Taking Stock of the Evidence on Micro-Financial Interventions

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Taking Stock: Goals

Two-fold goal:

1. review of empirical findings in attempt to line up the salient patterns.
2. assessment of our understanding of these patterns through the lens of economic theory
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Lucas (1993):

“If we understand the process of economic growth – or of anything else – we ought to be capable of demonstrating this knowledge by creating it in these pen and paper (and computer-equipped) laboratories of ours. If we know what an economic miracle is, we ought to be able to make one.”
Taking Stock: Goals

Two-fold goal:

1. review of empirical findings in attempt to line up the salient patterns.

2. assessment of our understanding of these patterns through the lens of economic theory

Again, Lucas (1993):

“simply advising a society to ‘follow the Korean model’ is a little like advising an aspiring basketball player to ‘follow the Michael Jordan model’. To make use of someone else’s successful performance at any task, one needs to be able to break this performance down into its component parts so that one can see what each part contributes to the whole, which aspects of this performance are imitable and, of these, which are worth imitating. One needs, in short, a theory.”
Taking Stock: Outline of Analysis

1. review of empirics
   - grants to micro-entrepreneurs
   - grants to ultra-poor
   - microcredit

2. assessment of theory
   - returns to poor entrepreneurs
   - redistributive grants to ultra-poor
   - microcredit (new analysis: vary int. rate subsidies)
Taking Stock: Findings

1. review of empirics
   - grants to micro-entrepreneurs: increase $k$, profits
   - grants to ultra-poor: increase $k$, $y$, and $c$
   - microcredit: some increase $i$, but little $y$, $c$, low take up
     - village funds: bigger impacts, higher take up

2. assessment of theory
   - returns to poor entre.: up to 75% in low wealth decile
   - grants to poor: impacts transient, smaller than in data
   - microcredit:
     - small agg. impacts, but GE wage effects can redistribute
     - interest rates potentially quite important
Taking Stock: Broader Conclusions

Both empirically and in theory:

1. no widescale escapes from poverty traps
   - empirics: some policies have persistent gains, but not long run growth
   - simulations: no aggregate poverty traps, only individual

2. responses are heterogeneous:
   - across individuals: wealth, intervention size, gender, ability, entrepreneurial status, financial access, and time frame
   - across interventions: environment (?), measurement (?)

3. GE and dynamic effects can matter
   - dissaving after receiving grants
   - large-scale wage effects can impact non-participants
Empirical Evaluations

Recent flurry of experimental evaluations of micro-financial interventions that improve access to capital across:

1. Cash and in-kind grants to poor, self-employed microentrepreneurs

• increase in $k$, $\pi$
• sizable returns to capital for many

2. In-kind grants to ultra poor (often joint with training, nutrition, savings, other services)

• significant increases to $y$, $c$
• sometimes sustained

3. Microcredit access to new populations

• low take up
• some impacts on entry, $i$
• but few impacts on $y$, $c$
• “village funds” have positive impacts on $y$, possibly $c$
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## Grants to Micro-entrepreneurs

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Sample</th>
<th>Intervention</th>
<th>Time horizon</th>
<th>Profit (chg. rel. to grant)</th>
<th>Capital (chg. rel. to grant)</th>
</tr>
</thead>
<tbody>
<tr>
<td>de Mel et al. (2008)</td>
<td>Sri Lanka</td>
<td>408, non-employer</td>
<td>$460 to 920 PPP (cash or in-kind)</td>
<td>24 months</td>
<td>4–6% per month</td>
<td>70–130%</td>
</tr>
<tr>
<td>McKenzie Woodruff (2008)</td>
<td>Mexico</td>
<td>198, self-employed</td>
<td>$210 (cash or in-kind)</td>
<td>12 months</td>
<td>20–33% per month</td>
<td>N/A</td>
</tr>
<tr>
<td>Fafchamps et al. (2014)</td>
<td>Ghana</td>
<td>793, self-employed</td>
<td>$280 (cash or in-kind)</td>
<td>12 months</td>
<td>15% per month</td>
<td>20–105%</td>
</tr>
<tr>
<td>Karlan et al. (2015)</td>
<td>Ghana</td>
<td>160, tailors employing 3 or fewer</td>
<td>$370 (cash), plus consulting</td>
<td>14 months</td>
<td>-67%</td>
<td>-250%</td>
</tr>
<tr>
<td>McKenzie (2015)</td>
<td>Nigeria</td>
<td>1,831, young applicants, “ordinary merit” winners</td>
<td>$98,200 (cash), plus business training</td>
<td>12 months</td>
<td>23%</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Empirical Evaluations

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   - significant increases to $y, c$, sometimes sustained
# Grants to Ultra-Poor

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Country</strong></td>
<td>Bangladesh</td>
<td>Various</td>
<td>India (WB)</td>
<td>India (AP)</td>
<td>Uganda</td>
<td>Uganda</td>
<td>Kenya</td>
</tr>
<tr>
<td><strong>Sample</strong></td>
<td>6,700, women</td>
<td>10,500 (900 to 2,600 per country), women</td>
<td>800, women</td>
<td>3,500, women</td>
<td>1,900, younger adults</td>
<td>1,800, younger women</td>
<td>1,380, men and women</td>
</tr>
<tr>
<td><strong>Randomization level</strong></td>
<td>Village</td>
<td>Village and individual</td>
<td>Individual</td>
<td>Village</td>
<td>Groups of 10–40</td>
<td>Village</td>
<td>Village and individual</td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td>$520 PPP or 2 cows, plus technical training</td>
<td>$440–1,280 PPP, plus consumption support</td>
<td>$330 PPP, plus consumption support, technical training, forced saving</td>
<td>$510 PPP, plus technical training, forced saving, health service, group building</td>
<td>$1,310 PPP, plus artisan training</td>
<td>$380 PPP, plus business training, group building</td>
<td>$404–1,520 PPP, plus mobile money access</td>
</tr>
<tr>
<td><strong>Horizon</strong></td>
<td>48 months</td>
<td>36 months</td>
<td>18 months</td>
<td>18 months</td>
<td>47 months</td>
<td>16 months</td>
<td>≈ 4 months</td>
</tr>
<tr>
<td><strong>Income change</strong></td>
<td>+44%</td>
<td>Sig. positive</td>
<td>+39%</td>
<td>Insignificant</td>
<td>+43%</td>
<td>+70–150%</td>
<td>+34%</td>
</tr>
<tr>
<td><strong>Income activity</strong></td>
<td>Specialized self-emp +15 p.p., self-emp hours +106%</td>
<td>14% increase in productive assets</td>
<td>48% increase in hours worked, income from business labor</td>
<td>Increase in livestock income</td>
<td>Non-agri hours +56%, overall labor supply +19%</td>
<td>34% of transfer, 68% of original investment</td>
<td>Business, agri expenses rise</td>
</tr>
<tr>
<td><strong>Increase in assets</strong></td>
<td>137% of grant</td>
<td>8–97% of grant</td>
<td>Sig. positive</td>
<td>No impact, except the prob. of owning livestock</td>
<td>Insufficient</td>
<td>Sig. positive</td>
<td>35% of grant</td>
</tr>
<tr>
<td><strong>Consumption change</strong></td>
<td>10%</td>
<td>5%</td>
<td>29%</td>
<td>Insignificant</td>
<td>Sig. positive</td>
<td>30%</td>
<td>23%</td>
</tr>
</tbody>
</table>

- **PPP** stands for Purchasing Power Parity.
Empirical Evaluations

Recent flurry of experimental evaluations of micro-financial interventions that improve access to capital across:

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3. Microcredit access to new populations
   - low take up
   - some impacts on entry, $i$ but few impacts on $y$, $c$
   - “village funds” have positive impacts on $y$, possibly $c$
## Micro-Credit Evaluations

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>Mongolia</td>
<td>Morocco</td>
<td>Ethiopia</td>
<td>India</td>
<td>Mexico</td>
<td>Bosnia and Herzegovina</td>
<td>Thailand</td>
<td>China</td>
</tr>
<tr>
<td>Sample</td>
<td>600, rural, women micro-entrepre.</td>
<td>5,600, rural, at least partly self-employed</td>
<td>6,300, rural, potential micro-entrepre.</td>
<td>6,900, urban, women</td>
<td>16,600, women</td>
<td>1,000, marginal borrower</td>
<td>1,000, rural, no targeting</td>
<td>1,200, rural, no targeting</td>
</tr>
<tr>
<td>Average loan size</td>
<td>$700 PPP</td>
<td>$1,080 PPP</td>
<td>$500 PPP</td>
<td>$600 PPP</td>
<td>$450 PPP</td>
<td>$1,820 PPP</td>
<td>$1,450 PPP</td>
<td>$1,570 PPP</td>
</tr>
<tr>
<td>Nominal APR</td>
<td>27%</td>
<td>15%</td>
<td>12%</td>
<td>24%</td>
<td>110%</td>
<td>22%</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td>Average loan term</td>
<td>6 months</td>
<td>16 months</td>
<td>12 months</td>
<td>12 months</td>
<td>4 months</td>
<td>14 months</td>
<td>12 months</td>
<td>12 months</td>
</tr>
<tr>
<td>Horizon</td>
<td>19 months</td>
<td>24 months</td>
<td>36 months</td>
<td>39–42 months</td>
<td>27 months</td>
<td>14 months</td>
<td>24 months</td>
<td>24 months</td>
</tr>
<tr>
<td>Take-up</td>
<td>50–57%</td>
<td>13%</td>
<td>31%</td>
<td>17%</td>
<td>19%</td>
<td>99%, by design</td>
<td>54%</td>
<td>29%</td>
</tr>
<tr>
<td>Overall credit chg.</td>
<td>+67%</td>
<td>+64%</td>
<td>+195%</td>
<td>+63%</td>
<td>+18 p.p. (frac. with loan)</td>
<td>+19 p.p. (frac. with loan)</td>
<td>+50% (frac. with loan)</td>
<td>+50% (frac. with loan)</td>
</tr>
<tr>
<td>Change in Entrepre.</td>
<td>Fraction of entrepre. +8 p.p.</td>
<td>Insignificant, as expected</td>
<td>Livestock revenue and crop exp. rise</td>
<td>Fraction of entrepre. +2 p.p</td>
<td>Revenue and crop exp. rise</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td></td>
</tr>
<tr>
<td>Change in capital</td>
<td>Insignificant</td>
<td>+29%</td>
<td>Insignificant</td>
<td>+25%</td>
<td>-18%</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td></td>
</tr>
<tr>
<td>Labor supply change</td>
<td>+57%</td>
<td>Decreased non-self-emp hours</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>N/A</td>
<td>Insignificant</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Profit chg.</td>
<td>Insignificant</td>
<td>+40%</td>
<td>+68%</td>
<td>+57%</td>
<td>Insignificant</td>
<td>+34%</td>
<td>+16%</td>
<td>+10%</td>
</tr>
<tr>
<td>Consumption change</td>
<td>+11%</td>
<td>Insignificant</td>
<td>N/A</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>-16%</td>
<td>Insignificant</td>
<td>Insignificant</td>
</tr>
</tbody>
</table>

**Note:** Insignificant points are marked with "Insignificant" or "N/A."
Patterns Across Interventions

1. Heterogeneous impacts across individuals
   - vary by initial assets, ability, gender, financial access
   - concentrated among small share of recipients

2. Intensive and extensive margin impacts
   - existing entrepreneurs increase investment, profits, credit
   - Grants/credit lead to new entrepreneurs as well

3. No sustained growth impacts
   - realized rapidly, plateaued or fell over time

4. Impacts: grants > village funds > other microcredit
   - repayment burden (interest rate?, timing of payment?)
   - targeted population (wealthier?, women?)
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Quantitative Theory Features

Based on earlier work (BKS, 2011,12,14,15, and BS, 2013)

- extensive entrepreneurship decisions
- intensive investments
- financial frictions (quantitatively important: BKS, 2011)
- individual heterogeneity in assets/wealth, $a$, entr. ability, $z$, labor opportunities, $x$
- forward-looking behavior in entre., investment, saving
- stochastic shocks to productivity, labor opportunities
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- extensive entrepreneurship decisions
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- individual heterogeneity in assets/wealth, $a$, entr. ability, $z$, labor opportunities, $x$
- forward-looking behavior in entre., investment, saving
- stochastic shocks to productivity, labor opportunities
- quantitative result: Individual poverty traps, but no aggregate poverty traps
Model: Plant Technology

\[ f(z, k, l) = zk^\alpha l^\theta \]

- \( z \): entrepreneurial productivity
- 1 unit of entrepreneur’s time
- \( k \): capital input
- \( l \): labor input (workers)
- \( \alpha + \theta < 1 \)
Two-state symmetric Markov chain with

\[ x = \{x_L, x_H\} \]

and

\[ \text{Prob}(x_{t+1} = x | x_t = x) = \rho. \]

\(\rho\) controls persistence of labor income
Process of Entrepreneurial Productivity

\[ z_s = \begin{cases} 
  z_{s-1} & \text{w/ prob. } \gamma \\
  \zeta_s & \text{w/ prob. } 1 - \gamma 
\end{cases} \]

\( \zeta_s \overset{iid}{\sim} \eta \zeta^{-\eta-1}, \ \zeta \geq 1 \)

- \( \gamma \) controls persistence of entr. productivity
- \( -\eta \) controls the thickness of firm size tail
- \( z \perp x \)
Model Timeline

entrepreneur (k,l)

borrow (assets: a, ability: z)

occupational choice (each period)

worker

produce repay/default consume/save

produce consume/save

1-\gamma

1-\gamma

(a', z' \sim \mu(z'))

(a', z)

(a', z)

(a', z)

(a', z)
Model Timeline

borrow

(assets: a, ability: z)

entrepreneur
\( k \leq \bar{k}(a, z; \phi) \)

produce repay
consume/save

occupational choice (each period)

worker

produce consume/save

(a', z)

1-\( \gamma \)

(a', \( z' \sim \mu(z') \))

1-\( \gamma \)

(a', \( z' \sim \mu(z') \))
Quantitative Strategy

- Choose technologies and productivity process to match data on the distribution and dynamics of establishments and income in developing country (India)

- Calibrate the quality of contract enforcement in developing countries to match their credit to GDP data

- Contrast the PE implications of the model to the micro experimental evidence

- Evaluate GE and long run implications
Savings and Occupational Choice

unconstrained profits/ avg. wage
net-worth/ avg. wage
worker/entrepreneur | x=x_i
disaving/saving | x=x_i
Average MPK by Wealth and Firm Size

Wealth Percentile | e=1

\[ E_z [\alpha z k^{\alpha - 1} \theta - \delta | \theta | e=1] \]

0 500 1000 1500 2000 2500 3000

Wealth Percentile | e=1

\[ E_z [\alpha z k^{\alpha - 1} \theta - \delta | l, e=1] \]

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1

0

0.05

0.1

0.15

0.2

-0.05

0

0.05

0.1

0.15

0.2

employment
Assets Grants, BKS(2014)

• Model as initial transfer to the poorest, \( a \leq \alpha \),

\[ S_0(a) = \max\{2E[xw] - a, 0\} \]

• financed by one-time taxes on the richest, \( a \geq \tilde{a} \),

• Results
  • entrepreneurship results comparable
  • Shortcoming: income increase too small (4% \(< 34\text{-}150\%\))
  • Not targeted toward higher ability/marginal entrepreneurs
  • Does ag. training increase ability?
  • Income measurement?

• Impacts persist at 4 years but ultimately transitory
Model as initial transfer to the poorest, $a \leq a$, 

$$S_0(a) = \max\{2E[xw] - a, 0\}$$

financed by one-time taxes on the richest, $a \geq \bar{a}$,

Results

- entrepreneurship results comparable
- **Shortcoming:** income increase too small ($4\% \ll 34-150\%$)
  - Not targeted toward higher ability/marginal entrepreneurs
  - Does ag. training increase ability?
  - Income measurement?
- Impacts persist at 4 years but ultimately transitory
Wealth Distribution in the Initial Stationary Equilibrium

$t = 0$
Transitory Distributional Impacts

Initial Impact

![Graph showing transitory distributional impacts with a peak at t=1 and a net-worth/average wage ratio (a) on the x-axis and wealth density on the y-axis.]
Transitory Distributional Impacts

4 years

![Graph showing wealth density vs. net-worth/avg. wage (a) for t=0 and t=2]
Transitory Distributional Impacts

6 years
Transitory Distributional Impacts

10 years
Transitory Distributional Impacts

20 years

![Graph showing transitory distributional impacts over 20 years. The x-axis represents net-worth/average wage, ranging from 0 to 5, and the y-axis represents wealth density, ranging from 0 to 0.4. Two lines are present: one for t=0 and another for t=10.]
• Models the microcredit revolution as a new lending technology that:
  1. guarantees a minimum uncollateralized loan for production
  2. has no risk of default
  3. different intermediation costs (i.e., interest rates)
• capital constraint becomes:
  \[ k \leq \max\{\bar{k}(a, z; \phi), a + b^{MF}\} \]
• Results: matches takeup and credit increase quite well
Heterogeneous Take Up, Short Run Impacts

Take-up Rates

- $r_{MF} = -0.04$
- $= 0.06$
- $= 0.36$

MF to Total Credit

Income Growth

Consumption Growth
## Impacts by Interest Rates

<table>
<thead>
<tr>
<th>MF Lending rate</th>
<th>Short Run PE</th>
<th>Long Run GE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-4%</td>
<td>6%</td>
</tr>
<tr>
<td>Wage</td>
<td>1 by definition</td>
<td>1.05</td>
</tr>
<tr>
<td>Output</td>
<td>1.07</td>
<td>1.04</td>
</tr>
<tr>
<td>Capital</td>
<td>1.03</td>
<td>1.01</td>
</tr>
<tr>
<td>TFP</td>
<td>1.00</td>
<td>1.03</td>
</tr>
<tr>
<td>Consumption</td>
<td>1.01</td>
<td>1.01</td>
</tr>
<tr>
<td>Avg. $z$ (active entrep.)</td>
<td>1.01</td>
<td>1.02</td>
</tr>
<tr>
<td>Fraction of entrep.</td>
<td>+0.04 p.p.</td>
<td>+0.01 p.p</td>
</tr>
</tbody>
</table>
Conclusions

• Policy:
  1. No miracle escapes from poverty traps
  2. Asset grants can have impacts on poor/small entrepreneurs
  3. Microfinance less costly but less effective
  4. Subsidized interest may increase impact of microfinance
  5. Microfinance may have broader, sustained impacts at widescale

• Methods:
  • Quantitative theory and experimental empirics largely align
  • Methodological gains to trade