

Market Structure and Borrower Welfare in Microfinance

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Commercialization has been a terrible wrong turn for microfinance, and it indicates a worrying “mission drift” in the motivation of those lending to the poor. Poverty should be eradicated, not seen as a money-making opportunity.

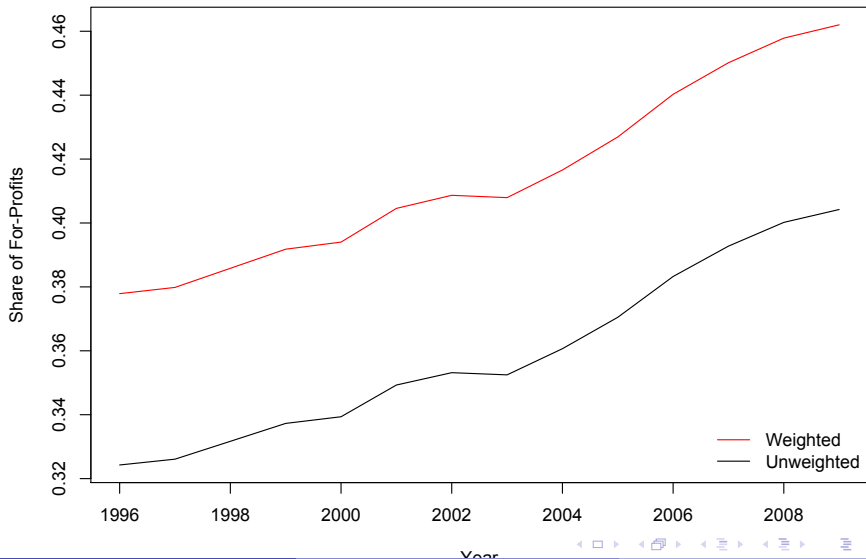
Muhammad Yunus in NYT, January 2011

Three Stylized Facts

Fact 1

- There has been a steady increase in the market share of for-profit lenders.
- From the cross-section of 1,106 MFIs that reported to the MIX Market dataset in 2009, this rises from 32 percent of institutions (38 percent of loans) in 1996, to 39 percent of institutions (46 percent of loans) in 2009.
- "Unweighted" counts the number of institutions in existence at a given date, "weighted" weights institutions by size, measured as number of loans outstanding in 2009.

Commercialization



Three Stylized Facts

Fact 2

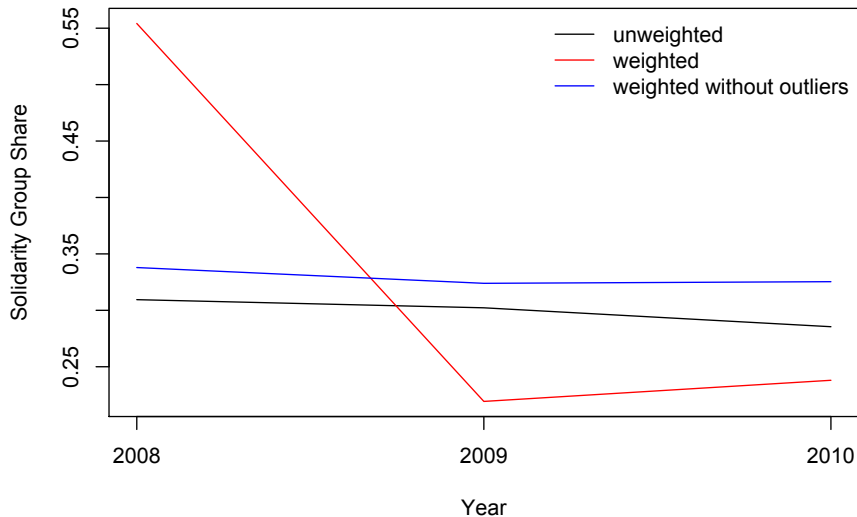
- Non-profit lenders are more likely to use group-based lending methods than for-profit lenders.
- In our full sample of 712 MFIs with both legal status and lending methodology data for 2009, the mean share of "solidarity group" loans for non-profits is 37 percent, while for for-profits it is 34 percent.

Three Stylized Facts

Fact 3

- The decline of JL has been exaggerated - some decline, but still widely used.
- Around 51% of borrowers in the MIX dataset are under JL contracts (Cull, Demirguc-Kunt, Morduch 2009), 2002/04 data, 315 institutions.
- Our estimates: 54% JL (2009 data, 715 institutions).
- Taking the balanced panel of 333 MFIs in the MIX Market dataset that report lending methodology information in 2008, 2009 and 2010, we find that 31 percent of the average MFI's loans were made to solidarity groups in 2008, falling to 28.5 percent in 2010.

Decline of Joint Liability



- Use the measure "Solidarity Group Share" which is the ratio of each lender's number of solidarity group loans to solidarity group and individual loans.
- Then compute the mean of this measure across all MFIs to find the average solidarity group share ("unweighted").
- Compute the weighted mean (by number of loans outstanding) to find the share of JL in all loans, with/without two outliers.
- Two very large lenders (BRAC in Bangladesh and Bandhan in India) switched from solidarity group to individual in 2009.

▶ Further discussion

For-profit lending on the backs of the poor?

- Need to understand better these trends and their inter-connections
- Yunus quote reflects concern about commercialization and abuse of market power in microfinance. Through shift from non-profit to for-profit, microcredit “[gave] rise to its own breed of loan sharks.”.
- Some MFIs are alleged to be profiteering at the expense of poor borrowers, attracted by the high repayment rates, and charging very high interest rates which seemingly contradicts the original purpose of the MFI
- From its mission-oriented, not-for-profit roots, microfinance now attracts large scale private investment through venture capital, large investment vehicles, IPOs (e.g. SKS India, Compartamos Mexico, LAPO Nigeria).

Market power

- In India, the five biggest MFIs account for more than 50% of the market. Globally, market concentration varies widely (Baquero et al., 2012).
- Anecdotal evidence suggests existence of market power ▶ Anecdotal evidence
- This paper shows that commercialization and presence of market power could explain particular resistance to JL on the part of borrowers, and also, reluctance to use it on the part of lenders

This paper

- This paper compares for-profit or commercial lending in microfinance, with and without market power, to a benevolent non-profit maximizing borrower welfare subject to a break-even constraint.
- Two points of departure from the existing literature where
 - ▶ Lenders are assumed to be a benevolent non-profit who try to maximize borrower welfare subject to some break even constraint;
 - ▶ A partial equilibrium framework that focuses on one MFI and a given set of borrowers

This paper

- Majority of work on microfinance looks at repayment rates
- For welfare judgement, this assumes zero-profit lending: borrowers get all the surplus, and so repayment rates are sufficient.
- Naturally, the size and allocation of this surplus depends on lender motivation and information structure.
- Interest rates, type of loan, and degree of rationing matter for borrower welfare as well.
- Need to go beyond partial equilibrium
- Part of a broader agenda: don't just focus on contracts, look at the market/institutional environment in it operates (as in Besley, Burchardi, and Ghatak, 2012)

This paper

- Much of the microfinance literature has shown how joint liability lending can be used by MFIs to leverage borrowers' social capital and local information in order to lend to otherwise unbankable customers and increase their welfare.
- Using a simple, tractable model we show that when the lender is a for-profit with market power he can instead leverage these to extract higher rents at the borrowers' expense.
- In particular, borrowers with more social capital may be worse off than those with less.
- However, given that borrowers are credit constrained and have very few outside options, they are better off borrowing than not borrowing, and they are better off borrowing under joint liability (when the lender chooses to use it) than under individual liability.

This paper

- We then show that competition between for-profit lenders can close down this channel, but has an ambiguous effect on borrower welfare as competition undermines borrowers' incentives to repay their loans and thus leads to credit rationing.
- One of the interesting trade-offs that emerges therefore is that of rent extraction under monopoly with the enforcement externality under competition.

This paper

- We show that for-profit lenders - both with and without market power - inefficiently under-use joint liability relative to the altruistic non-profit benchmark.
- Since joint liability is associated with tighter repayment incentive constraints (because larger amounts are due, when a group member is unable to pay her loan), it is relatively less attractive to for-profit lenders.
- This suggests that the apparent decline in the use of joint liability loans relative to individual liability loans may indeed be related to changes in market structure, e.g., increasing commercialization.

Preview - Simulation

We simulate the model using empirical estimates of the parameters. This is also part of a broader agenda: trying to bridge theory and policy through quantitative analysis. Results:

- We expected that inefficient contract choice and exploitation of social capital by monopolists would have large effects on borrower welfare.
- Turns out this effect is relatively modest - forcing the lender to switch from IL to JL increases borrower welfare by 12%-20%.
- In contrast, switching to a non-profit lender increases borrower welfare by 54%-73%, mostly through lower interest rates.
- Despite credit rationing, competition achieves similar borrower welfare to non-profit lending.
- Non-profit lenders predicted to always use JL. Competitive lenders or monopolist only use JL for social capital worth at least 15% of the loan size.
- Qualitative results are robust to alternative parameter values.

Literature

- Non-contractible output enforcement problem: Bolton & Scharfstein (1990), Besley and Coate (1995), Rai & Sjöström (2004), Bhole and Ogden (2010)
- Groups without JL: Rai & Sjöström (2010), de Quidt, Fetzer and Ghatak (2012b).
- Social capital: Karlan (2007), Cassar and Wydick (2010), Feigenberg, Field and Pande (2011), Bloch, Genicot and Ray (2008), Greif (1993)
- Competition: McIntosh and Wydick (2005), McIntosh, de Janvry and Sadoulet (2005), Genicot & Ray (2006), Baquero et al., (2012)
- Reviews of the industry: Cull et al. (2009), Cull et al. (2007)

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Preview - Theory

- We take a weak enforcement/ex-post moral hazard setting: JL induces high social capital borrowers to guarantee one another's interest payments, increasing total surplus (Besley and Coate, 1995).
- We show once you have relaxed the assumption of perfectly competitive lenders or a benevolent non-profit the following happens:
 - ▶ JL will not necessarily be chosen when it is optimal - it will be under-used by for-profit lenders
 - ▶ This can explain its alleged decline
 - ▶ Borrowers with high social capital can be "exploited" by a lender with market power
 - ▶ So some borrowers could be *worse off with JL*
- Competition is no panacea unless lenders can share borrower history - credit rationing will have to be used to give incentives
- JL will be under-used relative to non-profits, but not so relative to a monopolist

Model setup

- Enforcement problem with limited liability.
- Borrowers risk neutral, discount factor δ , no savings. Invest 1, generate independent stochastic output:

$$Y = \begin{cases} R & p \\ 0 & 1 - p \end{cases}$$

- Lender's opportunity cost of capital ρ . Opportunity cost of labour normalized to 0. Positive social surplus: $pR > \rho$.
- Gross interest rate r .
- V is the continuation value of a lending relationship for the borrower, Π the profits of the lender.

Model setup

- Output is not observable to the lender. Borrowers need to be given rents + dynamic incentives to prevent strategic default.
- Unsuccessful borrowers involuntarily default (no savings).
- Output *is* observable to borrowers within a group: potential for mutual repayment guarantees backed by social sanctions.

Contracts

- Sticking with much of the literature we restrict contractual forms:
 - ▶ Borrowers are either individually or jointly liable.
 - ▶ No partial repayment.
 - ▶ Punishment for default is permanent termination of lending.
 - ▶ JL is a natural contract choice in our simple environment, might not be in richer settings (Rai & Sjöström, 2004, 2010, de Quidt et al., 2013)
- The lender commits forever to a lending contract specifying a repayment r and JL/IL.
- JL groups are two borrowers, both terminated unless repayment is $2r$.

Social Capital

- Social capital is the discounted lifetime utility “ S ” that a friend or partner can credibly threaten to destroy as a “social sanction”.
- S can also be a non-pecuniary cost a friend or partner can impose on you
- S is pair-specific (bilateral) but could have many friends (parallel). Each friendship is worth S to both (symmetric).
- Friends are valued additively, worth $\sum_{i=1}^n S_i$.
- Can model S as generated from a repeated “social game” with some interesting implications, explored in other work. [▶ Formalization of \$S\$](#)
- Alternative models: social ostracism (Greif, 1993); network-based approach (Bloch, Genicot & Ray, 2008); reputation (Guttman, 2010)

Loan Repayment

- Borrowers play a simultaneous-move “repayment game” each period.
- Borrowers agree amongst themselves a repayment rule, specifying repayments in each state, enforced by social sanctions.
- Some examples:
 - ▶ Repay r whenever own output is R , nothing otherwise.
 - ▶ Repay $2r$ in state $(R, 0)$, r in (R, R) , 0 in $(0, R)$ or $(0, 0)$.
 - ▶ Default in all states.
- Any deviation from the agreed rule is punished by destruction of S .
- For simplicity, focus on symmetric, stationary, joint welfare-maximizing equilibria.

Constraints on the lender

- **Limited Liability Constraint (LLC):** The largest required repayment must be feasible given limited liability. For simplicity, we assume parameters such that this is slack ($\delta p \leq \frac{1}{2}$).
- If π is the repayment probability, then $V = \frac{pR - \pi r}{1 - \delta\pi}$
- **Incentive Constraint 1 (IC1):** $R \leq R - r^{LL} + \delta V^{LL}$
- The continuation value for a representative borrower (δV) must exceed the interest payment (r).
- Otherwise all borrowers, individual or group, default immediately.
- Borrowers cannot be made worse off than if they took one loan and defaulted

Constraints on the lender

- It turns out this constraint is identical for any contract with strict dynamic incentives
- Using the value of V under IL we get:

$$r \leq \delta pR \equiv r_{IC1}$$

Constraints on the lender

- **Incentive Constraint 2 (IC2):** under JL, borrowers sometimes have to repay $2r$. This must be incentive compatible, given S .
- IC2: $2r^{JL} \leq \delta(V^{JL} + S)$.
- Let repayment probability under JL be q
- Continuation value of borrower under JL (with repayment probability q)

$$V^{JL} = \frac{pR - qr^{JL}}{1 - \delta q}$$

Timing

Period zero:

- 1 Lender observes S and makes a take-it-or-leave-it contract offer
- 2 Borrowers agree a repayment rule.

Then, each period

- 1 Loans disbursed and output realisations observed by the borrowers.
- 2 Repayment game.
- 3 Conditional on repayment, contracts renewed and/or social sanctions carried out.

Individual Liability

Suppose the borrower repays whenever successful:

$$\begin{aligned}V^{LL} &= p(R - r^{LL}) + \delta p V^{LL} \\ &= \frac{p(R - r^{LL})}{1 - \delta p}.\end{aligned}$$

- IC1: $r^{LL} \leq \delta V$
- Implies $r^{LL} \leq \delta p R \equiv r_{IC1}$

Individual Liability

- Zero profit condition: $r^{IL} = \frac{\rho}{p}$.
- IL is usable if it earns non-negative profits, i.e. $pr_{IC1} \geq \rho$.
- We assume this condition holds strictly:

Assumption

$$\delta p^2 R > \rho$$

Joint Liability

- Borrowers must repay $2r$ whenever at least one succeeds.
- Repayment probability is $1 - (1 - p)^2 = p(2 - p)$. Define:

$$q \equiv p(2 - p)$$

- Both loans are repaid and contracts renewed with probability q so:

$$V^{JL} = \frac{pR - qr^{JL}}{1 - \delta q}$$

Joint Liability

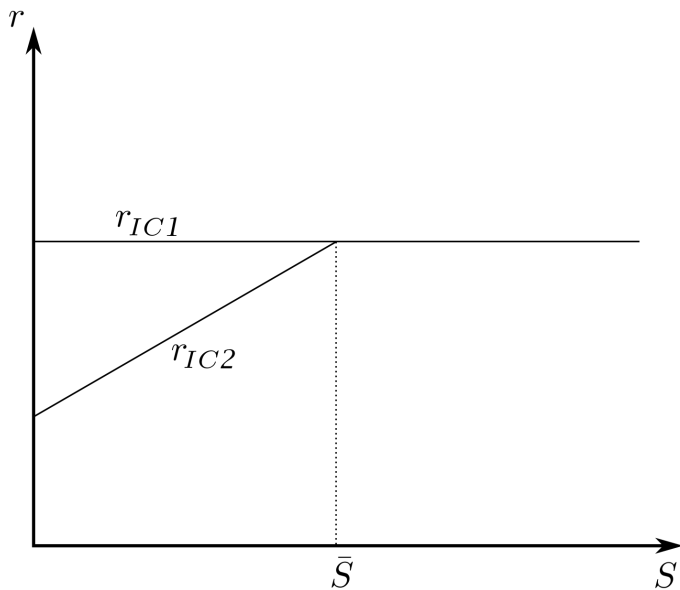
- IC1: $r \leq r_{IC1} = \delta pR$
- IC2: $2r^{JL} \leq \delta(V^{JL} + S)$.

Define the interest rate at which IC2 binds as:

$$r_{IC2}(S) \equiv \frac{\delta[pR + (1 - \delta q)S]}{2 - \delta q}$$

- $r_{IC2}(S) \leq r_{IC1}$ for $S \leq \bar{S} \equiv pR$.
- For $S > \bar{S}$, IC1 binds and IC2 no longer relevant.

Interest rates



Joint Liability

JL usable if it earns non-negative profits: requiring $qr^{JL} - \rho \geq 0$ or

$$q \min\{r_{IC1}, r_{IC2}^{JL}(S)\} \geq \rho$$

This is satisfied for all $S \geq \hat{S}$

$$\hat{S} \equiv \max\left\{0, \frac{(2 - \delta q)\rho - (2 - p)\delta p^2 R}{\delta q(1 - \delta q)}\right\}.$$

Nonprofit lender

- Nonprofit lender assumed to choose the contract that maximises borrower utility, subject to a zero profit condition.

$$\hat{r}^{IL} = \frac{\rho}{p} > \hat{r}^{JL} = \frac{\rho}{q}$$
$$\hat{V}^{IL} = \frac{pR - \rho}{1 - \delta p} < \hat{V}^{JL} = \frac{pR - \rho}{1 - \delta q}$$

Proposition

Borrowers are strictly better off under JL, so JL is always offered by the nonprofit when $S \geq \hat{S}$.

- Constant opportunity cost of capital: the lender serves the whole market.
- S is not "used" in equilibrium, so no welfare loss on that count

Monopolist lender

A for-profit monopolist chooses whatever contract and interest rate maximises profits, subject to the LLC, IC1 and IC.

$$\tilde{r}^{JL} = r_{IC1}$$

$$\tilde{V}^{JL} = \frac{p(R - r_{IC1})}{1 - \delta p} = pR$$

$$\tilde{r}^{JL}(S) = \min\{r_{IC1}, r_{IC2}^{JL}(S)\}$$

$$\tilde{V}^{JL} = \frac{pR - q \min\{r_{IC1}, r_{IC2}^{JL}(S)\}}{1 - \delta q} \geq pR$$

Observation

The monopolist “exploits” the borrowers’ social capital: \tilde{r}^{JL} is increasing and \tilde{V}^{JL} is decreasing in S for all $S \leq \bar{S}$.

Monopolist lender

- One way of viewing this result is that the lender's motivation matters more as the amount of borrower social capital increases, as the difference between borrower welfare under the nonprofit and for-profit monopolist increases.
- Much of the microfinance literature has shown how different aspects of MFIs' lending methodologies can be thought of as leveraging social capital and local information among borrowers to address various asymmetric information or weak enforcement issues where as this result shows that this not need be a force for good from the perspective of borrowers
- With endogenous social capital, this would lead to decrease

Monopolist lender

Proposition

Even with a monopolist lender who exploits their social capital, borrowers are weakly better off under JL than under simple IL, strictly so for $S < \bar{S}$.

- “Weakly” follows from the fact that the same IC1 applies to both.
- “Strictly” when IC2 is tight and the lender needs to give more rents to the borrowers to incentivise repayment.
- Under JL, the monopoly interest rate is weakly lower and the repayment/renewal probability strictly higher.
- For $S \geq \bar{S}$, IC1 binds and borrower welfare is equal to pR under both IL and JL.
- Under both contracts, the lender is constrained by IC1: it must be individually rational to repay a loan, at least when the partner is repaying - this constraint puts a lower bound on borrower welfare at the IL level
- However, compared to a non-profit lender borrowers are worse off, and more so the greater is S

Monopolist Contract Choice

- Repayment probability is higher but interest rate weakly lower under JL than under IL.
- For simplicity we assume the lender is myopic: maximizes per-period profit from each borrower.
- Profit with arbitrary repayment probability π :

$$\Pi = \pi r - \rho$$

- As with the non-profit, the lender serves the whole market.

Monopolist Contract Choice

JL dominates IL if:

$$q\tilde{r}^{JL} \geq p\tilde{r}^I$$

JL is offered if $S \geq \tilde{S}$:

$$\tilde{S} \equiv \max \left\{ 0, \frac{p^2 R(1 + \delta p - 2\delta)}{(2 - p)(1 - \delta q)} \right\}$$

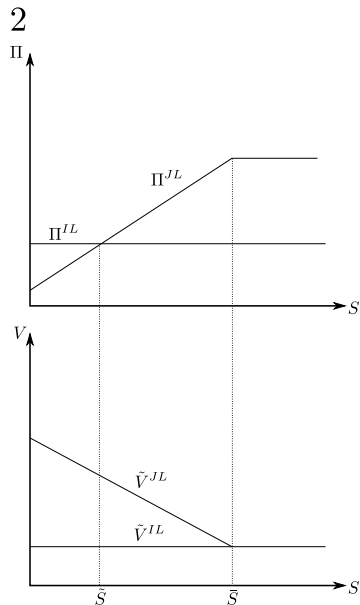
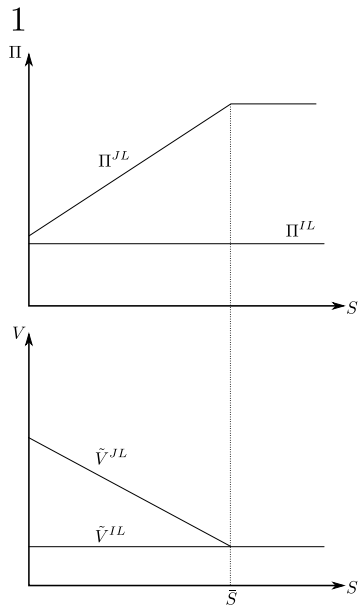
Observation

$\tilde{S} < \bar{S}$, so JL always offered for large S .

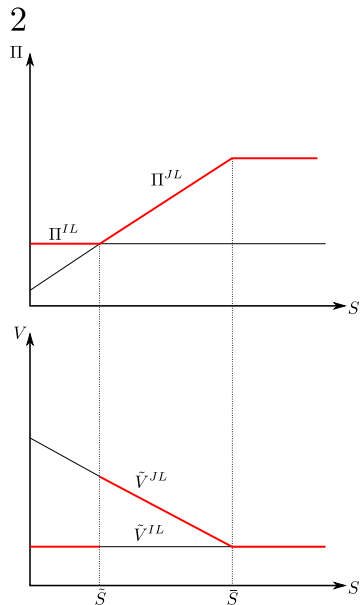
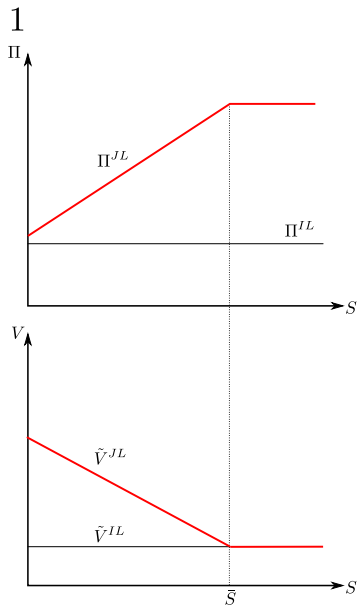
Observation

$\tilde{S} \geq \hat{S}$, strictly if $p > \delta q$. Thus the monopolist is less likely to use JL than the non-profit: source of inefficiency.

Lender profit and borrower utility under IL and JL



Equilibrium profit and borrower utility in red



Intuition

- The for-profit monopolist is less willing to offer joint liability loans than the non-profit, because when social capital is low the need to give borrowers incentives to help one another (IC2) constrains his rent extraction.
- Intuitively, the non-profit is willing to offer JL whenever the borrowers have sufficient social capital for JL to break even, while the for-profit monopolist only offers JL when doing so is more profitable than IL.
- This result is consistent with the current debate over the decline of joint liability lending in microfinance, which goes hand in hand with increasing commercialization of microfinance lending.
- An analogous result carries over to competitive equilibrium

Policy implication: Interest rate caps

- First-order effect of interest rate caps (a key component of the Indian Microfinance Bill): lower interest rates under both IL and JL, obviously good for the borrowers.
- Effect on contract choice: the advantage of IL for the lender is the higher interest rates. The cap erodes this advantage and may induce an efficient switch to JL.
- Therefore, interest rate caps have potential as a tool for borrower protection.
- Note that in our model the lender always supplies the whole market, ruling out any supply-side effects.

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Competition

- So far, we assumed no competition. Lender is either a non-profit or for-profit monopolist, serving the whole market.
- Hoff & Stiglitz (1997): competition between lenders imposes enforcement externalities. Repayment incentive constraints become tighter.
- How does this fit into the benchmark model? Contract choice? Borrower welfare?

Summary of Results

- Competition between for-profit lenders closes down the rent extraction channel, but has an ambiguous effect on borrower welfare due as it undermines borrowers' incentives to repay their loans and thus leads to credit rationing.
- One of the interesting trade-offs that emerges therefore is that of rent extraction under monopoly with the enforcement externality under competition.
- Even under competition, JL is used less than non-profits but more so than monopoly for-profit.
- Since the termination threat is weaker under competition than with a single lender, more social capital will be required for lenders to be able to break even in competitive equilibrium than for the non-profit to break even

A simple model of competition

- There is a population of size 1 of **pairs** of borrowers, and size l of competitive lenders.
- Each lender can serve exactly 2 IL borrowers or one JL pair.
- No information sharing between lenders: a defaulting borrower or pair can go on to borrow from another lender.
- Each period, unmatched lenders post contracts, unmatched borrowers are randomly matched to lenders.
- Borrowers stay matched until they default, then rejoin the unmatched pool.

A simple model of competition

Observation

There will always be credit rationing ($l < 1$) in equilibrium.

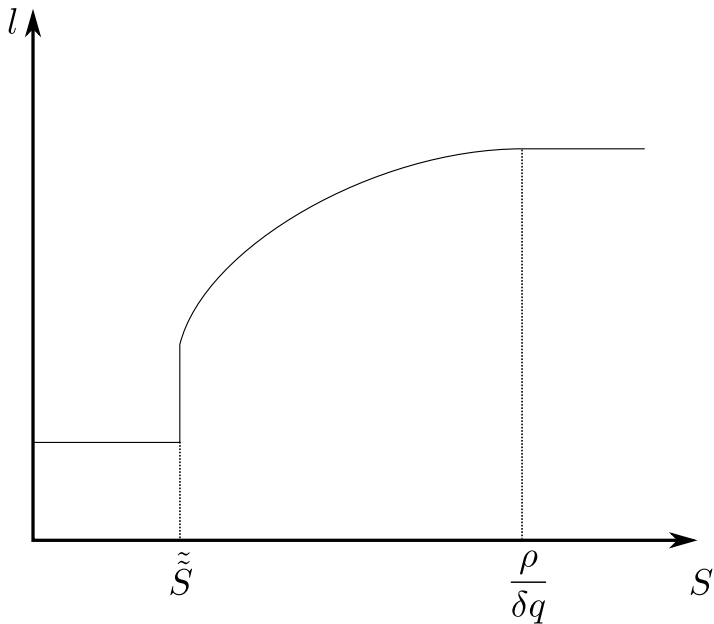
- If not, unmatched borrowers would rematch immediately - no incentive for borrowers/groups to repay.
- Standard efficiency wage argument, a la Shapiro & Stiglitz (1984)
- In contrast, our monopolist/nonprofit is able to serve the whole market as they are able to fully terminate defaulting borrowers.
- Proponents of commercialization argue that access to capital markets will expand industry scale. We rule this channel out and find an opposing effect - commercialization can lead to more rationing.

Equilibrium contracts

- Denote the welfare of an unmatched borrower by U .
- If a borrower defaults, she is terminated by her current lender and earns U .
- IC1: $\delta(V - U) \geq r$.
- IC2: $\delta(V + S - U) \geq 2r$.
- When S is small, IC2 is relatively tight: market entrants can earn higher profits under IL than under JL.
- Thus for small S , equilibrium contract will be IL.
- For large S , equilibrium switches to JL.

Equilibrium market scale

- Unmatched borrower welfare U is endogenous: determined by entry of competitive lenders.
- For low S , the JL IC2 is tight, this constrains entry, so U is low.
- Low U implies that the IL IC1 is slack, so equilibrium is vulnerable to entry by an IL lender.
- As S increases, the JL IC2 becomes slacker, permitting entry, until IL is no longer viable.



Summary

- The relevant welfare measure (Z) includes both current borrowers and rationed “unmatched” borrowers.
- Increases in market scale relax credit rationing - Z improves as S increases.

Proposition

When S is small, and thus market scale is small, total welfare can be higher under monopolistic lending than competitive lending.

▶ Theory detail

Interest rate caps

- In the competitive market, lenders earn zero profits so interest rate caps have less potential to improve borrower welfare and might drive lenders out.
- However, since the JL repayment rate is higher, JL interest rates are lower - therefore a cap could force a switch from IL to JL.
- Credit rationing will worsen, but welfare can still increase.

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Simulation

- We calibrate the model parameters using simple estimates from the MIXmarket data and other sources. This enables us to plot value functions, interest rates etc.
- This enables us to get a sense of the magnitude and relative importance of the effects analyzed.
- Generalize the model to groups of size 5 (otherwise JL typically never profitable - limited liability too tight)

Parameters

- $\rho = 0.921$: estimated from Portfolio At Risk data, accounting for IL/JL shares in portfolio.
- $\rho = 1.098$: estimated from MIX cost data.
- $R = 1.737$: from de Mel et al. (2008) average returns to investment of around 1.6, implying $\rho R \approx 1.6$.
- $\delta = 0.864$: trickiest one. We take the midpoint of δ implied by US long run real interest rate and a calibration from MIX interest rate data.

▸ Detail

▸ Summary Stats

Summary

- **Abuse of lending methods:** forcing the monopolist to use JL when IL is preferred increases welfare by 12%-20%.
- **Impact of market power:** Switching to a non-profit lender increases welfare by 54%-73%, mostly through lower interest rates.
- **Effect of competition:** Despite credit rationing, competition achieves similar borrower welfare to non-profit lending.
- **Use of joint liability:** Non-profit lenders predicted to always use JL. Competitive lenders or monopolist only use JL for social capital worth at least 15% of the loan size.

Full Sample results

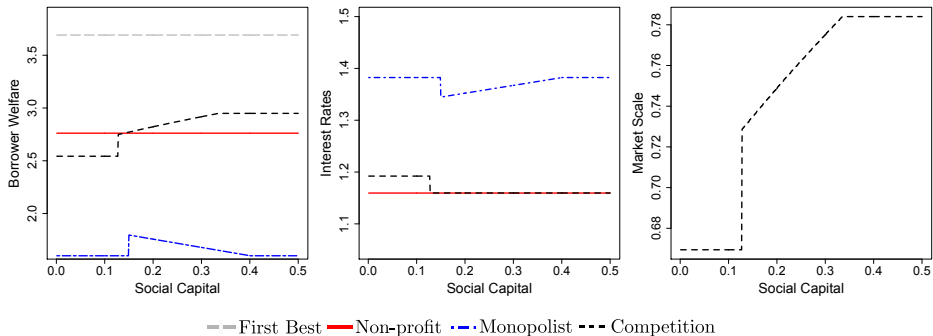


Figure: Full Sample Welfare, Interest Rates and Market Scale.

Basic results: Non-Profit and Monoplist

For the benchmark simulation we obtain the following:

- The non-profit lender always offers JL
- The for-profit monopolist switches from IL to JL at $\tilde{S} = 0.148$, i.e. social capital worth 14.8% of the loan size.
- IC1 is tighter than the LLC and binds at $\tilde{S} = 0.4$ or 40% of loan size, above which social capital has no further impact.
- The non-profit (break-even) interest rate is 16%.
- The for-profit monopolist charges 38% under IL, 35% under JL at \tilde{S} and 38% under JL at \bar{S} .

Basic results: Welfare

- (Present value of) borrower welfare with the non-profit lender is 2.76
- Aggregate welfare under competition varies from 2.54 to 2.95
- Under the monopolist, welfare is 1.6 under IL, 1.796 at \tilde{S} and 1.6 at $S \geq \bar{S}$.

▶ Regional Results

Sensitivity

- We check sensitivity of the results to varying each parameter in turn.
- For simplicity focus on borrower welfare holding $S = 0$ (since welfare effect of S relatively modest) and S thresholds.
- Qualitative conclusions are generally robust.

Sensitivity

- *Observation 1:* Borrower welfare under monopolist is insensitive as monopolist extracts part of the surplus gained/lost.
- *Observation 2:* Welfare under competition and non-profit track one another quite closely, strengthening the conclusion that non-profit and competition have similar performance (i.e. enforcement externality is low).
- *Observation 3:* The S thresholds for competition and the non-profit follow each other closely and are insensitive to parameter values - the region of inefficiency is robust.

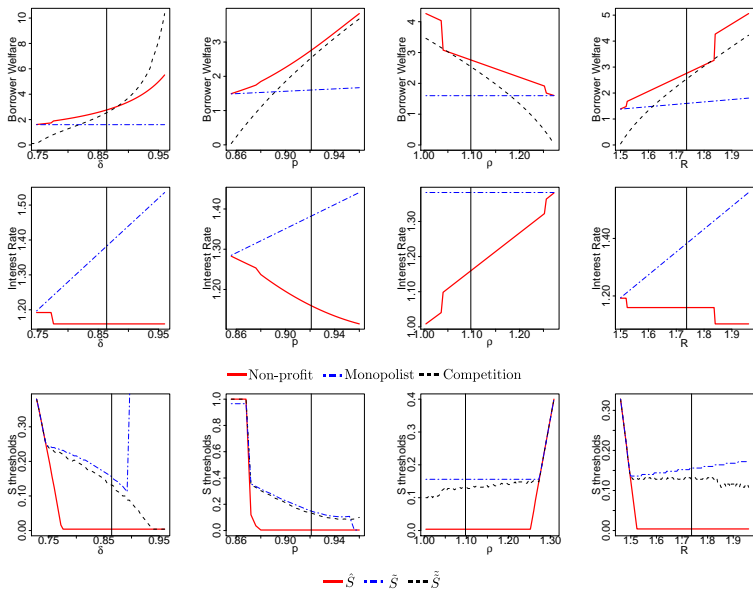


Figure: Sensitivity Analysis. Vertical lines indicate full sample parameter estimates.

An aside - competition dominates the non-profit?

- This result follows from the fact that the non-profit must use strict termination threats.
- Competition process essentially acts as a weaker termination threat - borrowers can reborrow in future. Entry occurs until repayment constraint binds.
- Nevertheless, competition is inefficient: free entry may not select the optimal contract from borrowers' perspective. + credit rationing.
- Non-profit can do better using e.g. stochastic termination upon default.
- We work out a simple example. Mech. design approach in Bhole & Ogden (2010). [▶ Simulation Results.](#)

Concluding remarks - Summary

- The monopolist for-profit lender does exploit the borrowers' social capital and this has economically meaningful effects on interest rates and welfare.
- However, these are substantially smaller than the change in interest rates and welfare when switching to a large non-profit lender - “mission drift” concerns of Muhammad Yunus raised earlier seem to have some validity
- The theoretical welfare effects of competition are ambiguous, due to the trade-offs between credit rationing, lower interest rates and the ability of borrowers to reborrow after an involuntary default.
- However, for the parameters estimated from our full sample and most regions considered, welfare under competition is approximately the same as under non-profit lending.
- Findings corroborate the theoretical prediction that for-profit lenders are less likely to offer JL than the non-profit.

Concluding remarks - Future Directions

- In our model there is no multiple borrowing and lenders are constrained to use dynamic incentives only, no coercion
- These are some of the key ingredients of the recent controversies.
- The main general argument in favor of non-profits is that because financial incentives are muted, they are less likely to pursue narrow profit maximization at the expense of other social goals.
- This includes not to use harsh loan collection practices

Concluding remarks - Future Directions

- For-profits however might be more efficient than non-profits in terms of cutting costs of operations, being able to raise capital, and reaching out to more borrowers - but less likely to reach out to poorer borrowers whose projects may have lower financial returns, but high social ones
- In our set up non-profit is effectively a social planner - in ongoing work we study organizational issues that would create a genuine trade-off between non-profit and for-profit status (e.g. Glaeser & Shleifer, 2001).
- As interest rates are observable but coercion less so, a cost-quality like trade off could arise

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Market Power & Commercialization

“[Yunus] takes pride in the industry’s achievement in reaching 100 million poor clients, but does not acknowledge that commercialization is precisely how much of that goal was achieved.

Mr. Yunus rightly says that the lure of profits has, in some cases, attracted players with questionable motivations and with practices that must be condemned. But as with the problems of the American subprime mortgage market, the solution is not to abolish the mortgage business but to demand that the market be sound, transparent and well regulated. . . . Microfinance institutions aim to reach the two billion people who lack access to basic financial services. To do that, we need to harness the capital markets, not abandon them.”

Michael Schlein, Chief Executive of Accion in NYT, January 2011

▶ Back to motivation

Market Power & Commercialization

“In most countries, the microcredit market is still immature, with low penetration of the potential clientele by MFIs and little competition so far.”

Rosenberg et al., 2009 [CGAP]

“In many countries in the region [Asia], the majority of microcredit is provided by a few leading institutions, and competition among them is mostly on non-price terms”

Fernando, 2006 [ADB]

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Why Joint Liability?

- Gine & Karlan (2011): roughly speaking, JL seems not to matter too much for repayment. But this is in an environment with almost no default.
- Gine, Krishnaswamy & Ponce (2012): JL influences behavior as theory predicts: groups cluster into repay/default dependent on fraction of the group that is repaying.
- Attanasio et al. (2011) study: JL loans outperformed individual loans in consumption and entrepreneurship outcomes.
- Carpena, Cole, Shapiro & Zia (2010): study an MFI that switched from IL to JL.
- Banerjee (2012): we currently lack clear evidence of JL mattering significantly for default rates, but otherwise it does seem to work as theory predicts along several channels.

▶ Go back

Social capital

A simple model of endogenous social capital. Each period, each pair of friends plays a “social game” with payoffs:

	C	D
C	s, s	as, bs
D	bs, as	$0, 0$

We assume

- $a + b < 2$ so (C, C) is Pareto dominant
- $a \leq 0$ so (D, D) is a stage-game Nash equilibrium.

Two types of game:

- $b \leq 1$: “coordination game”. (C, C) is a stage-game NE
- $b > 1$: “opportunism game”. (C, C) may be SPNE in infinitely repeated game.

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Social capital

Definition

Social capital is the expected discounted lifetime payoff from the social game. If borrowers expect to play (C, C) in every period, $S = \frac{s}{1-\delta}$.

Social capital is sustainable if (C, C) can be supported as a SPNE of the infinitely repeated game under trigger strategies.

Definition

Social capital is *sustainable* if $b \leq \frac{1}{1-\delta}$

Social capital is always sustainable in the cooperation game but may not be in the opportunism game.

Since (D, D) is NE, switching to (D, D) forever is a credible threat and could be used to enforce cooperation in the repayment game also.

We assume the game is a coordination game. This implies we can treat S as exogenous to the lending arrangement.

Competition - theory

- Suppose fraction η lenders offer IL.
- We assume that in equilibrium lenders offer JL if both IL and JL break even (rules out mixed equilibria, which only occur for a single value of S anyway).
- Each period, $(1 - p)\eta l$ IL lenders and $(1 - q)(1 - \eta)l$ JL lenders have spare capacity. There are $(1 - p)\eta l + (1 - q)(1 - \eta)l + (1 - l)$ unmatched borrowers.

Value functions

Denoting the utility of an unmatched borrower by U and a matched borrower by \tilde{V} , and using $r^{LL} = \frac{\rho}{p}$ and $r^{JL} = \frac{\rho}{q}$:

$$\tilde{V}^{LL} = \frac{pR - \rho + \delta(1 - p)U}{1 - \delta p}$$

$$\tilde{V}^{JL} = \frac{pR - \rho + \delta(1 - q)U}{1 - \delta q}$$

$$U = \chi(l, \eta) \frac{pR - \rho}{1 - \delta}$$

with:

$$\chi(l, \eta) \equiv$$

$$\frac{(1 - p)(1 - \delta q)\eta l + (1 - q)(1 - \delta p)(1 - \eta)l}{(1 - \delta p)(1 - \delta q)(1 - l) + (1 - p)(1 - \delta q)\eta l + (1 - q)(1 - \delta p)(1 - \eta)l}$$

Total welfare:

$$\begin{aligned} Z &= \eta l \tilde{V}^{LL} + (1 - \eta) l \tilde{V}^{JL} + (1 - l) U \\ &= \left[\frac{\chi(l, \eta)}{1 - \delta} + l(1 - \chi(l, \eta)) \left(\frac{\eta}{1 - \delta p} + \frac{1 - \eta}{1 - \delta q} \right) \right] (pR - \rho) \end{aligned}$$

Constraints

Under IL the tightest constraint is IC1/IC2:

$$\delta V - \frac{\rho}{p} \geq \delta U$$

or

$$\frac{\rho}{p} \leq \delta p R \frac{1 - \chi(l, \eta)}{1 - \delta p \chi(l, \eta)} \equiv r_{IC1}^{IL}(\chi)$$

Similarly, we obtain for JL $\frac{\rho}{q} \leq \min\{r_{IC1}^{JL}(\chi), r_{IC2}^{JL}(S, \chi)\}$:

$$r_{IC1}^{JL}(\chi) \equiv \delta p R \frac{1 - \chi(l, \eta)}{1 - \delta q \chi(l, \eta)}$$
$$r_{IC2}^{JL}(\chi, S) \equiv \frac{\delta[(1 - \chi(l, \eta))pR + (1 - \delta q)S]}{2 - \delta q - \delta q \chi(l, \eta)}$$

All constraints are tighter as χ , (i.e. U) increases: this is the competition effect.

Equilibrium

In equilibrium, it must not be profitable to enter offering either IL or JL.
Therefore, in equilibrium:

$$\rho = \max\{pr_{IC1}^{IL}(\chi), \min\{qr_{IC1}^{JL}(\chi), qr_{IC2}^{JL}(S, \chi)\}\}$$

- For each S , there is a unique value of χ that satisfies this condition.
- If $pr_{IC1}^{IL}(\chi) < \rho$, no IL lending. If $\min\{qr_{IC1}^{JL}(\chi), qr_{IC2}^{JL}(S, \chi)\} < \rho$, no JL lending.
- This enables us to solve for η and l .

Summary of results

- For $S < \tilde{S} \equiv \frac{\rho - \delta q}{\delta q(1 - \delta q)} \rho$ the unique equilibrium is IL-only lending. If $\rho - \delta q$ there is only JL lending in equilibrium.
- For $S > \tilde{S}$ the unique equilibrium is JL-only lending, with scale l increasing in S until $S = \frac{\rho}{\delta q}$.
- At $S = \tilde{S}$, lending switches from IL to JL and scale increases discontinuously.
- Welfare Z is strictly increasing in l , which is weakly increasing in S . As l increases:
 - ▶ Credit rationing falls: more borrowers receive \tilde{V} and fewer receive U .
 - ▶ Unmatched borrowers rematch with higher probability, so U increases.
 - ▶ \tilde{V} increases in U (involuntary default is less painful).

▶ Back to summary

Parameters

p :

- MIX reports two fairly standardized measures: Portfolio At Risk (30 days and 90 days).
- We use 30 days. This is not ideal - not all PAR30 will default (+ve bias), but PAR90 will be -vely biased due to rapidly growing portfolios.
- Let θ be fraction of IL loans and $(1 - \theta)$ be JL (observed). $\pi(p, m)$ is the (binomial) repayment probability under JL, depends on p and m , the minimum number of “successes” needed for repayment.

$$1 - PAR = p\theta + \pi(p, m)(1 - \theta)$$

- p and m estimated using (Weighted) Non-Linear Least Squares.
- Estimated p is 0.921.

Parameters

ρ :

- MIX reports data on administrative and financial expenses, x_a and x_f . We want to know the cost per \$ disbursed.
- Disbursals are not reported, only gross loan portfolio. We obtained disbursal figures for 26 of the 50 largest MFIs, weighted average Disbursal/Portfolio ratio is 1.91.
- For lender i , $\rho_i = 1 + \frac{x_{a,i} + x_{f,i}}{\text{GrossLoanPortfolio} * 1.91}$.
- Weighted mean $\rho = 1.098$.

Parameters

R :

We need some estimate of returns to investment in microenterprises

- De Mel, McKenzie and Woodruff (2008) find annual real expected returns of around 60% to random cash and capital grants to microenterprises in Sri Lanka.
- Other studies find similar figures.
- Implies $pR = 1.6$.
- Dividing by $p = 0.921$, we obtain $R = 1.737$.

Parameters

δ :

The trickiest one:

- Empirical estimates of discount rates for typical microfinance clients vary widely, and often implausible.
- Usually elicited using “cash today vs cash tomorrow” approaches, which are problematic.
- Instead, we estimate an upper and lower bound, take the midpoint.
- δ^U : 0.975 implied by long run real yield on US bonds around 2.5%.
- δ^L : 0.753. Model implies $\delta \geq \frac{r}{pR}$. We observe a proxy for r , use the mean to avoid outliers.
- Therefore we use $\delta = 0.864$.

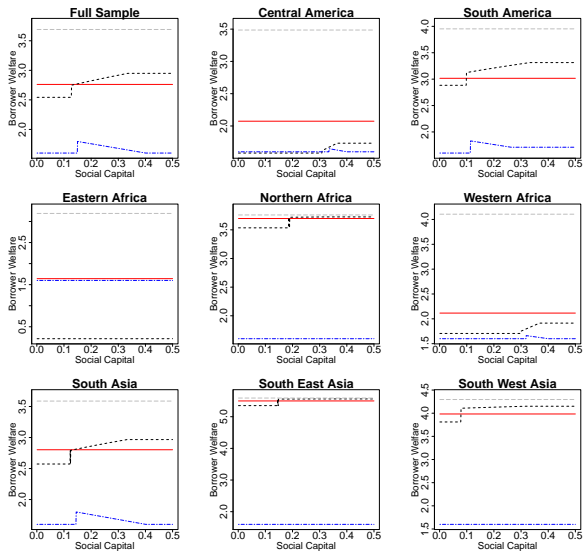
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Summary Statistics and Parameter Estimates

	MFI's	Loans (m)	% Full Sample	IL share (number) ^a	IL share (value)	Interest rate	ρ	R	ρ	δ
Full Sample	715	65.217	100.0%	46.0%	81.9%	1.206	0.921	1.737	1.098	0.864
Central America	60	1.671	2.6%	93.8%	98.8%	1.190	0.881	1.816	1.112	0.860
South America	133	6.884	10.6%	97.7%	99.3%	1.237	0.928	1.724	1.102	0.874
Eastern Africa	20	2.439	3.7%	38.7%	70.4%	1.152	0.831	1.925	1.115	0.848
Northern Africa	20	1.735	2.7%	37.5%	59.2%	1.227	0.984	1.626	1.115	0.871
Western Africa	48	1.184	1.8%	60.5%	89.2%	1.306	0.882	1.814	1.173	0.896
South Asia	133	44.067	67.6%	34.8%	33.3%	1.180	0.926	1.728	1.083	0.856
South East Asia	85	4.296	6.6%	45.7%	68.3%	1.389	0.988	1.619	1.164	0.922
South West Asia	61	0.865	1.3%	75.0%	93.8%	1.272	0.967	1.655	1.106	0.885

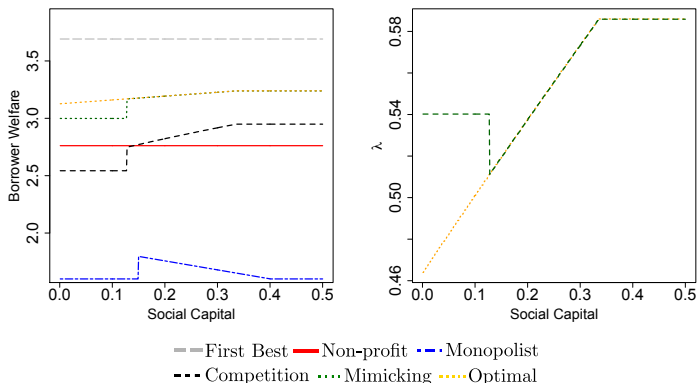
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Regional results



— First Best — Non-profit - - Monoplist - - Competition

Optimal λ



- Non-profit can improve by offering stochastic renewal: graph depicts two scenarios, *mimicking* equilibrium under competition or choosing renewal probability optimally (Bhole and Ogden (2010))