



## INTERNATIONAL REMITTANCES AND POVERTY REDUCTION IN NIGERIA

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### Abstract

The increase in migration by Nigerians and surge in amount remitted by citizens of the country living abroad make it imperative to study how funds remitted by migrants have affected poverty in Nigeria. Using time series data on poverty incidence, inward and outward remittances, ODA and technical cooperation grants in Nigeria and applying the ARDL method in analyzing the data, the result indicates that: inward and outward remittances have diverse effects on poverty reduction in Nigeria in the short run. Also in the short run, inward remittances impact was significant while outward remittance was not. ODA and technical cooperation grants also have conflicting effect on poverty in the short run. In the long run, inward remittances stimulated poverty while outward remittances, ODA and technical cooperation grants all reduced poverty incidence in Nigeria given their negative coefficients. All the explanatory variables were insignificant in the long run. This implies that their impacts were not significant. Based on this result, the study recommends: investment in foreign countries in order to diversify the income source of the economy, creation of conditions that will enhance inflow of grants and reductions of bottlenecks for inflows of foreign funds as possible ways of reducing poverty in Nigeria.

**Key Words:** Poverty, inward remittances, outward remittances, development assistance, technical cooperation grants.

### 1. Introduction

In developing countries, there have been increasing attention on remittances as critical sources of foreign exchange earnings for their economies and income for households. In relation to the proportion of labour migration as advocated in the New Economics of Labour Migration (NELM), the amount of international remittances flows has increased substantially in recent times. For instance, the World Bank (2013) reported that foreign remittances constituted the single largest source of external fund, surpassing export earnings, foreign direct investments (FDI) and other types of private capital flows. Also the practice of remitting money by migrants to their countries of origin has continued to rise in pace and magnitude at national, regional and international levels. The official flows of remittances for developing countries as reported by the World Bank (2014) increased from US\$200 billion in 2003 to US\$404 billion in 2013. The

World Bank also reported that remittance inflows to sub-Saharan Africa increased to about US\$18.6 billion constituting about 3.7 percent of the gross domestic product (GDP).

From both theoretical and empirical views, remittances have been identified to have impacts on the economy through their effects on growth and development. Remittances provide opportunities for poverty alleviation through increase in the recipients' income and standard of living (Adams and Page, 2005; Siddiqui and Kemal, 2006 and Gupta, Paltiel and Wagh, 2009). Similarly, Iheke (2012) remarked that international remittances are very important for reductions in poverty and inequality as well as overall development. Other channels through which remittances influence macroeconomic outcomes are through their impacts on economy wide aggregate, especially output, exchange rate human capital amongst others.

Hnatkouska and Louyza (2003) and Chaimi et al. (2009) argued that constant inflows of remittances reduce macroeconomic shocks, especially volatility in output. This enhances rapid growth of the economy. More so, Ratha, Mohapatra and Silwal (2009) remarked that remittances are important for the development of the financial sector which help in reducing credit constraints for investment purposes and in turn stimulates rapid economic growth. Furthermore, remittances inflows also cause the domestic currency of the recipient country to appreciate. This appreciation in the exchange rate is perceived by Acosta, Lartey and Mandelman (2007) as growth-retarding. The net effects of remittances on human capital as identified in existing literature are mixed. On one hand, remittances are expected to boost human capital formation through the investment of the remitted funds on education. This tends to increase employment opportunities and in turn reduce poverty. However, skill shortages and fall in net stock of human capital on the other hand, are the obvious negative outcomes of labour emigration in the remittance recipient countries. These controversies on the macroeconomic impacts of remittances have among others remained the major source of surge in the literature on the economics of remittances in the recipient countries.

It is noteworthy that over the years, Nigeria has remained outstanding in terms of inflows of remittances at both regional and global levels but has not really utilize it as a major sources of foreign exchange. For instance, Hernandez-Coss and Bun (2006) opined that Nigeria is the highest recipient of remittances in the sub-Saharan Africa as the country accounts for approximately 65 percent of the officially remitted funds in the region and 2 percent at the global level. Similarly, Iheke (2012) remarked that Nigeria received nearly US\$2.26 billion remittances in 2004. According to the World Bank (2008), about twenty million Nigerians in the diaspora remitted about US\$7 billion in 2008.

Despite the huge income remitted to Nigeria by her nationals oversea, it is worrisome to the country still faces tremendous challenges in addressing the problems of poverty and inequality as well as stimulating the growth potentials of the domestic economy. Unarguably, the macroeconomic impacts of remittances are mostly captured through economic growth and socio-economic indicators, especially poverty reduction and fall in inequality amongst others. Whilst these macroeconomic impacts of remittances have received considerable attention in other countries, the effects of remittances at various levels in Nigeria seem not to be adequately explored even as numerous reports and empirical evidence indicate that Nigeria surpasses other countries in Africa in terms of inflows of remittances. It is in light of these scenarios that this paper seeks to examine the effect of international remittances on poverty reduction in Nigeria.

## **2. Literature review**

Scholars have explored motives behind movement of persons across national borders and remittances by migrants. The views of these scholars are examined under the theoretical underpinning for movement of persons and remittances and case studies. Theoretically, the Neo-classical theory of migration pioneered by Hicks (1932) and expanded by Lewis (1954) and Harris and Todaro (1970) explained international labor migration in the light of economic development. According to the theory, the decision to migrate is solely a function of the migrant welfare and not the social welfare of the migrant's household. From the macroeconomic stance, the neo-classical economic theory argues that real wage differences among different economies are the driving force of migration and flow of capital (Lewis, 1954).

The development lists position on migration and remittances championed by Todaro (1969) is in consonance with the argument of the remittance-optimist school which posits that migration is an important agent of change and innovation. For instance, Englama (2009) argued that developing economies encouraged emigration as it is perceived as engine of national development and migrants are described as change agents, innovators and inventors. Again, it is expected that labor migrants would re-invest their earnings substantially in enterprises in their home economies to boost rapid economic growth and development.

Based on the neo-classical theory and developmental view on migration, Lucas and Stark developed three motives behind migrants' remittances. Lucas and Stark (1985), in their pure altruism motive argued that the basis for remitting money is based on the selfless and concern of migrants to support their households in their home country. The proponents of pure altruism are of the view that the drive for migrants to remit money is the care they have for their households and the decision to provide them with additional income. According to Lucas and Stark, migrants optimize their social welfare by remitting funds because they are concerned about the welfare and consumption behavior of their household.

The self-interest motive also by Lucas and Stark (1985) assumes that the tendency to remit is purely based on selfish motivations. The first motivation is the ambition to inherit property in the home country of the migrant. With this motivation, the money is sent home with intentions of using it for investments in the current period, which the migrant can inherit in the future. The second motivation is related to the intention of investing in the home area with the remitted money and that the family will maintain the property until the period the migrant returns. The last one is based on making the transition home easier for the migrant so the remitted money is used to invest in either fixed capital such as real estate or livestock, in public assets such as political influence, or in social assets (Lucas and Stark, 1985). According to Vargas-Silva and Huang (2006), some emigrants send money to their home countries with the intent of returning home in the future and can equally enjoy the gratitude of family members for sending some money home while working in the diaspora.

The theory of tempered altruism proposed by Lukas and Start (1985), assumes that remittances are mutually beneficial to a migrant and the family members he/she left behind in the country of origin. This mutually beneficial arrangement is mainly characterized by both investment and risk motives. According to Van-Dalen et al, (2005), remittances are perceived as a repayment package embarked upon by a migrant with the core objective of repaying the fund invested by the household in his/her education

Though the three motives discussed above attempted to explain why people remit funds to their home countries, however, it should be noted that the ability of a migrant to remit fund to

his/her home country depends on the natural, legal and macroeconomic environments both in the host and home countries of the migrants. For instance, the legal provision in the host country determine the volume of fund to be remitted by a migrant. Also, the macroeconomic environment, tax laws, skills/earning capacity of the migrant, among other factors also determine the frequency and volume of funds that could be remitted and how such funds may affect the wellbeing of the people in particular and the economy at large.

Empirical studies also abound on the relationship between remittances and the performance of an economy with emphasis on poverty alleviation in countries of the world. For instance, Zieseemer (2007) studied the relationship between funds remitted and economic growth through the physical and human capital links using the Generalized method of moment with heteroscedasticity correlation (GMM-HAC), investigating the implications of gross national product as share of gross domestic product, savings as share of GDP interest rate, gross capital formation as a ratio of GDP, primary school enrolment, literacy and remittances as a ratio of GDP on gross domestic product per capita, they discovered from their results that countries with per capita income below 1200 USD gained more from funds remitted in the long run because they have the largest impact of remittances on savings.

In the study by Yadav (2006) in which both the descriptive and simple analytical approaches drawing inferences from data and literature were used to investigate the contributions of funds remitted by citizens of Nepal compared to FDI and grants on its economic development, the findings from the study indicated that remitted funds by the nationals of Nepal living abroad and grants had serious implications on foreign exchange earnings in the country. The study further found that remitted funds could be a reliable source of national income and economic growth if jobs are guaranteed for workers with the wage level equal to the nationals in their host countries.

Jongwanich (2007) explored the simultaneous effects of remittances on economic growth and poverty level in both Asia and the Pacific economies from 1993 to 2003. Employing the Generalized Methods of Moment (GMM) and the results show strong evidence that remittances have a significant effect on poverty reduction in the region. However, the impact of remittances on economic growth was marginal. The result reveals that the channels through which remittances influence poverty reduction are through increased income, consumption smoothing and easing capital constraints while the effects on economic growth are mainly mirrored through domestic capital and human capita development. Based on the findings, the study concludes that while remittances could have a significant impact on poverty reduction, governments in both countries- resident and home countries should aim to sharpen the impacts of such international flows, especially with a focus on the welfare of the poor.

Olowa and Adebayo (2012) studied the effect of remittances on inequality in rural Nigeria using the Nigeria Living standard survey elicited in 2004 by National Bureau of Statistics. The study segmented income inequality in rural Nigeria using the Gini-decomposition and regression-based methodologies to capture the impact of remittance on income inequality in rural Nigeria. It was evident from the empirical analysis that domestic remittances tend the potentially reduce income inequality than international remittances. Another finding associated with the study is that the level of educational attainment is linked to poor domestic remittances and higher foreign remittances. It is evident in the result that rising education levels increases inequality through domestic remittances and contracts inequality via foreign remittances.

Fonta et al. (2011) critically explored the link between remittance inflows, poverty and income inequality in Nigeria. The study employed poverty and Gini decomposable techniques for the

empirical analysis. The study finds evidence to support the claim that remittances and household poverty are indirectly related in the sampled geopolitical zones. Additionally, the result of the Gini decomposition reveals that increase in remittances produces more robust result in urban than in rural area with regard to reduction in inequality. The study however recommended for the provision of policy actions that will enhance the opportunities for inflows of remittances.

OkoduaEwetan and Urhie (2015) appraised the connection between remittance expenditure patterns and human development implications in migrant sending communities of Nigeria. The study specifically investigates the extent to which human development outcomes in migrant sending communities of Nigeria is related with remittance expenditure patterns in the economy. Evidence from World Bank Migration and Remittances Household Surveys for the period 2009/2010 indicated that the remittance expenditure patterns across the economy seem not to vary for the period investigated. The study therefore recommends for the channeling of household remittance receipts into higher productive activities like human capital development.

Gonzalez-Konig and Wodon (2005) studied the effect of remittances on inequality in Honduras using the decomposition method. They first developed a simple model to show that remittances are more unequalizing or less equalizing in low income areas than in high income areas. The study utilized nationally representative data for the empirical analysis and discovered that remittances on the margin increases inequality at national level whereas clear disparity exists between rural and urban areas. In rural areas where income is low, remittances widens the income gap and by extension increases inequality, but in urban areas where income is relatively higher, remittances seems to reduce equality.

In analyzing the effect of remittances on poverty, Adelman and Taylor (1990) discovered in their study that each dollar remitted by Mexican migrants stimulates the Mexican GNP by about 3 dollars. In a similar study Duran, Parrado and Massey (1996) observed that an increase in funds sent by 2 billion dollars increased growth in output by 6.5 billion dollars. The results are however different in cross-sectional studies. For instance, Stark and Lucas (1988) in their study found a positive relation between remittances and growth in the home countries, however, in a similar study, Chami and al. (2003) found that remittances have a negative effect on the supply of labour by households. They also reported that if remittances are specifically used to fund basic consumption, they tend to reduced poverty even if their effect on economic growth is marginal.

In a study by Wallsten and Clarke (2003), they examined the extent remittances enhance households to insure against the environmental shocks. Using cross sectional data from Jamaican households, they analyzed how remittances provided a soft ground for the effect of hurricane Gilbert in 1988. Their result indicated that remittances provided an insurance role against natural disasters, but only partly. That is remittances increase by 25 percent for every additional dollar of damages.

In a related study by Yang and Choi (2006) in which they analyzed if the uncertainty sharing allowed by the flow of remittances is adequate or otherwise and also on how funds remitted by migrants of Philippine origin interact with the shocks of revenue in Philippines families. Their findings indicated that for every household which a member has migrated, remittances can cushion for 60 percent of the local income losses. Mishra (2005) study revealed that funds remitted to the Caribbean appeared to rise after an unfavourable shock of product, but with little delay. According to the author, a decline of GDP by 1 percent may occur two years after by a rise of remitted funds by 3 percent.

Adams and Page (2005) used cross sectional data from 71 developing economies to study how international remittances affect poverty in these countries. Their result indicated that remittances reduced the level, depth, and severity of poverty in the developing countries significantly. Using cross sectional data from 24 Asian and Pacific countries. Imai et al. (2014) also carried out a

study to determine the impact of remitted funds on the growth of GDP per capita. Their result indicated that remittances conform with both theoretical and empirical expectation by having positive impact on economic growth and poverty reduction.

In another study by Anyanwu and Erhijakpor (2010) in which they used panel data to analyzed the impact of international remittances on poverty reduction in African countries over the period 1990 - 2005. Their result indicated that remitted funds have strong implication on reducing poverty in Africa.

Using micro data from 1782 families, Taylor et al.(2005) examined the nexus between international remittances and poverty and inequality in 14 Mexican states. Their findings indicated that as the number of migrants increases, remittances from foreign migrants are very significant and effective in minimizing poverty.

Semyonov and Gorodzeisky (2008) also used data from 2346 families from 1990 – 2000 to study the effect of funds remitted by Filipino working in foreign countries affect the income and living standard of families in the Philippines. Their findings indicated that remitted funds from citizens working in foreign countries are used mostly for household consumption and to train family members in school. Their findings further show that there exist an income and living standard gaps between family members in home and host countries of migrants which may widen the degree of income inequality among family members in Philippines.

Hein's (2005) used the survey approach to study the relationship between remittances and living condition of households in home country. The result of the study revealed that money sent by migrants did not actually account for an improvement in the welfare in migrants' home countries as a result of unfavourable investment climate and strict immigration laws which most time disrupt circular migration patterns and constitute a bulwark to the realization of the full development potential of migrants.

Azamand Gubert (2006) studied the household effect of migration and remittances in Africa. Using cross sectional data, they concluded that: movement of persons from Africa is viewed as a decision collectively made by household, thus it is seen as a means of diversifying the household's income sources required for assisting the household's consumption. The authors also found that remitted funds by migrants have potential of causing some moral hazard problems in Africa. To the authors, family members in home countries (Africa) tend to be less interested in working with a lower salary compared to those family members living oversea because they feel that migrant's family members will fill their income gap through remitted funds.

World Bank (2006) in its International Migration and Development Research Program investigated how remittances affect poverty and the living conditions of the migrants' home countries. The research reported that the level and incidence of poverty could be eradicated through international remittances. The report shows that a 10 percent rise in remitted funds could account for a 3.5% fall in the proportion of poor people. The report however, noted that poor countries tend to receive less remittances because they may not be able to produce many foreign migrants hence will receive less remittances compare to rich countries.

Papanek (1972) in his study on the effect of foreign assistance and growth reported a relatively weak and negative relationship between foreign assistance and growth. This implies that foreign assistance stimulated poverty. Subsequent studies by Lockwood (1990), Duc (2006) and Malik (2008) also found that development assistance retarded economic growth and increased poverty. Though the authors reported a positive relationship between development assistance and growth in the short run which implies that it can reduced poverty, the negative relationship between development assistance and growth in the long run suggests that the long-run negative impacts greatly overshadow most short-term benefits of development assistance.

The above review revealed that a lot of studies have been done on the relationship/effect of remittances on poverty. The studies examined the effect of remittances on both household and the national economies of countries hence both micro and macro data were used. Also most of the studies consulted employed panel analysis and were done outside Nigeria. This appears to support the claim that policy makers and scholars in Nigeria give less attention to the gains of international migration and remittances in the development of the country. Given that more than 5 million Nigerians are currently living outside the shore of the country as established by the UNDP statistics of 2015, it is necessary we examine how funds remitted to Nigeria by her citizens living abroad have affected poverty and improve the living conditions of household members in the country.

### **3. Methodology**

Katz and Stark (1986) argued that decision making is crucial role of the household hence migration by a household member is necessary when it enhances the minimization of total household risk through diversification of sources of financial earnings. Thus stark and Bloom (1985) posited that an exchange of intention to share income provides coinsurance for both migrant and non-migrants household members. Thus migration of a household member is viewed as a veritable tool of not just providing an alternative source of income but also to increase household income capacity which will help increase consumption and alleviate poverty. Chenery and Strout (1966) in their The Two-Gap model argued that developing countries are faced with low level of savings due to low level of income. This leads to the savings-investment gap. To close the gap in income and savings-investment an additional earnings is required. Remittances by household members provide additional income to household members in home countries hence help improve their welfare via increase in consumption and household investment. This help to reduce the depth and incidence of poverty both at the family and national levels. Given this theoretical relationship and link, we specific a model that relate poverty reduction to remittances, official development assistance and technical cooperation grant in a model or functional relationship thus:

$$POV = f(ORT, IRT, ODA, TCG)$$

1

The above equation was further expressed in mathematical form below to enhance estimation. We also introduced the error term  $U_t$  to capture those variables that influence poverty but are not specified in equation 1.

$$POV_t = \delta_0 + \delta_1 IRT_t + \delta_2 ORT_t + \delta_3 ODA_t + \delta_4 TCG_t + U_t$$

2

Where:  $POV_t$  = poverty headcount,  $IRT_t$  = inward remittances,  $ORT_t$  = outward remittances,  $ODA_t$  = official development assistance,  $TCG_t$  = technical cooperation grants,  $\delta_0$  = autonomous component of poverty,  $\delta_1 - \delta_4$  = coefficients of the explanatory variables and  $U_t$  = disturbance term.

### **4. Results**

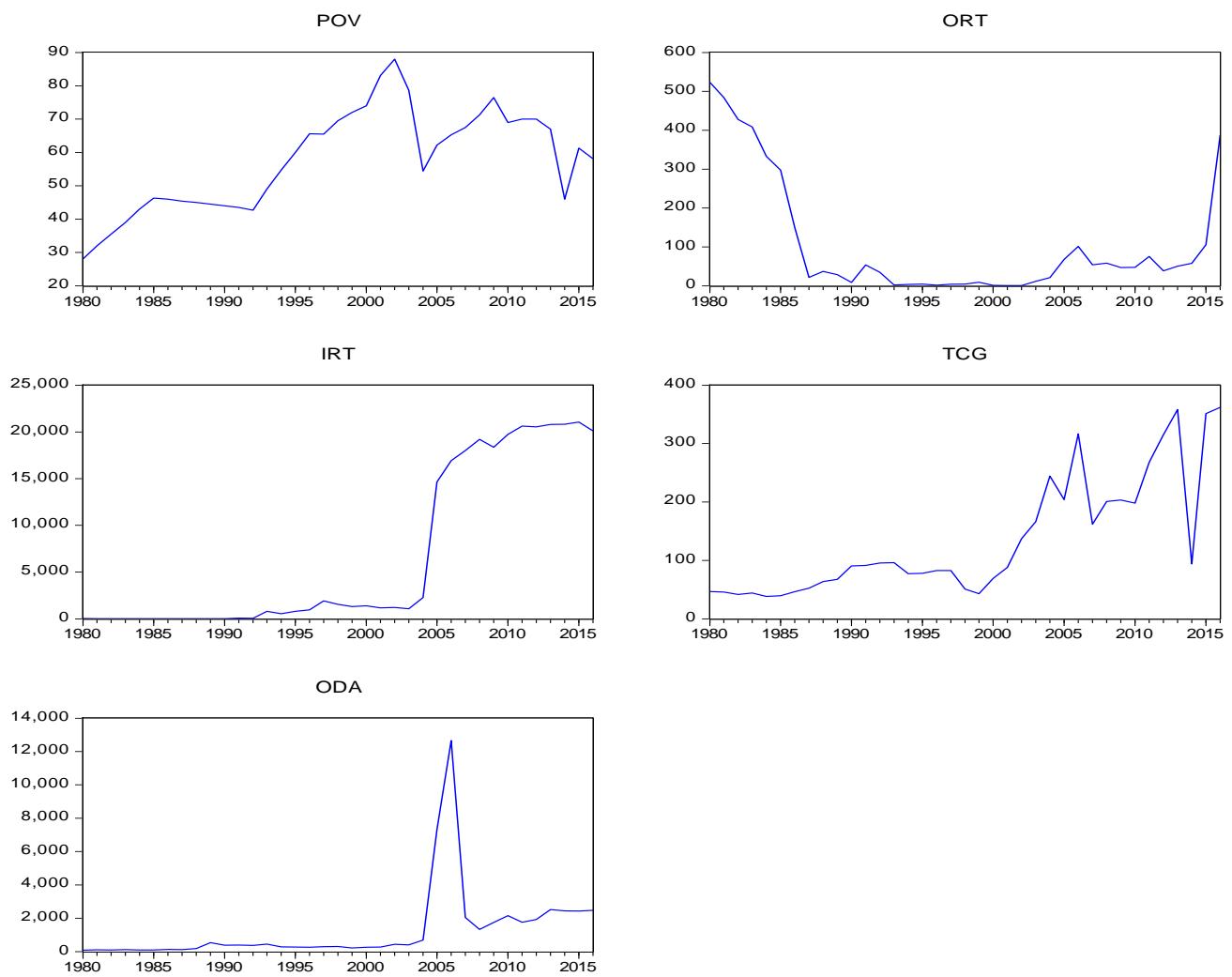
We started the analysis of data by examining the behavior of the data using descriptive statistics and graph. This analysis provided a picture of the trend in the variables.

**Table 1. Descriptive statistics**

Statistic	POV	IRT	ORT	ODA	TCG
Mean	57.65	6276.50	99.38	1253.37	129.19
Median	60.67	1114.70	42.87	372.51	89.29
Maximum	88.00	21060.21	523.06	12665.80	358.34
Minimum	28.10	2.00	0.59	82.10	38.23
Std. Dev.	15.28	8753.19	149.42	2381.13	96.89
Skewness	-0.02	0.88	1.78	3.63	1.09
Kurtosis	1.99	1.84	4.75	16.77	2.96
Jarque-Bera	1.51	6.61	23.69	363.64	7.17
Probability	0.47	0.04	0.00	0.00	0.03
Sum	2075.49	225953.80	3577.61	45121.18	4650.86
Sum Sq. Dev.	8174.56	2.68E+09	781424.2	1.98E+08	328539.1
Observations	36	36	36	36	36

The result in Table 1, shows that poverty headcount was 57.65 percent on an average, inward remittance was \$99.38billion on an average, outward remittance had an average of \$6276.50 billion, Official Development Assistance grew to an average of \$1253.37 billion while technical corporate grant over the period in Nigeria was \$129.19 billion on an average. Poverty levelgrew to a maximum of 88 percent, outward remittances grew to a peak value of \$523.06 billion, inward remittance has maximum value of \$21060.21 billion while technical cooperation grants and official development assistance have maximum values of \$358.3 billion and \$12665.80 respectively in Nigeria during the period under review. The result also indicates that poverty declined to a minimum rate of 28.10 percent, outward remittance declined to a minimum \$0.59 billion, inward remittance declined to \$2.0 billion, official development assistance declined to \$82.10 billion while technical cooperation grants dropped to \$38.2 billion in Nigeria over the period under investigation. Poverty has standard deviation of 15.28 percent, outward remittances has standard deviation of \$149.42 billion, inward remittances standard deviation was \$8753.19 billion, official development assistance has standard deviation of \$2381.13 while technical cooperation grant standard deviation was \$96.89 billion. The descriptive statistics shows that standard deviation was high in inward remittances, outward remittances and official development assistance while poverty level and technical cooperation grants have low standard deviation. This implies that poverty level and technical cooperation grants have consistent trend over the period.

Figure 1 indicates that poverty level, inward remittance and technical cooperation grants have increasing trend whereas outward remittances has a decreasing trend in the early period of the study but increased from the year 2000. ODA rise slowly during the period but has a sharp increase between 2004 – 2006 before a decline in 2008 and marginal increase again. This revealed that inward remittances and poverty have been increasing while outward remittance has been fluctuating in Nigeria



**Figure 1. Trend in Poverty, inward remittances, outward remittances, technical cooperation grants and official development assistance**

The result in Table 2 indicates that inward remittances, official development assistance and technical cooperation grants have positive but weak correlation with poverty level. Outward remittances have negative and strong correlation with poverty. Official development assistance and technical cooperation grants have strong and positive relationship with inward remittances while outward remittance has negative but weak correlation with inward remittances. Official development assistance and technical cooperation grants both have negative and weak correlation with outward remittances. All the explanatory variables have weak correlation with poverty level except outward remittances.

**Table 2. Correlation result**

Variable	POV	IRT	ORT	ODA	TCG
POV	1				
IRT	0.41	1			

ORT	-0.65	-0.19	1		
ODA	0.21	0.56	-0.10	1	
TCG	0.47	0.81	-0.29	0.59	1

#### 4.2. Regression model result

We started our regression analysis by examining the characteristics of the data used for this study. To ensure the data conform with the basic assumptions of ordinary least squares estimation, we conducted the diagnostic tests. The result as reported in Table 3 indicates that we accepted the null hypotheses of absence of serial correlation, no specification error, the distribution is normally distributed, absence or no heteroscedasticity given that their probability values. This implies that the data utilized for this study are reliable for prediction.

**Table 3. Diagnostics test results**

Test	F-statistic	Degree of Freedom	Probability
Breusch-Godfrey serial correlation LM test	2.93	F(2,12)	0.10
Ramsey Reset Test	1.08	F(1, 13)	0.32
Normality test(Jarque-Bera)	0.71	F(3,30)	0.70
Heteroscedasticity(ARCH)	0.90	F(1,28)	0.35
Heteroscedasticity(Breusch-Pagan-Godfrey)	0.75	F(16,14)	0.71

The unit roots test result reported in Table 4 using the Augmented Dickey Fuller (ADF) and Philip-Perron approaches shows that outward remittances is stationary at level. This implies that the null hypothesis of presence of unit root was rejected without differencing. On the other hand, poverty level, inward remittances, official development assistance and technical cooperation grants attained stationarity at first difference. This implies that the null hypotheses of presence of unit roots were rejected after differencing the variables (POV, IRT, ODA & TCG) once. The attainment of stationarity of variables in a model is a pre-condition for testing the long run relationship among the variables.

**Table 4. Unit roots test results**

Variable	ADF Statistic	1%	5%	Order of integration	Decision	PP Statistic	1%	5%	Order of integration	Decision
POV	-5.49	-3.64	-2.95	I(1)	Stationary	-5.49	-3.64	-2.95	I(1)	Stationary
IRT	-4.57	-3.64	-2.95	I(1)	Stationary	-4.57	-3.64	-2.95	I(1)	Stationary
ORT	-3.93	-3.63	-2.95	I(0)	Stationary	-3.72	-3.63	-2.95	I(0)	Station

					y					ary
ODA	-6.29	-3.64	- 2.95	I(1)	Stationar y	-14.13	-3.64	- 2.95	I(1)	Station ary
TCG	-8.16	-3.64	- 2.95	I(1)	Stationar y	-12.35	-3.64	- 2.95	I(1)	Station ary

However, given that the result of the unit roots tests give different order of stationarity in the variables, the study adopted the ARDL methodology in our analysis. Feridun (2016) argues that in case where the presence of structural breaks introduces uncertainty as to the true order of stability of the variables, the autoregressive distributed lag (ARDL) bounds testing procedure introduced by Pesaran and Pesaran (1997), Pesaran and Shin (1999), and Pesaran et al (2001) is applicable. The merit of this technique is that it yields valid results regardless of whether the underlying variables are stationary at level or first difference or a combination of both.

In order to estimate the effect of remittances on poverty level, the ARDL model of poverty and the interacting variables (independent variables) is stated below.

$$\Delta POV_{t-1} = \sum_{i=1}^n \delta_0 \Delta POV_{t-1} + \sum_{i=1}^n \delta_1 \Delta IRT_{t-1} + \sum_{i=1}^n \delta_2 \Delta ORT_{t-1} + \sum_{i=1}^n \delta_3 \Delta ODA_{t-1} + \sum_{i=1}^n \delta_4 \Delta TCG_{t-1} + \varphi_0 \Delta POV_{t-1} + \varphi_1 \Delta IRT_{t-1} + \varphi_2 \Delta ORT_{t-1} + \varphi_3 \Delta ODA_{t-1} + \varphi_4 \Delta TCG_{t-1} + \varepsilon_t \quad 3$$

In estimating the short-run dynamics, the ARDL error correction equation with model selection (4,4,3,1,4) using Akaike Information Criterion (AIC) is stated thus:

$$\Delta POV_{t-1} = \sum_{i=1}^n \rho_0 \Delta POV_{t-1} + \sum_{i=1}^n \rho_1 \Delta IRT_{t-1} + \sum_{i=1}^n \rho_2 \Delta ORT_{t-1} + \sum_{i=1}^n \rho_3 \Delta ODA_{t-1} + \sum_{i=1}^n \rho_4 \Delta TCG_{t-1} + \sum \Delta ECM_{t-1} + \varepsilon_t \quad 4$$

To test for a possible long run relationship between the dependent and explanatory variables, we conducted the ARDL bounds test. The result of the bound test reported in Table 5 indicates that long run relationship exist between poverty and the interacting independent variables given the F-statistic value of 7.18 which is greater than the critical value bounds at the various levels of significance as contained in table 5.

**Table 5. ARDL Bounds test for ARDL model selection (4, 4, 3, 1, 4)**

Test Statistic	Value	K
F-statistic	7.18	4
<b>Critical Value Bounds</b>		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

**Table 6. ARDL Cointegrating and Long Run Form of model selection (4, 4, 3, 1, 4)**

Variable	Coefficient	t-Statistic	Prob.
D(POV(-1))	0.49	1.37	0.20
D(POV(-2))	0.03	0.05	0.96
D(POV(-3))	-0.94	-1.75	0.11
D(IRT)	0.05	3.37	0.01
D(IRT(-1))	0.002	0.49	0.63
D(IRT(-2))	0.005	1.51	0.16
D(IRT(-3))	-0.003	-1.21	0.25
D(ORT)	0.020	0.612	0.55
D(ORT(-1))	-0.046	-1.11	0.29
D(ORT(-2))	0.041	1.59	0.14
D(TCG)	-0.021	-0.91	0.38
D(ODA)	-0.003	-0.88	0.40
D(ODA(-1))	-0.002	-0.51	0.62
D(ODA(-2))	-0.001	-1.61	0.14
D(ODA(-3))	0.001	1.90	0.08
CointEq(-1)	-0.055	-0.36	0.73

## Long Run Coefficients

Variable	Coefficient	t-Statistic	Prob.
IRT	0.03	0.35	0.73
ORT	-0.13	-0.42	0.68
TCG	-3.00	-0.35	0.74
ODA	-0.100	-0.30	0.77
C	358.03	0.40	0.70

The long run result reported in Table 6 indicates that inward remittances is positively related to poverty level. This implies that inward remittances spurred poverty in Nigeria in the long run. The long run result also shows that outward remittances, official development assistance and technical development assistance all have negative relationship with poverty. This implies that increases in these variables (ORT, ODA & TCG) reduced poverty. In the long run all the explanatory variables were insignificant at 5% level.

**Table 7. Parsimonious Error Correction ARDL model (4, 4, 3, 1, 4)**

Variable	Coefficient	t-Statistic	Prob.
POV(-1)	1.95	9.86	0.00
POV(-2)	-0.93	-3.62	0.00
POV(-3)	-0.64	-2.76	0.02
POV(-4)	0.46	2.10	0.05
IRT	0.01	7.18	0.00
IRT(-1)	-0.01	-5.24	0.00

IRT(-3)	-0.003	-3.15	0.01
IRT(-4)	0.004	4.01	0.00
ORT(-1)	-0.04	-1.61	0.13
ORT(-2)	0.05	1.61	0.13
ORT(-3)	-0.04	-1.94	0.07
TCG(-1)	-0.16	-9.48	0.00
ODA(-2)	0.002	2.20	0.05
ODA(-3)	0.002	4.48	0.00
ODA(-4)	-0.002	-4.73	0.00
C	20.50	4.29	0.00
ECM(-1)	-0.77	-2.92	0.01

$R^2 = 0.96$ ,  $R^2$  -adjusted = 0.93, F-stat = 26.31, F-prob = 0.00, AIC=5.62, SC=5.9,  
DW=2.4

The result in Table 7 indicates that inward remittances is positively related to poverty at level and lag 4. This implies that increase in inward remittances spurred poverty. At lags 1 and 3, inward remittances negatively influenced poverty. The significance of inward remittances implies that it has serious implication on either reducing or increasing poverty incidence at all the levels. Outward remittances from the result is negatively related to poverty at lags 1 and 3. This implies that the variable retarded poverty at these levels but was positively related to poverty at lag 2 implying that outward remittances stimulated poverty at this level. Outward remittances were also significant at lag 3 but insignificant at lags 1 and 2. Technical cooperation grants from the result is negatively and significantly related to poverty level. This implies that it significantly decreased poverty. Official development assistance is significant in supporting poverty given its positive coefficient at lags 2 and 3 but significantly reduced poverty at lag 4 given its negative coefficient also. This implies that ODA has mixed effects on poverty reduction. The result further revealed that the variables investigated adjust speedily to changes in long run dynamics given the negative coefficient of the ECM and its significance at 5 percent level. The goodness of fit of 0.93 implies that 93% of the total variation in poverty is accounted for by changes in inward and outward remittances, official development assistances and technical cooperation grants in Nigeria.

#### 4.3. Discussion of results

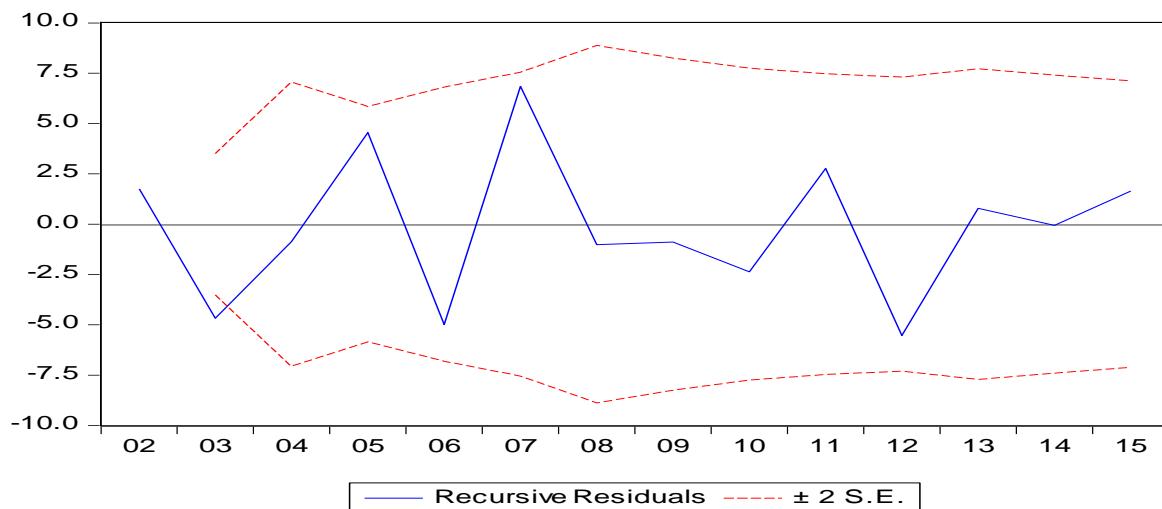
Inward remittances conform to theoretical expectation at lags 1 and 3 with a negative coefficient. This implies that funds remitted by Nigerians living overseas significantly retarded poverty in the country. This result corroborates the earlier findings by Adam and Page, (2005); Anyanwu and Erhijakpor, (2010); Semyonov and Gorodzeisky, (2008) and World Bank, (2006). Funds remitted by citizens of a country living abroad could serve as a veritable tool for poverty alleviation by increasing consumption, providing resources for training of family members and providing alternative source of funds for investment in the local/home economy. However, at level and lag 4, inward remittances significantly spurred poverty given its positive sign. This result is in tandem with the findings of Hein (2005) and Azam and Gubert (2006). Inward remittances could lead to brain drain and stimulate poverty by reducing manpower availability and productivity of an economy. Nigeria has suffered shortages of skilled manpower due to migration of most of her citizen to the western World in search for greener pasture. This may account for the behaviour of this variable in the model. The significance of outward remittances

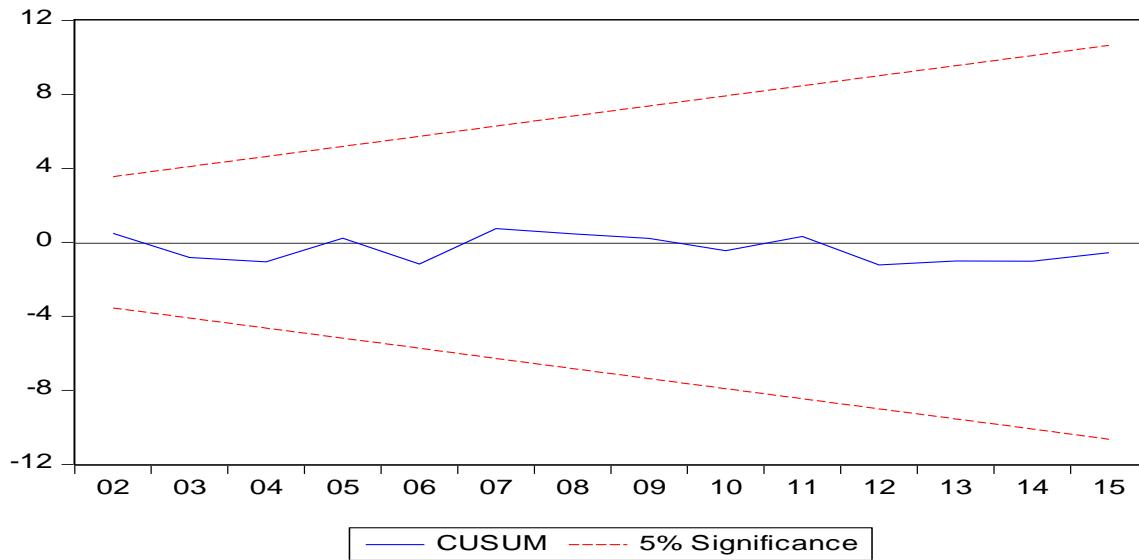
at lag 3 and its negative coefficient implies that it has serious implication on poverty reduction. Outward remittances could reduce poverty when citizens whose such funds are spent on return to their home country to work and contributes to the productivity and development of the country. Also investments made abroad could serve as alternative source of revenue for household and the parent economy. Hence increased income level and reduced poverty.

The positive relationship between poverty and development assistance (ODA) in lags 2 and 3 implies that it did not reduced poverty in Nigeria during the period of this study. This result deviated from the theoretical expectation but conformed with the earlier studies by Papanek (1972) Lockwood (1990), Duc (2006) and Malik (2008). Development assistance is a source of finance for development in developing economies hence could serve as avenue for poverty reduction as evidenced in our result at lag 4. However, most developing countries like Nigeria mismanaged such funds hence the poor effect of ODA on poverty in the country. The compliance of technical cooperation grants with theoretical expectation and its significance at 5% level indicates that it has serious negative impact on poverty reduction in Nigeria.

In order to determine the stability of the parameter used in this study, we applied the Bahmani-Oskooee and Shin (2002) method in examining the stability of the variables. The Cumulative Sum of Recursive Residual (CUSUM) and the Recursive Residuals were applied to the parsimonious ARDL poverty equation to capture the stability of the parameters. The stability of variables in the ARDL poverty equation requires that, the Recursive Residuals and CUSUM value of squares stay within the 5% critical bound represented by two straight lines whose equation is detailed in Brown et al. (1975). As shown in Figures 2(a) and 2(b), the CUSUM and recursive residuals plots do not cross the 5% critical lines in the ARDL poverty model. This implies that the variables suffer less from instability over the period of study.

**Figure 2. Stability test result: Recursive residuals and CUSUM graphs**





## 5. Conclusion

Consequent upon the results of this study, the following conclusion are made: inward and outward remittances have mixed effects on poverty reduction in Nigeria in the short run. Also in the short run, inward remittances impact was significant while outward remittance was not significant. ODA and technical cooperation grants also have conflicting effect on poverty. The mixed result in the effects of remittances on poverty reduction in the short run is in tandem with the earlier study by Mishra (2005). In the long run, inward remittances stimulated poverty while outward remittances, ODA and technical cooperation grants all reduced poverty incidence in Nigeria given their negative coefficients. All the explanatory variables were however, insignificant in the long run. This implies that their impacts were not significant. Based on this result, the study recommends: investing in foreign countries in order to diversify the income source of the economy, creation of conditions that will enhance inflow of grants and reductions of bottlenecks on inflows of foreign funds as possible ways of reducing poverty in Nigeria.

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