# Commercialization and the Decline of Joint Liability Microcredit

Jonathan de Quidt[1]    Thiemo Fetzer[2]    Maitreesh Ghatak[3]

[1]IIES    [2]Warwick    [3]LSE

October, 2017

1

# Joint Liability

- Microfinance first attracted economists' attention for pioneering use of joint liability contracts: groups of borrowers who assume joint responsibility for one another's debts.
  - e.g. Stiglitz (1990), Varian (1990), Besley & Coate (1995)

# Joint Liability

- Microfinance first attracted economists' attention for pioneering use of joint liability contracts: groups of borrowers who assume joint responsibility for one another's debts.
  - e.g. Stiglitz (1990), Varian (1990), Besley & Coate (1995)

- Most notably, Grameen Bank and Muhammad Yunus, Nobel Peace Prize recipients, 2006.

# Joint Liability

- Microfinance first attracted economists' attention for pioneering use of joint liability contracts: groups of borrowers who assume joint responsibility for one another's debts.
  - e.g. Stiglitz (1990), Varian (1990), Besley & Coate (1995)

- Most notably, Grameen Bank and Muhammad Yunus, Nobel Peace Prize recipients, 2006.

- Theoretically (e.g. Ghatak & Guinnane, 1999) joint liability helps alleviate contracting failures due to
  - Adverse selection
  - Moral hazard
  - Costly state verification
  - Limited enforcement

# Joint Liability

▶ Microfinance first attracted economists' attention for pioneering use of joint liability contracts: groups of borrowers who assume joint responsibility for one another's debts.

  ▶ e.g. Stiglitz (1990), Varian (1990), Besley & Coate (1995)

▶ Most notably, Grameen Bank and Muhammad Yunus, Nobel Peace Prize recipients, 2006.

▶ Theoretically (e.g. Ghatak & Guinnane, 1999) joint liability helps alleviate contracting failures due to

  ▶ Adverse selection
  ▶ Moral hazard
  ▶ Costly state verification
  ▶ Limited enforcement

▶ Long thought of as foundational to MFIs' very low default rates on unsecured credit to the poor.

# Joint Liability

- But over the last 10 years, numerous authors have pointed to a decline in the use of joint liability contracts.
  - Hermes and Lensink (2007), Armendáriz de Aghion and Morduch (2010), Breza (2011), Giné, Krishnaswamy and Ponce (2011), Feigenberg, Field and Pande (2013), Carpena et al. (2013), Giné and Karlan (2014)

# Joint Liability

- But over the last 10 years, numerous authors have pointed to a decline in the use of joint liability contracts.
  - Hermes and Lensink (2007), Armendáriz de Aghion and Morduch (2010), Breza (2011), Giné, Krishnaswamy and Ponce (2011), Feigenberg, Field and Pande (2013), Carpena et al. (2013), Giné and Karlan (2014)

- **Essentially anecdotal**, centering around the decision of Grameen and BancoSol to switch to Individual Liability lending in early 2000s.

# Joint Liability

- But over the last 10 years, numerous authors have pointed to a decline in the use of joint liability contracts.
  - Hermes and Lensink (2007), Armendáriz de Aghion and Morduch (2010), Breza (2011), Giné, Krishnaswamy and Ponce (2011), Feigenberg, Field and Pande (2013), Carpena et al. (2013), Giné and Karlan (2014)

- **Essentially anecdotal**, centering around the decision of Grameen and BancoSol to switch to Individual Liability lending in early 2000s.

- **This paper:**
  - Is it true?
  - Why?

- Our claim: two parallel forces we term **commercialization** predict decline of JL
  1. Growth of for-profit microcredit
  2. Increased competitiveness & improvement in borrowers' outside options

▶ Our claim: two parallel forces we term **commercialization** predict decline of JL
  1. Growth of for-profit microcredit
  2. Increased competitiveness & improvement in borrowers' outside options

▶ No claims about other hard-to-measure forces (technological progress, preference change, "borrowers never liked JL").

- Our claim: two parallel forces we term **commercialization** predict decline of JL
  1. Growth of for-profit microcredit
  2. Increased competitiveness & improvement in borrowers' outside options

- No claims about other hard-to-measure forces (technological progress, preference change, "borrowers never liked JL").

- **No normative claims**
  - Companion paper (de Quidt et al., 2016) - restricted model to analyze specific market structures & implications for welfare.

# Outline

1. Document a set of facts about the microcredit industry.

2. Simple contracting model predicts a causal link from commercialization to decline of JL.

3. Three testable predictions.

# Outline

1. Document a set of facts about the microcredit industry.
   - Broad move toward commercialization
   - Modest decline in JL lending in a 4-year panel
2. Simple contracting model predicts a causal link from commercialization to decline of JL.

3. Three testable predictions.

1. Document a set of facts about the microcredit industry.

2. Simple contracting model predicts a causal link from commercialization to decline of JL.
   - For-profit and non-profit lenders.
   - Weak enforcement environment with dynamic repayment incentives.
   - JL improves repayment through social pressure.
   - Improved borrower outside options undermine repayment.

3. Three testable predictions.

# Outline

1. Document a set of facts about the microcredit industry.

2. Simple contracting model predicts a causal link from commercialization to decline of JL.

3. Three testable predictions.
   - For-profits use JL less than non-profits
   - Non-profits decrease use of JL when borrowers' outside options improve
   - For-profits *increase* use of JL when borrowers' outside options improve

# Literature

Not the first to identify an association between commercialization and contract type

- Cull et al. (2009): For-profit lenders less likely to use JL than non-profits.
- Karlan & Zinman (2009):

> [T]he industrial organization of microcredit is trending toward something that looks more like the cash loan market: for-profit, more competitive delivery of untargeted, individual liability loans... This evolution is happening from both the bottom-up (non-profits converting to for- profits) and the top-down (for-profits expanding into subprime and consumer segments).

But (we think) first to formalize the association and claim causality

# Other literature

- Microcredit contracts
  - Besley & Coate (1995), Ghatak & Guinnane (1999), many more
- Joint vs individual liability (empirical)
  - Giné & Karlan (2014), Carpena et al. (2013), Mahmud (2015), Attanasio et al. (2015)
- Importance of social capital
  - Besley & Coate (1995), Karlan (2005, 2007), Ahlin & Townsend (2007), Cassar & Wydick (2010), de Quidt et al. (forthcoming, 2016)
- Competition
  - Spillovers on other lenders: Hoff & Stiglitz (1997), McIntosh et al. (2005), de Quidt et al. (2016)
  - Spillovers on poor borrowers: McIntosh & Wydick (2005)
  - Spillovers on informal credit market: Demont (forthcoming)
- Impact of microcredit
  - AEJ: Applied 7(1) 2015: Banerjee et al., Tarozzi et al., Attanasio et al., Crépon et al., Angelucci et al., Augsburg et al.
  - Meta-analysis: Meager (2016)

# 1. Steady growth of market scale
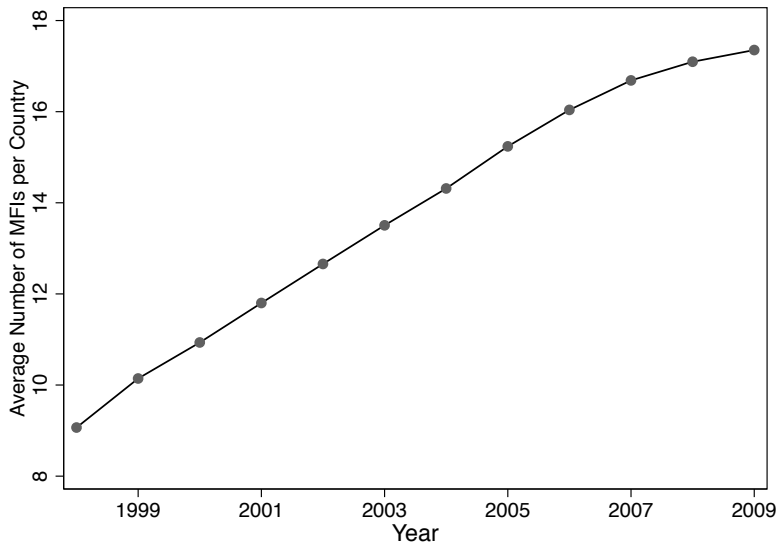
# 2. Increasing importance of for-profit lenders
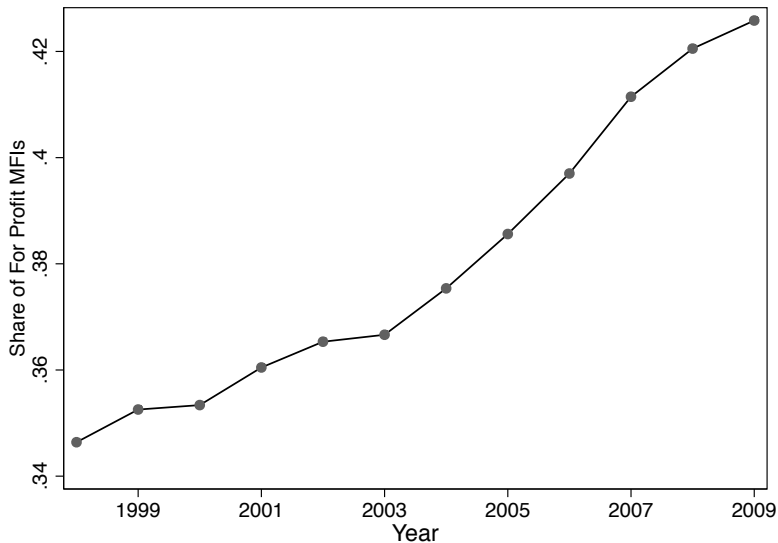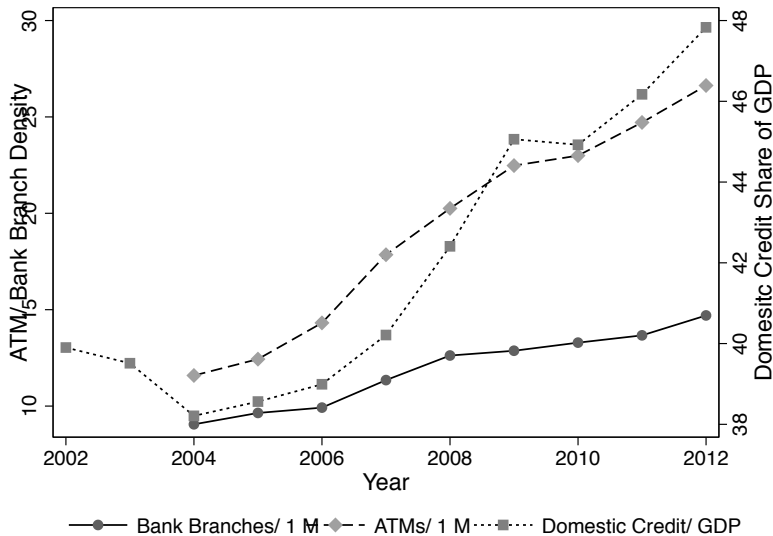
# 4. Modest decline of joint liability lending

# Caveats
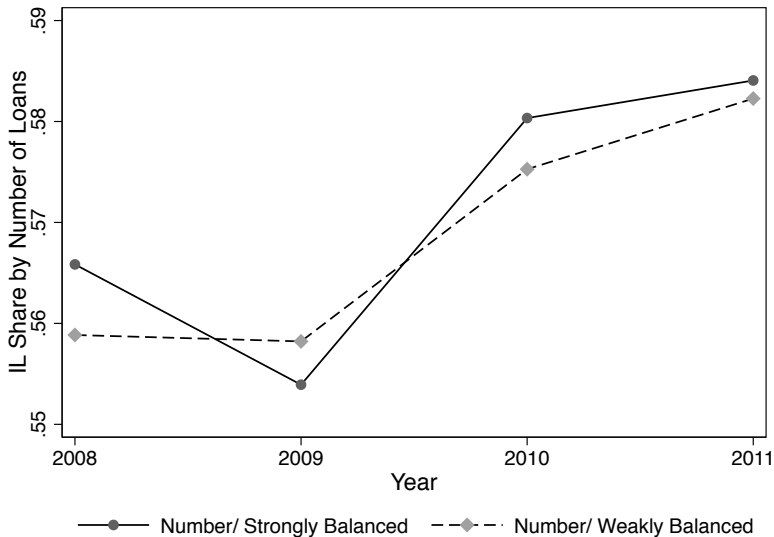
Many challenges to documenting trends in lending methodology

- ▶ Short time window

- ▶ Global trend driven by
    - ▶ Shift to IL within MFI portfolios (our figures)
        - ▶ Captures e.g. a JL lender switching to IL (like Grameen)
    - ▶ Relative growth of IL lenders (difficult to capture)
    - ▶ More entry/less exit of IL lenders (not observable)

- ▶ Selective reporting leads us to focus on within-MFI changes

- Study choice of lending methodology within a weak enforcement/strategic default/ex-post moral hazard model.

- Basic framework used in other work
  - Original form: Besley & Coate (1995)
  - This form: de Quidt et al. (forthcoming), de Quidt et al. (2016)
  - Also Allen (2015) same basic setup

- We focus the analysis on
  - (Exogenous) changes in for-profit/non-profit composition
  - (Exogenous) changes in competition or borrower outside options

- Each period, risk-neutral, infinitely lived borrowers have access to a productive investment opportunity that
  - costs 1
  - yields $R$ with probability $p$
  - yields 0 with probability $1 - p$

- Investment payoffs independently distributed across borrowers.

- No assets and no saving
  - Must borrow to finance investment.
  - Consume all income each period.

- Can take *at most one* loan per period.

- Discount future payoffs by per-period discount factor $\delta$

- Lenders are either **for-profit** or **non-profit**.
  - For-profit lenders maximize *per-period* profits from a given borrower.
    - Rationale: capacity constraints + costless replacement
  - Non-profit lenders maximize borrower welfare, subject to break-even
- Opportunity cost of capital $\rho$

- Lenders are either **for-profit** or **non-profit**.
  - For-profit lenders maximize *per-period* profits from a given borrower.
    - Rationale: capacity constraints + costless replacement
  - Non-profit lenders maximize borrower welfare, subject to break-even
- Opportunity cost of capital $\rho$

- **Weak enforcement**: project returns are non-contractible
  - e.g. because state verification is prohibitively costly

- Dynamic repayment incentives: defaulting borrowers' contracts are terminated.

- **Limited liability:** unsuccessful borrowers *cannot* repay and are inefficiently terminated.

▶ Lenders offer take-it-or-leave-it individual liability (IL) or joint liability (JL) contracts.

▶ Loan of 1, gross repayment of $r$ at period end.

▶ IL: defaulting borrower is terminated.

▶ JL: groups of two borrowers jointly liable. **Both** contracts terminated unless **both** loans repaid.
  ▶ JL incentivizes successful borrowers to assist their unsuccessful partners with repayment.

- A borrower who rejects a loan offer, or has her contract terminated, receives continuation value $U$.

- A borrower who rejects a loan offer, or has her contract terminated, receives continuation value $U$.
- $U$ captures many things
  - Alternative occupational choice
  - Waiting period to access next loan
  - Value of next-best financing option

- A borrower who rejects a loan offer, or has her contract terminated, receives continuation value $U$.
- $U$ captures many things
  - Alternative occupational choice
  - Waiting period to access next loan
  - Value of next-best financing option
- de Quidt et al. (2016): model $U$ explicitly as "waiting for credit."
  - Defaulters enter a pool of "unmatched" borrowers, waiting for an available slot at a lender.
  - Competitive equilibrium, analogous to Shapiro & Stiglitz (1984) (also Ghosh & Ray, forthcoming).
  - But $U$ is an equilibrium object - hard to study ceteris paribus *changes* in competitiveness.

- A borrower who rejects a loan offer, or has her contract terminated, receives continuation value $U$.
- $U$ captures many things
  - Alternative occupational choice
  - Waiting period to access next loan
  - Value of next-best financing option
- de Quidt et al. (2016): model $U$ explicitly as "waiting for credit."
  - Defaulters enter a pool of "unmatched" borrowers, waiting for an available slot at a lender.
  - Competitive equilibrium, analogous to Shapiro & Stiglitz (1984) (also Ghosh & Ray, forthcoming).
  - But $U$ is an equilibrium object - hard to study ceteris paribus *changes* in competitiveness.
- This paper, fully **reduced form** approach: increased competitiveness reflected in increased $U$

**Individual Liability**

▶ Consider a borrower offered an IL loan at interest rate $r$.

▶ If she repays when successful, value function is:

$$V^{IL} = p(R - r) + \delta p V^{IL} + \delta(1 - p)U$$
$$= \frac{p(R - r)}{1 - \delta p} + \frac{\delta(1 - p)}{1 - \delta p}U$$

▶ Repayment is incentive-compatible iff

$$\delta U \leq \delta V^{IL} - r$$
$$r \leq \delta p R - \delta(1 - \delta)U \equiv r_{IC1}(U) \qquad \text{(IC1)}$$

▶ IC1 implies $V^{IL} \geq U$ (participation/individual rationality constraint)

# Theory

Since we are interested in the move from JL to IL, we assume:

**Assumption**

*IL is always feasible: $\rho \leq pr_{IC1}(U)$*

## Assumption

*Within JL groups, borrowers can observe and contract on output realizations.*

- ▶ Typical assumption in the microcredit literature

- ▶ They write contingent repayment contracts, "repayment rules," specifying who repays what and when.

- ▶ Penalty for violating the repayment rule is a social sanction, $S$.
  - ▶ Not required for this paper, but simplifies comparative statics
  - ▶ Again, fully reduced-form treatment.
  - ▶ Many microfoundations - real punishment, loss of reputation, breakdown of social ties, collapse of other informal contracts, ...

- Focus on *efficient*, *stationary*, *symmetric* repayment rules.
  - Efficiency $\Rightarrow$ max. borrower welfare $+$ no social sanctions enacted in equilibrium.
  - Stationarity $\Rightarrow$ stationary value function
  - Symmetry $\Rightarrow$ representative borrower
- Can restrict attention to three rules:
  1. Always default.
  2. Repay when both are successful, default otherwise.
  3. Repay own loan when successful, and also repay partner's if she is unsuccessful.
- For simplicity, assume borrowers can always *afford* to repay partner's loan when successful. Sufficient condition:

## Assumption

$\delta p \leq \frac{1}{2}$

## Joint liability

- Now consider a pair of borrowers offered a JL contract at rate $r$.
- Efficient, symmetric repayment rule $\Rightarrow$ if expected repayment is $\pi r$, contract renewal probability is $\pi$.
  Intuition:
  - Groups always repay both loans, or neither (efficiency).
  - $\Rightarrow$ contract is renewed whenever my loan is repaid.
  - I am as likely to repay partner's loan as she is to repay mine (symmetry).
- Value function:

$$V^{JL} = pR - \pi r + \delta \pi V^{JL} + \delta(1 - \pi)U$$
$$= \frac{pR - \pi r}{1 - \delta \pi} + \frac{\delta(1 - \pi)}{1 - \delta \pi}U$$

Incentive compatibility

- ▶ Step 1: repay own loan, when partner is repaying?

$$\delta U \leq \delta V^{JL} - r$$
$$r \leq \delta pR - \delta(1-\delta)U \equiv r_{IC1}(U) \qquad\qquad (\text{IC1})$$

- ▶ **Same condition as for IL**
- ▶ Note: did not invoke social sanction $S$, why?
  If IC1 does not hold efficient repayment rule is "always default"
  $\Rightarrow S$ never needed to enforce individual repayment.
- ▶ If IC1 holds, welfare is increasing in $\pi$, so efficient rule will maximize repayment.

▶ Step 2: repay partner's loan, when partner is not repaying?

$$\delta(U - S) \leq \delta V^{JL} - 2r \qquad \text{(IC2)}$$

▶ Larger values of $S$ relax IC2, enhancing borrowers' ability to side-contract.

▶ If IC2 does not hold, efficient rule is "repay own loan when partner is successful"

▶ But this achieves lower **repayment**, **welfare** and **lender profit** than IL.

▶ So JL never offered if IC2 does not hold.

- If IC2 holds, efficient rule is "Repay own loan when successful, and also repay partner's if she is unsuccessful."
- Expected repayment: $pr + p(1-p)r = p(2-p)r$ so

$$\pi = p(2-p) \equiv q$$
$$V^{JL} = \frac{pR - qr}{1 - \delta q} + \frac{\delta(1-q)U}{1 - \delta q}$$

and substituting into IC2:

$$r \leq \frac{\delta pR - \delta(1-\delta)U + \delta(1-\delta q)S}{2 - \delta q}$$
$$= \frac{r_{IC1}(U) + \delta(1-\delta q)S}{2 - \delta q} \equiv r_{IC2}(U, S) \qquad \text{(IC2)}$$

**Recap**

- IL contracts must satisfy:

$$r^{IL} \leq r_{IC1}(U)$$

  achieving repayment rate $p$

- JL contracts must satisfy:

$$r^{JL} \leq \min\{r_{IC1}(U), r_{IC2}(U, S)\}$$

  achieving repayment rate $q > p$

**Non-profit lender**

▶ Non-profit lender maximizes borrower welfare, subject to break-even.

▶ Break-even interest rates:

$$\hat{r}^{IL} = \frac{\rho}{p}$$

$$\hat{r}^{JL} = \frac{\rho}{q}$$

▶ Borrower welfare is higher under JL, so JL offered whenever possible. Why?

  ▶ Higher repayment $\Rightarrow$ less inefficient termination & lower $r$

▶ Non-profit offers JL iff:

$$\rho \leq q \min\{r_{IC1}(U), r_{IC2}(U, S)\}$$

or

$$S \geq \hat{S}(U)$$

**For-profit lender**

▶ For-profit lender maximizes (per-period) profits

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

▶ Charges the highest possible interest rate, subject to incentive-compatibility:

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

▶ Offers JL iff

$$p\tilde{r}^{IL} \leq q\tilde{r}^{JL}$$

or

$$S \geq \tilde{S}(U)$$

# Predictions

- Suppose that $S$ is distributed in the population according to $F(S)$
  - e.g. different villages have stronger/weaker social ties

- Non-profit lender's IL share: $F(\hat{S}(U))$

- For-profit lender's IL share: $F(\tilde{S}(U))$

- IL shares are weakly monotone increasing in $\hat{S}, \tilde{S}$.

# Prediction 1. For-profits vs non-profits

## Proposition

*Non-profits are weakly less likely to offer IL than for-profits:*

$$\hat{S}(U) \leq \tilde{S}(U)$$

*The inequality is strict if IL earns positive profits*

Intuition

- Non-profits offer JL whenever it breaks even:
  $q \min\{r_{IC1}(U), r_{IC2}(U, S)\} - \rho \geq 0$
- For-profits offer JL whenever it breaks even **and** is more profitable than IL
  $q \min\{r_{IC1}(U), r_{IC2}(U, S)\} - \rho \geq pr_{IC1}(U) - \rho \geq 0.$

## Proposition

*Increases to U increase IL lending by non-profits*

$$\hat{S}'(U) \geq 0$$

*The inequality is strict if IL is offered for some U (p > $\delta q$)*

Intuition

- Increases to $U$ tighten incentive-compatibility constraints - decreasing the maximum interest rate the lender can charge.
- If $r_{IC2}(U, S) < r_{IC1}(U)$, tightening $r_{IC2}$ may render JL loss-making.

## Proposition

*Increases to U **decrease** IL lending by for-profits*

$$\tilde{S}'(U) \leq 0$$

*The inequality is strict if IL is offered for some U ($p > \delta q$)*

Intuition

- Increases in $U$ tighten both IC2 and IC1, decreasing profits under both IL and JL.
- But JL interest rate is less sensitive.
- Heuristically, IC2 bounds $2r$, IC1 bounds $r$, so a $\Delta U$ tightening has a larger effect on IL than JL.

**Useful discriminating prediction** - unlikely to be generated by other correlates of commercialization and methodology change.

# Taking stock

We identify commercialization with
- ▶ Growth in the market share of for-profits

- ▶ Increasing competition in the market

# Taking stock

We identify commercialization with
- Growth in the market share of for-profits
  - Mechanically increases the share of IL loans, as for-profits use IL more.
- Increasing competition in the market

We identify commercialization with
- Growth in the market share of for-profits
  - Mechanically increases the share of IL loans, as for-profits use IL more.
- Increasing competition in the market
  - Increases IL use by non-profits

# Taking stock

We identify commercialization with

- Growth in the market share of for-profits
  - Mechanically increases the share of IL loans, as for-profits use IL more.
- Increasing competition in the market
  - Increases IL use by non-profits
  - Decreases IL use by for-profits

We identify commercialization with

- Growth in the market share of for-profits
  - Mechanically increases the share of IL loans, as for-profits use IL more.
- Increasing competition in the market
  - Increases IL use by non-profits
  - Decreases IL use by for-profits

Net effect in principle ambiguous, **but** for sufficiently low initial share of for-profits, commercialization induces a trend toward IL.

# Robustness

Several strong assumptions, useful to explore how crucial they are.

- No saving.
  - **Important.** Unbounded saving causes dynamic incentives to unravel and undermines repeat borrowing.
  - Evidence for saving constraints (e.g. Dupas and Robinson, 2013).
  - Repeat borrowing is common.

# Robustness

Several strong assumptions, useful to explore how crucial they are.

- No saving.
  - **Important.** Unbounded saving causes dynamic incentives to unravel and undermines repeat borrowing.
  - Evidence for saving constraints (e.g. Dupas and Robinson, 2013).
  - Repeat borrowing is common.
- Borrowing for productive investment.
  - **Not important.** Only require borrowers to value future credit, and to be sometimes unable to repay.

# Robustness

Several strong assumptions, useful to explore how crucial they are.

- No saving.
  - **Important.** Unbounded saving causes dynamic incentives to unravel and undermines repeat borrowing.
  - Evidence for saving constraints (e.g. Dupas and Robinson, 2013).
  - Repeat borrowing is common.
- Borrowing for productive investment.
  - **Not important.** Only require borrowers to value future credit, and to be sometimes unable to repay.
- IL always feasible
  - **Somewhat important.** Without this assumption, increases in $U$ might cause IL lenders to shut down instead of switch to JL - non-monotone effect.
  - **Unimportant for the empirical exercise** as we only analyze within-MFI portfolio shifts.

# Robustness

Several strong assumptions, useful to explore how crucial they are.

- ▶ No saving.
  - ▶ **Important.** Unbounded saving causes dynamic incentives to unravel and undermines repeat borrowing.
  - ▶ Evidence for saving constraints (e.g. Dupas and Robinson, 2013).
  - ▶ Repeat borrowing is common.
- ▶ Borrowing for productive investment.
  - ▶ **Not important.** Only require borrowers to value future credit, and to be sometimes unable to repay.
- ▶ IL always feasible
  - ▶ **Somewhat important.** Without this assumption, increases in $U$ might cause IL lenders to shut down instead of switch to JL - non-monotone effect.
  - ▶ **Unimportant for the empirical exercise** as we only analyze within-MFI portfolio shifts.
- ▶ Borrowers can only take one loan at a time
  - ▶ **Unclear.** No simple way to model multiple borrowing.

- Competition influence only through borrowers' outside option.
  - **Not important.** Modeling "ex-ante" competition weakly reinforces our qualitative findings.
- Borrowers can always afford their JL payment.
  - **Not important.** Dropping this condition introduces an additional constraint but does not otherwise alter our qualitative conclusions.
- Bernoulli output distribution
  - **Somewhat important.** Other contracts become attractive for richer distributions (de Quidt et al., forthcoming)
- For-profit lenders are myopic.
  - **Not important.** Same qualitative results with forward-looking lenders (quantitatively weaker).
- Risk-neutral borrowers
  - **Not important.**
- Social sanctions
  - **Not important.** $S$ permits continuous comparative statics.

## Data

- Our data come from the MIX Market, an organization that collates financials of a large number of MFIs around the world.

# Data

- Our data come from the MIX Market, an organization that collates financials of a large number of MFIs around the world.

- Key observables: founding dates, for-profit/non-profit status, lending methodology.
  - Portfolios divided into "individual," "solidarity group," "village bank."
  - We (and many others) treat "individual" as individual liability, the rest as joint liability.
  - Matches with what we know about practices for specific MFIs.
  - Concern: not all "solidarity group" loans are JL. Identifying assumption: IL/JL breakdown not changing in confounding direction.

# Data

- Our data come from the MIX Market, an organization that collates financials of a large number of MFIs around the world.

- Key observables: founding dates, for-profit/non-profit status, lending methodology.
  - Portfolios divided into "individual," "solidarity group," "village bank."
  - We (and many others) treat "individual" as individual liability, the rest as joint liability.
  - Matches with what we know about practices for specific MFIs.
  - Concern: not all "solidarity group" loans are JL. Identifying assumption: IL/JL breakdown not changing in confounding direction.

- Observe portfolio composition in 2008-2011, measured by value and by number of loans.

# Data

▶ **First data challenge**: not all MFIs report to MIX, and those who report may not report every year or every variable.

# Data

- **First data challenge**: not all MFIs report to MIX, and those who report may not report every year or every variable.

- Start with around 1900 MFIs with some data.

# Data

- **First data challenge**: not all MFIs report to MIX, and those who report may not report every year or every variable.

- Start with around 1900 MFIs with some data.

- Construct two panels: *weakly balanced* and *strongly balanced* .
  - **Weakly balanced** (MFIs that report lending methodology at least twice): $\sim$ 930 institutions, 100 countries
  - **Strongly balanced** (MFIs that report every year): $\sim$ 380 institutions, 64 countries

▶ **First data challenge**: not all MFIs report to MIX, and those who report may not report every year or every variable.

▶ Start with around 1900 MFIs with some data.

▶ Construct two panels: *weakly balanced* and *strongly balanced* .
  ▶ **Weakly balanced** (MFIs that report lending methodology at least twice): $\sim$ 930 institutions, 100 countries
  ▶ **Strongly balanced** (MFIs that report every year): $\sim$ 380 institutions, 64 countries

▶ Caution: imperfectly representative of the MIX Market population (which may be imperfectly representative of the world).

# Sample frame: MFIs

Table: MFI Characteristics for MFIs reporting IL share by Number of Loans

|  | Full Sample | | Weakly Balanced | | | Strongly Balanced | | |
|---|---|---|---|---|---|---|---|---|
|  | Mean | N | Mean | N | p | Mean | N | p |
| IL Share by Number of Loans | 0.60 | 1538 | 0.58 | 932 | 0.35 | 0.58 | 378 | 0.72 |
| IL Share by Loan Value | 0.64 | 1476 | 0.64 | 894 | 0.87 | 0.64 | 365 | 0.99 |
| Non Profit | 0.60 | 1408 | 0.60 | 932 | 0.94 | 0.66 | 378 | 0.19 |
| Non-Regulated | 0.33 | 1768 | 0.39 | 932 | <0.01 | 0.46 | 378 | <0.01 |
| NGO | 0.32 | 1898 | 0.36 | 932 | 0.01 | 0.44 | 378 | <0.01 |
| Portfolio at Risk 90 days | 6.43 | 1732 | 5.71 | 930 | 0.26 | 4.86 | 378 | <0.01 |
| Return on Assets | -0.25 | 1657 | 0.62 | 930 | <0.01 | 1.56 | 378 | 0.01 |
| Profit Margin | -4.88 | 1741 | 0.45 | 931 | <0.01 | 4.85 | 378 | <0.01 |
| MFI Risk Rating (1-5) | 2.65 | 1920 | 2.95 | 932 | <0.01 | 3.57 | 378 | <0.01 |
| Capital to Asset Ratio | 36.77 | 1813 | 31.90 | 931 | 0.11 | 29.98 | 378 | 0.78 |
| Debt to Equity Ratio | 8.47 | 1772 | 4.84 | 931 | 0.16 | 7.10 | 378 | 0.08 |
| Average Loan Balance | 6405.76 | 1906 | 1448.17 | 932 | 0.66 | 1273.97 | 378 | 0.20 |
| Cost per Borrower | 304.37 | 1514 | 241.57 | 923 | 0.10 | 197.31 | 378 | <0.01 |
| Write Offs/ Assets | 2.36 | 1623 | 2.21 | 929 | 0.31 | 2.21 | 378 | 0.58 |

# Data

- **Second data challenge**: selective reporting means it is impossible to construct usable competition measures from the MIX data (e.g. concentration indices)

# Data

- **Second data challenge**: selective reporting means it is impossible to construct usable competition measures from the MIX data (e.g. concentration indices)

- Instead, search for plausible proxies for borrower outside option.

# Data

- **Second data challenge**: selective reporting means it is impossible to construct usable competition measures from the MIX data (e.g. concentration indices)

- Instead, search for plausible proxies for borrower outside option.

- Use three country-level financial penetration measures from the World Bank
  - Bank branches per capita
  - ATMs per capita
  - Domestic credit/GDP ratio

# Data

- **Second data challenge**: selective reporting means it is impossible to construct usable competition measures from the MIX data (e.g. concentration indices)

- Instead, search for plausible proxies for borrower outside option.

- Use three country-level financial penetration measures from the World Bank
  - Bank branches per capita
  - ATMs per capita
  - Domestic credit/GDP ratio

- **Identifying assumption.** These measures are positively correlated with $U$

Table: Country characteristics

| | Full Sample | | Weakly Balanced | | | Strongly Balanced | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | N | Mean | N | p | Mean | N | p |
| Urban population share | 0.47 | 113 | 0.47 | 100 | 0.57 | 0.51 | 64 | 0.03 |
| Mobile Phones/100 people | 74.16 | 112 | 73.13 | 99 | 0.39 | 82.21 | 63 | 0.01 |
| Agriculture share in GDP | 18.18 | 103 | 18.52 | 92 | 0.63 | 15.64 | 61 | 0.02 |
| Industrial sector share in GDP | 29.06 | 103 | 28.27 | 92 | 0.27 | 28.93 | 61 | 0.97 |
| Service sector share in GDP | 53.21 | 104 | 53.71 | 93 | 0.25 | 56.14 | 62 | <0.01 |
| Development Aid as share of GDP | 6.72 | 107 | 6.19 | 95 | 0.51 | 5.31 | 61 | 0.17 |
| GDP Growth Rate | 3.87 | 111 | 3.99 | 98 | 0.17 | 3.82 | 64 | 0.99 |
| GDP per capita | 3.68 | 111 | 3.33 | 98 | 0.06 | 3.78 | 64 | 0.72 |
| Domestic Credit / GDP | 4.52 | 105 | 4.34 | 93 | 0.60 | 4.70 | 61 | 0.37 |
| Commercial bank density | 1.30 | 112 | 1.29 | 100 | 0.82 | 1.65 | 64 | <0.01 |
| ATM Density | 2.26 | 110 | 2.16 | 98 | 0.21 | 2.61 | 63 | 0.07 |

# Final caveat

- Our results turn out to be highly sensitive to inclusion of one country: Peru.
    - Not sensitive to any other country or any individual MFI.

- Our interpetation:
    - Peru experienced very rapid growth in our competition proxies over the period.
    - Stretches their interpretation as valid proxies.

- Results shown today exclude Peru

- Qualitative (sign) results largely hold up to inclusion, but point estimates shrink toward zero.

# Basic empirical specification

$$IL_{icrt} = \alpha\, NP_i + \eta\, C_{ct} + \gamma NP_i \times C_{ct} + \mathbf{X}'_{ict}\beta + a_{icr} + b_t + \epsilon_{icrt}$$

- $i$: MFI, $c$: country, $r$: region, $t$: year (2008-2011)
- $IL$: IL share in portfolio
- $NP$: non-profit dummy
- $C$: competition proxy measure
- $a$: MFI/country/region fixed-effect
- $b$: time fixed-effect
- Standard errors clustered at country level

# Basic empirical specification

$$IL_{icrt} = \alpha\, NP_i + \eta\, C_{ct} + \gamma NP_i \times C_{ct} + \mathbf{X}'_{ict}\beta + a_{icr} + b_t + \epsilon_{icrt}$$

**Predictions**

1. $\alpha < 0$: non-profits use IL less than for-profits.
2. $\eta < 0$: for-profits decrease IL use when competition increases
3. $\eta + \gamma > 0$: non-profits increase IL use when competition increases
4. $\gamma > 0$: *non-profit IL respond more positively to competition*

No IV or natural experiment: instead rely on increasingly stringent fixed-effects specifications to (we hope) soak up spurious variation.

- ▶ Prediction 1: for-profits use IL more than non-profits
  - ▶ No within-MFI variation in profit status
  - ▶ Exploit within-region or within-country variation

# Identification

No IV or natural experiment: instead rely on increasingly stringent fixed-effects specifications to (we hope) soak up spurious variation.

- Prediction 1: for-profits use IL more than non-profits
    - No within-MFI variation in profit status
    - Exploit within-region or within-country variation

- Predictions 2 & 3: non-profit/for-profit competition response
    - Within-region, -country or -MFI variation over time in competition proxies

# Identification

No IV or natural experiment: instead rely on increasingly stringent fixed-effects specifications to (we hope) soak up spurious variation.

- Prediction 1: for-profits use IL more than non-profits
  - No within-MFI variation in profit status
  - Exploit within-region or within-country variation

- Predictions 2 & 3: non-profit/for-profit competition response
  - Within-region, -country or -MFI variation over time in competition proxies

- Prediction 4: non-profits respond relatively more positively
  - All the above, + within-country-year variation between MFIs with different for-profit status.

# Main results

Table: Non Profit Status, Competition and IL Lending

*Panel A*: IL Share by Number of Loans

| | Strongly Balanced | | | Weakly Balanced | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Commercial bank density | -0.059 | -0.088* | -0.023 | -0.058 | -0.047 | -0.021 |
| | (0.065) | (0.052) | (0.017) | (0.036) | (0.029) | (0.014) |
| Non Profit | -0.139** | -0.179** | | -0.098* | -0.169*** | |
| | (0.059) | (0.077) | | (0.050) | (0.046) | |
| Non-Profit x Bank Branch Density | 0.067 | 0.113* | 0.031 | 0.069** | 0.067** | 0.024* |
| | (0.052) | (0.060) | (0.020) | (0.029) | (0.033) | (0.014) |
| *Joint test*: | | | | | | |
| Comp + Non-Profit x Comp = 0? | .008 | .024* | .008 | .011 | .02** | .003 |
| | (.0415) | (.0132) | (.0116) | (.0253) | (.00864) | (.00621) |
| MFIs | 348 | 348 | 348 | 878 | 878 | 878 |
| Countries | 64 | 64 | 64 | 94 | 94 | 94 |
| Observations | 1392 | 1392 | 1392 | 2756 | 2756 | 2756 |
| Year FE | X | X | X | X | X | X |
| Region FE | X | | | X | | |
| Country FE | | | X | | | X |
| MFI FE | | | X | | | X |

45

# Main results

Table: Non Profit Status, Competition and IL Lending

*Panel B*: IL Share by Gross Loan Portfolio

|  | Strongly Balanced | | | Weakly Balanced | | |
|---|---|---|---|---|---|---|
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| Commercial bank density | -0.090 | -0.100** | -0.017 | -0.075** | -0.066** | -0.018 |
|  | (0.064) | (0.043) | (0.012) | (0.033) | (0.026) | (0.011) |
| Non Profit | -0.151*** | -0.182*** |  | -0.119*** | -0.170*** |  |
|  | (0.051) | (0.062) |  | (0.043) | (0.041) |  |
| Non-Profit x Bank Branch Density | 0.086* | 0.140** | 0.032 | 0.080*** | 0.092*** | 0.029 |
|  | (0.049) | (0.054) | (0.023) | (0.028) | (0.032) | (0.018) |
| *Joint test*: |  |  |  |  |  |  |
| Comp + Non-Profit x Comp = 0? | -.005 | .04** | .015 | .005 | .026** | .011 |
|  | (.04) | (.0156) | (.017) | (.024) | (.0122) | (.0116) |
| MFIs | 340 | 340 | 340 | 831 | 831 | 831 |
| Countries | 60 | 60 | 60 | 92 | 92 | 92 |
| Observations | 1360 | 1360 | 1360 | 2605 | 2605 | 2605 |
| Year FE | X | X | X | X | X | X |
| Region FE | X |  |  | X |  |  |
| Country FE |  | X |  |  | X |  |
| MFI FE |  |  | X |  |  | X |

# Summary of main results

1. Robust finding: non-profits use IL less than for-profits
2. Negative association between bank branch density and use of IL by for-profits
3. Positive (in most specifications) association for non-profits
4. *Competition effect relatively more positive for non-profits*

# Robustness

- Alternative proxies `▸ Go`
- Additional country-level controls `▸ Go`
- Additional MFI-level controls `▸ Go`
- Country×year fixed effects `▸ Go`
- Dropping village banks and MFIs with data discrepancies `▸ Go`
- Including Peru `▸ Go`
- Regulatory shocks `▸ Go`

# Conclusion

- A modest decline in (within-MFI) JL usage over 2008-2011, alongside a long-run trend toward commercialized microcredit.
- Simple contracting model to capture main features of the environment:
  - Variation in lender motivation
  - Variation in borrower outside options
- Three testable predictions, broadly consistent with the data.
- Provides an explanation for changes in lending patterns through observable changes in the market environment.
- Future work:
  - Exploit credit bureau data & within-country variation in competitive environment
  - Natural experiments?

Table: IL Share by Number of Loans: Robustness to Other Competition Proxy Variables

|  | Strongly Balanced | | | Weakly Balanced | | |
|---|---|---|---|---|---|---|
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| ATM Density | -0.057 | -0.050 | -0.014 | -0.055 | -0.023 | -0.010 |
|  | (0.055) | (0.047) | (0.031) | (0.044) | (0.037) | (0.020) |
| Non Profit | -0.157** | -0.209*** |  | -0.109** | -0.187*** |  |
|  | (0.059) | (0.076) |  | (0.051) | (0.047) |  |
| Non-Profit x ATM Density | 0.042 | 0.057 | 0.006 | 0.028 | 0.026 | 0.013 |
|  | (0.045) | (0.055) | (0.036) | (0.042) | (0.038) | (0.020) |
| *Joint test:* |  |  |  |  |  |  |
| Comp + Non-Profit x Comp = 0? | -.015 | .008 | -.008 | -.027 | .003 | .003 |
|  | (.0311) | (.0286) | (.0289) | (.0223) | (.0114) | (.00823) |
| MFIs | 346 | 346 | 346 | 864 | 864 | 864 |
| Countries | 63 | 63 | 63 | 91 | 91 | 91 |
| Observations | 1348 | 1348 | 1348 | 2667 | 2667 | 2667 |
| Year FE | X | X | X | X | X | X |
| Region FE | X |  |  | X |  |  |
| Country FE |  | X |  |  | X |  |
| MFI FE |  |  | X |  |  | X |

Table: IL Share by Number of Loans: Robustness to Other Competition Proxy Variables

| | Strongly Balanced | | | Weakly Balanced | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Domestic Credit Share | -0.130** | -0.189*** | -0.112*** | -0.097** | -0.086* | -0.110*** |
| | (0.054) | (0.058) | (0.037) | (0.038) | (0.049) | (0.038) |
| Non Profit | -0.153*** | -0.227*** | | -0.113** | -0.193*** | |
| | (0.051) | (0.061) | | (0.049) | (0.043) | |
| Non-Profit x Domestic Credit Share | 0.109* | 0.174** | 0.066 | 0.077* | 0.086 | 0.094** |
| | (0.057) | (0.075) | (0.041) | (0.040) | (0.054) | (0.036) |
| *Joint test:* | | | | | | |
| Comp + Non-Profit x Comp = 0? | -.021 | -.015 | -.045 | -.02 | .001 | -.016 |
| | (.0293) | (.0343) | (.0309) | (.0219) | (.0367) | (.0208) |
| MFIs | 338 | 338 | 338 | 833 | 833 | 833 |
| Countries | 61 | 61 | 61 | 88 | 88 | 88 |
| Observations | 1352 | 1352 | 1352 | 2640 | 2640 | 2640 |
| Year FE | X | X | X | X | X | X |
| Region FE | X | | | X | | |
| Country FE | | X | | | X | |
| MFI FE | | | X | | | X |

# Country-level controls

◆ Back

Table: Additional country-level controls, IL shares by number of loans

| | Strongly Balanced | | | Weakly Balanced | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Commercial bank density | -0.110 | -0.151*** | -0.032 | -0.073* | -0.062* | -0.026 |
| | (0.075) | (0.053) | (0.020) | (0.039) | (0.034) | (0.017) |
| Non Profit | -0.166*** | -0.200*** | | -0.124*** | -0.184*** | |
| | (0.050) | (0.052) | | (0.038) | (0.041) | |
| Non-Profit x Bank Branch Density | 0.134** | 0.197*** | 0.048** | 0.103** | 0.102** | 0.038** |
| | (0.065) | (0.066) | (0.020) | (0.041) | (0.039) | (0.016) |
| *Further Interactions:* | | | | | | |
| Urban population share | -0.026 | -0.056 | -0.990 | -0.253 | 1.615 | -0.322 |
| | (0.452) | (1.283) | (1.383) | (0.266) | (1.418) | (0.883) |
| Non Profit x Urban population share | 0.129 | -0.085 | -0.207 | 0.094 | -0.220 | -0.288 |
| | (0.487) | (0.526) | (1.844) | (0.358) | (0.386) | (1.812) |
| Mobile Phones/100 people | -0.002 | -0.001 | -0.000 | -0.000 | -0.001 | -0.000 |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.000) |
| Non Profit x Mobile Phones/100 people | -0.006*** | -0.004** | 0.001 | -0.007*** | -0.004*** | -0.000 |
| | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) | (0.001) |
| GDP per capita | -0.006 | -0.004 | -0.013** | -0.020* | -0.006 | -0.013** |
| | (0.017) | (0.008) | (0.005) | (0.012) | (0.007) | (0.005) |
| Non Profit x GDP per capita | 0.018 | 0.007 | -0.021** | 0.019 | 0.005 | -0.008 |
| | (0.026) | (0.028) | (0.009) | (0.022) | (0.023) | (0.011) |
| *Joint test:* | | | | | | |
| Comp + Non-Profit x Comp = 0? | .024 | .046** | .016 | .03 | .039*** | .013* |
| | (.0524) | (.0179) | (.0111) | (.0379) | (.0148) | (.00711) |
| MFIs | 334 | 334 | 334 | 792 | 792 | 792 |
| Countries | 58 | 58 | 58 | 82 | 82 | 82 |
| Observations | 1335 | 1335 | 1335 | 2517 | 2517 | 2517 |
| Year FE | X | X | X | X | X | X |
| Region FE | X | | | X | | |
| Country FE | X | | X | | X | |
| MFI FE | | | X | | | X |

52

# MFI-level controls and country×year FE

Table: Additional fixed effects and MFI-level controls

|  | Strongly Balanced | | | | Weakly Balanced | | | |
|---|---|---|---|---|---|---|---|---|
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Non Profit | -0.179** |  | -0.104 |  | -0.170*** |  | -0.133*** |  |
|  | (0.083) |  | (0.074) |  | (0.049) |  | (0.042) |  |
| Non-Profit x Bank Branch Density | 0.112* | 0.016 | 0.117* | 0.020* | 0.067* | 0.017** | 0.076** | 0.015* |
|  | (0.066) | (0.010) | (0.070) | (0.010) | (0.034) | (0.008) | (0.032) | (0.008) |
| MFIs | 348 | 348 | 348 | 348 | 878 | 878 | 874 | 874 |
| Countries | 64 | 64 | 64 | 64 | 94 | 94 | 94 | 94 |
| Observations | 1392 | 1392 | 1347 | 1347 | 2756 | 2756 | 2611 | 2611 |
| Country x Year FE | X | X | X | X | X | X | X | X |
| MFI FE |  | X |  | X |  | X |  | X |
| Controls |  |  | X | X |  |  | X | X |

Controls include Diamonds, Capital to Asset Ratio, Debt to equity ratio, Average loan balance per borrower, Return on assets, Financial revenue/Assets , Yield on gross portfolio (nominal), Financial expense/assets, Operating expense/assets. Standard errors in parentheses are clustered at the country level, with stars indicating *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

# Drop observations

Table: Restricting the Analysis to Non-Village Banks, Institutions that did not switch Legal Status and have no Discrepancy in IL Shares reporting: Profit Status, Competition and IL Lending

|  | Strongly Balanced | | | Weakly Balanced | | |
|---|---|---|---|---|---|---|
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| Commercial bank density | -0.055 | -0.066 | -0.019 | -0.074** | -0.042 | -0.020 |
|  | (0.038) | (0.042) | (0.014) | (0.032) | (0.038) | (0.013) |
| Non Profit | -0.178*** | -0.199*** |  | -0.090 | -0.170*** |  |
|  | (0.062) | (0.074) |  | (0.055) | (0.047) |  |
| Non-Profit x Bank Branch Density | 0.063 | 0.084 | 0.024 | 0.071** | 0.065 | 0.023* |
|  | (0.047) | (0.052) | (0.016) | (0.035) | (0.041) | (0.013) |
| *Joint test*: |  |  |  |  |  |  |
| Comp + Non-Profit x Comp = 0? | .009 | .017 | .005 | -.003 | .023** | .004 |
|  | (.032) | (.0142) | (.00935) | (.022) | (.00922) | (.00513) |
| MFIs | 252 | 252 | 252 | 681 | 681 | 681 |
| Countries | 59 | 59 | 59 | 92 | 92 | 92 |
| Observations | 993 | 993 | 993 | 2060 | 2060 | 2060 |
| Year FE | X | X | X | X | X | X |
| Region FE | X |  |  | X |  |  |
| Country FE |  | X |  |  | X |  |
| MFI FE |  |  | X |  |  | X |

54

Table: Including Peru with IL Share by Number of Loans: Robustness to Other Competition Proxy Variables

| | Strongly Balanced | | | Weakly Balanced | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Commercial bank density | -0.023 | -0.032 | -0.009 | -0.028 | -0.029 | -0.010 |
| | (0.048) | (0.052) | (0.012) | (0.037) | (0.027) | (0.009) |
| Non Profit | -0.156** | -0.202** | | -0.112** | -0.182*** | |
| | (0.059) | (0.077) | | (0.050) | (0.046) | |
| Non-Profit x Bank Branch Density | 0.021 | 0.044 | 0.013 | 0.035 | 0.034 | 0.010 |
| | (0.051) | (0.066) | (0.013) | (0.036) | (0.037) | (0.010) |
| *Joint test*: | | | | | | |
| Comp + Non-Profit x Comp = 0? | -.002 | .012 | .004 | .006 | .005 | 0 |
| | (.0342) | (.0171) | (.00987) | (.0233) | (.0157) | (.00574) |
| MFIs | 378 | 378 | 378 | 932 | 932 | 932 |
| Countries | 65 | 65 | 65 | 95 | 95 | 95 |
| Observations | 1512 | 1512 | 1512 | 2934 | 2934 | 2934 |
| Year FE | X | X | X | X | X | X |
| Region FE | X | | | X | | |
| Country FE | | X | | | X | |
| MFI FE | | | X | | | X |

**Dropping each country in turn**
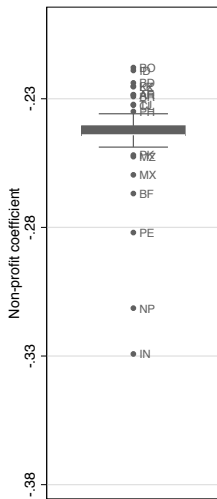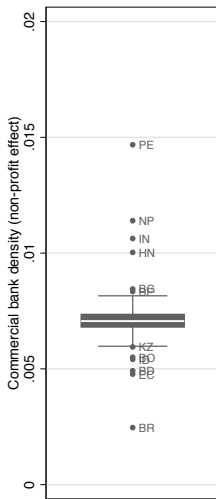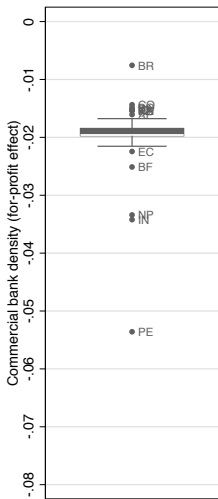
# Regulatory Shocks

Table: Ruling out Time Varying Regulatory Shocks and Sensitivity to India: Profit Status, Competition and IL Lending

|  | Strongly Balanced | | | Weakly Balanced | | |
|---|---|---|---|---|---|---|
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| Commercial bank density | -0.113** | -0.138*** | -0.149*** | -0.059** | -0.056 | -0.059 |
|  | (0.054) | (0.043) | (0.045) | (0.029) | (0.037) | (0.037) |
| Non Profit | -0.238*** | -0.073 | -0.093 | -0.203*** | -0.116** | -0.125** |
|  | (0.077) | (0.059) | (0.076) | (0.042) | (0.046) | (0.056) |
| Non-Profit x Bank Branch Density | 0.142** | 0.198*** | 0.213*** | 0.081** | 0.091** | 0.095** |
|  | (0.064) | (0.062) | (0.064) | (0.033) | (0.043) | (0.044) |
| *Joint test*: |  |  |  |  |  |  |
| Comp + Non-Profit x Comp = 0? | .029** | .06*** | .064*** | .022** | .036** | .036** |
|  | (.0144) | (.0226) | (.023) | (.00835) | (.0173) | (.0174) |
| MFIs | 310 | 348 | 310 | 803 | 878 | 803 |
| Countries | 63 | 64 | 63 | 93 | 94 | 93 |
| Observations | 1240 | 1392 | 1240 | 2506 | 2756 | 2506 |
| India included? | No |  | No | No |  | No |
| Country FE | X | X | X | X | X | X |
| Year FE | X |  |  | X |  |  |
| Region x Legal Status x Year FE |  | X | X |  | X | X |

57