Inequality, Financial Development and Government in Low-Income Developing Countries

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Abstract

The purpose of this study is to examine the impact of financial and economic development on cross-country income inequality using a panel data set from 50 low-income developing counties over a long period, 1970-2008. The results show that financial development helps in reducing inequalities, but a non-monotonic relationship between financial development and inequality does not hold. The study, however, finds a non-monotonic relationship between inequality and the level of economic development, which supports Kuznet's inverted-U hypothesis. The government emerges as a major player in reducing income inequalities as its role is significant in all models. The study suggests that the policy makers must focus primarily on economic development to reduce inequalities. Since financial development, irrespective of its level, also reduces inequalities, policy makers also need to encourage financial reforms.

JEL Classification: G00, G2, O11, H50 and D13.
Keywords: financial development; inequality; government; developing countries

1. Introduction

An extant literature has shown a strong linkage between financial development and economic growth (e.g. Levine, 2005). More recently, a small body of literature explores whether financial development contributes towards less income inequality. A definite answer to the question still eludes us.

On one hand, some theories support that financial development increases growth and reduces inequality. The argument is that the poor may face financing constraints in the presence of imperfect financial markets as they lack collateral and credit histories. Hence, any relaxation of the financing constraints disproportionally benefits the poor. With financial development, not only does the efficiency of capital allocation increase but also income inequality decreases as the poor are facilitated by funding and productive investments (Galor and Zeira, 1993; Aghion and Bolton, 1997; Galor and Moav, 2004; Majeed, 2010).

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On the other hand, theoretical models imply that financial development initially helps the rich. The argument is that the poor seek finances through the informal sector of the economy, such as through family relations, while the rich rely on the formal financial sector. Thus, financial devolvement inordinately benefits the rich. Greenwood and Jovanovic (1990) develop a model that predicts a non-monotonic relationship between financial development and income inequality. According to the model, at early stages of development, the rich benefit from financial development because they can easily afford access to better financial markets, being in possession of collaterals and credit histories. Later on, at higher levels of development, more people, and not just the rich, get access to financial markets.

Although theoretical studies predict a conflicting impact of financial development on income distribution, empirical studies clearly show that financial development improves the income distribution. Beck et al. (2007) find that financial intermediary development decreases income inequality. Clarke et al. (2006) also find that financial intermediary development and income inequalities are inversely related, and that a larger proportion of society benefits from an improved financial sector.

According to Kuznet (1955), and his inverted-U hypothesis, income inequality increases during the early stages of economic development and decreases at higher levels of economic development. Kuznets Curve predicts favourable effects at higher levels of economic development but the fact is that poverty is still a long standing problem of developing countries, particularly in low income countries, despite many of these countries having experienced growth episodes. Does Kuznets Curve hold in low income countries? It is not yet empirically tested, to the best of the authors' knowledge.

Since theoretical models predict conflicting effects, estimating the actual impact of economic and financial development on inequality remains largely an empirical issue. No previous effort has been made to quantify the relative contributions of financial and economic development and other fundamental variables to inequality in low-income countries. This study, therefore, attempts to fill the gaps in existing literature and lends a fresh perspective to the financial development-inequality debate by addressing the following five key concerns.

(1) Does economic development benefit different economic actors equally or does it promote increased inequality leaving poor actors behind?
(2) Is the effect in (1) different for development path in the long run?
(3) Does high financial intermediation reduce inequality?
(4) Does the relationship in (3) vary with the level of financial intermediation?
(5) Does government spending reduce potentially existing inequalities?

Rest of the discussion is structured as follows. Section 2 provides a review of the related literature and theory on the predictors of inequality. Section 3 presents an analytical framework for the study. Section 4 provides a discussion on data and estimation procedures, while Section 5 discusses the results. Finally, Section 6 concludes the study by stating answers to the above-mentioned research questions.

2. Inequality, Finance and Other Control Variables

The role and importance of financial development in reducing income inequality can be traced to the theoretical papers by Galor and Zeira (1993) and Banerjee and Newman (1993) which demonstrate an inverse relationship between financial development and income inequality. Haber (1991), on the other hand, argues that at the early stage of financial deepening access to financial services is limited to incumbents and will thus raise their incomes relative to the incomes of the poor. Greenwood and Jovnovie (1990) predict a non-linear inverted U-shaped relationship between financial development and income distribution. They show that initially financial development favours the rich but the poor also benefit over time as more people get access to the financial system.

The Kuznets Curve suggests an inverse U-shaped relationship between economic growth and income inequality. This implies that income inequality increases at the early stage of economic development but eventually decreases at the later stage due to trickle down effects of economic growth. However, development literature has established that the relationship varies depending on the choice of methodology, sample size and conditioning variables. Paukerit (1973), Ahluwalia (1976) and Macdonald and Majeed (2010) support the Kuznets Curve. However, some later studies (see for example, Deininger and Squire, 1998) do not find evidence in support of an inverse U-shaped relationship between economic growth and income inequality. One of the reasons is that inflation accompanying growth may have a strong redistributive effect which could be positive (through its effects on individual income wealth) or negative (through a progressive tax system). The negative effects of inflation on poor are intensified when wages fail to chase increasing price levels. In developing countries, trade unions are generally weak and minimum wage laws do not work properly due to weak institutions. Hence, workers enjoy little or no rise in wages, while firms do avail the benefits of rising prices and get richer (MacDonald and Majeed, 2010).

Government spending is also one of the factors that affect income inequality. Income inequality may increase or decrease with government consumption. If most redistribution through taxes and transfer system is towards the poor, government spending might result into lower inequality. Papanek and Kyn (1986) test the impact of government intervention on inequality and results

of their study do not support the contention that government spending reduces inequality. They argue that government intervention often benefits the elite, such as the political, bureaucratic and military leadership, rather than the poor. However, some cross-country studies (Boyd, 1998; Macdonald and Majeed, 2010) find the size of public sector to be significant in reducing income inequality.

Generally, it is believed that faster population growth is associated with higher income inequality. One of the reasons is that dependency burden may be higher for poorer groups. Investment in human capital can be expected to reduce income gaps as higher education improves skills, productivity and labour income. Deaton and Paxon (1997) argue that population growth increases the size of families in the poor stratum, thereby increasing poverty. Becker, Glaeser and Murphy (1999) argue that population growth does not increase labour force and high income in poor agricultural economies, or in economies characterised by limited human capital or outdated technology.

The present study is closely related to the studies by Papanek and Kyn (1986), Jha (1996), Jalilian and Kirkpatrick (2002), and Clarke et al. (2006). Papanek and Kyn (1986) investigate the impact of economic development on inequality for 83 countries and find some weak evidence in favour of the Kuznets Curve. Their study does not, however, find any systemic effect of the government intervention and economic growth on inequality. The results of this study are constrained by the availability of data series with above fifty percent of the countries in the sample having a single observation. The problem of endogeneity is not addressed by the study which also does not consider the impact of financial development on inequality,

In a successive study, Jha (1996) revisits the Kuznets Curve relationship and finds evidence in its favour. The sample used by the study includes both developed and developing countries over the time period 1960-1992. The study notes the issue of reverse causality but chooses to leave it for future research. Furthermore, the role of government spending and financial development is not incorporated in the study possibly causing an "omitted variable bias". The present study differs from Jha (1996) by exclusively studying cross-country inequality variation in low-income developing countries, taking note of the omitted variable bias and endogeneity issues.

Jalilian and Kirkpatrick (2002) address the effect of financial development on poverty using a sample of low-income developing countries. The results of their study show that financial development helps in reducing poverty. While Jalilian and Kirkpatrick (2002) use poverty as dependent variable, the present study differs by using inequality as the dependent variable. Their study also does not take account of Kuznets Curve and the non-linear nature of the relationship between finance and poverty. The results of the study are further

constrained by the data series which is available for only 18 developing countries.

Recently, Clarke et al. (2006) examine the relationship between finance and inequality for a pooled sample of 83 developed and developing countries over the period 1960-1996, and their results support the inequality-narrowing hypothesis of finance. The study also finds some evidence in the favour of the inequality-widening hypothesis but the evidence is not robust.

The present study attempts to fill the gaps in the above mentioned studies by studying the finance-inequality relationship, the role of government and Kuznet's hypothesis exclusively for low-income developing countries. The study is distinct in a number of ways. First, the study uses a more comparable statistic for inequality by averaging the household survey years. Second, it addresses the problem of omitted variable bias. Third, it carefully controls the problem of endogeneity. Fourth, the study utilises both within-countries inequality variation and across-countries inequality variation for a large set of low-income developing countries over a long period. Fifth, and finally, it provides a fresh understanding of cross-country inequality variation using the most recent panel data set.

3. Methodology

The study introduces a methodological framework for inequality. Following the conventional approach to inequality, Kuznets Curve has been initially modelled followed by some key variables of interest. Some additional control variables have been added later to assess the sensitivity of results and to control for omitted variable bias.

3.1: Inequality Model

$$\log Gini_{it} = \alpha_{it} + \gamma_1 \log Y_{it} + \gamma_2 \log Y^2_{it} + \varepsilon_{it} \quad (I)$$

$$(i = 1, \ldots\ldots\ldots N \; ; \; t = 1, \ldots\ldots\ldots T)$$

Log $Gini_{it}$ = it refers to the natural logarithm of the Gini Index.
Log Y_{it} = it refers to the natural logarithm of income per capita, adjusted with PPP.
Log Y^2_{it}= square term controls nonlinear conditional convergence across the countries.
ε_{it} = it is a disturbance term

Equation (I) is conventionally used to test for Kuznet's hypotheses (Garbis, 2005; Majeed and Macdonald, 2010). The expected signs for γ1 and γ2 are positive and negative respectively.

$$\log Gini_{it} = \alpha_{it} + \gamma_1 \log Y_{it} + \gamma_2 \log Y^2_{it} + \gamma_3 \log FI_{it} + \varepsilon_{it} \quad \text{(II)}$$

FI_{it} = It is natural log of financial intermediation as proxy for financial development

Cross country inequality variation depends on other factors like government size, education and population growth. Higher targeted government spending could reduce inequalities given that rent seeking activities are avoided and government spending enhances the possibilities and opportunities for the poor. A rise in human capital can be expected to narrow down the gap between poor and rich as people with high investment in human capital have less chances to fall into the poverty trap. Equation (I) can be rewritten as

$$\log Gini_{it} = \alpha_{it} + \gamma_1 \log Y_{it} + \gamma_2 \log Y^2_{it} + \gamma_3 \log FI_{it} + \gamma_4 \log G_{it} + \gamma_5 \log HK_{it} + \gamma_6 \Delta Pop_{it} + \varepsilon_{it} \quad \text{(III)}$$

G_{it} = It is natural log of government spending as proxy for government spending on social sector
HK_{it} =It is measured as secondary school enrolment rate.
ΔPop_{it}=It is percentage change in total population.
ε_{it} =It is a disturbance term

Finally, this study tests for Greenwood and Jovanovic's inverted U-shaped relationship by including a square term for the financial development.

$$\log Gini_{it} = \alpha_{it} + \gamma_1 \log Y_{it} + \gamma_2 \log Y^2_{it} + \gamma_3 \log FI_{it} + \gamma_4 \log G_{it} + \gamma_5 \log HK_{it} + \gamma_6 \Delta Pop_{it} + \gamma_7 \Delta FI^2_{it} + \varepsilon_{it} \quad \text{(IV)}$$

According to Greenwood and Jovanovic (1990), at lower levels of financial development, only rich have access to private credit, thereby, initially, income inequality increases. However, at higher levels of financial development, poor also have access to private credit thereby, later on, income inequality decreases.

This study also controls for inflation and trade liberalization variables to assess the robustness of results. The inflation is likely to increase inequalities as it hits the poor hard. The likely impact of trade liberalization on inequalities is negative as predicted by the Hecksher-Ohlin (HO) model. The inflation rate is measured with consumer price index while trade liberalization is measured as sum of exports and imports as % of GDP.

4. Data

The income inequality data may not be comparable across countries due to differences in definitions and methodologies. The study uses the Gini coefficient (one of the most popular representations of income inequality) to

measure income inequality. It is based on the Lorenz Curve, which plots the share of population against the share of income received and has a minimum value of 0 (case of perfect equality) and maximum value of 1 (perfect inequality). Garbis (2005) introduces the idea of a comparable cross country data series and this study closely follows his approach by extending the data set for different variables and for a longer period. The level of financial development is measured by two variables - credit to private sector and broad money supply. Some other variables, such as the number of banks (private and state owned), also indicate financial development. However, the study focuses on the above-mentioned two variables for the following reasons. First, these variables are highly correlated with other measures of financial development. Second, sufficient data series are available for the two variables. Most other measures of financial development are constrained by the non-availability of data series particularly for low-income developing countries. Third, these two variables have been widely used in the literature on financial development (see, for example, Clarke et al., 2006).

To make the data more comparable, the study averages the data for the two variables for two survey years. Panel data for 50 low-income countries for the period 1970-2008 has been assembled by averaging over periods of three to nine years, depending on the availability of inequality data. Only countries with observations for at least three consecutive periods are included. Hence, the minimum number of observations for each country is three and the maximum is nine. Following King and Levine (1993), financial market development and credit market imperfections are represented by taking the summation of the share of broad money (M2) in GDP, and the share of credit to the economy in GDP. M2 as a percentage of GDP shows broad money and is taken from line 34 plus 35 of the IFS. Credit as percentage of GDP represents the claims on the non-private sector and is taken from line 32d line of the IFS. Description of other control variables is provided in Table 4.1, while the description of basic statistics is listed in Table 4.2. Table 4.2 shows that average inequality (40.34) for low-income developing countries is rather high.

The classification of low-income countries in this study follows the World Bank's classification of countries according to income level. This study comprises a sample of low-income and middle low-income developing countries with focus on development level rather than regional similarity.

4.1: Endogeneity

In order to control for possible reverse causality, both internal and external instruments are used. Internal instruments are defined as "own lag variables" while external instruments are "other exogenous factors". Following financial development literature, this study uses "legal origin" as an instrument (La Porta et al., 1997 and Clarke et al., 2006). The legal origin of a country is measured as a dummy variable. The legal origin for a country can be British, French German, Socialist or Scandinavian. The dummy variable takes value 1 when it belongs to a specific origin and zero otherwise.

Table 4.1: Data sources and variable definitions

Variable name	Definitions	Sources
Per capita real GDP	GNP per capita at PPP is annual averages between two survey years.	[1] and [4]
Gini coefficient	It is a measure of income inequality based on Lorenz curve, which plots the share of population against the share of income received and has a minimum value of zero (reflecting perfect equality) and a maximum value of one (reflecting total inequality).	[3] and [4]
Secondary school enrolment	The secondary school enrolment as % of age group is at the beginning of the period. It is used as a proxy of investment in human capital and derived from.	[1]
Inflation	Inflation rates, annual averages between two survey years.	[2] and [4]
Credit as % of GDP	Credit as % of GDP represents claims on the non-financial private sector/GDP.	[2] and [4]
Government expenditures	Government expenditures as share of GDP are averages for the period between two survey years.	[2] and [4]
Population	Population growth rates	[1]
M2 as % of GDP	It represents Broad money/GDP.	[2] and [4]
Trade Liberalization	It is the sum of exports and imports as a share of real GDP. Data on exports, imports and real GDP are in the form of annual averages between survey years.	[1]
Financial Intermediation (FI)	Following Garbis (2005), the level of Financial Intermediation is determined by adding M2 as a % of GDP and credit to private sector as % of GDP. The high level of financial intermediation represents development of financial sector.	
Legal Origin	It is a dummy variable. The legal origin of a country can be British, French German, Socialist or Scandinavian	[5]

Sources: [1] World Bank, World Development Indicators online data base, 2009; [2] International Financial Statistics online data base, 2009; [3] UNDP; [4] Garbis (2005); [5] La Porta et al. (1997).

Table 4.2: Descriptive Statistics in low-income developing countries

Variable	Observation	Mean	Std. Dev.	Min	Max
Income Inequality	241	40.34	8.69	23.3	62.3
GDP Per Capita	241	3475.9	2667.1	260	15832
Financial Intermediation	223	59.74	37.03	10	211.33
Human Capital	191	54.79	23.04	16	101.69
Government Spending	191	20.54	8.46	5.18	45.9
Population	191	1.57	1.16	-1	4.2
Inflation	191	20.97	38.08	.1383	310
Trade Openness	240	69.67	31.94	13.05	172.90

5. Results and Discussion

The Estimation procedure consists of four steps. First, following the conventional approach of cross sectional and panel data studies, parameter estimates have been obtained using OLS method. Second, the study initially tests the hypothesis of Kuznets Curve and then the effect of financial development followed by some other determinants of income inequality borrowed from the literature. To test the inverted U-shaped relationship between financial development and income inequality, the study introduces a square term. Third, Table 5.2 reports the benchmark results using own lag variables as instruments to control for endogeneity. Fourth, finally, Table 5.3 replicates the results of Table 5.1 using exogenous instruments for financial development.

Table 5.1: Inequality in low-income developing countries

Independent Variables	Dependent Variable: Income Distribution					
Per Capita GDP	1.03	0.94	0.71	0.66	0.65	0.67
	(3.90)*	(3.54)*	(2.38)*	(2.24)**	(2.12)**	(2.31)**
Per Capita GDP	-0.04	-0.059	-0.037	-0.03	-0.03	-0.04
squared	(-3.89)*	(-3.41)*	(-2.00)**	(-1.85)***	(-1.74)***	(-1.95)**
Financial		-0.01	-0.06	-.05	-0.11	-.05
Intermediation (FI)		(-0.37)	(-2.90)*	(-2.36)*	(-0.60)	(-2.34)*
Human Capital			-0.031	-0.03	-0.03	-0.04
			(-0.73)	(-0.75)	(-0.73)	(-0.97)
Population			0.098	0.10	0.10	0.11
			(6.03)*	(6.35)*	(6.25)*	(6.37)*
Government			-0.12	-0.13	-0.13	-0.14
Expenditure			(-3.65)*	(-3.86)*	(-3.79)*	(-4.16)*
Inflation				.001	0.001	.001
				(1.99)**	(1.97)**	(1.92)**
FI square					0.007	
					(0.31)	
Trade						0.001
						(2.08)**
Constant	-0.287	0.007	1.00	1.14	1.29	1.13
	(-0.28)	(0.01)	(0.87)	(1.01)	(1.02)	(1.01)
F Stat	7.63	5.55	17.61	15.80	13.84	14.56
	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)
R square	0.06	0.07	0.33	0.34	0.43	0.36
Observations	241	223	187	187	187	187

F-statistics and associated p-values are reported for the test of all slope parameters jointly equal to zero.
* denotes statistically significant at the 1% level.
** denotes statistically significant at the 5% level.
*** denotes statistically significant at the 10% level.

Table 5.1 reports the results for factors determining income distribution in low-income countries. Column 2 of Table 5.1 indicates that the relationship

between economic development and income distribution is non-linear, implying that at lower levels of economic development income inequality tends to increase while at higher levels of economic development it tends to fall. This finding suggests that poor are deprived of benefits of economic development till the pace of development is below threshold level. However, the poor do benefit from economic development once its pace surpasses the threshold level. In other words, results of this study bear out the validity of Kuznets Curve for low-income developing countries. Column 3 shows a negative relationship between financial development and inequality. However, the effect is insignificant. The negative relationship is rendered significant once additional control variables are incorporated.

The impact of government spending is consistently negative and significant in all regressions, while the effect of inflation is positive. Evidently, in low-income countries the government can play an important role in reducing income inequalities through its spending, and also by controlling inflation to reduce sufferings of the poor. Papanek and Kyn (1986) do not support the contention that government spending reduces inequality. The present study finds strong support to the contention that government spending increases equality in low-income countries. It appears that in low-income countries benefits of government spending have reached the poor in recent years.

Column 6 introduces a non-linear term for financial development to test for Greenwood and Jovanovic's hypothesis of inverted U-shaped relationship between financial development and income distribution. Empirical results do not support the inverted U-shaped relationship, predicted by Greenwood and Jovanovic (1990), as both variables (FI_{it} and FI^2_{it}) are found to be insignificant. The inequality-widening hypothesis does not appear to be valid for low-income developing countries. Clarke et al. (2006) did find some support for the inequality-widening hypothesis, however results in this study differ. One possible reason could be the intra group differences between high-income developing and low-income developing countries. As already mentioned, the present study focuses solely on low-income developing countries.

Table 5.2: Inequality in low-income developing countries (robustness analysis I)

Independent Variables	Dependent Variable: Income Distribution						
	2SLS	2SLS	LIML	LIML	GMM	GMM	GMM
Per Capita GDP	1.13	1.11	1.13	1.13	1.06	1.04	1.05
	(2.77)*	(2.68)*	(2.41)*	(2.34)*	(2.62)*	(2.52)*	(2.62)*
Per Capita GDP	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06
squared	(-2.42)*	(-2.33)*	(-2.07)**	(-2.01)**	(-2.26)*	(-2.16)**	(-2.28)**
Human Capital	-.06	-.06	-.06	-.06	-.06	-.06	-.07
	(-1.18)	(-1.13)	(-1.19)	(-1.18)	(-1.19)	(-1.12)	(-1.29)
Financial	-0.06	-.09	-.06	-.09	-.06	-.11	-.05
Intermediation (FI)	(-2.14)**	(-0.31)	(-1.80)**	(-0.28)	(-2.05)**	(-0.38)	(-1.98)**
Population	0.11	.11	.11	.11	0.11	0.11	0.11
	(5.57)*	(5.23)*	(5.22)*	(5.10)*	(5.57)*	(5.23)*	(5.51)*
Government	-0.11	-0.11	-0.11	-0.11	-0.12	-0.12	-0.13
Expenditure	(-3.15)*	(-3.19)*	(3.20)*	(3.20)*	(-3.41)*	(-3.45)*	(-3.65)*
Inflation	.001	0.001	.001	.001	.001	.001	.001
	(0.760	(0.76)	(0.85)	(0.86)	(0.94)	(0.95)	(0.85)
FI Square		.004		.004		0.01	
		(0.11)		(0.09)		(0.19)	
Trade							0.001
							(1.01)
Constant	-0.79	-0.69	-0.82	-0.73	-0.49	-0.34	-0.45
	(-0.50)	(-0.39)	(-0.46)	(-0.36)	(-0.31)	(-0.19)	(-0.29)
Wald	85.92	86.34	64.65	64.75	88.33	88.43	88.18
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Over id. Chi2	1.90	1.90					
	(0.17)	(0.17)					
Sargan			2.36	2.36			
			(0.13)	(0.12)			
Basmann			2.22	2.20			
			(0.14)	(0.14)			
Hansen J					1.91	1.90	2.57
					(0.17)	(0.17)	(0.11)
R Square	0.28	0.28	0.28	0.28	0.28	0.28	0.29
Countries	51	51	51	51	51	51	51

F-statistics and associated p-values are reported for the test of all slope parameters jointly equal to zero.
* denotes statistically significant at the 1% level.
** denotes statistically significant at the 5% level.
*** denotes statistically significant at the 10% level.

Table 5.2 records the benchmark results using alternative econometric techniques and internal instruments to control for possible endogeneity. Column 2 reports results without controlling square term and using 2SLS, while column 3 introduces the square term. Columns 4 and 8 present the results using LIML and GMM techniques, respectively. The estimated coefficients for Y_{it} and Y^2_{it} have

expected signs and are consistently significant. The coefficient of Y_{it} is about 1.1, while the coefficient of Y^2_{it} is consistently 0.06. It implies that a 1% increase in economic development leads to a 1.1% decrease in income inequality at a lower level of economic development, while at higher levels of development a 1% increase in economic development leads to only 0.06% decrease in income distribution. It is noteworthy that economic development alone is not sufficient to pull all the poor from poverty traps; the process must be accompanied by other pro-poor reforms such as financial development. The financial development is consistently negative and significant in all regressions implying that higher level of financial development could bridge the gap between rich and poor. This finding supports the inequality-narrowing hypothesis.

However, columns 3, 5 and 7 indicate that the effect of financial development is insignificant when the FI^2_{it} term is introduced. Thus, this study does not find support for the inequality-widening hypothesis. In other words, an inverted U-shaped relationship between financial development and inequality does not hold in low-income countries.

Financial development is robustly negatively associated with income inequalities. The coefficient on financial liberalization variable fluctuates around the value of 0.06, implying that a one standard deviation increase in financial liberalization explains 1.8% of income inequalities. The government plays an important role in reducing income inequalities as estimated coefficients of government spending in all regressions are robustly significant.

Table 5.3 replicates the benchmark results including exogenous instruments for financial development that are dummies for legal origin of the countries.[3] The quality of results is the highest in this table though main findings of the study remain robust. In all columns, human capital turns out to be significant. This means that human capital can play an important role in low-income countries in reducing the gap between the rich and the poor because investment in human capital is a potential source of income for individuals. Chi2, Sargan, Basmann and Hansen J stat support the validity of exogenous instruments.

[3] The impact of exogenous instruments has been explained through financial development variables; see Clarke et al. (2006) for details.

Table 5.3: Inequality in low-income developing countries (robustness analysis II)

Independent Variables	Dependent Variable: Income Distribution						
	2SLS	2SLS	LIML	LIML	GMM	GMM	GMM
Per Capita GDP	0.84	0.91	0.85	0.91	1.01	1.05	1.02
	(2.74)*	(2.87)*	(2.33)*	(2.45)*	(3.47)*	(3.51)*	(3.46)*
Per Capita GDP squared	-0.04	-0.05	-0.04	-0.05	-0.05	-0.06	-0.05
	(-2.20)**	(-2.34)*	(-1.86)***	(-2.00)**	(-2.88)*	(-2.94)**	(-2.90)**
Human Capital	-.07	-.08	-.07	-.08	-.09	-.09	-.09
	(-1.78)***	(-1.84)***	(-1.77)***	(-1.83)***	(-2.08)**	(-2.24)**	(-2.17)**
Financial Intermediation (FI)	-0.06	-.13	-.06	0.14	-.05	.06	-.05
	(-2.41)*	(-0.64)	(-2.09)**	(0.59)	(-2.22)**	(0.30)	(-2.13)**
Population	0.10	.10	0.10	0.10	0.10	0.10	0.10
	(6.05)*	(5.85)*	(5.68)*	(5.49)*	(6.09)*	(5.84)*	(6.07)*
Government Expenditure	-0.12	-0.12	-0.12	-0.12	-0.13	-0.14	-0.14
	(-3.60)*	(-3.60)*	(-3.75)*	(-3.74)*	(-3.95)*	(-4.15)*	(-4.29)*
Inflation	.001	0.001	.001	.001	.001	.001	.001
	(1.38)	(1.35)	(1.36)	(1.33)	(1.72)***	(1.68)***	(1.53)
FI Square		-0.023		-.024		-0.51	-0.22
		(-0.90)		(-0.84)		(-0.42)	(-0.20)
Trade							0.001
							(1.39)
Constant	0.42	-0.16	0.39	0.22	-0.22	-0.34	-0.34
	(0.36)	(-0.12)	(0.29)	(0.14)	(-0.19)	(-0.19)	(-0.19)
Wald	138.31	136.83	88.80	89.00	162.79	165.07	159.96
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Over id. Chi2	5.65	5.26					
	(0.13)	(0.15)					
Sargan		6.98		6.24			
		(0.07)		(0.10)			
Basmann		2.19		1.95			
		(0.10)		(0.13)			
Hansen J					5.64	5.26	7.5
					(0.13)	(0.15)	(0.06)
R Square	0.31	0.31	0.31	0.31	0.31	0.30	0.32
Observations	172	172	172	172	172	172	172
Countries	51	51	51	51	51	51	51

F-statistics and associated p-values are reported for the test of all slope parameters jointly equal to zero.

* denotes statistically significant at the 1% level.

** denotes statistically significant at the 5% level.

*** denotes statistically significant at the 10% level.

6. Conclusion

The purpose of the study is to assess the effect of financial development on inequality for a large set of developing countries over a long period (1970 to 2008). The study has employed a unique methodology to examine the inequality-financial development nexus for low-income developing countries, while using a more comparable time series of inequality. Furthermore, it applies alternative econometrics techniques.

The major findings of the study relevant to the research questions posed are as below. First, a non-monotonic relationship (Kuznets Curve) holds for low-income developing countries that necessitates policies which may help build a threshold level of economic development to pull the poor out of poverty traps. Second, financial development plays an important role in reducing income inequality underlining the importance of domestic financial reform in low-income countries. Third, the government can play an important role in reducing inequality in low-income developing countries. This study does not support an inverse U-shaped relationship between financial development and inequality implying that financial reforms are helpful for the poor of low-income developing countries at all levels of economic development.

Appendix

Table A1: List of Low-Income Developing Countries

1	Algeria	18	Honduras	35	Nigeria
2	Armenia	19	India	36	Pakistan
3	Azerbaijan	20	Indonesia	37	Paraguay
4	Bangladesh	21	Iran	38	Peru
5	Belarus	22	Ivory Coast	39	Philippines
6	Bulgaria	23	Jamaica	40	Romania
7	Cameroon	24	Jordan	41	Russia
8	China	25	Kazakhstan	42	Senegal
9	Colombia	26	Kyrgyz Rep.	43	Sri lanka
10	Costa Rica	27	Latvia	44	Tajikistan
11	Dominican Rep	28	Lesotho	45	Thailand
12	Ecuador	29	Lithuania	46	Tunisia
13	Egypt	30	Madagascar	47	Uganda
14	El Salvador	31	Mali	48	Ukraine
15	Ethiopia	32	Mauritania	49	Vietnam
16	Georgia	33	Morocco	50	Zambia
17	Ghana	34	Nepal		

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