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Financial Development and Income Inequality at Different Levels of Institutional Quality

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ABSTRACT: We examine whether the relationship between financial development and income inequality varies with levels of institutional quality. The empirical evidence based on the threshold regression approach shows that there indeed exists an institutional quality threshold effect in the relationship between financial development and income inequality. Financial development tends to reduce income inequality only after a certain threshold level of institutional quality has been achieved. Until then, the effect of financial development on income inequality is nonexistent. This finding suggests that institutional quality affects the link between financial development and income inequality, reflecting the notion that better quality finance results in more equal income distribution.

KEY WORDS: financial development, income inequality, institutions, threshold regression.

Interest has recently been growing in the importance of financial development as a means to reduce income inequality. In the literature, two linear hypotheses explain the link between financial development and income inequality: the inequality-widening hypothesis and the inequality-narrowing hypothesis. The inequality-widening hypothesis states that financial development might benefit the rich and well connected while excluding the poor, especially when institutional quality in the society is weak. This hypothesis claims that the rich are able to offer collateral and are more likely to repay a loan (Rajan and Zingales 2003). The poor, who do not enjoy this benefit, might find it difficult to obtain loans even when financial markets are well developed; thus, this might worsen income inequality. The inequality-narrowing hypothesis puts forward the idea that when the financial sector grows, the poor, who were previously excluded from obtaining loans, might gain access (Beck et al. 2007; Clarke et al. 2006; Hamori and Hashiguchi 2012; Jalil and Feridun 2011; Mookerjee and Kalipioni 2010).

Recent empirical evidence reveals that the relationship between financial development and income inequality is very likely to be nonlinear, which further supports Greenwood and Jovanovic's (1990) suggestion that a hump or inverted U-shaped relationship exists between these two variables. For example, Kim and Lin (2011) find that the benefits of financial development on income distribution occur only if the country has reached a threshold level of financial development. Below this critical threshold, financial development hurts the poor and exacerbates income inequality. Tan and Law (2012) find a U-shaped relationship between financial development and income inequality. They

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emphasize that income inequality tends to narrow at the early stage of countries' financial development, with financial deepening below a certain threshold level. Further deepening above that level will lead to a reverse effect, which will deteriorate income inequality.

If the relationship between financial development and income inequality is indeed nonlinear, then what are the driving factors for such nonlinearities? We argue that institutional quality may play an important role in capturing the nonlinear financial development–income inequality relationship. It may be that a certain level of institutional quality must be attained before financial development can have any impact on income inequality. If the institutional quality is weak, financial development may neither improve economic well-being nor decrease inequality due to lack of judicial protection for the poor (Chong and Gradstein 2007), widespread corruption, and political interference. Rajan and Zingales (2003) argue that in the presence of weak institutional environments, de jure political representation is dominated by de facto political influence. This allows established interests to influence access to finance, and implies that higher financial development induced by captured direct controls is likely to hurt the poor. In addition, weak institutions tend to distort the ability of financial intermediaries to channel resources to finance productive activities efficiently. In the presence of strong institutions, financial development may reduce inequality, allowing the poor to invest in building their human and physical capitals. While this is a plausible conjecture, there is little, if any, direct evidence to confirm that institutional quality makes a difference in the way financial development affects income inequality. This paper represents a first step in providing such evidence by analyzing the effect that the role of institutional quality in influencing financial development has on income inequality.

In an attempt to fill the gap and contribute to the current empirical literature, we examine whether the relationship between financial development and income inequality differs along with institutional quality. Specifically, we explore whether there exists an institutional quality threshold in the financial development–income inequality nexus by suggesting that the country's institutional quality also matters in shaping the link between financial development and income inequality. The discovery of an institutional quality threshold may have important policy implications. In addition, it adds one more dimension of explanation to the current literature concerning nonlinearity in the link between financial development and income inequality and calls attention to the need for policy makers to consider the level of institutions when exploring possible benefits from financial market reforms.

The Empirical Model and Econometric Methodology

To test the role of financial development in income inequality, we specify the following cross-country log-linear equation for income inequality:

$$\ln GINI_i = \beta_0 + \beta_1 \ln FD_i + \beta_2 \ln GDPC_i + \beta_3 \ln HC_i + \beta_4 \ln INF_i + \beta_5 \ln INS_i + \varepsilon_i, \quad (1)$$

where *GINI* is an indicator of income inequality, *FD* is financial development, *GDPC* is real income per capita, *HC* is human capital, *INF* is inflation rate, *INS* is institutional quality, ε is the error term, and the subscript *i* represents country. The control variables for inequality are identified based on the literature survey. For example, greater economic development, which is proxied by *GDPC*, tends to improve the income distribution (Agnello et al. 2012; Gimet and Lagoarde-Segot 2011; Kuştepeli 2006; Mookerjee and Kalipioni 2010). We control for human capital or educational attainment because

these factors have been found to affect income inequality (Ang 2010; Beck et al. 2007; Huggett et al. 2006). The strength of institutions tends to improve the income distribution (Chong and Gradstein 2007; Dincer and Gunalp 2012; Dobson and Ramlogan-Dobson 2010). Inflation has been found to increase income inequality (Ang 2010; Beck et al. 2007; Dobson and Ramlogan-Dobson 2010; Hamori and Hashiguchi 2012). Thus, the coefficients of β_2, β_3, and β_5 are expected to be less than zero, whereas the coefficient of β_4 is expected to be greater than zero.

To test the hypothesis outlined in the previous section, we argue that Equation (2) is particularly well suited to capture the presence of contingency effects and to offer a rich way of modeling the influence of financial development on income inequality. The model, based on threshold regression, takes the following form:

$$GINI_i = \begin{cases} \beta_0^1 + \beta_1^1 FD_i + \beta_3^1 X_i + e_i, & INS \le \lambda \\ \beta_0^2 + \beta_1^2 FD_i + \beta_2^2 X_i + e_i, & INS > \lambda, \end{cases} \tag{2}$$

where *INS* (i.e., the level of institutional quality) is the threshold variable used to split the sample into regimes or groups, *X* is a vector of control variables, and λ is the unknown threshold parameter. This type of modeling strategy allows the role of financial development to differ depending on whether institutions are below or above some unknown level of λ. In this equation, institutional quality acts as a sample-splitting (or threshold) variable. The impact of financial development on income inequality will be β_1^1 and β_1^2 for countries with a low or high regime, respectively. It is obvious that under hypothesis $\beta^1 = \beta^2$, the model becomes linear and reduces to Equation (1).

The first step of our estimation is to test the null hypothesis of linearity H_0: $\beta^1 = \beta^2$ against the threshold model in Equation (2). Since the threshold parameter λ is not identified under the null, this becomes a nonstandard inference problem, and the Wald or Lagrange multiplier (LM) test statistics therefore do not carry their conventional chi-square limits (see Hansen 1996, 2000). Instead, inferences are implemented by calculating a Wald or LM statistic for each possible value of λ and subsequently basing inferences on the supremum of the Wald or LM across all possible λs. The limiting distribution of this supremum statistic is nonstandard and depends on numerous model-specific nuisance parameters. Since tabulations are not possible, inferences are conducted via a model based on bootstrap where validity and properties are established by Hansen (1996). Once an estimate of λ is obtained (as the minimizer of the residual sum of squares computed across all possible values of λ), estimates of the slope parameters follow trivially as $\hat{\delta}(\hat{\lambda})$.

As discussed in the literature, the financial development variable is highly likely to be endogenous, possibly due to feedback from income inequality to financial development. To deal with the endogeneity issue and account for the threshold nonlinearity simultaneously, the instrumental variable (IV) threshold regression technique suggested by Caner and Hansen (2004) is employed, where Equation (1) can take the following form:

$$GINI_i = (\beta_1 FD_i + \gamma_1 X_i)1(INS_i \le \lambda) + (\beta_2 FD_i + \gamma_2 X_i)1(INS > \lambda) + \varepsilon_i \tag{3}$$

$$FD_i = (\delta_1 Z_i + \phi_1 X_i)1(INS_i \le \lambda) + (\delta_2 Z_i + \phi_2 X_i)1(INS > \lambda) + \nu_i, \tag{4}$$

where $1(\cdot)$ is the indicator function, *Z* is a vector of instrumental variables, and the order condition is satisfied. Caner and Hansen (2004) suggest a three-step procedure to estimate the regression coefficients. First, we regress FD_i on instrumental variables by the ordinary least squares (OLS) approach and obtain the fitted values of FD_i. Second, by substituting the predicted values of FD_i into Equation (3), we estimate the threshold parameter

λ with the OLS method, which is similar to that in Hansen (2000). Finally, based on the estimate of λ, we divide the whole sample into two subsamples and estimate the slope parameters using the generalized method of moments (GMM). Caner and Hansen (2004) propose a supremum Wald (sup W) statistic to test for the existence of a threshold effect and derive the asymptotic distribution of this statistic.

The Data

To estimate Equation (2), the sample consists of cross-country annual observations for eighty-one countries averaged over the 1985–2010 period.[1] The income inequality, or Gini, coefficient indicator is obtained from the Standardized World Income Inequality Database (SWIID) created by Solt (2009), who uses various techniques to estimate the ratios between different types of Gini coefficients—relying heavily on information about the ratio for the same country in proximal times—to increase the number of comparable observations. The SWIID combines information from the Luxembourg Income Study (LIS) with United Nations University-World Institute for Development Economics Research (UNU-WIDER) World Income Inequality Database (WIID) data to create an improved data set with greater coverage than the LIS data and greater comparability than the UNU-WIDER data. The SWIID is our preferred measure of income inequality because it provides comparable Gini indexes of net income inequality based on disposable household income. In addition, the SWIID is better suited for cross-national research on income inequality than are previously available sources (Solt 2009).

In terms of financial development, we focus only on banking sector development due to the following: (1) Bank credits are the only feasible sources of financing for the majority of developing countries in our sample. (2) The number of available observations for stock market indicators is insufficient to conduct sample-splitting regression. In addition, the banking sector seems to exert stronger influence on income inequality than does the stock market (Gimet and Lagoarde-Segot 2011). These banking sector developments are (1) private sector credit, which equals the value of credit issued by financial intermediaries to the private sector; (2) bank credit, defined as the credit extended by deposit money banks to the private sector; and (3) commercial bank branches, which is the number of commercial banks that provide financial services to customers and are physically separated from the main office but are not organized as legally separated subsidiaries.[2] All three banking sector development indicator data sets are obtained from the World Bank's World Development Indicators (WDI).

Two data sets of institutions have been employed in the analysis: the *International Country Risk Guide* (*ICRG*) and the Worldwide Governance Indicators (WGI) by Kaufmann et al. (2008). The *ICRG* data set uses five indicators: corruption, law and order, bureaucratic quality, government repudiation of contracts, and risk of expropriation. The first three indexes are scaled from zero to six; the last two indexes are scaled from zero to ten. Higher values of these indexes imply better institutional quality. We bundle these indicators into a single summary measure by summing them after appropriate rescaling from zero to ten. Thus, the theoretical range of this index runs from zero to fifty.

The second institutions data set (WGI) is based on information gathered through a wide variety of cross-country surveys and expert polls. The data set covers 1996–2010. Kaufmann et al. (2008) use a model of unobserved components, which enables them to achieve levels of coverage for approximately 212 countries for each of their indicators. They construct six different indicators, each representing a different dimension of insti-

Table 1. Summary statistics

	Source	Mean	SD	Min	Max
Gini (percent)	SWIID	39.93	9.59	22.29	63.28
Private sector credit (percent of GDP)	WDI	47.27	37.48	3.93	182.22
Bank credit (percent of GDP)	WDI	39.51	31.78	1.84	148.80
Commercial bank branches (percent of 100,000 adults)	WDI	20.50	19.78	1.09	101.24
Real GDP per capita (US$ at 2005 prices)	WDI	6,952.22	9,136.83	119.79	32,592.08
Human capital (average years of secondary schooling)	Barro–Lee (2013)	0.16	0.14	0.01	0.54
Inflation rate (percent)	WDI	38.03	100.74	1.10	545.99
Institutional quality (scaled 1 to 50)	ICRG	29.00	9.62	10.86	47.74

tutional quality: voice and accountability, political stability and lack of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. The WGI institutions indicator is measured by averaging these six indicators into a single broader index (see Easterly 2002; Langbein and Knack 2010; Méon and Weill 2005).

Annual data on real GDP (gross domestic product) per capita, converted to U.S. dollars based on 2005 constant prices, are from the WDI. The inflation rate is also from the WDI. Human capital is measured by average years of secondary schooling; the data set is obtained from the Barro-Lee (2013) data set. It is well known that in cross-sectional data sets, the estimation is inefficient and biased if outliers are present. Therefore, the different-in-fits statistic of Welsch and Kuh (1977) is used to detect outliers. The data sets are summarized in Table 1.

Empirical Results

Table 2 reports the results of estimating Equation (2) using three financial development indicators: private sector credit, bank credit, and commercial bank branches. The statistical significance of the threshold estimate is evaluated by *p*-value calculated using the bootstrap method with 1,000 replications and 15 percent trimming. As shown in all models, the bootstrap *p*-values indicate that the test of no threshold effect can be rejected. Thus, the sample can be split into two regimes. For example, referring to Model 1 where financial development is measured by private sector credit, the empirical results favor a threshold model. The point estimate of the threshold value of institutions is 3.505 with a corresponding 95 percent confidence interval [3.413, 3.579] for Model 1. This implies that countries with threshold values of less than 3.505 are classified into the low institutional quality regime, while those with greater values are classified into the high institutional quality regime.[3]

Having established the existence of an institutional quality threshold, the next question is how institutions affect the relationship between financial development and income inequality. Since the data favor a threshold model, we focus on the threshold model specifications as shown in Table 3. Turning first to Model 1, the coefficient estimates of financial development are insignificant when institutions fall below the threshold level.

Table 2. Threshold estimates of institutions

	Model 1 FD = Private-sector credit	Model 2 FD = Bank credit	Model 3 FD = Commercial bank branches
First sample split			
LM test for no threshold	24.11	21.19	22.56
Bootstrap *p*-value	0.0001	0.0001	0.0010
Threshold estimate	3.505	3.536	1.255
95% confidence interval	(3.413, 3.579)	(3.378, 3.612)	(1.140, 1.322)
Second sample split			
LM test for no threshold	7.02	8.29	6.72
Bootstrap *p*-value	0.853	0.609	0.471

Notes: H_0: No threshold effect, FD = financial development. The threshold value of institutions is in natural logarithm.

In contrast, above the threshold level, the effect of financial development on income inequality becomes significant and negative. Models 2 and 3 present the empirical results of the repeated analysis using bank credit and commercial bank branches, respectively, as a proxy for financial development. The results of these two financial development indicators are similar to those obtained using private sector credit, reported in Model 1, where results concerning the nonlinear relationship between financial development and income inequality still hold. The estimated institutional quality threshold above which bank credit and commercial bank branches significantly reduce income inequality is exactly the same as that found in the case of private sector credit.

In all the models, the estimated coefficients on real GDP per capita are positive and statistically significant when institutions fall below the threshold level. This finding suggests that economic development tends to increase income inequality when countries have weak institutions. Above the institutional quality threshold level, real income per capita is an insignificant determinant of income inequality. The estimated coefficients on human capital and institutional quality are consistent with theory. Both coefficients are negative in all models regardless of whether they are below or above the institutional quality threshold. Human capital tends to reduce the income gap below the threshold, but the effect of human capital on income inequality diminishes when the country's institutional quality improves. This finding is in line with Glaeser et al. (2004), who find that education policy comes first in explaining better institutions and therefore growth. In higher institutional quality regimes, the role of human capital tends to diminish in explaining income inequality because institutional quality is driven by human capital. The empirical results also reveal that better institutional quality is critical in reducing income inequality; the institutional quality variable is a statistically significant determinant of income inequality in the high institutional quality regime.

Table 4 presents the results of the Caner and Hansen (2004) instrumental variable (IV) threshold regression using three instrumental variables: legal origins, creditor rights, and initial values of financial development. La Porta et al. (1997) point out that the legal origins in general can explain cross-country differences in financial development; Djankov et al. (2007) find that stronger protection of creditor rights is positively correlated with financial institutions.[4] The Hausman test results (the statistic is 20.45 and its *p*-value

Table 3. Regression results using institutional quality (INS[ICRG]) as a threshold variable; dependent variable: income inequality (GINI)

	Model 1 FD = Private-sector credit/GDP		
	Linear model	Threshold model	
	OLS without threshold	Regime 1 INS < 3.506	Regime 2 INS > 3.506
Constant	4.679*** (0.442)	3.895*** (0.341)	5.849*** (1.381)
Financial development	0.013 (0.041)	–0.034 (0.035)	–0.414*** (0.102)
Real GDP per capita	0.029 (0.023)	0.072*** (0.023)	–0.097 (0.061)
Human capital	–1.048*** (0.215)	–1.218*** (0.284)	–0.456 (0.252)
Inflation rate	0.001 (0.099)	0.042 (0.062)	0.358 (0.349)
Institutional quality	–0.342*** (0.092)	–0.445 (0.352)	–0.187** (0.095)
R^2	0.559	0.377	0.749
Heteroskedasticity test (p-value)	0.853	—	—
Number of observations	81	57	24
	Model 2 FD = Bank credit/GDP		
	Linear model	Threshold model	
	OLS without threshold	Regime 1 INS < 3.536	Regime 2 INS > 3.536
Constant	4.654*** (0.386)	3.736*** (0.333)	6.472*** (1.070)
Financial development	–0.023 (0.035)	–0.031 (0.032)	–0.207** (0.084)
Real GDP per capita	0.039 (0.022)	0.075*** (0.023)	0.169 (0.128)
Human capital	–1.034*** (0.216)	–1.285*** (0.284)	–0.316 (0.179)
Inflation rate	0.004 (0.083)	0.037 (0.059)	0.602 (0.357)
Institutional quality	–0.316*** (0.092)	–0.135 (0.094)	–0.779** (0.330)
R^2	0.561	0.363	0.494
Heteroskedasticity test (p-value)	0.819	—	—
Number of observations	81	59	22

(continues)

Table 3. Continued

	Model 3 FD = Commercial bank branches/100,000 adults		
	Linear model	Threshold model	
	OLS without threshold	Regime 1 INS < 1.255	Regime 2 INS > 1.255
Constant	4.562*** (0.332)	3.853*** (0.328)	5.353*** (1.047)
Financial development	–0.065 (0.045)	–0.049 (0.037)	–0.175** (0.085)
Real GDP per capita	0.032 (0.027)	0.070*** (0.023)	0.134 (0.116)
Human capital	–0.987*** (0.226)	–1.174*** (0.296)	–0.302 (0.175)
Inflation rate	0.003 (0.074)	0.045 (0.051)	0.367 (0.415)
Institutional quality	–0.319*** (0.084)	–0.112 (0.089)	–0.684** (0.272)
R^2	0.588	0.381	0.525
Heteroskedasticity test (p-value)	0.731	—	—
Number of observations	74	34	40

Notes: FD = financial development; INS = institutional quality; OLS = ordinary least squares. The standard errors are reported in parentheses (White-corrected for heteroskedasticity). Results correspond to trimming percentage of 15. *** Significance at the 1 percent level; ** significance at the 5 percent level.

is 0.00) indicate that the endogeneity problem exists where the financial development indicator is proxied by private sector credit. Therefore, Table 4 presents only the results where the financial development indicator is private sector credit. As shown in Model 4a, the sup-Wald test statistics along with their bootstrap p-values indicate a significant presence of a threshold effect in the financial development–income inequality nexus, suggesting two separate regimes conditional on the quality of institutions. The empirical results indicate that in the regime with high-quality institutions, private sector credit has a substantial negative impact on income inequality.[5] In the regime with low-quality institutions, private sector credit has no impact on income inequality. Model 4b repeats the same analysis but with institutions measured using principal component analysis.[6] The results are broadly similar to those reported in Model 4a; the only notable difference is that institutions appear significant at the 1 percent level in Model 4b. Overall, the results of Table 4 are similar to those reported in Table 3. Therefore, the findings are robust to the alternative IV threshold estimation method.

To verify the sensitivity of the estimated threshold value, we replace the institutional quality data set from *ICRG* with the WGI data set and perform the same analysis. As reported in Table 5, we present only a subset of the checks carried out using two financial development indicators: private sector credit and bank credit.[7] The empirical results are summarized in Models 5a and 5b. Again, the data favor a single-threshold model, and the hypothesis of a no-threshold model is rejected. Therefore, only the threshold model results are reported. The empirical results also reveal that in countries with low levels

Table 4. Results of instrumental variable threshold regression; dependent variable: income inequality (GINI)

	Model 4a FD = Private sector credit/GDP Institutions: *ICRG* (averaged)		Model 4b FD = Private sector credit/GDP Institutions: *ICRG* (principal component)	
	75.426*** (0.000)		80.327*** (0.000)	
	Threshold model		Threshold model	
Sup-Wald statistic (*p*-value)	**Regime 1 INS < 3.512**	**Regime 2 INS > 3.512**	**Regime 1 INS < 0.038**	**Regime 2 INS > 0.038**
Constant	3.421*** (0.298)	6.641*** (0.867)	3.227*** (0.312)	5.319*** (0.743)
Financial development	–0.016 (0.038)	–0.508*** (0.071)	–0.018 (0.035)	–0.487*** (0.075)
Real GDP per capita	0.078*** (0.020)	–0.007 (0.067)	0.089*** (0.024)	–0.028 (0.085)
Human capital	–1.215*** (0.318)	–0.442 (0.271)	–1.208*** (0.313)	–0.374 (0.202)
Inflation rate	0.067 (0.058)	0.335 (0.261)	0.071 (0.056)	0.348 (0.235)
Institutional quality	–0.172 (0.094)	–0.209** (0.099)	–0.187 (0.102)	–0.235*** (0.082)
R^2	0.374	0.562	0.360	0.553
Number of observations	57	24	58	23

Notes: The instrumental variables are legal origins (British and French), creditor rights, and the log of initial financial development. FD = financial development; INS = institutional quality; *ICRG* = *International Country Risk Guide*. Following Caner and Hansen (2004), we use the sup-Wald statistic to test for the presence of threshold effects. The corresponding *p*-values are calculated using 10,000 bootstrap replications. The standard errors are reported in parentheses (White-corrected for heteroskedasticity). *** Significance at the 1 percent level; ** significance at the 5 percent level.

of institutional development there is no significant relationship between financial development and income inequality. This is reflected in the coefficient on financial development, which is highly significant in the second regime (high institutional quality), but insignificant in the first regime (low institutional quality). Thus, the results concerning the nonlinear relationship between financial development and income inequality still hold; the nexus between these two variables is significantly negative only in the high institutional development regime.

The second set of robustness checks involves using an alternative data set of income inequality provided by Galbraith and Kum (2005) under the University of Texas Inequality Project: estimated household income inequality (EHII). We continue to use the institutions data set from *ICRG*, and the empirical results are reported in Table 5, Models 6a and 6b. The data favor a single-threshold model, and the hypothesis of a no-threshold model is rejected. The results are similar to those in Table 4 in terms of sign and significance, but the magnitudes differ. Again, for institutions above the threshold, financial development has a negative and significant effect on income inequality. We therefore conclude that

Table 5. Robustness checks using other institutional quality and income inequality measures; dependent variable: income inequality (GINI)

	Model 5a FD = Private-sector credit		Model 5b FD = Bank credit		Model 6a FD = Private-sector credit		Model 6b FD = Bank credit	
	GINI = SWIID Institutions = WGI				GINI = Estimated household income inequality (EHII) Institutions = *ICRG*			
	Threshold model		Threshold model		Threshold model		Threshold model	
	Regime 1 INS < 4.174	Regime 2 INS > 4.174	Regime 1 INS < 4.182	Regime 2 INS > 4.182	Regime 1 INS < 3.505	Regime 2 INS > 3.505	Regime 1 INS < 3.536	Regime 2 INS > 3.536
Constant	–3.661***	6.641***	3.666***	6.001***	3.759***	5.634***	3.894***	5.849***
	(0.334)	(0.867)	(0.324)	(0.873)	(0.322)	(1.005)	(0.341)	(1.381)
Financial development	–0.005	–0.308***	–0.018	–0.227***	–0.078**	–0.221***	–0.034	–0.414***
	(0.035)	(0.071)	(0.031)	(0.086)	(0.038)	(0.066)	(0.035)	(0.102)
Real GDP per capita	0.089***	–0.007	0.092***	–0.039	0.092***	–0.066	0.072***	–0.096
	(0.022)	(0.067)	(0.022)	(0.096)	(0.021)	(0.099)	(0.022)	(0.061)
Human capital	–1.221***	–0.442	–1.223***	–0.368	–1.119***	–0.178	–1.218***	–0.456
	(0.326)	(0.271)	(0.329)	(0.211)	(0.354)	(0.229)	(0.283)	(0.251)
Inflation rate	0.075	0.335	0.069	0.352	0.076	0.384	0.041	0.358
	(0.056)	(0.261)	(0.054)	(0.243)	(0.046)	(0.271)	(0.061)	(0.349)
Institutional quality	–0.165	–0.209**	–0.159	–0.205**	–0.101	–0.179**	–0.145	–0.188**
	(0.096)	(0.099)	(0.116)	(0.097)	(0.104)	(0.093)	(0.352)	(0.095)
R^2	0.369	0.559	0.373	0.423	0.402	0.458	0.377	0.748
Number of observations	57	23	58	22	57	23	58	22

Notes: FD = financial development; INS = institutional quality; SWIID = Standardized World Income Inequality Database; WGI = Worldwide Governance Indicators; *ICRG* = *International Country Risk Guide*. Standard errors are reported in parentheses (White-corrected for heteroskedasticity). Results correspond to trimming percentage of 15. *** Significance at the 1 percent level; ** significance at the 5 percent level.

the qualitative nature of the results remains unaltered, even when using an alternative income inequality indicator.

Conclusions

Using data from eighty-one countries covering 1985–2010, we examine whether there exists an institutional quality threshold in the relationship between financial development and income inequality. One major contribution of the paper is the adoption of the regression model based on the concept of threshold effect proposed by Caner and Hansen (2004) and Hansen (2000) to capture rich dynamics in the relationship between financial development and income inequality. The empirical results indicate a significant institutional quality threshold in the financial development–income inequality nexus. For institutions below the threshold, financial development has an insignificant effect on income inequality. However, financial development turns out to be statistically significant in narrowing income inequality for institutions above the threshold level. These findings suggest that the financial development–income inequality nexus is contingent on institutional quality. Thus, the quality of financial development matters for income inequality, where better institutional quality is potent in ensuring the effectiveness of financial systems in reducing income inequality. The results also demonstrate that low quality of institutions tends to distort the ability of financial intermediaries to channel resources to improve income distribution. The empirical findings are robust to alternative income inequality and institutional quality measures as well as estimation technique.

To conclude, it appears that financial development has significant effects on income inequality when the financial system is embedded within a sound institutional framework. Thus, "better quality finance, more equal income distribution" seems to be a much more appropriate rationalization in explaining the link between financial development and income inequality. In terms of policy implications, since the effect of financial development on income inequality kicks in after institutions reach a certain threshold, policy makers should improve the level of institutional quality to explore the benefits of financial sector development in reducing income inequality. Despite these important findings, other potential research might look at which component of institutional quality has the largest effect on income inequality. Is there an interaction between financial development and institutional quality, that is, is it possible that financial development reduces income inequality only after both financial development and institutional quality pass their critical levels? This is certainly worthy of further investigation.

Notes

1. Algeria, Argentina, Australia, Austria, Bahamas, Bangladesh, Belgium, Bolivia, Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, Colombia, Costa Rica, Côte d'Ivoire, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Finland, France, Gambia, Germany, Ghana, Greece, Guatemala, Guyana, Haiti, Honduras, Hungary, India, Indonesia, Iran, Ireland, Italy, Jamaica, Japan, Jordan, Kenya, Madagascar, Malawi, Malaysia, Mali, Mexico, Morocco, Mozambique, Netherlands, New Zealand, Niger, Nigeria, Norway, Panama, Paraguay, Peru, Philippines, Portugal, Romania, Senegal, Sierra Leone, Singapore, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Tanzania, Thailand, Trinidad & Tobago, Tunisia, Turkey, Uganda, United Kingdom, United States, Uruguay, Venezuela, Zambia.

2. The sample period of this financial development indicator spans 2004–10, with seventy-four countries.

3. We also test whether the high institutional quality regime could be split further into subregimes. The bootstrap *p*-values are insignificant for the second sample split, which suggests that only the single threshold in Equation (2) is adequate for all models.

4. Legal origins and creditor rights data sets are obtained from La Porta et al. (1997) and Djankov et al. (2007), respectively.

5. The estimated coefficient on private sector credit is –0.51, which implies that if financial development increases 1 percent, income inequality tends to reduce 0.51 percent. The estimated coefficient by Kim and Lin (2011) using a similar estimation technique is 0.69 percent. However, their sample is based on seventy-two countries and the period is 1960–2005.

6. Since all six WGI measures are highly correlated, we construct an index of institutions from the underlying six series using principal components to obtain a summary measure.

7. The commercial bank branches indicator results are not reported here to save space.

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