



Saima Shakeela¹, Sadia Ali², Muhammad Rizwan Yaseen³, Muhammad Faraz Riaz⁴

¹PhD Scholar, Department of Economics Government College University Faisalabad, Pakistan

Email: saimashakeela30009350@gmail.com

²Assistant Professor Department of Economics Government College University Faisalabad, Pakistan

Email: sadiaali@gcuf.edu.pk

³Professor Department of Economics Government College University Faisalabad, Pakistan

Email: rizwanyaseen@gcuf.edu.pk

⁴Assistant Professor Department of Economics Government College University Faisalabad, Pakistan

Email: farazriaz@gcuf.edu.pk

KEYWORDS	ABSTRACT
Human capital; poverty reduction; poverty index; pupil-teacher ratio; gini index; life expectancy; financial development; employment to population ratio; remittances received by individuals; Panel Cointegration; Panel data; FMOLS/DOLS; PMG Long-Run Estimation.	Poverty remains a significant hurdle for equitable human development and socioeconomic progress, notably where lack of educational opportunities, health services, employment and financial resources restricts the advantages economic growth. This study systematically investigates the impact of human capital on poverty alleviation, specially highlighting the variation among developing and developed countries. The analysis defines human capital with education (pupil-teacher ratio), health (life expectancy), individually and includes income inequality, financial development, employment-to-population ratio and personal remittances received as supplementary socioeconomic determinants. Poverty is estimated by a composite Poverty index comprises of both the poverty headcount ratio and poverty gap, thus covering the degree and deepness of poverty. The analysis utilizes a strong balanced panel of developing and developed countries for the time period of 1990-2024 for examining the long-term relations and causal mechanisms across the variables. The findings indicate cross-sectional dependence and long-run cointegration across the variables and show heterogeneous relations among country panels. Life expectancy indicates strong negative connection with poverty across developing and developed countries. The Gini Index has positive link with poverty for developed countries, while personal remittances strongly contribute to poverty reduction for developing countries. Furthermore, the causality results reveal significant association across poverty and its socioeconomic determinants. The results of this study indicates the need of human capital development and interrelated socioeconomic policies for attaining sustainable poverty alleviation. The study advances to the prior research by evaluating and comparing multiple dimensions of poverty drivers and by highlighting the significance of human capital development inside socioeconomic context. The findings of the study reveals policy implications for improving education and health care services, generating employment opportunities and financial inclusion, mitigating inequality, and optimizing remittances inflows for supporting poverty alleviation.
ARTICLE HISTORY Date of Submission: 21-08-2026 Date of Acceptance: 24-09-2026 Date of Publication: 05-10-2026	 2026 Journal of Social Research Development
Correspondence	Sadia Ali
Email:	sadiaali@gcuf.edu.pk
DOI	https://doi.org/10.59075/jsrd.v7i8.561
Volume/Issue	7(8), 2026, 124-152

Introduction

Poverty remains an important challenge faced by international society for the twenty-first century, regardless of significant improvements recorded under the Millennium Development Goals (MDGs) and further strengthened by the Sustainable Development Goals, yet millions of individuals continuously experiencing multidimensional deprivation (United Nations, 2015; World Bank, 2020; UNDP, 2020; Sachs et al., 2022). The continuity of poverty, specifically in low- and middle-income countries has inspired the researchers and policymakers for investigating the structural factors that either reinforce or combat poverty over time. Among several determinants revealed in the empirical studies, human capital has emerged as one of the most theoretically and empirically influential driver for sustainable poverty reduction (Schultz, 1961; Becker, 1994; Psacharopoulos & Patrinos, 2018). According to anthropologists, poverty encompasses lack of ethics such as self-respect, equity, sovereignty, democratic rights, vulnerability, social rules and power of decision making (Masika et al., 1997).

These viewpoints highlight that poverty is not only a shortage of asset but also a situation of living in social isolation and limited access to the opportunities and resources. Education, health and strong institutions ensure the improvement of labor productivity, economic mobility and sustainable social welfare (World Bank, 2018; United Nations Development program, 2020). Poverty has two main types: relative poverty and absolute poverty. Relative poverty refers to the inadequate income or consumption which are concerning to social expectations while the absolute poverty means the unavailability of fundamental needs such as food, shelter, health and education (Sen, 1978). During the last few decades, the relation of human capital with poverty has captivated more attention theoretically and for empirical work. Findings of several empirical studies reveals that investment in education and health increase individual income along with generating positive macroeconomic spillover impacts, promoting the long-run productivity growth and reduce the poverty (Barro, 2001; Bloom et al., 2004; Hanushek & Woessmann, 2012).

Education plays a critical engine of human capital accumulation which is essential for generating long-term economic growth and structural development. The indicator of pupil-teacher ratio generally represent the quality education and higher ratios indicates overcrowded classrooms and limited educational outcomes. Current studies focus that poor education quality can confine the academic achievements for poverty reduction, so confirming the presence of inequalities (UNESCO, 2021; World Bank, 2022). Whereas, developed countries identifies higher quality education, while systematic flaws and skill gaps remain in existence. Substandard education persists as a strong barrier for poverty alleviation for developing countries as the large classes, untrained teachers and inadequate education infrastructure shows a strong block for human capital development (UNESCO, 2021). Quality education strongly mitigates multidimensional poverty through improving family earning and workforce productivity (Bashir et al., 2022). Learning disruptions due to COVID 19 strongly spoiled the human capital development and increase poverty, particularly in low-income countries where digital infusion is very low (UNICEF, 2023). Large class size revealed link with poor learning attainment and ensure an increase in

poverty in Asian countries with reduction in labor productivity and employability (Rehman & Hussain, 2023). An increase in teacher availableness and better school infrastructure significantly mitigate multidimensional poverty (Malik et al, 2024).

A study of developing countries for the time period of 2000 to 2022 identifies that higher educational access and larger attainment statistically alleviate poverty and impact is magnified with lower inequality and higher teacher competencies (Chemli, 2025). For India, technical and vocational education fosters employment potential, increases workforce productivity and reduce poverty, thus emphasis on skill-based training for modern labor markets formed by technological and industrial development (Bairagya & Thomas, 2025). A study published in the International Journal of Educational Development (2025) shows that multidimensional poverty reveals negative impact on educational outcomes through poorer families, poor educational access and insufficient availability of educational opportunities (Yu et al., 2025). Enhancing higher educational opportunities boost economic growth and reduces poverty across 38 countries with improving labor productivity and fostering employment creation (Li et al., 2024). A comprehensive review strengthens that education plays a vital role for poverty alleviation with boosting skill development, enhancing learning and improving employment creation (Panduwinata et al., 2024). A comprehensive study conducted in Sub-Saharan Africa and findings reveal that higher education achievement and human capital development strongly enhance household earning and mitigate social inequalities (Epo et al., 2025).

Health is the other necessary determinant of human capital which directly effects the poverty deprivation. Bad health condition declines the productivity with expanding the medical expenses and stops the individuals for participating in economical business. High mortality rates generates a “health-poverty trap” thus bad health and poverty fostering each other in the long-run (Bloom & Canning, 2008; Weil, 2014). Better health outcomes boost the human capital development and stop the intergenerational transmission of poverty. In the contemporary economic scenery, the traditional determinants of human capital has widened for financial development, as key determinant for poverty reduction strategies. Financial development makes easy access to credit and savings, enable individuals for stabilizing consumption and making investment in productive work (Beck et al., 2007; Demirguc-Kunt et al., 2018).

Quality health with high life expectancy confirms more labor production and reduce poverty, whereas investment in health sector improves economic involvement and long-run prosperity (Bloom et al, 2021). Lower health deepens family fragility, lower labor productivity and restricts learning outcomes, thus reinforces poverty and further, availability of global health services ensure the sustainable development and poverty alleviation (WHO, 2022). Improvement in health care systems strongly rise employment rates and mitigate income disparity in Asian countries and strong health care services improve human development and reduce poverty (Ahmad & Bukhari, 2022). Similarly, high life expectancy has strong relation with higher employment ratio and earning potential (Khan & Ahmad, 2024).

Remittance inflows play a vital role for poverty reduction, importantly for developing countries. The determinant of remittance acts as a financial resource for families and contributes for improving their livelihood with an increase in consumption and easy access to healthcare facilities and education. Remittance has to become a leading sources of external funding for several developing countries (World Bank, 2023). However, the power of remittance for poverty reduction relies on their optimal use because more dependence on remittances additionally makes a decline in labor force contribution in certain contexts.

Employment acting a communication channel whereby human capital impacts poverty alleviation. Humans with tertiary education and sound health are in position for obtaining stable employment and high salaries, which enhances family welfare. Job opportunities is key for alleviating poverty and boosting inclusive growth (ILO, 2023). Economies with robust employment markets and enhanced output commonly encounter reduced poverty. Higher employment-to-population ratios strongly alleviate poverty in the long run in the developing countries through human capital development, improving labor market production and efficient work (Rehman et al, 2022). Technological progress and digital inclusion, strongly rising the demand for experts, thus emphasizing the significance of education and healthcare role in employment generation and poverty reduction (World Economic Forum, 2024). Education is the key determinant of human capital as it drive labor productivity, enhancement in earning potential and facilitating social mobility (World Bank, 2020; Organization for Economic Co-operation and Development, 2022). Educational achievement enhances technical abilities, analysis skills and economic resilience, thus improve work opportunities and poverty alleviation (United Nations Educational, Scientific and Cultural Organization, 2021; World Bank, 2022).

Financial development shows positive effect on economic growth and supports poverty alleviation by enhancing resource allocation and labor productivity, whereas empowering poor families (Levine, 2021). Financial services statistically support employment potentials and poverty alleviation in developing countries (World Bank, 2022). Financial development in emerging countries shows linkage with poverty reduction through expansion education, employment opportunities and family income (Nasir et al, 2023). Financial development substantially improves human capital development and poverty reduction in South Asian countries (Hussain & Tariq, 2024). Sustainable poverty alleviation and reducing regional disparities needs improvement in education, health sector and labor market opportunities, instead of growth targeted strategies (Chen et al, 2025).

The findings of the study show that post-pandemic health inequalities identified that delicate health systems, socioeconomic inequalities and poor health access disproportionately impact marginalized communities and ill health systems makes reduction in labor market participation and strengthen poverty cycles for developing countries (Conduah & Ofoe, 2025). Income inequality acts as a key engine for poverty and a strong hurdle for human capital development because quality education inequality, health services and economic pathways statistically lower the investment of human capital development efficiently for alleviating poverty. This study finds

under the Sustainable Development Goals structure that investment in education, skills and health services statistically alleviate poverty while higher economic disparity strongly weakens these gains through stopping lower-income individuals in engaging in gainful employment. Various studies focused the relation between poverty and quality education. European countries identify lower employment rate, low production level and advanced poverty rates as labor skills mismatch with workplace requirements (Boyadjiva & Ilieva-Trichkova, 2025).

A bibliometric-Systematic literature review highlights that multidimensional poverty in developing countries is largely determined by lower income, poor educational attainment and health services (Chipunza & Ntsalaze, 2025). Poor educational systems strengthen poverty and create social immobility across marginalize people (Valik et al., 2025). Multidimensional poverty in Pakistan is largely influenced by lower educational attainment, inadequate health services and geographic discrepancy strongly lead to persistent poverty among regions (Haq et al., 2024).

Regardless of executive research, various gaps are still present. Firstly, the earlier studies depend on micro level factors of poverty instead of examining integrated framework which incorporates quality education, financial development, digital inclusion, health and remittances. Secondly, various empirical studies depend on classical econometric techniques which fails for accounting the cross-sectional dependence and heterogeneity among countries, leads for biased estimations. Thirdly, limited comparative analysis is available across developing and developed countries which limits the generalization of the outcomes. For addressing such gaps, this study implements a wider and comparative approach for examining the impact of human capital and relevant socio economic determinants for poverty reduction among developing and developed countries for the time period of 1990 to 2024. By adopting second-generation econometric approach, the findings of the study supply strong evidence for the long-run relation and causal mechanisms among variables. Consequently, it contributes to the emerging research.

Research Methodology

Data Sources and Sample Selection

This study employs annual data spanning from 1990 to 2024 and for 46 countries (22 developed countries and 22 developing countries), for allowing a comparative analysis of human capital and poverty dynamics. The data of all variables were extracted from the World Development Indicators.

Theoretical Framework

This study is founded in Human Capital Theory, the Capability Approach, Endogenous Growth Theory, Inequality and Distributive Growth Theory, and the New Economics of Labor Migration. Human Capital Theory was presented by Schultz, 1961 and Becker, 1964, focusing, education and health services investment improve the productivity of people, income and socioeconomic resources, thus supporting poverty alleviation. The Capability Approach was presented by Sen, 1999 and Nussbaum, 2000, expands on this views through showing poverty as lack of competencies

and opportunities instead of merely lack of income; advancement in education and health thus improve abilities of individuals for attaining improved quality of life. Endogenous Growth Theory which was presented by Lucas, 1988 and Romer 1990 describes, human capital development, learning and skills improvement increase productivity and sustainable economic growth. Inequality and Distributive Growth Theory of Kuznets, 1955 and Dollar & Kraay, 2002 emphasise that income inequality may restrict the range of how economic and human capital development advantages can boost to poor individuals, considering the Gini Index a key determinant of poverty reduction. Lastly, the New Economics of Labor Migration was presented by Stark & Bloom in 1985 establish a theoretical framework for in addition of personal remittances ease the household finance restrictions and improve investment for education, health and spending, thus supporting to poverty alleviation. Employment-to-population ratio provides an extra earning channel by which human capital may be transformed in income generation and better standard of life. Generally, these theories established an unified framework for observing how human capital and socioeconomic determinants impact poverty among developing and developed countries.

Variable Definition

Dependent Variable: Poverty Index: This research employs the Poverty Index as the dependent variables which aggregates the headcount ratio and the poverty gap, thus capturing the frequency and deepness of the poverty. The headcount ratio indicates the percentage of the population of whom earning or consumption is below the related poverty line, the poverty gap measures, how far the earning or consumption of the poor people lies below the line. Examining the two aspects supplies a detailed depiction of poverty severity relative to the headcount ratio only. Presently, the global data highlights that poverty endures as a key *obstacle to international progress and its estimation needs interest for inequality, human capital development, employment opportunities and several areas of deprivation* (World Bank, 2024; UNDP, 2024).

Independent Variables:

This study integrates education and health as key determinants of human-capital, employing the pupil-teacher ratio and life expectancy as their proxies, while the income inequality, financial development, employment and personal remittances are the essential socioeconomic drivers of poverty.

Table 1: Description of Variables

Variable	Definition	Theoretical Foundation	Expected relation with Poverty index	Expected sign	References
Pupil-Teacher Ratio	Calculated as the average number of students allotted to every teacher, represent as proxy of educational quality. Large ratio identifies overcrowded classes, reduce teaching efficacy and human capital development	Human Capital Theory (Schultz, 1961; Becker, 1964)	Larger pupil-teacher ratio minimizes quality of education, restricts human capital development, decrease income and worsening poverty.	+	Schultz (1961); Becker (1964); Hanushek & Woessmann (2008); Hanushek & Woessmann (2020); UNESCO (2021); Tilak (2002)
Life Expectancy	Calculated as the average number of years an infant to live	Human Capital Theory; Health	High life expectancy reveals good health status, improves labor force	-	Bloom & Sevilla (2004); Sachs &

	in existing death rate and used as proxy for health and human capital.	Augmented Solow Model	production and long-term income, increase human capital development and eliminate poverty.		Warner (1997); Weil (2007); Sen (1999).
Gini Index	Used to quantifying income inequality in a country for 0 to 100 scale, here 0 represents equal distribution of income while 100 means income inequality.	Kuznets Hypothesis, Inclusive Growth Theory	Higher unequal distribution of income hinders the ability of attaining education, health services and production opportunities, which enhance poverty	+	Kuznets (1955); Ravallion (2001); Bourguignon (2004); Fosu (2022).
Financial Development	Domestic credit to the private sector and used as percentage of GDP, calculator for financial deepening.	Financial Intermediation Theory, Finance Growth Theory	Higher financial effectiveness enhances access to credit opportunities, improves investment, develop employment dynamics and minimizes poverty	–	Levine (2005); Kunt & Levine (2007); World Bank (2021); Ahmad & Mallick (2021).
Employment-to-Population Ratio	It is the ratio of working age population which is employed, use for employment outcome.	Human Capital Theory; Labor Market Theory	Greater employment ratio increase family earning, enhance standard of life and decrease poverty.	–	Fields (2021); International Labor Organization (2022); Loayza & Raddatz (2010).
Personal Remittance Received	A share of GDP, calculating income redistribution from immigrants to their families to their homelands.	New Economics of Labor Migration	It provides supplements to family earning, enhance expenditures for education, health, food, shelter and entrepreneurship, thus reduce poverty.	–	Adams & Page (2005); World Bank (2023); Balde et al. (2025); Uddin et al. (2025).

This research evaluates the effects of fundamental socioeconomic determinants, such as the pupil-teacher ratio, financial development, employment-to-population ratio, life expectancy, Gini index and personal remittances received on the poverty index for both developed and developing countries. Employing Human Capital Theory, Financial Development Theory, Labor Market Theory and Income Distribution Theory, this research identifies the multifaceted dynamics between education, financial system, employment potential, health, income inequality and remittances for effecting poverty among country groups.

Econometric Specification:

The empirical framework of this study is based on the Human Capital Theory, designed by Gray Becker (1964) and Theodore Schultz (1961) which concludes that investment in human capital formation enhance productivity and contribute to reduction in poverty. Using a panel data methodology, this study investigates the effect of socio-economic determinants on poverty and human capital development among developed and developing countries.

The baseline relationship is specified as follows:

$$POV_{it} = \alpha_i + \beta_1 PTR_{it} + \beta_2 FD_{it} + \beta_3 EMP_{it} + \beta_4 GIN_{it} + \beta_5 LIF_{it} + \beta_6 PREM_{it} + \mu_i + \epsilon_{it}$$

Where

POV_{it} = Poverty index (coupling poverty headcount ratio and poverty gap), PTR_{it} = Pupil-Teacher-Ratio (proxy of quality education), FD_{it} = Financial Development, EMP_{it} = Employment

to population ratio, GIN_{it} = Gini index, LIF_{it} = Life expectancy (proxy of health condition), $PREM_{it}$ = Personal remittance received, α_i = Country specific fixed effects and ϵ_{it} = error term.

Panel diagnostics tests validates the existence of cross-sectional dependence and cointegration across variables, so the second-generation panel cointegration techniques are used for estimating the long run dynamics. For addressing endogeneity and serial correlation, the Fully Modified Ordinary Least Squares (FMOLS) estimator is employed. For ensuring robustness and long-run relationship among variables Dynamic Ordinary Least Squares (DOLS) estimator presented by Stock and Watson (1993) is used.

Functional form and estimation strategy:

This study defines a long-run poverty function wherein the Poverty Index is expressed as a linear representation of human capital determinants likewise pupil-teacher ratio and life expectancy, income inequality (Gini index), financial development, employment-to-population ratio and personal remittances, along with country-specific intercepts for capturing hidden heterogeneity. Provided cross-sectional dependence, $I(1)$ variables indicated across CIPS and CADF tests, and the Westerlund test verified the cointegration in both developing and developed countries, further this study applies the Panel ARDL~ PMG framework through the Pooled Mean Group (PMG) for estimating the short-run and long-run relations, that approves heterogeneous short-run effects, whereas enforcing general long-run coefficients in every country panel. Fixed effects estimators acts as a base for short-run relationships, whereas panel FMOLS and DOLS applied as validity test for the long-run parameters for addressing endogeneity and serial correlation within the cointegrated framework. Dumitrescu-Hurlin panel causality tests are employed for examining the causal relationships across poverty and their socioeconomic drivers.

Econometric Methodology:

The econometric methodology yields into four stages: firstly, Pesaran CD, Friedman, and Frees tests are employed for detecting cross-sectional dependence; existence of dependence confirms transferring to second-generation panel techniques; secondly, order of integration is analyzed through CIPS and CADF unit-root tests, verifying that all variables are integrated of order one $I(1)$, thirdly, Westerlund error-correction-based panel cointegration tests are employed, that makes rejection of the null hypothesis of no cointegration and justifying long-run assessment; lastly, the long-run relation across the Poverty Index and its drives are calculated by employing the Pooled Mean Group (PMG) test in a panel ARDL test, alongwith panel FMOLS and DOLS applied as robustness tests, whereas Fixed Effects tests give a short-run base and Dumitrescu-Hurlin panel causality tests are employed for assessing direction across the variables.

Comparative Sample Dynamics: Developed vs, Developing Countries

Table 2. Descriptive Statistics of Variables (Developing and Developed Countries).

Variables	Developing Countries			Developed Countries		
	Mean (Std. Dev)	Min	Max	Mean (Std. Dev)	Min	Max
Poverty Index	-0.000(1.394)	-4.319	-2.170	0.043(1.446)	-0.993	7.498
Pupil-Teacher Ratio	32.092(13.695)	0.019	82.996	13.927(3.909)	2.691	27.544
Life Expectancy	64.141(8.790)	37.221	80.435	79.167(2.978)	69.012	84.700
Gini Index	40.947(10.561)	15.000	76.900	32.498(5.532)	22.567	63.400*
Financial Development	47.537(38.965)	0.696	193.710	134.924(69.642)	7.574	451.790
Employment to population ratio	58.994(12.008)	26.328	87.242	56.988(6.283)	38.129	69.134
Personal Remittances Received	3.837(4.856)	-7.952	34.486	0.449(0.726)	-2.914	5.690

Note: values are in parentheses represent standard deviations.

Comparative Cross- Sectional Dependence (CD) Test Results

All variables show strong cross sectional dependence with a base on Pesaran CD, Friedman and Frees tests. The results of this table reveals that, there exists the presence of cross sectional dependence in all tests with $p=0.000$.

Table 3: Cross Sectional Dependence test for Developing and Developed countries

Test	Country Group	Life Exp	Employment	Finance	Gini	PTR	Personal remittance	Decision
Pesaran CD	Developing	64.569***	82.571***	86.358***	86.481***	86.405***	81.387***	Reject Ho
	Developed	5.444***	12.406***	72.14***	81.769***	6.170***	12.414***	Reject Ho
Friedman	Developing	396.259***	560.375***	585.328***	548.779***	585.970***	551.198***	Reject Ho
	Developed	81.496***	115.298***	63.015***	519.883***	60.594***	116.192***	Reject Ho
Frees Q	Developing	14.486***	17.078***	18.252***	18.199***	182.76***	16.657***	Reject Ho

	Developed	4.770***	2.979***	3.301***	19.655***	3.269***	3.183***	Reject Ho
Avg.Corr	Developing	0.556	0.691	0.723	0.724	0.723	0.681	-----
Avg.Corr	Developed	0.423	0.358	0.331	0.750	0.343	0.324	-

Note: ***p < 0.01, **p < 0.05, *p < 0.10

Table 4: Second Generation Unit Root Tests (CIPS & CADF) and Stationarity Tests

Comparative Second Generation Panel Unit Root Tests (CIPS & CADF)

Variable	Country Group	1st Diff CIPS	1st Diff CADF	Decision
Pupil- Teacher ratio	Developed	-2.720***	-2.620*	1(1)
Pupil- Teacher ratio	Developing	-5.792***	-4.366***	1(1)
Life Expectancy (LIFX-I)	Developed	-3.404***	-2.871***	1(1)
Life Expectancy (LIF-I)	Developing	-3.748***	-4.131***	1(1)
Gini Index (GG-I)	Developed	-5.041***	-3.524***	1(1)
Gini Index (GIN-I)	Developing	-2.290**	-2.592**	1(1)
Employment-to-population ratio	Developed	-2.696***	-2.900***	1(1)
Employment-to-population ratio	Developing	-5.367***	-4.237***	1(1)
Financial development	Developed	-2.752***	-3.035***	1(1)
Financial development	Developing	-2.161**	-2.560*	1(1)
Personal remittance received	Developed	-3.446***	-2.689*	1(1)
Personal remittance received	Developing	-5.347***	-4.244***	1(1)

Notes:

- Significance: ***p < 0.01, **p < 0.05, *p < 0.10
- CIPS = Cross-sectional augmented IPS test and CADF = Cross-sectional augmented Dickey- Fuller test
- 1(1) is stationary at first difference

Note: Stationary confirms by Pesaran CIPS and CADF tests.

All variable pairs with poverty index show strong evidence of cointegration . All Gt, Ga, Pt, Pa statistics consistently reject the null of no cointegration.

Table 4: Westerlund Cointegration Test Results

Explanatory Variable	Country Group	Gt	Ga	Pt	Pa	Robust p-value	Decision
Pupil-teacher ratio	Developing (24)	-7.179	~ 33.063	-41.748	~ 32.983	0.000	Cointegration
Pupil-teacher ratio	Developed (22)	-5.821	25.274	26.524	26.028	0.000	Cointegration
Gini Index	Developing (24)	~ 7.090	~ 33.619	-41.498	~ 33.598	0.000	Cointegration
Gini Index	Developed (22)	~ 5.567	-23.911	~ 24.245	-21.159	0.000	Cointegration
Life Expectancy	Developing (24)	~ 6.486	~ 34.226	~ 39.470	~ 34.864	0.000	Cointegration
Life Expectancy	Developed (22)	~ 5.567	~ 23.698	~ 23.586	~ 20.469	0.000	Cointegration
Employment-to-population ratio	Developing (24)	~ 6.912	~ 35.009	~ 40.242	~ 34.704	0.000	Cointegration
Employment-to-population ratio	Developed (22)	-5.821	~ 25.274	~ 26.524	~ 26.028	0.000	Cointegration
Personal remittance received	Developing (24)	~ 7.553	~ 33.717	~ 43.054	~ 33.656	0.000	Cointegration
Personal remittance received	Developed (22)	~ 5.472	-21.915	~ 23.495	-21.819	0.000	Cointegration
Financial development	Developing (24)	~ 6.991	~ 32.145	-41.078	~ 32.264	0.000	Cointegration
Financial development	Developed (22)	-5.915	~ 24.156	~ 26.468	~ 22.302	0.000	Cointegration

Note:

- For the Westerlund (2007), error-correction-based panel cointegration test, Gt and Ga represents group-mean statistics, whereas Pt and Pa are the panel statistics.
- For this test, the null hypothesis reveals that no cointegration is present across the variables.
- Robust bootstrap p-values of 0.000 of four statistics reject the null hypothesis for the 1 % significance level, confirm the presence of the long-run cointegration relation across both panel groups.

Table 5: PMG Long-Run Estimation

Variables	Developing Countries	Developed Countries
Pupil-Teacher Ratio	0.008***	-0.012*
Financial Development	0.0017**	-0.0004*
Employment	0.057***	-0.005
Life Expectancy	-0.174***	-0.012**
Gini Index	-0.007**	0.008**
Personal Remittances	0.045***	0.040
Error Correction Term	-0.057***	-0.284***

Notes: PMG= Pooled Mean Group Estimator

Table 6: Comparative FMOLS Long-Run Estimates for Developing and Developed Countries

Dependent Variable: Poverty Index

Variable	Developed Countries				Developing Countries			
	Coefficients	Std. error	t-Statistic	Prob	Coefficients	Std. error	t-Statistic	Prob
TE/ PTR	-0.037750	0.028845	-1.308758	0.1910	0.003066	0.004618	0.663910	0.5069
GG/ GINI	0.095507	0.015648	6.103537	0.0000***	-0.004436	0.006495	-	0.4948
							0.682961	
LIFEX/ LIFX	-0.150030	0.032992	-	0.0000***	-0.087784	0.005130	-17.11061	0.0000***
			4.547430					
WINTER/ FD	-0.000128	0.001244	-	0.9183	0.001120	0.001384	0.809498	0.4185
			0.102654					
Personal Remittances Received	0.150775	0.113165	1.332347	0.1832	-0.005893	0.010023	-	0.5567
							0.587984	
Employment to population ratio	0.044818	0.024736	1.811875	0.0704*	0.016058	0.003600	4.461052	0.0000***
R-squared	0.621522				0.351404			
Adjusted R-squared	0.607329				0.317446			
S.E. of regression	0.894148				1.145232			
Long-run variance	2.218952				1.167285			
Observations								
Cross-section	22				24			

Notes: Positive (+) shows poverty-increasing effect while Negative (-) poverty-reducing effect.

Table 7: Comparative DOLS Long-Run Estimates for Developing and Developed Countries
 Dependent Variable: Poverty Index

Developed Countries (n=22)					Developing Countries (n= 24)			
Variable	Coefficient	Std. Error	T-Statistic	Prob	Coefficient	Std. Error	T-Statistic	Prob
TE-I/ PTR-I	-0.130969	0.037676	-3.476179	0.0006***	0.011914	0.007599	1.567779	0.1180
WINTER-I/ FD-I	-0.000492	0.001475	-0.333631	0.7389	-0.002864	0.002670	-1.072389	0.2844
GG-I	0.088695	0.026743	3.316565	0.0010***	-0.011181	0.012459	-	0.3702
LIFEY-I/ LIFX-I	-0.144141	0.037929	-	0.0002***	-0.064775	0.019367	0.897402	0.0009***
PREMT-I/ PREMR-I	-0.114097	0.140864	-	0.4186	-0.106167	0.026970	-3.936512	0.0001***
EM-I	-0.010820	0.029610	0.809984	0.7151	-0.001426	0.026627	-	0.9573
			-0.365431				0.053556	
R-squared	0.878976				0.898059			
Adjusted R-squared	0.696142				0.744480			
SE of regression	0.785712				0.687738			
Long-run variance	0.358886				0.483710			
Observations								

Notes:

- 1- Sample period: 1990-2024. Fixed leads and lags specification (lead = 1, lag = 1)
- 2- Long-run variance uses Bartlett kernel, Newey-West fixed bandwidth.

Table 8: Comparative Dumitrescu-Hurlin Panel Causality Results

H₀: No Homogeneous Causality | Sample: 1990 – 2024 (Lags: 2)

Null Hypothesis	Developed Countries (n=22)			Developing Countries (n=24)		
	W-Stat	Z bar-Stat	Prob	W-Stat	Z bar-Stat	Prob
PTR-I does not homogeneously cause Pov index	3.53312	2.78082	0.0054**	1.83247	0.99101	0.3217
Pov index does not homogeneously cause PTR-I	4.54725	4.82546	0.0000***	2.25721	0.02158	0.9828
FD-I does not homogeneously cause Pov index	5.25579	6.25400	0.0000***	2.47825	0.48293	0.6291
Pov index does not homogeneously cause FD-I	6.75675	9.28016	0.0000***	1.88754	0.86533	0.3869

LIFEY-I does not homogeneously cause Pov index	3.40414	2.52078	0.0117**	2.24582	0.04758	0.9620
Pov index does not homogeneously cause LIFEY-I	4.03640	3.79552	0.0001***	2.14108	0.28664	0.7744
EMI-I does not homogeneously cause Pov index	4.11210	3.94815	0.0001***	1.45028	1.86333	0.0624
Pov index does not homogeneously cause EMI-I	3.24803	2.20604	0.0274**	1.23745	-2.34909	0.0188**
PREMT-I does not homogeneously cause Pov index	3.17491	2.05863	0.0395**	1.52801	1.68592	0.0918
Pov index does not homogeneously cause PREMT-I	3.33801	2.38746	0.0170**	2.06442	0.46161	0.6444
GG-I does not homogeneously cause Pov index	1.61714	1.08209	0.2792	2.51721	0.57183	0.5674
Pov index does not homogeneously cause GG-I	2.28494	0.26431	0.7915	4.41807	4.91039	0.0000***
FD-I does not homogeneously cause Pov index	3.46072	2.63486	0.0084**	4.03565	4.03732	0.0001***
PTR-I does not homogeneously cause FD-I	6.77434	9.31562	0.0000***	6.61198	9.91778	0.0000***
LIFEY-I does not homogeneously cause PTR-I	4.27057	4.26764	0.0000***	5.17889	6.64689	0.0000***
PTR-I does not homogeneously cause LIFEY-I	3.17446	2.05770	0.0396**	3.43321	2.66253	0.0078**
EMI-I does not homogeneously cause PTR-I	2.50785	0.71372	0.4754	2.50380	0.54124	0.5883
PTR-I does not homogeneously cause EMI-I	3.86494	3.44983	0.0006***	1.58463	1.55668	0.1195
PREMT-I does not homogeneously cause PTR-I	3.66835	3.05347	0.0023**	3.02319	1.72671	0.0842
PTR-I does not	4.32273	4.37280	0.0000***	3.66491	3.19136	0.0014**

homogeneously cause PREMT-I						
GG-I does not	2.10668	-0.09509	0.9242	3.33315	2.43414	0.0149**
homogeneously cause PTR-I						
PTR-I does not	2.05474	-0.19981	0.8416	3.67570	3.21599	0.0013**
homogeneously cause GG-I						
LIFEY-I does not	7.91832	11.6221	0.0000***	28.8907	60.7669	0.0000***
homogeneously cause FD-I						
FD-I does not	3.03558	1.77771	0.0755	20.3131	41.1892	0.0000***
homogeneously cause LIFEY-I						
EMI-I does not	1.84537	0.62193	0.5340	1.99935	0.61013	0.5418
homogeneously cause FD-I						
FD-I does not	4.78848	5.31182	0.0000***	2.00329	0.60113	0.5478
homogeneously cause EMI-I						
PREMT-I does not	5.25007	6.24246	0.0000***	3.36825	2.51426	0.0119**
homogeneously cause FD-I						
FD-I does not	6.12593	8.00832	0.0000***	2.96351	1.59047	0.1117
homogeneously cause PREMT-I						
GG-I does not	2.01456	-0.28083	0.7788	2.58168	0.71899	0.4721
homogeneously cause FD-I						
FD-I does not	2.11662	-0.07505	0.9402	3.33341	2.43475	0.0149**
homogeneously cause GG-I						
EMI-I does not	3.03747	1.78152	0.0748	2.19553	0.16235	0.8710
homogeneously cause LIFEY-I						
LIFEY-I does not	4.90293	5.54257	0.0000***	1.63831	1.43417	0.1515
homogeneously cause EMI-I						
PREMT-I does not	1.95208	-0.60840	0.5429	3.20283	2.13670	0.0326**
homogeneously cause LIFEY-I						
LIFEY-I does not	4.88895	5.51439	0.0000***	2.67997	0.94334	0.3455
homogeneously cause PREMT-I						
GG-I does not	1.09682	-2.13113	0.0331**	1.89420	-0.85012	0.3953
homogeneously cause						

LIFEY-I						
LIFEY-I does not homogeneously cause GG-I	3.37550	2.46304	0.0138**	2.87384	1.38582	0.1658
PREMT-I						
PREMT-I does not homogeneously cause EMI-I	5.12169	5.98363	0.0000***	1.84711	-0.95759	0.3383
EMI-I						
EMI-I does not homogeneously cause PREMT-I	3.58163	2.87864	0.0040**	1.83081	-0.99481	0.3198
GG-I						
GG-I does not homogeneously cause EMI-I	2.89772	1.49976	0.1337	0.18016	-4.76227	0.0000***
EMI-I						
EMI-I does not homogeneously cause GG-I	1.49536	-1.32762	0.1843	1.45606	-1.85014	0.0643
GG-I						
GG-I does not homogeneously cause PREMT-I	2.68874	1.07843	0.2808	3.77260	3.43715	0.0006***
PREMT-I						
PREMT-I does not homogeneously cause GG-I	4.63749	5.00740	0.0000***	5.15459	6.59142	0.0000***

Notes:

- 1- Method: Pairwise Dumitrescu-Hurlin Panel Causality Tests. Lags=2.
- 2- Sample period- Developed: 1990-2024 (22 Cross-sections, obs = 704); Developing: 1990-2024 (24 cross-sections, obs = 820).
- 3- The null hypothesis states that the variable in question does not homogeneously cause the dependent variable.

Table 9: Variance Inflation Factor (VIF) Test

Variables	Developing Countries VIF	Developed Countries VIF
Pupil-Teacher Ratio	2.57	1.33
Life Expectancy	1.27	2.03
Gini Index	2.88	1.15
Employment-to-Population Ratio	1.25	1.14
Financial Development	1.88	1.13
Mean VIF	2.20	1.96

Empirical Results and Discussion

Descriptive Statistics:

The descriptive statistics show significant variations among socioeconomic situations across developing and developed countries. Developing countries show greater pupil-teacher ratio (32.09 vs. 13.93), Gini Index (40.97 vs. 32.50) and personal remittances (3.87 % vs. 0.45 %), showing higher academic pressure, income inequality and dependence on external income. Whereas, developed countries depict greater financial development (134.92 vs. 47.54) and life expectancy (79.17 vs 64.14 years), showing higher financial infrastructure and higher living situations. The employment-to-population ratios are comparatively same among the both panel groups (58.99 % and 56.99 %), whereas the poverty index identifies minor variation into mean values.

Cross Sectional Dependence test for Developing and Developed countries

The results present conclusive proof of cross-sectional dependence across developing and developed countries. The results of the Pesaran CD, Friedman tests and Frees Q test strongly confirm the rejection of the null hypothesis of cross-sectional independence at the 1 % level of significance. Additionally, the average correlation values reveal significant correlation across countries for the variables. These outcomes imply that countries can be effected through general economic, financial, business and global circumstances. Thus, traditional first-generation panel models which account cross-sectional independence can be improper. The findings generally confirm the utilizing the second-generation panel tests, specially CIPS and CADF unit-root tests and the Westerlund cointegration test, that justify for cross-sectional dependence fro further analysis.

Panel Unit Root Tests for Developing and Developed countries

The findings of the Pesaran CIPS and CADF panel unit-root tests show that all variables come to be stationary at first difference across developing and developed countries. The null hypothesis of a unit root is denied at standard significance levels, confirm the integration of all variables at order one $I(1)$. The uniformity for the results of the CIPS and CADF tests present strong evidence concerning the stationarity of the variables. Although, all variables are integrated at the first difference, $I(1)$, the results present a suitable foundation for identifying its long-run relations by panel cointegration methods. Thus, the Westerlund cointegration test is applied for determining a consistent long-run equilibrium relation across variables prior to use the subsequent long term empirical framework.

Empirical Results of Westerlund ECM Panel Cointegration Tests:

The findings of the Westerlund ECM test depicts a long-term cointegration association across the Poverty Index and the independent variables across developing and developed countries. The

important Gt, Ga, Pt and Pa statistics along with their bootstrap p-values of 0.000, makes rejection of the null hypothesis of no cointegration for the level of 1 %, support the usage of long-run panel evaluation techniques.

PMG long-run model Results:

The findings of the PMG long-run model identify vital variation across developing and developed countries. For developing countries, pupil-teacher ratio, financial development, employment to population ratio and personal remittances reveal positive and statistical significant long-run impact on the Poverty Index whereas life expectancy and Gini Index show negative impacts. For developed countries, pupil-teacher ratio, financial development, life expectancy and Gini Index indicate statistical significance, while employment and personal remittances indicate statistical insignificance. The significance and negative error-correction coefficients (-0.057 and -0.284) verify the correction for long-run equilibrium, as developed countries show a rapid rate of adjustment.

Comparative FMOLS Long-Run Estimates for Developing and Developed Countries.

The findings of the FMOLS estimator depict heterogeneous long-run association among poverty and social and economic determinants among developing and developed countries. For both panel groups, life expectancy shows negative and strong significant impact on the Poverty Index (-0.1500 and -0.0878, separately; $p < 0.01$). The employment-to-population ratio show strong significant positive impact for both panel groups while, the Gini Index show statistical positive impact merely for developed countries. Pupil-teacher ratio, financial development and personal remittances received identify statistical insignificance for both group countries. Generally, the empirical results highlight the need of health related human capital for determining the poverty trends.

DOLS Estimation:

The findings of the DOLS estimator show the heterogeneous long-run determinants of poverty across developing and developed countries. Life expectancy reveal statistical significant negative impact on the Poverty Index across both panel groups (-0.1441 and -0.0648, $p < 0.01$). For developed countries, the pupil-teacher ratio identifies strong negative impact on poverty (-0.1310, $p < 0.01$), whereas the Gini Index show strong positive effect (0.0887, $p < 0.01$) For developing countries, personal remittances reveal statistical significant negative impact on poverty (-0.1062, $p < 0.01$). Financial development and employment-to-population ratio reveal statistical insignificance across both panel groups. The findings also show that the drivers of poverty are different for levels of economic growth.

Empirical Results of Dumitrescu-Hurlin Panel Causality Test:

The Dumitrescu-Hurlin causality analysis shows combined bidirectional and unidirectional causal relation between the poverty and the explanatory variables among developing and developed

countries. For developed countries There persists a bidirectional causality between poverty and socioeconomic indicators such as pupil-teacher ratio, financial development, life expectancy, employment to population ratio and personal remittance received, indicate a deep interdependence across poverty and these social and economic determinants. While, there exist no critical causal relation between poverty and the Gini index for developed countries. In the case of developing countries, there exists a bidirectional causality between poverty and employment to population ratio, whereas present a unidirectional causality between poverty and Gini index and the reverse causal relation show statistical insignificance. Such findings indicate that variations in poverty structure can effect income inequality for developing countries, while inequality may not reveal statistical significance causal impact on the poverty index across the panel. The findings show that there exists a robust causal link across explanatory variables, in particular, there exist bidirectional causal relationship between pupil-teacher ratio and life expectancy across developing and developed countries. Financial development and life expectancy show vital interdependence, though the association fluctuates across developing and developed countries. Likewise, there exist a bidirectional relation between personal remittances and financial development for developed countries, while the developing countries reveal a mainly unidirectional relation, as remittances causes financial development. Generally, the findings reveal, socioeconomic determinants engage actively with each other and along with poverty highlight the need of integrated policy metrics instead of solitary policy measures.

Empirical Results of Variance Inflation Factor (VIF) Test:

The results show that the values of VIF are less than 10, revealing no sever multicollinearity exist across the independent variables. The lower mean of VIF values which is 2.20 and 1.96 of developing and developed countries extended the confirmation for the validity of the variables for the regression analysis.

Conclusion

This study empirically investigates the long-run relation among human capital, socioeconomic determinants and poverty for developed and developing countries and for the time period of 1990-2024. The findings support the presence of cross-sectional dependence and long-run cointegration across the variables, validating the application of the second-generation panel and long-run estimating methods. The FMOLS and DOLS estimation techniques show significant heterogeneity across the developing and developed countries. Particularly, life expectancy continuously shows a statistical significant negative relation with the Poverty Index for the both panel groups, highlights the need of health related human capital development for alleviating poverty reduction. Gini Index for the developed countries, shows positive relationship with poverty, whereas personal remittances are specifically significant for poverty alleviation for developing countries. Furthermore, the causality analysis reveals that poverty and its social and economic factors are actively interconnected. There exists a bidirectional causality across poverty and various vital determinants consisting pupil-teacher ratio, financial development, life expectancy, employment-to-population ratio and personal remittances received for developed countries. Whereas, for

developing countries, bidirectional causality exhibit among poverty and employment and poverty unidirectionally generates the Gini Index. The important causal collaboration between the independent variables additionally identify that socioeconomic determinants act as an integrated system instead of separate factors. Generally, the findings recommend that human capital development, specially advancement in health services along with socioeconomic policies of a country is vital for attaining long term poverty reduction.

Policy Implications

The findings recommend various important policy implications. Firstly, a country ought to emphasize health related human capital, especially with improvement of health service coverage, nutrition and protective services, because life expectancy continuously support the poverty alleviation. Secondly, developed countries should improve inequality-reduction strategies by extensive social safety net programs, employment equity and economic levelling. Thirdly, developing countries should increase the effective utilization of remittances through lowering transaction costs and fostering investment in educational services, health care facilities and productive work. Lastly, a holistic approach with health, education, employment, financial development and inclusive economic growth is necessary for long-run poverty alleviation, along with policies suited the particular circumstances of developing and developed countries.

References:

- 1- Adams, R. H., Jr., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? *World Development*, 33(10), 1645-1669.
- 2- Adams, R. H., Jr., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? *World Development*, 33(10), 1645-1669.
- 3- Alkire, S., & Foster, J. (2011). Counting and multidimensional poverty measurement. *Journal of Public Economics*, 95(7-8), 476-487.
- 4- Aslam, M., & Kingdon, G. G. (2021). Public-partnerships in education: Do they offer an equitable solution to education in India and Pakistan. *Reforming education and challenging inequalities in southern contexts*. 79-97.
- 5- Asongu, S. A., & Odhiambo, N. M. (2023). Revisiting the impact of financial development on income inequality and poverty reduction: Empirical evidence from selected Sub-Saharan African countries. *International Journal of Organizational Analysis*, 31(7), 3393-3412.
- 6- Bairagya, I., & Thomas, S. (2025). Does vocational education and training help reduce poverty at the national level? An analysis of the Indian economy. *Review of Development and Changer*, 30(2), 143-168.
- 7- Barro, R. J. (1991). Economic growth in a cross section of countries. *The Quarterly Journal of Economics*, 105(2), 407-443.
- 8- Barro, R. J. (2001). Human capital and growth. *The American Economic Review*, 91(2), 12-17.

- 9- Bashir, M. S. (2024). Human capital and economic growth nexus. Evidence from GCC countries. *The Science of Tomorrow. Innovative Approaches and Forecasts*, 4-8.
- 10- Bayar, A. A. (2023). The impact of financial development on income inequality and poverty. *PLOS ONE*, 18(10), e0291651.
- 11- Beck, T., Demirguc-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. *Journal of Economic Growth*, 12, 27-49.
- 12- Becker, G. S. (1964). *Human capital: A theoretical and empirical analysis, with special reference to education*, Columbia University Press.
- 13- Becker, G. S. (1994). *Human capital: A theoretical and empirical analysis, with special reference to education* (3rd ed.). The University of Chicago Press.
- 14- Bloom, D. E., & Canning, D. (2008). Population health and economic growth. *The World Bank Economic Review*, 22(1), 1-15.
- 15- Bourguignon, F. (2004). The poverty-growth-inequality triangle. In *New perspectives on poverty reduction: What is needed?* (pp.1-28).
- 16- Boyadjieva, P., & Ilieva-Trichkova, P. (2025). Vertical educational (mis) match and inclusive growth: Theoretical conceptualizations and evidence from a European perspective. *Societies*, 15(4), 113.
- 17- Bukhari, S. J. R., Cheema, A. R., & Shah, S. Z. A. (2022). Literacy, poverty and trade openness in Pakistan: An empirical investigation. *Journal of Accounting and Finance in Emerging Economies*, 8(1), 13-24.
- 18- Chemli, L. (2025). Education and poverty: A panel data approach for a sample of developing countries. *Journal of Posthumanism*, 5(12), 170-183.
- 19- Chipunza, T., & Ntsalaze, L. (2005). Multi-dimensional poverty: A bibliometric analysis and content co-occurrence literature review. *Humanities and Social Sciences Communications*.
- 20- Conduah, A. K., & Ofoe, S. H. (2025). Intersecting impacts of ageing, migration and socioeconomic disparities on health equity: A post-pandemic policy review. *International Journal for Equity in Health*, 24, 304.
- 21- Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). *The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution*. World Bank.
- 22- Dollar, D., & Kraay, A. (2002). Growth is good for the poor. *Journal of Economic Growth*, 7(3), 195-225.
- 23- Epo, B. N., Baye, F. M., Mwabu, G., Manda, D. K., Ajakaiye, O., & Kipruto, S. (2025). Human capital, household prosperity, and social inequalities in Sub-Saharan Africa. *Economies*, 13(8), 221.
- 24- Farooq, F., Hussain, J., Shah, S. Z., & Faheem, M. (2025). Role of Human Capital and Renewable Energy in Shaping Economic Growth of Pakistan. *Review of Education, Administration & Law*, 8(1), 137-148.
- 25- Fields, G. S. (2021). *Employment and development: How work can lead from and into poverty*, Oxford University Press.
- 26- Fields, G. S. (2021). *Employment and development: How work can lead from and into poverty*. Oxford University Press.

- 27-Fosu, A.K. (2022). Economic growth, inequality, and poverty reduction: Recent global evidence. *Research in Economics*, 76(3), 295-310
- 28-Garcia-Fuentes, P. A., Kennedy, P. L., & Ash, W. R. (2025). The multiple impact of remittances on poverty in developing countries: Direct effects and through human capital. *Journal of Policy Modeling*, 47(2), 428-447.
- 29-Haan, J., Pleninger, R., & Sturm, J. E. (2022). Does financial development reduce the poverty gap? *Social indicators Research*, 161, 1-27.
- 30-Hanushek, E. A., & Woessmann, L. (2008). The role of cognitive skills in economic development. *Journal of Economic Literature*, 46(3), 607-668.
- 31- Hanushek, E. A., & Woessmann, L. (2012). Do better schools lead to more growth? Cognitive skills, economic outcomes, and causation. *Journal of Economic Growth*, 17(4), 267-321.
- 32-Hanushek, E. A., & Woessmann, L. (2020). Education, knowledge capital, and economic growth. In S. Bradley & C. Green (Eds). *The economics of education: A comprehensive overview* (2nd ed., pp.171-182). Academic Press.
- 33-Hanushek, E. A., & Woessmann, L. (2020). Education, knowledge capital, and economic growth.
- 34-Haq, W., Azam, M., Babar, Z., Amir, S., & Said, F. (2004). Investigation of multidimensional poverty in Pakistan at the national, regional and provincial level. *Humanities and Social Sciences Communications*.
- 35-Imaniyati, N., Ratnasari, C. D., & Adman, A. (2025). Enhancing job satisfaction through human resource information systems and communication: A commitment-based approach to achieve Sustainable Development Goals (SDGs) in education-oriented organizations. *ASEAN Journal of Educational Research and Technology*, 4(2), 237-254.
- 36-In S. Bradley & C. Green (Eds), *The economics of education: A comprehensive overview* (2nd ed., pp.171-182). Academic Press.
- 37-International Labor Organization, (2022). *World employment and social outlook: Trends 2022*. International Labor Office.
- 38-International Labor Organization. (2022). *World employment and social outlook: Trends 2022*. International Labor Office.
- 39-International Labor Organization. (2024). *World employment and social outlook: Trends 2024*. International Labor Office.
- 40-Kanat, O., Yan, Z., Asghar, M. M., et al. (2024). Gender inequality and poverty: The role of financial development in mitigating poverty in Pakistan. *Journal of the Knowledge Economy*, 15, 11848-11876.
- 41- Khan, A. A., Hidthiir, M. H. B., Ahmad, Z., & Mansur, M. (2025). Impact of human capital and governance in enhancing financial reachability in selected developing countries. *Discover Sustainability*, 6(1), 492.
- 42-Khan, J. A., Bhat, S. A., & Mir, A. H. (2026). Human capital, technological progress, and ecological sustainability in India: evidence from the load capacity factor approach. *Quality & Quantity*, 1-31.

- 43-Kousar, S., Ahmed, F., Afzal, M., & Trinidad Segovia, J. E. (2023). Is government spending in the education and health sector necessary for human capital development? *Humanities and Social Sciences Communications*, 10, 62.
- 44-Kuznets, S. (1995). Economic growth and income inequality. *The American Economic Review*, 45(1), 1-28.
- 45-Levine, R. (2005). Finance and growth: Theory and evidence. In P. Aghion & S. N. Durlauf (Eds), *Handbook of economic growth* (Vol. IA, pp. 865-934).
- 46-Levine, R. (2005). Finance and growth: Theory and evidence. In P. Aghion & S. N. Durlauf (Eds). *Handbook of economic growth* (Vol. IA, pp. 865-934).
- 47-Li, J., Xue, E., Wei, Y., & He, Y. (2024). How popularizing higher education affects economic growth and poverty alleviation: Empirical evidence from 38 countries. *Humanities and Social Sciences Communications*, 11, 520.
- 48-Loayza, N. V., & Raddatz, C. (2010). The composition of growth matters for poverty alleviation. *Journal of Development Economics*, 93 (1), 137-151.
- 49-Lucas, R. E., Jr. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22(1), 3-42.
- 50-Mahmood, F., & Nasir, N. (2023). Impact of green human resource management practices on sustainable performance: serial mediation of green intellectual capital and green behavior. *Environmental Science and Pollution Research*, 30(39), 90875-90891.
- 51- Malik, M. T., Hanafi, A., & Latiep, I. F. (2026). Advancing Digital Human Capital Through Talent Development in Postgraduate Higher Education. *Indonesia Journal of Enterprise Architecture*, 3(3), 1-13.
- 52-Masika, R., Joeke, S., & Preston, I. (1997). Gender and poverty: A review of two approaches to policy-making. *Institute of Development Studies*.
- 53-Nussbaum, M. C. (2000). *Women and human development: The capabilities approach*. Cambridge University Press.
- 54-Ojeyinka, T. A., & Ibukun, C. O. (2024). Do remittances mitigate poverty? Evidence from selected countries in Africa, Asia and Latin America. *Economic Change and Restructuring*, 57, 93.
- 55-Panduwina, L. F., Subroto, W. T., & Sakti, N. C. (2024). Education in poverty reduction: A systematic literature review. *Economics and Business Journal (ECBIS)*, 3(2), 147-156.
- 56-Psacharopoulos, G., & Patrinos, H. A. (2018). Returns to investment in education: A decennial review of the global literature. *Education Economics*, 26(5), 445-458.
- 57-Ravallion, M. (2001). Growth, inequality, and poverty: Looking beyond averages. *World Development*, 29(11), 1803-1815.
- 58-Rehman, M. A., Sabir, S. A. Bukhari, A. A. A. & Sharif, A. (2023). Do globalization and human capital an opportunity or threat to environmental sustainability? Evidence from emerging countries. *Journal of Cleaner Production*, 418, 138028.
- 59-Sachs, J. D., & Warner, A. M. (1997). Sources of slow growth in African economies. *Journal of African Economies*, 6(3), 335-376.

- 60-Sachs, J. D., Lafortune, G., Fuller, G., & Iablonovski, G. (2022). From crisis to sustainable development: The SDGs as roadmap to 2030 and beyond. Sustainable Development Solutions Network.
- 61-Schultz, T. W. (1961). Investment in human capital. *The American Economic Review*, 51(1), 1-17.
- 62-Schultz, T. W. (1961). Investment in human capital. *The American Economic Review*, 51(1), 1-17.
- 63-Schultz, T. W. (1961). Investment in human capital. *The American Economic Review*, 51(1), 1-17.
- 64-Sen, A. (1999). *Development as freedom*. Oxford University Press.
- 65-Sen, A. (2000). *Development as freedom*. Alfred A. Knopf.
- 66-Shair, W., Tayyab, M., Ul Hassan, R., & Iftikhar, R. (2024). Effect of institutional and financial development on poverty and income inequality in Pakistan. *Journal of Excellence in Management Sciences*, 3(2), 134-152.
- 67-Stark, O., & Bloom, D. E. (1985). The new economics of labor migration. *The American Economic Review*, 75(2), 173-178.
- 68-Tilak, J. B. G. (2002). Education poverty in India. *Review of Development and Change*, 7(1), 1-44.
- 69-Uddin, M. R., Sadik, N., & Rahman, M. M. (2025). Globalization, physical capital, and human capital nexus with economic growth: evidence from BIMSTEC. *Research in Globalization*, 10, 100284.
- 70-UNESCO (2021). *Global education monitoring report 2021/2: Non-state actors in education--- Who chooses? Who loses?* United Nations Educational, Scientific and Cultural Organization.
- 71- United Nations Development Programme. (2020). *Human development report 2020: The next frontier_ Human development and the Anthropocene*. United Nations Development programme.
- 72-United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. United Nations.
- 73-Wagle, U. (2006). Multidimensional poverty measurement: A conceptual framework. *Journal of Human Development*, 7(2), 159-180.
- 74-Wagle, U. (2006). Multidimensional poverty measurement: A conceptual framework. *Journal of Human Development*, 7(2), 159-180.
- 75-Wang, Q. S., Hua, Y. F., Tao, R., & Moldovan, N. C. (2021). Can health human capital help the Sub-Saharan Africa out of the poverty trap? An ARDL model approach. *Frontiers in Public Health*, 9, 697826.
- 76-Weil, D. N. (2007). Accounting for the effect of health on economic growth. *The Quarterly Journal of Economics*, 122(3), 1265-1306.
- 77-Weil, D. N. (2014). Health and economic growth. In p. Aghion & S. N. Durlauf (EDs). *Handbook of economic growth* (Vol. 2, pp. 623-682).
- 78-World Bank. (2018). *World development report 2018: Learning to realize education's promise*. World Bank.

- 79-World Bank. (2020). Poverty and shared prosperity 2020: Reversals of fortune. World Bank.
- 80-World Bank. (2020). Poverty and shared prosperity 2020: Reversals of fortune. World Bank.
- 81-World Bank. (2021). The World Bank annual report 2021: From crisis to recovery. World Bank.
- 82-World Bank. (2021). The World Bank annual report 2021: From crisis to recovery. World Bank.
- 83-World Bank. (2022). The state of global learning poverty: 2022 update. World Bank.
- 84-World Bank. (2023). Migration and development brief 39: Remittance flows continue to grow in 2023 albeit at a slower pace. World Bank.
- 85-World Bank. (2023). Migration and development brief 39: Remittance flows remain resilient. World Bank.
- 86-World Bank. (2023). Migration and development brief 39: Remittance flows remain resilient. World Bank.
- 87-World Bank. (2024). Poverty, prosperity, and planet: Pathways out of the policy crisis. World Bank.
- 88-World Bank. (2026). Human Capital Report 2026: Building human capital where it matters ----Homes, neighborhoods, and workplaces. World Bank.
- 89-Yu, S., Guo, Q., & Liang, Y. (2025). The power of education: The intergenerational impact of children's education on the poverty of Chinese older adults. *International Journal of Educational Development*, 116, 103297.

Appendix

Appendix A. Selected Developing Countries

Sr no	Country
1	Albania,
2	Argentina
3	Bangladesh
4	Bolivia
5	Brazil
6	Buruandi
7	Cameron
8	Chad
9	China
10	Comros
11	Ecudor
12	India
13	Indonesia
14	Kenya,

15	Mongolia
16	Moroco
17	Nigeria,
18	Pakistan,
19	South Africa
20	Uzbekistan
21	Vet nam
22	, Yemen
23	Zambia
24	Zimbawe.

Appendix B. Selected Developed Countries

Sr no	Country
1	Australia
2	Austria
3	Belgium
4	Canada
5	Denmark
6	Finland
7	France
8	Germany
9	Hungry
10	Italy
11	Japan
12	Netherland
13	Newzeland
14	Norway
15	Oman
16	Portagal
17	Spain
18	Sweden
19	Sweizerland
20	UK
21	USA

Table 1: Correlation Matrix

Variables	Developing Countries	Developed Countries
	Mean (Std. Dev)	Mean (Std. Dev)
Poverty Index & Pupil-Teacher Ratio	0.045	0.181
Poverty Index & Financial Development	-0.042	-0.050

Poverty Index & Employment	0.308	-0.239
Poverty Index & Life Expectancy	-0.592	-0.462
Poverty Index & Gini Index	-0.035	0.605
Poverty Index & Personal Remittances	-0.227	0.109

Table 1: Correlation Matrix

The correlation analysis exhibits varying relation between poverty and explanatory variables between country groups. For developing countries, poverty exhibits low positive correlation with pupil-teacher ratio (0.045) and employment (0.308), whereas reveals negative correlation with financial development (-0.042), life expectancy (-0.592) and personal remittances (-0.227). Findings shows that there is statistical negative relation between poverty and life expectancy, thus highlights that better health status serves strongly for poverty mitigation. For developed countries, poverty reveals positive correlation with pupil-teacher ratio (0.181), Gini index (0.605) and personal remittances (0.109) while there is negative correlation among financial development (-0.050), employment (-0.239) and life expectancy (-0.462) with poverty. The statistical positive relationship between poverty and income inequality identifies that growing income inequalities deepens poverty in advanced countries.

Table 2: Fixed Effects Model of Poverty Index (Developing vs Developed Countries)

Variables	Developing Countries	Developed Countries
Pupil-Teacher Ratio (ptr-i/ te-i))	0.0052 (0.0045)	-0.0261** (0.0127)
Life Expectancy (lifx-i/ lifey-i)	-0.0819*** (0.0050)	-0.2443*** (0.0206)
Gini Index (gin-i/ gg-i)	-0.0066 (0.0062)	0.1238** (0.0091)
Employment to Population Ratio (emi-i/ emi-i)	0.0163*** (0.0036)	-0.0156** (0.0073)
Financial Development (fd-i/ winter-i)	0.0000 (0.0014)	0.0007 (0.0007)
Personal Remittances Received (premt-i/ premt-i)	-0.0113 (0.0089)	0.0949 (0.0630)
Constant	4.4352*** (0.5299)	16.5165*** (1.6813)
Observations	840	770
Number of groups	24	22
R ² (Within)	0.3252	0.3401
R ² (Between)	0.9302	0.8042
R ² (Overall)	0.3762	0.3328
F-statistic	64.19***	62.61***
(rho)	0.0155	0.0445

Table 2: Fixed Effects Regression Results

The findings of this test shows that employment to population ratio statistically deepening poverty in developing countries such as shown by the positive coefficient (0.016***). In case of developed countries, employment to population ratio strongly mitigate poverty as shown by the negative coefficient (-0.030***), highlights that labor market potential is different in both groups. Life expectancy shows strong negative effect on poverty for both developing (-0.082***) and developed countries (-0.215***) which imply that quality health care services ensure poverty reduction. The pupil-teacher ratio reveals negative effect on poverty for developed countries (-0.035***), whereas shows insignificant effect for developing countries. Financial development shows insignificant effect for developing and developed countries. The Gini index shows significant positive effect on poverty for developed countries (0.161***), highlights the bad contribution of income inequality. Personal remittances strongly increase poverty in developed countries (0.290***), while reveals insignificant effect for developing countries. The within R-squared has values of 0.325 and 0.589 which reveals the moderate explanatory power of the model.

Random Effects Model of Poverty Index (Developing vs Developed Countries)

Variables	Developing Countries	Developed Countries
Pupil-Teacher Ratio (ptr-i/ te-i)	0.0055*(0.0028)	-0.0357*** (0.0120)
Life Expectancy (lifx-i/ lifey-i)	-0.0862*** (0.0046)	-0.1949*** (0.0150)
Gini Index (gin-i/ gg-i)	-0.0017 (0.0037)	0.1271*** (0.0088)
Employment to Population Ratio (emi-i/ emi-i)	0.0159*** (0.00375)	-0.0149* (0.0072)
Financial Development (fd-i/ winter-i)	-0.0002 (0.0010)	0.0007 (0.0006)
Personal Remittances Received (premt-i/ premt-i)	-0.0140 (0.0086)	0.1160* (0.0619)
Constant	4.5476*** (0.4319)	12.5833*** (1.2325)
Observations	840	770
Number of groups	24	22
R ² (Within)	0.3246	0.3356
R ² (Between)	0.9657	0.7826
R ² (Overall)	0.3778	0.3394
Wald χ^2 (rho)	505.76***	392.01***
	0.0000	0.0000

The findings of the random effect model depict that life expectancy identifies as the key determinant of poverty, revealing a strong negative impact across developing (-0.0862, $p < 0.01$) and developed countries (-0.1949, $p < 0.01$), indicate the significance of health-related human

capital. For developing countries, the employment-to-population ratio show a positive and substantial impact (-0.0159, $p < 0.01$), whereas for developed countries reveal negative and substantial impact (-0.0149, $p < 0.05$). The Gini Index strongly enhance poverty for developed countries (0.1271, $p < 0.01$), while show insignificance effects for developing countries. PTR shows significance effect for both panel groups while reveal inverse signs. Financial development shows insignificant effect for developing and developed countries. The models show joint significance, along with Wald χ^2 values of 505.76 and 392.01 with $p < 0.01$.

Hausman Specification Test Results (Developing and Developed Countries)

Country Group	Test Statistic (χ^2)	df	Prob > χ^2	Decision
Developing Countries	14.54	6	0.0241	Reject RE → Prefer FE
Developed Countries	44.06	6	0.0000	Reject RE → Prefer FE

The findings of Hausman test show that the Random Effects (RE) model ought be rejected for developing and developed countries. The developing countries with $\chi^2 = 14.54$ and $p = 0.0241$, whereas the developed countries with $\chi^2 = 44.06$ and $p = 0.0000$. As p – values are less than 0.05 for both panel groups, the null hypothesis about the consistency and effectiveness of RE is rejected. So, the Fixed Effects model is preferable for both country groups.