

FINANCIAL INCLUSION AND INCOME INEQUALITY: THE CONDITIONAL ROLE OF CONTROL OF CORRUPTION

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ABSTRACT

This study examines whether the effect of financial inclusion on income inequality depends on institutional quality. Specifically, it tests whether control of corruption moderates the relationship between financial inclusion and income inequality. Using panel data for 15 emerging Asian economies from 2008 to 2022 and applying the System Generalized Method of Moments estimator, the results show that financial inclusion has no significant direct effect on inequality. Its distributional effect, however, depends strongly on control of corruption. Financial inclusion reduces inequality only in countries with sufficiently strong institutions, with the effect emerging once the control of corruption index exceeds approximately 0.23. The analysis also identifies an inverted U-shaped relationship, whereby inequality begins to decline only after the financial inclusion index surpasses approximately 0.72. The findings indicate that institutional reform and effective control of corruption are essential for financial inclusion to reduce income inequality.

Keywords: Financial inclusion, income inequality, Gini index, control of corruption, institutional quality

1. INTRODUCTION

Rising income inequality represents a major challenge to sustainable development, particularly in developing and emerging economies where large income disparities can weaken social cohesion and constrain inclusive growth (Khan et al., 2022a; UNDP, 2019; World Bank, 2022a). Financial inclusion has therefore become an important policy objective and has been promoted through international initiatives such as the World Bank's Universal Financial Access 2020 programme (World Bank, 2022b).

The theoretical argument is that greater access to formal financial services enables disadvantaged households to save, borrow, obtain insurance, invest in education and health, and develop small businesses. These opportunities can improve consumption stability, support income generation, and reduce inequality (Demirgüç Kunt et al., 2018; Maruta et al., 2023; Ivashchenko & Ivashchenko, 2025).

Empirical evidence, however, remains inconclusive. Some studies find that financial inclusion significantly reduces income inequality (Beck et al., 2007; Onatunji, 2025), while others report insignificant effects or suggest that financial development may increase inequality under certain

conditions (Jauch & Watzka, 2016; Shaharuddin et al., 2023). These conflicting findings suggest that the distributional effect of financial inclusion may be conditional rather than universal. This study argues that institutional quality, particularly control of corruption, helps explain these differences. In highly corrupt environments, the benefits of financial expansion may be captured by politically connected individuals and firms instead of reaching disadvantaged groups. Financial inclusion may therefore reinforce existing inequalities when institutions are extractive or regulatory systems are weak (Acemoglu & Robinson, 2013; Khan et al., 2022b). The main research question is whether the effectiveness of financial inclusion in reducing income inequality depends on a country's ability to control corruption. The study pursues three objectives. It constructs a multidimensional financial inclusion index for a sample of emerging Asian economies, estimates the direct effect of financial inclusion on income inequality, and evaluates the moderating role of control of corruption.

The study makes three contributions. First, it explains conflicting evidence in the existing literature by modelling control of corruption as a moderating mechanism rather than only as an independent determinant of inequality. Second, it integrates the finance and inequality literature with New Institutional Economics to identify the institutional conditions under which financial inclusion becomes distributivity effective. Third, it examines a nonlinear relationship and identifies the levels of financial inclusion and corruption control at which inequality begins to decline. The analysis therefore shifts attention from whether financial inclusion reduces inequality to the conditions under which it does so.

The remainder of the paper is organized as follows. Section 2 presents the theoretical framework and develops the hypotheses. Section 3 describes the data, variables, and econometric methodology. Section 4 presents the empirical findings. Section 5 discusses the results, while Section 6 concludes and provides policy implications.

2. THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

This section integrates two theoretical perspectives. The first concerns the relationship between financial development and income inequality. The second draws on New Institutional Economics to explain why the effect of financial inclusion may depend on institutional quality, particularly control of corruption.

2. 1. THEORETICAL BASIS

The relationship between finance and inequality is central to development economics. According to the inequality reducing hypothesis, a more inclusive financial system can reduce income disparities by easing financial constraints faced by poor households and small enterprises.

Access to credit enables low-income households to invest in education, health, and productive activities, supporting human capital accumulation and reducing the intergenerational transmission of poverty (Beck et al., 2007; Galor & Zeira, 1993; Sophia et al., 2023). Savings and insurance services also allow vulnerable households to stabilise consumption and manage shocks such as illness, unemployment, or crop failure (Demirgüç Kunt et al., 2018; Maruta et al., 2023). Financial inclusion may further promote entrepreneurship, employment creation, and income diversification among disadvantaged groups (Ayayi & Dout, 2024; Maruta et al., 2023; Marjohan et al., 2026).

An alternative perspective suggests that financial development does not reduce inequality at all stages. Greenwood & Jovanovic (1990) propose an inverted U-shaped relationship in which inequality initially rises because wealthier groups are better positioned to access and

benefit from new financial services. As the financial system expands, and access becomes more widespread, poorer households begin to benefit and inequality subsequently declines. This theoretical ambiguity helps explain why empirical studies produce different results across countries and periods.

New Institutional Economics provides a framework for understanding this variation. [North \(1990\)](#) defines institutions as the rules that shape economic incentives, transactions, and distributional outcomes. [Acemoglu and Robinson \(2013\)](#) distinguish between inclusive and extractive institutions. Inclusive institutions protect property rights, enforce laws impartially, and support broad participation in economic activity. Extractive institutions concentrate opportunities and resources among political and economic elites. Corruption represents an important feature of extractive institutional systems ([Gupta et al., 2002](#); [Uslaner, 2008](#)). It can directly increase inequality and weaken the effectiveness of financial inclusion policies ([Iskandar, 2018](#); [Jong Sung and Khagram, 2005](#)). Institutional quality should therefore be understood not only as an independent determinant of income distribution but also as a condition shaping the distributional consequences of financial expansion. Corruption can undermine the inequality reducing effect of financial inclusion through several channels. First, expanded credit may be directed toward politically connected individuals and firms rather than poor households and small enterprises. This form of financial capture reinforces elite advantages and restricts access for disadvantaged groups ([Khan et al., 2022b](#)).

Second, corruption weakens the business environment. Even when entrepreneurs obtain financing, they may face bribery, unequal regulatory treatment, unfair competition, and insecure property rights. These conditions reduce the capacity of financial access to support productive investment and upward mobility.

Third, weak regulation may allow financial institutions to offer complex or exploitative products to customers with limited financial knowledge. In such environments, wider financial access may expose vulnerable groups to excessive fees, unsuitable credit, and unsustainable debt rather than improving their economic position.

The integrated framework therefore suggests that financial inclusion does not automatically reduce income inequality. Its effectiveness depends on whether institutions ensure fair access, prevent elite capture, protect consumers, and support productive use of financial services. Control of corruption is thus expected to strengthen the inequality reducing effect of financial inclusion.

2. 2. HYPOTHESIS DEVELOPMENT

2. 2. 1. FINANCIAL INCLUSION AND INCOME INEQUALITY

Theoretical arguments generally suggest that financial inclusion can reduce income inequality by expanding access to credit, savings, insurance, and payment services among disadvantaged households and small enterprises. Several empirical studies support this view. [Beck et al. \(2007\)](#) show that financial sector development benefits poorer groups and contributes to lower inequality. [Park and Mercado \(2018\)](#) similarly find that financial inclusion reduces poverty and income inequality in developing Asian economies. Comparable results are reported by [Khan and Khan \(2024\)](#) and [Onatunji \(2025\)](#).

Other studies, however, provide mixed or contrary evidence. [Jauch and Watzka \(2016\)](#), using data for 138 countries, find no significant relationship between financial development and inequality. [Li and Hu \(2024\)](#) suggest that financial expansion may increase inequality in some institutional and economic contexts. Wealthier households may benefit disproportionately because they possess greater collateral, financial knowledge, and access to information. Moreover, poorly regulated credit expansion may expose low-income households to excessive debt

and greater financial vulnerability (Shaharuddin et al., 2023).

In developing and emerging Asian economies, large rural populations and extensive informal sectors continue to restrict access to formal financial services (Doan et al., 2025). Expanding financial inclusion may therefore provide households and small enterprises with resources for investment, income generation, and protection against economic shocks and natural disasters (Shamim & Ahmad, 2025). On balance, the theoretical mechanisms and regional evidence suggest that greater financial inclusion should reduce income inequality.

H₁: Financial inclusion has a negative effect on income inequality.

2. 2. 2. CONTROL OF CORRUPTION AND INCOME INEQUALITY

New Institutional Economics identifies institutional quality as a fundamental determinant of economic and distributional outcomes. Corruption can increase inequality by diverting public resources from education, health, and social protection, which are particularly important to disadvantaged groups. It can also create unequal access to public contracts, licences, credit, and other economic opportunities, allowing politically connected individuals and firms to accumulate disproportionate benefits.

Gupta et al. (2002) provides early empirical evidence that corruption increases inequality and weakens poverty reduction. Subsequent studies confirm that stronger control of corruption is generally associated with more equal income distribution (Atadouanla Segning et al., 2024; Jong Sung & Khagram, 2005).

This relationship is particularly relevant in developing and emerging Asian economies, where rapid growth and extensive public investment may create opportunities for rent seeking when institutional safeguards are weak. Effective control of corruption can improve the allocation of public resources and reduce elite capture, thereby supporting a more equitable distribution of economic opportunities and income.

H₂: Better control of corruption has a negative effect on income inequality.

2. 2. 3. THE MODERATING ROLE OF CONTROL OF CORRUPTION

The central argument of this study is that the distributional effect of financial inclusion depends on institutional quality. In countries with effective corruption control, financial resources are more likely to be allocated according to economic viability rather than political connections or other nonmarket considerations (Acemoglu & Robinson, 2013; Apergis et al., 2010; Meyer et al., 2024). Transparent legal systems, secure property rights, and impartial regulation enable disadvantaged households and small enterprises to use financial services for productive investment and human capital development (Liang & Li, 2025; North, 1990).

In contrast, weak corruption control can prevent the benefits of financial inclusion from reaching intended groups (Lyu & Singh, 2023). Expanded financial resources may be captured by politically connected elites, leading to inefficient credit allocation and reinforcing existing disparities (Khan et al., 2022b). Weak supervision may also permit exploitative lending practices and expose vulnerable households to unsustainable debt (Bontempo, 2022; Khan & Naeem, 2020).

Institutional quality therefore acts as a conditioning mechanism that determines whether financial inclusion promotes broader participation or strengthens existing economic advantages. The inequality reducing effect of financial inclusion is expected to be stronger where corruption is more effectively controlled.

H₃: The negative effect of financial inclusion on income inequality is stronger in countries with better control of corruption.

3. RESEARCH METHODOLOGY

3.1. SAMPLE AND DATA SOURCES

The study uses an unbalanced panel of 15 developing and emerging Asian economies from 2008 to 2022. The starting year captures the period following the global financial crisis, during which financial inclusion initiatives and institutional reforms expanded considerably. The final year reflects the latest period for which sufficiently complete and comparable data were available.

An initial sample of 28 Asian developing and emerging economies was identified using classifications provided by the International Monetary Fund and the World Bank. Countries were excluded when data for the Gini index, financial inclusion, or control of corruption were unavailable for a substantial part of the study period. Economies affected by severe political instability or armed conflict were also excluded because these conditions could significantly distort the data.

The final sample comprises 218 country and year observations for Bangladesh, Cambodia, China, India, Indonesia, Kazakhstan, Malaysia, Mongolia, Nepal, Pakistan, the Philippines, Sri Lanka, Thailand, Uzbekistan, and Vietnam. These economies represent diverse levels of development, financial structures, and institutional conditions.

Income inequality data are obtained from the Standardized World Income Inequality Database. Variables used to construct the financial inclusion index, and the macroeconomic controls are drawn from the IMF Financial Access Survey and the World Bank World Development Indicators. Data on control of corruption are obtained from the Worldwide Governance Indicators. To reduce the influence of extreme values and potential measurement errors, all continuous variables are winsorised at the first and ninety ninth percentiles.

3.2. VARIABLE DEFINITION AND MEASUREMENT

The dependent variable is income inequality, measured by the Gini index after taxes and transfers from version 9.6 of the Standardized World Income Inequality Database. Although inequality measurement is challenging because national surveys and methodologies differ, this database offers broad country coverage and improved comparability across countries and years.

The use of the Gini index after taxes and transfers captures the income distribution experienced by households after government redistribution. It is therefore more appropriate than the market Gini index for assessing relationships involving public policy and institutions. This measure is also widely applied in comparative studies of income inequality (Berg et al., 2018).

The principal explanatory variable is financial inclusion. Since financial inclusion encompasses several dimensions, it is measured using a composite index constructed through Principal Component Analysis following Park and Mercado (2018). The index combines five indicators representing access to and use of formal financial services:

1. ATMs per 100,000 adults
2. Commercial bank branches per 100,000 adults
3. Accounts at financial institutions per 1,000 adults
4. Borrowers from commercial banks per 1,000 adults
5. Depositors with commercial banks per 1,000 adults

Principal Component Analysis combines these indicators into a single measure based on their common variation, providing a broader representation of financial inclusion than any individual indicator.

The Kaiser Meyer Olkin statistic is 0.77, exceeding the commonly accepted minimum value of

0.60. Bartlett's test rejects the null hypothesis that the correlation matrix is an identity matrix at the 1 per cent level, with a test statistic of 728.43 and 10 degrees of freedom. These results confirm that the indicators are sufficiently correlated for Principal Component Analysis.

The first principal component has an eigenvalue of 3.31 and explains 66.2 per cent of total variation. The second component has an eigenvalue of 0.79 and explains 15.8 per cent. The first component is therefore the only component with an eigenvalue above one.

All indicators have positive and substantial loadings on the first component, ranging from 0.74 for commercial bank branches to 0.87 for financial institution accounts. The relatively lower loading for branch penetration may reflect the uneven development of physical banking infrastructure in emerging Asian economies, where account ownership and deposit use have expanded more rapidly than branch networks.

Since the first component captures a common dimension of access to and use of financial services, its score is adopted as the composite financial inclusion index. Table 1 presents the definitions, measurements, expected coefficient signs, and data sources for all variables included in the analysis.

Table 1. Description of Variables and Data Sources

Variable	Symbol	Description	Data Source
Income Inequality	GINI	The GINI coefficient measures the income distribution within a country, with values ranging from 0 (perfect equality) to 100 (perfect inequality).	Standardized World Income Inequality Database (SWIID)
Financial Inclusion	FI	A composite index of financial inclusion developed by the International Monetary Fund (IMF). This index is aggregated from sub-indices on the access to and use of financial services.	IMF's Financial Access Survey (FAS)
Control of Corruption	CoC	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests. Values range from approximately -2.5 (weak) to 2.5 (strong).	Worldwide Governance Indicators (WGI)
Economic Growth	GROWTH	Annual growth rate of real GDP (%).	World Development Indicators (WDI), World Bank
GDP per capita	LOG_GDPPC	Natural logarithm of GDP per capita (constant 2015 US\$).	World Development Indicators (WDI), World Bank
Trade Openness	TRADE	The sum of exports and imports as a percentage of GDP.	World Development Indicators (WDI), World Bank
Government Spending	GOVSPEND	General government final consumption expenditure (% of GDP).	World Development Indicators (WDI), World Bank
Inflation	INFLATION	Annual inflation rate based on the consumer price index (%).	World Development Indicators (WDI), World Bank
Human Capital	HUMANCAP	Human Capital Index, based on years of schooling and quality of education.	Penn World Table (PWT)
Financial Development	FINDEV	Domestic credit to private sector (% of GDP).	World Development Indicators (WDI), World Bank

Source: Author's compilation

Table 2. Results of Principal Component Analysis for the Financial Inclusion Index

Indicator (PC1 loadings)	Loading	Component	Eigenvalue	% of Variance	Cumulative %
ATMs per 100,000 adults	0.78	PC1	3.31	66.2	66.2
Bank branches per 100,000 adults	0.74	PC2	0.79	15.8	82.0
Accounts per 1,000 adults	0.87	PC3	0.46	9.2	91.2
Borrowers per 1,000 adults	0.82	PC4	0.27	5.4	96.6
Depositors per 1,000 adults	0.85	PC5	0.17	3.4	100.0

Notes: KMO = 0.77; Bartlett's test of sphericity: $\chi^2 = 728.43$, $df = 10$, $p < 0.001$. The FI index is constructed as the score of the first principal component (PC1).

Source: Author's calculation using Stata 17

3. 3. ECONOMETRIC MODEL

To test the research hypotheses, we use a dynamic panel data regression model. Including the lagged dependent variable ($GINI_{i,t-1}$) in the model is crucial, as it reflects the persistence and time-invariant nature of income inequality, a characteristic widely noted in previous studies.

The baseline model to test hypotheses H1 and H2 is specified as follows:

$$GINI_{it} = \alpha_0 + \alpha_1 GINI_{i,t-1} + \beta_1 FI_{it} + \beta_2 CoC_{it} + \gamma_1 GROWTH_{it} + \gamma_2 LOG_GDPPC_{it} + \gamma_3 TRADE_{it} + \gamma_4 GOVSPEND_{it} + \delta_1 INFLATION_{it} + \delta_2 HUMANCAP_{it} + \delta_3 FINDEV_{it} + \mu_i + v_t + \varepsilon_{it} \quad (1)$$

To test hypothesis H3, we add an interaction term between financial inclusion and control of corruption to model (1). The interaction model is presented as follows:

$$GINI_{it} = \alpha_0 + \alpha_1 GINI_{i,t-1} + \beta_1 FI_{it} + \beta_2 CoC_{it} + \beta_3 (FI_{it} \times CoC_{it}) + \gamma_1 GROWTH_{it} + \gamma_2 LOG_GDPPC_{it} + \gamma_3 TRADE_{it} + \gamma_4 GOVSPEND_{it} + \delta_1 INFLATION_{it} + \delta_2 HUMANCAP_{it} + \delta_3 FINDEV_{it} + \mu_i + v_t + \varepsilon_{it} \quad (2)$$

Where: i and t are indices for country and year, respectively; $GINI_{it}$ is the GINI index of country i in year t ; $GINI_{i,t-1}$ is the first-order lag of the GINI index, representing the persistence of inequality; FI_{it} and CoC_{it} are the financial inclusion and control of corruption indices, respectively; $(FI_{it} \times CoC_{it})$ is the interaction term between financial inclusion and control of corruption; $GROWTH_{it}$, LOG_GDPPC_{it} , $TRADE_{it}$, $GOVSPEND_{it}$, $INFLATION_{it}$, $HUMANCAP_{it}$, and $FINDEV_{it}$ are control variables included to mitigate omitted variable bias; μ_i represents country-fixed effects, controlling for unobserved, time-invariant characteristics of each country (e.g., culture, geography, history); v_t represents time-fixed effects, controlling for common global shocks affecting all countries in a given year (e.g., the 2008 financial crisis, the COVID-19 pandemic); ε_{it} is the random error term; α , β , γ , δ are the regression coefficients to be estimated.

3. 4. ESTIMATION STRATEGY

Endogeneity may arise from three sources. First, the inclusion of the lagged dependent variable, $GINI_{i,t-1}$, creates dynamic panel bias. Second, reverse causality may occur because high inequality can encourage governments to expand financial inclusion policies. Third, unobserved institutional, social, or cultural factors may influence both financial inclusion and income inequality. Under these conditions, conventional pooled OLS, fixed effects, and random effects estimators may produce biased and inconsistent results.

To address these concerns, the study applies the System Generalized Method of Moments estimator developed by [Arellano and Bover \(1995\)](#) and [Blundell and Bond \(1998\)](#). System GMM

jointly estimates equations in first differences and levels. Lagged variable levels are used as instruments in the differenced equations, while lagged differences are used as instruments in the level equations. This approach can improve estimation efficiency when explanatory variables are persistent and suitable internal instruments are available.

The models are estimated using the two step System GMM procedure with the finite sample correction for standard errors proposed by Windmeijer (2005). The lagged dependent variable, financial inclusion, control of corruption, and their interaction term are treated as endogenous and instrumented using appropriate lags. The macroeconomic control variables, including GROWTH, LOG GDPPC, TRADE, GOVSPEND, INFLATION, HUMANCAP, and FIND-EV, are treated as predetermined, while time indicators are treated as strictly exogenous.

To limit instrument proliferation, the lag range used for instrument construction is restricted and the instrument matrix is collapsed. The number of instruments is maintained below the number of countries to preserve the reliability of the Hansen test of instrument validity.

Two diagnostic tests are used to assess the validity of the System GMM estimates. First, the Arellano Bond test examines second order serial correlation in the differenced residuals. The null hypothesis is that no second order serial correlation is present. Failure to reject this hypothesis supports the validity of the instruments. Second, the Hansen test evaluates the joint validity of the instrument set. Its null hypothesis states that the instruments are uncorrelated with the error term and are therefore valid.

Several robustness analyses are also conducted. First, the models are estimated using alternative measures of income inequality and financial inclusion. These include the Gini index from the World Development Indicators and individual components of the financial inclusion index, such as the number of accounts and borrowers. Second, the sample is divided according to World Bank income classifications to examine whether the moderating effect of corruption control differs between lower middle income and upper middle-income economies. Third, a squared financial inclusion term is included to test the inverted U-shaped relationship proposed by Greenwood and Jovanovic (1990).

All econometric analyses are performed using Stata 17.

4. RESEARCH RESULTS

4. 1. DESCRIPTIVE STATISTICS AND CORRELATION ANALYSIS

This section summarises the main characteristics of the data before presenting the regression results. Table 3 reports descriptive statistics for the dependent variable, the principal explanatory variables, and the control variables. The final sample comprises 218 observations across countries and years.

Table 3. Descriptive Statistics of Research Variables

Variable	Symbol	Obs.	Mean	Std. Dev.	Min	Max
Income Inequality	GINI	218	41.37	5.24	32.11	52.85
Financial Inclusion	FI	218	0.21	0.93	-1.82	1.95
Control of Corruption	CoC	218	-0.62	0.51	-1.49	0.43
Economic Growth	GROWTH	218	4.58	3.52	-7.21	12.04
Log GDP per capita	LOG_GDPPC	218	8.49	1.03	6.98	9.81
Trade Openness	TRADE	218	88.15	45.67	35.24	210.55
Government Spending	GOVSPEND	218	15.02	3.88	9.12	24.50
Inflation	INFLATION	218	4.96	3.71	-1.05	21.33
Human Capital	HUMANCAP	218	2.81	0.49	1.95	3.62
Financial Development	FINDEV	218	85.39	51.20	25.46	215.70

Source: Author's calculation using Stata 17

The descriptive statistics in Table 3 highlight several characteristics of the sample. The Gini index has a mean of 41.37 and a standard deviation of 5.24, with values ranging from 32.11 to 52.85. These figures indicate substantial variation in income inequality across the sampled countries.

The financial inclusion index has a mean of 0.21 and ranges from negative 1.82 to 1.95, reflecting considerable differences in access to and use of formal financial services. The control of corruption index has a mean of negative 0.62 and varies from negative 1.49 to 0.43. This variation captures a broad range of institutional conditions and supports the analysis of corruption control as a moderating factor.

The reported minimum and maximum values also suggest that winsorisation effectively limited the influence of extreme observations. Pearson correlation analysis is subsequently used to examine the preliminary relationships among the variables. The results are presented in Table 4.

Table 4. Pearson Correlation Matrix

	1	2	3	4	5	6	7	8	9	10
(1) GINI	1.000									
(2) FI	-0.384***	1.000								
(3) CoC	-0.451***	0.682***	1.000							
(4) GROWTH	-0.089	0.115	0.142*	1.000						
(5) LOG_GDPPC	-0.412***	0.753***	0.691***	0.056	1.000					
(6) TRADE	0.157*	0.301***	0.218**	0.245**	0.289***	1.000				
(7) GOVSPEND	0.203**	0.255**	0.311***	-0.041	0.354***	0.019	1.000			
(8) INFLATION	0.188*	-0.215**	-0.297***	-0.166*	-0.305***	-0.088	-0.240**	1.000		
(9) HUMANCAP	-0.395***	0.710***	0.655***	0.103	0.890***	0.251**	0.381***	-0.288***	1.000	
(10) FINDEV	-0.192*	0.550***	0.421***	0.098	0.613***	0.402***	0.207**	-0.155*	0.589***	1.000

*Note: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Author's calculation using Stata 17

Table 4 provides preliminary evidence on the relationships among the variables. Financial inclusion is negatively correlated with income inequality, with a coefficient of negative 0.384 that is statistically significant at the 1 per cent level. Control of corruption also has a significant negative correlation with the Gini index, with a coefficient of negative 0.451. These results offer initial support for hypotheses H_1 and H_2 .

Financial inclusion and control of corruption are strongly and positively correlated, with a coefficient of 0.682. This suggests that countries with stronger institutions also tend to achieve

higher levels of financial inclusion. Strong correlations are also observed among GDPs per capita, financial inclusion, control of corruption, and human capital. These relationships are consistent with economic development theory and justify the use of multivariate estimation to isolate their individual effects.

To assess whether these correlations create multicollinearity concerns, Variance Inflation Factors are reported in Table 5. The VIF values for financial inclusion and control of corruption are 3.04 and 2.41, respectively, which are below the conventional threshold of 10. The highest values are recorded for GDP per capita at 6.82 and human capital at 5.94, reflecting their strong correlation of 0.89.

Although these values indicate moderate collinearity, they remain within acceptable limits. The mean VIF of 2.82 further confirms the absence of severe multicollinearity. Since GDP per capita and human capital are included as control variables, their remaining correlation is unlikely to materially affect inference on the principal financial inclusion and corruption control coefficients.

Table 5. Variance Inflation Factors (VIF) for Multicollinearity Diagnostics

Variable	VIF
LOG_GDPPC	6.82
HUMANCAP	5.94
FI	3.04
CoC	2.41
FINDEV	1.97
TRADE	1.43
GOVSPEND	1.38
INFLATION	1.29
GROWTH	1.12
Mean VIF	2.82

Note: A VIF value exceeding 10 is conventionally regarded as indicative of severe multicollinearity.

Source: Author's calculation using Stata 17

4. 2. MAIN REGRESSION RESULTS

To test the research hypotheses, this section presents detailed results from the System Generalized Method of Moments (System GMM) estimation. Table 6 summarizes the regression results, which are built sequentially to test the research hypotheses. Column (1) is the baseline model including only control variables. Columns (2) and (3) add the Financial Inclusion (FI) and Control of Corruption (CoC) variables, respectively. Column (4) presents the full model with both main variables. Finally, Column (5) is the interaction model, testing the moderating role of control of corruption.

Table 6. System GMM Regression Results - The Impact of Financial Inclusion and Control of Corruption on Income Inequality

Dependent Variable: GINI	(1)	(2)	(3)	(4)	(5)
GINI(t-1)	0.861*** (0.052)	0.853*** (0.058)	0.824*** (0.061)	0.819*** (0.065)	0.825*** (0.063)
FI		0.158 (0.191)		0.251 (0.203)	0.283 (0.215)
CoC			-1.532** (0.685)	-1.604** (0.712)	-1.751*** (0.640)
FI * CoC					-1.215** (0.552)
GROWTH	-0.075* (0.041)	-0.081* (0.045)	-0.069 (0.043)	-0.072 (0.046)	-0.065 (0.044)
LOG_GDPPC	-1.211** (0.580)	-1.350** (0.612)	-0.985* (0.591)	-1.021* (0.605)	-0.953* (0.577)
TRADE	0.018** (0.008)	0.015* (0.009)	0.021** (0.009)	0.019** (0.008)	0.017* (0.009)
GOVSPEND	-0.115 (0.095)	-0.109 (0.099)	-0.140 (0.102)	-0.132 (0.105)	-0.128 (0.101)
INFLATION	0.142** (0.066)	0.155** (0.069)	0.168*** (0.061)	0.171*** (0.063)	0.165*** (0.060)
HUMANCAP	-2.154*** (0.755)	-2.301*** (0.790)	-1.887** (0.813)	-1.956** (0.841)	-1.890** (0.825)
FINDEV	0.009 (0.011)	0.005 (0.012)	0.012 (0.010)	0.008 (0.011)	0.006 (0.010)
Constant	18.54** (8.91)	19.82** (9.23)	15.61* (9.05)	16.05* (9.33)	15.33* (9.18)
Diagnostic Tests					
Number of observations	218	218	218	218	218
Number of countries	15	15	15	15	15
Number of instruments	28	30	30	32	34
AR(2) test (p-value)	0.254	0.281	0.305	0.312	0.337
Hansen test (p-value)	0.188	0.201	0.195	0.214	0.226

*Notes: Standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Author's calculation using Stata 17

The diagnostic tests support the validity of the System GMM estimates. The p values of the Arellano Bond AR (2) test exceed 0.10 in all specifications, indicating no evidence of second order serial correlation in the differenced residuals. The Hansen test p values also exceed 0.10, suggesting that the instruments are jointly valid and uncorrelated with the error term. The coefficient on the lagged Gini index is positive, below one, and statistically significant at the 1 per cent level in all models. This result confirms the persistence of income inequality and indicates that current inequality is strongly influenced by its previous level.

Hypothesis H_1 is evaluated using Column (4). The coefficient on financial inclusion is 0.251 but is not statistically significant. Financial inclusion therefore has no significant direct effect on income inequality after the other determinants are controlled for. Hypothesis $H1$ is consequently not supported. The coefficient on control of corruption in Column (4) is negative and statistically significant at the 5 per cent level, with an estimated value of negative 1.604. This finding indicates that stronger control of corruption is associated with lower income inequality and supports hypothesis H_2 .

Column (5) examines the moderating effect proposed in hypothesis H_3 . The interaction between

financial inclusion and control of corruption has a coefficient of negative 1.215 and is statistically significant at the 5 per cent level. This result shows that the effect of financial inclusion becomes more favourable as control of corruption improves. Hypothesis H₃ is therefore supported.

The marginal effect of financial inclusion on income inequality is expressed as follows:

$$\partial(\text{GINI})/\partial(\text{FI}) = 0.283 - 1.215 * \text{CoC} \quad (3)$$

This expression shows that the effect of financial inclusion varies with institutional quality. When control of corruption is weak, represented by a strongly negative CoC value, financial inclusion may increase inequality. For example, at a CoC value of negative 1.0, the estimated marginal effect is:

$$0.283 - 1.215(-1.0) = 1.498 \quad (4)$$

This result suggests that financial expansion in a weak institutional environment may disproportionately benefit politically connected or economically privileged groups.

The marginal effect becomes negative when the control of corruption index exceeds the following threshold:

$$\text{CoC} > (0.283 / 1.215) \approx 0.23 \quad (5)$$

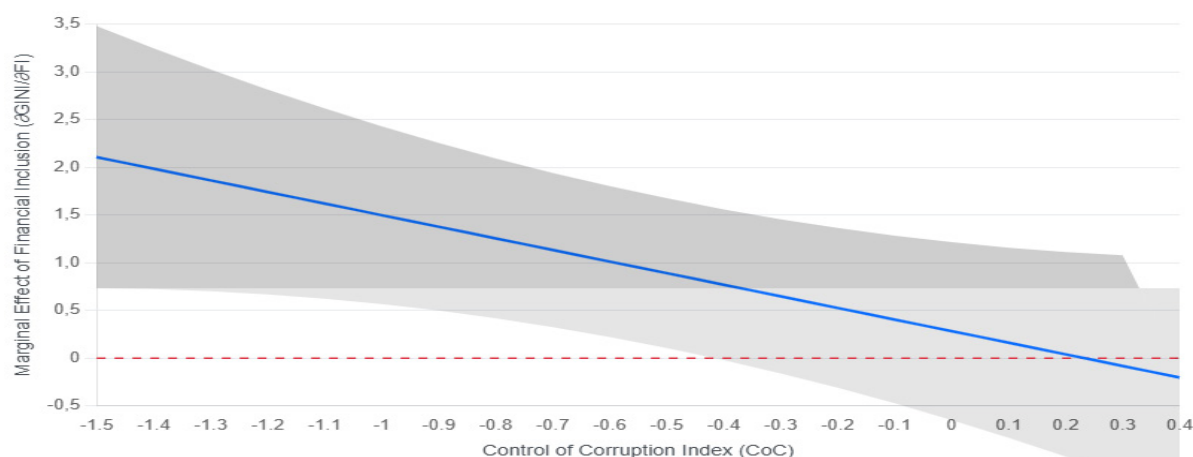
Financial inclusion therefore begins to reduce inequality only when a country reaches a control of corruption value above approximately 0.23. This threshold supports the argument that institutional quality is a necessary condition for financial inclusion to generate favourable distributional outcomes.

Overall, the findings indicate that control of corruption is not merely an additional determinant of income inequality. It fundamentally conditions the effectiveness of financial inclusion. Without sufficiently strong institutions, wider access to finance may fail to reduce inequality and may even reinforce existing disparities.

4. 3. MARGINAL EFFECT ANALYSIS

To further clarify and visualize the core result of hypothesis H3, we analyze the marginal effect of financial inclusion on income inequality, conditional on different levels of control of corruption. This marginal effect is calculated from model (5) in Table 6 and illustrated in Figure 1.

Figure 1. Marginal impact of financial inclusion on income inequality



Source: Author's calculations based on System GMM regression results (Table 6, Column 5)

Figure 1 shows that the marginal effect of financial inclusion declines as control of corruption improves. The negative slope indicates that stronger institutional quality makes the effect of financial inclusion on income inequality increasingly favourable. The results differ across three institutional conditions.

In countries with weak control of corruption, particularly where the CoC index is below negative 0.5, the estimated marginal effect is positive. This suggests that financial inclusion may increase inequality in weak institutional environments. However, the confidence interval includes zero, indicating that this positive effect is not statistically significant. One possible explanation is that financial expansion in corrupt environments disproportionately benefits politically connected and economically advantaged groups.

The marginal effect reaches zero at a CoC value of approximately 0.23. This value represents the point at which the estimated effect of financial inclusion changes from positive to negative. It should not, however, be interpreted automatically as the threshold of statistical significance. Statistical significance begins only at the CoC value where the entire 95 per cent confidence interval falls below zero.

At higher levels of corruption control, the marginal effect becomes negative. For countries with relatively strong institutions, such as those with CoC values above approximately 0.3, financial inclusion is associated with lower inequality and may become statistically significant, depending on the confidence interval shown in Figure 1. These findings confirm that stronger institutions enhance the distributional effectiveness of financial inclusion.

4. 4. ROBUSTNESS CHECKS

Several robustness tests are conducted to determine whether the main findings depend on measures, sample classifications, or functional forms. The results are reported in Table 7.

4. 4. 1. ALTERNATIVE MEASURES

The interaction model is first estimated using alternative measures of income inequality and financial inclusion. The Gini index from the Standardized World Income Inequality Database is replaced with the corresponding measure from the World Development Indicators. Although the World Development Indicators provide less complete coverage, this test reduces dependence on a single inequality database.

The composite financial inclusion index is also replaced with the number of financial institution accounts per 1,000 adults. These variable captures access to a formal account, which represents a fundamental dimension of financial inclusion.

The results are presented in Columns (1) and (2) of Table 7. The interaction coefficients remain negative and statistically significant. The coefficient on the interaction between financial inclusion and control of corruption is negative 1.187 and significant at the 5 per cent level when the alternative Gini index is used. The interaction between account ownership and control of corruption is negative 0.019 and significant at the 10 per cent level.

Although the coefficient magnitudes vary because the variables are measured on different scales, the signs and statistical significance remain consistent with the baseline findings. The moderating role of control of corruption is therefore robust to alternative measures of inequality and financial inclusion.

4. 4. 2. SUBSAMPLE ANALYSIS

The relationship between financial inclusion, institutional quality, and inequality may differ according to economic development. The sample is therefore divided into lower middle in-

come and upper middle-income economies based on the World Bank classification, and the interaction model is estimated separately for each group.

The results are reported in Columns (3) and (4) of Table 7. For lower middle-income economies, the interaction coefficient is negative 0.952 but is not statistically significant. For upper middle-income economies, the coefficient is negative 1.451 and statistically significant at the 1 per cent level.

These findings suggest that the moderating effect of corruption control is more pronounced in upper middle-income economies. In lower income settings, weaker financial infrastructure, limited administrative capacity, informality, or other structural constraints may prevent improvements in institutional quality from translating immediately into more equitable financial outcomes.

This interpretation should nevertheless remain cautious because dividing an already small sample reduces the number of observations and may weaken the precision of the System GMM estimates.

4. 4. 3. NONLINEAR RELATIONSHIP

Greenwood and Jovanovic (1990) propose that the relationship between financial development and inequality may follow an inverted U-shaped pattern. To examine this possibility, the squared financial inclusion term is added to the interaction model.

Column (5) of Table 7 reports a positive coefficient of 0.431 for financial inclusion and a negative coefficient of 0.298 for its squared term, with both coefficients statistically significant. These estimates support an inverted U-shaped relationship. When the interaction with control of corruption is temporarily held constant, the turning point is calculated as follows:

$$\partial(\text{GINI}) / \partial(\text{FI}) = 0.431 + 2 * (-0.298) * \text{FI} = 0.431 - 0.596 * \text{FI} \quad (6)$$

Solving the equation $0.431 - 0.596 * \text{FI} = 0$, we find the turning point at $\text{FI} \approx 0.72$.

This result indicates that in the initial stage when financial inclusion is low ($\text{FI} < 0.72$), financial expansion tends to increase inequality. However, after surpassing the 0.72 threshold, financial inclusion begins to have an inequality-reducing effect.

Most importantly, even when controlling for this complex non-linear relationship, the coefficient of the interaction term $\text{FI} * \text{CoC}$ remains negative (-1.109) and statistically significant at the 5% level. This confirms that the moderating role of control of corruption is an independent and robust mechanism. It not only affects the linear impact but also shapes the entire non-linear curve: in countries with better institutions, the inverted U-shaped curve will shift downward (meaning the maximum level of inequality will be lower) and the turning point may be reached sooner.

Table 7. Robustness Checks

Dependent Variable: GINI	(1) Alt. GINI	(2) Alt. FI	(3) LMI Countries	(4) UMI Countries	(5) Non-linear
GINI(t-1)	0.833*** (0.068)	0.815*** (0.069)	0.849*** (0.075)	0.802*** (0.071)	0.817*** (0.066)
FI	0.295 (0.228)		0.301 (0.244)	0.358* (0.210)	0.431** (0.208)
FI_Account		0.008 (0.007)			
FI ²					-0.298** (0.135)
CoC	-1.690** (0.715)	-1.705** (0.688)	-1.588* (0.850)	-1.895*** (0.603)	-1.688** (0.671)
FI * CoC	-1.187** (0.580)		-0.952 (0.695)	-1.451*** (0.521)	-1.109** (0.533)
FI_Account * CoC		-0.019* (0.011)			
Control Variables	Yes	Yes	Yes	Yes	Yes
Country & Year FE	Yes	Yes	Yes	Yes	Yes
Diagnostic Tests					
Observations	205	218	110	108	218
Countries	15	15	8	7	15
AR (2) test (p-value)	0.351	0.315	0.388	0.362	0.349
Hansen test (p-value)	0.240	0.231	0.265	0.251	0.238

Notes: All models are estimated using the System GMM method. Standard errors are in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. All models include the full set of control variables as in Table 6.

(1) The dependent variable is the GINI index from WDI (GINI_WDI). The number of observations is reduced due to data availability.

(2) The composite FI index is replaced with FI_Account (number of accounts per 1,000 adults).

(3) The subsample includes lower-middle income (LMI) countries: Cambodia, India, Bangladesh, Pakistan, Sri Lanka, Nepal, Mongolia, Uzbekistan.

(4) The subsample includes upper-middle income (UMI) countries: Indonesia, Malaysia, Philippines, Thailand, Vietnam, China, Kazakhstan.

(5) The model includes the squared term of financial inclusion (FI²) to test for a non-linear relationship.

Source: Author's calculations using Stata 17

5. DISCUSSION

The findings reveal that the relationship between financial inclusion and income inequality is conditional rather than universal. Financial inclusion has no significant direct effect on inequality across the full sample. This result differs from studies that identify an inequality reducing effect of financial expansion (Beck et al., 2007; Park & Mercado, 2018), but is consistent with research reporting insignificant or context dependent effects (Chisadza & Biyase, 2023; Erkişi & Boğa, 2023; Jauch & Watzka, 2016).

The absence of a direct effect supports the central argument of this study. Financial inclusion does not automatically improve income distribution. Its effectiveness depends on the institutional environment in which financial services are expanded. By incorporating control of corruption as a moderating factor, the study extends the finance and inequality literature through the perspective of New Institutional Economics (Acemoglu & Robinson, 2013; North, 1990). The mechanisms through which financial inclusion may benefit disadvantaged groups require

transparent institutions, effective accountability, and fair allocation of financial resources.

The main result is the negative and statistically significant interaction between financial inclusion and control of corruption, with a coefficient of negative 1.215. This finding indicates that stronger corruption control improves the distributional effect of financial inclusion. It may also help explain the inconsistent results of earlier studies. Research based primarily on countries with stronger institutions may be more likely to identify favourable effects, while pooled samples containing weak institutional environments may produce insignificant average coefficients. This finding is especially relevant to emerging Asian economies, where rapid economic growth often occurs alongside substantial governance challenges. In weak institutional environments, the benefits of financial expansion may be diverted toward politically connected individuals and firms rather than disadvantaged households and small enterprises. Corruption can therefore weaken or reverse the intended distributional effects of financial inclusion.

The marginal effect of financial inclusion is expressed as follows:

$$\partial(\text{GINI})/\partial(\text{FI}) = 0.283 - 1.215 * \text{CoC} \quad (7)$$

At a control of corruption value of negative 1.0, the estimated marginal effect is positive 1.498. This suggests that financial inclusion may increase inequality in highly corrupt environments, although the statistical significance of this effect depends on the associated confidence interval. At a control of corruption value of 0.4, the estimated marginal effect is negative 0.203, indicating a more favourable distributional effect.

The estimated marginal effect changes sign at a control of corruption value of approximately 0.23. This value should be interpreted as an indicative institutional turning point rather than a formally estimated structural threshold. It nevertheless suggests that financial inclusion is more likely to reduce inequality after a minimum level of institutional quality has been achieved. Corruption control is therefore not merely an ethical objective, but an important condition for the effectiveness of economic and social policy.

The analysis by income group provides additional insight. The interaction between financial inclusion and control of corruption is statistically significant in upper middle-income economies but not in lower middle-income economies. This does not imply that institutions are unimportant in poorer countries. Rather, financial underdevelopment, limited infrastructure, weak human capital, and extensive informality may prevent the interaction between finance and institutional quality from producing a measurable macroeconomic effect.

In upper middle-income economies, financial systems are more developed and more deeply integrated into economic activity. Institutional quality consequently becomes more important in determining whether further financial expansion supports broad participation or reinforces existing advantages. The results therefore suggest that the effect of institutional reform depends partly on the stage of financial and economic development.

The study also supports the inverted U-shaped relationship proposed by Greenwood and Jovanovic (1990). The positive coefficient on financial inclusion and the negative coefficient on its squared term indicate that inequality initially rises before declining at higher levels of financial inclusion. When the interaction term is temporarily held constant, the estimated turning point is approximately 0.72.

However, because the model includes an interaction between financial inclusion and corruption control, the turning point depends on institutional quality:

This expression indicates that stronger control of corruption lowers the level of financial inclusion required before inequality begins to decline. Institutional quality therefore influences both the direction and the shape of the relationship between financial inclusion and income inequality.

The study makes three principal contributions. First, it helps reconcile conflicting empirical findings by identifying institutional quality as a conditioning factor. Second, it integrates the finance and inequality literature with New Institutional Economics. Third, it shifts the debate from whether financial inclusion reduces inequality to the conditions under which it can do so. Several limitations should be recognised. The estimated values of approximately 0.23 for control of corruption and 0.72 for financial inclusion are derived from regression coefficients rather than from a formal threshold model. They should therefore be treated as indicative turning points. Future research could apply dynamic panel threshold estimators to test these values more precisely. Control of corruption is measured using the Worldwide Governance Indicators, which are based partly on perceptions and may contain measurement error. In addition, country level data cannot identify the household and firm level mechanisms through which corruption influences access to finance. Future studies could use microeconomic data and consider broader institutional dimensions, including regulatory quality, government effectiveness, and the rule of law.

6. CONCLUSION AND IMPLICATIONS

6. 1. CONCLUSION

This study examines whether control of corruption conditions the effect of financial inclusion on income inequality in emerging Asian economies. The results show that financial inclusion has no significant direct effect on inequality across the full sample. Its distributional effect depends on the quality of the institutional environment.

Financial inclusion becomes more effective in reducing inequality as control of corruption improves. In weak institutional environments, financial expansion may fail to benefit disadvantaged groups and may even reinforce existing disparities. Stronger corruption control is also directly associated with lower inequality, confirming the importance of institutions for distributional outcomes.

The study contributes theoretically by incorporating New Institutional Economics into the relationship between finance and inequality. It challenges the assumption that financial inclusion is universally beneficial and demonstrates that its effectiveness depends on transparent, accountable, and inclusive institutions.

The central conclusion is that financial inclusion should not be evaluated only in terms of whether access expands. Greater attention must be given to the institutional conditions under which financial resources are allocated and used. Financial inclusion can support social equity only when accompanied by effective governance and corruption control.

6. 2. RESEARCH IMPLICATIONS

The findings suggest that financial inclusion policies should be integrated with institutional reform. Expanding access to financial services without strengthening transparency, accountability, and the rule of law may produce limited benefits or increase inequality. National financial inclusion strategies should therefore include measurable governance objectives alongside indicators such as account ownership, credit access, and digital payment use.

Regulatory authorities should strengthen oversight of credit allocation, particularly in programmes designed for disadvantaged households and small enterprises. Transparent eligibility requirements, independent monitoring, and accessible complaint procedures can reduce the risk that financial resources are captured by politically connected groups.

Policy priorities should also reflect differences in development levels. In upper middle-income economies, the main task is to ensure that increasingly mature financial systems remain in-

clusive. This requires stronger supervision, protection of consumers, and continued improvements in institutional quality.

In lower middle-income economies, the expansion of financial access should be accompanied by investment in basic financial infrastructure, institutional capacity, education, and financial literacy. Rapid expansion without these foundations may expose vulnerable households to unsuitable products, excessive debt, and unequal access.

Financial institutions should avoid uniform products that do not reflect the needs of low income households and microenterprises. Savings, insurance, and credit products should be transparent, accessible, and adapted to users with limited collateral and financial knowledge. Digital financial services may reduce transaction costs and improve transparency, but they must be supported by consumer protection and effective supervision.

International development institutions should also recognise the interaction between financial inclusion and governance. Support for financial inclusion programmes may be more effective when combined with institutional reforms, monitoring mechanisms, and clear commitments to corruption control.

Overall, the results indicate that financial inclusion and institutional reform should be pursued as complementary policies. Expanding financial access is unlikely to reduce inequality unless the institutional environment ensures that opportunities and resources are allocated fairly.

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