2

Model 2, the determinants of population growth in Nigeria, tests the effects of changes in annual GDP, labour force, annual health expenditure and corruption level on annual changes in population. The model shows how Nigerian population changes in relation to these variables. This is very important for demographic analysis by policy makers and private businesses during their investments decisions. Thus, model 2 regressed GDP, labour force, health expenditure and corruption on population growth. The result shows that all, except health expenditure, are statistically significant; see table 2. The test shows the influence of economic growth, labour force and corruption on the growth of population in Nigeria. Thus, population growth in Nigeria is positively affected by level of economic growth, labour force size and participation and the general corruption level in Nigeria. Economic growth has the implication of increasing wealth and making people more prosperous. It tendency to reduce poverty will naturally make people to marry more wives and increase children. Labour is a source of getting income to feed oneself and family, thus as more people get into the workforce, some of these workers will get married. Those, that are already married will increase the number of

wives under their custody or increase the number of children they give birth to. Corruption is very harmful to the development of any country in the world. It have tendency to increase the number of poor people in a country, thereby making having children and more wives difficult. Thus, corruption is naturally anti population growth.

Table 2: results of regression analysis on model 2

<i>Population growth (PG) is the dependent variable</i>				
		<i>Coefficient</i>	<i>t-test</i>	<i>P-value</i>
1	GDP	4.50E-13	7.645693	0.0000
2	LF	0.017065	6.844136	0.0000
3	HE	0.002733	0.223514	0.8255
4	CP	0.001057	2.368924	0.0286

Source: author's calculation using Eview

Pesaran et al (1996) proposed the Autoregressive Distributed Lag (ARDL) approach to cointegration or bound procedure for a long-run relationship, irrespective of whether the underlying variables are I(0), I(1) or a combination of both. F-test tests for significance of the lagged levels of the variables. The null hypothesis of no cointegration is $H_0 : k_1 = k_2 = k_i = 0$. It is tested against the alternative hypothesis of at least one non-zero result, i.e. $H_1: k_1 \neq 0$ or $k_2 \neq 0$ or $k_i \neq 0$. While the calculated F-statistics is compared with the critical values; where F-statistic exceeds the upper bound level, the null hypothesis is rejected, which shows the existence of co-integration. But, if F-statistic falls below the lower bound, null hypothesis cannot be rejected, implying the absence of co-integration. It is inconclusive if it falls within the upper and lower bounds. The result of the ARDL bound testing show that there is cointegration since the F-statistics is higher than the upper bound critical value in model 2 where ARDL tests was run.

Table 3: ARDL bound tests results

Model 2				
	<i>Test Statistic</i>	<i>Value</i>	<i>k</i>	
	<i>F-statistic</i>	10.62178	4	
		<i>Significance</i>	<i>(0) Bound</i>	<i>(1) Bound</i>
	Critical Value Bounds	5%	2.56	3.49

Source: author's calculation using Eview

CONCLUSION

This paper finds out the effects of demographic factors and other variables on Nigerian economic growth. Nigeria is estimated to have over 200 million people, this make it necessary for Nigerian government to be very watchful of demographic transition. There are various theories that try to explain the relationship between population growth and economic growth; all of them believe in the effect of population on economic growth. Effect of population on economic growth is relative; it depends on the nature of the country and its economic potentials. In a country with small population and abundance of economic resources, population growth tends to be positive. But, in a country with overpopulation problem, population growth usually resulted in negative or very slow economic growth. Nigeria found herself in between the two extreme positions, thus it needs to (very well) be mindful of how its population growth. This thesis has tested three models that try to explain the relationship between population growth and economic growth, using the econometric techniques of regression and ARDL cointegration. Its findings show that both birth rate and death rate affect economic growth in Nigeria; though in different ways. While birth rate affects economic growth positively, death rate affects economic growth negatively. It also shows that net migration, health expenditure and labour force affect economic growth. On the other hand, the result of the other analysis shows that population growth is affected by economic growth, labour force and health expenditure.

Based on the results of the various analysis conducted in the course of this work, the conclusion that can be drawn from this work is that the role played by population in economic growth in Nigeria is very significant and real. Factors such as growth rate of population, availability of labour force, general development in the health sector and net migration are important in influencing what happen to economic growth in Nigeria. Considering the negative effects of death on economic growth, the paper sees future improvement in health care sector and national security as necessary for economic growth. Statistical works of this nature are not only contribution to academic analysis but contribute to the real world in term of finding way out of real problems facing our world.

The paper recommendations are as follows: Nigerian government shall develop an effective demographic strategy to be able to deal with the challenge of over population that is looking at Nigeria in the years ahead. Studies such as this shall be supported to further find out challenges and way forward in Nigerian demographic transition. Nigerian government shall increase its annual allocations to the health sector to be able to improve its budgets and develop its infrastructures to compete with that of advanced countries. But at the same time the government shall watch out for corruption in the sector, as it is detrimental to the development of any kind. Government shall also follow very

carefully the trend in immigration into Nigeria to avoid having people that add nothing to Nigerian economy adding to Nigeria existing problems. Government shall look at ways of stopping brain drain where the very best from Nigeria emigrate to developed countries; this cheats Nigeria of her very best, whose place in the economy will be difficult to replace. Nigeria shall further develop and train her labour force to make them more effective.

Reference

- Abdullahi, S. I., Shuaibu, M., Yusufu, M., Shehu, K. K., & Rafay, A. (2023). Economic growth, financial development and bank failure: The case of corruption in Nigeria. In A. Rafay (Ed.), *Concepts, Cases, and Regulations in Financial Fraud and Corruption*. (pp. 144–163). IGI Global. <http://doi:10.4018/978-1-6684-5007-9.ch006>
- Abdullahi, S. I. (2018). “Nigerian economy: business, governance and investment in period of crisis”, available at: <https://ssrn.com/abstract=3310120>.
- Abernethy, V. D. (2002). *Population Dynamics: Poverty, Inequality, and Self-Regulating Fertility Rates*. New York, NY: St Martin’s Press.
- African Development Bank, (2002). *Africa in the world economy rural development for poverty reduction in Africa economic and social statistics on Africa*. Oxford University Press and Edition Economica for the African Development Bank.
- Ahlburg, D. A. (1998). *Julian Simon and the Population Growth Debate*. New Zealand: Otago University Press.
- Amaral, E. F. L. (2018). Theories of demography. *Population and Society*. September 3–7, 2018, Texas A & M University.
- Ashraf, QH, DN Weil, and Wilde, J. (2013). The effect of fertility reduction on economic growth. *Population and Development Review* 39(1), 97–130.
- Bleak, E. (1987). *The Malthus Factor: Population, Poverty and Politics In Capitalist Development*. London: Zed. Books.
- Bloom D.E & Williamson J.G (1997). Demographic Transition and Economic Miracles in Emerging Asia. *Working Paper 6268*, Cambridge, NBER.
- Bloom, D, Canning, D., Fink, G., and Finlay, J. (2009). Fertility, Female Labor Force Participation, and the Demographic Dividend. *Journal of Economic Growth*, 14(2), 79-101.
- Bloom, D, Canning, D. and Malaney, P. (2000). Population dynamics and economic growth in Asia. *Population and Development Review* 26(Suppl.), 257–290.
- Blanchet, D. (1991). *On Interpreting Observed Relationships between Population Growth and Economic Growth: A Graphical Exposition*. New Zealand: Otago University Press.
- Bucci, A. (2008). Population growth in a model of economic growth with human capital accumulation and horizontal R&D. *Demography*, 45, 543-555.

- Burch, T. K. (2003). Demography in a new key: A theory of population theory. *Demographic Research*, 9(11), 263-284.
- Caldwell, John (1987). Towards a Restatement of Demographic Transition Theory. *Population and Development Review*. 2(3-4), 321-366.
- Canning, D. (2015). *Demographic dividend in Africa*. Washington D.C.: The World Bank.
- Cincotta, R, Engelman, R. and Anastasion. D. (2003). *The security demographic: Population and civil conflict after the Cold War*. Population Action International, Washington DC.
- Coale A.C and Hoover, E.M (1958), *Population Growth and Economic Development in Low Income Countries: A Case Study of India*, Princeton University Press, Princeton, Chapter. 2.
- Davison, A. C. and Hinkley, D. V. (1997). *Bootstrap Methods and their Application*. Cambridge University Press.
- Davidson, R. and MacKinnon, J. G. (1999), *Econometric theory and methods*, Oxford: Oxford University press.
- Edward M., Ansari Z. A., and Matthew C. (1997). Population Dynamics and Economic Development: Age-Specific Population Growth Rates and Economic Growth in Developing Countries, 1965 to 1990. *American Sociological Review* 62(6):974. DOI: 10.2307/2657351.
- Engel R. F. and Granger C. W. J. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica*. 55(2), 251-276.
- Eniang, R. A., (1977). *The Consequences of Rapid Population Growth on Nigeria's Economic Development: A Simple Econometric Analysis*. All Graduate Theses and Dissertations. 3201. <https://digitalcommons.usu.edu/etd/3201>
- Gujarati, D. N., Porter, D. C. and Gurasekar, S. (2012). *Basic econometrics*. New Delhi, Tata McGraw Hill.
- Hoover, E. M. (1958). *Population Growth and Economic Development in Low-Income Countries: A Case Study of India's Prospects*. The Free Press; The Hague: W. van Hoeve Ltd.
- Jhingan, M. L. (2005). *The Economics of Development Planning*. 38th Edition. New Delhi: Vrinda Publications.
- Johansen, S. (1988). Statistical analysis of cointegration vectors. *J Econ Dynam Contr*. 12(2-3), 231-254.
- Johansen S, Juselius K. (1990). Maximum likelihood estimation and inference on cointegration-with applications to the demand for money. *Oxf Bull Econ Stat*. 52, 169-210.
- Kelly A and Schmidt R (1995). Aggregate Population and Economic Growth Correlation: The Role of the Components of Demographic Change. *Demography*, 32, 543-555.
- Kolawole, O. E. (2017). *Implications of a rapidly growing Nigerian population: a review of Literature*. Department of Demography and Social Statistics Joseph Ayo Babalola University, Ikeji Arakeji, Osun state, Nigeria.

- Lamb, D.R. (1995). *Physiology of exercise, Responses and adaptation*. (5th ed), New York: Macmillan Publishing Co.
- Livingston, B. (2002). *The One-child Policy: An Economic Analysis*. <http://www.lclark.edu/econ/China.htm>.
- Makinwa, L., Adebuseye, U. and Edigbola, A. (1992). *Cost of Children in Lagos*. Nigeria: Heinemann Educational Nigeria Limited.
- Marchine, C.L and Uzonicha J. O. (2010). *Knowledge of the Health Effects of Physical activity and practice Among Student Nurses in Benin Metropolis*. In the proceeding of the 52nd ICHIPER-SD Anniversary World Congress, Doha, Qatar 199-200.
- Marx, K., McLellan, D., ed. (2008). *Capital: An Abridged Edition*, Oxford: Oxford.
- Marx, K. (1867). *Capital A Critique of Political Economy: Volume I*. Progress Publishers, Moscow, USSR.
- Mason, A. (1988). Saving, Economic Growth, and Demographic Change. *Population and Development Review*. 14(1), 113-144.
- Mason, A. (2001). *Population change and economic development in East Asia: Challenges met, opportunities seized*. Stanford: Stanford University Press.
- Menike, H. R. A. (2018). A Literature Review on Population Growth and Economic Development. *International Journal of Humanities Social Sciences and Education*, 5(5), 67-74.
- Mukhtar, S., & Abdullahi, S. I. (2020). Do poverty, unemployment and sexual violence explain suicide rate in Nigeria: what the data says. *Journal of conflict resolution and social issues*, vol. 1 no. 1, p. 72-80.
- Mukhtar, S., & Abdullahi, S. I. (2020). Testing the relationship between socio-political factors, economic variables and food insecurity in Nigeria. *Journal of conflict resolution and social issues*, vol. 1 no. 1, p. 148-159.
- Notestein, F. W. (1945). Population—The Long View. In, Theodore W. Schultz (Eds.) *Food for the World*, Chicago: University of Chicago Press.
- Olatayo, T. O. and Adeboye, N. O. (2013). Predicting Population Growth through Births and Deaths Rate in Nigeria. *Mathematical Theory and Modeling*, 3(1), 96-104.
- Olubayo-Fatiregun M.A., & Aderonmu K. (2010). *Motivation for Physical Activity Among Selected 15 and 17 year-old secondary school students in Lagos state, Nigeria*. In Proceeding of the 52nd ICHIPER-SD Anniversary World Congress, Doha, Qatar, 199-200.
- Olusegun, A. J. and Eke, G. (2019). Nigeria's Population Explosion and Its Underdevelopment Imperatives. *American International Journal of Humanities, Arts and Social Sciences*, 1(2), 63-70.
- Onifade A. (2001). Sports and society. In C.O. Doh (Eds.). *Issues in Human kinetics: Health promotion and education*, (p.123-156), Ibadan: Chris Rose ventures.
- Onifade, A. and Oyewumi, I. A. (2005). Assessment of physical activity level among selected vocational groups in South-West, Nigeria. *International Journal of Applied Psychology and Human Performances* 2: 276-277.

- Onwuka, E. C. (2013). Another Look at the Impact of Nigeria's Growing Population on the Country's Development. *African Population Studies*, 21(1), 1-18.
- Otinwa, G.O (2008). Controlling the risk factors of obesity and overweight through sports and exercise. *JONASSM*, 10 (1), 1-8.
- Otinwa, G.O and Agbaraji, N.A. (2008). Exercise as adjunct to weight loss and maintenance in moderately obese female. *JONASSM*, 10(1), 67-70.
- Pate, R.R, Pratt, M.and Blair, S. N. (1995). Physical activity in public health: A recommendation from the centres for diseases control and prevention and the American college of sports medicine. *Journal of the American Medical Association* 273(5): 402 -407, PubMed; PMID 7823386.
- Pesaran, M.H. and Shin, Y. (1999). An Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis. In: Strom, S., Holly, A. and Diamond, P. (Eds.), *Centennial Volume of Rangar Frisch*. Cambridge University Press, Cambridge.
- Peter, A. and Bakari, I. (2019). Impact of Population Growth on Economic Growth in Africa: A Dynamic Panel Data Approach (1980 -2015). Available at SSRN: <https://ssrn.com/abstract=3432263> or <http://dx.doi.org/10.2139/ssrn.3432263>
- Peterson EWF. (2017). The Role of Population in Economic Growth. *SAGE Open*, October, doi:10.1177/2158244017736094
- Payne, W.A, and Hahn, D.B (2002). *Understanding your health*. (7th ed) New York: McGraw-Hill, IARC (International Agency for Research on Cancer). 2002. Weight Control and Physical Activity. Lyon, France: IARC Press.
- Pindyck, R. S. and Rubinfeld, D. L. (1998). *Econometric models and economic forecasts*. Boston, McGraw Hill.
- Sallis, J. F. (1994). Physical activity guidelines for adolescents. *Paediatrics Exercise science*.; 6: 229-463.
- Shuaibu, M., Yusufu, M., Abdullahi, S. I., Shehu, K. K. and Adamu, M. B. (2021). What Explains Economic Growth in Nigeria in the Last Three Decades? – A Dynamic Modelling Approach. *East African Scholars Multidiscip Bull*, 4(7): 75-84.
- Sterum R. (2002). The effect of obesity, smoking and problem drinking on chronic medical problems and Health care costs. *HethAffaors* 21(2), 245-253.
- Snow-Harter, C., Shaw, J.M. and Matkin, C.C. (1996). Physical activity and risk of osteoporosis, In Marcus D.; Feldman, D; & Kelsey, J.(eds). *Osteoporosis*. San Diego, CA: Academic Press.511-528.
- Stone, J. A. (1993). *Advances in sports medicine and medical fitness*. Chicago: Year book medical publishers inc.
- Toda, H.Y., and Yamamoto, T. (1995). Statistical inference in Vector Autoregressions with possibly integrated processes. *Journal of Econometrics*, 66, 225–250.

- Todaro, M. and Smith, S. C. (2015). *Economic Development*. 12th Edition, Pearson, UK.
- U. S. Department of health and human services (1996). Physical activity and health: A report of the surgeon general . Atlanta, GA: U.S. Department of Health and Human Services centres for Disease control and prevention, National Centre for Chronic Disease Prevention and Health Promotion. Surgeon General Report in physical activity and health (1996).
- Vanslavijis, E.M.F; Van Mireille, N.M; Van.P.Jos, W.R; Twisk, M.J. Chin; A, P, Kareem, J.C and Willem, Van.(2004), *American Journal of Public Health Association*. 10 (2105).
- Welk, G.J and Blair S. N (2001). Health benefit of physical activity and fitness in children. In G. Welk, J. Morrow Jr, and H Falls (Eds). *Fitness grant reference guide* Dallas, Texas: The Cooper Institute.
- World Bank (2016). *Nigeria's demographic dividend?* Policy note in support of Nigeria's ERGP, 2017–2020.
- Zaman, A. (1996). *Statistical Foundations for Econometric Techniques*. Oxford: Academic Press.