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# Government Expenditures, Foreign Aid and Remittances: A Review of Income Inequality in Nigeria

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#### Abstract

Income inequality unequivocally is one of the foremost development challenges facing developing economies. The contradictions bedevilling the reality where rising government expenditures in Nigeria failed to reflect in narrowing income inequality over time prompted this study. This study specified foreign aid and remittances as other sources of expenditures along with government expenditures and employed bounds testing autoregressive distributed lag approach of cointegration to assess the impact they have on income inequality. Findings revealed that, in the long run, capital expenditure has a negative but insignificant effect on income inequality, whereas recurrent expenditure has a positive and significant impact on income inequality, implying that government expenditures in Nigeria have not been directed towards addressing inequality. Foreign aid, in the long run, exhibits a significant negative impact on income inequality. However, remittances did not conform to a priori expectations as it increases income inequality. Recommendations suggest that sustained efforts are required towards overcoming the existing impediments holding back policies and programmes on narrowing inequality gaps.

**Keywords:** Distribution, Expenditures, Income inequality, Redistribution, Gini index, Welfare.

## Introduction

Nigeria was in 2014 ranked the largest economy GDP-wise in Africa (Ojo, 2022). However, development realities vary between expectations and basic development indicators, especially in real income, inequality, employment, poverty, health and literacy (Onodugo, Nwonye, Anowor, & Ofoegbu, 2019). This socio-economic paradox is enough to motivate intensified debates on outcomes of revenues and expenditures over the years. In the context of this study, the situation of social imbalance in the form of income inequalities and how spending could influence it occupies momentous space in the discourse. Inequality implies that people do not have equal opportunities, have unequal visions, capacities, behaviours and concerns as such that one is greater than another. Moreover, all societies share a basic intrinsic desire for equity and an aversion for inequality every so often especially when unequal opportunities are presented based on gender, tribe, clan, ethnicity, class, religion and, in this study, income distribution (Easterlin, 1974; Williams, 1984; Alesina & Perotti, 1996; Ravallion, 1997; Barber, 2001; Luttmer, 2005; World Bank, 2005; Asaana & Sakvi, 2021). Hence, concern about inequality especially in the Global-South, as noted by Obeng-Odoom (2020), must expand and be demonstrated beyond simply academic.

There are many shreds of evidence to suggest that government expenditures in Nigeria have been on an upward trend since the past decades; expectantly, these increases are presumed to have had a foreseeable positive influence on the overall level of economic activities and on the welfare of the citizenry (Anowor & Nwanji, 2018; Onodugo, Anowor & Ofoegbu, 2018; Abu & Abdullahi, 2010). Central bank of Nigeria (CBN) data showed that government recurrent expenditure increased from N4.847 billion in 1981, to N15.65 billion, N127.63 billion, N579.30 billion, N1390.10 billion, N3109.44 billion and N 5675.20 in 1987, 1995, 2001, 2006, 2010, and 2018 respectively (Ademola, 2022). While government capital expenditure increased from 6.57 billion in 1981 to N6.73 billion, N121.14 billion, N438.70 billion, N552.39 billion N152.80, and N1,152,796.6 in 1987, 1995, 2001, 2006, and 2009 respectively and to N1682.10 in 2018 (Ademola, 2022).

It may well be worthy to emphasise that the impact of public spending on income distribution/redistribution may be direct or indirect and that this particularity is partly connected with spending policies of various regimes of governments. Still on the public policy on expenditure, government spending theoretically is expected to have effect on income distribution and is anticipated to infuse income and spending powers in the hands of individuals which purposefully should narrow the inequality gap existing between the richer and the poorer citizens and equally improve productivity (Afonso, Schuknecht, & Tanzi, 2008; Agbarakwe, Anowor, & Ikue, 2018; Yobouet, Liangsheng, GuyRoland, Akadje, & Diby, 2019; Anowor, Ichoku, & Onodugo, 2020; Anowor, Ichoku, Onodugo, Ochinanwata, & Uzomba, 2023).

Possibly, an introspection on foreign aid and remittances could offer some valuable insights on external determinants of inequality and also additional variables that can sufficiently influence inequality. Foreign aid is notably one of the essential resources governments of recipient countries (particularly less developed countries) rely on for strategic development of social and tangible infrastructures. Foreign aid is a wide range of donations and grants from donor country/countries to recipient country/countries for economic development, security and military assistance, healthcare, education and response to disasters (Isiaka & Makinde, 2020). Remittance is money transferred by foreign worker(s) to individual(s) in their home countries. Foreign workers frequently remit substantial proportions of their surplus incomes to families and acquaintances back home. Remittances over the last four decades have predominantly become a sizeable source of finance to developing economies (Igbinedion, 2020). According to the World Bank (2018), of the total remittances of \$ 689 billion, first, \$ 528 billion was transferred to developing countries, and second, about \$ 24.3 billion was received by Nigerian citizens as cross-border remittances. Apparently, Nigeria, with US\$24.3 billion from the World Bank statistics of 2018, is the largest recipient of remittance in Africa and fifth in the world: behind India (US\$78.6 billion), China (US\$67.4 billion), Philippines (US\$33.8 billion) and Mexico (US\$35.7 billion) (Igbinedion, 2020). These external sources of finance (foreign aid and remittance) may lend a hand in lifting citizens out of poverty, narrowing the inequality gap, improving livelihoods and useful as solutions to economic imbalances.

Consequently, this study points towards investigating the effects expenditures have on income inequality in Nigeria. Onodugo et al. (2019) explore the possibility of achieving inclusive growth through sufficient support to SMEs; Acosta-Ormaechea and Morozumi (2017) examine public spending reallocations and economic growth across different income levels. Further, Fournier and Johansson (2016) study the effect of the size and the mix of public spending on growth, while the work of Djeneba and Tidiane (2019) concentrates on the feasibility of reallocating public spending to reduce income inequality. Other works like that of Yobouet et al. (2019), Madzinova (2017), Anderson, D'Orey, Duvendack and Esposito (2017), Jianu (2018) and Haves and Vidal (2015) are concerned about the impact of government expenditure on inequality. Nonetheless, it is obvious from the empirical evidence mentioned that none of them takes the pain to examine how government expenditures, foreign aid and remittances simultaneously influence income inequality, especially in Nigeria. In view of the foregoing shortcomings, this study makes bold to fill this gap and departs from the rest of the existing literature. Expenditures here are beyond aggregates government expenditure, rather government expenditure is disaggregated into capital and recurrent. Meanwhile, government expenditures have become the most often variables in assessing distribution and redistribution of income and this implies to methods of combating income inequality. However, this study further expands the explanatory variables to include foreign aid and remittances. Other notable sources that can support private expenditure, public spending and remittances from abroad and foreign aid. From the literature perspective, this study is the first to model government expenditures, foreign aid and remittances as the predictors of income inequality, especially in Nigeria, and further extending to their direct and indirect effects on income inequality in Nigeria. To sum up, this study considers the emerging econometric challenges of endogeneity and multicollinearity. The study adopts an autoregressive distributed lag (ARDL) technique of analysis because it combines endogenous and exogenous variables, and can model both the common and individual behaviours of variables and measure the statistical causal impact that have been some kind of challenge to pure time series models

## Literature Review

## Theoretical literature

Government spending reflects the policy choices of government. Two main components of expenditure are recurrent expenditure and capital expenditure (Alesina & Rodrik, 1994; Onodugo, Obi, Anowor, Nwonye, & Ofoegbu, 2017). Recurrent expenditures are current or consumption expenditures incurred on civil administration, defence forces, public health and education, and maintenance of government machinery (Onodugo et al., 2017). This type of expenditure is of recurring type which is incurred regularly and repeatedly from year to year. Nonetheless, capital expenditures are incurred on building durable assets such as highways, multipurpose dams and irrigation projects, and buying machinery and equipment (Onodugo et al., 2017). They are non-recurring types of expenditure in the form of capital investments.

Among a number of determinants of economic welfare, income per capita is commonly used (Anderson et al., 2017). Nevertheless, income per capita has been subjected to much criticism when providing an across-the-board picture of the productive capacity of an economy, because income per capita as a measure of welfare excludes many variables that contribute to individual welfare. The major drawback of income per capita as a measure of welfare is that it fails to consider income inequality existing among individuals. Hence, it is pertinent to derive summative welfare from individual welfare. As a result of income inequality, according to Ulu (2018). under conditions of income inequality, people are not able to provide basic living needs, namely life, housing, health and education. Consequently, poverty levels will rise and things like social peace and tranquility are impossible. Other factors that can enable economic inequality, according to Fletcher (2013), are wealth (wealth inequality), consumption and income (income inequality). The low-income group is characterised by poverty, poor health care, unstable jobs and low education attainment, whereas the high-income group is characterised by the opposites.

More than a few of the literature have put forth inequality measures. Prominent among them is the Lorenz curve. Lorenz curve is the relationship between the cumulative proportion of individual and the cumulative proportion of income received when individuals are arranged in ascending order of their income (Kakwani, 1995). Lorenz curve, as shown in Figure 1 below, can only be used to compare inequality distribution since its ranking assumes that the distributions have the same mean income. This criterion of ranking has been justified from the welfare point of view in terms of several alternative classes of social welfare functions. Thus, it can be said that if the generalised Lorenz curve for distribution X lies everywhere above the generalised Lorenz curve for another distribution Y, then distribution X is welfare superior to distribution Y (Kakwani, 1995).



Figure 1: Lorenz curve

Sen (1974), in Figure 1 above, proposed that the weight given to the income of the i<sup>th</sup> person should be proportional to the number of persons who are at least as well off as i. Sen arrived at the welfare (W) function:  $W = \mu (1 - G)$ 

Where  $\mu$  is the mean income of the society, G is the Gini index which is a measure of income inequality. The Gini index (G) as shown in Figure 2 below is equal to one minus twice the area under the Lorenz curve.

```
G = \frac{A}{A+B} (2)
```



Figure 2: Gini index

Proponents of the neoclassical framework posit that government spending and public policy in general do not play any role in determining the long-term macro-economic growth. They argue that all government expenditure, regardless of whether it is of a current or capital nature, would have deleterious effects on macroeconomic performance. Heller and Diamond (1990) argue the above through the prism that it is the principle of unified, centralised government (including economic) decisions, as well as the lack of profit motives and lack of competition, always contribute to the fact that state production becomes less efficient than production operating in the private sector.

## Empirical literature

Chude, Chude, Anah and Chukwunulu (2019) investigated the correlation between public spending, economic growth and poverty reduction in Nigeria, for the period between 1980 and 2013. The study employed the ARDL bound test co-integration approach and error correction techniques. The result of the study showed that government spending affected economic growth positively and significantly by increasing real private investment and fixed capital accumulation which increase capital accumulation; it also resulted in reduction in current account deficit and external debt burden, and improved education/skills of the households by improving human capital. Equally, the study found

that government expenditure had a significant short run impact on poverty reductions in its lag form in Nigeria.

Akinbobola and Saibu (2004) investigated the correlation between income inequality, unemployment and poverty in Nigeria between 1986 and 2000. In the research methodology, scientists took into account the vector autoregressive (VAR) approach to determine the specifics of quarterly indicators of real per capita income, government capital expenditures, real unemployment, and the human development index. According to the results of the VAR model obtained by scientists, the correlation of the reduction of the unemployment rate with the reduction of poverty and the enrichment of human development was confirmed. Another important conclusion of scientists was the correspondence between the increase in government spending and the decline in unemployment, as well as the rise of the Human Development Index.

Bergh and Fink (2008) analysed data from 35 countries in an intercountry regression on the change in the Gini coefficient (as a measure of economic inequality) between 1980 and 2000. Scholars have found a number of arguments for the pragmatic impact of public spending on education on equality. Another scientist, Sylwester (2002), performed an international regression of common least squares (OLS) on the trumpeting of the Gini coefficient between 1970 and 1990 for a set of 50 countries. The study found public education expenditures to be associated with a decline in income inequality. This result is robust to the inclusion of various control variables and appears to be larger in high-income nations.

## Methodology

The study of Lundberg and Squire (2003) uses (2) as a reference:

 $Gini_t = \alpha + S_{it} \, \varpi + Z_{it} \psi + e_t$ (3)

The equation (3) states that inequality (Gini) of a country in a region or country "i" at a period "t" is a function of variables related to the vector of economic growth and inequalities ( $S_{it}$ ) and of the vector of variables related with the vector of inequalities without relation to economic growth ( $Z_{ij}$ ).

The structure of the model that we propose to consider in this research is built in such a way that it is possible to empirically test how

much government spending (previously divided into capital and current expenditures) can affect the rate of income inequality. Our model takes into account the fact that the Gini index is evidence of income inequality. However, other variables that also theoretically influence the specified dependent variable, as earlier explained, are built into the model given that they as well check the influence of the variables and, also together with the variables, determine the total change in the dependent variable. Thus, foreign aid (FAID) and remittances from abroad (REMT) are built in the model as check variables of the dependent variable. The model for this study is thus specified:

 $GINCO = \pi_0 + \pi_1 CEXP + \pi_2 REXP + \pi_3 FAID + \pi_4 REMT + \mu.....(4)$ 

Where:

GINCO = Gini Coefficient (Proxy for income inequality); Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution (Holzner, 2011).

CEXP = Capital Expenditure REXP = Recurrent Expenditure FAID = Foreign Aid

Foreign aid or official development assistance (ODA) has the potential for increasing economic growth through its effect on savings and investment, and consequently reduce poverty and inequality.

REMT = Remittances

Remittances also play vital roles in poverty reduction, income redistribution and economic development, especially in rural areas.

 $\pi_0$  = Constant of the model  $\pi_1$ — $\pi_4$  = Parameters of the model  $\mu$  = Stochastic error terms Taking natural log "In" of CEXP, REXP, FAID and REMT, and specifying (4) in dynamic econometric form, we transform it to:\

 $GINCO = \pi_0 + \pi_1 lnCEXP_t + \pi_2 lnREXP_t + \pi_3 lnFAID_t + \pi_4 lnREMT_t + \mu_t......(5)$ 

### Analysis and Discussion of Findings

### Unit root tests

| <b>Tuble 2.</b> Child 1000 tests (Hughlented Dieney Tuber test) |            |                 |         |             |  |
|---|------------|-----------------|---------|-------------|--|
| Variables   | ADF Test   | Critical values | p-value | Order of    |  |
|   | statistics | at 5%           |         | Integration |  |
| GINCO   | -6.054640  | -3.365832       | 0.0001  | 1(0)        |  |
| ICEXP   | -6.372917  | -3.536601       | 0.0000  | 1(1)        |  |
| IREXP   | -9.253301  | -3.536601       | 0.0000  | 1(1)        |  |
| lFAID   | -5.493133  | -3.544284       | 0.0004  | 1(1)        |  |
| IREMT   | -6.799959  | -3.540328       | 0.0000  | 1(1)        |  |

**Table 2:** Unit root tests (Augmented Dickey–Fuller test)

Source: Author's computation using E-View 10.

Results of the unit-root tests in Table 1 above show all the specified variables, except GINCO, to be stationary after first differencing. GINCO was stationary at level. We then estimated the autoregressive distributed lag (ARDL) model since, at least, one of the variables was stationary at level. The estimation results are reported in Table 2 below. The ARDL bounds testing approach is favoured based on the fact that both the long-run and short-run parameters of the model specified can be estimated simultaneously. This approach is applicable irrespective of the order of integration whether the variables under consideration are purely I(0) (i.e. the variables are stationary at level form) or purely I(1) (i.e. the variables become stationary at first difference). Therefore, we used the autoregressive distributed lag (ARDL) bounds test to show the relationship between expenditures and income inequality in Nigeria.

#### ARDL specification for the model

 $\begin{aligned} \Delta(lnGINCO)_t &= \pi_0 + \pi_1(lnGINCO)_{t-1} + \pi_2 \quad (lnCEXP)_{t-1} + \\ \pi_3(lnREXP)_{t-1} &+ \pi_4(lnFAID)_{t-1} + \pi_5(lnREMT)_{t-1} \end{aligned}$ 

$$+\sum_{t=0}^{m} \pi \, 6\Delta lnGINCO_{t-1} + \sum_{t=0}^{n} \pi 7\Delta ln \, CEXP_{t-1} + \sum_{t=0}^{o} \pi 8\Delta REXP_{t-1} \\ + \sum_{t=0}^{p} \pi 9\Delta FAID_{t-1} + \sum_{t=0}^{q} \pi 10\Delta REMT_{t-1} \\ + \mu_{t}$$
(6)

 $\Delta$  denotes the first difference operator [i.e. D(GINCO)],

 $\pi_0$  is the drift component,

 $\mu_t$  is the white noise residuals.

The left-hand side in Equation (6) represents Gini index. The first until fifth expressions  $(\pi_1 - \pi_5)$  on the right-hand side correspond to the long-run relationship between the variables, while the expressions with the summation sign  $(\pi_6 - \pi_{10})$  represent the short-run dynamics of the model.

### ARDL cointegration test

| Wald      | F- | Critical value | Lower    | Upper    | Outcome      |  |
|-----------|----|----------------|----------|----------|--------------|--|
| statistic |    |                | bound l0 | bound l1 |              |  |
| 5.43      |    | 5%             | 2.86     | 4.01     | Cointegrated |  |
|           |    |                |          |          |              |  |

Table 3: Bounds test

Source: Author's computation using E-View 10.

The cointegration bounds test was further performed. The result of the cointegration bounds test is presented in Table 3. For a long-run relationship to hold between Gini coefficient and the determinants, the null hypothesis that there is no cointegration must be rejected.

The bounds test result for the model reveals that the calculated Wald F-statistic (5.43) is greater than the lower bound critical value of 2.86 and the upper bound critical value of 4.01 at the 5% level of significance. Given the above, it is considered appropriate to reject the null hypothesis, the essence of which is the lack of a long-term relationship. In conclusion, we believe that there is cointegration or a so-called long-term relationship between the variables in the research model.

## ARDL Error Correction Model (ECM)

The ECM is developed to test for the speed of adjustment and how the variables in the dataset converge towards equilibrium in the long run. Therefore, the ARDL version of the ECM for the model can be expressed as Equation (7) below. The error correction version of the ARDL model relating to the variables in Equation (6) is as follows: where  $\tau$  explains the speed of adjustment and ECT is the Error Correction Term, and is derived from the residuals obtained in Equation (6). The value of  $\tau$  is expected to be negative and significant since it is the speed of adjustment for the restoration to long-run equilibrium after external shocks, and ranges between 0 and 1, or 0% to 100%. 0 indicates absence of any adjustment while 1 indicates perfect or full adjustment after the occurrence of external shock. Positive values indicate that the result is explosive or absence of convergence to equilibrium after exogenous shock.

The unrestricted error correction version of the ARDL model:

$$\begin{aligned} \Delta(\ln GINCO)_{t} &= \pi_{0} + \sum_{t=0}^{m} \pi_{1} \Delta \ln GINCO_{t-1} + \sum_{t=0}^{n} \pi_{2} \Delta \ln CEXP_{t-1} \\ &+ \sum_{t=0}^{o} \pi_{3} \Delta \ln REXP_{t-1} + \sum_{t=0}^{p} \pi_{4} \Delta \ln FAID_{t-1} \\ &+ \sum_{t=0}^{q} \pi_{5} \Delta \ln REMT_{t-1} + \tau ECT + \mu_{t}......(7) \end{aligned}$$

The ARDL long-run regression result

Having established that a long-run relationship holds between Gini coefficient and its determinants, the ARDL model was estimated to establish the effects of capital expenditure, recurrent expenditure, foreign aid and remittances on income inequality in Nigeria. The ARDL result is presented in Table 4 below.

| Variables | Coefficient | Std. Error | t-Statistic | Prob.     |
|-----------|-------------|------------|-------------|-----------|
|           |             |            |             |           |
| LCEXP     | -0.458270   | 0.392088   | -1.168794   |           |
|           |             |            |             | 0.2868    |
| LREXP     | 0.579781    | 0.190223   | 3.047895    | 0.0226 ** |
|           |             |            |             |           |
| LFAID     | -0.354739   | 0.135224   | -2.623337   |           |
|           |             |            |             | 0.0394**  |
| LREMT     | 0.140710    | 0.179354   | 0.784533    | 0.4626    |
|           |             |            |             |           |

 Table 4: The ARDL long run result

**Source:** Author's computation using E-View 10. \*\*Denotes a 5% level of significance.

From Table 4, the estimated coefficient of the long-run relationship shows that capital expenditure has a negative but insignificant effect on income inequality. Capital expenditure conformed to the expected sign as it has a negative effect on GINCO as such a narrow income inequality gap, but it fails to attain 5% significant level. Foreign aid equally exhibits a negative and significant relationship with income inequality. The sign of the coefficient for foreign aid also conforms to theoretical a priori expectation as it has a negative sign. This means that a 1% increase in foreign aid will narrow income inequality by 0.35%.

Furthermore, the coefficient of recurrent expenditure and remittances for the period of this study do not conform to a priori expectation, as it is positively signed at 5% level of significant; however, while recurrent expenditure is statistically significant, remittances is not significant. This means that a 1% increase in recurrent expenditure will increase inequality by 0.57%. By implication, this shows that most of the government recurrent expenditures in Nigeria are not directed towards addressing inequality.

| Variable         | Coefficient | Std. Error | t-Statistic | Prob.  |
|------------------|-------------|------------|-------------|--------|
| С                | 2.138418    | 0.311694   | 6.860627    | 0.0005 |
| D(LCEXP)         | -0.134849   | 0.024870   | -5.422153   | 0.0016 |
| D(LCEXP(-1))     | 0.284466    | 0.044447   | 6.400117    | 0.0007 |
| D(LCEXP(-2))     | 0.403456    | 0.050089   | 8.054785    | 0.0002 |
| D(LCEXP(-3))     | 0.382269    | 0.069695   | 5.484865    | 0.0015 |
| D(LCEXP(-4))     | 0.333562    | 0.062186   | 5.363905    | 0.0017 |
| D(LCEXP(-5))     | 0.182133    | 0.038237   | 4.763232    | 0.0031 |
| D(LREXP)         | -0.115502   | 0.043233   | -2.671633   | 0.0369 |
| D(LREXP(-1))     | -0.397740   | 0.065792   | -6.045382   | 0.0009 |
| D(LREXP(-2))     | -0.218307   | 0.056824   | -3.841812   | 0.0085 |
| D(LREXP(-3))     | -0.135960   | 0.048939   | -2.778136   | 0.0321 |
| D(LREXP(-4))     | -0.202270   | 0.051353   | -3.938840   | 0.0076 |
| D(LFAID)         | 0.073859    | 0.024027   | 3.074003    | 0.0218 |
| D(LFAID(-1))     | 0.168568    | 0.032026   | 5.263412    | 0.0019 |
| D(LFAID(-2))     | 0.243405    | 0.036726   | 6.627543    | 0.0006 |
| D(LFAID(-3))     | 0.036480    | 0.019347   | 1.885531    | 0.1083 |
| D(LFAID(-4))     | 0.115097    | 0.022071   | 5.214887    | 0.0020 |
| D(LREMT)         | 0.002508    | 0.019304   | 0.129893    | 0.9009 |
| D(LREMT(-<br>1)) | -0.060375   | 0.018451   | -3.272173   | 0.0170 |
| D(LREMT(-<br>2)) | -0.045578   | 0.017652   | -2.581987   | 0.0417 |
| D(LREMT(-        | 0.023562    | 0.022070   | 1.067608    | 0.3268 |
| D(LREMT(-<br>4)) | -0.004007   | 0.019083   | -0.209961   | 0.8406 |
| ECM (-<br>1)*    | -0.681289   | 0.101322   | -6.723985   | 0.0005 |

Table 5: Error correction representation for the selected ARDL model

Source: Author's computation using E-View 10. 5% level of significance.

The short-run results associated with the long-run relationship obtained from the ECM in Equation (6) are presented in Table 5 above. The short-run result shows that government capital expenditure negatively and significantly impacts on income inequality. The result reveals that, in the short run, increase in government capital expenditure reduces income inequality significantly, meaning 1% increase in capital expenditure will reduce income inequality by 0.13%. This result equally reveals that income inequality is more responsive to capital expenditure in the short run than in the long run. The recurrent expenditure with a probability value of 0.0369 in the short run has the expected significant negative impact on income inequality. The coefficient of -0.115502 for recurrent expenditure means that 1% increase in recurrent expenditure will lead to 0.11% reduction in income inequality and this conforms to a priori expectation. The first period lag to the fourth period lag of recurrent relationship with income inequality. This result equally reveals that income inequality is more responsive to recurrent expenditure with income inequality.

Foreign aid and remittances exhibit a positive relationship with income inequality in the short run; although while foreign aid is statistically significant, remittances is not significant. Equally, on the contrary, the coefficients of the first, second and fourth period lags of remittance show a negative effect on income inequality in the short run.

The ECM coefficient shows how quickly the variables converge to equilibrium and how statistically significant the coefficient should be, with a negative sign. The latter thesis is clearly evidenced by the existence of a stable long-term relationship between variables. Similarly, if we talk about the error correction model coefficient (ECM), the latter is negative and significant, which justifies the existence of a long-term relationship between variables with their various significant lags. A value of (-0.68) for the ECM coefficient suggests a fast speed of adjustment of 68%, which means that approximately 68% of disequilibrium from previous year shock converge back to equilibrium in the current year.

## Diagnostic and stability tests on the ECM

| Test                     | Test Statistics | Prob-value |
|--------------------------|-----------------|------------|
| Breusch-Godfrey Serial   | 5.078316        |            |
| Correlation LM Test:     |                 | 0.0798     |
| Heteroskedasticity Test: | 0.371609        |            |
| Breusch-Pagan-Godfrey    |                 | 0.9638     |
| Heteroskedasticity Test: | 1.814965        | 0.1880     |
| ARCH                     |                 |            |
| Jarque-Bera Residual     | 2.250856        | 0.3245     |
| Ramsey RESET Test        | 0.827479        | 0.4047     |
|                          |                 |            |

Table 6: Stability and diagnostic tests

**Source:** Author's computation using E-View 10.

R-squared0.942758Adjusted R-squared0.816824

To further assess the goodness-of-fit and stability of the model, some diagnostic tests were conducted from the ECM. As presented in Table 6 above, Breusch-Godfrey serial correlation LM test confirms that there is no serial correlation in the model. The model as well appears not to be heteroscedastic as it passed the Breusch-Pagan-Godfrey and ARCH heteroskedasticity tests. The residuals are normally distributed in the model as evidenced by the Jarque-Bera test. The Ramsey RESET test result for the specification error shows that the model is correctly specified. The coefficient of determination  $R^2$  and the adjusted  $R^2$  used in measuring the goodness-of-fit of the estimated model indicates that the model is reasonably accurate in prediction.

## Discussion

Going strictly by the results presented above, it can be observed that all the specified variables, except Gini coefficient (GINCO), are stationary after first differencing. GINCO was stationary at level, which led to the estimation of an autoregressive distributed lag (ARDL) model. The results further establish that a long-run relationship exists between Gini coefficient and its determinants; and this confirms the findings of Afonso, Schuknecht and Tanzi (2008) that income distribution has a long-term link with its determinants. The long-run result shows that capital expenditure has a negative but insignificant effect on income inequality which implies that it has the expected sign (negative relationship) but lacks the significance to influence inequality in Nigeria. The reason for this could be attributed to insufficient allocation to capital expenditure which expectantly could have yielded long-run benefits if resources were sufficiently supplied. Abu and Abdullahi (2010) and Anowor and Nwanji (2018) share the same view that the economic progress of Nigeria has been held back by insufficient supply of capital expenditure.

Recurrent expenditure from the result shows a positive sign and a significant impact, implying that inequality increases significantly in Nigeria as recurrent expenditure increases. This can be attributed, as observed by Akinbobola and Saibu (2004), Anderson et al. (2017), Anowor and Nwanji (2018) and Djeneba and Tidiane (2019), to inequitable distribution of resources (which come in the form of payments for services) prevalent in developing economies. Distribution of resources is mostly skewed to favour a marginal proportion of the population at the detriment of the majority left in want. This differs from the finding from the study by Hayes and Vidal (2015) on economic inequality in the United States of America which affirms the theoretical postulation and finds recurrent expenditure significant in narrowing the income inequality gap.

The negative sign of foreign aid conforms to theoretical expectation. Moreover, foreign aid has shown to be significant in tightening income inequality in Nigeria. This finding is in line with the observation of Acosta-Ormaechea and Morozumi (2017) which maintains that foreign aid has assisted developing economies in fighting unemployment and inequality. Further, Fletcher (2013) supports advancing foreign aids to Africa to help in economic recovery and poverty reduction. This implies the more foreign aid to Nigeria, the narrower the inequality gap.

'Remittances' has a positive sign which does not conform with theoretical expectation; it is also not statistically significant in narrowing income inequality in Nigeria. Therefore, remittances from abroad failed to attain a statistically significant effect on narrowing the inequality gap. This also corroborates the findings of Onodugo et al. (2017) that remittances from abroad could not significantly affect income inequality because funds remitted from abroad are, most times, for household consumption instead of capital investment that could have created more wealth and employment opportunities for the population. However, this finding contrasts with the World Bank's (2018) position on recent development and outlook on migration and remittances, which posits that remittances have helped in economic development in recipient countries.

### **Conclusion and Recommendations**

The study used such indicators as the Gini index (the so-called Gini coefficient) as the size of income inequality; foreign aid (FAID); and transfers (REMT), which were incorporated into the research model as control variables of the dependent variable. It employed the bounds testing ARDL approach of cointegration to examine the long-run and short-run relationship between spending and income inequality in Nigeria. The study observed from the vast literature reviewed that government annual expenditure has been growing consistently without corresponding improvement in economic development: reduction in unemployment, poverty and inequality.

The findings of the study reveal that, in the long run, capital expenditure has a negative but non-significant effect on income inequality, while recurrent expenditure has a positive and significant impact on income inequality. This result is in line with Igbinedion (2020) who found that productive government expenditures increase employment generation and improve the standard of living, while non-productive government expenditures decrease employment generation and increase poverty and inequality. By implication, this shows that most of the government recurrent expenditures in Nigeria are not directed towards addressing poverty and inequality. The result further reveals that foreign aid, in the long run, exhibits a significant and negative impact on income inequality; and that remittances did not conform to a priori expectations as it increases income inequality.

The limited inroads in narrowing income inequality in Nigeria, as indicated in the results and as evidenced from the literature, evince that much needs to be done to accomplish a fair distribution of income. Sustained efforts are required towards overcoming the existing impediments holding back policies and programmes on narrowing inequality (especially income inequality) gaps. To even greater extent, stakeholders should adopt pro-poor programmes that can improve the welfare of the poor and the lower-income earners and also create employment opportunities.

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