Credit Access and Female Labour Supply: Evidence from a Microcredit Experiment in Eastern India

Pushkar Maitra, Sandip Mitra, Dilip Mookherjee and Sujata Visaria

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Economic growth may promote women’s empowerment (Duflo 2012)
- gender discrimination more prevalent in “at risk” households (Miguel 2005)
- higher economic returns to women’s work (Qian 2008)
- lower fertility
- technological change lowers opportunity cost of women’s time outside home (Greenwood et al. 2005, Dinkelman 2010)
Our finding

- We document that an intervention that increased household income is associated with a decrease in female labour participation outside the house.
Our Project

- We experimented with alternative delivery models for agricultural credit
- “traditional” group-based lending model with joint liability
- alternative agent-intermediated lending model with individual liability
AIL: an agent from the local community is asked to recommend borrowers to an outside lender

...through commissions that depend on repayments

The agent may

- select borrowers on their type/creditworthiness
- monitor borrowers’ actions/repayment behaviour
- provide technical/other assistance to borrowers
Characteristics/Incentives of the Agent

- **Trader-Agent-Intermediated Lending (TRAIL)**
  - agent is a trader/shopkeeper with a history of economic relationships within the community

- **Gram Panchayat-Agent-Intermediated Lending (GRAIL)**
  - agent is selected by local government
  - embedded within the community
  - likely to have political connections/motivations
Group-based Lending (GBL)

Modelled on “traditional” joint liability microcredit:
- 5-member self-formed groups of borrowers
- joint liability
- monthly group meetings
- savings requirements

Other loan features are identical to TRAIL
- interest rate
- duration
- repayment frequency
- growth of credit access
- insurance
Experimental Setting

- Two potato-growing districts: Hugli & West Medinipur
  - TRAIL scheme: 24 villages
  - GRAIL scheme: 24 villages
  - GBL scheme: 24 villages
- Experiment lasted 8 4-month cycles over the period: Sept 2010 - July 2013
The Agent-Intermediated Lending Scheme

- Agent recommends 30 landless or marginal landowners (≤ 1.5 acres)
  - subset of these are chosen randomly to receive offer of individual liability loans
- Agent plays no further role:
  - MFI sets loan terms, directly lends to and collects repayments from borrowers
- No group meetings, savings requirements or gender restrictions
Loan Features

- Loan interest rate pegged below average rates on informal credit
- Dynamic borrower incentives
  - start with small loans
  - future credit access grows at fast rate based on current repayment
- Loan durations/timing: 4 months, match key-crop cycles
- *Insurance against covariate (price-yield) risks
- *Doorstep banking, no bank accounts

(*: non-standard)
Randomisation Check

<table>
<thead>
<tr>
<th></th>
<th>TRAIL (1)</th>
<th>GRAIL (2)</th>
<th>GBL (3)</th>
<th>TRAIL-GRAIL (4)</th>
<th>TRAIL-GBL (5)</th>
<th>GRAIL-GBL (6)</th>
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</thead>
<tbody>
<tr>
<td>Head: More than Primary School</td>
<td>0.407</td>
<td>0.420</td>
<td>0.433</td>
<td>-0.013</td>
<td>-0.026</td>
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<tr>
<td>Head: Cultivator</td>
<td>0.441</td>
<td>0.415</td>
<td>0.437</td>
<td>0.026</td>
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<tr>
<td>Head: Labourer</td>
<td>0.340</td>
<td>0.343</td>
<td>0.323</td>
<td>-0.003</td>
<td>0.017</td>
<td>0.02</td>
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<tr>
<td>Area of house and homestead (Acres)</td>
<td>0.052</td>
<td>0.052</td>
<td>0.054</td>
<td>0.000</td>
<td>-0.002</td>
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<tr>
<td>Separate toilet in house</td>
<td>0.564</td>
<td>0.608</td>
<td>0.552</td>
<td>-0.044</td>
<td>0.012</td>
<td>0.056</td>
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<tr>
<td>Landholding (Acres)</td>
<td>0.456</td>
<td>0.443</td>
<td>0.473</td>
<td>0.013</td>
<td>-0.017</td>
<td>-0.03</td>
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<td>0.013</td>
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<tr>
<td>Own a motorized vehicle</td>
<td>0.124</td>
<td>0.126</td>
<td>0.129</td>
<td>-0.002</td>
<td>-0.005</td>
<td>-0.003</td>
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<td>0.010</td>
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<tr>
<td>Own a Savings Bank Account</td>
<td>0.447</td>
<td>0.475</td>
<td>0.446</td>
<td>-0.028</td>
<td>0.001</td>
<td>0.029</td>
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<tr>
<td>F-test of joint significance (p-value)</td>
<td>0.996</td>
<td>0.994</td>
<td>0.976</td>
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</tbody>
</table>
In each scheme
- In each village, the agent recommends 30 borrowers...
- ...and the lender offers the loans to a *randomly chosen subset* of 10 individuals (Treatment, T)
- 10 recommended but not chosen to receive the loans are Control 1 (C1)
- 30 of those not recommended are sampled & called Control 2 (C2)
Average Treatment Effects

\[ y_{ivt} = \beta_0 + \beta_1 \text{TRAIL}_v + \beta_2 (\text{TRAIL}_v \times \text{Treatment}_{iv}) + \beta_3 (\text{TRAIL}_v \times \text{Control 1}_{iv}) + \beta_4 (\text{GRAIL}_v \times \text{Treatment}_{iv}) + \beta_5 (\text{GRAIL}_v \times \text{Control 1}_{iv}) + \beta_6 (\text{GBL}_v \times \text{Treatment}_{iv}) + \beta_7 (\text{GBL}_v \times \text{Control 1}_{iv}) + \gamma X_{iv} + T_t + \varepsilon_{ivt} \]
Average Treatment Effects

\[ y_{ivt} = \beta_0 + \beta_1 TRAIL_v + \beta_2 (TRAIL_v \times \text{Treatment}_{iv}) + \beta_3 (TRAIL_v \times \text{Control 1}_{iv}) + \beta_4 (GRAIL_v \times \text{Treatment}_{iv}) + \beta_5 (GRAIL_v \times \text{Control 1}_{iv}) + \beta_6 (GBL_v \times \text{Treatment}_{iv}) + \beta_7 (GBL_v \times \text{Control 1}_{iv}) + \gamma \, X_{iv} + T_t + \epsilon_{ivt} \]

- Run on households with \( \leq 1.5 \) acres of land in TRAIL, GRAIL & GBL villages
  - Treatment
  - Control 1
  - Control 2
Average Treatment Effects

\[ y_{ivt} = \beta_0 + \beta_1 \text{TRAIL}_v + \beta_2 (\text{TRAIL}_v \times \text{Treatment}_{iv}) + \beta_3 (\text{TRAIL}_v \times \text{Control 1}_{iv}) + \beta_4 (\text{GRAIL}_v \times \text{Treatment}_{iv}) + \beta_5 (\text{GRAIL}_v \times \text{Control 1}_{iv}) + \beta_6 (\text{GBL}_v \times \text{Treatment}_{iv}) + \beta_7 (\text{GBL}_v \times \text{Control 1}_{iv}) + \gamma X_{iv} + T_t + \epsilon_{ivt} \]

- Run on households with \( \leq 1.5 \) acres of land in TRAIL, GRAIL & GBL villages
  - Treatment
  - Control 1
  - Control 2
- Treatment effects (ITT estimates), conditional on selection:
  - TRAIL: \( \beta_2 - \beta_3 \)
  - GRAIL: \( \beta_4 - \beta_5 \)
  - GBL: \( \beta_6 - \beta_7 \)
Average Treatment Effects

\[ y_{ivt} = \beta_0 + \beta_1 \text{TRAIL}_v + \beta_2 (\text{TRAIL}_v \times \text{Treatment}_{iv}) + \beta_3 (\text{TRAIL}_v \times \text{Control 1}_{iv}) \]
\[ + \beta_4 (\text{GRAIL}_v \times \text{Treatment}_{iv}) + \beta_5 (\text{GRAIL}_v \times \text{Control 1}_{iv}) \]
\[ + \beta_6 (\text{GBL}_v \times \text{Treatment}_{iv}) + \beta_7 (\text{GBL}_v \times \text{Control 1}_{iv}) \]
\[ + \gamma X_{iv} + T_t + \varepsilon_{ivt} \]

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- Controls for age, education, occupation of oldest male, land owned, year dummies, price information intervention

**Run on households with \( \leq 1.5 \) acres of land in TRAIL, GRAIL & GBL villages**
- Treatment
- Control 1
- Control 2

**Treatment effects (ITT estimates), conditional on selection:**
- TRAIL: \( \beta_2 - \beta_3 \)
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**Controls for age, education, occupation of oldest male, land owned, year dummies, price information intervention**
Average Treatment Effects

\[ y_{ivt} = \beta_0 + \beta_1 TRAIL_v + \beta_2 (TRAIL_v \times Treatment_{iv}) + \beta_3 (TRAIL_v \times Control 1_{iv}) + \beta_4 (GRAIL_v \times Treatment_{iv}) + \beta_5 (GRAIL_v \times Control 1_{iv}) + \beta_6 (GBL_v \times Treatment_{iv}) + \beta_7 (GBL_v \times Control 1_{iv}) + \gamma X_{iv} + T_t + \epsilon_{ivt} \]

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- Controls for age, education, occupation of oldest male, land owned, year dummies, price information intervention
- Standard errors clustered at the para level to account for spatial correlation
Impacts of schemes

- TRAIL loans generated significant increases in acreage, output, value-added and imputed profits.
- GRAIL loans increased acreage and output, but production costs swamped revenues so that value-added did not increase.
- GBL loans did not increase output significantly (?) check
- TRAIL farmers increased the use of family labour; GRAIL farmers increased it by even more (in magnitude)
Effect on Family Labour in Potato Cultivation

Family male labour

Family female labour

Family child labour

MMMV (May 2018)
Effect on Labour Supply

**Fraction working for others**
- **Female**
- **Male**

**Fraction self-employed**
- **Female**
- **Male**

**Hours working for others**
- **Female**
- **Male**

**Hours in self-employment**
- **Female**
- **Male**
Treatment Effects

Effect on Labour Supply, contd.

**Hours working for others in agriculture**

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAIL</td>
<td><img src="image1" alt="Graph" /></td>
<td><img src="image2" alt="Graph" /></td>
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<tr>
<td>GRAIL</td>
<td><img src="image3" alt="Graph" /></td>
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<tr>
<td>GBL</td>
<td><img src="image5" alt="Graph" /></td>
<td><img src="image6" alt="Graph" /></td>
</tr>
</tbody>
</table>

**Hours working for others in non-agriculture**

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<th></th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAIL</td>
<td><img src="image7" alt="Graph" /></td>
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</tr>
<tr>
<td>GRAIL</td>
<td><img src="image9" alt="Graph" /></td>
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<tr>
<td>GBL</td>
<td><img src="image11" alt="Graph" /></td>
<td><img src="image12" alt="Graph" /></td>
</tr>
</tbody>
</table>
Effect on Labour Supply, contd.

- Hours self-employed in agriculture
- Hours self-employed in livestock
- Hours self-employed in family business
Discussion

- Microcredit access could have increased women empowerment in different ways
  - e.g. smoother household consumption may have equalised gender imbalance
  - TRAIL, GRAIL, GBL could all have had positive effects
  - however we do not have consumption data
- We find that TRAIL increased incomes (mainly through potato farm incomes)
- and also lowered women’s labour market participation
Interpretation: Mechanism?

Possible mechanism:
- focus on agricultural credit may have increased men’s comparative advantage in farm work
- thereby increasing opportunity cost of women’s time spent outside home

However GRAIL treatment increased men’s participation on farm by more, but women’s time outside home did not decrease significantly

Suggests these are income effects
First stage of the U-shaped relationship between economic growth and female LFP (Olivetti 2013)
Effect on Empowerment?

- If women incur disutility from working outside the home (due to personal preferences or social norms) then positive effect on their welfare.
- If women’s bargaining power in the home is linked to autonomous earnings outside the home then negative effect.
Conclusion

- We document that an intervention that increased household incomes decreased women’s labour force participation.
  - labour supplied outside the home decreased
  - time spent on livestock/family business did not increase significantly
- We do not measure time-use, women’s consumption, subjective well-being or other empowerment indicators.
- Welfare effects of this phenomenon are ambiguous.