

DOES URBANIZATION MATTER FOR POVERTY REDUCTION IN NIGERIA: AN EMPIRICAL EVIDENCE FROM AUTOREGRESSIVE DISTRIBUTED LAG (ARDL) ESTIMATION

Ebenezer T. Megbowon*

Department of Economic and Business Sciences, Faculty of Commerce and Administration,
Walter Sisulu University, South Africa
E-mail: megbowontoyin@gmail.com

Peter Mukarumbwa

Department of Agricultural Economics, National University of Lesotho, Lesotho
E-mail: peerta@gmail.com

Oloruntimilehin S. Ojo

Department of General Studies, Federal Polytechnic, Ado-Ekiti, Nigeria
E-mail: oloruntimilehin_oj@fedpolyado.edu.ng

Titus A. Ojeyinka

Department of Economics, Obafemi Awolowo University, Nigeria
E-mail: tojeyinka@oauife.edu.ng

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Abstract. Urbanization has been argued to be having an impact on several other development challenges. To this end, this paper aims to contribute to the empirical literature by exploring the effect of urbanization and its' magnitude on poverty, both in the short run and long run in Nigeria. The macroeconomic analysis was conducted using data from 1982 to 2017 which was obtained from the World Bank. Bound Test and autoregressive distributed-lag (ARDL) estimation techniques were used to test the existence of a cointegration relationship and to estimate the short and long-run effect of urbanization and other variables on poverty reduction. Results from the study and an economic standpoint, provide strong evidence that urbanization remains an important factor in poverty reduction in Nigeria. The analysis further shows that while international remittances have a positive and significant effect, foreign aid and government expenditure have significant negative effects on poverty reduction in the long-term period. While findings from this study suggest that urbanization remains a valid

* Corresponding author: Ebenezer T. Megbowon. *E-mail: megbowontoyin@gmail.com*
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tool in the fight against poverty, the need for sustainable urbanization policies and efforts by the Nigerian government is highly imperative.

Keywords: Urbanization; Household consumption expenditure; Poverty; ARDL; Nigeria.

JEL Classification: I30, O10, R00.

1. Introduction

The state of Nigeria's economic development over the past 15 years remains unimpressive, disheartening, and worrisome to its citizens. Economic development statistics recently released by the National Bureau of Statistics and the United Nations jointly revealed that economic development in Nigeria remains a challenge. According to the United Nations Development Report (2019), Nigeria had an HDI of 0.534 and ranked among the Low Human Developed countries (158 out of 189 countries). Similarly, Nigeria was labeled the world's poverty capital in 2019 following an estimate that about 83 million Nigerians are living below \$381.75 per year, an amount considered to be the global poverty threshold (National Bureau of Statistics, 2019). The magnitude of the poverty condition within the nation has remained a paradox as situations reveal that various Nigerian governments over the years have been unable to take advantage of their abundant human and natural resources to enhance the welfare of the Nigerians. Concerning the realization of sustainable development goals by 2030, the country is perceived to be lagging. Hence, there is a growing concern to find solutions to poverty issues in the country by identifying micro and macroeconomic factors that either stimulate or reduce the poverty situation and consequently assist in initiating targeted policy directives for poverty reduction.

Recently, discussions, debates, and matters on poverty are being directed to the urban areas contrary to the long-term conceptualization of poverty as being a rural problem. The reason for this is the massive population shift to urban areas and natural population growth in urban areas occurring across countries of the world. It has been alluded to by the World Bank (2020), that there is an increase in the fraction of people inhabiting cities across the globe. According to Figure 1, it is estimated that the share of the global population residing in the metropolis increased by 22.38 percent between 1960 and 2019. The population forecast has it that about 66 percent of the world's population would live in cities by 2050. Similarly, it has earlier been projected for Nigeria that the share of the urban population will rise by 35.59 percent between 1960 and 2019, (World Bank, 2020). As can be deduced in Figure 1, the urbanization rate is faster than the global rate. The rising urbanization rate is always accompanied by developmental problems such as insufficient economic empowerment, food scarcity, poor accommodation, poor access to clean fuels, and

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inadequate access to health and education services, all these challenges characterize more urban centers than rural areas. Despite this pessimistic view regarding urbanization, there has been an argument in favor of urbanization that it guarantees better quality of life, increased literacy, increased return to education, better employment and income, and industrial agglomeration opportunities urbanization could offer (Todaro and Smith, 2014).

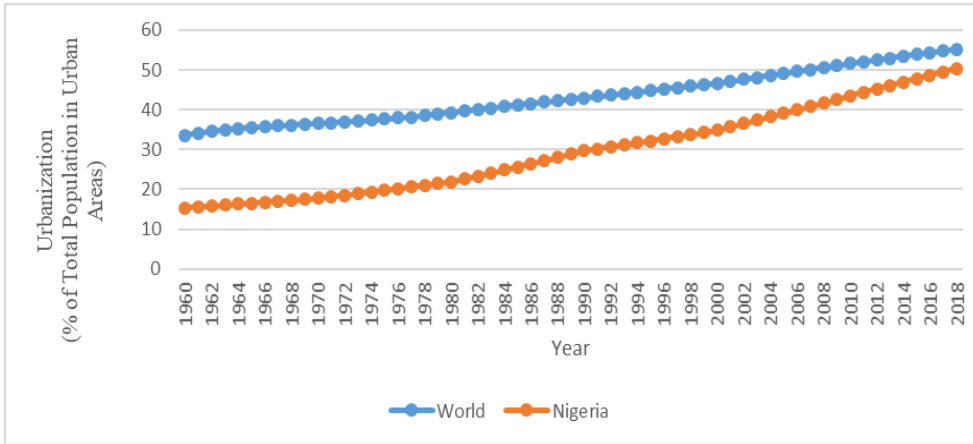


Figure 1 Trend in Urbanization in the World and Nigeria

Source: Own processing.

Thus, considering the alarming rate of urbanization in Nigeria, the study attempts to answer the question that does an increase in urbanization reduces poverty. Other sections of the paper are organized thus: Sections two and three discuss relevant literature review and provide insight on the analytical technique adopted in the study respectively, and the empirical findings are presented and discussed in the fourth section. The conclusion and implications of the results are presented in section five.

2. Urbanization and Poverty: Theory and Empirics

Urbanization is a phenomenon that is occurring in every region of the world, its intensity and effects however differ across regions. Theoretically, the place of urban population dynamics in the economic development process is embedded in the long-standing development models of Lewis (1954), Kuznets (1955), and Harris-Todaro (1970). Kuznets (1955), established the connection between social discrimination and income inequality and development, between rural and urban areas necessitated internal migration, a shift from traditional agriculture to modern economic activities. However, beyond internal rural-urban migration cause of urbanization which is often

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triggered by low agricultural productivity, low economic opportunities, and poor rural infrastructural availability and access, Barofsky et al., (2016) noted other pulling factors that stimulate and sustain rapid urbanization, to include; economic growth resulting from exploration of the natural resources, geographical location of the seat of governance, and improvement in health that have lowered mortality rate despite low birth rate which all together have increased population in urban centers. Besides the increase in urban population, urbanization is also reflected in the spatial expansion of urban space, such that rural geographical space is encroached on, overridden, reduced, and might nearly be eliminated. The resultant effect of urbanization has led to the conclusion that it is either a stimulant for poverty reduction or a deterrent, depending on how it is managed by the government of a country.

Empirically, research linking urbanization to poverty, welfare, and economic development has generally been conducted at both micro and macroeconomic levels. Shahbaz et al., (2010) applied the ARDL Bounds cointegration test and estimation technique to quantify the extent to which urbanization can impact poverty among Pakistanis. Findings from the study show that urbanization reduces poverty levels minutely in both short and long-term periods, but the effect is higher in the short-term period. Furthermore, the measurement of Urbanization influences the poverty situation of rural dwellers around Indian urban areas. Results of the instrumental variable technique employed in the study showed that poor rural dwellers living close to urban centers are positively impacted economically. This is so because of the increased demand for agricultural products by urban residents and internal remittance from the urban sector (Cali and Menon, 2013). Ha et al., (2021) applied both the static model and the dynamic panel models to find out the effects of urbanization on the poor in Vietnam and the findings revealed a negative impact of urbanization on poverty. In a comparative study between Western Balkan and the EU-27 and the estimation of random effect models, the parameter of urbanization has a positively significant coefficient, suggesting that an increase in urban population growth would stimulate economic development proxied by HDI in both study areas (Feruni et al., 2020). The size of the effect of urbanization though minute is however higher for Western Balkan (0.024) than the EU-27 (0.007).

Pham and Riedel (2019) used quarterly data that spanned from 2010-2016 for Vietnam and applied the two-stage estimating methodology with the view to finding the sectoral growth composition and urbanization impacts on the poverty-stricken in the chosen areas of study. Among other findings of the study, the urbanization rate variable exhibited a significant inverse relationship with poverty, suggesting that if urbanization rises by 1 percent, this would correspondingly cause a reduction in poverty by about 2.6 percent. The study argued that migration of the poor and labor

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force from the agricultural sector to urban areas as well as to the industrial sector resulted in significant negative urbanization effects. The result corresponds to other studies like Ngugen et al., (2020) which found urbanization to be having a very small but significant reducing effect on the poverty rate in Vietnam, having employed a fixed effect estimation technique. Arouri et al., (2017) conducted a household-level analysis of the effect of urbanization in Vietnam. Through various fixed effect model estimations conducted, the study provided evidence that suggests that urbanization increases the income of rural dwellers in Vietnam, that in turn positively impacts their consumption level by raising it. This result suggests that both rural farm income and consumption expenditure increase is sufficient to cater for household size-adjusted consumption expenditure, which eventually leads to poverty reduction. After controlling for the effect of the gross domestic product in a partial correlation estimation conducted between the urbanization rate and HDI, it was concluded that a positive correlation exists between the urbanization rate and HDI for Mongolia (Huang and Jiang, 2017). Liu et al., (2021) showed that urbanization is imperative for the human development index increase of Chinese provinces, following the finding that Chinese HDI would increase by 0.0520 percent because of a unit increase in urbanization rate.

Some researchers have submitted based on their studies' findings that urbanization can cause poverty to diminish, others, however, provided inconsistent results; such as establishing that urbanization increases poverty, or the impact of urbanization varies across time and income levels of countries. The study of Weldearegay et al., (2021) established, following an impact assessment estimation using propensity score matching (PSM) and econometric model, that the incidence, prevalence, and intensity of poverty was higher among displaced peri-urban farming households that were displaced as a result of urban expansion than households that were not displaced. Following a review of studies conducted in China, Zhang (2016) concluded that urban growth had a poverty-diminishing effect on the rural dwellers and peasants who are poor among them, but an increasing effect on urban poverty. Urbanization's influence on indices such as poverty gap, and square poverty gap among others for 143 countries for the period 1965-2005 was investigated by Martinez-Vazquez et al., (2014), estimated results not only confirmed that urbanization mitigates poverty level, the study established that an optimal threshold for urbanization that produces the expected poverty reduction outcome which when exited will make urbanization of a negative effect to poverty reduction efforts. The study further established that the different optimal level of urbanization in each region of the world affects the extent of response of neighboring rural areas' poverty to urbanization. The study by Sarpong and Bein (2021) indicates that the effect of urbanization on quality-of-life proxy by HDI differs by the level of income. This

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evidence is provided following a GMM dynamic panel regression on data from 26 SSA countries. Specifically, the finding shows that while urbanization increases the quality of life among low-income SSA countries, it reduces it among middle-income SSA.

Tripathi (2021) examined urbanization's influence on Human Development Indices for selected 187 nations using cross-sectional data spanning between 1990 and 2017 employing panel models (random effect Tobit and system GMM) from both aggregated and disaggregated perspectives. The study provided evidence that suggests that overall urbanization (comprising of the total urban populations, percentage of the urban populations, urban population growth rates, and percentage of the population living in million-plus agglomerations) has a strong positive effect on HDI. The result from disaggregated estimation by income level of countries shows that urbanization proxied by the total urban population has a positive effect on HDI in all other income-level countries except for upper-middle-income countries (Tripathi, 2021). The income level result provides a premise to conclude that the impact of urbanization on HDI depends on the stages of development of respective countries. A system-generalized method-of-moment was applied to data obtained from a panel of 98 countries by Ghak et al., (2018). The study provided evidence that the effect of urbanization differs across income categories of countries. The study showed that while the poverty gap is reduced among upper-middle-income countries, a contrary situation was found for low-income countries. This is however not unexpected because of the low wage rate and limited employment opportunities which could not accommodate migrants from rural areas. Rizk and Slimane (2018) empirically captured the effect of urbanization on poverty by using the percentage of the population living below different international poverty price thresholds (\$1.90 a day, then \$3.20 a day). The results show that the effect of urbanization differs across the international poverty thresholds. Across all the subgroups considered, urbanization significantly increases the poverty headcount by \$3.20 per day. Whereas, at \$1.90 a day poverty headcount increases irrespective of the income level (low income and lower-middle income, and upper middle income and high income). ARDL and VECM analytical techniques applied by Khan et al., (2019) for Pakistan gave mixed results. Urbanization's impact on HDI was found to be changing with the time factor. Urbanization's influence in the short run was significantly positive, however, its effect in the short run was negative and significant. Lazreg and Zouari (2018) investigated the joint impacts of FDI and Urbanization on poverty and inequality in Tunisia using data that spanned between 1985 and 2015 employing the FMOLS technique. From estimated results, the coefficient of urbanization was found to be significantly positive (11.005; $P < 0.01$) implying that a unit increase in urbanization rate lessens the poverty level by 11 units. Dhrifi et al., (2020) employed

a panel model for selected 98 developing countries using data ranging from 1995 to 2017. Among other variables examined, the effect of urbanization on poverty was positive and insignificant at the aggregate estimation level. However, disaggregated estimations for Africa, Asia, and Latin America regions indicated that urbanization influence over poverty was only significant for Africa. This reduction occurs through an increase in households' final consumption expenditure per capita. Korle et al., (2020) applied a Dynamic OLS estimation approach over data from 32 selected African countries comprising low, low middle, and high-middle-income countries from the period 1996 to 2017. Evidence from the estimate shows that a percentage increase in urbanization leads to a decrease in the human development index by about 0.081 percent. The study argued that the increase in the urban labor supply vis-a-vis a decreasing labor demand leading to low well-being usually gives rise to such situations. Empirically, it can be summarized and deduced that though urbanization does have a poverty reduction effect, the effect however depends on the income level of countries, the measure of poverty considered, and the level and component of urbanization. The income level of countries affects the ability of various governments to respond to the issue of urbanization, and the consequent effect on the welfare of the people. The probability of urbanization contributing to poverty reduction in Nigeria as a low-middle country is empirically unknown as it appears that there has not been adequate attention or little concern for it both from the government and the scholarly environment.

3. Methodology

3.1 Model Specifications and Explanation of Variables

This study posits that poverty is a function of urbanization, this is mathematically represented in the following equation (1):

$$\ln Pov_t = \alpha_0 + \alpha_1 \ln U_t + e_t \dots \dots \dots (1)$$

Hence, this study adopts an extended multivariate model specification estimation by Ha et al., (2021) likewise Shahbaz et al., (2010) who both primarily modeled urbanization influence on poverty reduction, however, based on the variables included in our model distinguished this study from earlier ones. However, empirical evidence from the literature (Musakwa and Odhiambo, 2019; Megbowon et al., 2021; Mahembe and Odhiambo, 2019; Ugwuanyi et al., 2017; Vacaflares, 2018; Inoue, 2018; Tsurai, 2018) have shown that several other macroeconomic factors have a significant relationship with and effect on poverty. Besides, to avoid errors related to bivariate modeling, a multivariate model consideration is considered. Other macroeconomic factors included in this study are; remittance (Musakwa and

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Odhiambo, 2019), government expenditure (Megbowon et al., 2021; Martins and Veiga (2014), and foreign aid (Mahembe and Odhiambo, 2019). The multivariate model specification showing the relation among variables of interest and other macroeconomic factors is expressed as follows:

$$\ln Pov_t = \alpha_0 + \alpha_1 \ln U_t + \alpha_2 \ln Rem_t + \alpha_3 \ln GE_t + \alpha_4 \ln FA_t + e_t \dots \dots \dots (2)$$

Explanation of Variables

Poverty is proxied by the per capita consumption expenditure of households which is expressed in US dollars at the 2010 constant value (Ugwuanyi et al., 2017; Magombeyi and Odhiambo, 2017), which captures expenditure poverty. Expenditure has been a good indicator for capturing welfare because it is stable over time, unlike income. It is also a reflection of achieved well-being, contrary to income which is an indicator of potential well-being. It is assumed that an increase in household final consumption expenditure per capita means a reduction in the poverty level while a reduction implies an increase in the poverty level.

Urbanization is the main independent variable of interest in this study expressed as a fraction of the urban population to the total population. Following both theoretical and empirical evidence on the effect of urbanization on welfare, which is both optimistic and pessimistic, this study posits that if the coefficient is negative, it implies that urbanization does not contribute to the mitigation of the poverty level in the country under consideration and vice versa.

International Remittance is one of the control variables used in this study, it is identified as one of the sources of international earnings, and an important source of foreign capital inflow and global development finance (Mowlaei, 2018). International remittance is defined as cross-border transfers of an amount of money from a migrant to his or her relatives, friends, and community. The effect of remittance can either be positive or negative. Musakwa and Odhiambo (2019) claimed that the remittance effect on poverty is responsive to other variables such as time, type of poverty variable employed, and characteristics of the country surveyed; thus, making it impossible to use a regional result for generalization. In this study, household final consumption expenditure is directly related to remittance, indicating a further lessening of poverty informed by an increase in household final consumption expenditure and vice-versa.

Government expenditure is captured by government size in this study which is government expenditure as a fraction of gross domestic product. The government's role in the development process cannot be overemphasized. In line with the Keynes school of thought, government spending creates job opportunities, increases productivity leading to a desirably improved income, and stimulates domestic

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demand and better welfare through spending in the social sector (health and education) and on infrastructural development (Megbowon et al., 2021). A negative association is found to exist between government spending and poverty indicating that government expenditure is influential in reducing the poverty situation in the country under consideration.

Foreign Aid is a form of international earning, fund, or financial donation given by external public or private economic agents to developing or poor countries to support their economic development process, projects, and programs to improve their citizens' welfare. Official Development Assistance and Net Official Aid are proxies for this variable. In this study, following Mahembe and Odhiambo (2019), a direct association was established between household final consumption and foreign aid, showing that foreign aid is influential in poverty reduction efforts, while an inverse relationship between foreign aid and poverty connotes inconsequential effects in foreign aid on poverty reduction.

Table 1 Summary and Definition of Variables

Variable	Definition and Measurement	Reference
Poverty-Pov	Household final consumption expenditure per capita (constant 2010 US\$)	Ugwuanyi <i>et al.</i> , (2017)
Urbanization-U	Total Urban population	Pham and Riedel (2019); Khan <i>et al.</i> , (2019)
International Remittance-REM	Migrant remittance inflows (US\$ million)	Musakwa and Odhiambo (2019)
Government expenditure- GE	Government expenditure as a percentage of GDP (%)	Martins and Veiga (2014)
Foreign Aid- FA	Net official development assistance and official aid received (constant 2015 US\$)	Mahembe and Odhiambo (2019)

NB: i) All variables are in natural logarithm form, ii) a negative coefficient is posited to imply an increase in poverty, and vice-versa.

3.2 Techniques of Estimation

Unit Root Test

In econometrics, it is often generally assumed that economic variables are not always stationary while empirical analysis with such variables leads to faulty or misleading estimations (Keorite and Moubarak, 2016), it, therefore, becomes imperative to conduct stationarity tests on variables of interest to ascertain if none of the variables are integrated beyond order two (I(2)) while expectedly dependent variable should be integrated of order one (I(1)) are conditions to be fulfilled before employing the

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ARDL model. Consequently, the Augmented Dickey-Fuller (ADF) test was applied for this purpose.

Autoregressive Distributed Lag (ARDL)

ARDL model is employed to determine the existence of a cointegration relationship among variables included in our model or not and to determine the size of the effect of both explanatory and dependent variables in the short-run and long-run respectively. This estimation technique has some advantages over other long-run cointegration test techniques and this prompted its adaption in this study. ARDL technique is programmed to allow estimations regardless of the combination of the order of integration of series in the model which should not be above an order of one. One of its advantages is its capability of estimating at the same time both short-run and long-run dynamics, often suitable for small sample sizes (Demirhan, 2020; Pesaran et al., 2001).

The mathematical representation of the ARDL model concerning the variables of interest is presented below in equation (3).

$$\begin{aligned} \Delta \ln Pov_{mt} = & \delta_0 + \sum_{i=1}^n \delta_{1i} \Delta \ln pov_{t-i} + \sum_{i=0}^n \delta_{2i} \Delta \ln U_{t-1} + \sum_{i=0}^n \delta_{3i} \Delta \ln Rem_{t-i} \\ & + \sum_{i=0}^n \delta_{4i} \Delta \ln GE_{t-i} + \sum_{i=0}^n \delta_{5i} \Delta \ln FA_{t-1} + \delta_6 \ln pov_{t-1} + \delta_7 \ln U_{t-1} \\ & + \delta_8 \ln Rem_{t-1} + \delta_9 \ln GE_{t-1} + \delta_{10} \ln FA_{t-1} + \varepsilon_{1t} \dots \dots \dots (3) \end{aligned}$$

Following the long-run equilibrium relationship test for equation (3), the short-run dynamic relationship among the dependent variable and independent variables is checked by estimating an ARDL-error correction model whose mathematical representation is expressed in equation (4) as;

$$\begin{aligned} \Delta \ln Pov_{mt} = & \delta_0 + \sum_{i=1}^n \delta_{1i} \Delta \ln Pov_{t-1} + \sum_{i=0}^n \delta_{2i} \Delta \ln U_{t-1} + \sum_{i=0}^n \delta_{3i} \Delta \ln Rem_{t-1} \\ & + \sum_{i=0}^n \delta_{4i} \Delta \ln GE_{t-1} + \sum_{i=0}^n \delta_{5i} \Delta \ln FA_{t-1} + \gamma_{1i} ECM_{t-1} + \varepsilon_{1t} \dots (4) \end{aligned}$$

Where the constant is represented with α_0 , while δ_{1i} - δ_{5i} are the independent variables short-run coefficients, \hat{I}_{-1} the error correction term is indicated by ECM and ε_i denotes the error term.

Data Source

This study utilized time series data from 1982-2017. The data used for the study was sourced online from the World Bank website.

4. Empirical Results and Discussion

Summary of Statistics

Table 2 below gives summary statistics of the variables modeled. Per capita household’s final consumption expenditure is averaged at US\$1089.92, while minimum and maximum values are \$657.4 and US\$1667.5, respectively. The mean urban population is 47.3 million people, while the minimum and maximum values are 18,109,529 and 94,518,555. On average government size (GS) and international remittance are 3.69 and US\$7435.9, respectively. The minimum value for government size is 0.91, while the maximum value is 9.45. Likewise, the maximum and minimum values attained for remittance in the country are US\$ 22001 million and US\$2 million, respectively. The average value for foreign aid is US\$1.3 billion.

Table 2 Descriptive Summary of Variables

	POV	U	GS	REM	FA
Mean	1089.915	47 377 224	3.698790	7435.889	1290000000
Median	931.0013	41 757 333	2.084226	1255.000	360000000
Maximum	1667.501	94 518 555	9.448340	22001000	11300000000
Minimum	657.3942	18 109 529	0.911235	2000000	78710000
Std. Dev.	350.1518	22494139	2.919071	9233.195	2140000000
Observations	36	36	36	36	36

Source: Computed by authors.

4.1. Order of Integration and Cointegration test results

The result of the Augmented Dickey-Fuller (ADF) unit root test result is displayed in Table 3. Results show that variables (lnPov, lnU, lnRem, lnGE, and LnFA) are integrated of an order, not above one, a condition that adequately validates the application of an ARDL-Bound long-run relationship test technique.

Table 3 Order of Integration

Variables	Augmented Dickey-Fuller				
	Level		First Difference		
<i>lnPov</i>	-1.1324	0.6918	-7.5138*	0.0000	< I(2)
<i>lnU</i>	-0.3007	0.9146	-6.2982*	0.0000	< I(2)
<i>lnRem</i>	-0.7792	0.8126	-2.6362***	0.0961	< I(2)

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<i>lnGE</i>	-1.2633	0.6354	-5.8848*	0.0000	< I(2)
<i>lnFA</i>	-1.1269	0.6933	-5.9077*	0.0000	< I(2)

Source: Computed by authors.

The long-run relationship among variables, using the ARDL-Bound test, was established through F-statistics and critical values comparison. However, prior to checking the existence of cointegration or not, the optimal lag order is determined. Consequently, the SIC was employed to determine the optimal lag length for the model, and this is indicated to be ARDL (1,4,2,4,1). The result of the ARDL-Bound test for the model in equation (3) is presented in Table 4. The result shows clearly that the F-statistic of 7.25 is higher than all upper bound critical values at 1 percent, 2.5 percent, 5 percent, and 10 percent levels of significance respectively. This result confirms that there is the existence of a long-run relationship among the variables.

Table 4 Result of ARDL-Bound Test of Long-run Relationship

Test Statistic	Value	Significance	I(0) Bound	I(1) Bound	Decision
Model 1					
F-Statistic	7.25	10%	2.2	3.09	Cointegration
K	4	5 %	2.56	3.49	Exist
		2.5 %	2.88	3.87	
		1 %	3.29	4.37	

Source: Computed by authors.

4.2. Short and long-run estimation results

Table 5 presents the result of the estimated short and long-run effects of urbanization and other variables considered on poverty. The establishment of the existence of a cointegration relationship through the Bound test validated the decision to conduct short-run and long-run estimations. The short-run coefficients are obtained from the ECM specification. From Table 5, the error correction term (ECT) of -0.81, indicates that a shock to the model in Equation (2) would result in a large convergence to equilibrium, with about 81 percent of adjustment occurring in the first year.

Urbanization which is the main variable of interest has a positive and statistically significant coefficient value irrespective of time. It suggests that a 1 percent increase in urbanization rate would lead to about a 14.6 percent decrease in poverty which could also increase to about a 68.5 percent decrease in poverty after a third-year lag period. However, the poverty reduction potential of urbanization is reduced to about 1.18 percent after a longer period of time. This result is consistent with Pham and Riedel (2019) for Vietnam, Ghak et al., (2018) for upper-middle and low-income countries, Shahbaz et al., (2010) for Pakistan, Martinez-Vazquez et al., (2014) for

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143 countries, all studies establishing reducing effect of urbanization on poverty reduction outcome. Equally, the magnitude of the effect of urbanization on poverty in Nigeria in the short run as revealed in this study is very much higher than other studies considered for Pakistan and Vietnam (Pham and Riedel, 2019; Khan et al., 2019; Shahbaz et al., 2010). This result is explained by the increased likelihood of getting economically engaged in urban areas than in rural areas. Urban areas offer a wider range of employment opportunities within an underemployed, self-employment conditions or otherwise that provide income on which several individuals could survive on. Furthermore, there are opportunities for skill acquirement and upgrading in the urban area that could aid labor force participation.

Table 5 Short-run and Long-run Coefficient Estimates Short-run Estimate (ARDL 1,4,2,4,1)

Variables	Coefficients	Standard Err	Prob.
$\Delta(\ln U)$	14.602**	6.257	0.034
$\Delta(\ln U(-1))$	13.550	9.319	0.167
$\Delta(\ln U(-2))$	-5.327	9.429	0.580
$\Delta(\ln U(-3))$	68.519*	11.643	0.000
$\Delta(\ln Rem)$	0.039	0.031	0.233
$\Delta(\ln Rem(-1))$	0.112*	0.024	0.000
$D(\ln Rem(-2))$			
$\Delta(\ln GE)$	-0.312*	0.052	0.000
$\Delta(\ln GE(-1))$	0.113**	0.044	0.021
$\Delta(\ln GE(-2))$	0.046	0.046	0.334
$\Delta(\ln GE(-3))$	0.392*	0.057	0.000
$\Delta(\ln FA)$	-0.022	0.038	0.567
<i>Ect (CointEq(-1)*)</i>	-0.813*	0.1067	0.000
Long-run Estimate			
C	-14.363*	4.369	0.005
<i>LnU</i>	1.184*	0.282	0.001
<i>LnRem</i>	0.223*	0.052	0.001
<i>LnGE</i>	-0.513*	0.146	0.003
<i>LnFA</i>	-0.292*	0.085	0.004
R-squared	0.838		
Adjusted R-squared	0.749		
Durbin-Watson stat	1.896		

Source: Computed by authors.

*, **, *** indicate significance at 1 percent, 5 percent, and 10 percent.

Remittance is positive and statistically significant on poverty in both the short run and long run. This means that remittances are poverty reduction enhancing in both

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the short-run and long-run in Nigeria as a result of an increase in household consumption expenditure. This result is similar to the findings from Masron and Subramaniam (2018), Vacaflores (2018), Inoue (2018), and Tsaurai (2018) who found that remittance inflows are more helpful in alleviating poverty in developing countries, Asian and Pacific countries, Sub-Saharan Africa respectively. This is expected following the theoretical consideration that migrants' remittances are often channeled towards economically productive businesses or investments, real estate, smoothing household expenditures, and human capital investment that could have a trickledown effect of poverty reduction and eventually improve welfare.

The government expenditure variable coefficient is statistically significant though negative in the short run. The negative suggests that an increase in government expenditure reduces consumption expenditure and thus increases poverty. This could mean that money expended on poverty is being diverted to non-productive ventures. It may also be because of the high level of corruption among public officials in Nigeria. As a result, *ceteris paribus*, a 1 percent increase in government expenditure would increase the poverty level by about 0.31 percent in the short run. The findings also show that the first and third-time lags of government expenditure are positive and statistically significant at 1 percent and 5 percent levels in the short term, respectively. This indicates that a percentage change in the previous levels of government expenditure is associated with about 0.11 and 0.39 percent increase in the current level of household consumption expenditure, *ceteris paribus*. Consequently, the poverty level is reduced. In the long run, however, the effect of government spending on poverty reduction is negative (-0.5129) and significant ($p < 0.01$), meaning that government spending has a reduction effect on household consumption expenditure. This shows that over a longer period, a one percent increase in government spending will reduce household consumption expenditure by about 0.51 percent, in this case, poverty reduction is not enhanced in Nigeria. Generally, the scenario of the inability of increased government expenditure to stimulate household expenditure arises due to unfavorable fiscal (taxation) and monetary (inflation) policies and corruption that crowd out the potential effect of increased government expenditure.

The result also shows that the coefficient of foreign aid is negative in both the short-run and long-run periods but it is statistically significant only in the long run (-0.2917) at 1 percent. The coefficient value of -0.2917 implies that when other variables are held constant, a one percent increase in foreign aid to Nigeria will lead to about a 0.29 percent reduction in household consumption expenditure, which consequently leads to an increase in the poverty situation in the country. Though this finding is contrary to the *a priori* expectation of this study, it is however consistent with empirical findings of some existing studies (Anetor et al., 2020; Ugwuanyi et

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al., 2017) that noted that foreign aid has a negative or no impact on poverty reduction. Corruption and the diversion of foreign aid funds to non-welfare promoting channels and economic activities provide a possible explanation for this result.

The reliability of the model used in the study is established through post-estimation diagnostic tests that were conducted, these are presented in Table 6. The Jarque-Bera normality test value of 1.7(0.4) supports the rejection of the null hypothesis that the estimated residual series are not normally distributed. The rejection of the problem of serial correlation is established by the Breusch–Godfrey serial correlation LM test of 1.46(0.267). The value of the Breusch-Pagan-Godfrey test for heteroskedasticity of 0.617(0.8262) shows that the residual series does not suffer from heteroscedasticity. Additionally, the CUSUM and CUSUM of squares graphs in Figure II point to the stability of the parameters and model used in the study. These post-estimation diagnostics results imply that the model estimated passed the necessary post-estimation tests and thus confirm the reliability and stability of the findings.

Table 6 Model Post-Estimation Diagnostics

Diagnosics Test	
Jarque-Bera Test for Normality (Prob)	1.711(0.425)
Breusch-Godfrey Serial Correlation LM Test	F-Statistic: 1.46 Prob. F (2,13): 0.267
Breusch-Pagan-Godfrey test for heteroscedasticity	F-Statistic: 0.617 Prob. F (16,15): 0.8262

Source: Computed by Authors.

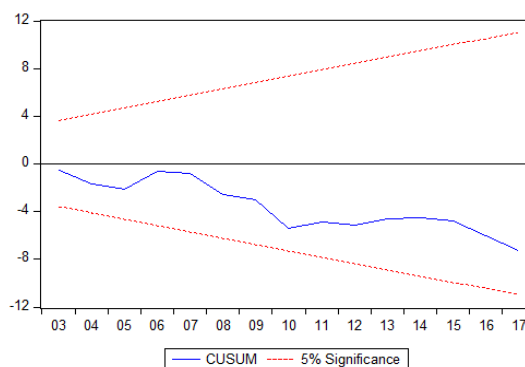
5. Conclusions and Implication

Eradication of extreme poverty for all people everywhere by 2030 is one of the main targets of the recently adopted SDGs. Population shifts towards urban areas raise concern and debate around urbanization being that while urbanization is a challenge itself, it could also be a solution to other development challenges, it could be a stimulant for poverty reduction or otherwise. This paper investigates the effect of urbanization on poverty reduction in Nigeria within a multivariate framework that includes international remittance, government expenditure, and foreign aid. The ARDL method was applied to data obtained between 1982 and 2018 to study the cointegration relationship and long-run and short-run effects of urbanization. The result from this study shows that the effect of urbanization on poverty reduction is positive and the largest among other variables examined in the model. The analysis further shows that while international remittance has a positive and significant effect, foreign aid and government expenditure have a significant negative effect on poverty reduction in the long-term period. The large magnitude of the effect of urbanization

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on poverty reduction in this study especially in the short-term period provides strong evidence that urbanization remains central to poverty reduction in the country, and this is achieved through increased consumption expenditure. This finding stimulates the imperativeness for sustainable urbanization strategies and policies that will cater to the increasing urbanization rate and that will have a positive impact on other interwoven urban issues like housing, sanitation, transportation, security, and clean energy access among other things. There is a need for the government of Nigeria at all levels to make adequate and recurrent plans for the continuous urban sprawl such that urban growth would correlate with needed vibrant and economically productive cities that will enable desired growth and improved welfare. This further have implication for indispensable rural development. Hypothetically, this effect of urbanization shows that if the trend is sustained, rural sector space, economics, and social life in the country could be entirely encroached upon and eroded due aging of the few senior citizens left behind and by various dynamic urban and modern forces. With a massive urbanization growth rate but non-protection of the rural sector, the rural sectors become incapacitated from being an indispensable provider of food and raw materials for the modern and industrialized urban society. There is therefore a need to initiate policies that will decongest urban areas. This could be achieved by promoting countryside living for urban workers through financial inducement and an efficient transport system, initiating policies that will encourage and stimulate the development of both small-scale and medium-sized industries in rural areas e.g. tax holidays, financial subsidies, and a reorientation of economic activities, social investments and integrated development towards rural areas in order to create an appropriate rural-urban economic balance. In conclusion, sustainable urbanization policies and integrated rural development strategies are imperative amidst increasing urbanization in Nigeria.



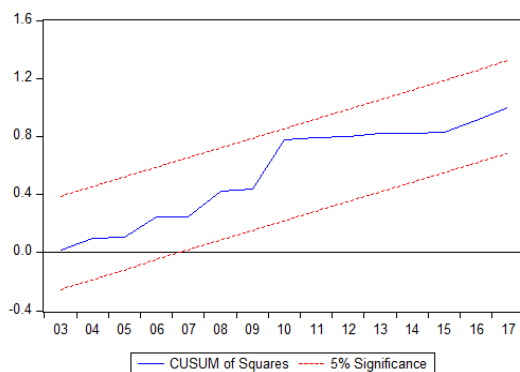


Figure 2 Stability Test: CUSUM and CUSUM Squares

Source: Computed by authors.

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Conceptualization: Megbowon; methodology: Megbowon and Ojeyinka; formal analysis: Megbowon and Ojeyinka; writing and original draft preparation: Megbowon, Makarumbwa, Ojo, Ojeyinka; review and editing: Megbowon, Makarumbwa, Ojo, Ojeyinka; validation: Megbowon, Mukarumbwa, Ojo, and Ojeyinka; resources: Megbowon, Makarumbwa, Ojo, Ojeyinka.

Disclosure Statement

The authors have no competing financial, professional, or personal interests from other parties. The authors declare no conflict of interest.

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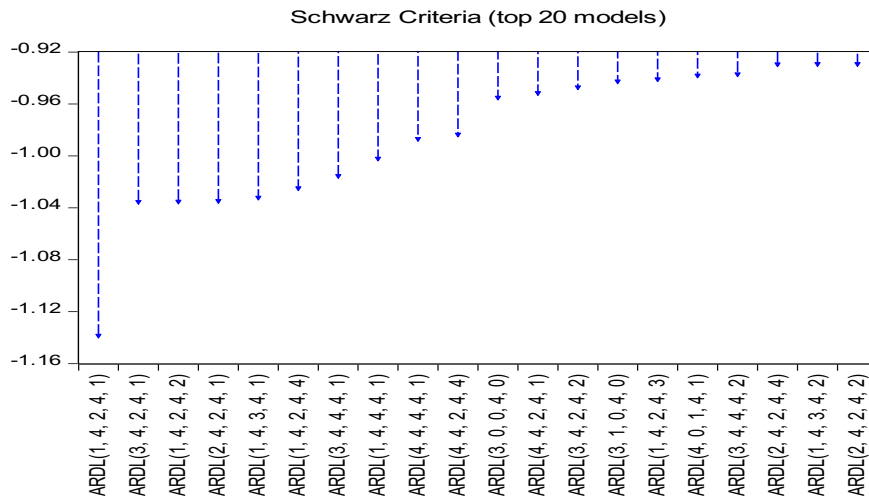
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Appendix: Lag Selection Criteria



Source: Computed by authors.