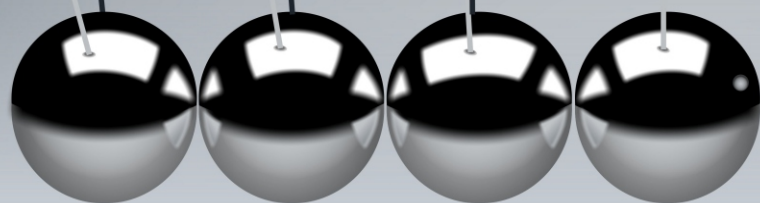


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Analysis of the Impact of Foreign Aid on Poverty Reduction in Nigeria, 1981-2017

Ogbodo Joseph Charles

Nicholas Attamah

Department of Economics

Faculty of Social Sciences

Enugu State University of Science and Technology, Enugu.

Abstract

One of the major purposes of the demand for foreign aid is to alleviate poverty. What is not clear, however, is whether the substantial foreign aid inflow to Nigeria in recent times has yielded the desired goal of poverty reduction. This work examined the impact of foreign aid on poverty reduction in Nigeria for the period 1981 to 2017. The objectives are to determine the impact of foreign aid on poverty reduction in Nigeria and to ascertain the direction of causality relationship between foreign aid and poverty reduction in Nigeria over the period of the study. Annual time series secondary data on: Poverty Reduction, Foreign Aid, Foreign Remittances, Inflation and Trade Openness, sourced from Central Bank of Nigeria (CBN) Statistical Bulletin 2017 online edition and the World Bank Development Indicator (WDI), were the variables used. Poverty Reduction is the dependent variable; others are the independent variables in the model. The study employed standard econometric method, involving theoretical (apriori), statistical (first-order) and econometric (second order) criteria. Autoregressive Distributed Lag (ARDL) Model and Pairwise Granger Causality Test were used to investigate the long run linkage between foreign aid and poverty reduction, the short run dynamics, and the direction of causality relationship between poverty reduction and foreign aid in Nigeria respectively. The ARDL bounds test result revealed that long run correlation exists among variables in the model. The result of ARDL Error Correction Model indicated that foreign aid had statistically significant impact on poverty reduction in Nigeria over the studied period. However, the result of Pairwise Granger Causality test revealed that there is no directional causality relationship between poverty reduction and foreign aid in Nigeria over the period studied. The study recommends that foreign aid flow should be directed more to the poor and the middle class in Nigeria by the government.

Keywords: poverty, foreign aid, granger causality, Nigeria

Introduction

One of the major concerns of most economies, especially developing nations, in recent times is poverty issue. The World Bank defined poverty as the income level below which a certain percentage of the population is to live and described it as a person's inability to earn a daily income of \$1, have access to safe drinking water; a situation of poor health services; high rates of illiteracy and infant mortality (World Bank, 2004). Poverty reduction, or alleviation, therefore, refers to a set of humanitarian and economic measures designed to permanently lift people out of poverty. Foreign aid or official Development assistance, referred to as the international transfer of capital, goods, or services from a country or international organization for the benefit of the recipient country or its population (Encyclopedia Britannica 2015) can come in form of economic,

military, or emergency humanitarian like aid given as a result of natural disasters. Aid in the form of official development assistance (ODA) is given basically not only to promote development but also to fight poverty. Developing countries, like Nigeria, desire foreign aid in form of support of investment projects, budget support, debt relief, technical assistance, grants, loans payable at lower interest rate over a longer period, aid or contributions from United Nation institutions, International Monetary Fund (IMF), World Bank (WB) or regional banks to assist them achieve sustainable development in terms of capital development, low mortality rate, sustainable economic growth and poverty reduction (Niiyoonkuru, 2016).

Over the years, Nigeria experienced huge and significant inflows of foreign aid into the economy. The major purpose is to mitigate poverty which, if not checked, exacerbates crime of various dimensions, encourages prostitution, increases frustration and leads to loss of confidence in the country. "Poverty, according to Evbromeran (1997), is capable of causing fear, depression, despondency, suicide, revolution, envy, bitterness, and self-depreciation of ego". However, poverty situation in Nigeria in recent times appears to be in conflict with the purpose of foreign aid flows; the poverty level in Nigeria is still very high and persistent, notwithstanding increase in foreign aid inflow. This persistent increase in poverty level amidst the foreign aid inflows casts doubt on the potency of foreign aid as a veritable tool for poverty reduction in Nigeria. The questions are: what is the impact of foreign aid on poverty reduction in Nigeria? What is the direction of causality between foreign aid and poverty reduction in Nigeria? It is against this background that this work examined foreign aid and poverty reduction nexus in Nigeria to determine whether foreign aid impact significantly on poverty reduction in Nigeria and to ascertain the direction of causality relationship that exists between foreign aid and poverty reduction in Nigeria over the period.

2. Literature Review

Theoretical Literature

The theoretical underpinnings of this study include the two gap model and the dependency theory of underdevelopment. In economic literature, the beneficial effect of foreign aid is based on the two gap model, where foreign aid may ease savings and foreign exchange constraints on economic growth of developing countries. The arguments advanced in support of the plausibility of a positive effect of foreign aid on domestic savings include the equation: $S = I - F$, where S, I, and F are domestic savings, gross investment, and net total foreign inflows respectively. An increase in the foreign inflows does not necessarily lead to a reduction in domestic savings irrespective of whether or not some of the inflows are used for consumption as an increase in consumption demand can be met by an increase in investment and output.

In some literatures, foreign aid refers to the total foreign inflows to a recipient country and often includes foreign aid, foreign borrowing and foreign investment. The effect of foreign aids on

economic growth and domestic savings differs from that of foreign borrowing and foreign investment. Foreign aid does not cause an outflow of funds to pay back debt or repatriate profits and capital. A positive effect of foreign aid is more plausible than the effect of all foreign inflows. The Dependency Theory of Underdevelopment states that the dependency of less developed countries (LDCs) on developed countries (DCs) is the main cause for the underdevelopment of the former.

Empirical Literature

Over the years, many scholars have researched on impact of foreign aid inflows on poverty reduction in an economy. Tohru and Malcolm (2005) examined the relationship between foreign aid and poverty reduction, using cross-sectional and panel data. They disaggregated foreign aid and used several poverty indexes to show that while real per capita income had the robust and highly significant impact on poverty reduction, aid had no significant effect. A simulation based on their results showed that Sub-Saharan Africa was seriously off track to achieve MDG of halving poverty by 2015.

Abuzar, Estrada, Kim, and Quibria (2005) empirically investigated the issue of aid effectiveness from a macro perspective. They adopted poverty reduction, as contrasted from economic growth, as the metric for measuring aid effectiveness. They experimented with a number of different regression equations and used a new panel dataset on poverty to show that aid and aid-squared had significant coefficients but with different signs (positive for aid and negative for aid-squared). The result suggested that aid is effective when it is relatively moderate but becomes ineffective when the size of aid exceeds the critical value defined by the absorptive capacity. Their results further suggested that while the macro policy environment and the quality of governance had a significant bearing on poverty reduction, aid effectiveness was not critically contingent on them. They noted that aid had on average been effective, as their regression results confirmed, under a whole variety of circumstances (in terms of policy environments and quality of governance) in a wide diversity of developing countries. The result also points to the limited usefulness of using aggregative index of (macroeconomic) policy and governance for policy insights. They added that there is need to look beyond these aggregates in order to derive useful policy insights.

Nadia and Yontcheva (2005) studied the effectiveness of foreign aid in reducing poverty by impacting on human development indicators using a data set of bilateral aid and NGO aid flows. They found out that Non-Governmental Agencies aid reduces infant mortality more effectively than official bilateral aid and that the impact on illiteracy was less significant. The result of their test on whether foreign aid reduces government efforts in achieving developmental goals showed mixed evidence of a substitution effect.

Abiola and Olofin (2008) examined the relationship among foreign aid, food supply and poverty reduction in Nigeria using secondary data for the period 1975-2005. They employed econometric analysis and specified a structural model that examined the determinants of poverty-reduction. They tested their model specification with Statistical Analysis of Time Series (STATA 10) software. They found that multilateral aid, food supply, public sector spending on health care and education are the major determinants of poverty reduction in Nigeria and concluded that, given the ongoing food supply crises, the gradual withdrawal of government from provision of health care

and education as well as the unreliability of aid, there was the need for some policy re-think in order to reduce poverty in Nigeria.

Adams et al. (2008) using a two-stage multinomial logit model, investigated the impact of internal and international remittances on poverty alleviation and inequality in Ghana and found that both internal and international remittances reduced the severity, level and depth of poverty in Ghana. They also found out that, in comparison to internal remittances, international remittances inflow contributed more to poverty reduction in Ghana while both remittances raised inequality gap in Ghana though international remittances contributed more than internal remittances to the inequality gap.

Javid and Qayyum (2011) with the use of linear regression with the application of ordinary least squares (OLS) technique examined the effectiveness of aid in Zimbabwe from 1990-2010, focusing on the ongoing debate on the interactive effect of aid and policy on sustainable economic growth. Main findings were that foreign aid and real GDP have a negative relationship, while the aid-policy interactive term and real GDP growth have a positive and significant relationship.

Chani, et al. (2011) analyzed the impact of macroeconomic parameters on growth and poverty in the context of Pakistan. Covering time series data from 1972 through 2008, they found out that inflation is positively correlated with poverty. Quantifying the effect of inflation on poverty, they found evidence that one percentage point increase in the CPI is expected to raise the head count ratio of poverty by 0.38% next year. Chukwuone et.al (2012) examined the impact of internal and international remittances on poverty reduction in Nigeria using propensity score matching approach and multinomial logit model with instrumental variables and found out that the probability of households' falling into poverty significantly reduced when household received remittances from either internal or international sources though the impact was more in case of international remittances.

Olofin (2013) re-examined the effects of different types of foreign aid on poverty level in 8 West African countries between 1975 and 2010 by employing both the first and second generation econometrics methods of panel unit root test, co-integration test and empirical estimators with heterogeneous slopes. Results obtained suggested that total foreign aid and food aid impacted positively on poverty while technical aid reduced poverty. Olofin however noted that apart from total foreign aid, none of the results was statistically significant; the results showed negative relationship among poverty, life expectancy, foreign direct investment, per capita GDP and financial depth but they were statistically insignificant. This suggested that their impacts on poverty were minimal in West Africa.

Waheed et al. (2013) studied the effects of remittances on poverty among rural households in Nigeria and observed that domestic and foreign remittances decreased the level and severity of poverty in rural areas of Nigeria. They also noted that, as opposed to foreign remittances, domestic remittances contributed more towards poverty reduction in rural areas of Nigeria.

Zerihun (2015) examined the poverty reduction effects of trade openness and structural transformation in Africa using a panel data covering the period 1981 to 2010 and constituting 43 African countries. He employed System generalized methods of moments and found out that trade

openness initially exacerbates poverty by about 1.3% and after one period lag, it reduced it by about 1.2%. Structural transformation lagged two periods, on the other hand, led to poverty reduction of about 3%. Further, the results show that infrastructure development and fostering the participation of the private sector in the continent greatly contribute towards poverty reduction. The study also confirms the famous 'Bhagwati hypothesis' that growth is good for the poor, as an increase in GDP per capita was found to have a proportionate reduction in poverty levels (0.7 to 1%). The study also investigated the causality between trade openness and structural transformation, and the results demonstrated that there is a bi-causality relationship between the two variables. As a robustness check, the results were validated using fixed effects, random effects, and panel vector auto regression (PVAR) models.

John and Shimeles (2015) examined aid, employment and poverty reduction in Africa and observed that growth in Africa is weakly linked to poverty reduction for the reason that Africa has failed to create enough good jobs. They noted that structural transformation (the relative growth of employment in high productivity sectors) has not featured in the post - 1995 growth story of Africa. In view of this, the region's fastest growing economies had the least responsiveness of employment and poverty to growth. They added that development aid was partly responsible as more aid went to countries with a low employment intensity of growth across Africa. They proposed a new approach to aid and poverty that would focus on supporting structural change for job creation in Africa.

Ojo, Okoronkwo, and Adewumi (2016) discussed the impact of foreign aid on poverty reduction, and or eradication programmes in Lagos State of Nigeria, examined literature on foreign aids and poverty, the nature of foreign aid and its strategy for poverty reduction in Lagos State, investigated and analysed how foreign aid has impacted poverty eradication/ reduction programmes in Lagos State using exploratory method that made use of both primary and secondary data collection. The primary data were collected through interview and government document; while the secondary data were collected from textbooks, library search, scholarly peer-reviewed journal articles and internet. The data collected were content analyzed. Result showed that there were serious challenges militating against the effective use of foreign aid on poverty alleviation programmes. Such challenges include misappropriation of funds, and lack of statistics on who should benefit from the programme.

Azam, Haseeb, and Samsudin (2016) using data covering the period of 1990-2014 and Panel fully modified OLS (FMOLS) method, empirically analyzed the impact of foreign remittances along with some other variables such as foreign aid, debt, human capital, inflation and income on poverty alleviation in 39 countries including the lower middle, upper middle and high income countries. The estimates of FMOLS revealed that increase in income did lead to decrease in poverty. Foreign remittances had positive impact on poverty alleviation though statistically significant only for upper middle income countries. The result further revealed that impacts of foreign aid and debt on poverty were positive, indicating that both factors contribute positively to poverty expansion. The results also exhibited no visible evidence that foreign aid has an effective apparatus for the poverty mitigation. Policy-makers should therefore devise an appropriate policy

to rationalize dependency on foreign aid. Government should also encourage remittances inflows so as to mitigate poverty.

Ugwuanyi, Ezeaku, and Ibe (2017) assessed the impact of official aid on poverty reduction in Nigeria from 1981 to 2014 using ARDL and error correction model (ECM) to estimate respectively for long-run and short-run dynamics. They employed bound test in testing for long-run relationship between variables in the model. The bound test result showed that long-run relationship exists between official aid flows and poverty. The estimates of both long-run and short-run regression revealed that official aid has non-significant positive impact on poverty reduction within the period. There is however strong sign of convergence toward long-run equilibrium as the speed of adjustment is significantly high. The results further showed that population growth exerted negative influence on poverty reduction both in the long and short-run whereas labour force participation was found to have relative positive impact on poverty reduction. They concluded that while it was evident that official aid had positive influence on poverty reduction, the influence so established was not significant. They recommended that aid donors and international aid organizations should earmark aids for specific needs and exhaust every prudential steps to ensure that such aid are used for the targeted aim with fact-based appraisals and implementation reports.

Edmore and Odhiambo (2017) explored the theoretical link and transmission mechanism through which official development assistance (ODA) or foreign aid affects poverty and presented some major debates on the effectiveness of foreign aid on development in general and poverty reduction in particular. The main findings from their exploratory study suggested that there was no generally accepted economic theory upon which foreign aid allocation is based. They added that several theories had been advanced, but most of them were strongly criticized. In view of this, there were two distinct and extreme lines of thoughts: those who believed that foreign aid can contribute to a virtuous circle of economic growth and poverty reduction and those groups that contended that foreign aid leads to a vicious cycle of poverty and stunted development. The third groups are those who assumed that once channels through which foreign aid affects development are distinguished several degrees of positive impact on development and diminution of poverty might be noticed, depending on the choice of channel, the recipient country features and the domestic economic policies.

Method

Theoretical Framework and Model Specification.

The model for this work followed the primary linear model form applied in Nakamura and McPherson (2005) to ascertain whether foreign aid is effective in reducing poverty. The model for the study was expressed as
$$PI_{ct} = \alpha_0 + \alpha_1 Y_{ct} + \alpha_2 X_{ct} + \varepsilon_{ct} \quad (1)$$
 where c and t denote country and time respectively, PI_{ct} is the logarithm of poverty index, Y_{ct} is the logarithm of per capital income and X_{ct} is a set of conditioning variables, and ε_{ct} is the error term. Equation (1) is modified for this work and to capture the variables selected for the study.

Model Specification

The functional form of the model is specified as follows:

$$\text{POV} = f(\text{FAID}, \text{FREMIT}, \text{INF}, \text{TOPN}) \quad 3.1$$

The econometric form of the model is as follows:

$$\text{POV} = \alpha_0 + \alpha_1 \text{FAID} + \alpha_2 \text{FREMIT} + \alpha_3 \text{INF} + \alpha_4 \text{TOPN} + u \quad 3.2$$

ARDL model is specified as follows:

$$\begin{aligned} \Delta \text{POV} = & \alpha_0 + \alpha_1 \text{FAID}_{t-1} + \alpha_2 \text{FREMIT}_{t-1} + \alpha_3 \text{INF}_{t-1} + \alpha_4 \text{TOPN}_{t-1} + \sum_{i=1}^k \delta_{1i} \Delta \text{POV}_{t-1} \\ & + \sum_{i=1}^k \delta_{2i} \Delta \text{FAID}_{t-1} + \sum_{i=1}^k \delta_{3i} \Delta \text{FREMIT}_{t-1} + \sum_{i=1}^k \delta_{4i} \Delta \text{INF}_{t-1} + \sum_{i=1}^k \delta_{5i} \Delta \text{TOPN}_{t-1} \\ & + \delta_{6i} \text{ECM}_{t-1} + \varepsilon_t \end{aligned} \quad 3.4$$

where:

POV = Poverty Reduction

FAID = Foreign Aid

FREMIT = Foreign Remittances

INF = Inflation

TOPN = Trade Openness

α_0 = the drift; α_1 - α_4 = Long run multipliers or parameters to be estimated, ε_t = Error Term; and δ_1 to δ_5 are the short run dynamic multipliers while δ_6 is the speed of adjustment to equilibrium.

A priori expectation: $\alpha_1 > 0$, $\alpha_2 > 0$, $\alpha_3 > 0$, and $\alpha_4 > 0$.

Justification for variables in the model and a priori expectations:

In this study, poverty is the dependent variable. Foreign aid, on the other hand, is the independent variable. Remittances, inflation, and trade openness, though independent variables, are used as control variables, consistent with similar empirical studies.

According to Shahidur (2012), inflation lowers the value of people's cash holdings, their real income and the purchasing power of their money, thereby subjecting them to increased poverty levels. According to the United Nations Report (2010), inflation decreases real wages, thus pushing up employment levels as a result of reduced labour costs and subsequently raises the possibility of workers creating income, generating projects for themselves, and by so doing, reducing poverty levels. Inflation is therefore expected to affect poverty positively or negatively.

Pradhan and Mahesh (2014), in their study, found that trade openness had a deleterious effect on poverty in developing countries. As the noted, trade openness creates new international markets for locally manufactured goods and services while also injecting new foreign manufactured goods and services into the local market, making it possible for Local producers to easily access foreign inputs for use in their production processes, while consumers benefit from increased variety and cheaper products, thus, raising national income and triggering poverty reduction. Therefore, trade openness is expected to reduce poverty.

Method of Evaluation

Econometric methodology, involving the theoretical criteria or apriori test, statistical or first-order and econometric or second order tests was employed in analyzing the data. Thus, Unit root test, cointegration test were used to carry out the pre-estimation tests of the time series data. Autoregressive distributed lag (ARDL) bounds test technique and Granger causality approaches were used to analyze the work.

Unit Root Test for Stationarity

The variables in the model were tested and corrected for stationarity using Augmented Dickey-Fuller (ADF) unit root test. The essence is to ascertain the unit root properties of the single series, that is, the order of integration of the variables in the model and to ensure that the variables in the model are void of seasonal variation and also to avoid spurious regression result. The unit root procedure requires estimating the following ADF equation:

$$\Delta Y_t = \alpha_0 + \eta Y_{t-1} + \sum_{i=1}^k B_i \Delta Y_{t-i} + U_t$$

where

$\Delta Y_t = Y_t - Y_{t-1}$ is the difference of series

$Y_t \Delta Y_{t-1} = Y_{t-1} - Y_{t-2}$ is the first difference of Y_{t-1} .

α_0 , η , and B_i are parameters to be estimated and U_t is stochastic error term.

The null hypothesis of non stationarity (presence of unit root) is accepted if $\eta = 0$ while the null hypothesis of non stationarity is rejected if $\eta < 0$.

Co-integration Test

The model was tested for co-integration using ARDL bounds test. The reason is to determine whether long run relationship exist between the dependent variable and independent variable(s) in the model, that is, if the variables move together over time. Evidence of co-integration was established in the model; it was corrected by introducing error correction mechanism (ECM) in the model as one of the independent variables.

Granger Causality Test

Granger causality test was conducted to establish the direction of causality relationship existing between the dependent and the explanatory variables in the model. Engle and Granger (1987) noted that if two variables are cointegrated, the possibility of causality between the two exists, at least in one direction. Granger causality test for the series could be expressed in general form as follows:

$$Y_t = \sum_{i=1}^k \delta_{11i} Y_{t-i} + \sum_{i=1}^k \delta_{12i} Y_{t-i} + U_{1t}$$

$$X_t = \sum_{i=1}^k \delta_{21i} Y_{t-i} + \sum_{i=1}^k \delta_{22i} Y_{t-i} + U_{2t}$$

Where Y = dependent variable, X = independent variables in the model, t = the current period of the variables and $t-i$ = the lagged period of the variables, δ_{11} to δ_{22} = the coefficients of the lagged variables and U_1 and U_2 = mutually uncorrelated white noise error terms. The Granger causality

analysis decision rule follows F-distribution. Therefore, rejected null hypothesis if the $p(F\text{-statistic}) < 0.05$; otherwise accept.

Data Sources

The data used in this work are annual time series secondary data sourced from CBN statistical bulletin 2017 online edition and the World Bank Development Indicator (WDI) for the period 1981 to 2017. The time series data include poverty, foreign aid, foreign remittances, inflation, and trade openness. Eviews 10 econometric software was used to estimate the specified model.

4. Results and Discussion

Unit Root Test

The result of the unit root test presented in table 4.1 below shows that poverty, inflation, and trade openness are integrated of order zero, $I(0)$ while foreign aid and foreign remittances are integrated of order one, $I(1)$.

Table 4.1: Unit Root Test Result

Variables	ADF Test Statistic	ADF Critical value at 5%	Probability	Order of Integration
POV	- 2.989016	- 2.951125	0.0460	$I(0)$
FAID	-6.429219	-2.951125	0.0000	$I(1)$
FREMIT	-6.746582	-2.948404	0.0000	$I(1)$
INF	-3.047283	-2.945842	0.0400	$I(0)$
TOPN	-4.625527	-2.945842	0.0007	$I(0)$

Source: Researcher's computation using EVIEW 10

None of the variables is $I(2)$. The variables were tested at 5% critical value and the results obtained from ADF test fulfilled the underlying conditions for ARDL bound testing proposed by Pesaran et al., (2001) instead of the conventional Johansen and Juselius (1990) co-integration method. To this end, the co-integration estimation is carried out under ARDL bound framework to test the sufficient condition for the error correction model after satisfying the stationary requirements.

Co-integration Test - ARDL Long Run Form and Bounds Test

ARDL Bounds Test Result

The result of ARDL Bounds test performed to test for the presence of co- integration among the variables in the model presented in table 4.2 below shows that the computed F-Statistic for the

equation, 4.888805, exceeds the upper bounds critical value of 3.49 at 5% level of significance. This implies that variables in the model are co-integrated; a long run relationship exists among the variables. The computed F-Statistic for the equation, 4.888805, also exceeds the lower bounds critical value of 2.56 at 5% level of significance.

Table 4.2ARDL Long Run Form and Bounds Test Result

ARDL Long Run Form and Bounds Test
Dependent Variable: D(POV)
Selected Model: ARDL(3, 1, 1, 3, 4)
Case 2: Restricted Constant and No Trend
Date: 05/25/19 Time: 16:00
Sample: 1981 2017
Included observations: 33

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18.36249	7.890016	2.327307	0.0334
POV(-1)*	-0.073918	0.033603	-2.199729	0.0429
FAID(-1)	-1.27E-08	4.54E-08	-0.279463	0.7835
FREMIT(-1)	-2.30E-05	9.89E-05	-0.233049	0.8187
INF(-1)	-0.136840	0.071187	-1.922255	0.0726
TOPN(-1)	0.862501	0.231725	3.722087	0.0019
D(POV(-1))	-0.310258	0.229485	-1.351971	0.1952
D(POV(-2))	3.438452	0.717314	4.793512	0.0002
D(FAID)	9.67E-08	4.75E-08	2.036848	0.0586
D(FREMIT)	-0.000126	7.77E-05	-1.621442	0.1245
D(INF)	-0.101229	0.053115	-1.905841	0.0748
D(INF(-1))	0.038732	0.044747	0.865569	0.3995
D(INF(-2))	-0.104905	0.042633	-2.460663	0.0256
D(TOPN)	-0.024513	0.062577	-0.391722	0.7004
D(TOPN(-1))	-0.936357	0.205452	-4.557545	0.0003
D(TOPN(-2))	-0.950201	0.189629	-5.010832	0.0001
D(TOPN(-3))	-0.221701	0.182896	-1.212170	0.2430

* p-value incompatible with t-Bounds distribution.

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAID	-1.72E-07	6.09E-07	-0.281746	0.7818
FREMIT	-0.000312	0.001278	-0.243914	0.8104
INF	-1.851248	1.401040	-1.321339	0.2050
TOPN	11.66840	7.113945	1.640216	0.1205
C	248.4181	36.52408	6.801486	0.0000

EC = POV - (-0.0000*FAID -0.0003*FREMIT -1.8512*INF + 11.6684*TOPN + 248.4181)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic k	4.888805 4	10%	Asymptotic: n=1000	
		5%	2.2	3.09
		2.5%	2.56	3.49
		1%	2.88	3.87
Actual Sample Size	33	10%	Finite Sample: n=35	
		5%	2.46	3.46
		2.5%	2.947	4.088
		1%	4.093	5.532
		10%	Finite Sample: n=30	
		5%	2.525	3.56
		2.5%	3.058	4.223
		1%	4.28	5.84

Source: Researcher's computation using EVIEW 10

ARDL Long Run Model Result

Table 4.2 also shows the result of the long run form of the ARDL model. The result indicates that foreign aid, remittances, inflation and trade openness have no significant impact on poverty reduction in the long run as revealed by their t-statistic values: -0.281746, -0.243914, -1.321339, and 6.801486, and probability values 0.7818, 0.1804, 0.2050, and 0.1205 respectively.

ARDL Error Correction Regression

Table 4.3 ARDL Error Correction Regression

ARDL Error Correction Regression
Dependent Variable: D(POV)
Selected Model: ARDL(3, 1, 1, 3, 4)
Case 2: Restricted Constant and No Trend
Date: 05/25/19 Time: 16:07
Sample: 1981 2017
Included observations: 33

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POV(-1))	-0.310258	0.178634	-1.736833	0.1016
D(POV(-2))	3.438452	0.534559	6.432317	0.0000
D(FAID)	9.67E-08	3.76E-08	2.569841	0.0206
D(FREMIT)	-0.000126	5.60E-05	-2.247611	0.0391
D(INF)	-0.101229	0.036542	-2.770229	0.0137
D(INF(-1))	0.038732	0.029789	1.300186	0.2120
D(INF(-2))	-0.104905	0.034344	-3.054528	0.0076
D(TOPN)	-0.024513	0.041030	-0.597439	0.5586
D(TOPN(-1))	-0.936357	0.146669	-6.384142	0.0000
D(TOPN(-2))	-0.950201	0.141654	-6.707898	0.0000
D(TOPN(-3))	-0.221701	0.142906	-1.551383	0.1404
CointEq(-1)*	-0.073918	0.011913	-6.204783	0.0000
R-squared	0.945882	Mean dependent var	-1.890909	
Adjusted R-squared	0.917534	S.D. dependent var	8.503395	
S.E. of regression	2.441906	Akaike info criterion	4.898723	
Sum squared resid	125.2210	Schwarz criterion	5.442907	
Log likelihood	-68.82892	Hannan-Quinn criter.	5.081824	
Durbin-Watson stat	2.504762			

* p-value incompatible with t-Bounds distribution.

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.888805	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Researcher's computation using EVIEW 10

The ARDL Error Correction Regression result is presented in table 4.3. It indicates that the sign of the short-run dynamic impact of foreign aid, remittances, inflation and trade openness on poverty reduction is negative, fractional and statistically significant as required. The coefficient of error correction mechanism (ECM) is -0.073918 with probability value of 0.0000. This shows that approximately 7.39% of any movement into disequilibrium is corrected for back to the long run equilibrium within one period. However 7.39% suggests a very low speed of adjustment process; meaning that the entire system will get back to long run equilibrium at the speed of 7.39% annually.

The ARDL Error Correction Regression result also revealed that foreign aid has positive and significant impact on poverty reduction in Nigeria in the short run as indicated by its probability value of 0.0206. Foreign remittances and inflation are found to exert negative and significant impact on poverty reduction in Nigeria over the period as shown by their probability values 0.0391 and 0.0137 respectively. Current period trade openness has no significant impact on poverty reduction in Nigeria. However, trade openness lags 1 and 2 impact significantly on poverty reduction. The result also showed that the previous year's information on poverty level significantly impacts poverty reduction in Nigeria. The R-squared, 0.945882, means that the estimated short run model has a good fit and very strong explanatory power and shows that about 94.58% of total variation in poverty reduction in Nigeria is explained by the independent variables in the model.

Granger Causality Test

Table 4.4 Granger Causality Test

Pairwise Granger Causality Tests
Date: 05/25/19 Time: 16:27
Sample: 1981 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
FAID does not Granger Cause POV POV does not Granger Cause FAID	35	0.52194 0.09958	0.5987 0.9055
FREMIT does not Granger Cause POV POV does not Granger Cause FREMIT	35	1.43391 2.77778	0.2542 0.0782
INF does not Granger Cause POV POV does not Granger Cause INF	35	0.73069 1.16929	0.4900 0.3243
TOPN does not Granger Cause POV POV does not Granger Cause TOPN	35	0.80906 5.16559	0.4548 0.0118
FREMIT does not Granger Cause FAID FAID does not Granger Cause FREMIT	35	0.14767 0.49408	0.8633 0.6150
INF does not Granger Cause FAID FAID does not Granger Cause INF	35	0.37026 1.12959	0.6937 0.3365
TOPN does not Granger Cause FAID FAID does not Granger Cause TOPN	35	0.22010 1.26836	0.8037 0.2959
INF does not Granger Cause FREMIT FREMIT does not Granger Cause INF	35	0.02180 1.83389	0.9784 0.1773
TOPN does not Granger Cause FREMIT FREMIT does not Granger Cause TOPN	35	0.08115 0.19549	0.9223 0.8235
TOPN does not Granger Cause INF INF does not Granger Cause TOPN	35	0.39402 0.55991	0.6778 0.5771

Source: Researcher's computation using EVIEW 10

The decision rule for Granger causality analysis follows F-distribution. The result of Granger causality test conducted to determine the causality relationship between foreign aid and poverty reduction is presented in table 4.4 above. The result shows that there is no directional causality relationship between poverty reduction and foreign aid as indicated by their probability values.

Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test was conducted to check autocorrelation problem in the residuals, that is whether error terms corresponding to different observations are uncorrelated. The result in Table 4.4 indicates F-statistic p-value of 0.1489 which is greater than 0.05. This implies that there is no serial correlation in the model.

Table 4.4 Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation at up to 2 lags				
F-statistic	2.189138	Prob. F(2,14)	0.1489	
Obs*R-squared	7.861625	Prob. Chi-Square(2)	0.0196	
Test Equation: Dependent Variable: RESID Method: ARDL Date: 05/25/19 Time: 16:10 Sample: 1985 2017 Included observations: 33 Presample missing value lagged residuals set to zero.				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
POV(-1)	0.428864	0.306052	1.401277	0.1829
POV(-2)	-1.215087	1.036200	-1.172637	0.2605
POV(-3)	0.816353	0.778847	1.048156	0.3123
FAID	1.47E-08	4.66E-08	0.316339	0.7564
FAID(-1)	2.83E-10	5.08E-08	0.005571	0.9956
FREMIT	1.99E-05	7.58E-05	0.261847	0.7973
FREMIT(-1)	5.73E-05	8.83E-05	0.649059	0.5268
INF	0.004279	0.050159	0.085319	0.9332
INF(-1)	0.007959	0.051300	0.155150	0.8789
INF(-2)	0.014491	0.052773	0.274584	0.7876
INF(-3)	0.005087	0.040114	0.126816	0.9009
TOPN	0.031024	0.060409	0.513568	0.6156
TOPN(-1)	0.033093	0.061112	0.541522	0.5967
TOPN(-2)	0.029397	0.059658	0.492762	0.6298
TOPN(-3)	0.024381	0.055938	0.435863	0.6696
TOPN(-4)	-0.305955	0.229636	-1.332350	0.2040
C	-7.819858	8.258777	-0.946854	0.3598
RESID(-1)	-0.777070	0.371378	-2.092396	0.0551
RESID(-2)	-0.144778	0.299382	-0.483590	0.6362
R-squared	0.238231	Mean dependent var	-2.78E-14	
Adjusted R-squared	-0.741186	S.D. dependent var	1.978170	
S.E. of regression	2.610275	Akaike info criterion	5.050853	
Sum squared resid	95.38949	Schwarz criterion	5.912479	
Log likelihood	-64.33908	Hannan-Quinn criter.	5.340764	
F-statistic	0.243238	Durbin-Watson stat	2.171405	
Prob(F-statistic)	0.997057			

Source: Researcher's computation using EVIEW 10

Heteroskedasticity Test

The result of heteroskedasticity test used to verify the constancy of the variance of the error term between different time series observation of the same variable in the regression model (that is, equal variance of error term), presented in table 4.5 below also shows that the residuals are homoskedastic as indicated by probability chi-square value of 0.3405 which is higher than 0.05.

Table 4.5 Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.159818	Prob. F(16,16)	0.3852
Obs*R-squared	17.72094	Prob. Chi-Square(16)	0.3405
Scaled explained SS	5.927614	Prob. Chi-Square(16)	0.9889

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/25/19 Time: 16:12
Sample: 1985 2017
Included observations: 33

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-32.71356	17.64235	-1.854263	0.0822
POV(-1)	1.264918	0.523682	2.415431	0.0280
POV(-2)	-5.427826	2.027102	-2.677628	0.0165
POV(-3)	4.286139	1.603939	2.672258	0.0167
FAID	-4.45E-08	1.06E-07	-0.418981	0.6808
FAID(-1)	1.48E-07	1.21E-07	1.222849	0.2391
FREMIT	0.000199	0.000174	1.147527	0.2680
FREMIT(-1)	-0.000155	0.000201	-0.773109	0.4507
INF	0.295601	0.118767	2.488922	0.0242
INF(-1)	-0.033288	0.112191	-0.296703	0.7705
INF(-2)	0.176227	0.124167	1.419269	0.1750
INF(-3)	-0.094762	0.095328	-0.994065	0.3350
TOPN	0.022495	0.139924	0.160764	0.8743
TOPN(-1)	0.071744	0.141243	0.507945	0.6184
TOPN(-2)	-0.008004	0.138553	-0.057765	0.9547
TOPN(-3)	0.172579	0.130278	1.324702	0.2039
TOPN(-4)	-0.956398	0.408962	-2.338600	0.0327
R-squared	0.536998	Mean dependent var	3.794576	
Adjusted R-squared	0.073996	S.D. dependent var	6.500561	
S.E. of regression	6.255431	Akaike info criterion	6.811161	
Sum squared resid	626.0867	Schwarz criterion	7.582090	
Log likelihood	-95.38416	Hannan-Quinn criter.	7.070555	
F-statistic	1.159818	Durbin-Watson stat	2.836182	
Prob(F-statistic)	0.385219			

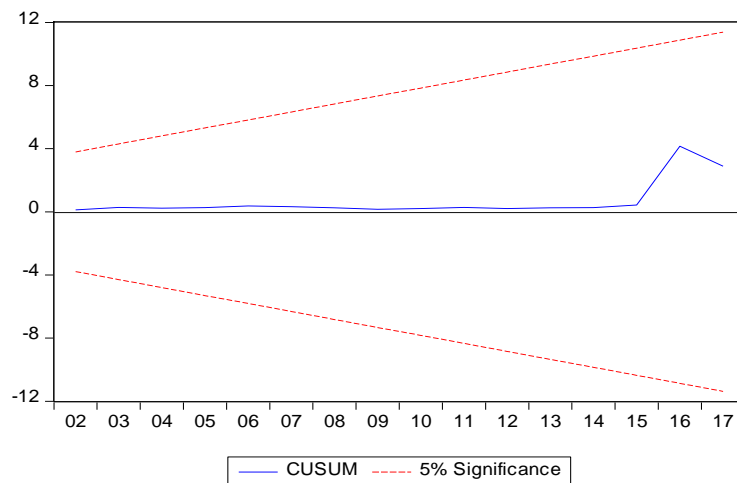
Source: Researcher's computation using EVIEW 10

Stability Test of the model

Model Stability Test examines the stability of the parameter. In other words, it tests model stability and adequacy. Figure 4.1 below shows the plot of stability test: cumulative

sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests of the model. The CUSUM is plotted against the critical bounds at 5% level of significance. The result revealed that the model is stable because the critical bounds at 5% fell in between the two 5% lines.

Figure 4.1 CUSUM TEST

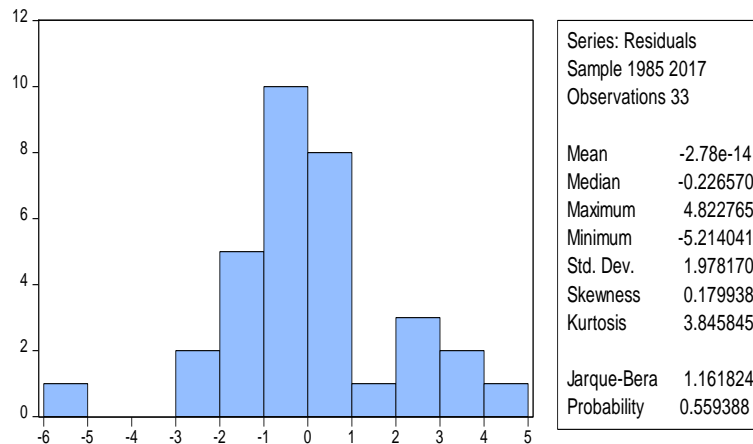


Source: Researcher's computation using EVIEW 10

Normality Test

Jarque-Bera Test was performed to determine whether the residuals (proxy for stochastic error term) followed normal distribution or not. The result is presented in figure 4.2. It shows Jarque – Bera probability of 0.559388 which is greater than 0.05. What this means is that the residuals follow normal distribution.

Figure 4.2 Jarque-Bera Test



Source: Researcher's computation using EVIEW 10

5. Summary, Conclusion and Recommendation

Summary

The work empirically investigated foreign aid and poverty reduction nexus in Nigeria. The specific objectives are to determine the impact of foreign aid on poverty reduction in Nigeria for the period 1981 to 2017 and to find out the direction of causality between foreign aid and poverty reduction in Nigeria within the study period. Autoregressive distributed lag (ARDL) bounds test technique, Error Correction Model and Granger causality approaches were used to analyze the work.

The ARDL Error Correction Regression result revealed that foreign aid has positive and significant impact on poverty reduction in Nigeria in the short run as indicated by its probability value of 0.0206. Foreign remittances and inflation are found to exert negative and significant impact on poverty reduction in Nigeria over the period as shown by their probability values 0.0391 and 0.0137 respectively. Current period trade openness has no significant impact on poverty reduction in Nigeria. However, trade openness lags 1 and 2 impact significantly on poverty reduction. The result also showed that the previous year's information on poverty level significantly impacts poverty reduction in Nigeria.

The ARDL Error Correction Regression result indicated that the sign of the short-run dynamic impact of foreign aid, remittances, inflation and trade openness on poverty reduction is negative, fractional and statistically significant as required. The coefficient of error correction mechanism (ECM) is -0.073918 with probability value of 0.0000. This shows that approximately 7.39% of any movement into disequilibrium is corrected for back to the long run equilibrium within one period. However 7.39% suggests a very low speed of adjustment process; meaning that the entire system will get back to long run equilibrium at the speed of 7.39% annually.

The ARDL Long Run Model Result indicates that foreign aid, remittances, inflation and trade openness have no significant impact on poverty reduction in the long run as revealed by their t-statistic values: -0.281746, -0.243914, -1.321339, and 6.801486, and probability values 0.7818, 0.1804, 0.2050, and 0.1205 respectively.

The ARDL bounds test result revealed that long run correlation exists among variables in the model.

Conclusion

This study examined whether foreign aid has significant impact on poverty reduction in Nigeria over the period 1981 to 2017 and whether causality relationship exists between foreign aid and poverty reduction in Nigeria. Autoregressive distributed lag (ARDL) bounds test technique, Error Correction Model and Granger causality approaches were used to analyze the work. The ARDL bounds test result revealed that long run correlation exists among variables in the model.

From the results obtained we conclude that foreign aid positively and significantly impacts on poverty reduction in Nigeria in the short run. Foreign remittances and inflation also exert negative and significant impact on poverty reduction in Nigeria over the period studied. Current period trade openness has no significant impact on poverty reduction in Nigeria. However, trade openness lags 1 and 2 impact significantly on poverty reduction. The previous year's information on poverty level significantly impacts poverty reduction in Nigeria.

Recommendations

Based on the findings, the work recommends that foreign aid flow should be directed more to the poor and the middle class in Nigeria by the government.

Aid donors and international aid organizations should specify areas of needs and insist that aid are channeled towards the targeted purposes. Government should ensure correct appropriation and judicious use of foreign aid and that aid inflows are made available to rural areas where majority of the poor abound to enable them benefit from the poverty reduction programme.

The government should put in place policies that would support the inflow of remittances. Such policies could include provision of better and cheaper means of transferring remittance, and development of an appropriate regulatory framework and mechanism for monitoring the foreign remittance flow.

Developmental policies should ensure effective management of technical aid, encourage foreign remittances and put in place policies that would improve welfare to complement the efforts of poverty reduction in Nigeria. Government policies should also promote trade liberalization.

Government should monitor and evaluate the use of aid funds to ensure effective and appropriate use of the aid funds in the country.

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