The Mystery of Capital under Adverse Selection: The Net Effects of Titling Policies

Luis H.B. Braido (FGV Rio)
Carlos E. da Costa (FGV Rio)
Bev Dahlby (U. Alberta)
Introduction

- Hernando de Soto (2000) advocates economic policies that enable the poor in developing countries to use a larger fraction of their total wealth to collateralize investments by providing them with title to their homes and land.

  - Higher access to credit, investments & welfare.

- Prediction theoretically valid when the credit market collapses due to asymmetric information and absence of collateral (Akerlof, 1970).
Introduction

- Natural experiment in the allocation of land titles in a poor suburban area of Buenos Aires.
- Weak average treatment effect over credit access.
What do we do in this paper?

- General model of adverse selection in which credit market does not collapses.
- Continuum of projects characterized by their net return and probability of success.
- Titling policies reduce the welfare of agents endowed with projects with high reward and low probability of success.
Introduction

How come increasing the set of individual possibilities can actually hurt some of them?

- Projects with different characteristics are financed by the same debt contract (i.e., same interest rate) with safe projects subsidizing risky projects.
Main conclusions

- de Soto's thesis is not universally valid.
- This cross-subsidization (intrinsic to the debt market) generates externalities that are absent in de Soto's argument.

Insights for empirical investigations:

- Titling programs change the composition of investments.
- They need not affect the average treatment effect typically measured in randomized experiments.
Model

Projects: \((p,R)\) distributed according to a density function \(f(p,R)\)

Illiquid Capital: \(H>0\)
Colateralizable Fraction: \(\alpha>0\)

Liquid Capital: \(K\geq0\)

Competitive Debt Market: \(\theta=(k,h,i)\)

Risky Financing: \(\alpha H+K<1\)
Model

Safe Investors:

$$\bar{c} \equiv (1 + r)K + H$$

Entrepreneurs:

$$c_l \equiv (K - k)(1 + r) + (H - h)$$

$$c_h \equiv (K - k)(1 + r) + R - (1 + i)(1 - k) + H, \text{ if } R \geq (1 + i)(1 - k);$$

$$c_h \equiv (K - k)(1 + r) + (H - h), \text{ if } R < (1 + i)(1 - k).$$
Model

For each $\theta \equiv (k, h, i)$, the entrepreneur’s expected utility is given by:

$$EU_\theta \equiv pu(c_h) + (1 - p) u(c_l).$$

Agents prefer debt financing their projects to investing in the safe asset whenever:

$$EU_\theta \geq u(\bar{c}).$$ (6)
Model

Profit Function

$$\pi(\theta) \equiv \bar{p}_\theta (1 + i) (1 - k) + (1 - \bar{p}_\theta) h - (1 + r) (1 - k),$$

$$\bar{p}_\theta \equiv E[p \mid EU_\theta \geq u(\bar{c})]$$
Definition 1  A zero-profit price-taking equilibrium for this class debt-market economies with adverse selection is given by a vector $\theta \equiv (k, h, i)$ such that:

(a) $\pi(k, h, i) = 0$;

(b) there is no vector $(k', h') \in [0, K] \times [0, \alpha H]$ such that:

$$\pi(k', h', i) > \pi(k, h, i).$$
Figure 1. Locus of Debt-Financed Projects

Debt-Financed Projects

Non-Undertaken Projects
Model

Proposition 1  One must have $k = K$ and $h = \alpha H$ in every zero-profit price-taking equilibrium for this class of debt-market economies with adverse selection.

Proposition 2  There exists a zero-profit price-taking equilibrium for this class debt-market economies with adverse selection.
Model

\[
\frac{d \bar{R}}{d \alpha} = (1 - K) \frac{d i}{d \alpha} + \frac{(1 - p) H u'(c_l)}{p u'(c_h)}.
\]

\[
\frac{d E U_{i, \alpha}}{d \alpha} = -p u'(c_h) (1 - K) \frac{d i}{d \alpha} - (1 - p) u'(c_l) H.
\]

\[
\lim_{p \to 0} \frac{d E U_{i, \alpha}}{d \alpha} < 0.
\]
Figure 2. The Effects of a Tiling Policy
Model

Simulation

CRRA utility

Equally Distributed Equivalent

\[ SWF = \frac{1}{1-\zeta} \int \int [EU_{\alpha,i}]^{1-\zeta} f(p, R) dpdR, \]

\[ SWF = \frac{1}{1-\zeta} [u(EDE)]^{1-\zeta}. \]
# Model

Table 1

<table>
<thead>
<tr>
<th></th>
<th>$\alpha = 0$</th>
<th>$\alpha = 0.5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest rate on loans, $i$</td>
<td>0.441</td>
<td>0.133</td>
</tr>
<tr>
<td>Proportion of projects financed, $\tilde{F}$</td>
<td>0.090</td>
<td>0.068</td>
</tr>
<tr>
<td>Avg. probability of success of financed projects, $\tilde{p}$</td>
<td>0.728</td>
<td>0.822</td>
</tr>
<tr>
<td>EDE Wealth $\zeta = 0$</td>
<td>1.253821</td>
<td>1.247367</td>
</tr>
<tr>
<td>EDE Wealth $\zeta = 0.5$</td>
<td>1.253393</td>
<td>1.247001</td>
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<tr>
<td>EDE Wealth $\zeta = 1.5$</td>
<td>1.252568</td>
<td>1.246294</td>
</tr>
</tbody>
</table>

Simulation results for: $f(p,R)=1.25e^{-1.25R}$, $r=0.05$, $\sigma=0.90$, $H=0.8$, and $K=0.4$. 