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WHEN DOES FINANCIAL INCLUSION REDUCE POVERTY? MODERATING ROLE OF INEQUALITY AND INSTITUTIONS IN DEVELOPING COUNTRIES

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ABSTRACT

Access to formal finance has spread quickly across developing countries since 2000, but poverty has fallen at very different speeds from one country to the next. This study asks whether the poverty payoff of financial inclusion depends on the economic and social conditions into which it arrives. We use an unbalanced panel of 36 developing countries for 2000–2025, build a financial inclusion index from six IMF Financial Access Survey indicators through principal component analysis, and estimate dynamic poverty models with one-step and two-step difference and system GMM. Financial inclusion lowers both the US$3 and the US$4.20 a day poverty headcount in all specifications. In the two-step system GMM the coefficients are −3.218 for extreme poverty and −3.476 for moderate poverty. Poverty is very persistent, with coefficients on lagged poverty between 0.884 and 1.052. Interaction models show that income inequality, wealth concentration and gender inequality weaken the poverty-reducing effect of financial inclusion while institutional quality and secondary school enrolment strengthen it. At the sample mean Gini of 41.7, the marginal effect of the index on extreme poverty is −2.148, and it shrinks by about 0.41 for every 10-point rise in the Gini. Expanding bank accounts and credit will do most for the poor where it goes together with redistribution, gender-inclusive reform, better governance and wider schooling.

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Introduction

In 2011 about half of the world's adults had an account at a bank or a mobile money provider. By 2021 the share had reached 76 percent and in developing economies it rose to 71 percent (Demirgüç-Kunt, Klapper, Singer, & Ansar, 2022). Branches, automated teller machines and mobile money agents now reach villages that had no formal financial presence two decades ago. Still 1.4 billion adults remain

unbanked, most of them in developing economies and women in these economies are 6 percentage points less likely than men to hold an account (Demirgüç-Kunt et al., 2022). Poverty has not retreated at the same pace as access. The COVID-19 shock pushed about 70 million people into extreme poverty in 2020, the largest one-year increase since global poverty monitoring began (World Bank, 2022). In the 36 developing countries studied here, nearly one person in three lived below the US$3 a day line on average between 2000 and 2025.

The case for expecting finance to help the poor is old and well argued. Financial intermediaries pool small savings and lend them to people with productive projects (Gurley & Shaw, 1960). Where finance is repressed, the poor are the first to be rationed out of credit and are forced to self-finance (McKinnon, 1973; Shaw, 1973). When credit markets are imperfect, households without collateral cannot invest in schooling or a small business, so initial poverty becomes lasting poverty (Galor & Zeira, 1993). A savings account, a small loan or an insurance product lets a poor household smooth consumption after a bad harvest or an illness and invest when an opportunity appears. In the language of Sen (1999), access to finance widens the set of things a poor person is actually able to do.

The evidence, however, is less tidy than the theory. Omar and Inaba (2020) find that financial inclusion lowers poverty and income inequality in 116 developing countries, and Saha and Qin (2023) report a strong effect on extreme poverty in developing countries but none in high-income countries. Neaime and Gaysset (2018) find no significant effect of financial inclusion on poverty in the Middle East and North Africa, and Seven and Coskun (2016) conclude that financial development in emerging economies has not reached the poorest households. Studies using similar data and methods reach different conclusions in different places. This pattern suggests that the effect of financial inclusion depends on something the average estimate leaves out.

One candidate is the distribution of income and assets. Formal lending rests on collateral and documentation and both are held by those who already have wealth. In unequal societies, the people best placed to use new credit are those who needed it least, and elites can shape lending rules in their own favour (Claessens & Perotti, 2007; Rajan & Zingales, 2003). Greenwood and Jovanovic (1990) show that the gains from financial development can go first to richer households, who can afford the cost of joining the financial system. Gender is a second candidate. Women make up a large share of the unbanked, and where they lack property rights, identity documents or freedom to work, an expanding branch network passes them by (Demirgüç-Kunt et al., 2022; Swamy, 2014). Institutions and education may push in the other direction. Contracts that are enforced and officials who do not divert public programmes make banks willing to lend to small borrowers (North, 1990), and borrowers who can read a loan agreement and keep accounts make better use of credit (Becker, 1964; Lusardi & Mitchell, 2014).

These arguments raise a set of questions that cross-country work has not answered together. Does financial inclusion reduce both extreme and moderate poverty once the strong persistence of poverty is modelled? Does its effect shrink where income is unequally distributed, and is the answer the same when inequality is measured by wealth concentration rather than income? Is it weaker where women face barriers in health, education and the labour market? Do good institutions and wider secondary schooling make finance work harder for the poor? Most cross-country studies estimate a single average effect of financial inclusion on poverty. The few that test conditioning factors usually examine one at a time, such as gender

equality in Saha and Qin (2023) or institutions in Cepparulo, Cuestas, and Intartaglia (2017), using different samples and periods, so their results cannot be compared directly.

This paper contributes to the literature in four ways. First, it tests five moderators (income inequality, wealth concentration, gender inequality, institutional quality and secondary school enrolment) within the same sample, period and estimation framework, so their effects can be compared. Second, it separates income inequality from wealth concentration, using the top 10 percent wealth share from the World Inequality Database alongside the Gini index. The two measures capture different things: annual income flows on one side and the stock of assets that serves as collateral on the other. Third, the financial inclusion index includes registered mobile money agent outlets alongside bank-based indicators, so it reflects the newer channels of access that matter in low-income economies. Fourth, the data run to 2025 and the analysis checks for cross-sectional dependence and uses a second-generation unit root test before estimating dynamic models with four GMM estimators.

The rest of the paper is organised as follows. Section 2 reviews the literature. Section 3 describes the data, variables, model and estimation method. Section 4 presents and discusses the results. Section 5 concludes and draws policy implications.

Literature review

Theoretical background

Thinking on finance and poverty began with the role of intermediaries. Gurley and Shaw (1960) argued that banks and other intermediaries turn small, scattered savings into loans for productive investment, and that this transformation raises output. McKinnon (1973) and Shaw (1973) carried the idea to developing economies, where interest rate ceilings and directed credit kept financial systems shallow. In a repressed system, credit is rationed, and small firms and poor households lose out first. Liberalising and deepening finance should therefore widen access for those at the bottom.

Later work asked who gains as finance grows. Greenwood and Jovanovic (1990) modelled a fixed cost of joining the financial system, which means only richer households benefit at first and inequality can rise before it falls. Galor and Zeira (1993) showed that when borrowing requires collateral, the initial distribution of wealth decides who can invest in skills, so poverty passes from one generation to the next. On this view, finance can reduce poverty only if access reaches people without assets. Rajan and Zingales (2003) and Claessens and Perotti (2007) added a political angle: incumbents with wealth and connections can capture financial institutions and block reforms that would open finance to newcomers.

Three further ideas explain why the same financial services may help the poor more in some countries than others. Sen's (1999) capability approach holds that resources matter only to the extent that people can turn them into real choices, which depends on their education, health, rights and social position. New institutional economics treats the rules of the game, such as property rights, contract enforcement and control of corruption, as the main determinant of how well markets work (North, 1990). Human capital theory adds that education raises the return a person can earn on any resource, including credit (Becker, 1964). Taken together, these theories predict that financial inclusion reduces poverty, that inequality in income, wealth and gender weakens this effect, and that strong institutions and education reinforce it.

Empirical evidence on financial inclusion and poverty

Cross-country evidence on the direct effect is large and mostly supportive. Omar and Inaba (2020) used an unbalanced panel of 116 developing countries for 2004–2016 and found that a composite financial inclusion index lowers both poverty and income inequality. Nyarko, Amoateng, and Aboagye (2023) built a principal component index that included mobile money accounts for 142 developing countries over 2004–2018. Their two-step system GMM estimates showed that financial inclusion reduces poverty in the short and long run, while income inequality raises it. Chinnakum (2023) reached a similar result for 27 developing Asian countries between 2004 and 2019 using GMM and also found that trade openness improved the living standards of poor households. Saha and Qin (2023) covered 156 countries over 2004–2019 with static and dynamic panel models. Financial inclusion lowered extreme poverty in developing economies but had no significant effect in high-income countries, and its effect on moderate poverty was weaker than on extreme poverty.

More recent studies have widened the methods used. Mbodj and Laye (2025) applied quantile regression to 134 developing countries for 2011–2021 and found that financial inclusion and financial development both reduce the poverty headcount, with controls for income, the Gini coefficient, trade, inflation and secondary enrolment. Khudoykulov et al. (2026) estimated a cross-sectionally augmented ARDL model for Asian economies over 2000–2023 and reported that the poverty effect differs between East and South Asia. Osuma (2025) used system GMM and quantile regression for 28 Sub-Saharan African countries over 2016–2023 and found that digital financial services did more than ATM availability to reduce poverty, especially in East and Southern Africa. Earlier work on Sub-Saharan Africa by Ibrahim et al. (2019), covering 49 countries from 1980 to 2017, linked savings, private credit, ATM access and information technology to lower poverty. Outside the developing world, Tran and Le (2021) found that financial inclusion lowered poverty at all three international poverty lines in 29 European countries over 2011–2017.

Household studies point the same way. Churchill and Marisetty (2020) drew on 44,705 household observations from India's 2016 Financial Inclusion Insights survey and found that more financially included households were less poor on every poverty measure they tried. In Ghana, Koomson, Villano, and Hadley (2020) used the seventh round of the Ghana Living Standards Survey and an instrumental variable design based on distance to the nearest bank. Financial inclusion reduced the probability of being poor by 27 percent and vulnerability to future poverty by 28 percent, with larger effects for female-headed and rural households. Mohammed, Mensah, and Gyeke-Dako (2017) applied propensity score matching to Global Findex data for 35 Sub-Saharan African countries and found that individuals with formal accounts accumulated more wealth.

Not every study agrees. Neaime and Gaysset (2018) found that financial inclusion reduced income inequality in MENA countries but had no significant effect on poverty. Seven and Coskun (2016) concluded that banking and stock market development in emerging economies did not reduce income inequality or poverty. These null results come from regions with high inequality and weak links between the formal financial sector and the poor, which hints that the surrounding conditions matter.

Conditions that shape the effect

A separate literature on growth and poverty has long shown that distribution decides how much the poor gain. Adams (2004) estimated that the growth elasticity of poverty is larger where the Gini coefficient is lower. Fosu (2017) confirmed with recent global data that high inequality slows the conversion of growth into poverty reduction, and Bergstrom (2022) showed that changes in the income distribution can matter as much for poverty as changes in mean income. Lakner, Mahler, Negre, and Prydz (2022) simulated that even small reductions in the Gini could lift large numbers of people out of poverty without any extra growth. If finance reduces poverty partly by raising incomes, the same distributional brake should apply to it. Demir, Pesqué-Cela, Altunbas, and Murinde (2022) offer a contrasting view: using quantile regression, they find that fintech-driven financial inclusion itself reduces income inequality, which would imply that inclusion can work even in unequal settings.

Gender has received more attention at the household level than across countries. Swamy (2014) found that the income gains from financial inclusion programmes in India were larger for women than for men. Ghosh and Vinod (2017) showed that women's financial inclusion in India is limited by education, income and social norms. At the cross-country level, Saha and Qin (2023) reported that lower gender inequality strengthens the poverty-reducing effect of financial inclusion.

For institutions, Tebaldi and Mohan (2010) found that institutional quality explains cross-country differences in poverty beyond its effect on income, and Perera and Lee (2013) reported that government stability, law and order and bureaucratic quality reduced poverty in developing Asia. Cepparulo et al. (2017) went a step further and showed that financial development reduces poverty more where institutions are stronger. Ochi, Saidi, and Labidi (2023), however, found that governance reduces poverty in South Asia and Sub-Saharan Africa only above a threshold level of quality. On education, Lusardi and Mitchell (2014) documented that financial literacy shapes saving, borrowing and investment decisions, and Koomson, Villano, and Hadley (2023) found that financial literacy helps Ghanaian households accumulate assets.

What is missing is a single framework that tests these conditions side by side. The studies above differ in samples, periods, poverty measures and estimators, so it is hard to say whether inequality matters more than institutions, or whether wealth concentration behaves like income inequality. This paper fills that gap by estimating the direct effect of financial inclusion on two poverty lines and five interaction models on the same panel of developing countries.

Material and methods

Data and sample

The study uses an unbalanced panel of 36 developing countries over 2000–2025. The countries were selected on the basis of data availability for the financial inclusion index and the two poverty measures. Many other developing countries were dropped because of gaps in these series. The final sample includes countries from Sub-Saharan Africa, South and Southeast Asia, Latin America and the Caribbean, the Middle East and North Africa, Europe and the Pacific, and is listed in Appendix Table A6. We pool all countries rather than splitting them by World Bank income group, because separate income groups would leave too few observations for reliable dynamic panel estimation.

Poverty, macroeconomic, education and trade data come from the World Bank's World Development Indicators (WDI). The Gender Inequality Index comes from the United Nations Development Programme. The indicators used for the financial inclusion index come from the IMF Financial Access Survey (FAS). The wealth share of the richest 10 percent is taken from the World Inequality Database, and the six governance dimensions are from the Worldwide Governance Indicators (Kaufmann, Kraay, & Mastruzzi, 2011).

Variables

Poverty is measured by two headcount ratios from the WDI: the share of the population living below US$3.00 a day (extreme poverty, EPOV) and below US$4.20 a day (moderate poverty, MPOV), both at 2021 purchasing power parity. Using two lines shows whether financial inclusion reaches only those near the threshold or also those in deeper deprivation.

The main explanatory variable is a financial inclusion index (FII) constructed by principal component analysis from six FAS indicators: (i) deposit accounts with commercial banks per 1,000 adults, (ii) commercial bank branches per 100,000 adults, (iii) ATMs per 100,000 adults, (iv) loan accounts with commercial banks per 1,000 adults, (v) registered mobile money agent outlets per 100,000 adults, and (vi) outstanding commercial bank loans as a percentage of GDP. Branches, ATMs and mobile money agents measure access, while deposit accounts, loan accounts and outstanding loans measure usage. Each indicator is standardised, and the index is the weighted sum of the standardised indicators using the loadings of the first principal component:

$$FII_{it} = \Sigma_j \; w_j Z_{ijt}, \; j = 1, \ldots, 6 \qquad (1)$$

where Z_{ijt} is the standardised value of indicator j for country i in year t and w_j is its loading on the first principal component. The index is rescaled to lie between 0 and 1, with higher values meaning greater inclusion. Institutional quality (WGI) is built in the same way from the six Worldwide Governance Indicators: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption.

The moderators are the Gini index (GINI), the wealth share of the top 10 percent (WS), the Gender Inequality Index (GII), the governance index (WGI) and gross secondary school enrolment (SSE). The control variables are GDP per capita growth (GDPPC), general government final consumption expenditure (GCE), trade openness (TO) and inflation measured by the GDP deflator (INF). Table 1 defines all variables and their sources.

Table 1. Definition of variables and data sources

Variable	Symbol	Measurement	Source
Extreme poverty	EPOV	Poverty headcount ratio at US$3.00 a day (2021 PPP), % of population	WDI
Moderate poverty	MPOV	Poverty headcount ratio at US$4.20 a day (2021 PPP), % of population	WDI

Financial inclusion	FII	PCA index of six access and usage indicators, 0–1	Authors, from IMF FAS
GDP per capita growth	GDPPC	Annual growth of GDP per capita, %	WDI
Secondary school enrolment	SSE	Gross secondary enrolment ratio, %	WDI
Income inequality	GINI	Gini index, 0–100	WDI
Wealth concentration	WS	Share of personal wealth held by the top 10%	WID
Gender inequality	GII	Gender Inequality Index, 0–1	UNDP
Institutional quality	WGI	PCA index of six Worldwide Governance Indicators	Authors, from WGI
Government consumption	GCE	General government final consumption expenditure, % of GDP	WDI
Trade openness	TO	(Exports + imports) / GDP, %	WDI
Inflation	INF	GDP deflator, annual %	WDI

Note: WDI = World Development Indicators; FAS = Financial Access Survey; WID = World Inequality Database; UNDP = United Nations Development Programme; WGI = Worldwide Governance Indicators.

Model specification

The baseline model draws on financial intermediation theory (Gurley & Shaw, 1960; McKinnon, 1973; Shaw, 1973) and the capability approach (Sen, 1999). Poverty depends on financial inclusion, income growth, human capital, income inequality and institutional quality:

$$POV = f(FII, GDPPC, SSE, GINI, WGI) \quad (2)$$

Poverty in one year is closely tied to poverty in the year before, because the assets, skills and health that keep a household poor change slowly. We therefore add the lagged dependent variable and write the dynamic models for extreme and moderate poverty as:

$$EPOV_{it} = \beta_0 + \delta\, EPOV_{i,t-1} + \beta_1\, FII_{it} + \beta_2\, GDPPC_{it} + \beta_3\, SSE_{it} + \beta_4\, GINI_{it} + \beta_5\, WGI_{it} + \mu_i + \varepsilon_{it} \quad (3)$$

$$MPOV_{it} = \beta_0 + \delta\, MPOV_{i,t-1} + \beta_1\, FII_{it} + \beta_2\, GDPPC_{it} + \beta_3\, SSE_{i} + \beta_4\, GINI_{it} + \beta_5\, WGI_{it} + \mu_i + \varepsilon_{it} \quad (4)$$

where i indexes countries, t indexes years, μ_i is an unobserved country effect and ε_{it} is the error term. We expect $\beta_1 < 0$.

To test whether the effect of financial inclusion depends on country conditions, we add the interaction of FII with each moderator in turn. Following the capability approach and new institutional economics (North, 1990; Sen, 1999), the interaction models take the form:

$$EPOV_{it} = \alpha_0 + \delta\, EPOV_{i,t-1} + \alpha_1\, FII_{it} + \alpha_2\, M_{it} + \alpha_3\, (FII_{it} \times M_{it}) + \alpha_4\, GDPPC_{it} + \alpha_5\, GCE_{it} + \alpha_6\, TO_{it} + \alpha_7\, INF_{it} + \mu_i + \varepsilon_{it} \quad (5)$$

where M is, in five separate models, GINI, WS, GII, WGI or SSE. The marginal effect of financial inclusion on extreme poverty is:

$$\partial EPOV_{it} / \partial FII_{it} = \alpha_1 + \alpha_3 M_{it} \quad (6)$$

Because α_1 is expected to be negative, a positive α_3 means the moderator weakens the poverty-reducing effect of financial inclusion and a negative α_3 means it strengthens it. Theory leads us to expect $\alpha_3 > 0$ for GINI, WS and GII (Claessens & Perotti, 2007; Galor & Zeira, 1993; Piketty, 2014) and $\alpha_3 < 0$ for WGI and SSE (Becker, 1964; North, 1990).

Estimation strategy

Before estimation we test the panel for cross-sectional dependence, because countries are linked through trade, capital flows, technology and common shocks. We use the Pesaran (2004) CD test:

$$CD = \sqrt{[2T / N(N-1)]} \, \Sigma_{i=1}^{N-1} \Sigma_{j=i+1}^{N} \hat{\rho}_{ij} \quad (7)$$

where $\hat{\rho}_{ij}$ is the pairwise correlation between countries i and j, N is the number of countries and T the number of years. Under the null hypothesis of cross-sectional independence, CD follows a standard normal distribution. Because dependence is present, first-generation unit root tests are not valid, so we use the cross-sectionally augmented IPS (CIPS) test of Pesaran (2007). It augments each country's Dickey–Fuller regression with cross-sectional averages:

$$\Delta y_{it} = a_i + b_i y_{i,t-1} + c_i \bar{y}_{t-1} + d_i \Delta \bar{y}_t + e_{it} \quad (8)$$

and averages the resulting t-statistics across countries, $CIPS = N^{-1} \Sigma_i t_i$. The test is run with an intercept and with an intercept and trend.

The models include a lagged dependent variable, which is correlated with the country effect μ_i. Pooled OLS, fixed effects and random effects estimates are therefore biased. Financial inclusion may also be endogenous, since poorer countries attract fewer bank branches and less lending. We use the Generalised Method of Moments estimators of Arellano and Bond (1991) and Blundell and Bond (1998). Difference GMM removes μ_i by first-differencing equation (3):

$$\Delta EPOV_{it} = \delta \, \Delta EPOV_{i,t-1} + \beta' \, \Delta X_{it} + \Delta \varepsilon_{it} \quad (9)$$

and uses lagged levels dated $t-2$ and earlier as instruments, under the moment condition:

$$E[EPOV_{i,t-s} \, \Delta \varepsilon_{it}] = 0, \; s \geq 2 \quad (10)$$

When a series is highly persistent, its lagged levels are weak instruments for its first differences. System GMM addresses this by adding the equation in levels, instrumented with lagged differences, which improves efficiency (Blundell & Bond, 1998). Since poverty in our data is close to a unit root process, system GMM is the preferred estimator. We report one-step and two-step versions of both estimators. Two-step standard errors use the Windmeijer (2005) finite-sample correction.

Instrument validity is checked with the Hansen and Sargan tests of over-identifying restrictions and the Difference-in-Hansen test for subsets of instruments. The Arellano–Bond AR(1) and AR(2) tests check for serial correlation in the differenced errors: AR(1) is expected by construction, but AR(2) must be absent. Following Roodman (2009), we keep the number of instruments below the number of countries in all models.

Results and discussion

Descriptive statistics and correlations

Table 2 reports summary statistics. On average 31.3 percent of the population lives below US$3.00 a day and 44.5 percent below US$4.20 a day, and both measures vary widely across countries and years (standard deviations of 25.8 and 29.2). The financial inclusion index has a mean of 0.255 and a skewness of 1.972, so most countries sit at low levels of inclusion while a few are far ahead. The average Gini index is 41.7, and on average the richest 10 percent hold 64.3 percent of personal wealth. The Gender Inequality Index averages 0.516. GDP per capita growth averages 2.0 percent a year with a range from -36.8 to 33.8 percent, and inflation averages 7.0 percent with occasional very high readings. The Jarque–Bera test rejects normality for every variable, which supports the use of an estimator that does not assume normal errors.

Table 2. Summary statistics

Variable	Mean	Std. dev.	Min	Max	Skewness	Kurtosis	Jarque–Bera
EPOV	31.281	25.789	-21.300	86.900	0.339	1.754	78.498***
MPOV	44.518	29.183	-16.900	126.850	-0.008	1.761	59.842***
FII	0.255	0.148	0.000	1.000	1.972	8.312	1707.205***
GDPPC	2.038	4.389	-36.825	33.769	-1.130	20.035	11516.632***
SSE	59.129	26.546	7.555	133.654	0.131	2.098	34.401***
GINI	41.667	9.961	1.100	93.600	0.570	4.944	198.036***
WGI	0.587	0.121	0.181	0.918	0.161	3.290	7.351*
GCE	14.753	6.785	-10.863	43.482	1.033	5.389	389.018***
TO	75.803	50.499	1.788	477.602	3.053	18.829	11226.674***
INF	7.039	9.470	-21.165	112.694	4.828	42.126	63338.997***
WS	0.643	0.059	0.565	0.908	1.556	6.334	811.198***
GII	0.516	0.116	0.107	0.840	-0.599	3.684	74.234***

Note: ***, ** and * denote rejection of normality at the 1%, 5% and 10% levels.

Table 3 presents the correlation matrix. Financial inclusion is negatively correlated with extreme poverty (-0.563) and moderate poverty (-0.636). Secondary enrolment and institutional quality are also negatively correlated with poverty, while the Gini index, the wealth share, the Gender Inequality Index and inflation are positively correlated with it. The two poverty measures are almost perfectly correlated

(0.973), but they never enter the same regression. The highest correlation between regressors that appear in the same model is 0.686, between financial inclusion and secondary enrolment, which is below the usual threshold of 0.80. The Gini index and the wealth share are correlated at 0.728, but they enter separate models, so multicollinearity is not a serious concern.

Table 3. Pearson correlation matrix

	EPOV	MPOV	FII	GDPPC	SSE	GINI	WGI	GCE	TO	INF	WS	GII
EPOV	1											
MPOV	0.973***	1										
FII	-0.563***	-0.636***	1									
GDPPC	-0.002	0.016	-0.020	1								
SSE	-0.693***	-0.736***	0.686***	0.029	1							
GINI	0.461***	0.451***	-0.065*	0.034	-0.107***	1						
WGI	-0.408***	-0.491***	0.572***	0.033	0.560***	0.006	1					
GCE	-0.045	-0.083**	0.256***	-0.092***	0.213***	0.216***	0.312***	1				
TO	-0.310***	-0.352***	0.263***	0.027	0.272***	-0.033	0.358***	0.499***	1			
INF	0.208***	0.225***	-0.195***	0.012	-0.158***	0.021	-0.158***	-0.059*	-0.078**	1		
WS	0.307***	0.264***	0.184***	-0.085**	0.067**	0.728***	0.217***	0.248***	-0.031	0.069**	1	
GII	0.439***	0.488***	-0.577***	-0.177***	-0.499***	0.031	-0.372***	-0.126***	-0.277***	0.151***	0.012	1

Note: ***, ** and * denote significance at the 1%, 5% and 10% levels.

Cross-sectional dependence and unit roots

The Pesaran CD test in Table 4 rejects cross-sectional independence for every variable except institutional quality ($p = 0.168$). The dependence is strongest for financial inclusion, with an average pairwise correlation of 0.84, which fits the spread of mobile money and similar banking reforms across many developing countries during the period. Poverty, enrolment, the Gender Inequality Index and the Gini index also show strong dependence. Governance appears to be driven mainly by domestic politics rather than common shocks.

Table 4. Pesaran (2004) cross-sectional dependence test

Variable	CD statistic	p-value	Mean ρ	Mean |ρ|
EPOV	56.011	0.000	0.44	0.72
MPOV	62.485	0.000	0.49	0.74
FII	107.100	0.000	0.84	0.84
GDPPC	25.751	0.000	0.20	0.26
SSE	52.864	0.000	0.41	0.64
GINI	33.844	0.000	0.26	0.66
WGI	1.379	0.168	0.01	0.34
GCE	3.589	0.000	0.03	0.41
TO	6.858	0.000	0.05	0.39
INF	14.030	0.000	0.11	0.21
WS	12.209	0.000	0.10	0.56
GII	63.526	0.000	0.50	0.79

Note: The null hypothesis is cross-sectional independence.

Given this dependence, Table 5 reports the CIPS unit root test. GDP per capita growth and inflation are stationary in both specifications. Both poverty measures, the financial inclusion index, enrolment, the Gini index, government consumption, trade openness and the Gender Inequality Index are non-stationary in levels. Institutional quality and the wealth share give mixed results and are treated as non-stationary. This mix of stationary and persistent series, together with strong persistence in the dependent variables, supports a dynamic panel GMM approach, which can handle regressors of different orders of integration as long as none is integrated of order two.

Table 5. Pesaran (2007) CIPS panel unit root test

Variable	Lag (no trend)	Zt-bar (no trend)	p-value	Lag (trend)	Zt-bar (trend)	p-value
EPOV	1	-0.916	0.180	1	-0.361	0.359
MPOV	1	0.570	0.716	1	0.936	0.825
FII	1	4.739	1.000	1	3.590	1.000
GDPPC	0	-13.298	0.000	0	-12.294	0.000
SSE	1	0.944	0.828	1	2.892	0.998
GINI	1	-0.664	0.253	1	1.523	0.936
WGI	0	-1.505	0.066	1	-0.070	0.472
GCE	0	-1.100	0.136	1	0.618	0.732

TO	1	0.324	0.627	1	0.476	0.683
INF	0	-16.337	0.000	0	-14.698	0.000
WS	1	-2.113	0.017	1	-1.279	0.100
GII	0	2.178	0.985	0	4.481	1.000

Note: The null hypothesis is that the series contains a unit root.

Financial inclusion and poverty

Table 6 reports the estimates for extreme poverty. The lagged poverty term is positive and significant at the 1 percent level in all four columns, with coefficients from 0.908 to 1.052. Countries that were poor last year stay poor this year, and this persistence is why a static model would give misleading results. The financial inclusion index is negative and significant in every column. The coefficient is -0.473 in the one-step difference GMM (1 percent level) and between -1.423 and -3.218 in the other three columns (10 percent level). In the preferred two-step system GMM, a 0.1 rise in the index, about two-thirds of its standard deviation, is associated with a fall of about 0.32 percentage points in the extreme poverty headcount in the same year. Because poverty is so persistent, the cumulative effect over several years is much larger than this short-run figure.

Table 6. Financial inclusion and extreme poverty (dependent variable: EPOV)

Variables	One-step difference GMM	Two-step difference GMM	One-step system GMM	Two-step system GMM
L.EPOV	0.908***	0.914***	0.987***	1.052***
	(0.021)	(0.037)	(0.015)	(0.091)
FII	-0.473***	-1.865*	-1.423*	-3.218*
	(0.049)	(1.021)	(0.792)	(1.841)
GDPPC	-0.004	-0.011*	-0.031**	-0.028*
	(0.008)	(0.006)	(0.013)	(0.016)
SSE	-0.025	-0.012*	-0.008	-0.063
	(0.018)	(0.007)	(0.009)	(0.044)
GINI	0.098**	0.121**	0.030	0.187*
	(0.044)	(0.054)	(0.019)	(0.108)
WGI	-0.177	-2.084*	-3.126**	-2.887*
	(1.557)	(1.174)	(1.575)	(1.602)
Constant	–	–	-3.037***	-5.216*
			(1.071)	(2.901)
Hansen test (p-value)	0.412	0.356	0.581	0.438
Sargan test (p-value)	0.274	0.183	0.316	0.241

Difference-in-Hansen (p-value)	0.235	0.298	0.187	0.214
AR(1) (p-value)	0.024	0.018	0.011	0.027
AR(2) (p-value)	0.641	0.732	0.516	0.483
Number of instruments	26	26	28	28
Observations	864	864	900	900
Number of countries	36	36	36	36

Note: Standard errors in parentheses. p-values are reported for all diagnostic tests. ***, ** and * denote significance at the 1%, 5% and 10% levels. Two-step standard errors use the Windmeijer (2005) correction.

Among the controls, GDP per capita growth is negative in all columns and significant in three, but its coefficients are small (-0.011 to -0.031). Secondary enrolment is negative throughout but significant only in the two-step difference GMM. The Gini index is positive and significant in three columns, and institutional quality is negative and significant in three. The Hansen test p-values (0.356 to 0.581), the Sargan test p-values (0.183 to 0.316) and the Difference-in-Hansen p-values (0.187 to 0.298) do not reject instrument validity. AR(1) is significant, as expected, and AR(2) is not (p-values 0.483 to 0.732). The instrument count (26 to 28) stays below the 36 countries.

Table 7 repeats the exercise for moderate poverty. Lagged poverty again has coefficients close to one (0.884 to 1.037). The financial inclusion coefficient is negative and significant in all four columns, at the 1 percent level in the one-step estimators (-0.614 and -1.885) and at the 5 percent level in the two-step estimators (-1.042 and -3.476). The estimates are more precise than in the extreme poverty model. One reading is that households just below the US$4.20 line are better placed than the very poorest to put savings and credit to productive use. GDP per capita growth is negative and significant in all four columns here, compared with three in Table 6, which fits the idea that growth reaches the moderately poor more easily than those at the very bottom. The Gini coefficient is positive and significant in three columns but somewhat smaller than for extreme poverty (0.084 to 0.126 against 0.098 to 0.187), so inequality bites hardest at the bottom of the distribution. The diagnostic tests again support the instruments.

Table 7. Financial inclusion and moderate poverty (dependent variable: MPOV)

Variables	One-step difference GMM	Two-step difference GMM	One-step system GMM	Two-step system GMM
L.MPOV	0.884***	0.903***	0.968***	1.037***
	(0.025)	(0.038)	(0.019)	(0.088)
FII	-0.614***	-1.042**	-1.885***	-3.476**
	(0.128)	(0.447)	(0.683)	(1.513)
GDPPC	-0.012*	-0.015**	-0.038***	-0.032**
	(0.007)	(0.006)	(0.012)	(0.015)
SSE	-0.019	-0.017*	-0.021**	-0.044

	(0.015)	(0.009)	(0.010)	(0.035)
GINI	0.084**	0.097**	0.041	0.126*
	(0.039)	(0.047)	(0.028)	(0.074)
WGI	-1.284	-1.938*	-2.485**	-2.973*
	(1.214)	(1.103)	(1.182)	(1.681)
Constant	–	–	-2.814***	-5.628*
			(0.982)	(3.024)
Hansen test (p-value)	0.381	0.417	0.526	0.472
Sargan test (p-value)	0.213	0.184	0.267	0.238
Difference-in-Hansen (p-value)	0.281	0.344	0.226	0.193
AR(1) (p-value)	0.019	0.014	0.011	0.024
AR(2) (p-value)	0.592	0.683	0.541	0.436
Number of instruments	26	26	28	28
Observations	864	864	900	900
Number of countries	36	36	36	36

Note: Standard errors in parentheses. p-values are reported for all diagnostic tests. ***, ** and * denote significance at the 1%, 5% and 10% levels. Two-step standard errors use the Windmeijer (2005) correction.

Moderating effects

Table 8 summarises the interaction models estimated with two-step system GMM. Results from all four estimators, which tell the same story, are reported in Appendix Tables A1–A5. In all five models, lagged poverty stays close to one (1.038 to 1.046) and financial inclusion keeps a negative and significant direct effect (-3.104 to -3.856). The Hansen p-values range from 0.431 to 0.478 and the AR(2) p-values from 0.446 to 0.472, and each model uses 32 instruments for 36 countries.

Table 8. Moderating effects on the financial inclusion–extreme poverty link (two-step system GMM)

Variables	M = GINI	M = WS	M = GII	M = WGI	M = SSE
L.EPOV	1.046***	1.041***	1.038***	1.044***	1.043***
	(0.082)	(0.081)	(0.079)	(0.081)	(0.080)
FII	-3.856**	-3.538**	-3.281**	-3.104**	-3.364**
	(1.704)	(1.581)	(1.468)	(1.396)	(1.481)
Moderator (M)	0.148**	0.332**	0.486**	-0.587**	-0.086**
	(0.071)	(0.137)	(0.201)	(0.249)	(0.037)
FII × M	0.041**	0.049**	0.074**	-0.069**	-0.028**

	(0.018)	(0.020)	(0.031)	(0.029)	(0.012)
GDPPC	-0.031**	-0.029**	-0.033**	-0.031**	-0.031**
	(0.015)	(0.014)	(0.015)	(0.015)	(0.015)
GCE	-0.056*	-0.051*	-0.058*	-0.061**	-0.059**
	(0.030)	(0.029)	(0.031)	(0.029)	(0.029)
TO	0.028*	0.026*	0.031*	-0.030**	-0.031**
	(0.016)	(0.015)	(0.016)	(0.015)	(0.015)
INF	0.021**	0.023**	0.026**	0.025**	0.024**
	(0.010)	(0.011)	(0.011)	(0.011)	(0.011)
Constant	-6.274*	-6.018*	-6.582*	-6.873**	-6.384**
	(3.286)	(3.114)	(3.251)	(3.118)	(3.067)
Hansen test (p-value)	0.431	0.463	0.478	0.469	0.461
Sargan test (p-value)	0.259	0.247	0.251	0.258	0.249
Difference-in-Hansen (p-value)	0.194	0.176	0.182	0.188	0.196
AR(1) (p-value)	0.029	0.026	0.024	0.026	0.025
AR(2) (p-value)	0.447	0.451	0.472	0.451	0.446
Number of instruments	32	32	32	32	32
Observations	900	900	900	900	900
Number of countries	36	36	36	36	36

Note: Each column is a separate model in which M is the moderator named in the column heading. Windmeijer-corrected standard errors in parentheses. p-values are reported for all diagnostic tests. ***, ** and * denote significance at the 1%, 5% and 10% levels. Results for all four estimators are in Appendix Tables A1–A5.

The first column adds the interaction with the Gini index. Income inequality raises extreme poverty directly (0.148), and the interaction term is positive and significant (0.041). Inequality therefore weakens the poverty-reducing effect of financial inclusion. Using equation (6), the marginal effect of the index is -2.556 at a Gini one standard deviation below the mean (31.7), -2.148 at the mean (41.7), and -1.739 at one standard deviation above it (51.6). Moving from a fairly equal to a fairly unequal country in this sample cuts the poverty payoff of a given rise in financial inclusion by about a third.

The second column replaces the Gini index with the wealth share of the top 10 percent, to check whether the result depends on how inequality is measured. Wealth concentration raises extreme poverty (0.332), and its interaction with financial inclusion is positive and significant (0.049). The result matches the Gini model. Whether inequality is measured by income or by the stock of wealth, it takes away part of what financial inclusion does for the poor.

The third column turns to gender inequality. The Gender Inequality Index has a larger direct effect on extreme poverty (0.486) than the Gini index or the wealth share, and its interaction with financial inclusion is positive and significant (0.074). Where women face barriers in reproductive health, empowerment and the labour market, a wider financial network reduces poverty less.

The last two columns show moderators that work in the other direction. Institutional quality lowers extreme poverty directly (-0.587), and its interaction with financial inclusion is negative and significant (-0.069). The direct and interaction effects point the same way, so good governance adds to the poverty-reducing power of financial inclusion. In this model trade openness also becomes negative and significant (-0.030), while it was positive in the three inequality models. Secondary enrolment behaves the same way: its direct effect is negative and significant (-0.086), and so is the interaction (-0.028). The marginal effect of financial inclusion on extreme poverty is -4.276 when enrolment is one standard deviation below the mean (32.6 percent), -5.020 at the mean (59.1 percent) and -5.763 one standard deviation above it (85.7 percent). Education was weak and mostly insignificant in the baseline models, but once its joint role with financial inclusion is modelled it becomes significant in all four estimators (Appendix Table A5). Figure 1 plots the two marginal effects across the observed range of each moderator. The poverty-reducing effect of financial inclusion becomes smaller as the Gini index rises and larger as enrolment rises.

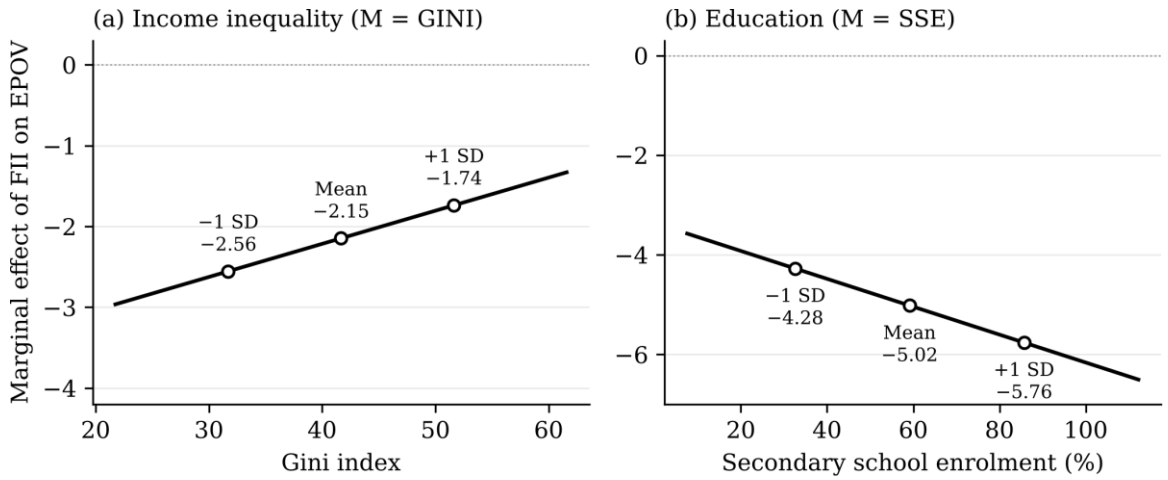


Figure 1. Marginal effect of financial inclusion on extreme poverty at different levels of income inequality and secondary school enrolment

Note: Lines show $\partial EPOV/\partial FII = \alpha_1 + \alpha_3 M$ from equation (6), using the two-step system GMM estimates in Table 8. Markers show the effect at the sample mean and one standard deviation either side. The Gini range shown is the mean ± 2 standard deviations; the enrolment range runs from the sample minimum to the mean plus 2 standard deviations.

Discussion

This section interprets each result in turn, starting with the main variable, then the control variables, and then the moderating effects.

Persistence of poverty

The lagged poverty coefficients lie between 0.884 and 1.052, so poverty in one year is almost fully carried into the next. Poor households have few assets, little schooling and poor health, and these change slowly. Poverty also limits what households can invest in the next generation, which keeps children poor as adults (Galor & Zeira, 1993). For policy, this means that short programmes are unlikely to move national poverty rates, and that the long-run effect of any variable in the model is much larger than its coefficient in a single year.

Financial inclusion

Financial inclusion lowers both extreme and moderate poverty, and three channels explain this. First, a safe place to save and access to small loans let poor households invest in income-generating activity, start microenterprises and expand small businesses, which raises their incomes above the poverty line (Kumar, 2023). Second, savings accounts, insurance and payment services help low-income households smooth consumption and cope with shocks such as illness, crop failure or job loss that would otherwise push them deeper into poverty (Saha & Qin, 2023). Third, inclusion brings women, rural residents and informal workers into the formal system, where they can receive remittances and government transfers safely and build a financial record (Demirgüç-Kunt et al., 2022; Omar & Inaba, 2020).

The result is consistent with Omar and Inaba (2020), who found that financial inclusion reduced poverty and income inequality in 116 developing countries, with Saha and Qin (2023), who found a significant effect on extreme poverty in developing but not high-income countries, with Kumar (2023) for a panel of developing countries, and with the household evidence of Churchill and Marisetty (2020) for India and Koomson et al. (2020) for Ghana. It is inconsistent with Neaime and Gaysset (2018), who found no significant effect of financial inclusion on poverty in MENA countries, and with Seven and Coskun (2016), who concluded that financial development in emerging economies did not reach the poor. Those studies relied on financial depth or bank-based indicators, while our index includes outreach measures and mobile money agents, which are more likely to reach poor households.

Our estimates for moderate poverty are more precise than those for extreme poverty, whereas Saha and Qin (2023) found a weaker effect on moderate poverty. The difference may come from the poverty lines, since their study predates the 2021 PPP lines, and from sample composition, since Sub-Saharan African economies make up 20 of our 36 countries. In such samples, households near the moderate line may be the main users of new branches and agents, while the extremely poor face barriers that access alone does not remove.

GDP per capita growth

Growth lowers poverty through three channels. First, rising average income lifts the incomes of the poor as well; Dollar, Kleineberg, and Kraay (2016) show that the incomes of the bottom 40 percent tend to grow

at about the same rate as average incomes. Second, growth that comes with structural change moves workers from low-productivity farming into manufacturing and services, which raises wages and employment for poor households (Erumban & de Vries, 2024). Third, higher incomes enlarge the government's revenue base, which pays for schools, health services and social protection (Bergstrom, 2022).

The result agrees with Dollar et al. (2016), with Ravallion and Chen (1997), who found that higher average incomes systematically reduce absolute poverty, and with Balasubramanian, Burchi, and Malerba (2023), who found that growth reduces multidimensional poverty in low- and middle-income countries. The small size and uneven significance of our coefficients are closer to Wu, Atamanov, Bundervoet, and Paci (2024), who found that growth has been less poverty-reducing in Africa than elsewhere even after controlling for initial poverty and inequality, and to United Nations Development Programme (2023), which documents cases where poverty rose after 2020 despite renewed growth. Growth helps the poor, but in this sample it does less on its own than financial inclusion.

Secondary school enrolment

Education is negatively related to poverty in all specifications, for three reasons. First, schooling raises productivity and earnings; each additional year of education yields substantial private returns in the labour market (Psacharopoulos & Patrinos, 2018), and Gethin (2023) finds that the expansion of schooling has been one of the main drivers of global poverty reduction since 1980. Second, secondary qualifications open the door to formal, salaried employment, which pays more and is more stable than informal or agricultural work (Appleton, 2001; Hofmarcher, 2021). Third, education reduces poverty across generations: educated parents, especially mothers, have fewer and healthier children and invest more in their schooling (Awan, Malik, Sarwar, & Waqas, 2011).

The negative sign is consistent with Hofmarcher (2021) for Europe, Gethin (2023) at the global level and Le Goff and Singh (2014), who found that higher school completion reduces poverty in Africa. The weak significance in the baseline models, however, departs from those strong effects. It fits the view that enrolment does not guarantee learning: the World Bank (2018) describes a learning crisis in which years of schooling in many developing countries do not translate into skills. Enrolment also affects poverty only after long lags, as students finish school and enter the labour market. Section 4.4 shows that education becomes strongly significant once its joint role with financial inclusion is modelled.

Income inequality

The Gini index raises both poverty measures, for three reasons. First, inequality reduces the growth elasticity of poverty, so a given rate of growth lifts fewer people out of poverty when the gains go mainly to the rich (Adams, 2004; Bergstrom, 2022). Second, in unequal societies poor households lack the collateral to borrow for schooling, health or a business, which keeps them in poverty traps (Galor & Zeira, 1993; Marrero & Servén, 2022). Third, for any given average income, a more unequal distribution places more people below the poverty line, and Lakner et al. (2022) show that even small reductions in the Gini can lift many people out of poverty without extra growth.

The result is consistent with Fosu (2017), who found that inequality slows the conversion of growth into poverty reduction in developing countries, with Adams (2004) and Bergstrom (2022), and with Omar and Inaba (2020) and Nyarko et al. (2023), who report that inequality raises poverty alongside the effect of financial inclusion. It is inconsistent with Dollar et al. (2016), who find little independent role for changes in distribution once mean income growth is accounted for, and with Balasubramanian et al. (2023), who found that changes in inequality did not contribute to changes in multidimensional poverty. The link between inequality and poverty may depend on whether poverty is measured by income or by multiple deprivations.

Institutional quality

The governance index reduces poverty through three channels. First, effective government and control of corruption improve the targeting and delivery of social programmes, so resources meant for the poor are not lost to leakage and rent-seeking (Tebaldi & Mohan, 2010). Second, the rule of law, secure property rights and sound regulation encourage private investment and formal job creation (Acemoglu & Robinson, 2012; World Bank, 2017). Third, political stability and accountability keep pro-poor policies in place over time and make governments more responsive to poor citizens (Perera & Lee, 2013).

The result agrees with Tebaldi and Mohan (2010), who found that institutions explain cross-country differences in poverty beyond their effect on income, with Perera and Lee (2013) for developing Asia, and with Dossou, Ndomandji Kambaye, Bekun, and Eoulam (2023), who link governance quality to lower poverty in Latin America. The insignificant coefficient in the one-step difference GMM is closer to Kou and Yasin (2024), who suggest that governance in developing countries may not be strong enough to have a consistent effect, to Chong and Calderón (2000), who found that the institutions–poverty link may be weak at early stages of institutional development, and to Ochi et al. (2023), who found that governance reduces poverty only above a threshold.

Government consumption expenditure

Government consumption reduces poverty in most specifications, through three channels. First, public spending on schools and clinics provides services that poor households could not buy themselves, which raises their human capital and future earnings (Gupta, Verhoeven, & Tiongson, 2002). Second, spending on infrastructure and public services supports the incomes of the poor; Fan, Hazell, and Thorat (2000) found that government spending on roads, research and education reduced rural poverty in India, and Sasmal and Sasmal (2016) found faster poverty reduction in Indian states that spent more on infrastructure. Third, transfers, subsidies and public employment shift purchasing power towards low-income groups and protect them from shocks.

The result is consistent with Gupta et al. (2002), Fan et al. (2000) and Sasmal and Sasmal (2016). The insignificant coefficients in the one-step difference GMM are closer to Anderson, d'Orey, Duvendack, and Esposito (2018), whose meta-analysis found that the average effect of government spending on income poverty is small once study quality is taken into account, and to Chong and Calderón (2000), who argue that weak institutions limit how much public spending reaches the poor. How public money is spent and targeted seems to matter more than how much is spent.

Trade openness

Trade openness raises poverty in the inequality and gender models and lowers it in the institutions and education models. Trade affects the poor through opposing channels, and which channel dominates depends on country conditions. On the positive side, trade lets developing countries specialise in labour-intensive exports, which raises demand for unskilled labour, and it lowers the prices of goods the poor consume (Winters, McCulloch, & McKay, 2004); Nessa and Imai (2023) found that trade openness reduced working poverty in developing countries. On the negative side, import competition can destroy jobs in protected industries, and poor workers often cannot move to new sectors; Topalova (2010) found that Indian districts more exposed to trade liberalisation saw slower poverty reduction. Commodity exporters also face unstable terms of trade, and the poor, who have no savings or insurance, bear most of the resulting income volatility.

The gains from trade reach the poor only when complementary conditions are in place. This explains our pattern, since trade becomes poverty-reducing precisely in the models that account for institutions (Table A4) and education (Table A5). The result is consistent with Le Goff and Singh (2014), who found that trade reduces poverty in Africa only where finance is deeper, education better and institutions stronger, with Nessa and Imai (2023) for the beneficial channel and with Topalova (2010) for the adjustment channel. It is inconsistent with Dollar and Kraay (2004), who found that trade raises the incomes of the poor without strong conditioning factors.

Inflation

Inflation raises extreme poverty in the interaction models, through three channels. First, inflation acts as a regressive tax: the wages of the poor are rarely indexed, they hold their small savings in cash, and they lack assets that keep their value (Easterly & Fischer, 2001; World Bank, 2022). Second, food takes up the largest share of poor households' budgets, and most poor households buy more food than they sell, so food price increases hit them hardest; Salvucci and Tarp (2024) show how price shocks reversed poverty gains in Mozambique. Third, high and unstable inflation discourages investment and job creation and erodes the real value of fixed transfers and pensions (Cardoso, 1992).

The result is consistent with Easterly and Fischer (2001), who used surveys from 38 countries to show that the poor are more likely than the rich to name inflation as a top concern and that inflation lowers the income share of the poorest, and with Cardoso (1992). The insignificant coefficients in the one-step difference GMM are closer to Talukdar (2012), who found that the link between inflation and poverty weakens in low-income countries in some specifications, and to Junaidin and Muniarty (2020), who found no significant local effect in Indonesia. The strength of the link probably depends on how much of household spending goes on food and whether wages and transfers adjust to prices.

Moderating role of income inequality and wealth concentration

The positive interactions of financial inclusion with the Gini index and with the wealth share show that inequality weakens the poverty-reducing effect of financial inclusion. Three reasons explain this. First, access to finance depends on collateral, connections and existing assets, so in unequal societies richer households and firms absorb most of the new credit while the poor stay at the margin (Claessens & Perotti,

2007; Rajan & Zingales, 2003). Second, poor households in unequal societies lack the collateral, stable income and documents that banks require, so wider infrastructure does not turn into borrowing for them (Galor & Zeira, 1993). Third, the income that finance generates, such as interest, dividends and capital gains, flows to those who own assets, so in a concentrated economy most finance-led gains go to the top (Greenwood & Jovanovic, 1990). Since inclusion reduces poverty partly by raising incomes, an unequal distribution means those gains reach the poor less, in the same way inequality lowers the growth elasticity of poverty (Adams, 2004).

These results are consistent with Saha and Qin (2023), who show that the effect of financial inclusion on poverty depends on distributional conditions, and with Claessens and Perotti (2007). They are inconsistent with Demir et al. (2022), who argue that fintech-led inclusion itself reduces inequality and so benefits the poor even in unequal settings, and with Dollar et al. (2016), who find that the incomes of the poorest grow in proportion to average incomes.

Moderating role of gender inequality

The positive interaction with the Gender Inequality Index shows that gender inequality also weakens the effect of financial inclusion. First, women make up a large share of the unbanked, so where they lack education, documents and property rights, new financial services miss half the population (Demirgüç-Kunt et al., 2022). Second, finance in women's hands tends to raise spending on food, health and children's schooling, so excluding women loses a benefit for the whole household (Swamy, 2014). Third, even women who obtain credit may not be able to turn it into income where norms and laws restrict their work and business ownership (Ghosh & Vinod, 2017). The result agrees with Saha and Qin (2023), who found that greater gender equality strengthens the effect of financial inclusion on poverty, and with Swamy (2014). It does not fit the view of Demir et al. (2022) that fintech-driven inclusion reduces inequality without prior gains in gender equity.

Moderating role of institutional quality

The negative interaction with the governance index shows that good institutions strengthen the poverty-reducing effect of financial inclusion. Where the rule of law protects creditors and property rights are secure, banks are willing to lend to small borrowers, so access becomes actual credit. Control of corruption keeps inclusion programmes from being captured by officials and connected elites (Tebaldi & Mohan, 2010). And an effective and predictable government earns enough trust for poor households to move their savings into formal accounts. The result agrees with Cepparulo et al. (2017), who found that financial development reduces poverty more where institutions are stronger, and with Dossou et al. (2023). It differs from Kou and Yasin (2024), who doubt that governance in developing countries is strong enough to have a consistent effect, and from Ochi et al. (2023), whose threshold result implies that governance helps only above a certain level.

Moderating role of secondary school enrolment

The negative interaction with enrolment shows that education strengthens the poverty-reducing effect of financial inclusion. First, educated people can read loan contracts, compare interest rates, keep records and plan repayments, so access leads to sound borrowing and saving rather than over-indebtedness

(Lusardi & Mitchell, 2014). Second, educated borrowers are more likely to invest credit in productive activities and manage them well, so the same loan produces more income (Koomson et al., 2023). Third, educated and financially included parents save for their children's schooling, which carries the gains into the next generation. The result agrees with Koomson et al. (2023), who found that financial literacy helps Ghanaian households accumulate assets, and it matches our finding that education becomes significant in all estimators once its interaction with financial inclusion is modelled. It differs from the World Bank (2018) learning-crisis view that enrolment without learning yields little, although that critique concerns education on its own, while our result concerns education combined with access to finance.

Conclusion and policy implications

This study examined whether financial inclusion reduces poverty in developing countries and whether its effect depends on inequality, institutions and education. Using a panel of 36 developing countries for 2000–2025, a principal component index of financial inclusion, and difference and system GMM, we find that financial inclusion lowers both extreme and moderate poverty in all specifications. Poverty is very persistent, with lagged coefficients close to one, so the long-run effect of inclusion is much larger than the short-run effect. The effect is not the same everywhere. Income inequality, wealth concentration and gender inequality weaken it, while institutional quality and secondary schooling strengthen it. At the sample mean, a 10-point rise in the Gini index reduces the marginal effect of financial inclusion on extreme poverty by about 0.41.

Several policy implications follow. First, expanding access should stay on the development agenda, but governments should judge financial inclusion programmes by whether they reach the poor and not only by the number of accounts opened. Because poverty is so persistent, these programmes need to be sustained over many years. Second, inclusion policies work better when paired with redistribution. Progressive taxation, land and property registration and cash transfers paid into formal accounts can widen the base of people able to use credit. Moveable collateral registries and credit bureaus that record the repayment history of small borrowers can reduce the advantage of those who already own assets. Third, gender barriers need direct attention. Simplified identity and know-your-customer rules for women, legal reforms on property and inheritance, and products designed for women-owned microenterprises would help women use the accounts and loans that are already available. Fourth, governance reform and financial inclusion should move together. Stronger contract enforcement, faster courts for small claims and anti-corruption controls on public credit programmes raise the return on every new branch and agent. Fifth, financial literacy should be built into secondary school curricula, and inclusion programmes should be targeted at regions where enrolment is rising, since educated borrowers make better use of credit. Inflation control also protects the poor, whose savings are rarely protected against rising prices.

The study has limitations. The sample was chosen on data availability, so it may leave out some of the most financially excluded countries. Pooling all countries keeps the sample large but may hide differences between income groups. The financial inclusion and governance indices rely on statistical weights, and other construction methods could produce different rankings. The poverty measures are monetary and do not capture multidimensional deprivation. GMM relies on internal instruments, and although the diagnostic tests support them, they cannot fully replace external instruments or natural experiments.

Future research could estimate the models separately by income group, use threshold or quantile methods to test whether the effect of inclusion changes at different levels of inequality or governance, and link the country-level results to household survey data that can trace how individual families turn access into higher income.

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Appendix

Table A1. Moderating role of income inequality (Gini index): all estimators (dependent variable: EPOV)

Variables	One-step difference GMM	Two-step difference GMM	One-step system GMM	Two-step system GMM
L.EPOV	0.896***	0.911***	0.982***	1.046***
	(0.024)	(0.036)	(0.017)	(0.082)
FII	-0.842**	-1.364**	-2.271***	-3.856**
	(0.367)	(0.625)	(0.801)	(1.704)
GINI	0.118**	0.134**	0.092*	0.148**
	(0.052)	(0.061)	(0.051)	(0.071)
FII × GINI	0.021**	0.027**	0.034***	0.041**
	(0.010)	(0.013)	(0.011)	(0.018)
GDPPC	-0.013*	-0.016**	-0.036***	-0.031**
	(0.007)	(0.007)	(0.013)	(0.015)
GCE	-0.026	-0.032*	-0.041**	-0.056*
	(0.017)	(0.018)	(0.019)	(0.030)
TO	0.008	0.014	0.021*	0.028*
	(0.011)	(0.010)	(0.012)	(0.016)
INF	0.009	0.013*	0.017*	0.021**
	(0.008)	(0.007)	(0.009)	(0.010)
Constant	–	–	-3.182***	-6.274*
			(1.104)	(3.286)
Hansen test (p-value)	0.418	0.362	0.547	0.431
Sargan test (p-value)	0.241	0.186	0.328	0.259
Difference-in-Hansen (p-value)	0.274	0.319	0.228	0.194
AR(1) (p-value)	0.022	0.018	0.014	0.029
AR(2) (p-value)	0.614	0.708	0.563	0.447
Number of instruments	30	30	32	32
Observations	864	864	900	900
Number of countries	36	36	36	36

Note: Standard errors in parentheses. p-values are reported for all diagnostic tests. ***, ** and * denote significance at the 1%, 5% and 10% levels. Two-step standard errors use the Windmeijer (2005) correction.

Table A2. Moderating role of wealth concentration (top 10% wealth share): all estimators (dependent variable: EPOV)

Variables	One-step difference GMM	Two-step difference GMM	One-step system GMM	Two-step system GMM
L.EPOV	0.901***	0.915***	0.989***	1.041***
	(0.023)	(0.035)	(0.016)	(0.081)
FII	-0.756**	-1.281**	-2.164***	-3.538**
	(0.342)	(0.582)	(0.744)	(1.581)
WS	0.183**	0.221**	0.284***	0.332**
	(0.078)	(0.094)	(0.089)	(0.137)
FII × WS	0.028**	0.034**	0.041***	0.049**
	(0.012)	(0.015)	(0.013)	(0.020)
GDPPC	-0.012*	-0.015**	-0.034***	-0.029**
	(0.007)	(0.006)	(0.012)	(0.014)
GCE	-0.024	-0.031*	-0.043**	-0.051*
	(0.016)	(0.017)	(0.019)	(0.029)
TO	0.009	0.013	0.022*	0.026*
	(0.010)	(0.009)	(0.012)	(0.015)
INF	0.011	0.014*	0.019*	0.023**
	(0.008)	(0.007)	(0.010)	(0.011)
Constant	–	–	-3.446***	-6.018*
			(1.128)	(3.114)
Hansen test (p-value)	0.436	0.391	0.548	0.463
Sargan test (p-value)	0.228	0.191	0.314	0.247
Difference-in-Hansen (p-value)	0.286	0.341	0.214	0.176
AR(1) (p-value)	0.021	0.016	0.013	0.026
AR(2) (p-value)	0.628	0.704	0.577	0.451
Number of instruments	30	30	32	32
Observations	864	864	900	900
Number of countries	36	36	36	36

Note: Standard errors in parentheses. p-values are reported for all diagnostic tests. ***, ** and * denote significance at the 1%, 5% and 10% levels. Two-step standard errors use the Windmeijer (2005) correction.

Table A3. Moderating role of gender inequality (Gender Inequality Index): all estimators (dependent variable: EPOV)

Variables	One-step difference GMM	Two-step difference GMM	One-step system GMM	Two-step system GMM
L.EPOV	0.899***	0.912***	0.985***	1.038***
	(0.022)	(0.034)	(0.016)	(0.079)
FII	-0.682**	-1.146**	-2.038***	-3.281**
	(0.315)	(0.546)	(0.702)	(1.468)
GII	0.294**	0.337**	0.412***	0.486**
	(0.123)	(0.147)	(0.139)	(0.201)
FII × GII	0.041**	0.052**	0.061***	0.074**
	(0.018)	(0.022)	(0.020)	(0.031)
GDPPC	-0.014**	-0.017**	-0.038***	-0.033**
	(0.007)	(0.006)	(0.012)	(0.015)
GCE	-0.027*	-0.034*	-0.046**	-0.058*
	(0.016)	(0.018)	(0.020)	(0.031)
TO	0.011	0.016*	0.024**	0.031*
	(0.010)	(0.009)	(0.011)	(0.016)
INF	0.012	0.016*	0.021**	0.026**
	(0.008)	(0.008)	(0.010)	(0.011)
Constant	–	–	-3.287***	-6.582*
			(1.087)	(3.251)
Hansen test (p-value)	0.451	0.389	0.562	0.478
Sargan test (p-value)	0.236	0.197	0.329	0.251
Difference-in-Hansen (p-value)	0.301	0.284	0.216	0.182
AR(1) (p-value)	0.019	0.015	0.012	0.024
AR(2) (p-value)	0.646	0.719	0.558	0.472
Number of instruments	30	30	32	32
Observations	864	864	900	900
Number of countries	36	36	36	36

Note: Standard errors in parentheses. p-values are reported for all diagnostic tests. ***, ** and * denote significance at the 1%, 5% and 10% levels. Two-step standard errors use the Windmeijer (2005) correction.

Table A4. Moderating role of institutional quality (governance index): all estimators (dependent variable: EPOV)

Variables	One-step difference GMM	Two-step difference GMM	One-step system GMM	Two-step system GMM
L.EPOV	0.904***	0.918***	0.992***	1.044***
	(0.023)	(0.035)	(0.016)	(0.081)
FII	-0.618**	-1.082**	-1.956***	-3.104**
	(0.291)	(0.498)	(0.671)	(1.396)
WGI	-0.241**	-0.314**	-0.452***	-0.587**
	(0.112)	(0.138)	(0.151)	(0.249)
FII × WGI	-0.038**	-0.047**	-0.058***	-0.069**
	(0.017)	(0.021)	(0.019)	(0.029)
GDPPC	-0.013*	-0.017**	-0.037***	-0.031**
	(0.007)	(0.006)	(0.012)	(0.015)
GCE	-0.029*	-0.036**	-0.049**	-0.061**
	(0.016)	(0.017)	(0.020)	(0.029)
TO	-0.010	-0.015*	-0.023**	-0.030**
	(0.010)	(0.009)	(0.011)	(0.015)
INF	0.011	0.015*	0.020**	0.025**
	(0.008)	(0.008)	(0.009)	(0.011)
Constant	–	–	-3.514***	-6.873**
			(1.096)	(3.118)
Hansen test (p-value)	0.437	0.384	0.548	0.469
Sargan test (p-value)	0.221	0.196	0.314	0.258
Difference-in-Hansen (p-value)	0.291	0.327	0.214	0.188
AR(1) (p-value)	0.021	0.017	0.013	0.026
AR(2) (p-value)	0.633	0.711	0.564	0.451
Number of instruments	30	30	32	32
Observations	864	864	900	900
Number of countries	36	36	36	36

Note: Standard errors in parentheses. p-values are reported for all diagnostic tests. ***, ** and * denote significance at the 1%, 5% and 10% levels. Two-step standard errors use the Windmeijer (2005) correction.

Table A5. Moderating role of secondary school enrolment: all estimators (dependent variable: EPOV)

Variables	One-step difference GMM	Two-step difference GMM	One-step system GMM	Two-step system GMM
L.EPOV	0.902***	0.916***	0.990***	1.043***
	(0.023)	(0.034)	(0.016)	(0.080)
FII	-0.695**	-1.176**	-2.083***	-3.364**
	(0.308)	(0.531)	(0.712)	(1.481)
SSE	-0.046**	-0.058**	-0.071***	-0.086**
	(0.019)	(0.025)	(0.024)	(0.037)
FII × SSE	-0.012*	-0.017**	-0.023***	-0.028**
	(0.007)	(0.008)	(0.008)	(0.012)
GDPPC	-0.014**	-0.017**	-0.036***	-0.031**
	(0.007)	(0.006)	(0.012)	(0.015)
GCE	-0.028*	-0.035**	-0.047**	-0.059**
	(0.016)	(0.017)	(0.020)	(0.029)
TO	-0.010	-0.015*	-0.024**	-0.031**
	(0.010)	(0.009)	(0.011)	(0.015)
INF	0.011	0.015*	0.020**	0.024**
	(0.008)	(0.008)	(0.009)	(0.011)
Constant	–	–	-3.291***	-6.384**
			(1.081)	(3.067)
Hansen test (p-value)	0.429	0.378	0.553	0.461
Sargan test (p-value)	0.232	0.188	0.321	0.249
Difference-in-Hansen (p-value)	0.287	0.314	0.221	0.196
AR(1) (p-value)	0.020	0.016	0.012	0.025
AR(2) (p-value)	0.627	0.703	0.551	0.446
Number of instruments	30	30	32	32
Observations	864	864	900	900
Number of countries	36	36	36	36

Note: Standard errors in parentheses. p-values are reported for all diagnostic tests. ***, ** and * denote significance at the 1%, 5% and 10% levels. Two-step standard errors use the Windmeijer (2005) correction.

Table A6. Countries in the sample

No.	Country	No.	Country	No.	Country
1	Albania	13	Gambia, The	25	Myanmar
2	Bangladesh	14	Guinea	26	Nepal
3	Botswana	15	Haiti	27	Pakistan
4	Cameroon	16	Honduras	28	Rwanda
5	Central African Republic	17	Jordan	29	Samoa
6	Chad	18	Kenya	30	South Africa
7	Colombia	19	Lesotho	31	Tanzania
8	Congo, Rep.	20	Madagascar	32	Thailand
9	Egypt, Arab Rep.	21	Malawi	33	Togo
10	El Salvador	22	Maldives	34	Tonga
11	Eswatini	23	Mauritania	35	Uganda
12	Fiji	24	Mauritius	36	Zambia