

The Inequality-Credit Nexus

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- Empirical Evidence:
 - There is no evidence that a rise in top income shares leads to credit booms (Bordo and Meissner, 2012).
 - Positive relationship between income concentration and private sector indebtedness (Perugini, Hòlscher, and Collie, 2015).

Overlapping Generations Model

OLG model along the lines of Matsuyama (2004).

2 key additional features are included:

- Income heterogeneity among agents.
- Bankruptcy and general collateral laws.

Distributional effects on credit measures are shaped by:

- Aggregate Income.
- The quality of legal system.

Short and Long-run effects appear.

OLG: Description

Agents

- Two-period lived: young and old.
- Born with l^z units of observable labour, $l^z \sim \Gamma(l^z)$, $l^z \in [0, l_{max}]$.
- Young work, earn $w_t l^z$ and save.
- Old can ask for a loan to invest in a risky project.

Goods

- Capital and output (consumption good).
- Output can be invested at a gross international rate $(1 + \rho^*)$.

Production technologies

- Old can produce physical capital investing one unit of output.
- Firms produce output contracting K and L .

OLG: The analysis

Firms

- Homogeneous per-capita production function $f(k_t)$ with $k_t = \theta\kappa cp_t$.
- Set competitive prices: $p_t = f'(k_t)$ and $w_t = f(k_t) - k_t f'(k_t)$.

Agents

- Young save $w_t l^z$ for next period.
- Old who access to credit solve ($l^z \geq \hat{l}_t(\phi, v)$):

$$\max_{D_{t+1}^z} \{ \Pi_{et+1}^z \equiv \theta\kappa p_{t+1} - (1 + r_{t+1}^z) D_{t+1} \}$$

s.t.

$$\Pi_{et+1}^z \geq 0 \quad (PC)$$

$$\Pi_{et+1}^z \geq A(\phi, D_{t+1}^z) \quad (IC)$$

Assumptions: $A_\phi < 0$, $A_D > 0$, $A_{DD} < 0$ and $w(\theta\kappa)l_{max} < 1$.

OLG: The Equilibrium

- Banks profits for setting a contract with z are:

$$\Pi_{bt+1}^z = [\theta(1 + r_{t+1}^z) - (1 + \rho^*)](1 - w_t l^z) + (1 - \theta)v$$

- They are competitive and set:

$$(1 + r_{t+1}^z) = \frac{1 + \rho^*}{\theta} - \frac{(1 - \theta)v}{\theta(1 - w_t l^z)}$$

- The minimum labour $\hat{l}_t(\phi, v)$ required for credit at $t + 1$ is:

$$\theta\kappa p_{t+1} + (1 - \theta)v - (1 + \rho^*)(1 - w_t \hat{l}_t) - A(\phi, 1 - w_t \hat{l}_t) = 0$$

- The PC condition reads: $\theta\kappa p_{t+1} + (1 - v)\theta \geq (1 + \rho^*)$.

Assumption: $\theta f'(\theta\kappa) \geq (1 + \rho^*)[1 - w(\theta\kappa)\hat{l}(\theta\kappa)] - (1 - \theta)v$.

OLG: Dynamics

Capital formation curve

$$k_{t+1} = \begin{cases} \Upsilon(k_t) & \text{if } k_t < \hat{k}(\phi, v) \\ f^{l-1} \left(\frac{(1+\rho^*)-(1-\theta)v}{\theta\kappa} \right) & \text{if } k_t \geq \hat{k}(\phi, v) \end{cases}$$

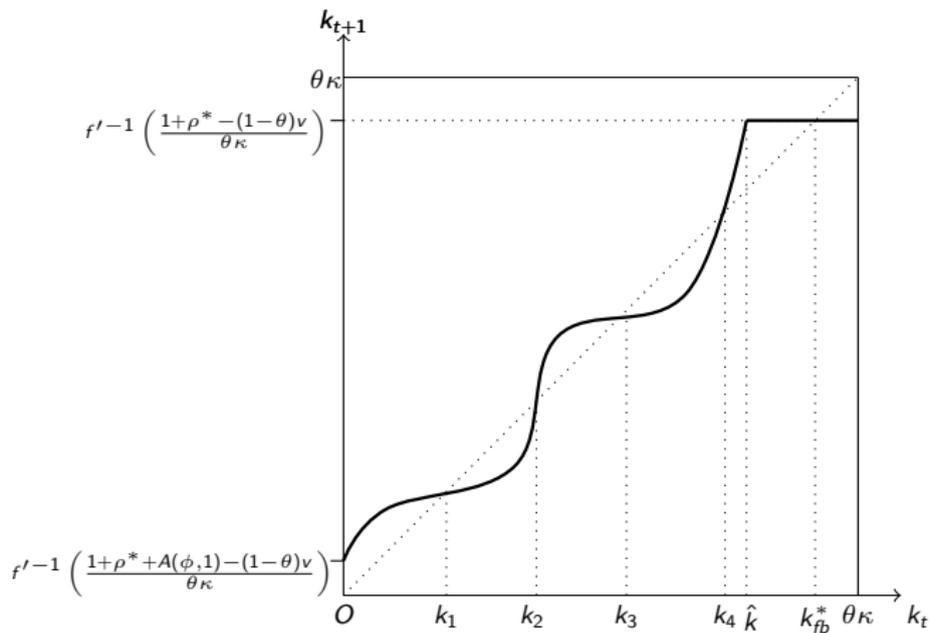
where $k_{t+1} = \Upsilon(k_t)$ arises from $k_{t+1} = \theta\kappa[1 - \Gamma(\hat{l}(k_t, k_{t+1}))]$.

Our interest variables are

- Aggregate debt: $\bar{D}_{t+1} = \int_{\hat{l}_t}^{l_{max}} (1 - w_t) \partial \Gamma(l^Z)$.
- Credit penetration: $cp_{t+1} = 1 - \Gamma(\hat{l}_t)$.

OLG: Dynamics

Figure: Dynamics and multiply steady-states



Main Result: effects of an aggregate redistribution

Result

Consider countries 1 and 2 such that the aggregate income distribution in country 1 at t is a MPS of that of country 2 with mean $\overline{W}_{t-1} + \overline{W}_t$. If $w_{t-1}\hat{l}_{t-1} \gg \overline{W}_{t-1}$, $w_t\hat{l}_t \gg \overline{W}_t$, then credit penetration and total debt are higher in country 1 at $t + 1$. If the opposite is satisfied the result is reversed.

- Short-run effect:
 - \uparrow inequality at t in *credit constrained* countries
 - $\uparrow cp_{t+1}, \overline{D}_{t+1}, GDP_{t+1}$.
- Long-run effects:
 - Credit multiplier effect.
 - 'Jump' to the basin of attraction of a higher ss.

Mapping to data and baseline regression

Data

- Panel of 148 countries in the period 1986-2013(World Bank, WDI).

Mapping

- \bar{D} : private credit/GDP.
- \bar{W} : GDP per-capita.
- (ϕ, ν) : Strength of Legal Rights Index(0-12).
- $Var(\Gamma)$: Gini and top 10% income share.

Baseline model

$$\begin{aligned} PrivateCredit_{i,t} = & \alpha_i + \nu_i + \beta_1 Inequality_{i,t-1} + \beta_2 GDPpc_{i,t-1} + \beta_3 LegalRights_{i,t-1} \\ & \beta_4 Inequality_{i,t-1} \times GDPpc_{i,t-1} + \beta_5 Inequality_{i,t-1} \times LegalRights_{i,t-1} + \epsilon_{i,t} \end{aligned}$$

Expected results: $\beta_1 > 0, \beta_4 < 0$ and $\beta_5 < 0$

Baseline regression

Table: Inequality, Capital Constraints and Private Credit

Private credit to GDP	(1)	(2)	(3)	(4)	(5)	(6)
Gini	2.871*** (0.738)	0.754*** (0.279)	3.085*** (0.734)			
10% top income share				3.402*** (0.880)	0.858** (0.361)	3.667*** (0.879)
Log(GDP per capita)	30.66*** (4.408)	16.32*** (2.303)	29.40*** (4.494)	29.63*** (4.167)	16.55*** (2.319)	28.63*** (4.220)
Legal Rights Index	2.244*** (0.706)	7.664*** (2.148)	5.735*** (2.198)	2.180*** (0.711)	7.006*** (2.123)	5.425** (2.187)
Gini x Log(GDP per capita)	-0.389*** (0.102)		-0.355*** (0.105)			
Gini x Legal Rights Index		-0.142*** (0.0497)	-0.0928* (0.0515)			
10% top income share x Log(GDP per capita)				-0.451*** (0.124)		-0.417*** (0.126)
10% top income share x Legal Rights Index					-0.159** (0.0626)	-0.109* (0.0654)
Observations	1,003	1,003	1,003	1,004	1,004	1,004
R-squared	0.874	0.873	0.875	0.874	0.872	0.874
Country fixed effects	YES	YES	YES	YES	YES	YES
Time fixed effects	YES	YES	YES	YES	YES	YES

Figure: Marginal effect of the Gini index on private credit to GDP conditional on the values of GDP per capita (in logs). The dotted lines are 95% confidence bands.

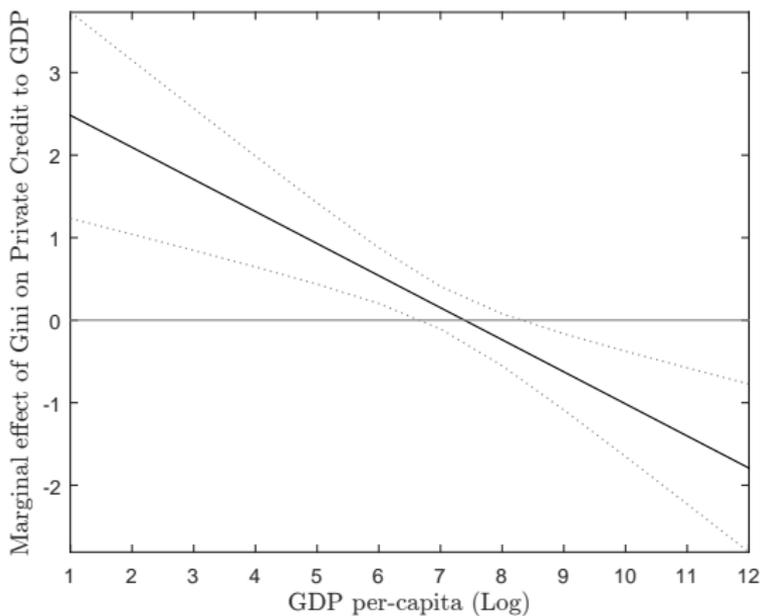
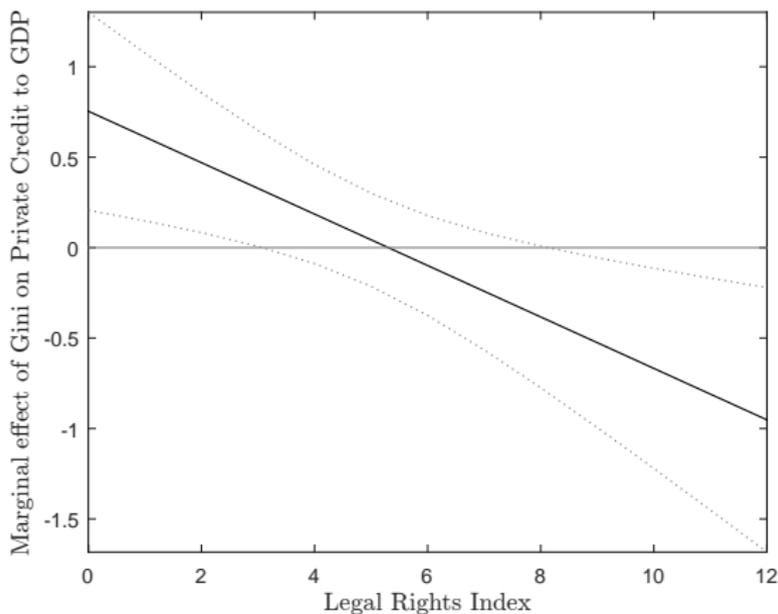


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Robustness

- Include additional controls: population, schooling, natural resources, net interest margin (Allen et al., 2014).
- Instrumental variables:
 - Inequality: residual variation that is not due to Private Credit (Fatás and Mihov, 2003; Brueckner and Lederman, 2015).
 - GDP per-capita: latitude (Acemoglu, Johnson, and Robinson, 2001)
 - LRI: Legal Origins (La Porta, Lopez-de Silanes, and Shleifer, 2008)
- Sub-samples:
 - Exclude LAC.
 - Exclude Africa.
 - Separate by high and low income countries.
- Alternative LRI measures. (Djankov, McLiesh, and Shleifer, 2007, and Doing Business)

Conclusions

- Novel theoretical and empirical nexus between inequality and credit:

Greater income inequality leads to higher private credit in countries with low income and weak creditor rights.

The opposite in high income/strong legal rights countries.

- New credit channel mechanism which can be an alternative explanation for similar effects of inequality in growth (Galor and Zeira, 1993; Brueckner and Lederman, 2015).

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