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Research Article

The Connection between Inequality, Democracy and Governance: Evidence from Panel Cointegration and Granger non-causality Approach

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ABSTRACT

Income inequality has been widely recognized as one of the most pressing socio-economic challenges for policymakers around the world. Strong democratic institutions may contribute to a more equitable distribution of income by promoting transparency and guaranteeing accountability. This study investigates the predictive causality and long-term relationship between democracy, governance, and inequality across three country income groups: high-income, middle-income, and low-income, using data from 2006 to 2023. The analysis employs Panel co-integration, FMOLS and DOLS methodology, the Dumitrescu-Hurlin (2012) panel causality test, Pooled Mean Group regression and regression with Driscoll-Kraay standard errors. The Dumitrescu–Hurlin test suggests bidirectional predictive causality between democracy and inequality. However, these findings should be interpreted as statistical predictability rather than structural causation. Furthermore, long-term regression results (FMOLS and DOLS) reveal substantial heterogeneity across income groups. Specifically, democracy variable is associated with lower income inequality in high-income economies, whereas its effect appears positive in middle- and low-income economies.

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1. Introduction

Income inequality is a multidimensional socio-economic phenomenon that is closely associated with political and institutional structures, particularly democratic governance. (Kashyap, 2024). Theoretically, democratization broadens political participation by granting larger segments of society, particularly lower-income groups, greater political representation and influence over policymaking processes (Nissen, 2021). Characteristically, Democratic governments tend to implement redistributive policies such as progressive taxation and social welfare programs, and labor market protections, which are effective in reducing income inequalities (Elkjær & Iversen, 2023). Furthermore, institutional mechanisms, such as free election processes, freedom of the press, and active civil society can increase governmental accountability and strengthen pressures for more equitable income distribution (Acemoglu et al., 2015).

Nevertheless, the actual influence of democracy on inequality manifests considerable variation (Sadeghi Amroabadi, 2021; Trinugroho et al., 2023). In transitioning democracies, weak institutional capacity, the capture of political power by elites, and patronage-driven politics hinder the implementation of effective redistributive practices (Ahmed, 2023). In these contexts, mere democratization does not assure equitable outcomes, as political authority remains concentrated within privileged economic elites who may resist redistributive effort (Basumatary & Das, 2024).

The institutional strength of democratic systems is a key determinant in shaping income distribution outcomes. Strong democratic institutions can limit excessive wealth concentration and support a more equitable distribution of income by fostering transparency and ensuring accountability, and safeguarding labor rights (Saha et al., 2025). Advanced democracies with well-developed institutional frameworks generally exhibit lower levels of income inequality due to their efficient welfare mechanisms and inclusive political habits (Solt, 2020). Conversely, vulnerable democracies frequently

encounter constraints in their institutional capacity and political stability, thereby impeding their capability to devise policies aimed at mitigating inequality (Wesołowska et al., 2025). Some scholars argue that the process of democratization can, in certain situations, first deepen inequalities, in particular in settings in which empowered political leaders are not in a position to pose a challenge to entrenched elites or in which state mechanisms are not sufficiently developed (Acemoglu, 2015).

Consequently, although democracy provides a structural framework conducive to equitable governance, its efficacy in alleviating income inequality is profoundly dependent on complementary factors. Since the 1990s, the components of good governance have increasingly been recognized as key determinants in the equitable allocation of opportunities and income, as well as in the formulation of national development strategies. This new economic philosophy has led to a shift in policy orientation among countries regarding income distribution patterns (Trung, 2022). In this context, the present research seeks to examine the reciprocal relationship between democracy, governance, and income inequality across countries at different income levels. This study is relevant for several reasons: democracy is not enough to close income gaps unless it is underpinned by strong, transparent, and effective institutional frameworks. Good governance, in particular through anti-corruption efforts and strict enforcement of laws, is effective in fostering more equitable income distribution. A comprehensive approach whereby democratic values are integrated with effective governance mechanisms proves considerably more effective in mitigating inequality than when these goals operate in isolation. Furthermore, high levels of income inequality pose a threat even to the stability of democratic regimes, underscoring the necessity for economic fairness to sustain democratic institutions in the long run.

Partially contributing to the significance of this research, and in contrast to prior investigations that have analyzed the influence of either democracy or governance on inequality separately (e.g., Elkjær & Iversen, 2023; Acemoglu et al., 2015; Trinugroho et al., 2023), this study endeavors to examine the

concurrent effects of both factors on economic inequality. Moreover, the nations involved in this analysis are categorized into three income groups: high-income economies, upper-middle-income economies, and lower-middle and low-income economies. The effects of democracy and governance on income inequality are analyzed separately within each group.

Finally, the study examines the causal relationships among democracy, governance, and inequality. In addition, compared to the methodology used in the studies by Acheampong et al. (2023) and Basumatary & Das (2024), this research employs the Panel co-integration test, Dumitrescu and Hurlin (2012) panel causality test, FMOLS, and DOLS estimators for analyzing the dynamics among inequality, democracy, and governance. To ensure the robustness of our findings, we additionally employ the JKS (2021) Granger non-causality test, the Pooled Mean Group (PMG) regression, and a regression model with Driscoll-Kraay standard errors.

This study does not claim to overturn existing findings regarding the democracy–inequality relationship. Instead, its contribution lies in explicitly modelling income-level heterogeneity and examining how the effect of democracy depends on countries' structural and institutional capacity. By estimating long-run relationships separately across income groups and incorporating governance quality as a concurrent institutional factor, this paper provides a conditional interpretation of the democracy–inequality nexus rather than a universal one. The results suggest that democracy reduces inequality only when supported by strong governance capacity, a distinction that helps reconcile conflicting findings in the literature.

The study is organized into several sections. Section 2 provides a literature review examining the relationship between democracy and governance and income inequality. Section 3 offers a review and explanation of the democracy and inequality indicators in developed and developing countries. In Section 4, we present the data and econometric methodology employed in this study. Finally, Section 5 presents a discussion of the model's test results and summarizes our conclusions.

2. Literature review

The connection between democracy and inequality is multifaceted, with diverse effects observed across different contexts (Acemoglu et al., 2015). While democracy aims to promote equitable representation and reduce disparities, the interaction between governance, natural resources, and political stability may hinder the realization of this objective (Fagbemi & Kotey, 2024).

2-1. Democracy and inequality

Recent empirical studies indicate that the effect of democracy on income inequality is conditional upon institutional quality and the level of economic development. For example, Wesołowska et al. (2025) show that in the post-transition nations of Central Europe and Central Asia, democratization after 2001 has resulted in an increase in the income share of the lower deciles and a reduction in that of the higher deciles. Conversely, another study focusing on BRICS nations from 1996 to 2020 shows that democracy alone may not reduce inequality in the absence of effective governance capacity. Tsitouras and Papapanagos (2025) examine the relationships between economic growth, income inequality and economic freedom, employing the nonlinear autoregressive distributed lag model and the Toda-Yamamoto causality test. Their results suggest that while enhancing economic freedom reduces income inequality in the long term, growth in per capita income more effectively enhances equality in the medium term.

Cross-regional evidence reveals substantial heterogeneity in the democracy–inequality relationship. For example, while democracy indices are associated with increased inequality in Central and West Africa, they exhibit a neutral effect in Eastern Africa. A study published in Ahmad (2017), using SWIID data, highlights that while economic freedom alone can intensify income inequality, this impact is moderated in democratic governments, where redistributive policies are more likely to be enacted. Comparative studies show that levels of democratization can worsen income inequality in some areas, like Sub-Saharan Africa, especially when combined with natural

resource endowments (Acheampong et al., 2023). One possible drawback of democratic regimes is their short-term policy bias induced by election cycles. Democratic governments often implement economic policies that are popular but short-term—like pre-election public expenditure hikes—which can offer relief but are not enough to tackle structural inequality (Sever & Yücel, 2025).

Overall, the literature suggests that the distributive consequences of democracy depend critically on institutional capacity and governance quality. In weak institutional settings, democratization may fail to translate into effective redistribution, whereas stronger governance structures can mitigate inequality and improve the allocation of resource revenues (Hartwell et al., 2019; Sadeghi Amroabadi, 2022).

Han (2024) investigates the association between wealth inequality and the stability of democratic institutions, with a focus on how subjective class perceptions affect support for democratic regimes. The findings indicate that rising inequality changes class identity and diminishes support for democratic regimes in both the lower and upper classes, while a shrinking middle class destabilizes democratic institutions.

2-2. Governance and inequality

Governance quality is widely regarded as a key institutional determinant of income distribution outcomes. Empirical evidence indicates that in developed economies, a reduction in corruption is strongly associated with lower inequality. However, in developing countries, anti-corruption reforms may produce uneven distributive effects in settings characterized by concentrated political power (Keneck-Massil et al., 2021). Lam and Vy (2024) utilized panel data from 63 Vietnamese provinces over the period 2018–2020 to investigate the effects of governance quality and infrastructure development on income inequality. Their research suggests that the quality of governance and the advancement of infrastructure are inversely correlated with income inequality.

Enduring disparities may undermine institutional legitimacy and weaken democratic stability, as fluctuations in governance and the rise of populism

can obstruct the fair execution of policies (Rafique et al., 2023). Cross-national studies spanning developed and developing countries reveal that improvements in control of corruption and institutionalization of the rule of law are strongly linked to reductions in income inequality (Islam & McGillivray, 2020). Furthermore, accumulating evidence shows that good governance in developing nations can increase income redistribution by decreasing corruption and improving government effectiveness.

Strong governance enhances institutional trust, improves governments' ability to respond effectively to economic crises (Mahmoudinia & Amroabadi, 2023; OECD, 2025). In this way, Moghaddasi et al. (2023) examined data from 21 oil-rich countries over the period 2000 to 2021 and found that improvements in governance quality in these countries help mitigate the negative impact of the COVID-19 pandemic on income inequality. Focusing on Middle Eastern and North African (MENA) countries, Hajili Davaji and Mila Elmi (2024) investigate the impact of good governance components on income inequality over the period 2008 to 2021, employing the System Generalized Method of Moments (SGMM) approach.

The estimation outcomes suggest that political instability intensifies income inequality in MENA countries.

2-3. Control variables and inequality

Based on the existing literature, inflation, gross domestic product (GDP), trade openness, and CO2 emissions also have an impact on inequality. In most studies (Ali & Asfaw, 2023), inflation is found to have a positive effect on income inequality, as it tends to drive up asset prices while eroding the purchasing power of low-income groups. However, when inflation is accompanied by economic growth or when the government implements supportive policies, its effect on inequality may turn negative (Berisha et al., 2023). The relationship between economic growth and income inequality remains theoretically and empirically ambiguous. In many countries, an increase in GDP leads to a reduction in inequality; however, this outcome largely depends on the economic

structure, social institutions, and the initial level of development (Ghosh et al., 2023). The relationship between income inequality and trade openness exhibits significant variation across different countries (Dorn et al., 2024). Ultimately, the relationship between carbon dioxide emissions and income inequality depends on a variety of factors (Kafili et al., 2023). The inclusion of CO2 emissions is theoretically motivated by the political economy of environmental degradation (Cappelli, 2025). Carbon-intensive growth models often generate rents that accrue disproportionately to capital owners and high-income groups, while environmental externalities are borne mainly by lower-income populations (Knight et al., 2017). This asymmetry may widen income concentration at the top. Furthermore, in developing countries, resource-dependent and carbon-intensive sectors are frequently associated with elite capture and weak redistributive institutions (Bergougui et al., 2024). Therefore, CO2 emissions are included as a proxy for environmentally biased growth structures that may indirectly affect income distribution (Wan et al., 2022).

3-A graphical review of inequality and democracy indicators

This section presents a graphical analysis of the relationship between inequality measures and democracy using three income groups—high, middle, and low income countries—during the 2006 to 2023 period, with such relationships illustrated in Figures 1-11. Figure 1 shows a negative correlation between inequality and democracy among high-income countries; as democracy increases, inequality decreases. This suggests that political and economic equality tend to move in the same direction in high-income countries. Figure 2, on the other hand, reveals a weak positive relationship between democracy and inequality among middle-income countries, suggesting that inequality may persist under democratic rule. However, the graph also shows several inconsistencies. For example, MKD and ALB and MDA are countries with high democracy and low inequality. Figure 3 also reveals the same weak positive relationship among low-income countries, where increasing inequality does not appear to reduce democratic activity.

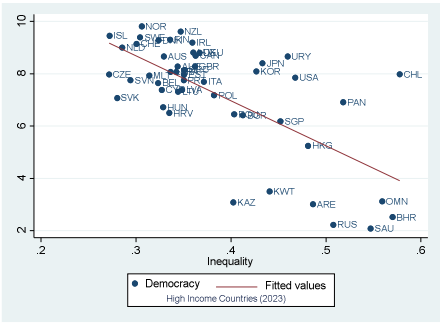

Fig 1. Inequality and Democracy in High income Countries

Source: Author's Compilation

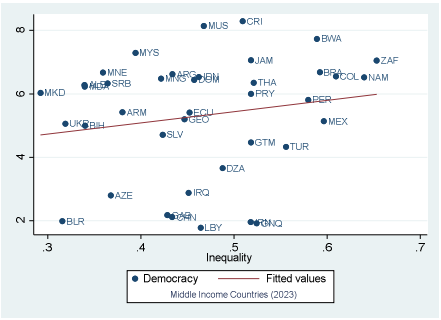

Fig 2. Inequality and Democracy in Middle income Countries

Source: Author's Compilation

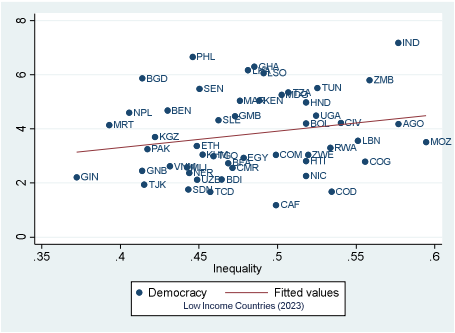

Fig 3. Inequality and Democracy in Low-income Countries

Source: Author's Compilation

Graphical analysis of trends in income inequality and democracy, as demonstrated in Figure 4 for high-income economies, suggests a complex relationship. While general consistency between the degree of inequality and democratic functioning is apparent over the period in question, there are considerable divergences in certain years. In particular, between 2006, 2007, 2017, 2019, and 2020, both inequality and democracy trends appear to be moving in opposite directions, suggesting a potential decoupling of these variables within this income group. In contrast, Figures 5 and 6, representing trends for middle and low-income countries, respectively, display steady and

correlated patterns. In those groups, the mean measures of inequality and democracy show correlated movements during most of the years in question.

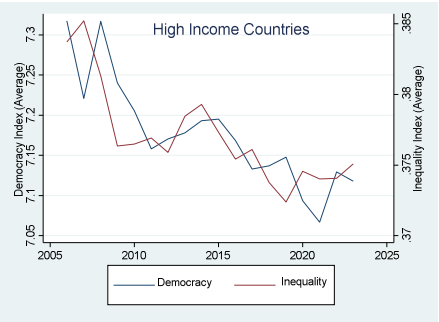

Fig 4. Average of Inequality and Democracy in High-income Countries
Source: Author's Compilation

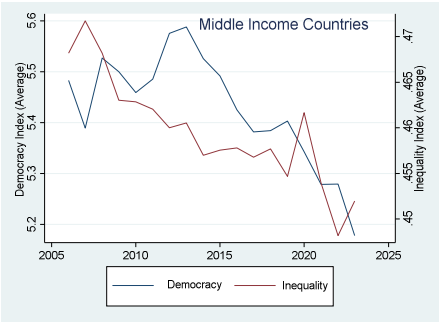

Fig 5. Average of Inequality and Democracy in Middle-income Countries
Source: Author's Compilation

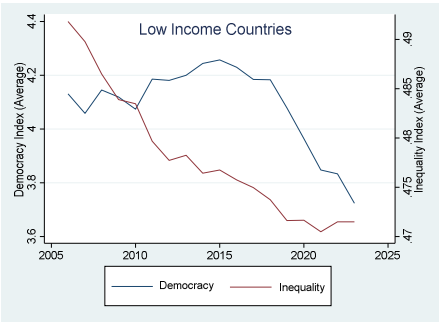

Fig 6. Average of Inequality and Democracy in Low-income Countries
Source: Author's Compilation

Figure 7 demonstrates the average democracy trend by country groups (high, middle, and low income), all of which are declining, but the middle- and low-income groups' trends show an overall downward trend and first increase slightly and then gradually decline, which is in line with democratic backsliding. As reported by Diamond (2008) a global trend is that even mature democracies are experiencing a loss of democratic institutions and norms. The initial rise and decline in middle- and low-income countries may be due to

initial optimism with democratization efforts, followed by disillusionment due to corruption, weak institutions, and unmet economic expectations. Figure 8 illustrates the average inequality by country groups, which declines overall, but low-income countries experienced a significant decline, which could be a potentially positive development. The decline can be a result of a combination of economic development, improved access to education and healthcare, and poverty reduction initiatives. However, it should be noted that aggregate statistics tend to cover up significant heterogeneity across countries and that this pattern will not be uniform across social groups. The inequality literature (Piketty, 2014) indicates that progressive taxation policies, investment in education, and strong social protection programs are key to curbing inequality. Figure 9 shows that the average control of corruption by country group remains stable over 2000-2025, though the high-income group declines moderately. Corruption slows down economic progress, undermines institutions, and erodes public trust (Rose-Ackerman, 1999). The comparative stability may be a result of failure to make progress against corruption or even the normalization of corrupt practices. A decrease in high-income countries may be an indication that the industrialized front-runners are currently affected by an increase in sophisticated corruption trends, e.g., increased influence of lobbying activities. Figure 10 indicates the average government effectiveness by country group without variation, but low- and middle-income groups rise slowly, and high-income groups fall slowly, suggesting that the majority of countries cannot improve the quality of public services and policy implementation. Figure 11 displays the average political stability and reveals that the mean for the high-income group decreased marginally, and the other two groups remained constant in the period from 2000 to 2025. The relative stability in political conditions, except for a decline in high-income countries, can imply shock resilience but also stagnation in addressing deep-seated political tensions.

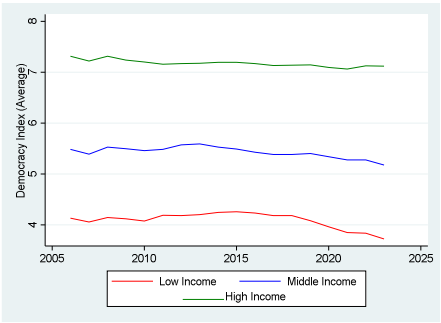

Fig 7. Average of Democracy by country group

Source: Author's Compilation

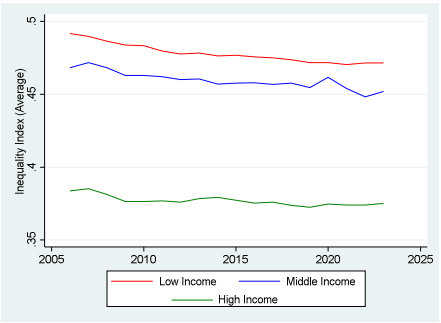

Fig 8. Average of Inequality by country group

Source: Author's Compilation

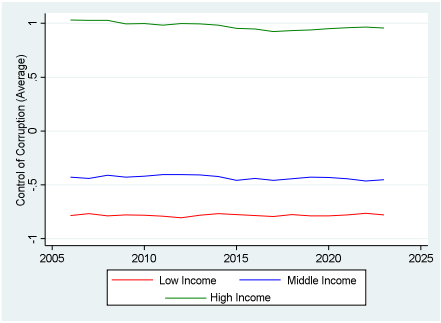

Fig 9. Average of Control of Corruption by country group

Source: Author's Compilation

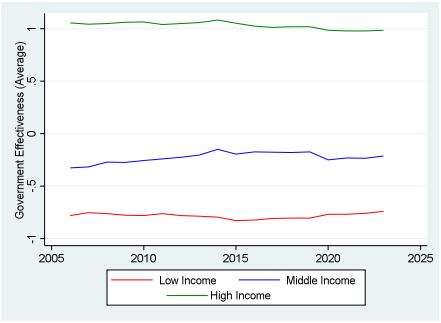

Fig 10. Average of Government Effectiveness by country group

Source: Author's Compilation

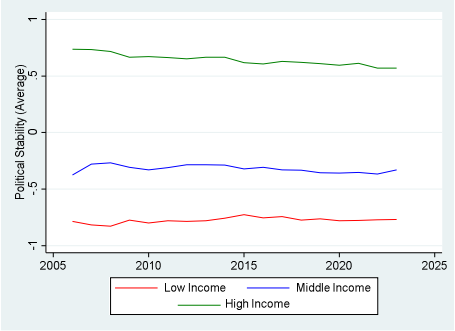

Fig 11. Average of Political Stability by country group

Source: Author's Compilation

4. Methodology

4.1. Data and Analysis

Based on ideas from numerous studies on public sector and governance theories such as Acemoglu & Robinson (2006), Diamond (2008), Piketty (2014), Wong (2022), and Keefer (2025), the primary goal of this paper is to examine the long-term and causal relationships between inequality, democracy and governance in countries grouped by income level from 2006 to 2023. In this study, based on the GNI per capita from the World Bank Atlas method (2025), the countries are divided into three categories: high-income economies, upper-middle-income economies, and lower-middle-income and low-Income economies. The classification of these countries is provided in Appendix 1. Econometric methods employed are the Panel co-integration test, Dumitrescu and Hurlin (2012) panel causality test, FMOLS, and DOLS estimators for analyzing the dynamics among inequality, democracy, and governance. For robustness, the JKS (2021) Granger non-causality test, Pooled Mean Group (PMG) regression and Regression with Driscoll-Kraay standard errors model were used. Therefore, following the existing literature, we represent the standard model as follows:

$$INEQ_{it} = f(\mathrm{DEM}_{it}, \mathrm{GE}_{it}, \mathrm{CC}_{it}, \mathrm{PS}_{it}, \mathrm{INF}_{it}, \mathrm{GDP}_{it}, \mathrm{OPE}_{it}, CO2_{it}) \quad (1)$$

where t represents the time period and i denotes the cross-section. Also, INEQ, DEM, GE, CC, PS, INF, GDP, OPE, and CO2 denote inequality index, democracy index, control of Corruption, government effectiveness, political stability, inflation, gross domestic product, trade openness, and CO2 emission, respectively. The detailed description and definitions of the variables used in this research are shown in Table 1.

Table 1. Descriptive characteristics of data.

Abbreviation	Variable	Indicators	Sources
$INEQ$	Inequality	Top 10% national income share - Pre-tax	World Inequality Database (WID)
DEM	Democracy index	The index is a composite of citizens' free and fair elections, civil liberties, participation in politics, having a functioning government, etc.	Economist Intelligence Unit
CC	Control of Corruption	The extent to which public power is exercised for private gain	Worldwide Governance Indicators (WGI)
GE	Government Effectiveness	Indicates perceptions of the quality of public services, the quality of civil services and its independence from political pressures.	WGI
PS	Political Stability	Indicates political stability and the absence of violence or terrorism and this index measures the likelihood of political instability.	WGI
INF	Inflation	Inflation, consumer prices (annual %)	World Development Indicators (WDI)
GDP	Gross Domestic Production	Gross Domestic Product in constant 2015 (US$)	WDI
OPE	Trade openness	The ratio of exports of goods and services plus Imports of goods and services to GDP.	WDI
$CO2$	Co2 emission	Total of Carbon dioxide (CO2) emissions	WDI

Source: Author's Compilation

Equation (1) is displayed as follows to form the econometric equation containing the stochastic error terms:

$$INEQ_{it} = a_0 + a_1\mathrm{DEM}_{it} + a_2\mathrm{GE}_{it} + b_3\mathrm{CC}_{it} + b_4\mathrm{PS}_{it} + b_5 GDP_{it} + b_6 INF_{it} + b_7 OPE_{it} + b_8 CO2_{it} + \varepsilon_{it} \quad (2)$$

Or in other words

$$INEQ_{it} = a_0 + a_1\mathrm{DEM}_{it} + a_i \sum_{i=2}^{4} GovernanceVar_{it} + b_i \sum_{i=5}^{8} ControlVar_{it} + \varepsilon_{it} \quad (3)$$

Here, the panel equation intercept is denoted by a_0, and the coefficients for the coefficients for the predictor variables are denoted by a_i and b_i. Finally, ε_{it} is the error term. Descriptive statistics in Table 2 indicate wide differences between income groups. The variables are from a perfectly balanced panel with 882, 702, and 918 observations for high-income economies, upper-middle-income economies, and lower-middle and low-income economies over 18 years, respectively. The lowest inequality as measured by INEQ is present in high-income economies, and the highest in lower-middle and low-income economies. Democracy scores (DEM) exhibit a clear positive relationship with income level, where high-income countries have the highest mean democracy scores and lower-middle and low-income countries have the lowest. Similarly, the indicators of governance—Control of Corruption (CC), Government Effectiveness (GE), and Political Stability (PS)—show a similar pattern. Higher average scores for these indicators are observed in high-income economies with more effective governance frameworks, whereas negative average scores exist in upper-middle and especially lower-middle and low-income economies with poorer governance. These early descriptive tendencies suggest a potential correlation between higher income levels, lower inequality, stronger democratic institutions, and stronger governance quality

which warrants further analysis through panel cointegration and Granger non-causality techniques to determine direction and significance.

Table 2. Descriptive statistics

Variables	Mean	Std.dev	Min	Max	Obs
High-Income Economics					
INEQ	0.38	0.08	0.25	0.66	882
DEM	7.32	1.99	1.71	9.93	
CC	0.99	0.88	-1.14	2.45	
GE	1.05	0.68	-0.71	2.46	
PS	0.65	0.52	-1.33	1.61	
Upper-Middle- Income Economics					
INEQ	0.47	0.09	0.27	0.70	702
DEM	5.56	1.69	1.66	8.29	
CC	-0.44	0.52	-1.64	1.02	
GE	-0.23	0.56	-1.85	1.23	
PS	-0.32	0.75	-2.82	1.20	
Lower Middle- & Low-Income Economics					
INEQ	0.48	0.05	0.34	0.64	918
DEM	4.16	1.48	1.13	7.92	
CC	-0.79	0.44	-1.59	0.77	
GE	-0.79	0.50	-2.22	0.67	
PS	-0.80	0.70	-2.45	0.66	

Source: Author's Compilation

Table 3 shows the correlation coefficients of variables that indicate a differential relationship between inequality (INEQ), democracy (DEM), control of corruption (CC), government effectiveness (GE), and political stability (PS) by income levels. In high-income economies, inequality demonstrates a very strong negative relationship with democracy, control of corruption, government effectiveness, and political stability, signifying that higher democracy and governance are associated with lower inequality. Conversely, in lower-middle/low-income and upper-middle economies, the relationships are normally

positive yet weak, implying a possible pattern whereby good democracy and governance are connected to somewhat higher levels of inequality. This difference is representative of the nature of the relationship between inequality, democracy, and governance as being considerably variable and contingent on the level of economic development within any country. Specifically, the results suggest that the benefits of improved democratic institutions and good governance in producing equality will only manifest at higher income levels.

Table 3. Results of correlation analysis

Variables	High-Income Economics	Upper-Middle-Income Economics	Lower Middle- & Low-Income Economics
	$INEQ$	$INEQ$	$INEQ$
$\boldsymbol{DEM}$	-0.65	0.26	0.16
$\boldsymbol{CC}$	-0.33	0.18	0.15
$\boldsymbol{GE}$	-0.39	0.11	0.02
$\boldsymbol{PS}$	-0.48	-0.08	0.18

Source: Author's Compilation

4. Results and discussion

This section presents a quantitative study that analyzes the effect of democracy and governance indices on inequality across different groups of countries classified by income level. To analyze the relationship between the study variables, the stationarity of the variables must first be examined.

4.1. Cross-sectional dependence tests

To examine the stationarity of the variables, the cross-sectional correlation of the variables is first tested using the Breusch-Pagan LM and CD Pesaran scaled LM tests, the results of which are shown in Table 4. This finding reveals a probability of less than 0.10 for all tests and indicates the cross-sectional dependence of the variables at the 10% significance level, and the classic ADF or PP stationarity tests cannot be used; therefore, the CIPS test should be used for the stationarity of the variables.

Table 4. The results of the cross-sectional dependence tests

Variable	Breusch-Pagan LM	Pesaran CD
High-Income Economics		
INEQ	4451*	5.30*
DEM	4602*	6.83*
CC	5826*	4.46*
GE	4723*	3.94*
PS	3669*	9.92*
INF	9761*	85.6*
GDP	11118*	92.0*
OPE	7051*	42.1*
CO2	9945*	26.1*
Upper-Middle- Income Economics		
INEQ	3157*	3.31*
DEM	2931*	4.62*
CC	3446*	-0.83
GE	2704*	5.66*
PS	3403*	0.70
INF	2785*	40.3*
GDP	6995*	73.5*
OPE	3410*	25.7*
CO2	6221*	34.4*
Lower Middle- & Low-Income Economics		
INEQ	7732*	11.5*
DEM	5477*	9.36*
CC	6129*	-1.99**
GE	4171*	1.07
PS	6442*	8.34*
INF	4228*	40.2*
GDP	15367*	115.3*
OPE	4834*	13.0*
CO2	13429*	102*

Note: ***, **, and * represent statistically significant level at 1%, 5%, and 10%, respectively.

Source: Author Compilation

4.2. Unit root tests

Table 5 presents the two generations of panel unit root tests. The ADF Fisher test from first-generation tests indicates the stationarity of variables in level or first difference. Also, CIPS Tests from the second unit root tests reveal the

stationary state of $INEQ$, PS, INF, and CO2 in different economies. Also, DEM, CC, GE, GDP, and OPE variables are in stationary with one difference (I(1)). After that, in Table 7, the parameter estimation of the models is presented.

Table 5. Panel unit root tests.

	ADF Fisher Test		CIPS Test	
Variable	**Level**	**First Difference**	**Level**	**First Difference**
High-Income Economics				
INEQ	173.6*	373.6*	-2.37*	-4.13*
DEM	104.3	271.8*	-1.86	-4.12*
CC	82.7	261.1*	-1.75	-3.83*
GE	96.5	278.5*	-1.76	-4.21*
PS	111.2	324.1*	-2.35*	-3.89*
INF	125.9**	448.9*	-2.36*	-4.39*
GDP	71.1	511.1*	-1.85	-3.39*
OPE	96.6	495.8*	-1.43	-3.22*
CO2	97.1	371.1*	-1.34	-3.73*
Upper-Middle- Income Economics				
INEQ	136.9*	233.7*	-2.22**	-3.70*
DEM	85.0	185.5*	-1.92	-3.67*
CC	80.1	229.1*	-1.65	-3.46*
GE	79.2	235.6*	-1.73	-4.16*
PS	92.2	296.7*	-1.68	-3.81*
INF	144.0*	391.0*	-2.49*	-4.69*
GDP	87.5	315.9*	-1.34	-3.23*
OPE	119.6*	358.5*	-1.83	-3.30*
CO2	62.7	251.9*	-1.24	-2.79*
Lower Middle- & Low-Income Economics				
INEQ	155.2*	255.0*	-2.52*	-3.09*
DEM	107.4	255.0*	-1.94	-3.25*
CC	92.2	294.6*	-1.28	-3.30*
GE	130.8**	357.9*	-1.91	-4.11
PS	139.7*	351.1*	-2.18**	-3.96*
INF	158.5*	612.4*	-2.26*	-5.09*
GDP	122.1***	416.5*	-1.85	-3.67*
OPE	145.4*	428.4*	-1.99	-3.54*
CO2	52.8	294.2*	-2.59*	-5.13*

Note: ***, **, and * represent statistically significant level at 1%, 5%, and 10%, respectively.
Source: Author Compilation

4.3. Panel Cointegration test

The slope homogeneity test results in Table 2 of the Appendix reject the null hypothesis of panel slope homogeneity for all estimated models. This finding underscores the importance of applying panel data techniques that account for cross-sectional heterogeneity, such as those that allow for individual-specific effects, to avoid biased or misleading inferences regarding the relationship between inequality, democracy/governance, and other macroeconomic variables. The panel cointegration test in Table 6, based on Westerlund & Kao tests, corroborates the existence of long-run relationships between inequality and its determinants across different income groups. Overall, the Kao test largely supports cointegration in all income groups. These findings point to the existence of long-run equilibrium relationships between inequality and the variables considered, which vary in strength and significance both across income groups and across governance measures of governance used. The stronger evidence of cointegration in the lower income groups suggest that inequality levels in these economies are more closely linked to the economic and governance variables examined.

Table 6. Panel co-integration test

	INEQ=f(DEM,INF,GDP,OPE,CO2)	INEQ=f(CC,INF,GDP,OPE,CO2)	INEQ=f(GE,INF,GDP,OPE,CO2)	INEQ=f(PS,INF,GDP,OPE,CO2)
High-Income Economics				
Westerlund test	2.05**	0.74	1.33***	3.00*
Kao test	-2.24**	-2.37*	-2.32**	-2.29**
Upper-Middle- Income Economics				
Westerlund test	2.26**	1.34***	3.03*	1.89**
Kao test	-1.72***	-1.69***	-1.59**	-1.61**
Lower Middle- & Low-Income Economics				
Westerlund test	4.95*	2.81*	4.00*	3.71*
Kao test	-1.46***	-1.47***	-1.44***	-1.28***

Note: ***, **, and * represent statistically significant level at 1%, 5%, and 10%, respectively.

H0: No cointegration

Source: Author's Compilation

4.5. Panel causality test

Based on the Dumitrescu and Hurlin (2012) panel causality test results, the significant relationships among inequality, democracy, and governance indicators (CC, GE, and PS) vary based on income groups. High-income economies show a two-way causal relationship among inequality, democracy, and government effectiveness, while corruption control and political stability affect inequality only one-way. In upper-middle-income economies, inequality and democracy are mutually causal; inequality influences political stability, and corruption control drives inequality. Government effectiveness also shows a weaker two-way link with inequality, and political stability does not Granger-cause inequality. Overall, the inequality–governance nexus is complex and varies by development level, implying that policies must be tailored to each country.

Table 7. Dumitrescu and Hurlin (2012) panel causality results

Null hypothesis: no causality	W-Stat.	Zbar-Stat.	prob	Decision of causality
High-Income Economics				
$INEQ \nRightarrow DEM$	4.21*	4.03	0.00	$INEQ \Leftrightarrow DEM$
$DEM \nRightarrow INEQ$	3.68*	2.83	0.00	
$INEQ \nRightarrow CC$	2.66	0.49	0.61	$CC \Rightarrow INEQ$
$CC \nRightarrow INEQ$	4.87*	5.54	0.00	
$INEQ \nRightarrow GE$	3.25***	1.85	0.06	$INEQ \Leftrightarrow GE$
$GE \nRightarrow INEQ$	4.57*	4.86	0.00	
$INEQ \nRightarrow PS$	2.98	1.23	0.21	$PS \Rightarrow INEQ$
$PS \nRightarrow INEQ$	3.57*	2.58	0.00	
Upper-Middle- Income Economics				
$INEQ \nRightarrow DEM$	3.80*	2.76	0.00	$INEQ \Leftrightarrow DEM$
$DEM \nRightarrow INEQ$	3.38**	1.91	0.05	
$INEQ \nRightarrow CC$	3.03	1.20	0.22	$CC \Rightarrow INEQ$
$CC \nRightarrow INEQ$	3.51*	2.17	0.02	
$INEQ \nRightarrow GE$	3.28***	1.70	0.08	$INEQ \Rightarrow GE$
$GE \nRightarrow INEQ$	2.49	0.10	0.91	
$INEQ \nRightarrow PS$	5.55*	6.33	0.00	$INEQ \Rightarrow PS$
$PS \nRightarrow INEQ$	2.92	0.97	0.33	

Null hypothesis: no causality	W-Stat.	Zbar-Stat.	prob	Decision of causality
Lower Middle- & Low-Income Economics				
$INEQ \nRightarrow DEM$	4.21*	4.11	0.00	$INEQ \Leftrightarrow DEM$
$DEM \nRightarrow INEQ$	3.90*	3.39	0.00	
$INEQ \nRightarrow CC$	4.14*	3.96	0.00	$INEQ \Leftrightarrow CC$
$CC \nRightarrow INEQ$	3.87*	3.32	0.00	
$INEQ \nRightarrow GE$	3.20***	1.77	0.07	$INEQ \Leftrightarrow GE$
$GE \nRightarrow INEQ$	3.21***	1.80	0.07	
$INEQ \nRightarrow PS$	3.11	1.56	0.11	$INEQ \nLeftrightarrow PS$
$PS \nRightarrow INEQ$	2.68	0.51	0.62	

Note: ***, **, and * represent statistically significant level at 1%, 5%, and 10%, respectively. The symbol ⇒ indicates unidirectional causality, while ⇔ indicates bidirectional causality. Also ⇏ indicates no causality.

Source: Author's Compilation

4.5. Long run estimation

The long-term estimates, using FMOLS and DOLS estimators in Table 8, reveal the heterogeneous relationship between inequality, governance, and democracy across income groups. Specifically, democracy (DEM) exhibits a significant negative relationship with inequality among high-income economies, reflecting that stronger democratic institutions can help reduce inequality in richer economies. Conversely, democracy and governance variables such as control of corruption (CC), government effectiveness (GE), and political stability (PS) are negatively correlated with inequality in upper-middle-income and lower-middle and low-income economies. Such a counterintuitive outcome can be an indicator of the pressures associated with democratization and governance reforms in developing countries, where early stages can have the unintended consequence of worsening existing inequalities. The control variables, namely inflation (INF), GDP, trade openness (OPE), and CO_2 emissions, show varying levels of significance across income groups, again highlighting the differential impact of macroeconomic factors and the environment in shaping inequality across income groups. Surprisingly, CO_2 emissions are found to have a positive and significant

relationship with inequality across all income groups, affirming the contribution of environmental degradation to increasing income gaps.

The negative relationship between inequality and democracy in developed countries is in line with evidence suggesting that embedded democratic institutions are capable of redressing inequality through redistributive policies and greater social inclusion (e.g., Acemoglu & Robinson, 2006). Nonetheless, the unexpected positive correlation between measures of democracy/governance and inequality in upper-middle and lower-middle and low-income countries is consist with studies highlighting the potential for democratization and governance reforms to raise inequalities in developing settings (e.g., Haggard & Kaufman, 1999). This could be due to elite capture of new institutions, uneven rollout of reforms, or disruption of entrenched social safety nets during the transition phase. The variable relative significance of the control variables to various income groups reflects the idea that that macro conditions and environmental degradation affect inequality differently across stages of economic development (e.g., Kuznets, 1955; Piketty, 2014).

Table 8. Results from FMOLS and DOLS estimators

	High-Income Economics				**Upper-Middle- Income Economics**				**Lower Middle- & Low-Income Economics**			
Variable	**FMOLS-β**				**FMOLS-β**				**FMOLS-β**			
DEM	-0.01* (-5.38)				0.02* (9.46)				0.00* (6.35)			
CC		-0.02* (-3.81)				0.06* (4.67)				0.01* (6.78)		
GE			-0.04* (-4.79)				0.03* (3.30)				0.00*** (1.75)	
PS				-0.05* (-5.32)				0.02* (2.46)				0.01* (8.22)
INF	0.00 (1.58)	0.00** (1.97)	0.01 (1.40)	0.01** (1.95)	0.00** (2.30)	0.00 (0.94)	0.00 (0.88)	0.00 (0.97)	0.01* (2.03)	0.01** (2.45)	0.01** (2.33)	0.00** (2.47)
GDP	0.01*** (1.86)	0.02* (2.67)	0.02* (3.31)	0.01 (1.34)	0.01* (5.89)	0.01* (2.72)	0.01** (2.34)	0.01* (3.10)	0.00* (3.07)	-0.01* (-5.38)	-0.01* (-6.11)	-0.00* (-3.81)
OPE	0.00 (0.54)	0.00** (2.10)	0.00* (2.85)	0.01** (2.43)	-0.00* (-8.42)	-0.00* (-5.83)	-0.00* (-5.67)	-0.01* (-5.87)	0.01* (2.71)	0.00* (2.72)	0.00* (3.47)	0.00 (0.80)
CO2	0.31* (3.28)	0.00* (10.6)	0.01* (10.7)	0.00* (10.1)	0.00* (6.59)	0.01* (3.42)	0.00* (2.95)	0.00** (2.16)	0.00* (5.21)	0.00* (7.13)	0.00* (9.75)	0.00* (7.87)

	High-Income Economics				Upper-Middle- Income Economics				Lower Middle- & Low-Income Economics			
	DOLS-β				DOLS-β				DOLS-β			
DEM	-0.01* (-3.83)				0.02* (4.38)				0.00*** (1.67)			
CC		-0.02* (-3.13)				0.06* (3.20)				0.01** (2.19)		
GE			-0.04* (-3.80)				0.04** (2.07)				0.00 (0.14)	
PS				-0.05* (-4.39)				0.02** (2.09)				0.01** (2.17)
INF	0.00*** (1.66)	0.00** (2.10)	0.01*** (1.67)	0.01** (2.04)	0.00 (0.81)	0.00 (0.24)	0.00 (0.12)	0.00 (0.23)	0.00 (0.49)	0.01 (0.70)	0.00 (0.31)	0.00 (0.58)
GDP	0.02** (2.28)	0.03* (3.09)	0.03* (3.55)	0.02** (2.10)	0.02** (2.56)	0.01 (1.60)	0.01 (1.16)	0.01** (2.48)	-0.01 (-1.42)	-0.01*** (-1.66)	-0.00 (-0.77)	-0.00 (-0.80)
OPE	0.00 (0.81)	0.01** (2.11)	0.00* (2.70)	0.01** (2.37)	-0.00* (-3.73)	-0.00* (-3.38)	-0.00* (-3.37)	-0.01* (-5.32)	0.01 (0.90)	0.00 (1.31)	0.00 (0.81)	0.00 (0.39)
$CO2$	0.00* (5.99)	0.00* (8.59)	0.01* (8.67)	0.00* (8.26)	0.00* (3.13)	0.00** (2.33)	0.00*** (1.79)	0.00*** (1.89)	0.00 (1.88)	0.00* (2.71)	0.00*** (1.66)	0.00** (2.18)

Note: ***, **, and * represent statistically significant level at 1%, 5%, and 10%, respectively.
Source: Author's Compilation

4.6. Robustness tests

For the robustness of the results, here we use several different models. Our panel data estimations are also stable according to the Granger non-causality tests presented in Table 9, which test the causality relationship between inequality (INEQ) and democracy (DEM) for all income groups. Using the HPJ Wald test, evidence reveals a complex pattern of causality. Specifically for high-income economies, the null hypothesis of no causality from democracy to inequality is rejected at the 1% level, and a significant unidirectional causality exists in the direction DEM⇒INEQ, suggesting that democracy has an impact on inequality. The reverse causality (INEQ⇏DEM) does not exist.

Table 9. JKS (2021) Granger non-causality test results

Null hypothesis: no causality	HPJ Wald test	prob.	Decision of causality
High-Income Economics			
$INEQ \nRightarrow DEM$	0.21	0.64	$DEM \Rightarrow INEQ$
$DEM \nRightarrow INEQ$	9.11*	0.00	
Upper-Middle- Income Economics			
$INEQ \nRightarrow DEM$	0.96	0.32	$INEQ \nLeftrightarrow DEM$
$DEM \nRightarrow INEQ$	0.38	0.53	
Lower Middle- & Low-Income Economics			
$INEQ \nRightarrow DEM$	0.005	0.94	$DEM \Rightarrow INEQ$
$DEM \nRightarrow INEQ$	3.73**	0.05	

Note: ***, **, and * represent statistically significant level at 1%, 5%, and 10%, respectively. The symbol ⇒ indicates unidirectional causality, while ⇎ indicates no causality
Source: Author's Compilation

The consistency of the long-run relationships calculated by FMOLS and DOLS is checked using Pooled Mean Group (PMG) regressions and regressions with Driscoll-Kraay Standard Errors (DKSE), which are presented in Table 10. While the FMOLS and DOLS estimates above validated the presence of a significant negative relationship between democracy and inequality for high-income nations, both PMG and DKSE estimates provide mixed results with varying significance. Specifically, democracy bears a positive and significant relationship with PMG but a negative relationship with DKSE. For the upper-middle- and lower-middle/low-income economies, our previous findings of a counterintuitive negative relationship of democracy and governance indicators (CC, GE, PS) with inequality are partly supported. The PMG and DKSE results exhibit a largely statistically significant relationship in all the variables for the income groups. The control variables (INF, GDP, OPE, and CO_2) continue to exhibit different levels of significance across income groups, in favor of the heterogeneous impact of macroeconomic variables. Overall, the robustness tests convey a more

nuanced picture, highlighting the sensitivity of the democracy-inequality relationship to the estimation method, but confirming the dominance of environmental factors in generating inequality across different income levels.

Table 10. Pooled Mean Group Regression & Regression with Driscoll-Kraay standard errors

	High-Income Economics		**Upper-Middle-Income Economics**		**Lower Middle- & Low-Income Economics**	
Variable	PMG	DKSE	PMG	DKSE	PMG	DKSE
DEM	0.01*	-0.01*	0.02*	0.02*	-0.00**	0.01*
	(5.67)	(-19.6)	(6.43)	(10.5)	(-2.08)	(10.1)
INF	0.00	0.00**	0.00*	0.00*	0.00*	0.00**
	(0.20)	(2.18)	(9.46)	(3.15)	(5.88)	(2.12)
GDP	0.07*	0.01*	0.00	0.01*	0.01	-0.00
	(6.53)	(12.6)	(0.40)	(17.2)	(0.95)	(-1.27)
OPE	0.00*	0.00*	0.00*	-0.00*	-0.00**	0.00*
	(2.62)	(3.77)	(4.98)	(-11.9)	(-2.28)	(3.45)
CO2	0.01*	0.00*	0.01	0.00*	0.00*	-0.00*
	(4.25)	(15.6)	(0.60)	(10.2)	(9.77)	(-26.8)

Note: ***, **, and * represent statistically significant level at 1%, 5%, and 10%, respectively.
Source: Author Compilation

Drawing on the empirical relationships, our Granger non-causality tests identify income-level-specific patterns between inequality and democracy, consistent with mixed evidence in the literature that tends to emphasize the context-specific nature of the relationship (e.g., Acemoglu et al., 2015; Boix, 2003). One-way causality from democracy to inequality among high-income, lower-middle-income, and low-income economies suggests that democratic processes, according to the income group, can influence income distribution patterns, possibly through policy choices or institutional changes as posited by Li & Reuveny (2009). The absence of causality among upper-middle-income countries suggests a potential threshold effect or the influence of some mediating factors. Moreover, the use of PMG and DKSE estimators during

robustness tests, despite being sensitive to some degree in the democracy-inequality nexus compared to the FMOLS and DOLS, also reinforces the finding that CO2 emissions contribute to rising inequality among groups.

5. Conclusions & Suggestions

This study analyzes the connection between inequality, democracy, and governance employing panel cointegration and the Granger non-causality approaches, using data from 2006–2023 for different income groups. It is important to clarify that panel cointegration and Granger non-causality tests identify long-run associations and predictive relationships, not structural causal effects. The finding that democracy substantially reduces inequality in developed countries is consistent with established literature contending that robust democratic institutions and redistributive policies within developed economies can effectively keep income inequality in check, as shown by Acemoglu & Robinson (2006) and Piketty (2014). However, the seemingly counterintuitive negative correlation between democracy and governance variables (CC, GE, PS) and inequality in low-income economies creates the possibility of "democratization paradox," where the initial democratic reforms and the progress in governance are actually augmenting inequality, perhaps because elite capture, discriminatory exposure to new opportunities, or the destruction of imperfect social protection systems as mentioned before in Robinson (2006) has not yet benefited the worst-off. This aligns with views highlighting the propensity of democratization in developing countries to be dominated by hegemonic interest groups, thus leading to policies favoring the wealthy and widening income disparity.

The tests of robustness, employing PMG and DKSE regressions and Granger causality tests, reveal income-group-specific relations between democracy and inequality and partially validate previous literature emphasizing conditional effects. Most importantly, the strong positive influence of democracy on inequality in high and upper-middle-income economies, as measured by the PMG and DKSE estimates, alongside one-way

causality from democracy to inequality in high-income, lower-middle-income, and low-income economies, challenges simplistic narratives of democracy possessing the property of automatically reducing inequality, instead perhaps first increasing it in certain circumstances. This is reaffirmed by hypotheses that democratic transition can initially worsen inequality due to the capture of new political and economic opportunities in an unequal manner, as argued by Acemoglu & Robinson (2006). The lack of a causal link between inequality and democracy in upper-middle-income countries, as well as the inconclusive evidence across income groups, testifies to the multifaceted and potentially non-linear nature of the relationship, also documented in previous research like Muller (1988). The constancy and direction of control variables highlight the conditional nature of the democracy-inequality nexus underlying dominant theories, as mentioned in Barro (2000).

There are many practical and scientific implications for policymakers arising from the analysis. In high-income economies, institution-strengthening through democratic means remains a necessary pathway direction towards inequality reduction. However, the complex correlations observed in developing economies require caution. Implementing governance reforms and democratization processes without addressing structural causes can unintentionally lead to rising inequalities, a process perhaps explained by elite capture models. These then need to be supplemented by pro-poor social safety nets and poverty alleviation policies designed to protect the vulnerable during phases of transition. The results of the study suggest a variety of avenues for future research. More sophisticated panel data techniques that explicitly recognize spatial spillover and common factor influences could be employed in such work. Additionally, future research may extend the analysis to include other dimensions of inequality, such as gender inequality or educational disparities, in an attempt to gain a fuller grasp of the nature of the relationship between democracy, governance, and inequality.

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Conflicts of interest

The authors declare no conflict of interest

References

Acemoglu, D., & Robinson, J. A. (2006). Economic origins of dictatorship and democracy. Cambridge University Press.

Acemoglu, D., Egorov, G., & Sonin, K. (2015). A political theory of populism. *The Quarterly Journal of Economics*, 128(2), 771–805. https://doi.org/10.1093/qje/qjs077

Acheampong, A. O., Dzator, J., Abunyewah, M., Erdiaw-Kwasie, M. O., & Opoku, E. E. O. (2023). Sub-Saharan Africa's tragedy: resource curse, democracy and income inequality. *Social Indicators Research*, 168(1), 471-509. https://doi.org/10.1007/s11205-023-03137-2

Ahmad, M. (2017). Economic Freedom and Income Inequality: Does Political Regime Matter? *Economies*, *5*(2), 1-28. https://doi.org/10.3390/economies5020018

Ahmed, M. (2023). Political economy of elite capture and clientelism in public resource distribution: Theory and evidence from Balochistan, Pakistan. *India Quarterly*, 79(2), 223-243. https://doi.org/10.1177/09749284231165115

Ali, A. K., & Asfaw, D. M. (2023). Nexus between inflation, income inequality, and economic growth in Ethiopia. *Plos one*, 18(11), e0294454. https://doi.org/10.1371/journal.pone.0294454

Barro, R. J. (2000). Inequality and growth in a panel of countries. *Journal of Economic Growth*, 5(1), 5-32. https://doi.org/10.1023/A:1009850119329

Basumatary, I. R., & Das, M. (2024). Investigating the Effect of Democracy and Governance Quality on Income Inequality: Evidence from BRICS. *Economic Research Guardian*, 14(1). https://www.ecrg.ro/files/p2024.14(1)12y2.pdf

Bergougui, B., Boudjana, R. H., Mehibel, S., & Zambrano-Monserrate, M. A. (2024). How do institutional quality and income asymmetrically affect carbon emissions inequality? A quantile-on-quantile assessment for six major global emitters. *Journal of Cleaner Production*, 483, 144215. https://doi.org/10.1016/j.jclepro.2024.144215

Berisha, E., Sewak Dubey, R., & Gharehgozli, O. (2023). Inflation and income inequality: does the level of income inequality matter?. *Applied Economics*, 55(37), 4319-4330. https://doi.org/10.1080/00036846.2022.2128293

Boix, C. (2003). Democracy and redistribution. Cambridge University Press.

Cappelli, F. (2025). Unequal contributions to CO2 emissions along the income distribution within and between countries. *World Development*, 193, 107070. https://doi.org/10.1016/j.worlddev.2025.107070

Diamond, L. (2008). The spirit of democracy: The struggle to build free societies throughout the world. Times Books.

Dorn, F., Fuest, C., & Potrafke, N. (2022). Trade openness and income inequality: New empirical evidence. *Economic Inquiry*, 60(1), 202-223. https://doi.org/10.1111/ecin.13018

Dumitrescu E., & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Econ Model*, 29(4), 1450–60. https://doi.org/10.1016/j.econmod.2012.02.014

Elkjær, M. A., & Iversen, T. (2023). The democratic state and redistribution: whose interests are served?. *American Political Science Review*, 117(2), 391-406. https://doi:10.1017/S0003055422000867

Fagbemi, F., & Kotey, R. A. (2024). Interconnections between governance shortcomings and resource curse in a resource-dependent economy. *PSU Research Review*, 8(2), 297-320.https://doi.org/10.1108/PRR-09-2021-0052

Ghosh, S., Doğan, B., Can, M., Shah, M. I., & Apergis, N. (2023). Does economic structure matter for income inequality?. *Quality & Quantity*,

57(3), 2507-2527. https://doi.org/10.1007/s11135-022-01462-1

Haggard, S., & Kaufman, R. R. (1999). The political economy of democratic transitions. In Transitions to democracy (pp. 72-96). Columbia University Press. https://doi.org/10.2307/422121

Hajili Davaji, M., & Elmi, Z. (2024). The Effects of Good Governance on Income Inequality with an Emphasis on Political Instability. *Iranian Economic Development Analyses*, 10(1), 227-250.https://doi.org/10.22051/ieda.2024.46408.1406. (In Persian)

Hartwell, C. A., Horvath, R., Horvathova, E., & Popova, O. (2019). Democratic institutions, natural resources, and income inequality. *Comparative Economic Studies*, *61*(4), 531-550.https://doi.org/10.1057/s41294-019-00102-2

Islam, M. R., & McGillivray, M. (2020). Wealth inequality, governance and economic growth. *Economic Modelling*, 88, 1-13. https://doi.org/10.1016/j.econmod.2019.06.017

Kafili, V., Zabihidan, M., & Kondelaji, M. H. H. (2023). Income distribution and environmental pollution: A panel data analysis for the provinces of Iran, 2005-2016. *Regional Statistics*, 13(4), 674-695. https://doi.org/10.15196/RS130405

Kashyap, H. (2024). Income Inequality and Economic Development: Exploring the Relationship Across Nations. *Shodh Sagar Journal of Commerce and Economics*, 1(1), 6-11. https://doi.org/10.36676/ssjce.v1.i1.02

Keefer, P. (2025). Trust and the New Institutional Economics. Handbook of New Institutional Economics, 975-1000. https://doi.org/10.1007/978-3-031-50810-3_37

Keneck-Massil, J., Nomo-Beyala, C., & Owoundi, F. (2021). The corruption and income inequality puzzle: does political power distribution matter?. *Economic Modelling*, 103, 105610. https://doi.org/10.1016/j.econmod.2021.105610

Knight, K. W., Schor, J. B., & Jorgenson, A. K. (2017). Wealth inequality and carbon emissions in high-income countries. *Social Currents*, 4(5), 403-412. https://doi.org/10.1177/2329496517704872

Kuznets, S. (1955). Economic Growth and Income Inequality. *The American Economic Review*, 45(1), 1-28. https://doi.org/10.4324/9780429311208

Lam, D. D., & Vy, V. N. T. (2024). Governance Quality, Infrastructure Development, and Income Inequality in Vietnam's Provinces. In Recent Trends in Vietnam's Rapid Economic Development: 1990–2023 (pp. 183-199). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-97-6079-4_11

Li, Q., & Reuveny, R. (2009). Democracy and environmental degradation. *International Studies Quarterly*, 53(4), 935-957. https://doi.org/10.1111/j.1468-2478.2006.00432.x

Mahmoudinia, D., & Amroabadi, B. S. (2023). Good governance and financial crises: A global evidence. *Global Business and Economics Review*, 29(2), 181–211. https://doi.org/10.1504/GBER.2023.133464

Muller, E. N. (1988). Democracy, economic development, and income inequality. *American Sociological Review*, 53(1), 50-68. https://doi.org/10.2307/2095732

Nissen, S. (2021). Political participation: Inclusion of citizens in democratic opinion-forming and decision-making processes. In Peace, justice and strong institutions, 665-675. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-95960-3_42

Piketty, T. (2014). Capital in the twenty-first century. Harvard University Press. https://doi.org/10.4159/9780674369542

Rafique, I., Nasim, A, & Shabbir, R. (2023). Democracy and Inequality: A Comparative Analysis of Political System and Social Disparities. *Global Sociological Review*, VIII(II), 351-362. https://doi.org/10.31703/gssr.2023(VIII-II).36

Robinson, J. A. (2006). Economic development and democracy. *Annual Review of Political Science*, 9, 503-529. https://doi.org/10.1146/annurev.polisci.9.092704.171256

Rose-Ackerman, S. (1999). Political corruption and democracy. *Conn. J. Int'l l.*, *14*, 363.

Sadeghi Amroabadi, B. (2021). Analysis of the effects of democracy and free trade on factor earnings in Iran. *Journal of Economic Research (Tahghighat-E-Eghtesadi)*, 55(4), 915–939. https://doi.org/10.22059/jte.2021.318592.1008280. (In Persian)

Sadeghi Amroabadi, B. (2022). Analyzing the Asymmetric Cumulative Effects of Rentier State on Income Inequality in Mena Countrie. *Quarterly Journal of Applied Theories of Economics*, 9(3), 113-146. https://doi: 10.22034/ecoj.2022.42390.274. (In Persian)

Saha, M., Dutta, K. D., & Rahman, T. (2025). Balancing financialization and equity: the crucial role of democratic governance. *Future Business Journal*, 11(1), 146. https://doi.org/10.1186/s43093-025-00562-2

Sever, C., & Yücel, E. (2025). Electoral cycles in inequality: C. Sever and E. Yücel. *The Journal of Economic Inequality*, 23(2), 433-456. https://doi.org/10.1007/s10888-024-09649-2

Solt, F. (2020). Measuring income inequality across countries and over time: The standardized world income inequality database. *Social Science Quarterly*, 101(3), 1183-1199. https://doi.org/10.1111/ssqu.12795

Trinugroho, I., Achsanta, A. F., Pamungkas, P., Saputro, N., & Yuniarti, S. (2023). Democracy, economic growth, and income inequality: Evidence from province level data. *Cogent Economics & Finance*, 11(1), 2220244. https://doi.org/10.1080/23322039.2023.2220244

Trung, V. (2022). Unbundling the effect of political instability on income redistribution. European *Journal of Political Economy*, 75, 102189. https://doi.org/10.1016/j.ejpoleco.2022.102189

Tsitouras, A., Papapanagos, H. (2025) The relationships between economic freedom, income inequality, and economic growth: empirical evidence from an asymmetric analysis in the case of Greece. *Port Econ J*., 24, 419-454. https://doi.org/10.1007/s10258-025-00269-w

Wan, G., Wang, C., Wang, J., & Zhang, X. (2022). The income inequality-CO2 emissions nexus: Transmission mechanisms. *Ecological Economics*, 195, 107360. https://doi.org/10.1016/j.ecolecon.2022.107360

Wesołowska, M., Kuźmar, S., Totleben, B., & Piątek, D. (2025). Distributional Consequences of Political Freedom: Inequality in Transition Countries. *Communist and Post-Communist Studies,* 1-32. https://doi.org/10.1525/cpcs.2025.2470160

Wong, M. Y. (2022). Democracy, belief in democratic redistribution, and income inequality. *European Political Science*, 21(3), 378-397. https://doi.org/10.1057/s41304-021-00350-w

Appendix 1. Countries by income classification

High-Income Economics					
Australia	Czechia	Iceland	Malta	Russia	United Arab Emirates
Austria	Denmark	Ireland	Netherlands	Saudi Arabia	United Kingdom
Bahrain	Estonia	Italy	New Zealand	Singapore	United States
Belgium	Finland	Japan	Norway	Slovakia	Uruguay
Bulgaria	France	Kazakhstan	Oman	Slovenia	
Canada	Germany	Kuwait	Panama	South Korea	
Chile	Greece	Latvia	Poland	Spain	
Croatia	Hong Kong	Lithuania	Portugal	Sweden	
Cyprus	Hungary	Luxembourg	Romania	Switzerland	
Upper-Middle- Income Economics					
Albania	Botswana	El Salvador	Iraq	Mongolia	South Africa
Algeria	Brazil	Equatorial Guinea	Jamaica	Montenegro	Thailand
Argentina	China	Gabon	Libya	Namibia	Turkey
Armenia	Colombia	Georgia	Malaysia	North Macedonia	Ukraine
Azerbaijan	Costa Rica	Guatemala	Mauritius	Paraguay	
Belarus	Dominican Republic	Indonesia	Mexico	Peru	
Bosnia and Herzegovina	Ecuador	Iran	Moldova	Serbia	
Lower Middle- & Low-Income Economics					
Angola	Chad	Guinea	Madagascar	Philippines	Tunisia
Bangladesh	Comoros	Guinea-Bissau	Mali	Rwanda	Uganda
Benin	Congo	Haiti	Mauritania	Senegal	Uzbekistan
Bolivia	Cote d'Ivoire	Honduras	Morocco	Sierra Leone	Vietnam
Burkina Faso	Democratic Republic of Congo	India	Mozambique	Sri Lanka	Zambia
Burundi	Egypt	Kenya	Nepal	Sudan	Zimbabwe
Cambodia	Ethiopia	Kyrgyzstan	Nicaragua	Tajikistan	
Cameroon	Gambia	Lebanon	Niger	Tanzania	
Central African Republic	Ghana	Lesotho	Pakistan	Togo	

Appendix 2. Slope homogeneity test

	INEQ=f(DEM,INF,GDP,OPE,CO2)	INEQ=f(CC,INF,GDP,OPE,CO2)	INEQ=f(GE,INF,GDP,OPE,CO2)	INEQ=f(PS,INF,GDP,OPE,CO2)
High-Income Economics				
Delta	10.4*	10.9*	10.8*	9.90*
Adj.	13.3*	14.0*	13.9*	12.7*
Upper-Middle- Income Economics				
Delta	9.97*	10.4*	9.40*	10.1*
Adj.	12.7*	13.3*	12.0*	12.9*
Lower Middle- & Low-Income Economics				
Delta	18.0*	17.3*	17.2*	17.1*
Adj.	23.5*	22.1*	22.0*	21.8*

Note: ***, **, and * represent statistically significant level at 1%, 5%, and 10%, respectively.