*Original Research Article*

# The Dynamics of economic globalization and income inequality in Sub-Saharan African countries: An empirical insightfrom two stage least squareand fixed effectapproach.


## ABSTRACT

Many empirical studies haveexamined the nexus between economic globalization and income inequality. However, findings are controversial, especially for developing countries, which require further investigation.Thisstudy,therefore, aimsto examine the effectof economic globalization on income inequalityusing unbalance panel datain 19 Sub Saharan Africancountries(SSA) from 2000 – 2015.Due to endogeneity problem and cross sectional dependence, the model was analyzed using a two-stage least square (2SLS)regressionand the fixed effect model with Driscoll-Kraay standard errors regressionrespectively. The findings reveal that FDI, Trade openness, and ICT developmentare positive and significantlylink to income inequality while remittances have a negative and significant effect. This is an indication that economic globalization indicators (FDI, Trade openness, ICT) have failed to bring a fairer income distribution in these countries while remittances have contributed to income distribution. On basis of this conclusion, policymakers should pursue policies, which will enhance a balanced development and improvement in the socioeconomic welfare of the population by improving measures of income distribution.



**Keywords:**economic globalization, income inequality, 2SLS, SSA



UNDER PEER REVIEW

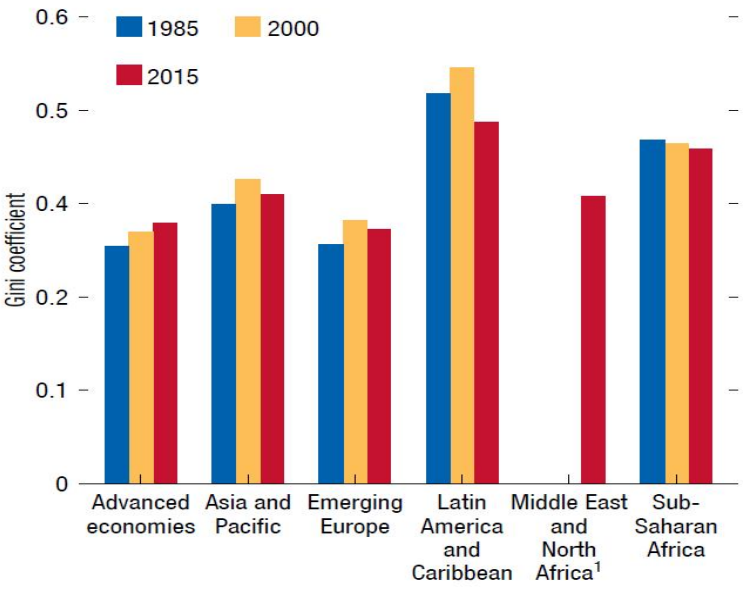
## 1. INTRODUCTION

The relationship between economicglobalization and income inequality is not new but remains a significant panacea for equality in income distribution as it integrates the world into a global village. Hence,Economic globalization is an indispensable activity that integratesthe world's economy through tradeliberalization and finance [1]. The study of[2]indicates that the social and economic outcomes of globalization such as driving growth, gender equity, and human rights improvement are paramount in achieving income equality.Witha fast-growing trend of the global economy, the debate of economic globalization's effecton income inequality has been widelycontested from numerousviewpoints due to rising inequality in both developing and developed countries [3]. In some countries where the population is managed and control bya specific group, income inequality may worsen due to rising economic globalization[1,4–7].However, other scholars believe economic globalization reduces income inequality[8,9]. Hence, the link between economic globalization and income inequality is not robust across studies[1].

This scenario is not different in Sub-Saharan Africa (SSA) as it represent one of the regions in the world with the worst rate of income inequality. Though, in the first 15 years of the 21st Century, itswitness a significant economic performance [9], the benefits of this economic performance, which emanate from the amalgamation of the global economy,are still far fetch as income inequality remain the slogan of most of these countries.It is evident that while economic globalization has brought a considerablerise in trade volume, the economic benefit of capital flows and income to some regions is uneven with the rich and the poor having a broadening gap in terms of all aspects of economic gratification. While Economic Globalization is expected to drive FDI by improving the efficiency of enterprises through technology transfer, capital market

UNDER PEER REVIEW

flows, and boost trade openness[10], sub-Saharan African economies remain in the bottom line of poverty and income inequality despite the abundant natural resources and economic interaction with the global economy[11]. After Latin America and the Caribbean, SSA is the world's second region with the highest level of inequality in income distribution[12](see figure 1).[13] also indicates that it is the least unequal region even with a moderate decline in its unweighted Gini coefficient from 0.47 to 0.43 between 1991 and 2011. This persistent income inequalities obstruct economic development and causes political instability[9]. In this light, the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) was adopted in September 2015 to drawmore considerable attention to income inequality in SSA. However, achieving the objectives of reducing income inequality by 2030 and the goal of 'no one behind', SubSaharan African countries need to carry out an in-depth analysis of their disparities, trends, and determinants[9].[13]indicates that SSA has multi-dimensional and complex factors that determine its inequality making it challenging to address the situation.SSA has been further marginalized in the world economy as its share of world trade, investment, and output have declined to negligible proportions compare to other regions of the world [11].




UNDER PEER REVIEW

**Figure 1. Average income inequality across regions and over time, 1985–2015**

**Source*:* IMF (2017)**

Looking at economic globalization as a multi-dimensional phenomenon, this study decomposeseconomic globalization into FDI, trade openness, and remittances, and then examines the effects on income inequality in SSA.

Thisstudy aims to contribute to scholarly literature by providingempirical evidence on the relationship between trade openness, ICT development, FDI, and remittance on income inequality, which is limited in SSA.The study represents one of the initial studies to present the first quantitative evidence of the impact of economic globalization on income inequality in SSA. Another significant ingredient of this study is incorporating many economic globalization regressors unlike in past empirical studies in SSA. For robustness checks, the study also integrates both the GINI coefficient and atkinson2 for comparative analysis.

## 2. Literature review

### 2.1 Theoretical literature

Numerous studies have established a theoreticalbond between economic globalization and income inequality [14–17].However, the theories will be examined based on the variables used in this study.

With regard to trade openness, one of the crucial theory is the Stolper-Samuelson theorem, which is an extension of the Heckscher–Ohlin (HO) model. Itenvisages that in LDCs, economic

UNDER PEER REVIEW

globalization will narrow income inequalities[18].The [19]theory originally assume that countries will specialized in areas with more factor endowment. It explains that the effect of inequality resulting from trade opennessis due to relative factor endowmentand productivity differences of countries[20]. Hence, a country will benefit from trade openness based on factor endowment andtrade specialization. For instance, developing countries that are endowed with unskilled labour would benefit from trade openness throughan increasein their wages and income.This is because the demand for unskilled workers from these countries will cause an upward push in their wages due to external trade and hence reduce income inequality within the country[20]. Also, since capital and skilled labor are relatively abundant in developed countries while unskilled labour is scarce, income inequality is expected to augment [21]. This is because trade openness will raise the real return of abundant skilled labour and lower returns for scarce unskilled labour. Thus, the theory predicts that inequality will decrease due to trade openness in developing countries while it will increase in advanced countries[21].[22]state that when countries are involved in free trade and they equalized product price between countries, it also makes factors price equalized. However, the level of development of a country plays a pivotal role in the nexus between trade openness and income inequality[19].

The conventional HO has limitations as pointed out by several studies.For instance, sub-Saharan African countries with majority of unskilled labour are supposed to have a reduced gap in income inequality but instead the region is top rank in the world on income inequality.

Concerning FDI and income inequality, the Neoclassical and Dependency theories are of principal interest. The neoclassical scholarscontend that FDI boosts growth and reduces inequality in the host country. They hypothesize that FDI does not only fill the income gap but

assists in the growth and development of a nation via diffusion of technology, human capital development, and export market access [23].

The dependency theory on its part argues that the exploitation of the low incomes nations by high-income nations is the cause of global inequality[24].They theorized that FDI negatively affects economic growth and increases income inequality[25]. Hence, the economic reliance of developing countries on advanced countries leads to income inequality.

In addition, the [26,27]technological change hypothesis posits that there is a rapid demand for skilled labour and new technologyin the early stage of development, which increases inequality but when low-skilled workers develop more skilled, there is a reduction in income inequality over time as the supply of skilled labour equatesdemand[28].

The North-South hypothesis of [29]also contends that FDI deteriorates income inequality in the global North since business corporations in the more advanced countries will want to take advantage of low production costs by investing less in the global South to develop unskilled labour. Hence, FDI widens the inequality gap as it demands more skilled workers with higher wages as compared to unskilled workers in the South[28].

Theories that support the relationship between remittance and income inequality are the optimistic and pessimistic perspectives [30]. For optimistic view,[31] argued that remittance offers financial supports to poor household which reduce income inequality through entrepreneurial innovation, aggregate money demand, and employment. For pessimistic view,[32,33]argued that due to external shocks, remittance can impede economic growth. In addition, , [34] indicates an inverted U-shaped between the theory of remittances and inequality,

UNDER PEER REVIEW

in which remittances initially widen the income inequality gap amongst households but reduce inequality over time.

Furthermore, the social capital theory argue that private property can be passed on from one generation to another. Therefore, those who inherit capital can enjoy high income even without any effort. They have access to the best private education and jobs. This creates inequality of opportunity as well as inequality of outcome. Hence, Differential access to such resources is one of the most enduring features of social inequality and a key reason for its reproduction across time and space[35,36].

### 2.2 Empirical literature

The relationship between economic globalization and income inequality is heterogeneous with mixed results. However, many empirical studies have found a positive link between both concepts, although the outcomes are mixed in developedand developing economies [1,4–7,37].

Specifically in developing countries,[5,6,37] found economic globalization to have a reducing effect on income distribution. Contrary,[5]conclude that economic globalization deterioratesincome inequality. Moreover, [38] argue that the driving force to income convergence through countries is economic globalization.[8]using developed and emerging economies in Europe finds that globalization has noeffect on income inequality.For in-depth analysis in this study, the literature will be examined under separate headings.

#### 2.2.1 Trade openness and income inequality.

The relationship between trade openness and income inequality is mixed[21]. In the 1990s, the relationship have been investigated in several empirical investigations[39–42], and from 2000s onward, the study receives the highest momentum [21,43–45]

UNDER PEER REVIEW

[45]using 32 developed countries from 1963– 2002 reveals that trade openness increases income distribution. They also finds that imports from LDCs correlate positively with income inequality in advance countries. Similarly,[44]use 65 developing countries for 19years to contrast the HO model by suggesting that trade increases income disparity. Likewise,[46]indicates that inequalities can be reduced in countries that integrated into the world economy. Equally,[47]found that there is a drop in rural-urban income distribution in Chinese cities that experience trade openness to a greater degree.[48] using a panel of 71 countries reveals that countries endowed with capital, witness an increasedin inequalities when trade is liberalized.

Contrarly, [43] using a sample of 31 developing and 20 developed countries for 22 years conclude that trade openness lower income inequality. Similarly, [49] also found trade openness to reduce inequality in wages between skilled and low-skilled workers in India.[50] argues that domestic inequality can be reducedif a country is integrated into international trade. [51] used 60 countries (both developed and undeveloped) to conclude that Globalization reduces inequality. Contrarily, [52] criticize[51] for their conclusion based on the selection of the countries. They claim that in developing countries, globalization instead worsens inequality.

Some empirical studies found contradictory results.[53]using 102 countries for 30 years found that for developed countries, trade openness increases inequalities but decreases inequalities in developing countries. The findings are true with that of Dorn et al (2022)using 139 countries from 1970-2014.

### 2.2.1 FDI, ICT development, and income inequality

[54] reveals that hi-tech FDI has significant positive effects on income distribution but the impact depends on the level of technology and human capital development in the host country.

UNDER PEER REVIEW

[28] using 38 countries in Sub-Saharan Africa (SSA) for 28years conclude that FDI does not directly affect income inequality. In a related study [55]used 16 African countries for 33 years to extablish a link between FDI and income inequality. Using a Pooled Mean Group estimator, they finds FDI to increase income equality. However, once there is a further increase in FDI, the effect diminishes. Similarly,[56] conclude that inequality in the EU-27 has been increasing since 1995 due to financial globalization via FDI. Their findings is accurate with that of [43] who conclude that financial globalization, particular foreign direct investment increased income inequality in 51 countries for 23 years.

[57] examine the main drivers of income inequality in 17 West African countries for 41 years. They found that FDI, trade openness, and remittances are the core drivers of income inequality in SSA. [58] reveals that the role of FDI on income inequality depends on technology diffusion, human capital development, and institutional quality in the host country. [59] using a sample of 42 countries in Sub-Saharan Africa for 18years reveals good governance is primordial in reducing income inequality. Similarly,[60]indicates that ICT lessens income inequality but the type of ICT and measurement of income inequality is paramount. This is contrary to the findings of [61] who indicates that ICT increase wealth inequality in the society.

### 2.2.3 Remittance and income inequality

[62] investigate the effect of remittances on income inequality in 42 African countries. The GMM results indicates that remittances worsen income inequality in Africa. Similarly, [63]using African countriesas a case study for 46 years conclude that international migrant remittances positively and significantlyaffects income inequality in Africa. Other empirical studies have found remittance to increase income inequality[64–67].Syne's (2019) study analyze the effect of

UNDER PEER REVIEW

globalization on income inequality for 25 countries in sub-Saharan Africa from 1996-2015 using institutional quality. The fixed-effect results indicates that remittances improve income inequality. Contrary, [68]using Mexico to examine the impact of remittances on inequality conclude that remittances lower inequality.Other empirical studies have found remittance to reduce income inequality [69–74] while others findsno significant effects [75,76]

## 3 Data analysis

The study makes used of unbalance panel data from World Bank data for 19 SSA countries (Burkina Faso, Burundi, Cabe Verde, Cameroon, CAR, Ethiopia, Ghana, Guinea, Kenya, Liberia, Madagascar, Mali, Mozambique, Namibia, Niger, Sierra Leone, Swaziland, Tanzania, and Uganda), ranging from 2000-2015.

To be consistent with literature, we used the Gini coefficientas the best measure of income inequality[77–81].It is obtainedby taking into account the disposable income of the selected countries[81]. Considering the disadvantages of the GINI index, which may be misleading when a country is large with unequal region, we also used the atkinson2 index as a measure of inequality. FDI, trade openness, ICT, and remittances are the explanatory variables while unemployment, inflation, natural resource endowment, and GFCE as a percentage of GDP are control variables. FDI inflows and trade openness is used in this study following the work of [81].Trade openness is used to show trade links between SSA and other countries. It is calculated as the sum of imports plus export over GDP[81]. Remittances which is also one of the explanatory variables is used based on the study of [30]while [60] inspires ICT development inclusion.The descriptive statistics in Appendix 1 shows that the averages of Gini index and atkinson2 between the study period 2000–2015 stand at 0.585% and 0.693% respectively.

UNDER PEER REVIEW

## 4. Methodology

The Two Stage Least Squares (2SLS) and the fixed effect model willbe employed in this study. The rationale of the 2SLS method is to tangle the endogeneity problem witness in the model. Using the Durbin-Wu-Hausan endogeneity test, four endogeneity cases were discovered when tested with Gini index, that is; remittance, population, inflation and natural resource endowment(see appendix 6). Also,remittances, urbanization, inflation, and natural resource endowment when tested with atkinson2 also show evidence of endogeneity (see appendix 5). In this case, the OLS is substituted with thetwo stage least square (2SLS)which is an alternative approach used when face with the problem of endogenity in OLS.This happens when theexplanatory variable correlate with error term. Hence, the 2SLS where we use instrumental variable is more suitable for the study. It should be noted that the study found no evidence of serial correlation amongst the variables as all coefficient were below 0.7 (see Appendix 2)

The fixed effect model is also applied in this study base on the outcome of the Pesaran's test of cross sectional independence (see table 1). The Hausman test also indicate the fixed effect model is the most appropriate (see table 2). However, the presence of cross sectional dependence and heteroskedasticity as indicated in table 1and 2 respectively, warrant the usage of fixed effect model with Driscoll and Kraay standard errors regression [82–84].

### 4.1Econometric specification

To realize how income inequality being a dependent variable is affected by economic globalization and other variables, we specify the following model based on the works of[85]

UNDER PEER REVIEW

$$GINI_{it} = \beta_0 + \beta_1 FDI_{it} + \beta_2 TO_{it} + \beta_3 Remit_{it} + \beta_4 ICT_{it} + \beta_5 unemp_{it} + \beta_6 urban_{it} + \beta_7 In\ la_{it} + \beta_8 NRE_{it} + \beta_9 GFCE_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where Gini is the GINI coefficient; ICT is ICT development; FDI is foreign direct investment; TO is trade openness; Remit is remittances; unemp is unemployment; Infla is inflation; NRE is natural resource endowment; GFCE is government final consumption expenditure as a percentage of GDP, $\beta_0$ = is the intercept, $\beta_i$ =parameter estimators, t=time;$\varepsilon_t$ is random error term.

In the case of fixed effect model, our specification look thus;

$$\bar{w}_{it} = \delta \bar{x}_{it} + \mu_i + \bar{\epsilon}_{it} \ldots\ldots\ldots\ldots 2$$

Where;$\mu_i$ is the each entity intercept, $\bar{w}_{it}$ is the dependent variable,$\bar{x}_{it}$ is the independent variables,$\delta$ is the coefficient of independent variables, $\bar{\epsilon}_{it}$is the error term

**4.2. Unit root test.**

Ascertaining stationarity is primordial to avoid spurious regression[86]**.**Also, since time series for different cross-sectional units may be correlated, which may arise due to presents of common shocks, unobserved factors, spillover effects,or due to similarity in political, cultural, and economic cross-sectional units, it is essential to conduct cross-sectional dependent tests[87,88]. The cross-sectional dependence test helped in deciding whether to use first generation panel unit root test [89,90] or the second generation panel unit root tests[87,88,91].However, the second-generation unit root tests is supreme in case of cross-sectional dependence to avoid spuriousregression[92].The study applied the[88] test for cross-sectional dependency (CD) which can be applied to small and large pane[92]. The outcome of the cross sectional dependence testin

UNDER PEER REVIEW

table 1 makes it suitable for both the first and second-generation unit root tests to be conducted in this study(see appendix 3 and 4).

**Table 1:Pesaran CD test for cross sectional dependence**

| variables | CD test | P-values |
|---|---|---|
| Gini index | 5.620 | 0.000 |
| atkinson2 | 4.807 | 0.000 |
| ICT | 25.056 | 0.000 |
| Unemployment | 9.903 | 0.000 |
| Urban | 13.593 | 0.000 |
| infla | 3.892 | 0.000 |
| NRE | 8.557 | 0.000 |
| GFCE | 0.216 | 0.829 |
| FDI | 6.374 | 0.000 |
| trade | 5.033 | 0.000 |
| remit | 8.817 | 0.000 |

**Source: Author's computation**

**Table 2: preliminary Panel data investigation**

| Gini index as the dependent variable | | Atkinson2 as the dependent variable | |
|---|---|---|---|
| **Test** | **p-values** | **Test** | **p-values** |
| Hausman Test | 0.0000 | Hausman Test | 0.0000 |
| Breusch-Pagan LM test of independence | 0.0000 | Breusch-Pagan LM test of independence | 0.0000 |
| Wald test for heteroskedasticity | 0.0000 | Wald test for heteroskedasticity | 0.0000 |

**Source: Author's computation**

## 5. Results and discussion

Regression results based on two stage least squares estimation are reported in Table 3while that of fixed effect are display in table 4.We limit our interpretations to the main explanatory variables that address the study objectives. For two stage least square,the results show that FDI and trade openness have influenced the degree of inequality not only positively but also significantly. This implies that, increasing the inflow of foreign capital penetration and trade

UNDER PEER REVIEW

volume fails to equalize the distribution of income. This findings is consistent with that of[54,77].Contrary, remittances have a negative impact on inequality. This also implies that by increasing the inflow of remittancesequalizes the distribution of income.The results are in line with that of[71].ICT development was found to be positive insignificant.

To check for robustness of the results, the fixed effect model display in table 4 also indicates that trade and ICT were found to exert a positive and significant influence on income inequality while remittances reduces income inequality as it was found to be negatives and significant. However, FDI did not have any significant influence on income inequality.The results of both Gini index and Atkinson2 show that most of the variables maintain the same sign and effect, implying that Gini and atkinson2 could be good and similar measures of inequality.

**Table 3: Two stage least square estimates**

| Variables | Atkinson2 as the dependent variable | Gini index as the dependent variable |
|---|---|---|
| FDI | 0.000618** | 0.000303** |
| | (0.000247) | (0.000150) |
| trade | 4.52e-05 | 3.45e-05* |
| | (3.09e-05) | (1.88e-05) |
| ICT | -2.17e-06 | 2.35e-07 |
| | (3.81e-05) | (2.32e-05) |
| remit | -5.42e-05* | -4.54e-05** |
| | (3.05e-05) | (1.85e-05) |
| Unemplo | 0.00194*** | 0.00126*** |
| | (0.000438) | (0.000267) |
| urban | -8.66e-05 | -0.000269** |
| | (0.000219) | (0.000133) |
| infla | 1.07e-05 | -2.86e-05 |
| | (3.00e-05) | (1.82e-05) |
| NRE | -0.00306*** | -0.00167*** |
| | (0.000409) | (0.000249) |
| GFCE | -2.96e-05 | -1.61e-05 |
| | (2.92e-05) | (1.78e-05) |
| remit | -2.62e-05 | 1.58e-05 |
| | (2.40e-05) | (0.000105) |
| Constant | 0.711*** | 0.606*** |
| | (0.0118) | (0.00720) |

UNDER PEER REVIEW

| | | |
|---|---|---|
| Number of groups | 19 | 19 |
| Observations | 285 | 285 |
| R-squared | 0.3582 | 0.3270 |
| Prob > F | 0.0000 | 0.0000 |

Note:*** denote 1% level of significant,** 5% level of significant and * 10% level of significant. Robust standard errors in parentheses

**Source: Author's computation**

UNDER PEER REVIEW

**Table 4: Fixed effect estimates with Driscoll-Kraay standard errors regression**

| Variables | Atkinson2 as the dependent variable | Gini index as the dependent variable |
|---|---|---|
| FDI | -5.99e-05 | -0.000203 |
| | (8.56e-05) | (0.000159) |
| trade | 1.27e-05** | 3.81e-05 |
| | (3.27e-05) | (2.58e-05) |
| ICT | 0.000118*** | -1.81e-05 |
| | (3.18e-05) | (2.74e-05) |
| remit | -9.98e-05*** | -1.58e-05 |
| | (1.87e-05) | (0.000105) |
| unemplo | 0.00117 | 0.00152 |
| | (0.00316) | (0.000921) |
| urban | -0.00808*** | -0.000751** |
| | (0.00133) | (0.000258) |
| infla2 | 4.27e-05*** | -2.78e-05 |
| | (9.84e-06) | (2.88e-05) |
| NRE | -0.00128** | -0.00140** |
| | (0.000495) | (0.000533) |
| GFCE | 9.23e-06 | -1.79e-05*** |
| | (1.66e-05) | (6.04e-06) |
| remit | -3.65e-05** | -3.93e-05 |
| | (1.37e-05) | (8.19e-05) |
| Constant | 0.928*** | 0.613*** |

| | | |
|---|---|---|
| | (0.0407) | (0.0277) |
| Observations | 285 | 285 |
| Number of groups | 19 | 19 |
| R-square | 0.2660 | 0.2625 |
| Prob > F | 0.0000 | 0.0000 |

Note:*** denote 1% level of significant,** 5% level of significant and * 10% level of significant. Robust standard errors in parentheses

**Source: Author's computation**

Considering table 3, the coefficient of determination (R-squared) is 0.3582 for atkinson2 while it is 0.3270 for Gini index, implying that variation in income inequality is explain by economic globalization variables used in this study by 35% and 32% respectively. In table 4, the R-square of Atkinson2 is 0.2660 and 0.2625 for Gini index indicating that explanatory variables contribute in explaining income inequality by 26% in both cases. In addition, the F-statistic is significant at1%, indicating the performance and acceptanceof the overall model.

## 9. Conclusion and policy implications

Globalisation – the process of integrating different economies is one of the most significant trends shaping the world today.It has undoubtfully boost economic growth, globalized trade, diffused knowledge, and equalized income distribution. However, empirical verification are controversial. Thus, this study was out to investigate the effects of economic globalizationon income inequality in SSA. The study utilizedthe 2STLS regression due endogeneity problem face in the model and fixed effect model due to cross sectional dependence.The results reveals that FDI, Trade openness, and ICT developmentpositively and significantly affects income inequalityin SSA while remittances have a negative and significant effect. The results relatively disfavor the conventional reasoning of HO theory that trade lower income inequality in developing countries. Based on this conclusion the study recommends the following;

UNDER PEER REVIEW

The governments should becautious in the invitation of foreign investors in their countriesas opening up their economy for investors and inflows of technology worsen their income inequality. More specifically, they should place ownership restrictions, tax rates, and sanctionsfor investors increasing income inequality. Thus, fostering FDI and trade should be geared towards equalizing the distribution of income.In addition, they should encourage the inflow of remittance through tax reduction as it reduces income inequality.

**Reference**


1. Bergh A, Kolev A, Tassot C. Economic globalisation, inequality and the role of social protection Working Paper No. 341. 2017.
2. Potrafke N. "The Evidence on Globalisation", The World Economy, Vol. 38, pp. 509-552. 2015;
3. Lee KK. Globalization, Income Inequality and Poverty: Theory and Empirics. Social Systems Studies. 2014;28:109–34.
4. Bergh A, Mirkina I, Nilsson T. Can social spending cushion the inequality effect of globalization? Economics & Politics. 2020;32(1):104–142.
5. Bergh A, Nilsson T. Do liberalization and globalization increase income inequality? European Journal of Political Economy. 2010;26(4):488–505.
6. Lang V, Tavares M. The distribution of gains from globalization. IMF Working Paper, 18(54), 1–65. 2018.
7. Sturm J E., Pleninger R, de Haan J. The "forgotten" middle class: an analysis of the effects of globalisation. KOF Working Papers, 466. 2019.
8. Atanasova I, Tsvetkov T. Globalization Comparative Countries Income Analysis of the Inequality : European. 2021;8003.
9. Syne HN. Evaluation of the impact of globalization on income inequality in sub-saharan african countries from the view of institutional economics. 2019.
10. Stiglitz JE. Globalization and its discontents. New York: W. W. Norton. 2003.
11. Ajayi I. Globalization and Equity in sub-Saharan Africa. Globalization and Equity: Perspectives from the Developing World, Edward Elgar, Cheltenham. 2005;1–44.
12. IMF. Chapter 1: Tackling Inequality. In: Fiscal Monitor. 2017. p. 1–60.
13. Odusola A, Cornia GA, Bhorat H, Conceição P. Income Inequality Trends in sub-Saharan Africa Divergence, Determinants and Consequences: Introduction, Motivation and Overview. Nations Development Programme (UNDP) Africa Reports. 2019. 1–6 p.
14. Achiko N, Erik T. Globalization, Poverty, and Inequality in Latin America: Findings from Case Studies. World Development. 2010;38(6):797–802.
15. Anderson E. Openness and inequality in developing countries: A review of theory and recent evidence. World Development. 2005;33(7):1045–63.
16. Demirguc-Kunt A, Levine R. Finance and inequality: theory and evidence. Annual Review of Financial Economics. 2009;1(1):287–318.


UNDER PEER REVIEW

17. De Haan J, Sturm J. Finance and income inequality: A review and new evidence. European Journal of Political Economy. 2017;5(3):171–95.

18. Stolper W, Samuelson P. Protection and real wages. The Review of Economic Studies. 1941;9(1):58–73.

19. Ohlin B. Inter-Regional and International Trade. Cambridge, MA: Harvard University Press. 1933.

20. Heimberger P. Does Economic Globalisation Affect Income Inequality ? A Meta-analysis.Working Paper 165. 2019.

21. Dorn F, Fuest C, Potrafke N. Trade openness and income inequality: New empirical evidence. Economic Inquiry. 2022;60(1):202–23.

22. Samuelson PA. "International Trade and the Equalisation of Factor Prices." economic journal. 1948;(6):163–84.

23. Li X, Liu X. Foreign Direct Investment and economic growth: An increasingly endogenous relationship. World Development. 2005;33(3):393–407.

24. Hendricks J. "Dependency Theory." In: Encyclopedia of Sociology, edited by EF Borgatta Retrieved January 5, 2012 (http://edu.learnsoc.org/Chapters/3%20theories%20of%20sociology/5%20dependency%20theory.htm). 2010.

25. Firebaugh G, Beck F. Does economic growth benefit the masses? Growth, Dependence, and Welfare in the Third World.Available from: http://www.jstor. org/stable/2096441. American Sociological Review. 1994;59:631-653.

26. Aghion P, Howitt P. Endogenous Growth Theory, The MIT Press, Cambridge, MA and London. 1998.

27. Aghion P, Howitt P. The Economics of Growth, MIT Press, Cambridge. 2009.

28. Gossel S. FDI and inequality in Sub-Saharan Africa: does democracy matter? International Journal of Emerging Markets. 2022;

29. Feenstra RC, Hanson G. "Foreign direct investment and relative wages: evidence from Mexico's maquiladoras." Journal of International Economics. 1997;42:371–93.

30. Ofori I, Gbolonyo E, Dossou T, Nkrumah R. Remittances and income inequality in Africa: Financial development thresholds for economic policy. Research in Globalization. 2022;4(113015):1–24.

31. Kindleberger C. Europe's post-war growth: the role of labour supply. Oxford University Press, New York, USA. 1965;

32. Binford L. Migrant remittances and (under) development in Mexico. Critical Anthropology. 2003;23(3):305–336.

33. Lipton M. Migration from the rural areas of poor countries: the impact on rural productivity and income distribution. World Development. 1980;8(1):1–24.

34. Stark O, Taylor J, Yitzhaki S. Remittances and inequality. Economic Journal. 1986;96(383):722–40.

35. Kariyasa K, Dewi YA. This document is discoverable and free to researchers across the globe due to the work of AgEcon Search . Help ensure our sustainability . Journal of Gender, Agriculture and Food Security. 2011;1(3):1–22.

36. Nan L. Inequality in Social Capital. Contemporary Sociology. 2000;29(6):785–95.

37. Dorn F, Schinke C. Top income shares in OECD countries: the role of government ideology and globalisation. The World Economy. 2018;41(9):2491–2527.

38. Lindert PH, Williamson JG. Does Globalization Make the World More Unequal? (Working Paper No.

UNDER PEER REVIEW

8228). https://doi.org/10.3386/w8228. 2001.

39. Borjas G., Freeman RB, Katz LF, DiNardo J, Abowd JM. How much do immigration and trade affect labor market outcomes? Brookings Papers on Economic Activity. 1997;1(1):1–90.

40. Feenstra RC, Hanson G. Globalization, outsourcing, and wage inequality. American Economic Review. 1996;86(2):240–245.

41. Wood A. How trade hurt unskilled workers. Journal of Economic Perspectives. 1995;9(3):57–80.

42. Leamer E. In search of Stolper□Samuelson linkages between international trade and lower wages. In: Collins, S.M. (Ed.) Imports, Exports and the American Worker. Washington, D.C.: Brookings, pp. 141–202. 1998;

43. Jaumotte F, Lall S, Papageorgiou C. Rising income inequality: technology, or trade and financial globalization? IMF Economic Review. 2013;61(2):271–309.

44. Meschi E, Vivarelli M. Trade and income inequality in developing countries. World Development. 2009;37(2):287–302.

45. Roser M, Cuaresma J. Why is income inequality increasing in the developed world? Review of Income and Wealth. 2016;66(2):1–27.

46. Lindert PH, Williamson J. "Does Globalization Make the World More Unequal?", paper presented at the NBER Globalization in Historical Perspective conference in Santa Barbra, California, May 3-6. 2001.

47. Wei SJ, Wu Y. Globalization and inequality: evidence from within China.Working Paper 8611 http://www.nber.org/papers/w8611. 2001.

48. Gourdon J. Openness and Inequality in Developing Countries: A New Look at the Evidence (No. 200709). Retrieved from CERDI website: https://ideas.repec.org/p/cdi/wpaper/895.html. 2007.

49. Kumar U, Mishra P. Trade Liberalization and Wage Inequality: Evidence from India. Review of Development Economics. 2008;12(2):291–311.

50. Chakrabarti A. Does Trade Cause Inequality. journal of economics. 2000;25(2):1-21.

51. Zhou L, Biswas B, Bowles T, Saunders P. Impact of globalization on Income Distribution Inequality in 60 countries. Global Economy Journal. 2011;11(1):1–18.

52. Tsai PL, Huang CH, Yang CY. Impact of Globalization on Income Distribution Inequality in 60 Countries: Comments. Global Economy Journal. 2012;12(3):1–10.

53. Calderón C, Chong A. External sector and income inequality in interdependent economies using a dynamic panel data approach. Economics Letters. 2001;71(2):225–231.

54. Wall R. The State of African Cities 2018. The geography of African investment. 2018. 1–139 p.

55. Teresia K, Charles A. FDI and income inequality in Africa. Oxford Development Studies. 2017;46(2):250–65.

56. Asteriou D, Dimelis S, Argiro M. Globalization and income inequality: A panel data econometric approach for the EU27 countries. economic modelling. 2004;34:592–9.

57. Anyanwu JC, Erhijakpor AEO, Obi E. Empirical Analysis of the Key Drivers of Income Inequality in West Africa. African development review. 2016;28(1):18–38.

58. Schneider BR, Soskice D. Inequality in developed countries and Latin America: coordinated, liberal and hierarchical systems. Economy and Society. 2009;38(1):17–52.

59. Asongu SA, Nnanna J, Acha-Anyi PN. Finance, inequality and inclusive education in Sub-Saharan Africa. Economic Analysis and Policy. 2020;64(9):162–77.

UNDER PEER REVIEW

60. Adams S, Akobeng E. “ICT, governance and inequality in Africa.” Telecommunications Policy. 2021;45(10):102198.

61. Njangang H, Beleck A, Tadadjeu S, Kamguia B. “Do ICTs drive wealth inequality? Evidence from a dynamic panel analysis.” Telecommunications Policy. 2021;102246.

62. Ofori I, Emmanuel Y, Amègnonna M, Nkrumah R. Remittances and income inequality in Africa: Financial development thresholds for economic policy.100084. Research in Globalization. 2022;4.

63. Anyanwu JC. International Remittances and Income Inequality in Africa. Review of Economic and Business Studies. 2011;4(1):117–48.

64. Bouoiyour J, Amal M. “The Effects of Remittances on Poverty and Inequality: Evidence from Rural Southern Morocco.” MPRA Paper 55686, Munich Personal RePEc Archive, Munich. 2014.

65. Möllers J, Wiebke M. “The Effects of Migration on Poverty and Inequality in Rural Kosovo.” IZA Journal of Labor & Development. 2014;16(3).

66. Abrar Ullah, Rohaizat Bin Baharum MY& KMN. Journal of Applied Economics and Business Studies ( JAEBS ). Journal of Applied Economics and Business Studies. 2020;4(2):181–204.

67. Bang JT, Mitra A, Wunnava P V. Do remittances improve income inequality? An instrumental variable quantile analysis of the Kenyan case. Economic Modelling. 2016;58:394–402.

68. Koczan Z, Loyola F. How do migration and remittances affect inequality. A case study of Mexico. 2018.

69. Akobeng E. Harnessing remittances for the poor: the role of institutions. Journal of Economics Policy reform. 2021;1–17.

70. Acheampong AO, Appiah-Otoo I, Dzator J, Agyemang KK. Remittances, financial development and poverty reduction in Sub-Saharan Africa: Implications for post-COVID-19 macroeconomic policies. Journal of Policy Modelling. 2021;43(6):136–1387.

71. Abduvaliev M, Bustillo R. Impact of remittances on economic growth and poverty reduction amongst. Post-Communist Economics. 2020;32(4):525–46.

72. Colombelli A, Grinza E, Meliciani V, Rossi M. Pulling Effects in Immigration Entrepreneurship: Does Gender Matter? Economic Geography. 2021;97(1):1-33.

73. Margolis, David, Miotti L, Mouhoud EM, Joël O. “To Have and Have Not”: Migration, Remittances, Poverty and Inequality in Algeria.” IZA Discussion Paper 7747, Institute for the Study of Labor, Bonn. 2013.

74. Mughal M, Amar IA. “Remittances, Inequality and Poverty in Pakistan: Macro and Microeconomic Evidence.” CATT Working Paper 2, Centre d’Analyse Théorique et de Traitement des données économiques, Cedex. 2012.

75. Beyene BM. “The Effects of International Remittances on Poverty and Inequality in Ethiopia.” The Journal of Development Studies. 2014;50(10):1380–96.

76. Yang D, Martinez C. “Remittances and Poverty in Migrants’ Home Areas: Evidence from the Philippines.” Available at: https://www.cbd.int/financial/charity/philippines-remittance.pdf. 2005;

77. Teresia K, Charles A. FDI and income inequality in Africa. Oxford Development Studies. 2018;46(2):250–65.

78. Nguyen CP, Schinckus C, Su TD, Chong FHL. The Influence of Tourism on Income Inequality. Journal of Travel Research. 2021;60(7):1426–1444.

79. Fang J, Gozgor G, Paramati SR, Wu W. The impact of tourism growth on income inequality: Evidence from developing and developed economies. tourism economics. 2021;27(8):1669–1691.

UNDER PEER REVIEW

80. Folarin O, Adeniyi O. Does Tourism Reduce Poverty in Sub-Saharan African Countries? Journal of Travel Research. 2020;59(1):140–155.

81. Xu C, Han M, Dossou TAM, Bekun FV. Trade openness, FDI, and income inequality: Evidence from sub-Saharan Africa. Afr Dev Rev. 2021;33:193– 203.

82. Mehmood B, Mustafa H. Empirical Inspection of Broadband Growth Nexus: A Fixed Effect with Driscoll and Kraay Standard Errors Approach. Soc Sci Pakistan Journal of Commerce and Social Sciences. 2014;8(1):1–10.

83. Knight KW. Temporal variation in the relationship between environmental demands and well-being: A panel analysis of developed and less-developed countries. Population and Environment. 2014;36(1):32–47.

84. Driscoll JC, Kraay AC. Consistent covariance matrix estimation with spatially dependent panel data. Review of Economics and Statistics. 1998;80(4):549–59.

85. Baek I, Shi Q. Impact of Economic Globalization on Income Inequality: Developed Economies vs Emerging Economies. Global Economy Journal. 2016;16(1):49–61.

86. Gujarati DN. Basic Econometrics, 4th ed. McGraw-Hill Companies, New York. 2004.

87. Pesaran M. Testing weak cross-sectional dependence in large panels. Econ Rev. 2015;34(6):1089–1117.

88. Pesaran MH. General Diagnostic Tests for Cross Section Dependence in Panels.IZA DP No. 1240 [Internet]. 2004. Available from: http://www.emeraldinsight.com/loi/afr

89. Im K., Pesaran M., Shin Y. Testing for unit roots in heterogeneous panels. J Econ. 2003;115(1):53–74.

90. Levin A, Lin C, Chu C. Unit root tests in panel data: asymptotic and finite-sample properties. J Econs. 2002;108(1):1–24.

91. Pesaran H. A Simple Panel Unit Root Test in the Presence of Cross Section Dependence, Cambridge Working Papers in Economics 0346, Faculty of Economics (DAE), University of Cambridge. 2003.

92. Adeleye BN, Akam D, Inuwa N, James HT, Basila D. Does globalization and energy usage influence carbon emissions in South Asia? An empirical revisit of the debate. Environmental Science and Pollution Research [Internet]. 2022;(0123456789). Available from: https://doi.org/10.1007/s11356-022-24457-9

## APPENDIX

### Appendix1: Descriptive Statistics

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Gini index | 296 | .585 | .029 | .527 | .788 |
| Atkinson2 | 296 | .693 | .052 | .583 | .812 |
| FDI | 304 | 5.338 | 10.96 | -2.739 | 103.337 |
| Trade | 293 | 67.107 | 38.97 | 20.964 | 311.354 |
| Remit | 280 | 2.658 | 3.604 | .001 | 21.81 |
| ICT | 302 | 4.635 | 7.277 | .015 | 42.683 |
| Unemplo | 304 | 6.142 | 6.466 | .32 | 28.24 |
| Urban | 304 | 31.9 | 13.17 | 8.246 | 64.3 |
| Infla | 282 | 7.316 | 6.77 | -8.238 | 44.391 |
| NRE | 304 | 9.962 | 7.142 | .414 | 40.492 |
| GFCE | 286 | 14.577 | 4.698 | 3.541 | 28.015 |

**Source: Authors computation**

UNDER PEER REVIEW

**Appendix 2: correlation matrix table**

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Gini index | 1.000 | | | | | | | | | | |
| (2) Atkinson2 | 0.874 | 1.000 | | | | | | | | | |
| (3) FDI | -0.108 | -0.037 | 1.000 | | | | | | | | |
| (4) Trade | 0.074 | 0.201 | 0.310 | 1.000 | | | | | | | |
| (5) Remit | -0.086 | -0.020 | 0.628 | 0.323 | 1.000 | | | | | | |
| (6) ICT | 0.096 | 0.156 | 0.014 | 0.150 | 0.303 | 1.000 | | | | | |
| (7) unemplo | 0.344 | 0.395 | -0.094 | 0.488 | 0.007 | 0.283 | 1.000 | | | | |
| (8) urban | -0.011 | 0.069 | 0.271 | 0.418 | 0.327 | 0.399 | 0.139 | 1.000 | | | |
| (9) Infla | -0.132 | -0.061 | 0.000 | 0.162 | -0.096 | -0.119 | -0.052 | 0.008 | 1.000 | | |
| (10) NRE | -0.435 | -0.467 | 0.306 | 0.045 | 0.190 | -0.277 | -0.440 | -0.138 | 0.309 | 1.000 | |
| (11) GFCE | 0.181 | 0.144 | 0.086 | 0.195 | 0.060 | 0.108 | 0.353 | -0.141 | -0.255 | -0.082 | 1.000 |

**Source: Authors computation**

**Appendix 3: Levin-lin-chu unite root test**

| Number of countries =19, number of years = 16 | | | | | |
|---|---|---|---|---|---|
| Variables | Test at level | | Test in difference | | Conclusion |
| | t-statistics | p-value | t-statistics | p-value | |
| GINI | -1.8901 | 0.0294** | | | I(0) |
| Atkinson2 | -2.4517 | 0.0071*** | | | I(0) |
| FDI | -3.9541 | 0.0000*** | | | I(0) |
| Remit | -2.1753 | 0.0148** | | | I(0) |
| Trade | -3.4602 | 0.0003*** | | | I(0) |
| ICT | 10.8544 | 1.0000 | 9.3257 | 1.0000 | I(1) |
| Unemplo | -3.6731 | 0.0001*** | | | I(0) |
| Urban | -2.3508 | 0.0094*** | | | I(0) |
| GFCE | -0.9088 | 0.1817 | -8.6458 | 0.0000 | I(1) |
| Infla | -7.5636 | 0.0000*** | | | I(0) |
| Pop | - 6.1278 | 0.0000*** | | | I(0) |
| NRE | - 4.3356 | 0.0000*** | | | I(0) |

**Source:Authors computation** ***(p<1%), **(p<5%), *(p<10%).

## Appendix 4: PESCADF unit root test

| **variables** | **Test statistics at levels** | **p-values** | **Test statistic at first difference** | **P-values** | **Decision** |
|---|---|---|---|---|---|
| Atkinson2 | -1.018 | 0.154 | 2.312 | 0.000 | 1(1) |
| Gini index | -3.889 | 0.000 | -- | -- | 1(0) |
| FDI | -2.425 | 0.001 | -- | -- | 1(0) |
| trade | -2.033 | 0.097 | -2.647 | 0.000 | 1(1) |
| ICT | -1.525 | 0.810 | -2.302 | 0.009 | 1(1) |

UNDER PEER REVIEW

| | | | | | |
|---|---|---|---|---|---|
| remi | -2.101 | 0.061 | -- | -- | 1(0) |
| unempl | -2.261 | 0.012 | -- | -- | 1(0) |
| urban | -1.087 | 0.997 | -2.196 | 0.026 | 1(1) |
| infla | -2.925 | 0.000 | -- | -- | 1(0) |
| NRE | -1.586 | 0.731 | -2.413 | 0.000 | 1(1) |
| GFCE | -1.671 | 0.599 | -3.341 | 0.000 | 1(1) |

**Source :Authors computation**

**Appendix 5: Durbin-Wu-Hausman endogeneity test with Atkinson2 as the dependent variable**

| HO: variables are exogenous, Ha: variables are endogenous | | | | |
|---|---|---|---|---|
| Variable | Robust score chi2(1) | p-value | Robust regression | p-value |
| FDI | 0.369613 | 0.5432 | F(1, 274) = 0.377861 | 0.5393 |
| Remit | 7.88595 | 0.0050* | F(1, 260) =7.70992 | **0.0059 *** |
| Trade | 0.611698 | 0.4341 | F(1, 274) =0.845783 | 0.3586 |
| ICT | 0.954175 | 0.3287 | F(1, 274) =1.11946 | 0.2910 |
| Unemplo | 0.459385 | 0.4979 | F(1, 274) =0.485307 | 0.4866 |
| Urban | 3.13198 | 0.0768* | F(1, 274) =3.20923 | **0.0743 *** |
| Pop | 0.418943 | 0.5175 | F(1, 274) =0.381093 | 0.5375 |
| Infla | 3.22225 | 0.0726* | F(1, 274) =3.714383 | **0.0550 *** |
| NRE | 6.62697 | 0.0100* | F(1, 274) =6.70118 | **0.0101 *** |
| GFCE | 0.163948 | 0.6855 | F(1, 274) =0.152376 | 0.6966 |

**Source: Authors computation** *(p-value less than 10%)

**Appendix 6: Durbin-Wu-Hausman endogeneity test with Gini as the dependent variable**

| HO: variables are exogenous, Ha: variables are endogenous | | | | |
|---|---|---|---|---|
| Variable | Robust score chi2(1) | p-value | Robust regression | p-value |
| FDI | 1.31776 | 0.2510 | F(1, 274) = 1.50039 | 0.2217 |
| Remit | 5.27009 | 0.0217* | F(1, 260) =6.33287 | **0.0125 *** |
| Trade | 0.241692 | 0.6230 | F(1, 274) =0.2918 | 0.5895 |
| ICT | 2.06527 | 0.1507 | F(1, 274) =2.46194 | 0.1178 |
| Unemplo | 1.17975 | 0.2774 | F(1, 274) =1.28417 | 0.2581 |
| Urban | 0.517406 | 0.4720 | F(1, 274) =0.516249 | 0.4731 |
| Pop | 2.76016 | 0.0966* | F(1, 274) =3.21553 | **0.0740 *** |
| Infla | 7.13265 | 0.0076* | F(1, 274) =9.01033 | **0.0029 *** |
| NRE | 4.56327 | 0.0327* | F(1, 274) =5.0295 | **0.0257 *** |
| GFCE | 1.96553 | 0.1609 | F(1, 274) =1.55912 | 0.2129 |

**Source:Authors computation***(p-value less than 10%)

UNDER PEER REVIEW