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Nº 316 **INEQUALITY AND PRIVATE CREDIT**

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Inequality and Private Credit

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This article examines whether the direction of the effect of inequality on private credit depends on the capital constraints of individual countries, as predicted by Balmaceda and Fischer (2010). Consistent with the model's predictions, we find that greater income inequality leads to a higher ratio of private credit to GDP in economies with low incomes and weak legal rights, whereas the reverse is true in economies with high incomes and strong legal rights.

JEL classification: F34; G15; G21; G38
Keywords: Financial development, Inequality, Legal rights, Private credit

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1. Introduction

The recent global financial crisis has spurred renewed interest in understanding the relationship between inequality and indebtedness. Rajan (2010) argues that the combination of rising inequality and the ensuing political pressures led to overindebtedness as a means of increasing consumption and job creation for lower-income households with stagnant real incomes. Acemoglu (2011) asserts that high-income groups pressured politicians to implement regressive policies that reduced financial regulation and led to excessive risk taking. Other studies suggest a positive relationship between inequality and private credit without an intervening political mechanism (Iacoviello, 2008; Kumhof et al., 2015).

Although the previous arguments are consistent with the experience of the U.S., they are difficult to reconcile with the experiences of Scandinavian countries that experienced a strong expansion of credit without much inequality. A recent theoretical model developed by Balmaceda and Fischer (2010) predicts that the direction of the effect of wealth inequality on private credit depends on the capital constraints of individual countries. We empirically test this hypothesis by employing a panel dataset covering 149 countries over the 1978-2011 period. Consistent with the model's prediction, we find that within-country increases in income inequality lead to a higher ratio of private credit to GDP in economies with low incomes and weak legal rights but that this effect vanishes and even becomes negative in economies with high incomes and strong legal rights.

This article contributes to our understanding of the inequality-finance nexus in at least three ways. First, this article suggests that arguments in favor of a positive relationship between inequality and private credit are incomplete, by analyzing conditions under which increases in inequality may have an opposite effect on credit. This analysis helps explain the mixed

evidence reported in international empirical studies that estimate the average effect of income inequality on private credit (see, e.g., Bordo and Meissner, 2012; Perugini et al. 2015). Second, this article suggests a novel channel through which inequality affects economic outcomes. Consistent with our main finding and with the well-established positive relationship between financial and economic development, Brueckner and Lederman (2015) show that income inequality has a negative effect on output and investment in middle- and high-income economies but a positive effect in low-income economies. Third, in contrast to studies that focus on the U.S. or high-income OECD economies, this article utilizes a dataset covering a large number of countries to gain a better understanding of the relationship between inequality and private credit under different economic conditions.

2. Theoretical framework

Using a static general equilibrium model, Balmaceda and Fischer (2010) theoretically establish a link between access to credit and wealth inequality. The model consists of an open economy in which agents are heterogeneous in terms of observable wealth and face endogenous credit constraints as a result of imperfect creditor protection. Potential entrepreneurs with different wealth levels, K_z, apply for a loan of size $D_z = I - K_z$ to invest in a project that requires a fixed initial investment I. Agents who receive the loan either invest in their projects or abscond (i.e., ex ante fraud). In the case of fraud, only a fraction $(1 - \emptyset)$ of the loan can be recovered through the legal system. Because wealthier agents' loans are smaller, these agents are less likely to abscond. The project can either succeed with a probability of p or fail with a probability of $(1 - p)$. The project yields a contractible return R if it succeeds; if the project fails, it is liquidated at a value of V. The minimum wealth level needed to obtain the loan, $K(\emptyset, V)$, is endogenously determined in the model. Only entrepreneurs with $K_z \geq$

$K(\emptyset, V)$ have access to credit. An economy is said to be capital constrained when the minimum wealth level needed to obtain the loan is higher than the economy's average wealth, i.e., $K(\emptyset, V) > \bar{K}$, and is said to be unconstrained otherwise. Thus, the proportion of potential entrepreneurs who effectively have access to credit depends on the wealth distribution $G(K_z)$, $K(\emptyset, V)$ and $\bar{K}$.

The model predicts that greater wealth inequality leads to more access to credit in capital-constrained countries by allowing a larger fraction of potential entrepreneurs to have wealth exceeding the threshold value $K(\emptyset, V)$. However, greater wealth inequality leads to less access to credit in capital-unconstrained countries. We empirically test this theoretical prediction in this article.

3. Data

The sample in this study includes 149 countries over the 1978-2011 period. The dependent variable consists of the level of private credit by deposit money banks as a fraction of GDP. Our main independent variables are inequality, which is measured by the Gini index, and two proxies reflecting whether an economy is capital constrained. Given that our theoretical framework assumes that an economy is capital constrained when $K(\emptyset, V) > \bar{K}$, our first proxy for capital constraints is GDP per capita.[1] The second measure related to capital constraints is the strength of legal rights (SLR) index, which measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders. The index ranges from 0 to 12.

[1] To be consistent with Balmaceda and Fischer (2010), we would like to use data on per capita capital stock and wealth distribution rather than data on GDP per capita and income inequality. Unfortunately, these data are not available for a large number of countries (i.e., 37% of countries in our sample). Given that most countries with unavailable data are low-income, capital-constrained economies, their exclusion from our sample would introduce a significant sample selection bias in our results. However, evidence indicates a strong positive correlation between GDP per capita and per capita capital stock (Berlemann and Wesselhöft, 2012) and between income inequality and wealth inequality (Perotti, 1996).

Higher scores indicate that these laws are better designed to expand access to credit. Therefore, we assume that the minimum level of stock of wealth needed to obtain a loan is smaller in countries with higher SLR indices.

For robustness purposes, following Fischer and Valenzuela (2013), we consider two control variables: economic growth and net interest margin. The source of all variables used in this study is the World Bank's World Development Indicators. Table 1 reports the descriptive statistics for the variables used in this study.

4. Empirical analysis

We explore the effect of income inequality on private credit and aim to determine whether this effect depends on GDP per capita and the SLR of borrowers and lenders. To reduce potential problems associated with endogeneity stemming from omitted variables, we conduct panel data regressions with country and year fixed effects in all of our specifications. Our first baseline econometric model takes the following form:

$$PC_{it} = \beta_0\, Gini_{it-1} + \beta_1 GDPpc_{it-1} + \beta_2\, Gini_{it-1}\, x\, GDPpc_{it-1} + A_i + B_t + \varepsilon_{it}, \quad (1)$$

where PC_{it} is the ratio of private credit to GDP in country *i* at time *t*, $Gini_{it-1}$ is the lagged value of the Gini index, and $GDPpc_{it-1}$ is the lagged value of GDP per capita. A_i and B_t are vectors of the country and year dummy variables that control for average country-level characteristics and global factors, respectively. ε_{it} is the error term. The interaction term $Gini_{it-1}\, x\, GDPpc_{it-1}$ attempts to capture the heterogeneity in the effect of inequality on credit penetration across different levels of GDP per capita.

Our second baseline econometric model is as follows:

$$PC_{it} = \gamma_0\, Gini_{it-1} + \gamma_1 Legal_{it-1} + \gamma_2\, Gini_{it-1}\, x\, Legal_{it-1} + A_i + B_t + \varepsilon_{it}, \quad (2)$$

where $Legal_{it-1}$ is the lagged value of the SLR index. Analogous to our previous specification, the interaction term $Gini_{it-1}\, x\, Legal_{it-1}$ attempts to capture the heterogeneity in the effect of inequality on private credit across different levels of legal rights for borrowers and lenders.

According to the models presented in Equations (1) and (2), the effect of income inequality on private credit at different levels of GDP per capita and legal rights can be calculated by examining the following partial derivatives:

$$\frac{\partial PC_{it}}{\partial Gini_{it-1}} = \beta_0 + \beta_2\, GPDpc_{it-1} \quad (3)$$

$$\frac{\partial PC_{it}}{\partial Gini_{it-1}} = \gamma_0 + \gamma_2 Legal_{it-1}. \quad (4)$$

We hypothesize that $\beta_0 > 0$ and $\beta_2 < 0$ and that $\gamma_0 > 0$ and $\gamma_2 < 0$. In other words, greater within-country income inequality leads to higher private credit in economies with low incomes and weak legal rights, but this effect vanishes and may even become negative in economies with high incomes and strong legal rights.

5. Results

Table 2 reports the results of estimating Equations (1) and (2), with and without control variables, using ordinary least squares with a clustering of errors by country. The Gini index, GDP per capita and the SLR index enter with positive and statistically highly significant coefficients in all of our regressions. Moreover, the interaction terms between the Gini index and our two proxies for financial constraints enter with negative coefficients that are also

highly statistically significant. Consistent with our hypothesis, the significant positive coefficient on Gini and the negative coefficients on the interaction terms indicate that greater within-country income inequality leads to higher private credit in capital-constrained economies, but this effect vanishes and even becomes negative in capital-unconstrained economies. Moreover, most of the coefficients associated with our control variables have the expected signs and are highly statistically significant.

Figures 1 and 2 show the marginal effect of the Gini index on private credit to GDP conditional on the values of GDP per capita and the SLR index.[2] The figures also report 95% confidence bands. We can observe that the marginal effect of increased income inequality on credit is positive and statistically significant in economies with low incomes and weak legal rights, while this effect is negative and statistically significant in economies with high incomes and strong legal rights.

6. Conclusion

This article reports novel preliminary results on the relationship between income inequality and indebtedness. Consistent with theoretical arguments, this study finds that inequality positively affects private credit in capital-constrained countries. However, this effect vanishes and even becomes negative in capital-unconstrained countries. This paper contributes to our understanding of the effect of inequality on private credit under different economic conditions and suggests a novel channel through which inequality affects growth and investment.

[2] We conduct this exercise using the results reported in columns 3 and 6.

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Table 1: Descriptive statistics

Variable	N	Mean	S.D.	Min.	Max.	p10	p90
Private Credit/GDP	784	31.09	26.29	1,049	176.8	7,028	66.54
Net Interest Margin	511	5,813	3,498	-6,448	40.63	2,621	9,425
GDP per Capita	783	3923	5889	120.2	84629	388	8247
Growth	773	4,196	4,469	-14.8	33.63	-0.853	8,853
Gini	784	42.56	10.05	20.96	69.17	29.74	57.28
Legal Rights	784	5,112	2,279	0	10	3	9

Table 2: Inequality and private credit

Private Credit / GDP	(1)	(2)	(3)	(4)	(5)	(6)
Gini	1.407***	1.294***	2.569***	0.724***	0.757***	1.153***
	(0.471)	(0.459)	(0.642)	(0.239)	(0.202)	(0.231)
GDP per Capita (log)	26.07***	25.00***	30.95***		18.91***	19.74***
	(3.220)	(3.156)	(4.090)		(1.871)	(2.359)
Legal Rights		2.191***	0.885*	7.086***	7.405***	7.779***
		(0.688)	(0.480)	(1.945)	(1.739)	(1.749)
Gini x GDP per Capita	-0.185***	-0.168***	-0.316***			
	(0.0655)	(0.0638)	(0.0863)			
Gini x Legal Rights				-0.106**	-0.133***	-0.170***
				(0.0430)	(0.0374)	(0.0381)
Net Interest Margin			-0.357**			-0.397**
			(0.151)			(0.168)
Growth			-1.382**			-1.299**
			(0.586)			(0.643)
Observations	787	784	453	785	784	453
Countries	150	149	116	149	149	116
R-squared	0.899	0.901	0.950	0.875	0.902	0.950

Note: Numbers in parentheses are standard errors. Standard errors are clustered at the country level. Country and year dummies are included in all the regressions.

* Significance level at 10%.

** Significance level at 5%.

*** Significance level at 1%.

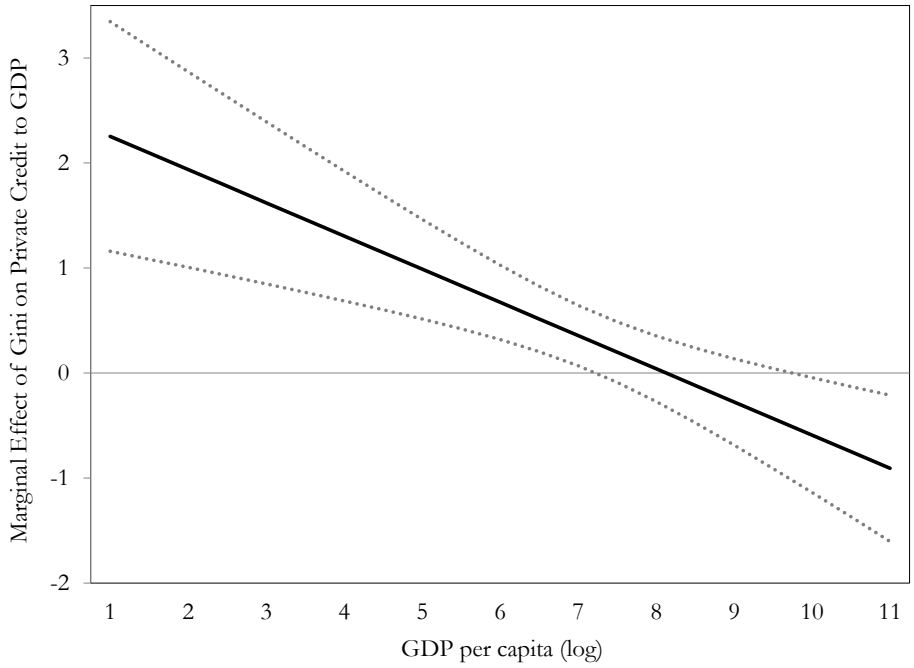

Fig. 1. Marginal effect of the Gini index on private credit to GDP conditional on the values of GDP per capita (in logs). The dotted lines are 95% confidence bands.

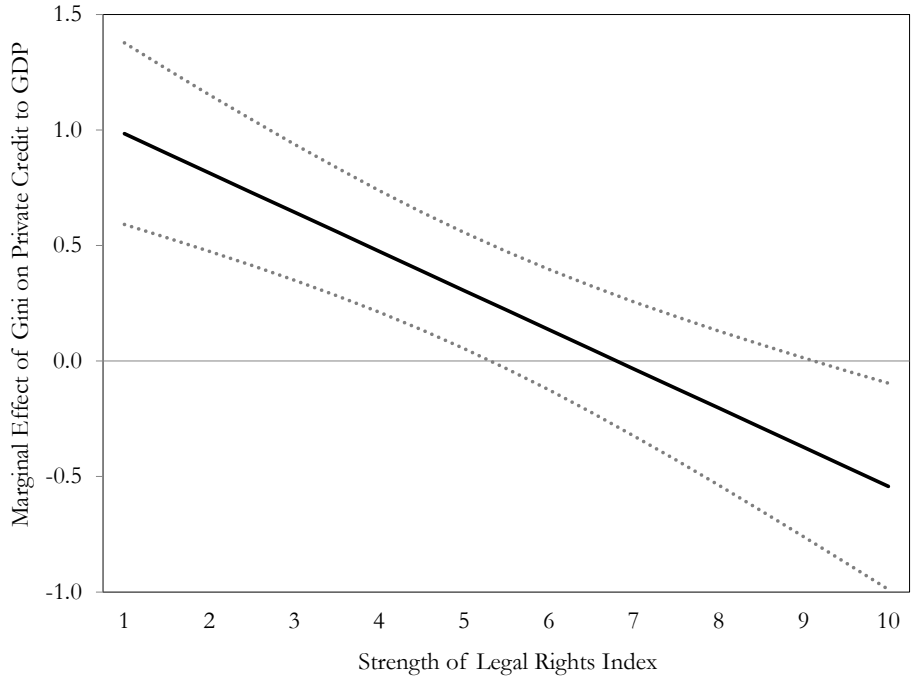

Fig. 2. Marginal effect of the Gini index on private credit to GDP conditional on the values of the strength of the legal rights index. The dotted lines are 95% confidence bands.

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