Financial structure and income inequality*

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* The opinions presented belong only to the authors and do not necessarily represent those of the respective institutions of affiliation.

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Outline

- Motivation
- Data
- Empirical analysis
- Robustness
- Conclusions

Motivation: *Does financial development always enhance growth?*

- In general, **financial development (FD) → more growth** by enabling efficient capital allocation & less financing constraints (Levine, 2005).

- But, **which part of society benefits** from the growth enabled by FD?

Motivation: *Does growth trickle down quickly?*

- **Pro-poor** growth = more **jobs**; **Pro-rich** growth = more **profits/rents**.
- **Link income distribution – economic development** since **Kuznets** (1955) **curve**: inverted U-shaped income inequality vs development.
- Kuznets: rural areas more equal & lower mean income vs urban areas at the start → **urbanization makes a society more unequal**.
- But, **later on**, new generations of the former migrants can use urban possibilities → Low wages rise → **income inequality (II) narrows**.

Motivation: *Theory vs. evidence on finance & inequality? – 1*

- Kuznets' **urban possibilities boosted by financial development** (**FD**), enabling education & own businesses – regardless of inherited wealth.
- So, economic theories predict **FD lowers income inequality**. FD leads to growth → more jobs, average incomes rise & inequality falls.
- Three theoretical papers on the FD-II nexus are: 1) Banerjee-Newman (1993), 2) Galor-Zeira (1993) & 3) Greenwood-Jovanovic (1990).
- First two: always more FD → lower II (**linear**), but 3) gives an **inverted-U-shaped curve between FD & II** → in early stages of FD – only part of society benefits – II rises; after a certain stage of FD, more FD lowers II.
- While specific mechanisms for the above differ, key reason why FD – at least after some stage – lowers II is that **more credit available** → household choices hinge **less on inherited wealth**.

Motivation: *Theory vs. evidence on finance & inequality? – 2*

- However the econometric evidence is mixed:

- Clarke et al. (2006) & Beck et al. (2007): **linear drop FD → II**.
- Recent studies Jaumotte et al (2013), Jauch-Watzka (2016): **FD rises II**.

- The idea is gaining support that, **above a certain threshold**, FD benefits more the higher wage classes.
- E.g., booming senior **executives' remunerations** (Kay, 2016) **may raise II**.
- Rajan (2010) indicates that wage stagnation and rising II in the U.S. prior to the Global Financial Crisis (GFC) encouraged low/middle-income **households to borrow more** to keep their consumption levels. Higher indebtedness, in turn, rose income transfers from constrained households to the wealthier, i.e. the funds providers, further exacerbating II.

Motivation: *Our paper*

- This paper investigates empirically the **link between financial structure** and **income inequality**.

- **We explicitly distinguish** the services provided by **banks from** those provided by **markets** and ask the following **four questions**:

Q.1 Does financial development (FD) affect income inequality (II)?

Q.2 Does financial structure (mix of bank vs market funds) alter the FD-II link?

Q.3 Is the relationship non-linear (below vs beyond a certain threshold)?; and

Q.4 Does this non-linearity differ for bank- vs market-provided finance?

- The main result is that the **FD – II relationship is not linear**. **Up to a point, more finance reduces income inequality**.

- **Beyond that point, inequality rises** if finance grows **via market-based financing**, but **not so clearly** if **through bank lending**.

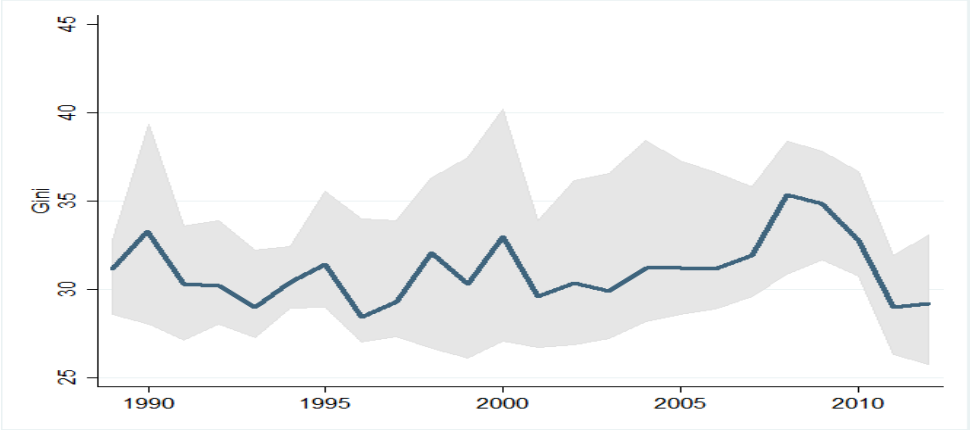
Data – 1

- First let's look at income inequality (Gini index):

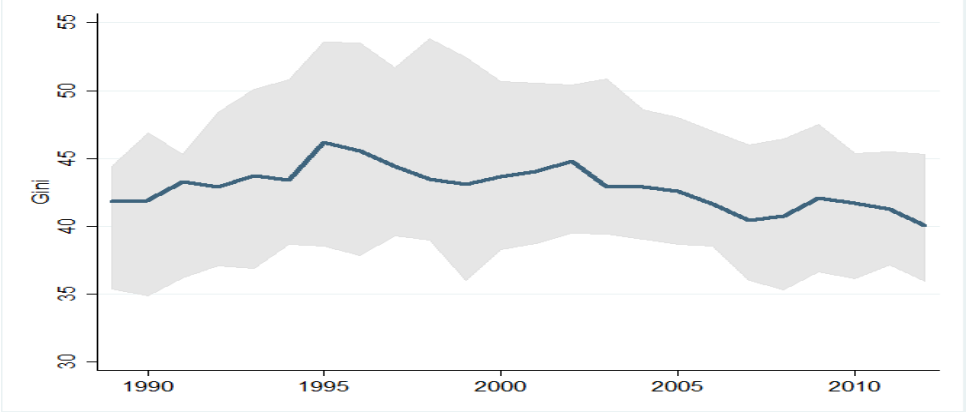
- There is mounting evidence that **income inequality & wealth disparity have risen in advanced economies** in recent decades (Piketty, 2014).

- Instead, **inequality is more stable in the low- and middle-income countries**, where income structures have converged, as evidenced by the decrease of inequality dispersion over time.

High Income Countries



Low & Middle-Income Countries

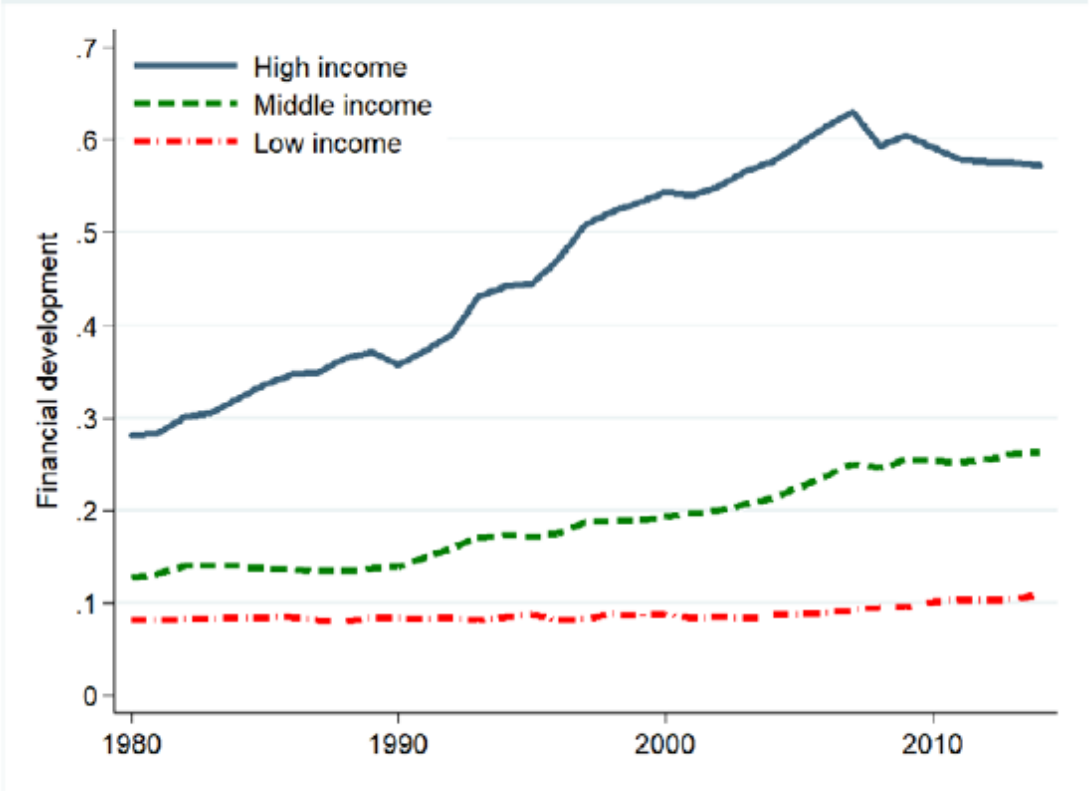


Data – 2

- Also Financial Development:

- **has risen comparably more in advanced economies** in recent decades.

Financial development over time — Graph 1



Note: The graph shows unweighted averages of the Financial Development Indicator across high income, middle-income and low-income countries.

Sources: Svirydzenka (2016); authors' calculations.

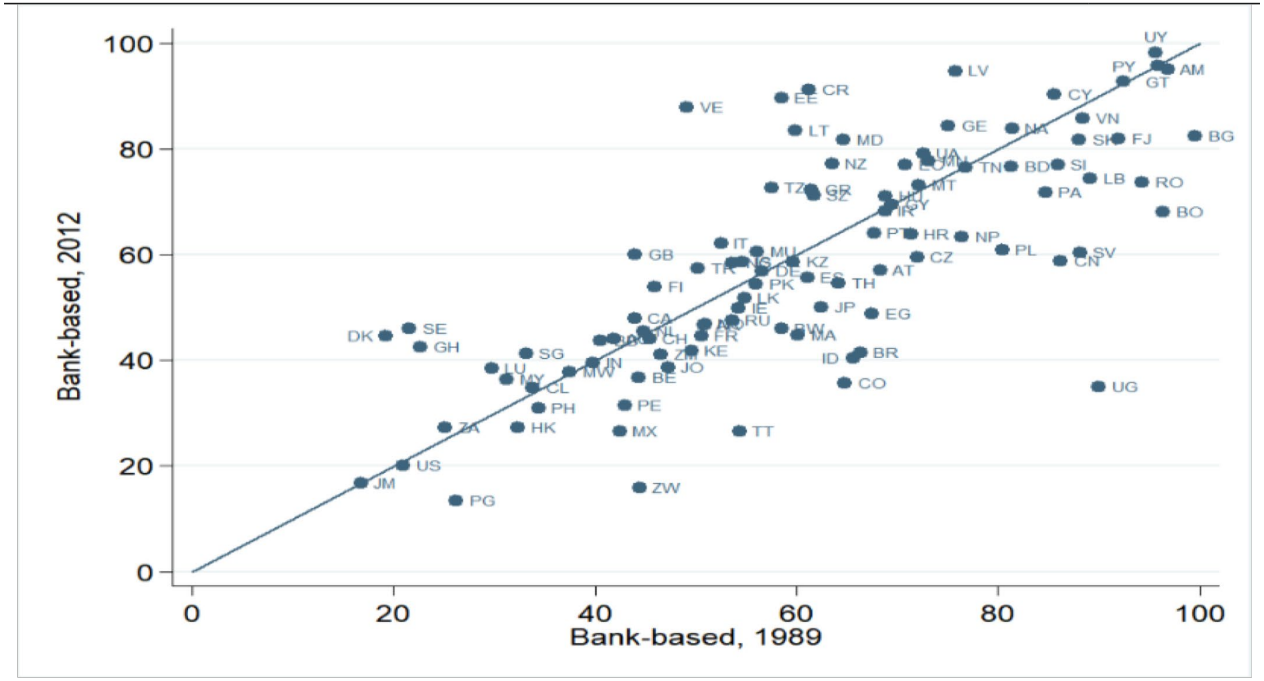
Data – 3

- Data on bank credit / (itself + bond market capitalization) for 97 countries
- Two patterns emerge:

i) Financial structure differs notably across countries. Banks' weight ranges from 20% (U.S.) to almost 100% (Uruguay);

ii) Market-based intermediation gained ground between 1989 and 2012.

Ratio of bank credit to total private sector funding



Note: The ratio of bank credit is expressed as a percentage of the sum of bank credit plus bond and equity market capitalisation. A higher value of the indicator suggests financial structure that is more bank-oriented. A dot that is below (above) the 45-degree line indicates that a particular system became more (less) market-oriented in 2012 compared to the initial value in 1989. Sources: World Bank World Development Indicators; authors' calculations.

Data – 4

- Panel of 97 countries over the period 1989-2012
- Gini coefficient from World Income Inequality database
- FD index by Svirydzenka (2016)
- Bank indicator (B) defined as the log of the ratio bank credit/GDP
- Market indicator (M) is the log of the ratio stock market capitalization/GDP
- Common law vs civil law countries (La Porta et al 1997)
- Non-overlapping five-year averages (following the literature). Use their initial values as instruments for GDP & FD, as well as legal origin, ethnic fractionalization, religious composition, the absolute value of latitude (Levine et al 2000; Beck et al 2001, 2003; Clarke et al 2006). We control for time-invariant country characteristics & include: log of industrial value added to GDP, average years of primary & secondary schooling, inflation (Clarke et al 2006; Beck et al 2007).

Empirical analysis – 1

- We have two baseline models (the 1st on Q1, the 2nd on Q2, Q3, Q4):

[1] $$Gini_{i,t} = \rho Gini_{i,t-1} + \alpha y_{i,t} + \alpha^* y_{i,t}^2 + \vartheta FD_{i,t} + \vartheta^* FD_{i,t}^2 + \delta' X_{i,t} + \psi_i + \varepsilon_{i,t}$$

- where $Gini_{i,t}$ is the log of the Gini coefficient, $y_{i,t}$ is the log of GDP per capita, $X_{i,t}$ represents a set of control variables, and *i* and *t* indicate countries and time periods, respectively. The indicator of financial development $FD_{i,t}$ is taken from Svirydzenka (2016).

[2] $$Gini_{i,t} = \rho Gini_{i,t-1} + \alpha y_{i,t} + \alpha^* y_{i,t}^2 + \beta B_{i,t} + \beta^* B_{i,t}^2 + \gamma M_{i,t} + \gamma^* M_{i,t}^2 + \delta' X_{i,t} + \psi_i + \varepsilon_{i,t}$$

- where $Gini_{i,t}$ is the log of the Gini coefficient, $y_{i,t}$ is the log of GDP per capita, $X_{i,t}$ represents a set of control variables, and *i* and *t* indicate countries and time periods, respectively. The indicators of financial structure are $B_{i,t}$ and $M_{i,t}$.

- We use GMM to mitigate endogeneity issues.

Empirical analysis – 2

We must bear in mind the following:

- In the hypothesis that more finance continues to reduce inequality in a **linear** way, β and γ should be negative and significant, with insignificant β^* and γ^*. The same applies to θ and θ* in eq. [1]

- Along the **inverted U-shaped** hypothesis, β and γ should be significant and positive, with β^* and γ^* negative and significant. The same applies to θ and θ* in eq. [1]
- Instead, for the **U-shaped** hypothesis, β and γ should be negative and significant, with β^* and γ^* positive and significant. The same applies to θ and θ* in eq. [1]
- As for the coefficients on *GDP per capita* and its squared term, the Kuznets curve predicts that α should be positive and significant, and α^* negative and significant.

Empirical analysis – 3

- **Equation [1]:**
- **Nonlinear model** supported both for
- GDP per capita
- and for FD.

Income inequality and financial development — Table 2

Regressors	Linear model Aggregate FD index (I)	Non-linear model Aggregate FD index (II)	Depth index (III)	Access index (IV)	Efficiency index (V)
Lagged dependent variable	0.825***	0.664***	0.733***	0.858***	0.830***
	(0.048)	(0.113)	(0.101)	(0.058)	(0.056)
Income per capita	-0.005	0.475*	1.099**	0.269	-0.069
	(0.009)	(0.259)	(0.506)	(0.294)	(0.165)
Income per capita squared		-0.030*	-0.065**	-0.015	0.005
		(0.016)	(0.031)	(0.016)	(0.010)
FD index	-0.038	-1.662**	-2.206**	-0.376	1.348
	(0.082)	(0.826)	(0.907)	(0.706)	(1.422)
FD index squared		2.564**	3.736**	0.348	-2.032
		(1.304)	(1.627)	(0.904)	(1.828)
Industrial production	-0.013	-0.014	-0.062	-0.021	0.027
	(0.031)	(0.033)	(0.066)	(0.035)	(0.045)
Average years of schooling	-0.021	-0.050	-0.156***	-0.032	-0.056*
	(0.032)	(0.038)	(0.056)	(0.034)	(0.032)
Inflation rate	0.267***	0.115	-0.049	0.213	0.196
	(0.088)	(0.132)	(0.143)	(0.174)	(0.126)
Observations	228	228	228	228	228
Number of countries	79	79	79	79	79
Serial correlation test, AR(2)[1]	0.001	0.004	0.145	0.021	0.100
Hansen test[2]	0.048	0.298	0.692	0.129	0.663

Empirical analysis – 4

- **Equation [2]:**
- **Nonlinear model** supported both for
- GDP per capita
- and for FD via market financing
- but link is weak for FD via bank financing
- differences in Common vs Civil law countries.

Income inequality, financial structure and legal system — Table 3

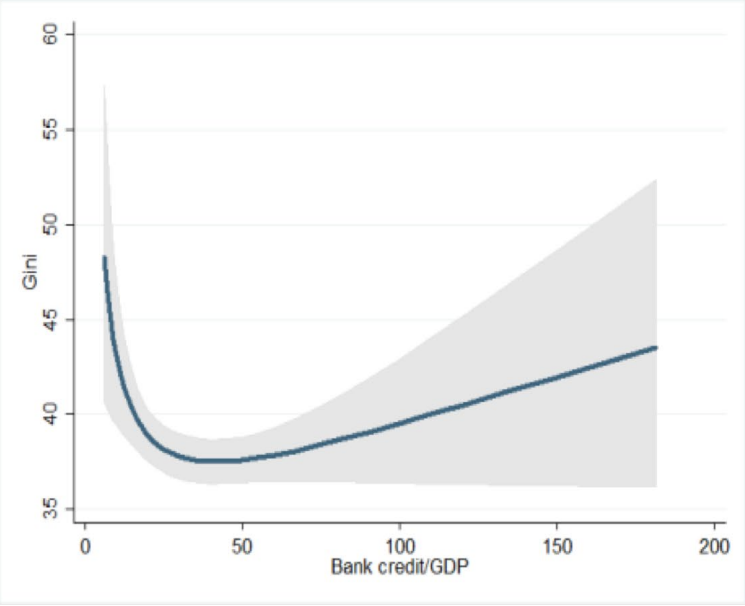
Regressors	Linear model (I)	Non-linear model (II)	Common law countries (III)	Civil law countries (IV)	Test of difference between (III) and (IV)
Lagged dependent variable	0.442***	0.711***	0.764***	0.728***	0.036
	(0.117)	(0.061)	(0.139)	(0.094)	(0.132)
Income per capita	-0.031*	0.508***	-0.129	0.673*	-0.802
	(0.018)	(0.184)	(0.238)	(0.404)	(0.571)
Income per capita squared		-0.030***	0.008	-0.039*	0.047
		(0.011)	(0.014)	(0.023)	(0.033)
Bank credit	-0.020	-0.509**	0.412	-0.403*	0.815**
	(0.016)	(0.258)	(0.246)	(0.246)	(0.349)
Bank credit squared		0.068*	-0.062	0.053*	-0.115**
		(0.037)	(0.040)	(0.032)	(0.049)
Market capitalization	0.017	-0.087*	-0.140*	-0.099**	-0.041
	(0.012)	(0.045)	(0.080)	(0.045)	(0.063)
Market capitalization squared		0.019**	0.023**	0.020**	0.003
		(0.009)	(0.012)	(0.009)	(0.013)
Industrial production	-0.021	-0.043	0.019	-0.068	0.087
	(0.039)	(0.043)	(0.070)	(0.056)	(0.079)
Average years of schooling	-0.047	-0.097***	0.038	-0.124***	0.162***
	(0.032)	(0.025)	(0.057)	(0.037)	(0.053)
Inflation rate	0.083	-0.111	-0.020	-0.070	0.050
	(0.085)	(0.106)	(0.305)	(0.143)	(0.203)
Observations	341	341	112	229	
Number of countries	97	97	34	63	
Serial correlation test, AR(2)[1]	0.583	0.507	0.681	0.138	
Hansen test[2]	0.558	0.992	0.334	0.269	

Empirical analysis – 5

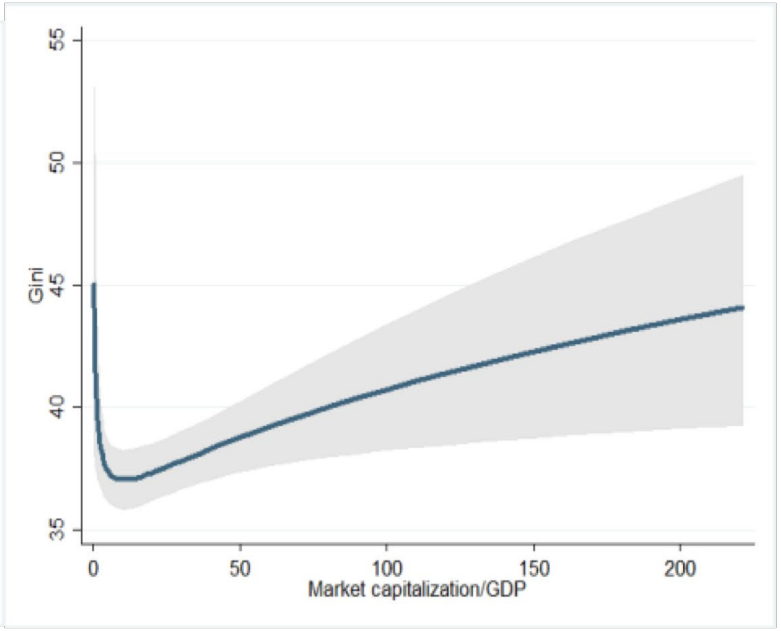
- The limits of financial deepening on inequality are depicted in the graph below.
- The x-axis indicates both credit/GDP and market capitalization/GDP variables, while the y-axis measures income inequality.
- Income inequality drops as the ratio of bank credit to GDP rises until the level of 41%. The corresponding minimum for market capitalization is 10%.
- Based on these thresholds, 48 of the 97 countries are above the threshold for bank credit and 74 are above the threshold for market financing (43 countries exceed both thresholds).
- These results concur with Delis et al. (2014) showing that securities market liberalization substantially increases income inequality.
- Splitting the sample into common and civil law countries, the non-linear effect of market-based financial development emerges in both groupings and is not too dissimilar.

Income inequality and financial structure

(a) Banking sector development



(b) Financial market development



Note: The non-linear effect is calculated from the regression in column (II) of Table 3 in Brei, Ferri and Gambacorta (2018). The marginal effects are calculated at average values of the regression variables. The shaded area shows 95% confidence bands.

Robustness

- Our results survive several robustness checks:
- **Top 10 per cent income share** instead of Gini coefficient
- **Split** the sample across **common law** vs **civil law systems**
- High-to-medium degree of **economic freedom**
- Different activism in the use of **macroprudential policies**
- **Transparency** of financial statements

Conclusions

- Our responses to the four questions above are:

R.1 Financial development (**FD**) **does affect** income inequality (**II**)

R.2 **Financial structure impacts the FD-II relationship**

R.3 The **relationship is non-linear**. **Up to a point**, more finance reduces income inequality. **Beyond that point, inequality rises**

R.4 This happens **especially if finance is expanded via market-based financing**, while it does not so evidently when finance grows via bank lending.

- Thus, we conclude that the role of finance in modern economic systems needs to be reassessed. **More finance is definitely not always better**, **especially** if it comes **through market-based financing**.