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An Interaction Effect of Human Capital and Democracy on Income Inequality in South Asia: A Panel Data Analysis

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Abstract

The global rise in income disparity has been the subject of numerous political and public discussions in the wake of the most recent economic crises. The objective of the current study is to empirically investigate the impact of human capital and democracy on income inequality. This study analyzed the interaction between democracy and income inequality from 2000 to 2020. The balanced panel data is collected from South Asia and regressed by applying three different statistical techniques (Pooled OLS, Fixed Effect Model, and Random Effect Model). The Levin-Lin Chu test, the Hardri LM test, and the IM-Pesaran-Shin test have all been used to address the order of integration in the study. The White test, the Brush-Pagan test, the Brush-Pagan LM test, and the Hausman test were all used in this study to increase reliability. The outcomes of every diagnostic test support Fixed-Effect Model estimation (FEM). The results revealed that human capital, the interaction term (human capital*democracy), and government health expenditures are negatively associated with income inequality, whereas population growth, trade openness, and infrastructure have been positively related to income inequality in South Asian countries during the specified period. The study concludes that democracy plays an essential role in reducing income gaps by enhancing human capital. The outcomes suggest that the role of democracy in reducing the income inequality gaps should not be overemphasized particularly in South Asian countries.

Keywords: Human Capital, Democracy, Inequality

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1 Introduction

The proposition that democracy encourages a more equitable distribution of income has informed political and economic debates since the late eighteenth century. Democratic participation may enable disadvantaged groups to demand more equitable redistribution (Boix, 1998; Chan, 1997). Accordingly, democratically accountable governments may pursue public expenditure, progressive taxation, minimum-wage legislation, subsidies, and employment policies that address distributive concerns. However, political participation does not automatically produce such policies: organized interest groups, institutional arrangements, and the relative influence of economic elites can affect how redistributive demands are translated into decisions. Lenski (1978) emphasizes the potential connection between political power and distributive outcomes, whereas historical research associates changes in suffrage and public spending with shifts in inequality (Justman & Gradstein, 1999; Lindert, 1994). Moreover, democracy and income distribution may influence one another. Political stability, economic growth, and inequality can shape political institutions, while institutions can affect the allocation of economic resources (Alesina, 1998; Alesina & Perotti, 1996; Muller, 1988). These considerations make the relationship between democracy and income inequality an empirical question rather than a predetermined outcome.

This study investigates the relationship among democracy, human capital, and income inequality using panel data for seven countries included in the study's regional sample. South Asian economies face the simultaneous challenges of unequal educational opportunity, economic insecurity, demographic change, and competing demands for public resources. Therefore, the effectiveness of political institutions should be considered alongside the distribution of educational resources and the ability of individuals to translate education into economic opportunity. The analysis focuses on whether the relationship between human capital and inequality differs with the level of democracy, rather than assuming that democratic institutions have identical distributive consequences across countries. In addition, the analysis examines population growth, trade openness, infrastructure, and health expenditure as relevant correlates of income inequality. This approach preserves the study's central concern with the role of democratic governance in shaping the distributive implications of human capital development.

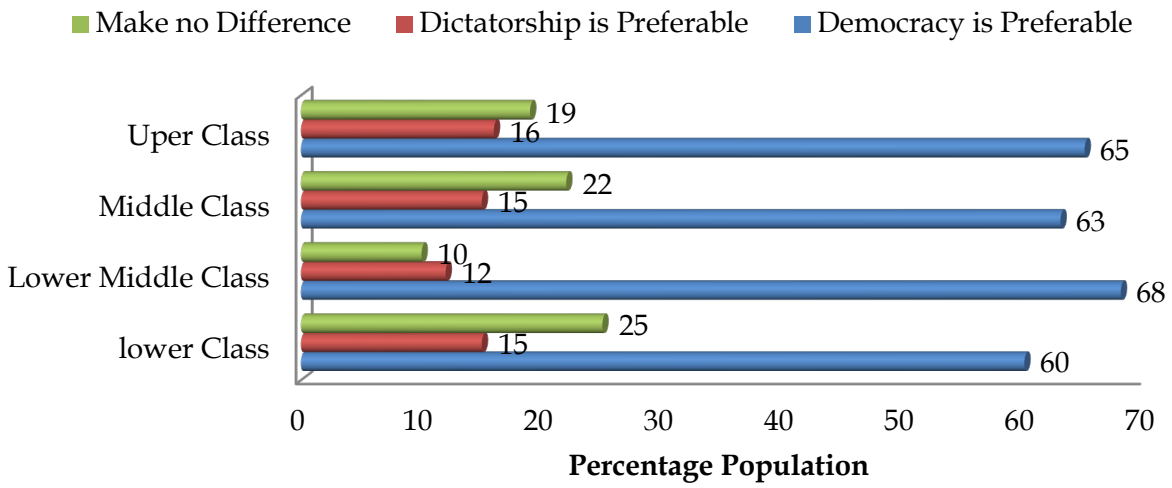


Figure 1: Percentage Support for Democracy in South Asia
Source: SDSA Data Set, Lokniti-CSDS.

In a broad political sense, democracy denotes a system in which public authority is exercised through the participation and representation of citizens. However, support for democratic government should be distinguished from satisfaction with its day-to-day performance. Figure 1 presents responses concerning preferences for democracy by reported economic class, using the SDSA dataset compiled by Lokniti-CSDS. The figure indicates that democracy is preferred by a majority in each displayed class: 65% of the upper class, 63% of the middle class, 68% of the lower-middle class, and 60% of the lower class. At the same time, the proportions preferring dictatorship or expressing no preference vary between the groups. These descriptive comparisons suggest broad support for democracy across classes; however, they do not establish that economic position causes particular political preferences, nor do they directly measure respondents' satisfaction with the operation of democracy. Consequently, the figure provides contextual evidence rather than a test of the study's principal econometric hypothesis.

1.1 Economic Linkages between Democracy and Human Capital in South Asia

Human capital has been defined in several ways, but many accounts emphasize the productive value of acquired knowledge and skills. Schultz (1961) distinguished investments in education and training from the contribution of unskilled labour. Political participation may also be relevant to human development because it can expand the ability of disadvantaged groups to express their needs and influence public priorities. However, the connection between democracy and human capital is not automatic. Research suggests several possible mechanisms (McGuire, 2010; Ross, 2006). First, electoral competition may encourage leaders to respond to public concerns about education, health, and social welfare (Lake & Baum, 2001). Second, democratic protections for civic activity may support associations through which citizens exchange information, organize collective interests, and seek improvements in public services (Parker, 1996). These channels provide a rationale for examining political institutions alongside human capital, although their effectiveness may vary across national contexts.

Third, democratic participation may enable socially marginalized groups to articulate demands concerning educational opportunity, employment, and welfare. Expanding formal political rights can increase the public visibility of groups that were previously excluded from policy-making, although legal inclusion does not necessarily produce equal political influence (Alvarez et al., 1998; Piven & Cloward, 1995; Rubin, 1997). Fourth, institutional continuity and accountable procedures may affect how consistently public commitments are translated into services and redistribution. Political institutionalization involves regular and predictable arrangements for political competition and governance (Huntington, 1984; Levitsky, 1998). These arguments suggest plausible connections between democracy and human development. Nevertheless, each mechanism requires empirical evaluation, especially in countries where democratic institutions and educational opportunities differ substantially.

South Asian economies continue to face unemployment, population growth, poverty, and episodes of economic instability. Educational disadvantage is an additional obstacle to human development and meaningful political participation. Therefore, investments in accessible, high-quality education can be relevant both to labour-market opportunities and to the capacity of citizens to engage with democratic institutions. Nevertheless, the distributional implications of these investments depend on who receives educational opportunities and whether labour markets reward the acquired skills (Schultz, 1961; Dahlum & Knutsen, 2017).

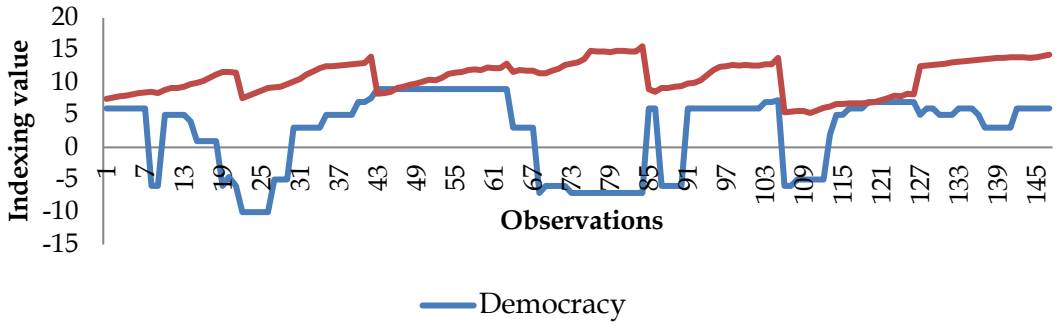


Figure 2: Relationship between Human Capital and Democracy in South Asia
Source: Authors' calculations based on the study data.

Figure 2 displays the reported trajectories of human capital and democracy in the study sample between 2000 and 2020. The figure illustrates the possible association between educational development and political institutions. In a democratic system, education may improve citizens' ability to evaluate policies, participate in public debate, and demand accountability. Similarly, broader opportunities for civic participation may encourage attention to public services and educational provision (Lake & Baum, 2001; Ross, 2006). However, an apparent co-movement in plotted observations is insufficient to establish that democratic governance caused human capital to increase. The direction and magnitude of this relationship require formal estimation, while accounting for country-specific characteristics and other influences on educational attainment.

1.2 Income Inequality in South Asia

Economic inequality refers to differences in economic resources and living standards across individuals, households, and social groups. Since living standards can be measured in different ways, empirical

studies commonly use income or wealth as an observable indicator. This study concentrates on income inequality and adopts the Gini coefficient as its principal outcome measure. Unequal income distribution may constrain opportunities for disadvantaged households and undermine the inclusiveness of development. Therefore, understanding the economic and institutional correlates of inequality remains relevant to public policy in emerging economies (Piketty & Saez, 2014; Zhuang et al., 2014).

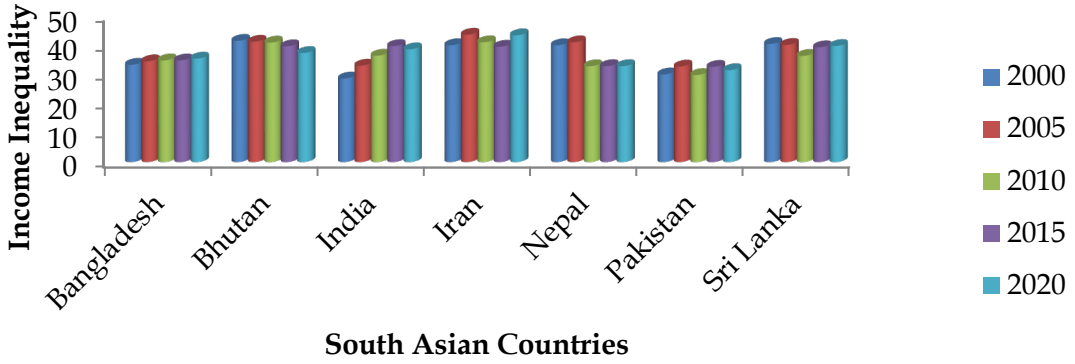


Figure 3: Income Inequality in South Asia, 2000–2020
Source: Authors' calculations based on the study data.

This study uses the Gini coefficient to describe income inequality. Figure 3 compares the reported Gini values for the selected countries at different points from 2000 to 2020. The manuscript also provides contextual information on income shares and poverty trends. For Pakistan, the reported figures indicate that the highest-income 10% receive 27.6% of national income, compared with 4.1% for the lowest-income 10%. The text further records a decline in the national poverty rate from 64.3% in 2001 to 24.3% in 2015, alongside lower poverty headcount values at the stated international threshold (World Bank, 2016). The manuscript notes substantial concentration of wealth in India in 2016. However, wealth concentration, poverty incidence, and the income Gini measure are not interchangeable statistics; they describe different features of economic disadvantage. The descriptive discussion reports a regional mean Gini value of 33.7 for 2000–2020. Consequently, Figure 3 should be read as a comparison of the displayed income inequality measures, while the additional poverty and wealth figures provide contextual information rather than direct estimates of the Gini coefficient.

1.3 Democracy and Income Inequality

Political arrangements can influence income distribution because they shape access to decision-making, the design of tax and transfer systems, and the provision of public services. The classic redistribution argument predicts that broader political representation may create pressure for policies benefiting lower-income citizens (Lipset, 1959; Meltzer & Richard, 1981). However, the relationship need not be uniform across settings: differences in political institutions, participation, economic structures, and the influence of organised groups can affect distributive outcomes (Boix, 1998; Reuveny & Li, 2003). Consequently, the present study examines democracy alongside human capital and the interaction between these two variables, rather than attributing differences in income distribution to political institutions alone.

1.4 Human Capital and Income Inequality

Income inequality has attracted increasing attention across Asia, particularly where economic expansion has not resulted in proportionate gains for every income group (Piketty & Saez, 2014; Zhuang et al., 2014). Although economic growth may raise average living standards, its benefits can remain unevenly distributed. In addition, disparities in access to education can limit disadvantaged households' ability to benefit from productivity improvements and new employment opportunities. Studies of Asian economies have therefore examined how educational attainment, economic structure, and other factors relate to changing income distributions (Jain-Chandra et al., 2019; Lee & Lee, 2018). Furthermore, inequality may limit investment in education among financially constrained households, creating persistent differences in future earnings and opportunities. These mechanisms support examination of the human capital–inequality relationship within South Asia's specific institutional setting.

Human capital is a central determinant of labour-market opportunities because acquired knowledge and skills influence productivity and potential earnings (Schultz, 1961). Educational investment can help individuals qualify for more productive employment and improve their capacity to adapt to economic change. However, its effect on inequality depends on the distribution of access, education quality, and

differences in labour-market returns. For example, expanding education concentrated among already advantaged households may initially widen earnings gaps, whereas broad-based access to effective education may reduce them. Empirical work reports important relationships between education and inequality while also identifying variation across countries and time horizons (Hovhannisyan et al., 2019; Vo et al., 2024).

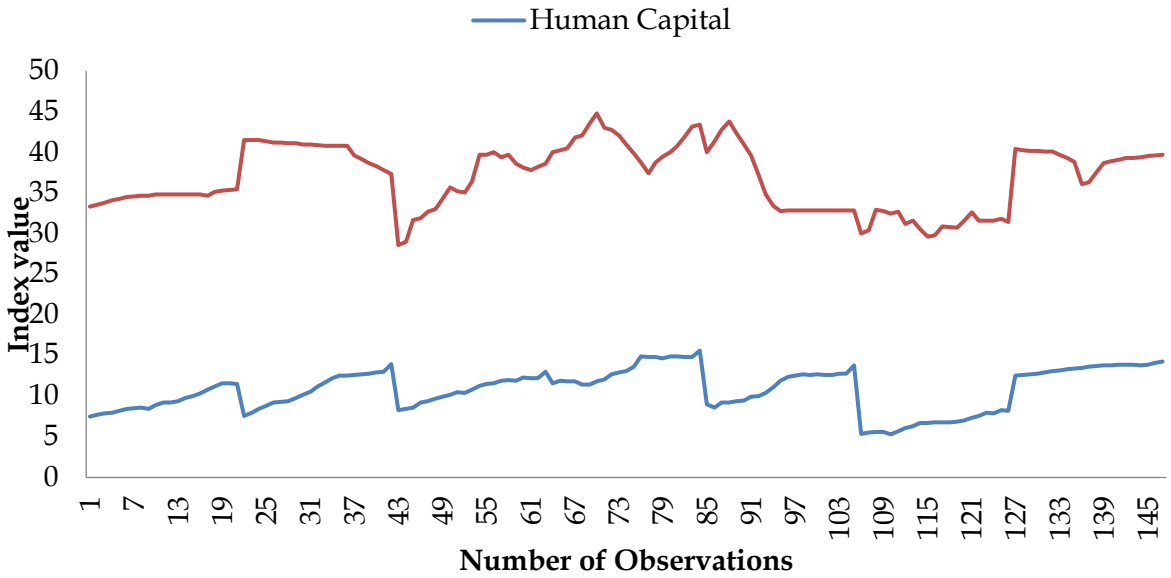


Figure 4: Human Capital and Income Inequality Trends, 2000–2020
Source: Authors' calculations based on the study data.

Figure 4 presents the reported relationship between human capital and income inequality during 2000–2020. The descriptive trajectories suggest that the association is not uniform across the study countries. For Pakistan, the reported human capital measure increased from 5.4 to 8.2, while the Gini coefficient changed from 30 to 31.47. For India, the respective figures increased from 8.3 to 12.9 and from 28.6 to 38.6. The manuscript also identifies Bangladesh and Iran among the countries displaying positive descriptive co-movement between these indicators. However, such observations do not establish that expanding human capital caused the income gap to widen. Other changing economic and institutional factors may influence both variables, and the plotted evidence does not by itself demonstrate a nonlinear relationship. Therefore, the formal panel analysis is necessary to examine whether the reported association persists after inclusion of the selected controls.

By contrast, the manuscript's descriptive discussion identifies Bhutan, Nepal, and Sri Lanka as countries in which human capital and inequality move in different directions. Such cross-country variation suggests that a uniform association should not be assumed. Moreover, descriptive trends need not reproduce the signs of regression coefficients after other variables and country-specific influences have been taken into account. The formal panel estimates therefore provide the principal basis for discussing the study's hypotheses.

1.5 Income Inequality and Other Economic Variables in South Asia

Figure 5 illustrates income inequality alongside trade openness, population growth, infrastructure, and government health expenditure. These variables can be associated with inequality through distinct channels. For example, trade integration may create new employment opportunities while affecting differently skilled workers in unequal ways. Similarly, access to infrastructure and health services may influence economic participation and household welfare. Consequently, the regression models include these variables as controls; however, the figures alone cannot establish the direction of their independent effects (Reuveny & Li, 2003; Zhuang et al., 2014).

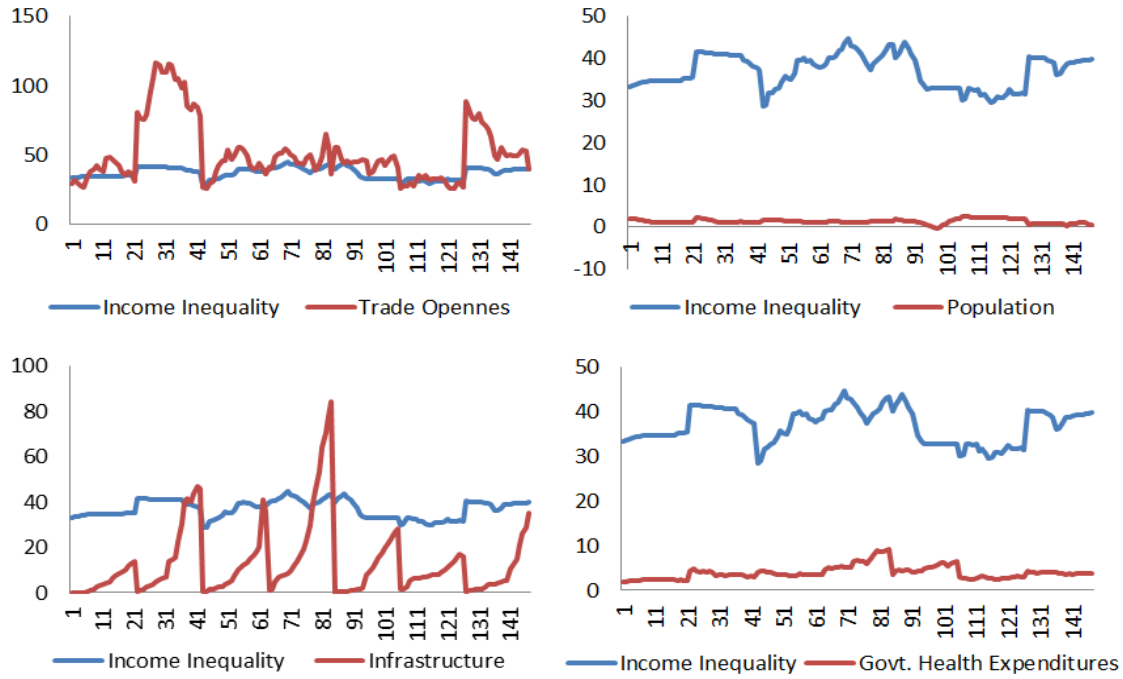


Figure 5: Income Inequality and other Economic Variables
Source: Authors' calculations based on the study data.

1.6 Research Questions

- To what extent is human capital associated with income distribution in South Asian countries when the level of democracy is taken into account?
- What is the relationship between human capital and income inequality in the selected South Asian countries?

1.7 Scope of the Study

This study seeks to extend knowledge about the joint relationship of human capital and democracy with income distribution and to provide evidence relevant to economic policy. Numerous socioeconomic conditions, including corruption, financial development, educational opportunities, and institutional effectiveness, may affect inequality. Nevertheless, the empirical scope of the present analysis is deliberately confined to the selected variables and seven-country panel over 2000–2020. Accordingly, conclusions should be interpreted in relation to this coverage and the observational nature of the data, without assuming that unmeasured social and institutional differences have been eliminated.

1.8 Research Hypotheses

Drawing on the theoretical discussion and previous empirical literature, the study evaluates the following hypotheses:

H1: Human capital is negatively associated with income inequality in the selected South Asian countries.

H2: The interaction between human capital and democracy is associated with income inequality in the selected South Asian countries.

The remainder of the paper is arranged as follows. Section 2 reviews relevant literature and develops the conceptual argument. Section 3 describes the data, variables, and econometric procedures. Section 4 presents and discusses the empirical findings. Section 5 considers the conclusions and their policy implications.

2 Literature Review

Reuveny and Li (2003) examined economic openness, democracy, and income inequality using pooled cross-sectional and time-series evidence from 69 countries over 1960–1996. Their analysis connected political institutions and dimensions of economic openness with distributive outcomes. The study is relevant because it treats the democracy–inequality relationship as conditional on economic circumstances rather than exclusively political factors. However, its broad international coverage differs from the regional emphasis adopted here. Arslan and Okten (2010) investigated foreign direct investment

and democracy in Turkey using cointegration and error-correction techniques for the period 1970–2010. Their findings suggested a long-run association between political institutions and foreign investment. Although the study did not directly estimate the interaction between democracy and human capital in explaining inequality, it illustrates a potential connection between institutions and economic processes that may ultimately influence income distribution.

Islam (2016) examined political freedom and income inequality using cross-country evidence and a generalized method of moments approach. The study indicated that the relationship between political freedom and inequality can be nonlinear, with redistribution playing a possible explanatory role. This finding is relevant because it cautions against assuming an identical effect of democracy at every institutional level. Therefore, the present paper considers whether democracy modifies the relationship between educational development and inequality. Amir-ud-Din and Khan (2017) investigated the interconnected relationships among democracy, income inequality, and economic growth in Pakistan over 1963–2016. Using a simultaneous-equations approach, they reported evidence of interdependence among these variables and discussed the distributive relevance of government spending. Their findings suggest that political and economic variables can be jointly determined, a consideration that is important when interpreting coefficients obtained from observational panel data.

Saha and Zhang (2017) explored the democracy–growth nexus and its interaction with human development using cross-national panel observations. Their findings indicated that the contribution of democracy to human development depends partly on economic conditions. Similarly, the present study approaches institutional effects as potentially conditional, although its outcome is income inequality rather than a broad human development indicator. Dahlum and Knutsen (2017) assessed whether democratic institutions are associated with better educational outcomes using comparative evidence from numerous countries. They did not identify consistent evidence that democracy necessarily produces higher educational quality. Their findings challenge a simple assumption that greater democracy always translates into stronger human capital and underline the need to distinguish educational access, attainment, and quality.

Annaka and Higashijima (2017) investigated democratization and human development, focusing on infant mortality and public expenditure. They reported that changes following democratization may unfold over a prolonged period. This evidence is pertinent to the potential role of health spending in the relationship between political institutions and distributional outcomes. However, health outcomes and income inequality are distinct dependent variables, and findings concerning one should not be treated as direct estimates of the other. Hovhannisyan et al. (2019) examined education as a determinant of income inequality across developed and developing economies during 1990–2014. Their results suggested a negative association between education and inequality after accounting for other economic and demographic factors. This evidence motivates the first hypothesis of the present analysis. Nevertheless, the strength of the relationship may differ across countries because education systems and labour-market structures vary.

Trinugroho et al. (2023) investigated democracy, economic growth, and income inequality across Indonesian provinces. Their provincial panel results suggested that democracy may be associated with lower inequality even when its relationship with economic growth is less favourable. The study highlights the importance of distinguishing distributive and growth outcomes and provides a useful comparison for the present regional analysis. Vo et al. (2024) analysed the short- and long-run association between human capital and inequality in ASEAN economies using alternative panel estimation procedures. They reported that the direction of the association can differ across time horizons. Therefore, the human capital–inequality relationship should not be treated as universally constant, and the period covered by the present study remains an important boundary to its conclusions.

2.1 Theoretical Framework

The theoretical framework links democracy, human capital, and income inequality through institutional responsiveness and economic opportunity. Human capital theory regards knowledge and skills as productive assets that can influence employment and earnings (Schultz, 1961). Political-economy approaches suggest that the distribution of political influence can affect redistributive policy and public services (Boix, 1998; Meltzer & Richard, 1981). In addition, cross-country evidence connects human capital with development and productivity, although the mechanisms are not identical to those determining household income distribution (Benhabib & Spiegel, 1994; Hsieh & Klenow, 2010). Taken together, these arguments suggest that educational improvements may have different distributive associations under different political institutions. However, the expected sign of an interaction term must

be tested rather than assumed because democratic institutions may differ in their ability to deliver inclusive educational and economic opportunities.

The Gini coefficient is commonly used to represent the inequality of an income distribution. The Lorenz curve compares the cumulative share of income received with the cumulative share of the population. As illustrated in Figure 6, a distribution closer to the 45-degree equality line indicates a more equal allocation of income, whereas a more bowed Lorenz curve indicates greater concentration. The Gini coefficient summarizes this separation, with values conventionally expressed on a 0–1 or 0–100 scale (World Bank, 2016). Although widely used, the measure does not by itself reveal which income groups experience gains or losses, and it should not be interpreted as a direct measure of wealth inequality.

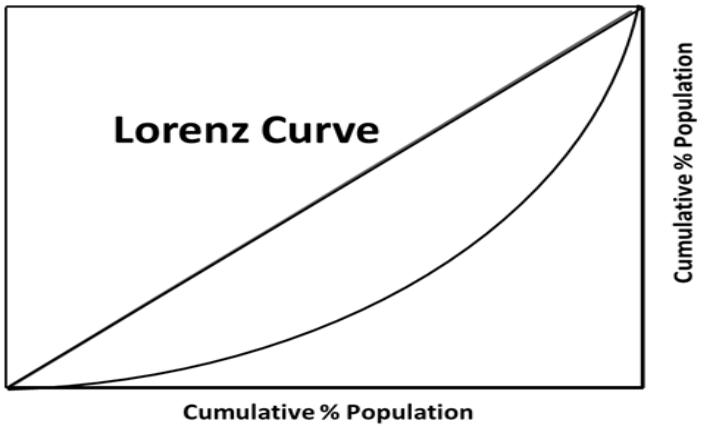


Figure 6: Lorenz Curve
Source: Authors' illustration based on the data and framework presented in this study.

Prominent sources of comparative inequality data include the Estimated Household Income Inequality dataset, the World Income Inequality Database (WIID), and the Standardized World Income Inequality Database (SWIID) (Galbraith et al., 2015; Solt, 2020; UNU-WIDER, 2015). These sources differ in coverage, harmonization, and the concepts of income reported. Therefore, specifying the source and definition of the Gini series used in the present panel is essential for reproducibility and for comparison with previous research.

2.2 Research Gap and Contribution

Previous studies have investigated democracy and inequality, education and inequality, or the relationship between political institutions and human development (Dahlum & Knutsen, 2017; Hovhannisyan et al., 2019; Reuveny & Li, 2003; Saha & Zhang, 2017). However, comparatively limited attention has been devoted to the specific interaction between democracy and human capital in models of income inequality for the seven countries and 2000–2020 period examined here. The present study addresses this contextual gap by evaluating the association of education-based human capital with inequality alongside a democracy–human capital product term. In addition, it compares pooled OLS, fixed-effects, and random-effects specifications. Its potential contribution lies in exploring whether political institutions are relevant to the distributive association of educational development, while recognising that the reported models cannot alone establish a causal moderation mechanism.

2.3 Conceptual Mechanisms and Expected Relationships

The interaction argument rests on two related but distinct mechanisms. First, the development of human capital may broaden the productive opportunities available to households through improved knowledge, qualifications, and employability. Second, democratic institutions may influence the distribution of those opportunities through public accountability, education policy, and the provision of collective goods. Although these channels are related, the benefit of education cannot be assumed to be equally distributed across households or countries. Therefore, the effect associated with human capital may depend on whether democratic institutions facilitate inclusive access to public resources and allow disadvantaged citizens to influence policy priorities (Boix, 1998; Dahlum & Knutsen, 2017; Meltzer & Richard, 1981).

This framework does not imply that democracy is a sufficient condition for equitable income distribution. Institutions may differ in state capacity, quality of representation, and the influence of powerful interest groups. In addition, differences in educational quality and labour-market demand may prevent increases in schooling from producing proportional income gains among lower-income households. The cross-country evidence of Hovhannisyan et al. (2019) and the time-horizon differences discussed by Vo et al.

(2024) reinforce the importance of considering these contingencies. Consequently, the present analysis is best understood as an examination of a theoretically motivated interaction-related association rather than a definitive causal test of the mechanisms themselves.

A standard empirical moderation model would estimate $GINI_{it} = \alpha_i + \lambda_t + \beta_1 HC_{it} + \beta_2 DEMO_{it} + \beta_3 (HC_{it} \times DEMO_{it}) + \gamma' X_{it} + \varepsilon_{it}$, where X represents the study's controls, α_i denotes country effects, and λ_t denotes optional time effects. Under this complete specification, the conditional association of human capital with inequality is $\beta_1 + \beta_3 DEMO_{it}$. This formula is provided to clarify the theoretical interpretation; it is not represented as an additional regression actually estimated in the reported tables. The original statistical findings remain unchanged.

3 Data and Methodology

Estimating associations among democracy, human capital, and income inequality is challenging because countries differ in their political histories, education systems, economic structures, and unobserved institutional conditions. The study assembles a balanced annual panel of seven countries for 2000–2020, yielding 147 country-year observations. Pooled ordinary least squares (POLS), fixed-effects (FEM), and random-effects (REM) models are used to examine the relationships of interest. These specifications offer different ways to address between-country heterogeneity; however, model comparison does not automatically resolve reverse causality, omitted time-varying factors, or measurement error. Accordingly, the estimated coefficients are interpreted as empirical associations.

Income inequality, represented by the Gini coefficient, is the dependent variable. Human capital is operationalized using the education measure described in Table 1, whereas democracy is represented by the Polity V measure. The analysis also includes the product of human capital and democracy, population growth, trade openness, infrastructure, and government health expenditure. The manuscript draws on international statistical sources, including the World Bank, UNESCO-related education data, and the Polity project; the exact definitions used in the assembled dataset are summarized in Table 1. Consistent description of the Gini source and of the education measure's scale is particularly important when interpreting the estimated coefficients.

Table 1: Measurement and Source of Data

Short form	Measurement	Source
GINI	Gini disposable income	World Inequality Database
HC	Education index	UNESCO Institute for Statistics (2022)
POP	Population growth (annual %)	World Bank
TROP	Trade (% of GDP)	World Bank
INF	Individuals using the Internet (% of population)	World Bank
GHE	Current health expenditure (% of GDP)	World Bank
DEMO	Polity V	Integrated Network for Social Conflict Research (INSCR)
Interaction Term	Multiple of polity V and education index	Author Calculations

Source: Compiled by the authors from the sources identified in the table.

Table 1 identifies the study variables, their operational definitions, and the reported sources. Population growth, trade openness, internet use as the infrastructure proxy, and current health expenditure are drawn from World Bank series. Income inequality is described in the table as a disposable-income Gini measure from the World Inequality Database, while the education measure is attributed to the UNESCO Institute for Statistics and democracy to the Polity V source. However, because the main text also refers to alternative inequality sources, this difference should be resolved against the original dataset before the analysis is reproduced. Similarly, the units of the human capital series should be verified against the numerical range presented in the descriptive statistics.

3.1 Panel Unit-Root Tests

The study evaluates the integration properties of the panel variables using the Levin–Lin–Chu (LLC), Im–Pesaran–Shin (IPS), and Hadri LM procedures, while also discussing the augmented Dickey–Fuller approach. These procedures are relevant to the distinction between stationary and nonstationary series, although they differ in their null hypotheses and assumptions. Therefore, their reported classifications should be assessed using the relevant test statistics, significance levels, lag specifications, and treatment

of country-specific effects. The notation below identifies the cross-sectional unit by i and the observation period by t.

$$\Delta y_{i,t} = \propto_t + \theta_t + \delta_t t + \rho_i y_{i,t-1} + \sum \alpha_t \Delta y_{t-i} + u_{i,t} \dots\dots\dots\dots\dots (6)$$

Here, t = 1, 2, ..., T denotes the time period, and i = 1, 2, ..., N denotes the cross-sectional country. The panel specification permits differences across countries and, where specified, across time. These indices are used consistently in the ensuing regression notation.$\alpha_t \theta_t$

The augmented Dickey–Fuller (ADF) representation provides an additional way to examine the time-series properties of the variables, subject to the maintained assumptions and selected lag structure.

$$\Delta Y_t = \gamma Y_{t-1} + \sum_{i=2}^{p} \beta_i \Delta Y_{t-i-1} + u_t \dots\dots\dots\dots\dots (7)$$

$$\Delta Y_t = a_0 + a_2 t + \gamma Y_{t-1} + \sum_{i=2}^{p} \beta_i \Delta Y_{t-i-1} + u_t \dots\dots (8)$$

3.2 Model Specification

Based on the literature review and theoretical framework, the study considers democracy, human capital, population growth, trade openness, infrastructure, and health expenditure as possible correlates of inequality. The first reported specification emphasizes the association between human capital and the Gini coefficient, while the second introduces the product of human capital and democracy. The accompanying model expressions are retained as originally presented. However, a conventional moderation specification also includes separate main effects of human capital and democracy alongside their product; without these terms, the coefficient of the product cannot be interpreted independently as the change in the slope of human capital attributable to democracy. This distinction is important for accurately describing the empirical contribution.

$$GINI = f\ (HC, POP, TROP, INF, GHE) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

$$GINI = f\ (interaction, POP, TROP, INF, GHE) \dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Equations (1) and (2) describe the proposed relationships with the Gini coefficient (GINI) as the dependent variable and population growth (POP), trade openness (TROP), infrastructure (INF), health expenditure (GHE), and the human capital–democracy product (HC × DEMO) among the explanatory variables. The manuscript uses the term GEDU in one description of government spending, whereas Table 1 labels the health variable GHE. For clarity, the narrative here refers to the variable as government health expenditure, consistent with the data-definition table and regression outputs.

The econometric transformation of the two model formulations is presented in Equations (3) and (4).

$$Gini = \alpha + \beta_1 HC + \beta_2 POP + \beta_3 INF + \beta_4 GHE + Ui \dots\dots\dots\dots\dots (3)$$

$$Gini = \alpha + \beta_1 Interaction + \beta_2 POP + \beta_3 INF + \beta_4 GHE + Ui \dots\dots\dots (4)$$

3.3 Panel Data Analysis

Panel data incorporate observations from multiple countries over several periods and can be used to account for unobserved characteristics that remain constant within countries. This feature is particularly relevant to cross-country inequality research, where historical and institutional differences may affect income distribution. However, country fixed effects do not eliminate bias arising from omitted factors that vary over time, and the interpretation of coefficients remains conditional on the specification and its assumptions. The general form of the empirical panel relationship is presented in Equation (5).

$$Y_{it} = \alpha + \beta_1 X_{it} + \beta_2 X_{it} + \beta_3 X_{it} + \beta_4 X_{it} + \mu_{it} \dots\dots\dots\dots\dots\dots (5)$$

Y_{it} = Dependent Variable

α = Intercept of the Model

X_{it} = Respective Independent Variables

β_i= Respective Slope

μ_i = Error Term of Model

3.4 Estimation Techniques

The estimation strategy compares POLS, FEM, and REM. POLS treats the observations as pooled, whereas FEM absorbs country-specific time-invariant characteristics. REM models country-specific heterogeneity as a random component subject to assumptions about its relationship with the explanatory variables. The preferred model should therefore be identified through a combination of substantive assumptions, diagnostic evidence, and statistical comparison rather than through coefficient significance alone (Hill et al., 2018). The reported equations describe alternative assumptions concerning intercepts and slopes across countries and time.

$$Y_{it} = \propto_1 + \sum_{k=2}^{k} \beta_j X_{kit} + u_t + \varepsilon_{it} \dots\dots\dots\dots\dots (9)$$

Slope coefficients are constant, and the intercept varies over individuals:

$$y_{it} = \alpha_i^* + \sum_{k=1}^{k} \beta_k x_{kit} + u_{it} \dots\dots\dots\dots\dots\dots (10)$$

Slope coefficients are constant, and the intercept varies over individual and time:

$$y_{it} = \alpha_{it}^* + \sum_{k=1}^{k} \beta_k x_{kit} + u_{it} \dots\dots\dots\dots\dots\dots (11)$$

All coefficients vary over individuals:

$$y_{it} = \alpha_i^* + \sum_{k=1}^{k} \beta_{ki} x_{kit} + u_{it} \dots\dots\dots\dots\dots\dots (12)$$

All coefficients vary over time and individuals:

$$y_{it} = \alpha_i^* + \sum_{k=1}^{k} \beta_{kit} x_{kit} + u_{it} \dots\dots\dots\dots\dots\dots (13).$$

In these specifications, i identifies the cross-sectional country and t identifies the observation year.

4 Results and Discussion

The empirical discussion begins with the panel unit-root results and then presents descriptive statistics, pairwise correlations, diagnostic tests, and panel regressions. The unit-root evidence is reported using the LLC, Hadri LM, and IPS procedures. Subsequently, the fixed-effects estimates are compared with pooled OLS and random-effects results to assess the consistency of the reported associations. Wherever the diagnostic results or model specifications create ambiguity, the interpretation is qualified rather than extending the findings beyond what the tables demonstrate.

Table 2: Results of Unit Root Tests

Variables	LLC	(HLM)	(IPS)	Summary
Gini coefficient	I(0)	I(0)	I(1)	I(0)
Democracy	I(1)	I(0)	I(1)	I(1)
Human capital	I(0)	I(0)	I(1)	I(0)
Population growth	I(0)	I(0)	I(0)	I(0)
Trade openness	I(0)	I(0)	I(0)	I(0)
Infrastructure	I(0)	I(0)	I(1)	I(0)
Govt. health Expenditures	I(0)	I(0)	I(1)	I(0)

Source: Authors' calculations.

Table 2 reports different integration classifications across the LLC, Hadri LM, and IPS procedures. Its summary column classifies democracy as I(1) and the other listed variables as I(0); however, several rows contain disagreements among the individual tests. These differences are not sufficient to establish a definitive integration order without the underlying statistics and p-values. In particular, the Hadri LM test employs a different null hypothesis from commonly used unit-root tests. Therefore, the classifications should be read as the study's reported screening results, and the implications of combining I(0) and I(1) series in level regressions warrant further investigation.

4.1 Descriptive Statistics

Descriptive statistics provide a concise account of the distributions of the study variables. The balanced dataset contains seven countries observed annually from 2000 to 2020, yielding 147 observations for each reported series. Table 3 presents means, standard deviations, minimum values, and maximum values. These statistics help establish the data range before interpreting the regression estimates and help identify variables whose reported scales require clarification.

Table 3: Descriptive Statistics

Variables	Mean	Standard deviation	Minima	Maxima	Observation
Income inequality	36.95925	3.974559	28.6	44.8	147
Democracy	2.45102	5.961697	-10	9	147
Human capital	10.82005	2.567285	5.3	15.61684	147
Population	1.32569	.5415625	-.2684863	2.647399	147
Trade openness	51.40606	22.30051	25.30623	116.5498	147
Infrastructure	12.83055	15.7027	.071039	84.11087	147
Govt. health expenditures	3.993597	1.502811	1.986744	9.329763	147
Human capital *Democracy	26.93382	65.78215	-109.3179	116.7726	147

Source: Authors' calculations.

Table 3 reports a mean Gini coefficient of 36.95925 and a mean democracy score of 2.45102. The Gini series ranges from 28.6 to 44.8, while each variable contains 147 observations. The manuscript associates the minimum with India in 2000 and the maximum with Iran in 2006. In addition, the recorded human capital values range from 5.3 to 15.6168. Because this range differs from the conventional presentation of some educational indices, the underlying measure and its units should be stated precisely. These descriptive values establish sample characteristics but do not, in isolation, indicate the effects of explanatory variables on inequality.

4.2 Pairwise Correlations

Pairwise correlations describe the direction and strength of linear associations between two variables. Values range from −1 to +1, with zero indicating no linear correlation. However, correlations neither account for the remaining regressors nor identify causal effects; they are used here as preliminary descriptive evidence.

Table 4: Pair-Wise Correlation

	GINI	DEMO	HC	POP	TROP	INF	GHE	HC*DEMO
GINI	1.0000							
DEMO	0.3943	1.0000						
HC	0.5501	0.0272	1.0000					
POP	0.3722	-0.1763	-0.7457	1.0000				
TROP	0.6048	-0.1157	0.3132	-0.2790	1.0000			
INF	0.2418	-0.1212	0.5715	-0.1262	0.1132	1.0000		
GHE	0.4175	-0.3662	0.6077	-0.2509	0.0936	0.5626	1.0000	
HC*DEMO	-0.3414	0.9697	0.0450	-0.2221	-0.0357	-0.1616	-0.4048	1.0000

Source: Authors' calculations.

Table 4 reports a positive correlation between the Gini coefficient and democracy (r = 0.3943), between the Gini coefficient and human capital (r = 0.5501), and between the Gini coefficient and trade openness (r = 0.6048). However, these positive bivariate associations need not imply that the corresponding within-country regression coefficients have the same signs. In addition, the correlation between democracy and the human capital–democracy product is very high (r = 0.9697), raising questions about collinearity in specifications that include both variables. Accordingly, the correlation matrix provides background for the subsequent regression analysis, not evidence that any variable independently determines inequality.

4.3 Diagnostic Tests

Diagnostic tests examine whether the assumptions supporting regression-based inference are plausible. The manuscript reports Breusch–Pagan, White, Breusch–Pagan LM, and Hausman procedures. However, the tests address different questions and their null hypotheses should be stated accurately before interpreting the p-values. The results can guide specification choice, but they do not replace direct

assessment of serial dependence, cross-sectional dependence, and the treatment of standard errors in panel models.

Table 5: Diagnostic Tests

Test Statistics	Null Hypothesis (H_0)	Prob.	Decision
Breusch-Pagan Test	H_0: Homoscedasticity	0.9302	Accept H_0
White Test	H_0: Heteroscedasticity	0.0000	Reject H_0
Breusch-Pagan LM Test	H_0: Fixed-Effect-Model is Appropriate	1.0000	Accept H_0
Hausman Test	H_0: Fixed-Effect-Model is not Appropriate	0.0000	Reject H_0

Source: Authors' calculations.

Table 5 presents the reported p-values for the diagnostic procedures. The Breusch–Pagan heteroskedasticity test has a p-value of 0.9302, while the White test has a p-value of 0.0000. These results point in different directions and should not be combined into an unqualified statement that heteroskedasticity is absent. The Hausman test has a p-value of 0.0000; under its conventional null hypothesis, this result provides evidence against the random-effects specification and supports considering fixed effects. However, the descriptions of the null hypotheses and decisions in Table 5 are internally inconsistent and require checking against the original statistical output. Therefore, fixed effects may be provisionally preferred, but the model-selection explanation should remain conditional on verified test specifications.

4.4 Fixed-Effects Estimates

This subsection presents the fixed-effects estimates obtained with Stata 14 and compares the reported specifications. Country fixed effects allow each country to have its own time-invariant intercept. The first regression includes human capital and the economic controls, whereas the second uses the human capital–democracy product alongside the controls. The estimates are interpreted as conditional associations. We then compare the results with pooled OLS and random-effects models. The Hausman procedure is relevant to model choice under its maintained assumptions (Hill et al., 2018).

Table 6: Panel Fixed Effect Model

Dependent Variable	**Income inequality**			
Method Used	Fixed Effect Model			
Sample Adjustment	2000 to 2020			
	Regression 1 FEM		**Regression 2 FEM**	**(interaction term)**
Variables	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**
HC & HC*DEMO	-0.7316131	0.004	-0.0272692	0.000
POP	0.5376795	0.408	1.131943	0.017
TROP	0.102707	0.000	0.1060429	0.000
INF	0.0889374	0.000	0.0707814	0.000
GHE	-1.245454	0.000	-2.003013	0.000
Constant term	42.71551	0.000	37.83292	0.000
R-Square		0.5810		
Adjusted R-Square		0.5661		
Prob (F-Statistics)		0.000		
Rho		0.86784552		

Source: Authors' calculations.

Table 6 presents the fixed-effects estimates for two reported regression specifications. In the first specification, income inequality is the dependent variable, with human capital, population growth, trade openness, infrastructure, and government health expenditure as explanatory variables. Human capital has a negative coefficient of −0.7316131 (p = .004), indicating a statistically significant inverse association with the Gini measure, conditional on the included controls and country fixed effects. This result is consistent with the negative education–inequality associations discussed by Lee and Lee (2018) and Hovhannisyan et al. (2019). However, since the units of human capital and the Gini coefficient are not expressed as logarithms in the reported model, the coefficient should not automatically be interpreted as a percentage change in inequality following a 1% change in human capital. Population growth has a positive coefficient of 0.5376795 but is not statistically significant at conventional levels (p = .408). In contrast, trade openness (0.102707; p reported as .000) and infrastructure (0.0889374; p reported as .000) show positive and statistically significant conditional associations. The coefficient for government health expenditure is negative (−1.245454; p reported as .000), suggesting an inverse association with income

inequality under the stated specification. The intercept is reported as 42.71551. Taken together, these coefficients describe within-country associations under the model's assumptions; they do not establish that policy changes in any particular variable would cause an equivalent change in income inequality.

The second fixed-effects specification introduces the product of human capital and democracy (HC × DEMO) in order to examine the second research hypothesis. Table 6 reports a negative coefficient for this term (−0.0272692; p reported as .000). The result indicates that the product variable is inversely associated with income inequality after accounting for the included controls and country fixed effects. This is a substantively relevant pattern because the study asks whether educational development and democratic governance should be examined jointly. However, the reported specification does not show separate coefficients for human capital and democracy alongside the product term. The estimated coefficient therefore cannot, by itself, be interpreted as the change in the marginal effect of education associated with a one-unit increase in democracy. Moreover, because the interaction term is constructed as a product of variables measured on their original scales, percentage-change interpretations are not warranted without an appropriate transformation. In the second specification, population growth becomes positive and statistically significant (1.131943; p = .017), whereas the coefficients of trade openness (0.1060429) and infrastructure (0.0707814) remain positive and are reported as statistically significant. Government health expenditure has a negative reported coefficient (−2.003013), while the intercept is 37.83292. These differences between the two fixed-effects specifications should be interpreted cautiously because the included primary explanatory variable changes. Related political-economy studies provide context for these findings (Amir-ud-Din & Khan, 2017; Islam, 2016; Reuveny & Li, 2003), but they are not direct replications of this specific product-term model.

The reported R-squared value for the first fixed-effects regression is 0.5810, with an adjusted R-squared of 0.5661. These measures describe the fitted explanatory performance under the reported calculation, rather than demonstrating causal validity. The F-test probability is reported as 0.000, indicating evidence of joint statistical significance in the stated specification. In addition, rho is reported as 0.8678 and reflects the share of unexplained variance attributable to the panel-specific component under the model's variance decomposition. This statistic should not be interpreted as a pairwise correlation between the explanatory variables or as independent proof that a particular specification is correct.

4.5 Comparison of POLS, FEM, and REM Estimates

The manuscript compares pooled ordinary least squares, fixed-effects, and random-effects approaches. POLS does not explicitly incorporate country-specific intercepts, whereas fixed effects account for time-invariant country characteristics and random effects impose an assumption concerning the relationship between unobserved country heterogeneity and the explanatory variables. Because these estimators use different sources of variation and assumptions, the coefficients can differ in sign as well as magnitude. Therefore, coefficient significance alone should not determine the preferred estimator. Table 7 reports the six specifications, including the alternative formulations with the human capital–democracy product, and their differences require explicit discussion.

Table 7: A Comparative Analysis between POLS, FEM, and REM

Variables	POLS	POLS with (HC*DEMO)	FEM	FEM with (HC*DEMO)	REM	REM with (HC*DEMO)
HC & HC*DEMO	0.78895 (0.000)	-0.01845 (0.000)	-0.73161 (0.004)	-0.02726 (0.000)	0.78895 (0.000)	0.02049 (0.000)
POP	1.29255 (0.092)	-1.85574 (0.000)	0.53767 (0.408)	1.13194 (0.017)	1.29255 (0.042)	-1.05289 (0.037)
TROP	0.08859 (0.000)	0.09021 (0.000)	0.10270 (0.000)	0.10604 (0.000)	0.08859 (0.000)	0.09449 (0.000)
INF	-0.05290 (0.013)	0.00007 (0.997)	0.08893 (0.000)	0.07078 (0.000)	-0.05290 (0.023)	0.01186 (0.472)
GHE	0.590114 (0.005)	0.483833 (0.018)	-1.24545 (0.000)	-2.00301 (0.000)	0.59011 (0.005)	-0.01108 (0.964)
Constant term	20.47688 (0.000)	33.3456 (0.000)	42.71551 (0.000)	0.78895 (0.000)	20.47688 (0.000)	33.94113 (0.000)
R-Square	0.5810					
Adjusted R-Square	0.5661					

Variables	POLS	POLS with (HC*DEMO)	FEM	FEM with (HC*DEMO)	REM	REM with (HC*DEMO)
Prob. (F-Statistics)			0.0000			
Rho			0.86784552			

Source: Authors' calculations.

Table 7 compares six reported specifications across pooled OLS, FEM, and REM. The first two columns present pooled OLS results, including a specification with human capital and the selected economic controls and an alternative specification with the human capital–democracy product. In the first pooled model, the human capital coefficient is positive (0.7889); the manuscript also reports positive coefficients for population growth (approximately 1.292), trade openness (approximately 0.0885), and government health expenditure (approximately 0.529). The estimated signs differ from those obtained in the first fixed-effects specification. This difference may reflect cross-country heterogeneity and the distinct variation used by pooled and within-country estimators. Consequently, it would be inappropriate to claim that all three estimators demonstrate the same negative association between human capital and inequality. The coefficients should be compared as model-specific associations rather than converted to percentage responses without verifying the variable scales and transformations.

The second pooled OLS specification uses the human capital–democracy product in place of the human capital variable displayed in the initial pooled model. Its reported coefficient is negative (approximately −0.0184), suggesting an inverse association between the constructed product term and income inequality under that pooled specification. The manuscript identifies this estimate as statistically significant and discusses it in relation to existing work on democracy, distribution, and political institutions (Amir-ud-Din & Khan, 2017; Islam, 2016; Reuveny & Li, 2003). However, the coefficient does not establish that the slope of human capital is negative at every democracy level, because the model does not display both main effects together with the product term. The reported signs of the other controls also differ from those of the first pooled specification. Therefore, the comparison indicates sensitivity to model specification rather than definitive evidence that the interaction formulation offers a superior explanation of inequality.

The third and fourth columns corresponding to the fixed-effects specifications reproduce the negative associations reported in Table 6 for human capital and for the human capital–democracy product, respectively. However, these are coefficients from separate specifications. Because the interaction specification does not display both constituent main effects, the results should not be described as an estimated marginal effect of human capital at a particular democracy score. The finding remains relevant as an association between the constructed product variable and income inequality within the reported specification.

The fifth and sixth specifications in Table 7 present the random-effects results. In the first REM model, the reported association between human capital and income inequality is positive, and the coefficient is described in the manuscript as approximately 0.7889. This estimate is similar to the first pooled OLS coefficient, but it differs from the negative coefficient obtained using fixed effects. The comparison illustrates the importance of assumptions concerning unobserved country characteristics. In addition, similarity between two coefficients does not independently demonstrate that either estimator is appropriate. The second REM specification incorporates the human capital–democracy product and is compared with the product-term POLS and FEM estimates in the following discussion.

The final random-effects specification reports a positive coefficient on the human capital–democracy product (0.0204917; p reported as .000). This is the opposite sign to the product-term coefficients reported in the pooled OLS and fixed-effects specifications. It is therefore not appropriate to characterize the interaction-related association as uniformly negative across the estimators. In the REM interaction specification, population growth and government health expenditure are described as negatively associated with inequality, whereas the product term, trade openness, and infrastructure have positive coefficients. These contrasts should be evaluated in relation to model assumptions, the role of country-specific heterogeneity, and the absence of separately reported main effects in the product-term specifications. They also strengthen the case for careful use of the Hausman test and further sensitivity analysis before drawing strong institutional conclusions.

The model-level R-squared, adjusted R-squared, and F-statistic results provide information about fitted explanatory performance and joint significance, subject to each estimator's definition. For the reported fixed-effects specification, the F-test probability is 0.0000 and rho is approximately 0.8678. However, these

values alone do not establish that the fixed-effects estimator is unbiased or that its coefficients represent causal effects. The suitability of FEM depends more directly on the underlying assumptions and the correctly specified model-comparison tests, particularly the Hausman test.

Taken together, the reported fixed-effects estimates indicate a negative association of human capital with income inequality in the specification without the product term, and a negative association of the human capital–democracy product with inequality in the alternative specification. These findings are consistent with the study's interest in the distributive relevance of education and political institutions. However, the results do not by themselves identify the mechanism through which democracy modifies the return to education, and this distinction should be maintained when discussing policy implications.

The conceptual argument suggests that democratic institutions may support more equitable outcomes through responsiveness to citizens and investment in public services (Boix, 1998; Meltzer & Richard, 1981). Nevertheless, the empirical estimates reported here do not justify claiming that democracy invariably reduces inequality. In particular, the cross-model sign differences and the absence of separately estimated democracy and human capital main effects in the product-term models limit a direct moderation interpretation. Accordingly, the evidence is better presented as suggestive of an institutionally conditioned association that warrants more complete specification and further testing. The authors favour fixed-effects estimation for the panel analysis, a choice that can be consistent with the reported Hausman test if its assumptions and null hypothesis are correctly represented. Prior studies also point to the complexity of the democracy–inequality relationship (Amir-ud-Din & Khan, 2017; Islam, 2016; Reuveny & Li, 2003). However, the appropriate inference is that FEM is the preferred specification among those examined under the stated conditions, not that it is universally the most accurate estimator. Additional checks using appropriate panel standard errors and alternative specifications would strengthen confidence in the findings.

4.6 Multicollinearity

Multicollinearity arises when explanatory variables share substantial linear information, which can inflate estimated standard errors and complicate the interpretation of individual coefficients. The study reports variance inflation factors (VIFs) and tolerance values to assess this concern. These measures should be interpreted for each fitted specification, particularly because the constructed interaction term can be highly associated with its constituent variables. The results are presented in Table 8.

Table 8: Multicollinearity

Variables	VIF	TOl	Conclusion
Human capital	6.22	0.160784	No Multicollinearity
Population growth	3.46	0.288878	No Multicollinearity
Govt. health expenditures	2.44	0.410237	No Multicollinearity
Infrastructure	2.18	0.458531	No Multicollinearity
Democracy	1.38	0.725599	No Multicollinearity
Trade openness	1.19	0.841133	
Mean VIF	2.81		

Source: Authors' calculations.

Table 8 reports a mean VIF of 2.81, below the commonly used screening threshold of 10. This suggests that the reported specification may not display severe collinearity according to that rule of thumb. However, a mean value does not rule out a high VIF for a particular regressor, and the 0.9697 correlation between democracy and the product term in Table 4 warrants attention in any model containing both. Therefore, assessment should focus on individual VIFs, the exact set of included regressors, and the possibility of centring the constituent variables when a complete interaction specification is estimated.

4.7 Interpretation of the Interaction and Robustness Considerations

The reported negative coefficient on HC × DEMO in the fixed-effects specification is consistent with an inverse association between the constructed interaction variable and the Gini coefficient, conditional on the controls included in that regression. However, interaction coefficients have a particular interpretation only when the relevant component terms are included in the same model. Since the reported interaction specification does not clearly show a separate coefficient for democracy and a separate coefficient for human capital, the marginal effect of one variable at different values of the other cannot be recovered reliably from Table 6 alone. Accordingly, the manuscript does not present an invented marginal-effects plot or an unsupported conditional-effect estimate.

The differences between FEM and REM coefficients, especially the opposite signs of the interaction-related estimates, deserve particular attention. These differences may arise from the estimators' assumptions and the variation on which they rely; they should not be interpreted as mutually confirming evidence. Similarly, the mixed panel unit-root results suggest that integration properties and the suitability of regressions in levels should be investigated more fully. These are methodological qualifications and priorities for subsequent analysis, not claims that further tests have already been conducted.

5 Conclusion and Policy Implications

Income inequality remains an important concern in South Asia because disparities in educational access, economic opportunities, and public services can shape the distribution of income. This study examined annual observations for seven countries over 2000–2020 using pooled OLS, fixed-effects, and random-effects estimators. The preferred fixed-effects results report a negative and statistically significant association between human capital and income inequality. In the alternative specification, the product of human capital and democracy also has a negative and statistically significant coefficient. These results suggest that educational development and the institutional setting in which it occurs merit joint consideration in discussions of distributive policy. However, the reported specifications do not establish a causal relationship, and the product-term coefficient should not be treated as a fully identified moderation effect without the constituent main effects. The policy implications therefore focus on broad-based access to education, improvements in the quality of human capital, and responsive public institutions rather than on any guaranteed effect of democracy on inequality. In addition, attention to health expenditure, trade integration, population change, and infrastructure may help policymakers assess the economic conditions associated with unequal income distribution. The findings encourage more detailed examination of how democratic accountability and educational opportunity interact across countries with different institutions and labour-market conditions. Further research using complete interaction specifications, transparent data construction, and stronger robustness checks would help determine whether the observed relationships are stable across measures and periods.

5.1 Theoretical Contributions

The study contributes to discussions in development economics and political economy by examining education-based human capital together with democracy in a regional panel of income inequality. Previous research considers the distributional implications of democratic institutions and human capital through separate empirical approaches (Hovhannisyan et al., 2019; Reuveny & Li, 2003). In comparison, the present work places their product term at the centre of the empirical discussion. This combination offers a way to formulate more specific questions about the institutional circumstances in which educational development is associated with greater equity. However, its theoretical contribution is exploratory until the complete moderation specification and conditional effects are estimated and assessed.

The analysis also draws attention to regional heterogeneity. Even within a relatively small country panel, income distribution, education, and political institutions may follow different trajectories. Therefore, scholarship on inequality can benefit from examining both shared regional pressures and distinct national institutional arrangements. The study's principal value is to identify a focused interaction-related question and report comparative panel evidence that can be refined and tested in later work.

A useful extension would re-estimate the model with human capital, democracy, and their product entered jointly, then plot the conditional slope of human capital over the observed range of democracy with confidence intervals. Mean-centering the continuous variables may improve interpretability, although it would not substitute for correctly including the main effects. In addition, country-clustered or other appropriate panel standard errors, sensitivity to influential countries, common time effects, and checks for cross-sectional dependence would help evaluate the stability of the result. Given the small number of countries, the limitations of conventional cluster-robust inference should also be considered.

5.2 Policy Implications for the Study Countries

The reported inverse association between human capital and inequality in the fixed-effects model suggests that equitable access to useful education deserves attention in development policy. Governments could give particular consideration to the educational participation of disadvantaged households, the quality of public schooling, and the transition from education to productive employment. However, changes in education indicators alone may not translate into equal income gains if labour

markets remain segmented or returns to skills are concentrated among higher-income groups (Lee & Lee, 2018; Vo et al., 2024).

In addition, political accountability and effective public services may help shape the distribution of development opportunities. Policies directed at inclusive educational investment should therefore be considered alongside access to health services and the transparency of public expenditure. Because the study uses associations rather than causal identification, these recommendations are policy considerations motivated by the evidence and theoretical framework, not forecasts of the effects of any single reform. The diversity of the countries in the sample also suggests that policy design should be adapted to national institutional and economic conditions.

5.3 Limitations and Future Research

The findings are subject to several limitations. First, the observational design does not eliminate reverse causality between inequality and political or educational conditions. Second, the data cover seven countries and the years 2000–2020, so the results may not generalize to other periods or regions. Third, the reported product-term regressions require a more complete interaction specification before the moderating role of democracy can be estimated as a conditional marginal effect. Fourth, the source and numerical scale of the inequality and human capital variables need to be documented consistently, particularly because the manuscript refers to multiple inequality databases and describes the education indicator in terms that do not fully clarify its measurement.

Future research could compare alternative inequality series, distinguish dimensions of educational attainment and quality, and examine differences in effects across country groups or democratic regimes. In addition, researchers could investigate whether health expenditure, labour-market conditions, or institutional quality help explain the observed associations. Updated panels, suitable strategies for endogeneity, and transparent replication materials would make it easier to evaluate the durability of the findings. These directions preserve the present study's aim while outlining specific questions for subsequent work.

Ethical Statement: Not Applicable

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