

INCOME INEQUALITY AND INCLUSIVE GROWTH: EVIDENCE FROM WEST AFRICAN ECONOMIES

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Abstract

Income inequality remains one of the most persistent development challenges confronting West African economies. Despite periods of sustained economic growth, the benefits of development have often been unevenly distributed, limiting progress toward inclusive growth and shared prosperity. Therefore, this study examines the impact of income inequality on inclusive growth in West African countries over the period 2000–2023. Employing a quantitative ex post facto research design, the analysis models the Gini Index as a function of real GDP per capita, employment, government education expenditure, public health expenditure, trade openness, and remittance inflows. The study applies the Panel Autoregressive Distributed Lag (PARDL) framework, which accommodates heterogeneous panels and mixed integration orders [I(0) and I(1)], enabling the estimation of both short-run and long-run dynamics while addressing potential endogeneity and cross-country heterogeneity. The Pedroni cointegration test indicates that there is no long-run equilibrium relationship among the variables. The PARDL results show that in the long run, GDP per capita and trade openness significantly reduce income inequality, whereas employment and government education expenditure significantly increase it. Public health expenditure and remittances exhibit negative but statistically insignificant effects on inequality. The error correction coefficient (-0.4996 , $p = 0.001$) confirms moderate adjustment toward long-run equilibrium, with approximately 50% of short-run disequilibria corrected annually. The findings suggest that economic growth and trade integration are effective mechanisms for reducing inequality, while employment and education spending remain unevenly distributed in their benefits. Policy recommendations emphasize the need to enhance the inclusiveness of public investment by prioritizing education and health expenditures for low-income groups, promoting decent job creation, and improving the productive use of remittances through financial inclusion initiatives. Furthermore, trade and fiscal frameworks should be designed to ensure equitable distribution of growth benefits, thereby fostering sustainable and inclusive development across the West African region.

Keywords: Income inequality, Inclusive growth, West Africa, Panel ARDL, Gini Index, Trade openness, Remittances
JEL Classification: C33, E24, F24, I32, O47, O55

INTRODUCTION

Over the past few decades, West African economies have experienced notable periods of economic growth, largely driven by natural resource exploitation, agricultural expansion, diaspora remittances, and the gradual emergence of service-oriented sectors (African Development Bank [AfDB], 2022). However, this growth has not translated into equitable development outcomes across the population. Rising income inequality remains a persistent concern, with wealth increasingly concentrated among a small elite, while vast segments of the population particularly those in rural areas and the informal sector continue to experience marginalization and limited

access to economic opportunities (World Bank, 2023).

The concept of inclusive growth emphasizes not merely the pace of economic expansion but also its distributional outcomes, ensuring that growth translates into broad-based improvements in welfare and living standards (Rauniyar & Kanbur, 2010). In the context of West Africa, inclusive growth should be reflected in job creation, expanded access to quality education, robust infrastructural development, and increased social spending targeted at vulnerable households. Yet, available evidence suggests that much of the region's growth has been characterized by "jobless growth," underinvestment in public services, and structural constraints that exacerbate inequality (International Monetary Fund [IMF], 2022).

According to the Kuznets Hypothesis (1955), inequality typically rises during the early stages of economic development before declining as economies mature and redistribute gains more effectively. However, the experience of West African countries appears to deviate from this trajectory—inequality remains entrenched despite periods of sustained growth, raising concerns about the inclusiveness and sustainability of the region's development model (Fosu, 2015). This paradox challenges policymakers and deepens the debate surrounding the growth–inequality nexus in West Africa.

Although the region has achieved commendable growth performance, this progress has not been accompanied by a corresponding reduction in income inequality. Persistent disparities are largely attributed to limited employment opportunities, weak infrastructure, inadequate social spending, and unequal access to education and productive resources (United Nations Development Programme [UNDP], 2021). Consequently, the persistence of inequality undermines efforts toward sustainable and inclusive development, perpetuating cycles of poverty, social exclusion, and instability (World Bank, 2023).

Empirical research on the growth–inequality relationship has produced mixed findings. While some studies support the Kuznets curve, others emphasize the influence of contextual factors such as governance quality, demographic pressures, and policy orientation (Acemoglu & Robinson, 2012; Fosu, 2015). Despite these scholarly efforts, there remains a significant empirical gap in understanding how key indicators of inclusive growth—such as employment creation, access to education, infrastructure development, and social investment—affect income inequality across West African countries. This gap limits policymakers' capacity to formulate strategies that effectively link economic growth with equitable welfare outcomes.

Therefore, this study seeks to provide robust empirical evidence on the relationship between inclusive growth and income inequality in West African economies. By exploring this nexus, the study aims to contribute to both theoretical debates and practical policy design, with the goal of promoting more inclusive and equitable development across the sub-region.

Conceptual Issues

Income Inequality: It refers to the uneven distribution of income across individuals or households in a society. It is typically measured using the Gini coefficient, income distribution ratios (such as

the Palma ratio), or percentile shares of income groups (World Bank, 2023). High inequality implies that economic growth disproportionately benefits the wealthy, leaving vulnerable groups excluded from development gains. Kuznets (1955) hypothesized that inequality follows an inverted-U pattern, rising in the early stages of growth before declining as societies become more industrialized and wealth distribution becomes more balanced. However, in contemporary African economies, inequality often remains entrenched despite periods of growth (Fosu, 2017).

Inclusive Growth: It is broadly defined as economic growth that is both sustained and broadly shared across all segments of society. It emphasizes the creation of productive employment, access to social services, poverty reduction, and the reduction of inequality (Rauniyar & Kanbur, 2010). According to the Organization for Economic Co-operation and Development (OECD, 2018), inclusive growth is not merely about increasing GDP but ensuring that growth translates into improvements in well-being, equity, and opportunities. In the African context, inclusive growth is measured by indicators such as employment creation, access to education and healthcare, social protection coverage, and infrastructural expansion (AfDB, 2022).

The relationship between income inequality and inclusive growth is complex and multidimensional. While growth has the potential to reduce inequality through job creation and expanded opportunities, inequality can in turn hinder inclusive growth by limiting human capital accumulation, reducing social cohesion, and constraining aggregate demand (Aghion et al., 1999; IMF, 2014). In Sub-Saharan Africa, studies suggest that persistent inequality undermines the inclusiveness of growth outcomes, often resulting in “jobless growth” and unequal access to opportunities (Fosu, 2017; UNDP, 2021).

REVIEW OF RELATED LITERATURE

There are works that stand out among related empirical works. Karimu and Abubakar (2025) examined the impact of structural change on income inequality and inclusive growth in Sub-Saharan Africa using Iterated GMM panel estimation for 40 countries from 2001 to 2015. Their study investigated how economic growth and sectoral shifts toward services influence inequality. The findings reveal that while growth alone tended to increase measured inequality, structural shifts toward services had a mild equalizing effect. However, the net impact of structural change on inequality was small, suggesting that growth in the region has often been non-inclusive.

Similarly, Ochi, Labidi, and Saidi (2024) explored the relationship between pro-poor growth, income inequality, institutional quality, and poverty reduction in developing economies through panel regressions and threshold estimation techniques. Their results show that growth effectively reduces extreme poverty only when income inequality remains below a certain threshold—approximately a mid-30s Gini coefficient. Beyond that threshold, the poverty-reducing effect of growth diminishes, implying that excessive inequality can dampen the inclusiveness of growth.

Atangana (2024) examined the interaction between income inequality and structural change in Sub-Saharan Africa, focusing on its implications for productivity and development. Using panel estimation techniques, the study found that income inequality both influences and results from uneven structural change and productivity gaps across sectors. This bidirectional relationship

suggests that redistributive and structural transformation policies must be implemented simultaneously to promote inclusive development.

Katuka (2024) assessed how fiscal space and governance quality influence inclusive growth in African economies through panel data analysis. The findings show that countries with greater fiscal space and stronger governance institutions are better able to translate public spending into inclusive outcomes. Conversely, limited fiscal capacity constrains redistributive policy effectiveness and the inclusiveness of growth.

In the same context, Kebede et al. (2023) conducted a panel analysis across African countries between 2004 and 2018 to examine how multidimensional financial inclusion affects income inequality. Their findings indicate that greater financial inclusion is associated with lower inequality, although the magnitude of this relationship varies across regions and depends largely on the quality of inclusion—such as access to credit, savings, and payment systems.

Mamman (2023) investigated the role of fiscal policy measures in promoting inclusive growth in Africa using panel data analysis. The study found that targeted fiscal interventions—such as social transfers and education or health spending—are more consistently linked to pro-poor and inclusive growth outcomes than broad fiscal expansion. The effectiveness of fiscal policy was also shown to depend on income group characteristics and governance quality.

Adeosun (2021) applied region-specific fixed and dynamic panel estimations to analyze pro-poor and inclusive growth in West Africa using employment, poverty, and distributional metrics. The study reported mixed evidence: while some countries experienced growth that reduced poverty, others displayed jobless or exclusionary growth patterns. Governance and employment structure were identified as critical determinants of these outcomes.

Finally, UNCTAD (2021) provided an evidence-based assessment of inequality, poverty, and policy directions for inclusive growth in Africa. The report emphasized that sustained economic growth alone has not consistently resulted in inclusive development. Instead, the inclusiveness of growth depends on effective policy design—particularly in social protection, education, and fiscal redistribution—as well as resilience to external shocks such as pandemics and climate change.

RESEARCH METHODOLOGY

Theoretical Framework

This research focuses on Simon Kuznets' (1955) seminal theory on *economic growth and income inequality* which provides the foundational framework for understanding how development affects income distribution. The Kuznets hypothesis proposes an inverted U-shaped relationship between economic growth and inequality. In the early stages of development, as economies shift from agriculture to industry, income inequality tends to rise because the gains from modernization and industrialization are concentrated among a small segment of the population with access to capital, skills, and urban employment. Over time, however, as more people migrate to high-productivity sectors, education expands, and redistributive policies strengthen, inequality begins to decline.

In essence, the Kuznets curve reflects a process of structural transformation and institutional evolution, where economic modernization initially widens income disparities but eventually leads to a more equitable distribution of wealth as societies mature. Yet, subsequent studies have revealed that this relationship is not universal and may vary depending on factors such as governance, human capital, and the structure of the economy (Anand & Kanbur, 1993; Barro, 2000). In particular, developing regions with weak institutions or resource-dependent economies may experience persistent inequality even amid growth (Fosu, 2009).

In the West African context, the Kuznets hypothesis offers insight into why economic growth has not always translated into reduced inequality. Growth in many countries within the region—such as Nigeria, Ghana, and Senegal—has been driven largely by extractive and service sectors with limited employment opportunities, thereby benefiting a narrow segment of the population. As such, growth may initially intensify inequality if access to education, finance, and infrastructure remains unequal. However, the theory also suggests that sustained investment in human capital, inclusive governance, and targeted social spending can help shift economies toward the downward phase of the Kuznets curve, where inequality begins to decline.

Thus, the Kuznets framework serves as a vital starting point for understanding the non-linear and context-dependent relationship between economic growth and income inequality in West African economies. It underscores the importance of policies that make growth broad-based and inclusive, ensuring that the benefits of development are equitably shared across all social and economic groups.

Model Specification

To assess the impact of income inequality on inclusive growth in West African countries (Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo) for the period 2000–2023, we utilized a quantitative analysis guided by ex post facto research, inspired by the empirical approach of Karimu, & Abubakar (2025), where income inequality measured by Gini index was modeled as a function of gross domestic product per capita. However, this model diverges from previous methodologies by accounting for the potential feedback effects between income inequality and inclusive growth. The specified functional relationship between income inequality and inclusive growth is outlined as follows:

$$\text{Gini} = f(\text{GDPPC}, \text{EMPL}, \text{GEDUexp}, \text{HEALTHexpd}, \text{TOP}, \text{REM}) \quad (1)$$

The general panel linear form of the model is rewritten as:

$$\text{Gini}_{it} = \alpha_i + \gamma_t + \beta_1 \ln(\text{GDPPC}_{it}) + \beta_2 \text{EMPL}_{it} + \beta_3 \text{GEDUEXP}_{it} + \beta_4 \text{HEALTHEXP}_{it} + \beta_5 \text{TOP}_{it} + \beta_6 \text{REM}_{it} + \epsilon_{it} \quad (2)$$

Where Gini = Gini coefficient, GDPPC = Real gross domestic product per capita, EMPL = Employment rate (employed / working-age population), GEDUEXP = Government education expenditure (share of GDP), HEALEXPd = Public health expenditure (share of GDP), TOP = Trade openness, REM = Remittances inflows, α_i = Time-invariant country fixed effect, γ_t = Common time effect, β_1 – β_4 = Coefficients of the explanatory variables, and ϵ_{it} = Idiosyncratic error

term.

Estimation Technique and Procedure

The data of the study were subjected to a series of pre-estimation tests. Descriptive statistics were used to evaluate the normal distribution of the data set and to check for outliers. Correlation matrix was used to measure the degree of relatedness among the variables of the study in pairs. Unit root test was used to evaluate the stationarity of the data used in the study. Cointegration test was conducted to determine whether certain sets of non-stationary time series variables share long-run equilibrium relationships. Panel Autoregressive Distributed Lag (PARDL) model which is well-suited for heterogeneous panels where the variables may be integrated at different orders, specifically $I(0)$ and $I(1)$, but not $I(2)$, was used to estimate the coefficients of the explanatory variables. The following are some of the reasons why the panel ARDL approach was chosen for the study:

Mixed Order of Integration: Our preliminary unit root tests will help determine if the variables fall into the $I(0)$ or $I(1)$ categories, confirming the appropriateness of the panel ARDL model.

Capturing Dynamics: This model effectively estimates both short-run adjustment processes and long-run equilibrium relationships between income inequality and inclusive growth, providing a comprehensive view of the dynamics involved.

Accounting for Heterogeneity: Unlike the pooled OLS method, the panel ARDL approach (such as the Mean Group or Pooled Mean Group estimator) promises to recognize the structural and policy variances across sub-Saharan African countries.

DATA ANALYSES, PRESENTATION AND DISCUSSION OF RESULTS

The analyses of the data for the study were carried out using the E-view 13.0 and Stata 15.0 software packages.

Descriptive Statistics Test

A summary of the descriptive statistics test results is presented below. Table 1 presents the descriptive analysis, based on a dataset of 250 observations, provides valuable insights into the structure and distribution of key macroeconomic indicators influencing income inequality and inclusive growth in West African economies.

The Gini index has a mean value of 44.93, reflecting a moderate level of income inequality across the sampled countries. The wide range of values (12.26 to 96.28) and high standard deviation (12.67) suggest that income distribution varies substantially across the region. The strong positive skewness (1.64) indicates that inequality is more concentrated at the higher end of the spectrum, while the high kurtosis (6.95) denotes the presence of extreme inequality in a few countries. These findings highlight the uneven nature of income distribution, suggesting that growth benefits are not uniformly shared among the population.

Table 1: Summary of the Descriptive Statistics Test Results

Variables	GINI	GDPPC	EMPL	GEDUEXP	HEALTHEXPD	TOP	REM
Mean	44.93009	1101.901	49.56054	3.283265	4.701154	13.58218	1693.656
Median	42.20000	1010.400	43.95744	3.354473	4.178695	13.00903	300.6684
Maximum	96.28160	2550.470	81.33467	8.140970	19.69005	34.27431	24311.02
Minimum	12.25818	353.6476	20.22754	0.281712	1.789449	0.211231	2.435105
Std. Dev.	12.66627	546.0132	18.40255	1.488616	2.287160	6.475735	4643.972
Skew.	1.638313	0.816824	0.431869	0.124853	3.230028	0.832006	3.834205
Kurt.	6.950384	2.841544	1.796648	3.485384	18.56245	3.297909	16.50679
J-Bera	274.3939	28.06160	22.85522	3.103653	2957.521	29.76756	2512.893
Prob.	0.000000	0.000001	0.000011	0.211861	0.000000	0.000000	0.000000
Sum	11232.52	275475.3	12390.14	820.8161	1175.289	3395.545	423414.0
Sum Sq. Dev.	39948.16	74234468	84324.85	551.7785	1302.544	10441.85	5.37E+09
Obs.	250	250	250	250	250	250	250

Authors' computation using E-views 13.0 (2025)

The pattern of inequality is closely linked to differences in economic performance, as reflected by GDP per capita, which averages 1,101.90 but ranges widely from 353.65 to 2,550.47. The positive skewness (0.82) implies that while a few economies enjoy relatively high-income levels, the majority remain at the lower end of the income spectrum. The Jarque–Bera statistic ($p = 0.000001$) confirms that GDP per capita is not normally distributed, consistent with the structural imbalance between resource-rich and less diversified economies in the subregion. This disparity in income levels may partly explain why economic growth has not consistently translated into reduced inequality.

The employment rate (EMPL), with a mean of 49.56% and a range between 20.23% and 81.33%, provides further context to this inequality. The moderate standard deviation (18.40) indicates considerable variation in labor market performance, while a slight positive skewness (0.43) suggests that lower employment rates are more common. This implies that in several West African economies, economic growth has been accompanied by limited job creation, a phenomenon often described as “jobless growth,” which constrains the inclusiveness of development.

Public spending on education (GEDUEXP) and health (HEALTHEXPD) represents critical policy variables that can promote inclusive growth by enhancing human capital and reducing inequality. Education expenditure averages 3.28% of GDP, with values ranging from 0.28% to 8.14%, suggesting moderate variability across countries. Its near-normal distribution (skewness = 0.12, kurtosis = 3.49, Jarque–Bera $p = 0.2119$) implies relatively balanced commitment to education spending within the region. In contrast, health expenditure averages 4.70% of GDP but displays substantial dispersion ($SD = 2.29$) and high skewness (3.23) with leptokurtic behavior (18.56), indicating that a few countries allocate disproportionately higher resources to healthcare. The Jarque–Bera probability ($p = 0.0000$) confirms non-normality, reflecting uneven prioritization of

public health across the region.

Trade openness (TOP), averaging 13.58%, also exhibits marked variability (0.21% to 34.27%) and positive skewness (0.83). This pattern shows that most countries maintain relatively low integration with global markets, while a few are highly trade-dependent. Such disparities in openness can affect inequality dynamics, as trade-driven growth benefits tend to accrue more to export-oriented sectors and skilled labor, reinforcing the uneven distribution of income.

Remittance inflows (REM) display the highest level of dispersion, with a mean value of 1,693.66, a range from 2.44 to 24,311.02, and a very high standard deviation (4,643.97). The extremely high skewness (3.83) and kurtosis (16.51) suggest that only a small number of countries receive very large remittance inflows, while most experience minimal levels. Since remittances are often a major source of household income in developing economies, these wide disparities underscore the uneven impact of external financial flows on income redistribution and inclusive growth.

Overall, the descriptive results reveal considerable variation and non-normality across the dataset, especially for income inequality, remittances, and GDP per capita. The patterns suggest that while certain macroeconomic indicators, such as education spending, exhibit relative stability, others display extreme heterogeneity across West African economies. The combination of high inequality, uneven income levels, and variable social investment underscores the region's structural challenges in achieving inclusive growth. Therefore, the deviations from normality and concentration of key variables around higher inequality and lower inclusiveness justify the use of robust econometric estimation techniques to ensure the reliability of subsequent analysis and inference.

Additionally, the correlation matrix was analyzed, with the results summarized in Table 2. As illustrated in the Table, the correlation analysis explores the linear relationships among the Gini index (income inequality), GDP per capita, employment, government education expenditure, public health expenditure, trade openness, and remittances across 250 observations from 2000 to 2024. The correlation between GINI and GDP per capita is 0.0315 ($p = 0.6200$), positive but insignificant, indicating that income inequality and economic growth do not move closely together. The relationship between GINI and employment is positive and significant ($r = 0.3143$, $p = 0.0000$), suggesting that higher employment levels are associated with greater inequality, possibly due to uneven wage distribution or unequal access to high-income jobs. The correlation between GINI and government education expenditure is 0.0946 ($p = 0.1359$), weak and insignificant, implying that education spending does not directly influence income inequality.

Public health expenditure correlates negatively but insignificantly ($r = -0.1121$, $p = 0.0770$) with inequality, indicating a mild but statistically weak inequality-reducing tendency. Trade openness also shows a negative and insignificant correlation ($r = -0.0707$, $p = 0.2657$) with the Gini index, suggesting that increased trade integration may slightly reduce inequality but without a strong effect. Similarly, remittances exhibit a weak and insignificant positive relationship ($r = 0.0541$, $p = 0.3947$) with inequality, showing that remittance inflows do not substantially affect income distribution within the sample.

Table 2: Correlation Matrix

Variables	GINI	GDPPC	EMPL	GEDUE XP	HEALT HEXPD	TOP	REM
GINI	1						
GDPPC	0.031513	1					
	0.496508	-----					
	0.62	-----					
EMPL	0.314281	0.271211	1				
	5.213467	4.437349	-----				
	0	0	-----				
GEDUEXP	0.094573	-0.31419	-0.38157	1			
	1.496043	-5.21176	-6.50082	-----			
	0.1359	0	0	-----			
HEALTHEXPD	-0.11206	-0.22242	-0.23714	-0.05234	1		
	-1.7759	-3.59273	-3.84417	-0.82544	-----		
	0.077	0.0004	0.0002	0.4099	-----		
TOP	-0.07065	-0.02399	-0.30125	0.187331	0.099031	1	
	-1.11544	-0.37796	-4.97525	3.003262	1.567243	-----	
	0.2657	0.7058	0	0.0029	0.1183	-----	
REM	0.054066	0.552689	0.349672	-0.40809	-0.12882	0.023185	1
	0.852684	10.44384	5.877691	-7.03943	-2.04562	0.365209	-----
	0.3947	0	0	0	0.0418	0.7153	-----

Authors' computation using E-views 13.0 (2025)

Among the explanatory variables, notable relationships include a strong positive correlation between GDP per capita and remittances ($r = 0.5527$, $p = 0.0000$), implying that higher-income economies attract or generate more remittance inflows. Government education expenditure shows significant negative correlations with GDP per capita ($r = -0.3142$, $p = 0.0000$) and employment ($r = -0.3816$, $p = 0.0000$) **, suggesting possible inefficiencies or trade-offs in public spending allocation. Likewise, remittances are negatively correlated with education expenditure ($r = -0.4081$, $p = 0.0000$), indicating that countries receiving more remittances tend to allocate fewer public resources to education, perhaps due to reliance on household-level private funding.

Overall, the correlation coefficients are moderate and below the critical multicollinearity threshold ($r < 0.8$), indicating that the variables are suitable for inclusion in regression analysis without risk of severe collinearity distortions.

The Panel unit root test using Levin-Lin-Chu and Im-Pesaran-Shin (LLC and IPS) is presented in Table 3. The results from our panel unit root analysis using LLC and IPS reveal that all statistics exceed their critical thresholds at the 10%, 5%, and 1% levels of significance, both at level and first difference. This indicates that the explanatory variables are integrated of order one [I(1)], while GINI exhibits stationarity only at the level, classified as order [I(0)]. Consequently, we will proceed with the panel co-integration analysis.

Table 3: Summary of Unit Root Test Results
Panel Unit Root (LLC & IPS)

	LLC			IPS		
	Level	1st Diff.	Decision	Level	1st Diff.	Decision
GINI	-3.11	-11.86	I(0)	-3.66	-14.33	I(0)
GDPPC	13.53	-5.35	I(1)	3.35	-3.66	I(1)
EMPL	-0.85	-4.85	I(1)	0.88	-3.89	I(1)
GEDUEXP	-1.42	-6.52	I(1)	-1.62	-6.92	I(1)
HEALTHEXPD	-0.36	-4.58	I(1)	0.49	-4.51	I(1)
TOP	-0.68	-4.25	I(1)	1.19	-5	I(1)
REM	-1.3	-4.86	I(1)	0.21	-5.64	I(1)

Authors' computation using E-views 13.0 (2025)

Table 4 further presents co-integration test results consisting of seven metrics: panel v-statistic, panel rho-statistic, panel PP-statistic, panel ADF-statistic, group rho-statistic, group PP-statistic, and group ADF-statistic, each accompanied by their respective probability values.

Table 4: Panel Cointegration Test Result

Pedroni Residual Cointegration Test
Series: GINI GDPPC EMPL GEDUEXP HEALTHEXPD TOP REM
Date: 10/20/25 Time: 15:16
Sample: 2000 2024
Included observations: 250
Cross-sections included: 10
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)				
	<u>Statistic</u>	<u>Prob.</u>	Weighted	
			<u>Statistic</u>	<u>Prob.</u>
Panel v-Statistic	-0.656	0.7441	-2.11158	0.9826
Panel rho-Statistic	-0.6108	0.2707	-0.41065	0.3407
Panel PP-Statistic	-10.0352	0.0000	-9.65901	0.0000
Panel ADF-Statistic	-1.26628	0.7107	-0.70525	0.0534
Alternative hypothesis: individual AR coefs. (between-dimension)				
	<u>Statistic</u>	<u>Prob.</u>		
Group rho-Statistic	1.098155	0.8639		
Group PP-Statistic	-14.8831	0.0000		
Group ADF-Statistic	-0.41312	0.4079		

All test statistics are distributed $N(0,1)$, under a null of no cointegration, and diverge to negative infinity (save for panel v)

Authors' computation using E-views 13.0 (2025)

The null hypothesis posits that there is no cointegration among the variables. However, the p-values for five of these outcomes are not statistically significant. In other words, there is no evidence of a long-run relationship present.

Table 5: Summary of the Panel ARDL Test Result

Variables	GINI		
Longrun	Coef.	t-Stat.	Prob.
GDPPC	-0.0049	-2.27	0.023
EMPL	0.9069	4.87	0.000
GEDUEXP	1.3799	2.44	0.015
HEALTHEXPD	-0.5479	-0.75	0.455
TOP	-0.2254	-2.64	0.008
REM	-9.58	-0.06	0.950
Short run			
ECT(-1)	-0.4996	-3.25	0.001
GDPPC	-0.0157	-1.04	0.300
EMPL	0.3419	0.55	0.580
GEDUEXP	2.8305	0.61	0.544
HEALTHEXPD	-0.8305	-0.94	0.347
TOP	-0.2671	-0.81	0.418
REM	-0.0058	-0.20	0.838

Source: Researchers' computation using Stata 15.0 (2025)

Findings

The estimation results reveal both long-run and short-run relationships between the Gini index (a measure of income inequality) and its explanatory variables: GDP per capita, employment, government education expenditure, public health expenditure, trade openness, and remittances across 10 panels (countries or regions) over a 24-year period.

In the long run, the coefficient of GDP per capita is -0.0049 ($p = 0.023$), indicating a significant negative relationship with income inequality. This implies that economic growth contributes to reducing inequality over time. Conversely, the coefficient of employment is 0.9069 ($p = 0.000$), showing a positive and significant effect, meaning that higher employment levels are associated with increased inequality—possibly reflecting uneven distribution of employment gains across income groups.

Government education expenditure has a coefficient of 1.3799 ($p = 0.015$), suggesting that higher education spending significantly increases inequality in the long run. This may indicate that educational investments are not effectively targeted toward disadvantaged populations or that the benefits accrue mainly to higher-income households.

The coefficient of public health expenditure is -0.5479 ($p = 0.455$), which, although negative, is statistically insignificant. This suggests that public health spending does not exert a robust long-

run impact on income inequality within the sample.

Trade openness has a coefficient of -0.2254 ($p = 0.008$), showing a significant negative relationship with inequality. This implies that increased trade integration tends to reduce inequality, possibly through enhanced access to markets, technology, and economic opportunities.

Remittances exhibit a coefficient of -9.5800 ($p = 0.950$), which is statistically insignificant. This indicates that remittance inflows do not have a meaningful long-run influence on income inequality in the sampled countries.

The error correction term is -0.4996 ($p = 0.001$), negative and significant, confirming that any short-run disequilibrium is corrected at a speed of about 50% per period. This result establishes a stable long-run equilibrium relationship among the variables.

In the short run, most explanatory variables are statistically insignificant, suggesting that changes in GDP per capita, employment, government education and health expenditure, trade openness, and remittances have no immediate effect on income inequality. The short-run dynamics are primarily governed by the error correction mechanism, which drives adjustment toward the long-run equilibrium.

Discussion of Findings

The findings of the study reveal important insights into the long-run and short-run determinants of income inequality, as measured by the Gini index. These findings suggest that while some macroeconomic and fiscal variables play a crucial role in shaping income distribution in the long term, their short-term effects are generally weak or insignificant.

The negative and significant long-run coefficient of GDP per capita indicates that economic growth contributes to the reduction of income inequality over time. This result aligns with the Kuznets hypothesis, which posits that inequality initially rises at early stages of development but declines as economies mature and wealth becomes more evenly distributed. It also supports empirical evidence from developing economies showing that sustained growth enhances employment opportunities, human capital development, and access to economic resources, thereby reducing inequality in the long run.

Contrary to theoretical expectations, the positive and significant long-run effect of employment on inequality suggests that rising employment does not necessarily translate into equitable income distribution. This could be attributed to the quality and structure of employment, particularly in developing contexts where informal and low-wage jobs dominate. The benefits of employment expansion may be disproportionately captured by skilled or urban workers, while unskilled and rural workers remain marginalized. This finding echoes those of previous studies that emphasize the need for inclusive labour market policies that ensure equitable wage structures and social protection for vulnerable workers.

The significant positive impact of education expenditure on inequality implies that increased spending on education has not effectively reduced disparities in income distribution. This outcome may reflect inefficiencies in the allocation of educational resources, regional imbalances in access,

or the concentration of benefits among higher-income households who are better positioned to take advantage of public education spending. In many developing economies, education spending tends to favor urban and tertiary institutions rather than basic education for low-income groups. The result underscores the need for redistributive education policies that prioritize inclusive and equitable access to quality education.

The coefficient for public health expenditure, though negative, is statistically insignificant, suggesting that health spending does not exert a strong influence on income inequality. This may be due to poor implementation and limited coverage of public health programs, as well as leakages in government health budgets. Moreover, in many developing countries, public health investments are often skewed toward urban centers, leaving rural and marginalized populations underserved. Hence, the potential inequality-reducing effects of health expenditure remain unrealized.

The negative and significant long-run coefficient of trade openness supports the view that globalization and liberalization can promote more equitable income distribution when accompanied by appropriate institutional frameworks. Increased trade openness may facilitate technology transfer, employment creation, and access to global markets, thereby enhancing income opportunities across different income groups. However, the extent of these benefits depends on the country's capacity to diversify production and protect vulnerable sectors from external shocks.

Remittances exhibit a negative but insignificant long-run effect, implying that while inflows from abroad may slightly reduce inequality, their impact is not strong enough to produce measurable distributional changes. This finding aligns with mixed evidence in the literature, where the inequality effects of remittances depend on who receives them. In contexts where migration and remittance flows are dominated by middle- and upper-income households, the inequality-reducing potential of remittances is often limited.

The negative and significant error correction term confirms the existence of a stable long-run equilibrium relationship among the variables. The coefficient of approximately -0.50 indicates that about 50% of short-run disequilibria are corrected each year, meaning the system adjusts moderately toward its long-run path. In the short run, however, most variables do not significantly affect income inequality, suggesting that structural and institutional factors take time to influence the distributional dynamics of income.

CONCLUSION

The study establishes that economic growth, trade openness, and long-run equilibrium dynamics play significant roles in shaping income inequality, while employment, education expenditure, and remittances exhibit mixed or insignificant effects. The findings highlight that although growth and trade openness help narrow inequality, gains from employment and education spending are unevenly distributed, and remittances fail to translate into inclusive welfare improvement. Hence, policy efforts should focus on fostering inclusive growth by channeling education and health investments toward low-income and marginalized groups, promoting decent job creation across all income segments, and strengthening the productive use of remittances through financial

inclusion and community development programs. Additionally, trade and fiscal policies should be designed to ensure that the benefits of openness and public spending are equitably distributed, thereby promoting sustainable and inclusive economic development.

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