Financial Development and Income Inequality: A U-shaped Relationship

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Abstract

This paper investigates how changes in financial development may affect income inequality. We apply the ordinary least squares method, controlling for time and country fixed effects, to an international panel dataset consisting of 195 countries and covering the period from 1990 to 2021. The findings reveal a U-shaped relationship between financial development and income inequality. The development of financial institutions initially lowers income inequality. However, any further advancement, once societies attain a certain threshold of fair distribution, leads to a worsening of income distribution. This is an interesting result as previous literature discusses positive, negative, or inverted U-shaped relationships between financial development and income inequality. For a decomposed sample of strong versus weak democracies and high- versus low-income countries, the finding of a U-shaped relationship firmly holds for strongly democratic and high-income countries.

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1. Introduction

Economic development is important for maximizing social welfare. However, if the boons of economic development are not trickled down to society evenly and fairly, this may result in many social, economic, and political issues. Financial development is considered imperative for stimulating resources to trickle down to society at large.

There is contrasting literature discussing the role of financial institutions in addressing inequality issues. Some studies find financial development leads to a fairer distribution of income (Abiad, Oomes, & Ueda, 2008; Banerjee & Newman, 1993; Beck, Demirgüç-Kunt, & Levine, 2007). In contrast, a number of researchers argue that financial development initially worsens the distribution of income but, later on, inequality falls with further advancement (an inverted U-shaped relationship between financial development and income inequality; for example, see Barro, 2000; Barro, 2008; Greenwood & Jovanovic, 1990).

This paper aims to explore the non-linearity between financial development, measured by domestic credit to private sector as a share of gross domestic product (GDP), and income inequality for a panel of 195 countries from 1990 to 2021. The specifications include time and country fixed effects to control for time-invariant and country-specific factors. The main aim of this paper is to exploit a new dataset of income inequality developed by the University of Texas Inequality Project (UTIP). Another contribution of this study is that the empirical analysis decomposes the sample between strong and weak democracies as well as high- and low-income countries.

Unlike previous studies, we find a U-shaped relationship between financial development and income inequality. In the initial stages, financial development leads to the improvement of income distribution (a fall in income inequality). In the later stages, once a financial institution attains a certain threshold, any further financial development enhances income inequality. The justification follows that in an unequal society a gap in the ability and capacity of rich and poor to arrange financial resources to make productive investment exists. With the advancement of a financial institution, the poor segment of society can access credit and hence the gap between the rich and the poor reduces. The entry of the poor into business thus leads to a reduction in income dispersion across society (the declining part of the U-shaped curve). Now that the society is relatively fairer, the poor population can seek education which stimulates innovation and business start-ups, leading to higher growth (such as in Sweden, for example). As a consequence of economic development through innovation, income inequality widens (the rising part of the U-shaped curve).

Across strong democracies and high-income countries, a U-shaped association between financial development and income inequality is confirmed. The financial sector is substantially more developed and may have crossed that certain threshold across high-income and strongly democratic countries in contrast to weakly democratic and low-income countries. As a result, rising inequality is found (the rising part of the U-shaped curve) throughout strongly democratic and high-income countries. On the other hand, the estimated coefficients (both linear and quadratic) for weakly democratic and low-income countries are negative, implying that these countries are yet to achieve the benchmark after which inequality rises with financial development.

The relevant literature is reviewed in the following section. Section 3 discusses the data and Section 4 presents the empirical analysis. Section 5 concludes this work.

2. Literature Review

The financial sector is important in the economic development of any society. It plays the role of an intermediary between savers and investors. A well-developed financial sector will attract both savers and investors that help society to accumulate more capital stock and hence economic growth (Levine, 2005). Similarly, Bencivenga and Smith (1991) argue that if savings tend to increase economic growth, then financial development will boost it.

There is a substantial amount of research relating to the non-linear relationship between financial development and income inequality. There is evidence for both inverted U-shaped as well as U-shaped relationships in the previous literature. For example, an inverted U-shaped association has been found by Greenwood and Jovanovic (1990), who discovered that income inequality rose with lower financial development, whereas the distribution of resources became relatively better and the income inequality started declining at a higher level. Owing to the substantial and unbearable initial costs, as this study proposes, inequality rises since poor people have limited access to financial services. With the further deepening of financial development across society, the initial costs reduce, ultimately offering poorer people an opportunity to access financial services. Consequently, inequality declines. There is an ample amount of research (Acemoglu & Zilibotti, 1997; Kim & Lin, 2011; Townsend & Ueda, 2006) which also draws an inverted U-shaped relationship between the two variables. On the contrary, Tan and Law (2012), Hassan and Meyer (2020), Clarke, Xu, & Zou (2013) and Nasreddine and Mensi (2016) provide evidence against the inverted U-shaped relationship. These works instead note a U-shaped relationship between financial development and the inequality. For example, according to Hassan and Meyer (2020), the potential causes for this U-shaped association between financial development and income inequality are market imperfections such as the lack of a collateral deposit or a sound credit history, the unaffordable costs of transactions and information asymmetries.

To sustain economic growth and development, it is important for the financial sector to provide society with equal access to loans. If the majority of the population has equal access to credit, it will not only boost economic growth, but also reduce the level of inequality within the country and vice versa (Todaro & Smith, 2012, pp. 781–816). Equal access to credit helps to increase human capital investment such as education. As a consequence, this results in the lowering of income inequality.

The literature indicates an inverted U-shaped relationship between the level of economic development and income inequality (Kuznets, 1955). The empirical findings of Barro (2000) and Barro (2008) also support this argument. Greenwood and Jovanovic (1990) argue that there will be the same relationship between financial development and income inequality. In the initial stages the financial markets are almost non-existent and grow slowly. In later stages, as the financial markets develop, savings tend to increase, hence inequality

rises. At the maturity stage the financial markets are well developed, savings decline, the economy moves towards convergence and inequality reduces with stabilization.

Banerjee and Newman (1993) argue that occupational choice (whether there will be more employees or entrepreneurs) depends on the initial endowment of wealth. A skewed wealth distribution implies capital market imperfections because poor people have less access to wealth/resources. This leads to fewer entrepreneurs and more wage earners. Initially, unequal wealth distribution will create more employment by increasing the number of entrepreneurs and the reverse will lead to stagnation. Hence, initial unequal distribution will lead to more inequality.

Along these lines, Aghion and Bolton (1997) have developed a trickledown theory in the presence of imperfect capital markets. They argue that with the high rates of capital accumulation the economy will converge towards the unique distribution of income in which wealth trickles down from rich to the poor. In contrast to Banerjee and Newman (1993), they state that even with relatively fairer distribution there is a need for redistributive policies to increase the longer-term efficiency of the economy. They further state that there is a need for permanent redistributive policies. With temporary redistributive policies inequality may increase in the longer term even when the economy has reached a certain threshold level.

Considering the political economy argument, Claessens and Perotti (2007) suggest that inequality and financial development both are jointly determined by the institutions whether or not there is unequal access to the political and contractual rights. They argue that countries with historically very high inequalities influence the political institutions, leading to unequal access to finance, and hence reinforce the increase in inequality. Similarly, unequal access to finance and the financial underdevelopment arising due to political influences may undermine the long-term feasibility of financial reforms.

In contrast to the theoretical literature cited above, the empirical type is inconclusive on the effect of financial development on income inequality. Clarke, Xu, and Zou (2006) have examined the financial development and inequality relationship with a sample of 83 countries from 1960 to 1995 and used the instruments as financial development might be endogenous. Their results show that financial intermediation development reduces inequality when controlled for endogeneity. Furthermore, their outcomes reject the inverted U-shaped hypothesis for longer-term data and provide weaker support to the argument based on short-term data. However, financial development may increase inequality at much lower levels of development.

Similarly, Kappel (2010) shows that financial development and stock market development reduce income inequality and poverty. Their findings are based on a panel of 78 countries from 1960 to 2006. Kim and Lin (2011) constructed a panel of 72 countries from 1960 to 2005. Their results reveal that financial development has a disproportionate burden on income inequality. It is imperative for the financial sector to reduce inequality once it has achieved a certain benchmark.

However, in the case of Organisation for Economic Co-operation and Development (OECD) countries, Denk and Cournède (2015) show that financial development and the stock markets both worsen the distribution

of income. Similarly, Jauch and Watzka (2016), using a panel of 138 countries from 1960 to 2008 and controlling for endogeneity problems, find that financial development increases the income inequality when controlled for country fixed effects.

De Haan and Sturm (2017) assess the relationship between financial development, financial liberalization, the banking crisis and inequality using a panel of 121 countries from 1975 to 2005. Their results show that all types of financial variables increase income inequality. However, in the presence of high-quality financial institutions, their findings suggest that financial development reduces income inequality.

Bahmani-Oskooee and Zhang (2015) have conducted a time series analysis for 17 countries to analyze the relationship between financial development, measured by five different measures, and inequality. Their results show that in the short run, financial development has an equalizing effect for most of the countries. However, in the long run, financial development increases inequality for 14 countries, while it reduces inequality only for three countries.

3. Data and Variables

This study focuses on international panel data. An annual dataset consisting of 195 countries from 1990 to 2021 explores how changes in the inclusiveness of financial institutions affect income distribution worldwide. We collect data for financial development measured by domestic credit to the private sector as a share of GDP following De Haan and Sturm (2017). The rationale for using domestic credit to private sector to measure financial development is that it does not include credit to the central bank, development banks, the public sector, credit to state‑owned enterprises, and the cross-claims of one group of intermediaries on another. In fact, domestic credit to private sector directs total savings to the private sector through financial institutions. Previous literature has applied different variables to measure financial institutions, for example M2 (% GDP). However, measuring financial development through domestic credit to the private sector is more preferable as it exploits the essential role of financial intermediaries in channeling the total savings of society to the private sector (Beck et al., 2007). Furthermore, Gimet and Lagoarde-Segot (2011) and Zhang and Naceur (2019) establish that the impact of financial institutions on inequality is captured through the banking sector as opposed to capital market capitalization. The source of the data is the World Development Indicators (WDI) database.

Table 1 presents the summary statistics. On average, domestic credit to private sector constitutes 46.37 percent of GDP across the sample. Nevertheless, the standard deviation (63.42) represents stark differences in financial inclusion. Financial credit facilities are democratized across society in some countries, whereas credit to private sector firms does not account for a considerable proportion of national income for others.

Table 1: Summary statistics

	Observations	Mean	St: Deviation	Minimum	Maximum
FinInc	4484	46.37037	31.4286	.1861699	89.493
Inequality	2116	43.71312	6.674261	24.92401	62.85039
GDPpc	5062	9.067063	1.225572	6.083686	11.81273
Trade	4858	85.923	31.99566	.0209992	72.62
Inflation	4537	28.68631	47.1052	-18.10863	73.13
Population	5614	1.467607	1.53156	-10.95515	17.51095
PrimSch	4254	100.374	17.13345	20.88291	99.6454
UnEmp	5104	7.840426	5.912487	.14	37.94

Notes: Table 1 presents the summary statistics for FinInc (financial inclusion), Inequality (measure of household income inequality collected from the UTIP dataset), GDPpc (GDP per capita), Trade (trade as a percentage of GDP), Inflation (annual %, consumer prices), Population (population growth annually), PrimSch (primary school enrolment rate, gross %) and UnEmp (unemployment rate).

Measuring inequality is not simple, especially in the presence of different inequality measures developed by different agencies, such as Gini coefficients estimated from the WDI, the Standardized World Inequality Dataset produced by Frederick Solt, the UTIP and United Nations University World Institute for Development Economics Research. Data availability remains a critical issue as some datasets do not provide sufficient time series data, whereas others lack sufficient country-wise observations (Knutsen, 2015). Along these lines, Galbraith, Choi, Halbach, Malinowska, and Zhang (2016) criticize the over- and under-representation of different datasets in terms of countries and time. They instead favor the even distribution of datasets to derive reliable insights. The difficulty of developing a unique, consistent, and harmonious dataset is not limited to the number of time-country observations. Sources for calculating and measuring inequality are important tools. In terms of the accuracy of inequality measures, the confidence regarding the technique used and the authority of authors in developing those measures is also important (Galbraith et al., 2016). For example, whether the inequality measures are developed from gross income or net income, wages or capital income may be apparently comparable, but are not in reality.

For this paper, we have exploited the inequality measure developed by the UTIP following Khoso, Rajput, Aziz, Hussain, and Jahanzeb (2021). The reason for the preference for the UTIP dataset to other ones is that it represents household income inequality based on regression, drawing a closer association between the household income inequalities as well as the industrial pay ones. This variable also has a higher number of country-year observations. Galbraith et al. (2016) argues for the comparability of the UTIP as its Gini coefficient is altered according to disposable and gross income. Furthermore, it is also adjusted for equivalence scales.

As suggested by the mean value, 43.71, there are substantial discrepancies in the distribution of income, whereas the standard deviation, 6.67, indicates that the countries do not diverge considerably in terms of the unfair distribution of income across society.

Economic development is an important factor that may potentially affect the distribution of income across society. One of the early works that discussed how changes in economic development affect inequality is that of Simon Kuznets. He proposed an inverted U-shaped relationship between economic development and income inequality (Kuznets, 1955). Initially a rise in economic development leads to worsened income distribution. However, once the economic development reaches a certain threshold, any further economic development is associated with lowering the levels of inequality. Following Kuznets (1955), we include GDP growth per capita, measuring economic development, as a control variable.

Economic integration through international trade has played a substantial role in enlarging the size of the global economic pie. As it benefited a certain proportion of population, it also created losers in the process. Krugman and Lawrence (1994) note that the role of technology in production processes substantially arose as a consequence of international trade. With the advent of technological innovation, the demand for skilled labor outweighed its supply, which worsened income distribution. Another important study, Borjas, Freeman, and Katz (1996), finds that a 15% decrease in the relative wages of school dropouts to total labor in the US labor market was a result of globalization. Chakrabarti (2000) and Harrison, McLaren, and McMillan (2010) also argue that international trade is responsible for the worsening distribution of income. Conversely, Zhou, Biswas, Bowles, and Saunders (2011) identify a fall in inequality as a result of higher international trade. Given the importance of international trade, we include trade, measured by sum of exports and imports to GDP, as a control variable in our model.

A rise in general price level affects the purchasing power of society at large. However, it may affect poor people more and hence may limit their access to natural, physical, and financial resources. The lack of access to current resources may also potentially affect future resource distribution. Albanesi (2007) and Sieron (2017) find that a rise in inflationary pressures lead to higher levels of income inequality.

According to the theory proposed by Malthus (1986), the growth rate of the population exceeds that of resources. Thus, a growing population would affect the per capita income and worsen resource distribution. In addition to this, a fall in mortality rates and a rise in life expectancy due to scientific and technological advancement relating to health sector have changed the demographic structure and, hence, escalated the relative share of the dependent population (Crenshaw, Ameen, & Christenson, 1997; Oeppen & Vaupel, 2002). Given a slower growth rate of resources in comparison to the population and a higher growth rate of the dependent population, greater population growth may considerably affect the distribution of income. Keeping in view the considerable influence which changes in population growth may exert on inequality, we add the population growth rate as a control variable.

Innovation through education has undeniably transformed ordinary labor into human capital. It is easy to observe the strong correlation between education and inequality. For example, Sylwester (2002) finds that lower levels of inequality are associated with higher public education in societies where the youth can forgo income and instead attend school. According to Jimenez (1986), however, poor people do not benefit from the

public education expenditures and hence the inequality does not fall. Interesting findings are identified by Knight and Sabot (1983). They propose an inverted U-shaped relationship between education and inequality. Initially, higher educational attainment raises inequality. But, later, the inequality lowers once the educational attainment reaches a certain threshold. Given this substantial role of education in affecting inequality, we add the primary school enrolment rate as another control variable in our model.

Unemployment is another potential determinant of inequality. While decomposing unemployment into its structural and cyclical components, Mocan (1999) suggests that structural unemployment leads to an unfair distribution of income. To control for the effect of unemployment on inequality, we include it as a control variable.

Table 2: Correlation matrix

	FinInc	Inequality	GDPpc	Trade	Inflation	Population	PrimSch	UnEmp
FinInc	1.000							
Inequality	-0.506	1.000						
GDPpc	-0.584	0.605	1.000					
Trade	-0.258	0.246	0.280	1.000				
Inflation	-0.004	-0.087	-0.079	-0.019	1.000			
Population	0.408	-0.115	-0.066	-0.026	-0.051	1.000		
PrimSch	0.084	-0.010	-0.021	-0.068	0.035	-0.015	1.000	
UnEmp	0.037	-0.002	-0.046	-0.095	-0.033	-0.251	0.032	1.000

Apart from discussing the summary statistics of the main variables employed in this paper, we now address the correlation among these variables, as we know that the higher levels of correlation among explanatory variables may cause multicollinearity problems and affect the reliability of results. Table 2 presents the correlation among the variables, which is not substantial, implying that there is no multicollinearity issue in the model.

4. Empirical Analysis

This section presents an empirical analysis on the relationship between financial development and income inequality. For the annual panel dataset, the ordinary least squares (OLS) method using time and country fixed effects is applied. The reason for employing time and country fixed effects is to control for time-invariant and country-specific confounding, estimating an independent variable's effect utilizing only within-unit variation.

The non-linearity between financial institutions and income inequality is assessed in column 1 of Table 3. In the following columns, from columns 2 to 7, the control variables are included. In contrast to previous literature, which establishes an inverted U-shaped relationship between financial development and income inequality, this paper instead finds the relationship to be U-shaped. Initially, a rise in access to financial credit reduces income inequality. Nevertheless, in the later stages after attaining a certain threshold, income inequality

increases with further financial development through granting access to a larger section of society. The rationale is as follows: The potential causes for this U-shaped association between financial development and income inequality are market imperfections such as the lack of a collateral deposit, a sound credit history, the unaffordable costs of transactions and information asymmetries (Hassan & Meyer, 2020). In addition to this study, there is an ample amount of existing literature, such as Tan and Law (2012), Hassan and Meyer (2020), Clarke et al. (2013) and Nasreddine and Mensi (2016), that substantiates a U-shaped association between financial development and income inequality. The Nobel Laureate Paul Krugman also shares this view. According to him, owing to a reduction in income inequality, societies become relatively fairer. Countries with low-income inequality (Sweden, for example) stimulate innovation and business start-ups, which result in higher economic growth as financial access further improves. Higher economic growth due to innovation may generate income inequality. This argument is verified when we observe the rising inequality in the US in the wake of widespread access to financial resources.

The U-shaped non-linear relationship between financial development and income inequality firmly holds throughout Table 3. A discussion regarding the control variables presented by column 7 is offered only as it contains all the control variables. The coefficient estimates of GDP per capita are negative and statistically significant, which confirms the falling phase of the Kuznets curve (Kuznets, 1955).

A positive sign of a statistically significant coefficient of trade implies that a rise in economic integration worldwide worsens income inequality. This is consistent with previous literature (Krugman & Lawrence, 1994). The negative sign of the inflation coefficient contradicts Albanesi (2007) and Sieron (2017), which infers that a rise in inflation decreases income inequality. Contrary to what Malthus (1986) suggested, a negative sign of the coefficient of population growth rate indicates improvement in the resource distribution across society. The positive sign of the unemployment coefficient supports the finding of Mocan (1999), which means that a higher level of unemployment rate worsens income distribution.

Although the coefficient estimate for the primary school enrolment rate is not statistically significant, controlling for it is logical for two reasons. While applying the variable selection method, we follow two strategies. One method is to independently choose variables depending on their theoretical relationship with the dependent variable. While reviewing the literature in the previous section we already established how these control variables may affect the dependent variable of this paper. The second method to consider while selecting potential variables is to analyze the values of adjusted R square. Throughout Table 3 (from column 1 to column 7), we can see that the numerical value of adjusted R square increases with the addition of a control variable. This implies that addition of each control variable helps explain the variance in the dependent variable.

Table 3: Estimation results: complete sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Inequality	Inequality	Inequality	Inequality	Inequality	Inequality	Inequality
FinInc	-0.0302***	-0.0252***	-0.0255***	-0.0224***	-0.0213***	-0.0251***	-0.0209***
	(0.0069)	(0.0071)	(0.0072)	(0.0072)	(0.0072)	(0.0078)	(0.0079)
FinIncSq	0.00019***	0.00019***	0.00019***	0.00019***	0.00019**	0.00019***	0.00019**
	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00003)
GDPpc		-1.8858***	-2.1899***	-2.3825***	-2.3606***	-2.2682***	-1.9391***
		(0.4519)	(0.4603)	(0.4754)	(0.4758)	(0.5125)	(0.5435)
Trade			0.0058*	0.0054	0.0055	0.0059	0.0072*
			(0.0034)	(0.0035)	(0.0035)	(0.0040)	(0.0040)
Inflation				-0.0004*	-0.0004*	-0.0006**	-0.0017***
				(0.0002)	(0.0002)	(0.0002)	(0.0004)
Population					-0.2014***	-0.1875**	-0.1957**
					(0.0772)	(0.0827)	(0.0822)
PrimSch						0.0065	0.0131
						(0.0088)	(0.0091)
UnEmp							0.0647**
							(0.0300)
Obs	1826	1805	1726	1649	1648	1477	1431
Countries	126	125	120	113	113	110	109
T&C-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Threshold	79.47	66.31	67.10	58.94	56.05	66.05	55
$\overline{R^2}$	.9007	.9031	.9058	.9086	.9089	.9090	.9122

Notes: Table 3 presents the estimation results for the non-linear relationship between Inequality (measure of household income inequality collected from UTIP) and FinInc (financial inclusion). In addition to the main regressors (Inequality and FinInc), GDPpc (GDP per capita), Trade (trade as a percentage of GDP), Inflation (annual %, consumer prices), Population (population growth annually), PrimSch (primary school enrolment rate, gross %) and UnEmp (unemployment rate) are included as control variables. The specification controls for time and country fixed effects (T&C-FE). Robust standard errors are shown in parentheses. *, **, *** denote statistical significance at 10%, 5% and 1%, respectively.

Table 4 contains empirical results for the sample disintegrated into strong and weak democracies as well as high- and low-income countries. A country is considered to be strongly democratic if the extent of democracy is above its median value, which is 6. Countries with democracy levels below or equal to 6 are categorized as weak democracies. Similarly, countries with a GDP per capita higher than its median value, 9.135, are regarded as high-income countries, whereas a country at any income per capita below or equal to its median is categorized as a low-income one.

Table 4: Estimation results: stronger vs. weaker democracies

	(1)	(2)	(3)	(4)
	Inequality	Inequality	Inequality	Inequality
FinInc	-0.0346***	-0.0004	-0.0167**	-0.0034
	(0.0077)	(0.0248)	(0.0071)	(0.0265)
FinIncSq	0.00028***	-0.00025	0.00019*	-0.00027
	(0.00003)	(0.0002)	(0.00002)	(0.0002)
GDPpc	2.4685***	-5.7274***	0.6026	-3.8731***
	(0.7309)	(0.8971)	(0.6512)	(1.2347)
Trade	0.0035	-0.0002	0.0078**	0.0077
	(0.0041)	(0.0102)	(0.0035)	(0.0107)
Inflation	-0.0075***	-0.0015***	0.0245***	-0.0018***
	(0.0018)	(0.0005)	(0.0065)	(0.0005)
Population	0.6145***	-0.3437***	-0.2390***	-0.1915
	(0.1817)	(0.1077)	(0.0653)	(0.3150)
PrimSch	-0.0015	0.0099	-0.0147	0.0158
	(0.0132)	(0.0136)	(0.0140)	(0.0136)
UnEmp	0.1604***	0.0291	0.1187***	0.0092
	(0.0312)	(0.0806)	(0.0259)	(0.0873)
Obs	952	479	915	516
Decomposition	Strong Democracy	Weak Democracy	High Income	Low Income
Countries	76	48	75	55
Threshold	61.78	.8	43.94	6.29
T&C-FE	Yes	Yes	Yes	Yes

Notes: Table 4 reproduces Table 3 after decomposing the sample into strong and weak democratic countries as well as high- and low-income countries.

Interesting results are suggested by the coefficient estimates throughout Table 4. A U-shaped association between financial development and income inequality is found across strongly democratic countries, whereas the estimated coefficients (both linear and quadratic) across weak democracies are only negative and statistically insignificant. This finding confirms the main argument proposed in this paper. As strongly democratic governments are more inclusive in comparison to dictatorial regimes, they ensure widespread access to domestic credit to the private sector, which results in lower income inequality. However, as societies become fairer, technological change takes place faster owing to the establishment of property rights and economic freedom for a larger section of society under democratic rule. This technological change follows higher income inequality. The argument appears crystal clear if we analyze some important data. Credit to the private sector constitutes 61.06% of GDP, on average, across strong democracies, whereas across weak democracies it is calculated to be 29.74% of GDP. To summarize this, as more democratic countries facilitate access to domestic credit to a larger section of society, income inequality initially decreases. But lower

inequality coupled with the establishment of property rights and economic freedom stimulates innovation and economic growth. This dynamic process leads to higher inequality after a certain threshold.

For the sample decomposed into high- and low-income countries, a statistically significant U-shaped association between financial institutions and income inequality is established for high-income ones. The coefficient estimates (both linear and quadratic) across low-income countries are negative and statistically insignificant. Financial inclusion, in the initial stages, improves income distribution. However, in the later stages, once the society becomes relatively fairer, greater access to financial credit for society worsens the income distribution as economically advanced societies with better income distribution become technologically advanced through innovation and higher spending on human capital. The extent of the evolution of financial institutions may be inferred through the mean and standard deviation. For high-income countries, domestic credit to the private sector constitutes 67.32% of GDP, whereas for low-income countries it is estimated to be 26.73% of GDP. Likewise, standard deviation informs us about how well-spread the access to financial credit is across the sample. Throughout high-income samples the standard deviation is calculated to be 47.93, whereas for a sample characterized by low income it is 69.60. Through these values, it can be inferred that the difference in access to borrowing for the private sector is greater across low-income countries as opposed to high-income ones.

A possible justification for why a U-shaped relationship exists across a sample of strong democracies and high-income countries is the extent to which financial access is ensured for a society. The proportion of GDP composed by domestic credit to the private sector may have crossed that certain threshold across strongly democratic and high-income countries, after which any further access to financial credit worsens income distribution. On the contrary, access to domestic credit to the private sector is yet to achieve that threshold point. This proposition is substantiated by the mean values of domestic credit to the private sector discussed above while comparing strong and weak democracies as well as high- and low-income countries.

After applying the Im-Pesaran-Shin test for stationarity and the unit root issues in the data, we find all the variables except GDP per capita to be non-stationary, which may potentially cause results to be spurious. As the standard assumption of asymptotic analysis violates due to non-stationarity, all the non-stationary variables are differenced to account for non-stationarity. Additionally, there are variables such as the unemployment rate, trade, GDP growth per capita and primary school enrolment rate which suffer endogeneity issues as there is a possibility of reverse causation among these variables and financial development. To account for endogeneity issues, two lags of endogenous variables are taken. As an econometric methodology, the two-stage least squares (2SLS) method is used.

Column 1 of Table 5 reports the regression results with 2SLS estimation to control for endogeneity issues and column 2 provides the estimated coefficients with 2SLS and first difference estimation to account for both endogeneity and non-stationarity issues. The findings of Table 5 verify the earlier results and are consistent with the proposed hypothesis. On the other hand, column 3 presents the estimation results keeping

in view Kuznet's hypothesis as it takes the square of the GDP per capita. Interestingly, there is strong evidence for Kuznet's hypothesis.

Table 5: Estimation results: 2SLS and 2SLS + first difference estimation (FD)

	(1)	(2)	(3)
	Inequality	Inequality	Kuznet's Hypothesis
FinInc	-0.029***	-0.083**	-0.063***
	(0.006)	(0.041)	(0.021)
FinIncSq	0.005***	-0.02**	-0.03**
	(0.0001)	(0.01)	(0.015)
GDPpc	2.8***	-4.1274***	2.2474***
	(0.0209)	(0.7171)	(0.32)
GDPpc Squared			-.031
			(.01)***
Trade	0.0035	-0.0002	-0.87
	(0.0041)	(0.0102)	(0.91)
Inflation	-0.0075	-0.0025***	-0.11
	(0.0058)	(0.0005)	(0.195)
Population	0.414***	-0.5637	-0.361
	(0.1217)	(0.4977)	(0.82)
PrimSch	-0.21	0.99	0.17
	(0.4632)	(0.8136)	(0.23)
UnEmp	0.2604***	0.0391	0.179
	(0.0212)	(0.0906)	(0.19)
Obs	712	756	756
	2SLS	2SLS+FD	2SLS+FD
T&C-FE	Yes	Yes	Yes

5. Conclusion

This paper examined how financial development may affect income inequality. The findings reveal a U-shaped relationship. Financial development may initially decrease inequality. However, after financial development achieves a certain threshold, any further financial development enhances income inequality. The findings substantially hold across strongly democratic and high-income countries. Based on these results, more financial development is recommended for weak democracies and countries characterized by low income. The reason for this recommendation is that these countries are yet to achieve the estimated threshold. A higher level of financial development in these countries will improve the resource distribution and reduce income inequality.

There are a few limitations to this study. Future researchers may add to the literature by addressing these. For example, developing a consistent and unique measure for income inequality and financial development is imperative to arrive at some conclusive evidence. Furthermore, efforts can be made to calculate the threshold after which the inequality increases. In relation to the empirical analysis of financial development and income inequality, we recommend that future researchers employ a variable selection method following Yang, Xiang, Shu, and Yang (2018) and Yang, Tian, Li, and Lin (2020), which would add considerable value to the existing literature.

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