EFFECTS OF POPULATION GROWTH AND URBANIZATION ON ECONOMIC GROWTH IN NIGERIA

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ABSTRACT
The uncontrollable population growth and urbanization rates in Nigeria is empirically contrary to the Malthus population and Haris-Todaro propositions. Thus, this motivated this study on the effects of population growth, urbanization, and economic growth in Nigeria. Secondary annual datasets from 1980 to 2019 were sourced from the World Development Indicators (WDI), the National Bureau of Statistics (NBS) and the Central Bank of Nigeria Statistical Bulletin (CBN). To achieve the specific objectives, the OLS estimation techniques employed are Autoregressive Distributed Lag (ARDL), Fully Modified OLS (FMOLS), and granger causality to test the causal direction of the model variables. While the ARDL estimates the short-run and long-run impact, the FMOLS estimates the long-run effects of population growth and urbanization on economic growth. Lastly, the granger causality test helps to identify the policy directions in this study. Findings revealed that population growth has a positive and significant effect on economic growth in both the short-run and long-run, while urbanization has a negative and insignificant effect on economic growth in the short-run and the long-run over the study periods. Therefore, the study recommended that government policy should be directed to improve the active population growth to spur economic growth through a quality education system. Also, Urbanization Policy should be guided to maximize the benefits rather than the current challenges posed like increasing Urban Unemployment.

Keywords: Urbanization, Population growth, Economic growth, modified endogenous model
JEL: J10, J15, F43, C20

1. INTRODUCTION

The increasing rate of urbanization around the world is susceptible to population growth, where more than half of the global population now lives in urban areas. The world's population is put at about 6.572 billion people out of whom the United Nations data indicated that about 3 billion people (50percent) live in urban areas (UNCHS, 2007). World Bank (2000) and IMF (2006) reported that 66percent of the entire world's population lived in the countryside in the early 1950s. The estimates by Peters (2000) and UNFPA (2007) show that by 2030, approximately 61 percent of the total population in the world will reside in cities; and that all the world's increase in

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population in the next three decades will occur in the low and middle-income countries. This estimate is projected to increase to 75 percent at the growing rate of 65 million urban dwellers annually by 2050 (Jamal &Jena, 2018). It is estimated that in 1900 about 95% of Africa's inhabitants South of Sahara earned their livelihood from the primary occupations of farming, hunting and gathering, cattle nomadism, and fishing (Aase, 2003;1) meaning that less than 5% lived in urban areas. At the start of the independence period in the 1950s, 14.7% of Africa's inhabitants were urban, the percentage rose to 37.2% in 2000 (UN, 2002). The rate of population growth has been spectacular in recent times. Sub-Saharan Africa (SSA) which is often regarded as African fastest urbanizing region currently contains 472 million people in the urban centers, and will likely increase in the next 25 years. This population growth has contributed to the increase in the gross domestic product (GDP) of the region.

Jamal and Jena (2018), noted that the global share of African urban residents is projected to grow from 11.3 percent in 2010 to 20.2 percent by 2050 while 143 sub-Saharan African cities generate a combined $0.5 trillion, totaling 50 percent of the region's gross domestic product (GDP). The implication is that out of 1,136 billion populations in the sub-Saharan Africa countries estimate, 76% are working- age (World Bank, 2017). Thus, there is a correlation between the active populations residing in the urban centers engaged in various employments and economic productivity. Hence, the gross domestic product of a number of sub- Saharan Africa countries is dependent on the contribution of its urban centers where labours are engaged in various employments. Alkali (2005) noted that the urban population in Nigeria over the last three decades has been growing close to 5.8percent per annum. In fact, 48.2 percent of the country's total populations are living in the urban centers of Nigeria and projections indicate that more than 60percent will live in urban centers by year the year 2025. World Bank (2020) estimated Nigeria's population in 2020 as 206.1 million which represents a 2.6 % average annual growth rate, while 81% of its population is working age which ordinarily resides at the urban centers engaged in various economic activities.

The Nigerian city of Lagos for example that had 665000 inhabitants in 1963 (Rakodi, 1997) and a 8.7million in 2000, was expected to become the 11th largest city in the world last year (2015) according to UN (2002) prediction. This expectation has now become a reality. Consequently, the world is rapidly urbanizing. The UN Population Division estimates that in this decade the world's population has shifted from being predominantly rural to predominantly urban. Cities are also the locus and drivers of most economic growth. According to Redman and Jones (2005) cities occupy 4% or less of the world's terrestrial surface, yet they are home to almost half the global population, consume close to three-quarters of the world's natural resources, and generate three quarters of its pollution and wastes.

In line with Redman and Jones (2005), the former World Bank President Robert McNamara cited in Todaro (2006) expressed his skepticism that huge urban agglomerations could be made to work at all: these sizes are such that any economies of location are dwarfed by the cost of congestion. The rapid population growth that has produced them will have far outpaced the growth of human and physical infrastructure needed for even moderately efficient economic life and orderly political and social relationships, let alone amenity for their residents. Moreover, the UN estimates that virtually all net global population and economic growth over the next 30years will occur in cities, leading to a doubling of current populations. This growth will require a lot of investment in new infrastructure and create unexpected uphill tasks for political and social institutions. In the early 1990s, approximately half the governments of the world, mostly those of

developing countries considered the patterns of a population distribution to be unsatisfactory. A key issue was the rapid growth of urban areas (Program of Action, 1994). The rapid growth of cities due to urbanization in most African countries has led to an increase in the urban population which in turn may have a positive impact on industrialization; since the industries will have access to cheap labour thereby increasing their profit and by implication has more to plough back. Therefore, cities will increasingly become the main players in the global economy (Kofi Annan cited in Todaro, 2006).

In the face of increasing urban population, poverty is becoming increasingly urbanized Wolfensohn (1998), there is an inadequate supply of housing and infrastructure for the teeming population, as a result, the existing infrastructure and housing are overstressed, while unsanitary living conditions characterized by the filthy environment, unclean ambient air, stinky and garbage-filled streets and sub-standard houses continue to dominate the urban landscape in Nigeria (Daramola and Ibem, 2010). The concentration of more people in urban areas of the country has reduced food production in the rural areas and overburdened the infrastructural amenities in the urban centers.

Therefore, population growth and urbanization rate in Nigeria have been generating severe environmental concern for both the government and interested stakeholders. The relationship between urbanization center and economic growth in sub-Saharan Africa has become a crucial policy concern, especially in Nigeria. However, a central question relating to the unprecedented size of these urban agglomerations is how these urban centers in Nigeria will, in the future cope economically, environmentally, and politically with such overcrowded cities. In other words, the extent, the dimension, the persistence of the urbanization challenge and its macroeconomic implications call for further research attention which indeed this study intends to address. Therefore, the objective of this study is to investigate the economic relationship amongst population growth, urbanization, and economic growth in sub-Saharan Africa, with a special focus on Nigeria.

2. LITERATURE REVIEW

Urbanization is the process that refers to the growth both in size and numbers of urban centers (Ujoh, Kwabe & Ifatimehin, 2010). Several studies (UNCHBP, 1974; Lambin et al, 2003; European Environment Agency, 2006; Ifatimehin & Musa, 2008) reveal that the proliferation of urban centers has been phenomenal from the turn of the 20th century. A population is a group of individuals with common features living in a geographical region. United Nations (2021) defines population as a group of people or at least a group of living beings, while Ochejele (2010) cited in Lawal, George, Oseni & Okuneye,(2020) defines economic growth as the quantitative and sustained increase in the county's per capita output or income accompanied by an expansion in the labour force, consumption, capital and volume of trade.

In Nigeria, the growth of capitalism into imperialism (colonialism) with its exploitative economic policies of plunder and appropriation, accelerated migratory tendencies of peasant producers from rural to urban centers such as Lagos, Enugu, Ibadan, Kano, Jos, and Port Harcourt (Tyav, Akpede & Abanyam, 2013). Thus, capitalism creates the urban and rural sectors of the society through the 17th and 18th century industrial revolutions. Wegh (2003) cited in Tyav, Akpede & Abanyam (2013) defines urbanization as a process, factor, and consequence of change that ensures the clustering of people. He states that urbanization is perceived in terms of anonymity and no heterogeneity. It describes a situation whereby people continuously come together in large

numbers with different cultural backgrounds and dwell in a particular urban center. Broom and Selzink (1968) cited in Odetola et al (1983: 47) defined urbanization as the process of transforming societies from simple and agrarian forms into complex and heterogeneous structured characterized by increasing population density and size. Development; in common parlance, refers to the physical quality of life index of a people (Tyav, Akpede & Abanyam, 2013).

According to Alkali (1997), and Apam (2006:203), the questions to ask about a country's development are three: what is happening to poverty? What has been happening to unemployment? What is happening to inequality? If all these have declined significantly beyond doubts, this has been a period of development for the country concerned. Using the dialectical and historical materialist perspective, Marx contended that capitalism allows for the concentration of wealth and affluence in the hands of a few who also constitute the political class and poverty for the masses of workers who are producers of wealth and are also deprived and exposed alienation (Tyav, Akpede & Abanyam, 2010). Colonialism which paved way for industrialization and urbanization in Africa and Nigeria drained the working forces of the rural areas into the urban centers leading to the total neglect of these rural areas.

EMPIRICAL REVIEW

The relationship between urbanization and economic growth was investigated by Liu Su and Jiang (2015) in China, while focusing on the cross-regional level and employed time-series data from 1952 to 2011 for 28 provinces in the economy, using a bootstrap panel Granger causality test. The results indicated that in the northern coastal and inland regions, urbanization promotes economic growth through demand expansion. Ochinyabo(2021)examined the relationship between rapid population growth and economic development issues in Nigeria using descriptive and analytical statistics tools. The study found that population, remittances, gross domestic product and unemployment negatively and significantly affected Human development index in Nigeria. Sarker, Khan and Mannan (2016) investigated the causal relationship between urban population growth and economic growth in South Asia using the Panel Pedroni Cointegration Test (PPCT) and a Panel Vector Error Correction Model (PVECM). The study found the presence of a long-run causal link between urban population and economic growth. Hence, the study concluded that urban population growth has a significant influence on economic growth in Southern Asia.

Li (2017) investigated the relationship between urbanization and economic growth in China by employing a VAR model to analyse time-series data from 1980 to 2014. The study found a unidirectional causal relationship between population, urbanization and economic growth as urban population growth promotes economic growth in the long-run. Moreover, the study found a unidirectional causal link between the rate of land urbanization and economic growth. However, growth in the rate of land urbanization was promoted by the rapid economic growth in the Chinese economy. Tripathi and Mahey (2017) examined the link between urbanization and economic growth in Punjab, India by adopting a micro-level analysis. The study suggested that urban population growth in Punjab is highly concerted around the major cities. Hence, the study found a positive relationship between urbanization and economic growth in Punjab.

Nguyen and Nguyen (2018) examined the link between urbanization and economic growth in seven ASEAN countries by using the Granger causality test and a static and dynamic panel data to analyse time-series data from 1993 to 2014. The empirical results suggest that there is a positive causal relationship between urbanization and economic growth. However, the impact of

urbanization on economic growth is found to be non-linear. Bakirtas and Akpolat (2018) investigated the relationship between urbanization and economic growth in new developing-market economies using the Dumitrescu-Hurlin panel Granger causality test to examine the dataset from 1971 to 2014. The bivariate analysis from the study found the existence of a panel Granger causality from urbanization to economic growth in the sampled economies.

Nathaniel and Bekun (2021) examined the impact of urbanization on economic growth in Nigeria from 1971 to 2014 by adopting the Bayer and Hanck and ARDL cointegration tests. The empirical results found that there exists a negative relationship between urbanization and economic growth in Nigeria. Pradhan, Arvin, and Nair (2021) investigated the effect of urbanization on the economic growth of the G-20 countries from 1961 to 2016 by adopting the PVECM. The empirical results indicated the existence of temporal causal links between urbanization and economic growth in the short and long run. The study also found that the path to long-run economic growth in the G-20 countries depends on urbanization rate, transport, and ICT infrastructures.

Daramola and Ibem (2010) examined the causes and implications and of increasing environmental deterioration for sustainable development in Nigeria. They employed archival records and observations to identify colonial antecedents of Nigerian cities, rapid urbanization, and poor psychological orientation of residents as being responsible for the current situation of environmental deterioration. They highlighted the three-fold effects of the human health, the economy and ecological system and suggested that the application of planning, economic, legal, institutional as well as educational tools will address the situation. Shabu (2010) employed a multiple correlation analytical technique to analyze the relationship between urbanization and economic development in developing countries using data obtained from 10 developing countries by the World Bank in 2009. He found that there are two side relationships between urbanization and economic development; on the one side, it impedes economic development while on the other side, it is an impediment to economic development of most nations. He correlated urbanization with economic development indicators of developing countries and concludes that a weak relationship between urban growth and economic development in developing countries exists.

Aidi,Emecheta and Ngwudiobu (2016) investigated the relationship between population dynamics and economic growth in Nigeria using augmented neoclassical growth model. The study found that fertility, mortality and net-migration inversely related to economic growth in Nigeria. Olabiyi(2014) investigated the effect of population dynamics on economic growth in Nigeria between 1980 and 2010 using the vector auto regressive(VAR) model. The study found a positive relationship between infant mortality rate and economic growth in Nigeria. Ivan and Gordon (2013) investigated the relationship between urbanization and economic growth in Africa and Asia. The study reviewed arguments and evidence on whether rapid urban population growth can help to raise living standards. The paper found out that the development effects of urbanization and the magnitude of agglomeration economies are very variable where there is no simple linear relationship between urbanization and economic growth, or between city size and productivity. Jamal and Jena (2018) examined urbanization in sub-Saharan Africa and submitted in their findings that the consequences of urbanization can be complex and intersect with other development policy issues such as climate change and migration; and that If properly managed, it has the potential to propel growth, create jobs, and end widespread poverty, but Without a holistic collaboration between actors, the influx of informal settlers will continue with environmental risk.

Ujoh, Kwabe, and Ifatimehin (2010) examined urban sprawl in Nigeria with a special focus on her federal capital, Abuja, and sustainable urbanization. This paper specifically focused on an integrated approach of Remote Sensing (RS) data, Geographical Information Systems (GIS) techniques, and ground data collected by the use of Global Positioning Systems (GPS) receiver in facilitating urban planning. Data set from Landsat TM, Landsat ETM, and Nigeriasat-1 satellite data for 1987, 2001, and 2006 respectively, revealed that the annual rate of urban sprawl was 10.6km^2 over a 19 years period (1987 – 2006). In view of the ecological and environmental challenges that accompany such rapid sprawl development, the study recommends measures like moving some key government agencies, ministries, and departments to other area councils of FCT to reduce the rapid rate of urban sprawl and to ensure sustainable urbanization.

3. METHODOLOGY

The research design adopted for this study is both descriptive and evaluative. This study makes use of secondary time series data relating to the relevant variables of the research. The study relies on secondary data obtained from various sources like the National Bureau of Statistics, Central Bank of Nigeria, National Population Census, and World Development Index, etc. The study would use time-series data from 1980-2019.

4. THEORETICAL FRAMEWORK

This study is premised on both Malthus Population and Haris-Todaro's theory of population and migration. However, this study observed that these theories do not consider the endogeneity factors, hence the incorporation of a modified endogenous growth model. Malthus model postulates that increasing population resulted from migration from rural-urban is expected to impact growth negatively. The main assumption of the model is that the migration to urban areas based on expected income between rural and urban areas to seek a job may expect to earn twice the annual real income in an urban area than in a rural environment but might end up disappointed of little consequence, if the actual probability of his securing the higher-paying job within, say, one year period turns to one chance in five (Todaro and Smith, 2006). The expected urban real per capita income is equal to the proportion of urban labour force (aging and active), given urban access to infrastructure and other intervening factors. It is expressed as;

Y=f(, $POPGR,\ AGPOP, ATPOP, UrbanElect$,GFCF,FDI) …… (i)

Where Y = GDP per capita growth (GDPPCG), AGPOP = Aging population, ATPOP = Active population, UbanElect= Urban electricity and POPGR = Population growth rate.

Rural-urban migration which is provoked by inadequate employment opportunities in the rural areas has aggravated urbanization and its attendant positive and negative impacts. The decision to migrate depends on the expected urban real income and not the actual urban-rural real wage differential (Haris &Todaro, 1970). The expected urban real income is determined by the population growth rate which brings about the interaction of two variables; the aging and active population given adequate infrastructures and employment opportunities occasioned by domestic and foreign direct investment in the urban area likewise, the probability of obtaining an urban job is directly related to urban employment rate and inversely related to the urban unemployment rate (Chaudhuri &Mukhopadhyay,2010).

The model specification is drawn from the Malthus population model which states that increasing population retards economic growth in terms of poverty, starvation amongst others in developing economies. Thus, modified and expressed in a function and baseline regression equation as follows;

Model I

GDPPCG =f(POPG, AGINGPOPG, ACTIVEPOPG, GFCF, FDI, POPELECT)…….(ii)

$\log GDPPCG = \propto_0 + \propto_1 \log POPG + \propto_2 \log AGINGPOP + \propto_3 \log ACTIVEPOP + \propto_4 \log POPELECT + \propto_5 \log GFCF + \propto_6 \log FDI + \mu$ ……(iii)

While the Haris-Todaro model of migration is modified and expressed in the endogenous form to capture the endogeneity factors of technical progress as:

Model II

$\log GDPRCG = \propto_0 + \propto_1 \log GFCF + \propto_2 \log FDI + \propto_3 \log URBAN + \propto_4 \log URBANUEMP + \propto_5 \log URBANR + \propto_6 \log URBANELECT + \mu$……..... …….(iii)

Where $\propto_0$, $\propto_1$, $\propto_2$, $\propto_3$ $\propto_4$ $\propto_5$, and $\propto_6$ are parameter estimates

GDPPCG= Gross Domestic product per capita growth

GFCF = Gross Fixed capital formation

FDI= Foreign Direct Investment

URBANUEMR =Urban unemployment Rate

URBANR= Urbanization rate

URBANELCT= Urban electricity

URBAN= Urbanization.

μ = Error term

5. RESULTS AND DISCUSSIONS

5.1 DESCRIPTIVE STATISTICS

Table 1 shows the summary of the descriptive statistics used in the relationship among increasing population, urbanization, and economic growth for the study period 1980-2019 in Nigeria. Table 1 results revealed that urban electricity and aging and active population growth of 47.51 and 0.03 are the highest and lowest average values respectively. Similarly, the highest and lowest standard deviations for urban electricity and active population growth rates are 19.39 and 0.002 respectively.

Table 1. Descriptive statistics result for the included variables (1980-2019)

	Mean	Std. Deviation	Maximum	Minimum	Jarque-Bera	Observations
GDPPCG	0.54	5.26	12.46	-15.45	10.94***	40
POPGrowth	2.59	0.08	2.85	2.49	6.77**	40
Agingpopg	0.03	0.003	0.03	0.02	0.77	39
Activepopg	0.03	0.002	0.03	0.02	3.25	39
GFCF	35.94	526	89.39	14.17	7.69**	39
FDI	1.49	0.57	5.79	-1.15	25.39***	40
Popelectricity	46.25	8.56	59.30	27.30	1.140	29
Urbanization	4.75	10.37	5.85	4.05	3.25	40
Urbanization rate	35.83	7.27	51.16	21.97	2.21	40
Urbanelectricity	47.51	19.39	83.90	27.30	20.50***	30
Urbanunem.	10.53	1.29	27.40	1.90	3.52	40

Source: Authors' compilation from E-Views 9 software, 2021

Further, the Jarque-bera test for all included variables found that all the included variables are normally distributed except GDP per capita growth (GDPPCG), population growth (Popgrowth), gross fixed capital formation (GFCF), foreign direct investment (FDI), and urban electricity access (urban electricity) at different significant levels as indicated in this study. Lastly, the annual dataset periods for the included variables are mixed and unbalanced in this study.

5.2 GRAPHICAL ANALYSIS

The relationship between increasing population, and economic growth as well as the nexus between urbanization and economic growth are exhibited in Figures 1 and 2. Importantly, Figure 1 showed that GDP per capita growth did not correspond to the population growth for the study period, 1980-2019 in Nigeria. In specific, in more than half of the study periods, population growth has outgrown GDP per capita growth in Nigeria and thus supports the Malthus population hypothesis. However, on fewer occasions like in 1990 and 2002 that GDP per capita growth sharply outgrown the population growth rate in Nigeria. On the other hand, Figure 2 like Figure 1 exhibited that Urbanization (Urban population growth) is far above the GDP per capita growth in all the study periods, except in the years 1990 and 2002 respectively. This suggested that the more Urbanization, the lesser the GDP per capita growth (average standard of living growth) over the study periods, 1980 to 2019 in Nigeria.

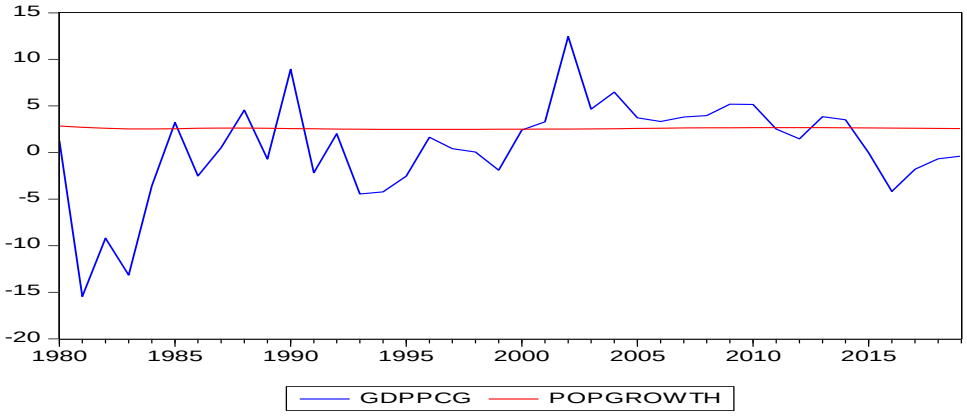

Figure 1. Trend in population growth and GDP per capita growth in Nigeria (1980-2019)

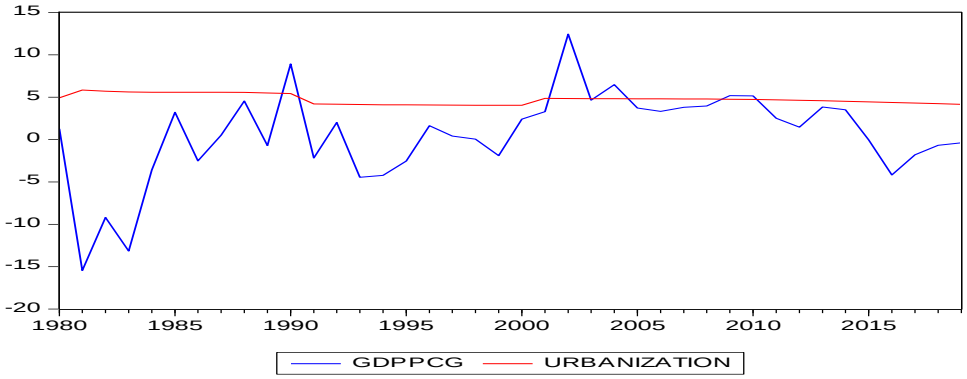

Figure2. Trend in urbanization and GDP per capita growth in Nigeria (1980-2019)

5.3 TIME SERIES ECONOMETRICS RESULTS

5.3.1 UNIT ROOT TEST

Table 2 reports the Augmented Dickey-Fuller (ADF) unit root test found that all included variables are stationary at first difference integrate order, I(1) except population growth (popgrowth), Agingpopg, GFCF, FDI, and Urban electricity access (urban electricity) at integrating order of zero, I(0) in this study. This conformed that the included variables dataset are stable at mixed integrating order of zero, I(0) and one I(1). Although, fewer variables are not stationary until at integrate order of two, I(2), which no estimation method support hence, Pesaran et al. (2010) opined that the I(1) should be considered instead of I(2) if and only if, the Akaike information criteria (AIC) of I(1) is lower than the AIC of I(2), and disregards their F-statistics outcomes. Therefore, all the included variables are stationary at level and first difference and thus a mixed stability order exists among the variables in this study.

Table 2. Unit root test for the included variables in this study (1980-2019)

Variable	ADF Unit Root Test			
	Level Difference	1st Difference	2nd	Integrate Order
GDPPCG	-2.78*	-11.64***	----------	I(1)
Popgrowth	-6.45***	----------	----------	I(0)
Agingpopg	-5.80***	----------	----------	I(0)
Activepopg	-1.86	-2.89*	-3.57***	I(1)
GFCF	-3.62***	----------	----------	I(0)
FDI	-4.19***	----------	--------	I(0)
Popelectricity	-2.06	-4.95***	---------	I(1)
Urbanization	-1.40	-4.15***	---------	I(1)
Urbanization rate	0.70	-1.55	-5.91***	I(1)
Urbanelectricity	0.28	-4.35***	----------	I(1)
Urbanune	----------	-5.99***	----------	I(1)

Source: Authors' compilation from EViews 9 software, 2021

Note: (a) *, **, ** significant at 1%level, 5%level and 10%level of significance.**

5.3.2 CO-INTEGRATION BOUND TEST

Since all the variables are stable at mixed integration orders of zero and one, then, the ARDL Bound test is appropriate for the joint variables long run relationship in this study. Table 5 found that all the included variables in the two models have a linear joint long run relationship in this study.

Table 5: Co-integration bound test (1980-2019)

Model	Variable	F-statistic	DF	Critical value			Cointegration Decision Ho: No long run relationships
				10%	5%	1%	
Population Growth and Economic Growth Nexus	All variables	5.49	6	3.23	3.61	4.43	Reject H_0
Urbanization and Economic Growth Nexus	All variables	7.36	6	3.23	3.61	4.43	Reject H_0

Source: Authors' compilation from EViews 9 software, 2021
Note: (a) Maximum critical value 10 and 11 Bounds at 1%level, 5%level and 10%
(b) Degree of freedom (DF)

5.3.3 OLS ESTIMATION FOR POPULATION GROWTH-ECONOMIC GROWTH NEXUS AND URBANIZATION-ECONOMIC GROWTH NEXUS BETWEEN 1980-2019 IN NIGERIA

Table 6. Estimated OLS Regression for models 1 and 2 (1980-2019)

Dependent variable: GDP per Capital growth						
	Model I				Model II	
Variable	ARDL OLS		FMOLS	DOLS	ARDL OLS	FMOLS	DOLS
	SR	LR			SR LR		
Popgrowth		1603.12** (2.46)	628.69 (1.62)	444.62 (0.86)			
Agingpopg		-74486.53** (-2.49)	-28703.18 (-1.63)	-19816.70 (-0.85)			
Activepopg		-86547.27** (-2.54)	-33581.19 (-1.69)	-23528.96 (-0.90)			
GFCF	-0.57*	(-2.07)	-0.31* (-1.98)	-0.29 (-1.39)	-0.15*** (-2.71)	-0.16 (-1.94)	-0.15*** (-2.71)
FDI		1.06 (1.09)	-0.39 (-0.75)	-0.48 (-0.73)	-0.92*** (-4.05)	-0.88*** (-4.36)	-0.92*** (4.05)
Popelect		-0.92** (-2.41)	-0.60*** (-2.94)	-0.65* (-2.32)			
C		134.61* (1.99)	48.86 (0.94)	28.39 (0.45)	103.54 (1.04)	-12.13 (-1.12)	-12.09* (-1.84)
Urbanization					-21.26 (-0.85)	8.08*** (6.30)	8.10*** (10.45)

Urbanization Rate				-1.74* (-1.81)	-0.58*** (-3.72)	-0.55*** (-4.28)
Urbanelectricity				0.01 (0.06)	0.12** (2.28)	0.11** (2.09)
Urbanune				0.16* (1.97)	0.06 (1.30)	0.05 (0.92)
ECT(-1)	-0.96*** (-5.53)			-1.44*** (-6.36)		
D(Pogrowth)	1129.81** (2.11)					
D(Agingpopg)	-54275.23** (-2.11)					
D(Activepopg)	-62283.98** (-2.11)					
D(GFCF)	-0.28 (-1.05)			0.05 (0.20)		
D(FDI)	-0.03 (-0.05)			-0.66 (-1.51)		
D(Urbanization)				-35.17 (-0.97)		
D(Urbanization rate)				122.72 (1.23)		
D(Urbanelectricity)				0.01 (0.10)		
D(Urbanune)				-0.06 (-0.67)		

Source: Authors' compilation from EViews 9 software, 2021

Note: (a) * significant at 1% level, ** significant at 5% level, and * significant at 10% level**

Table 6 presents the estimated OLS regression for the two models, population growth-economic growth nexus and urbanization-economic growth nexus over the study periods, 1980-2019 in Nigeria using three OLS estimations, ARDL OLS, FMOLS and DOLS respectively in this study. As shown in Table 6, the ARDL OLS showed the short-run and Long-run OLS estimates while FMOLS and DOLS revealed long-run estimates only. In models I and II, the error correction term (ECT) values of -0.96 and -1.44 at 1% level of significance confirm the expected negative and statistically significant level of the error correction term and thus, confirmed a long-run relationship exists in the two models in this study. In the model I, the long-run OLS estimation methods from ARDL, FMOLS, and DOLS found that population growth spurs economic growth consistently but only ARDL OLS exhibits a positive significant impact on economic growth in the long-run by 1603.12 at a 5% significant level. Importantly, all the regressors from ARDL OLS, FMOLS, and DOLS except population growth have a negative impact on GDP *per capita* growth over 1980-2019 in Nigeria. Further, the ARDL short-run dynamics found that only change in population growth causes a positive change in GDP *per capita* growth by 1129.81 at a 5% significant level, while other regressors change lead to a negative change in GDP *per capita* growth over 1980-2019 in Nigeria.

On the other hand, model II long-run regression results found that urbanization retards long-run GDP *per capita* growth from ARDL, ROLS while urbanization positively enhances long-run GDI *per capita* growth from FMOLS and DOLS methods consistently. In contrast, the urbanization rate (share of urban population to total population) has a negative and significant impact on GDP *per capita* growth over the study periods, 1980-2019 in Nigeria. Further, all regressions are consistent in signs except urbanization and urbanization rate that are not consistent in both signs

and significant levels from ARDL, LR, OLS, RMOLS, and DOLS in this study. In the short-run dynamics, the ARDL OLS result found that changes in all regressions do not significantly have a change in GDP *per capita* growth in this study. Importantly, a unit increase in urbanization (population urban growth) leads to a 35.17% decline change in the GDP *per capita* income in this study. But an increase in the share of urban population to the total population (urbanization rate) leads to a positive increase in GDP *per capita* growth by 122.12% in the short run. Therefore, the estimated OLS regression in Table 6 revealed that population growth positively and significantly enhances economic growth in the short-run and long-run while urbanization has a negative and insignificant impact on economic growth over the study periods 1980-2019 in Nigeria.

6.3.4 CAUSALITY TEST FOR POPULATION GROWTH, URBANIZATION AND ECONOMIC GROWTH IN NIGERIA (1980-2019)

Table 7. Pairwise Granger causality test (1980-2019)

Optimal Lag Length Level: 2			
Null hypothesis	F-statistics	Probability	Causal Direction
GDPPCG does not Granger cause Pop. growth	2.87*	0.07	GDPPCG→Pop. growth
Pop. growth does not Granger cause GDPPCG	4.86***	0.01	Pop. growth →GDPPCG
Urbanization does not Granger cause Pop growth	2.73*	0.08	Urbanization → Pop. growth
Pop. growth does not Granger cause Urbanization	0.65	0.53	Pop. growth ≠ Urbanization
Urbanization does not Granger cause GDPPCG	0.33	0.72	Urbanization ≠ GDPPCG
GDPPCG does not Granger cause Urbanization	0.56	0.57	GDPPCG ≠ Urbanization

Source: Authors' compilation from EViews 9 software, 2021

Note: (a) * significant at 1% level, ** significant at 5% level, and * significant at 10% level**

As shown in Table 7, the Pairwise Granger causality test found that economic growth and population growth have a bi-causal direction while Urbanization and population growth have a unicausal direction within the study periods, 1980 and 2019 in Nigeria. However, it is evident from table 7 that urbanization does not cause economic growth in this study.

7. CONCLUSION AND RECOMMENDATIONS

This paper examined the relationship among population growth, urbanization, and economic growth for the study period, 1980-2019 in Nigeria. the specific objectives of this study were to examine the impact of population growth on economic growth, as well as the impact of urbanization on economic growth, and finally, the causal direction among population growth, urbanization, and economic growth were gaps identified in the reviewed literature.

To achieve these objectives, the study employed three OLS estimation methods, ARDL, OLS, FMOLS, and DOLS to estimate both short run and long-run impacts of the first two objectives in models I and II and further, the Pairwise Granger causality test was employed to ascertain the causal direction of unicausal and bicausal directions among the main variables, population growth, urbanization, and economic growth.

The findings from the empirical results revealed that population growth has a positive and significant impact on economic growth in the short run and long run, however, Urbanization has a negative and insignificant impact on economic growth in the short run and long run over the study periods, 1980-2019 in Nigeria. Also, results from the Granger Causality test revealed that a bi-

causal direction existed between population growth and economic growth while a unicausal direction prevailed between Urbanization and economic growth within 1980-2019 in Nigeria. The results from the nexus between population growth and economic growth is in contrary to the Reverend Thomas Malthusian Population theory that increasing population growth will retards food production, implying increasing poverty but rather, the results found that population growth had stimulated GDP per Capital growth (Standard of living increasing) in Nigeria.

From the specific outcomes, the study recommends that Government policy should be directed to improve the active population growth to spur GDP per capita through a quality education system. It is also recommended that Urbanization Policy should be guided to maximize the benefits rather than the current challenges posed like increasing Urban Unemployment and decline in GDP per capita in this study. Rather, urbanization policy should promote rural-urban interdependence unlike as advocated in the dualism theory, unlike the rural-urban migration drives in most sub-Saharan African countries at the expense of the GDP per capita growth as found in Table 6 in this study.

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