Can Microfinance Unlock a Poverty Trap for Some Entrepreneurs?

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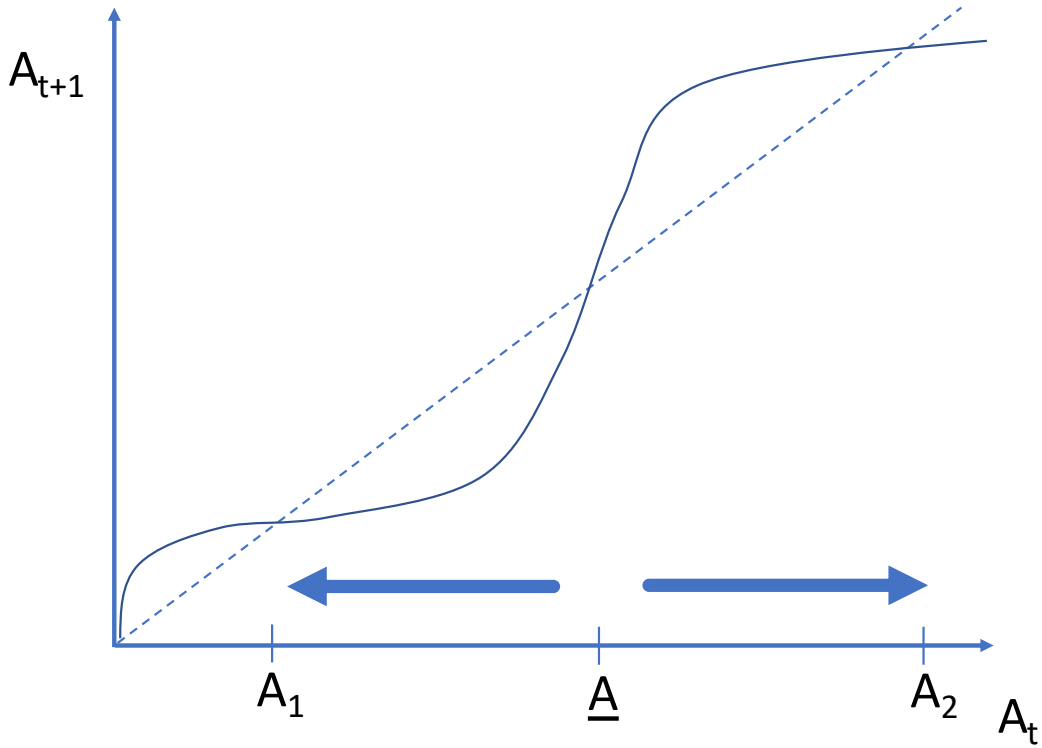
January 3, 2021

Poverty traps



- Dynamic process with multiple steady states
- Initial conditions determine long run steady state
- Implication: A one time shock to wealth or capital can push some households (and their businesses) onto a path to *permanently* higher incomes

This paper: Is there scope for microfinance to unlock a poverty trap?

Nonconvexities & poverty traps

Anecdotally, poor (micro-)entrepreneurs use technologies that are inefficient but cheap

- wealthier entrepreneurs use technologies that are efficient but have high upfront costs (Lewis et al., 2001)

Production nonconvexities, together with binding credit constraints, can *theoretically* generate a poverty trap.

- But rigorous empirical support for this idea has been elusive (McKenzie and Woodruff (2006); Kaboski and Townsend (2011))
- Evidence complementary to ours: Balboni et al. (2020) [livestock]; Kaboski, Lipscomb, Midrigan, Pelnik (2019) [land purchases]

$\Rightarrow$ can a relaxation of credit constraints help poor but talented entrepreneurs move to a more efficient scale of production and experience business growth?

We analyze the *long-run* impacts of an RCT that introduced microfinance to neighborhoods across Hyderabad, India (Banerjee et al 2015).

Scope for Microfinance to Unlock a Poverty Trap?

No smoking gun evidence for the average borrower:

- Short-run RCT evidence finds positive impacts on business investment, but no detectable impacts on profits, consumption.

Impacts likely heterogeneous for numerous reasons (Meager 2019).

- In Hyderabad, only 49.7% of MF borrowers have *any* business $\implies$ many borrow for consumption, not business growth.
- MF may cause weaker businesses to enter
- MF loans might not be large enough to push many entrepreneurs out of low steady state (Bandiera et al 2020)

$\Rightarrow$ Investment poverty traps likely most relevant for:

- "Gung-ho" entrepreneurs (GEs) who borrow to scale businesses
- We use a simple proxy: did household choose to enter entrepreneurship *before* microfinance was widely available?

Setting

We use the RCT variation from Banerjee et al. (2015)

- 104 neighborhoods of Hyderabad selected by Spandana in 2005
- Spandana entered 52 neighborhoods **(treatment)** in 2006
- Spandana entered remaining neighborhoods **(control)** in 2008
- Andhra Pradesh (AP) ordinance outlawed microfinance in 2010
  $\Longrightarrow$ all neighborhoods lost access

Surveys:

- (Partial) baseline in 2005
- Endlines in 2007 and 2010 (analyzed in Banerjee et al 2015)
- Longer-run endline in 2012, analyzed here.

Roadmap

1. **Reduced form impacts, by borrower type**
2. Estimating poverty traps
3. Unpacking types: Microfinance and business selection

Reduced form results summary

On eve of AP ordinance, treatment group has more total MF loans (stock), more current MF loans (flow)

This additional exposure to microfinance is associated with large effects *for those who started their business before MF entered*:

- Investment increases throughout the distribution
- Profits increase, driven by top tercile
- Non-business durables increase
- Consumption increases for middle 50%

No effects for those who entered entrepreneurship later.

Microfinance and informal credit are complements for pre-existing entrepreneurs (substitutes for others)

Exposure to microfinance

Table 1: Exposure to microfinance

	(1) Borrowed from MFI in last 3 years (EL1 1)	(2) Borrowed from MFI between 2004-10	(3) Outstanding MFI loan (EL 2)	(4) Total MFI loan amt (EL2)	(5) Informal credit (EL3)
Panel A: Exposure to credit					
Treatment	0.109***	0.044*	0.008	946.417**	2668.157
	(0.022)	(0.024)	(0.020)	(474.365)	(3545.218)
Control Mean	0.256	0.498	0.332	6670.434	57151.686
Control Std. Dev.	0.436	0.500	0.471	13627.432	1.13e+05
Observations	6804	5467	6143	6143	5744
Panel B: Exposure to credit by entrepreneurial status					
Treatment	0.109***	0.036	0.003	677.234	-1683.957
	(0.021)	(0.026)	(0.021)	(508.180)	(4226.917)
Treatment × GE	-0.002	0.020	0.013	754.962	14085.007*
	(0.030)	(0.032)	(0.031)	(929.289)	(7387.176)
Gung-ho entrepreneur (GE)	0.163***	0.110***	0.093***	2557.957***	3647.067
	(0.023)	(0.022)	(0.020)	(671.712)	(5833.084)
Treatment + Treat × GE	0.107	0.057	0.016	1432.197	12401.050
P(Treat + Treat × GE ≠ 0)	0.001	0.091	0.617	0.102	0.046

Reduced form outcomes (EL3)

Table 2: Effects of microfinance

	(1) Has a business	(2) Total business assets	(3) Business profits	(4) Total wages paid	(5) Non-business durables
Panel A: Effects of credit					
Treatment	0.038*	1565.222***	576.774***	373.747***	351.696
	(0.020)	(426.789)	(179.375)	(133.018)	(239.737)
Control Mean	0.307	6680.551	2066.436	348.367	8482.853
Control Std. Dev.	0.461	20448.064	6039.441	4700.427	14264.700
Observations	5744	5744	5580	5736	5744
Panel B: Effects of credit by entrepreneurial status					
Treatment	0.024	816.198	263.906	275.264**	-175.322
	(0.018)	(526.966)	(168.567)	(118.604)	(323.643)
Treatment × GE	0.040	2325.597	1004.523**	311.864	1716.980**
	(0.028)	(1483.448)	(501.565)	(368.366)	(725.416)
Gung-ho entrepreneur (GE)	0.422***	8906.264***	3493.457***	488.639*	-513.234
	(0.020)	(973.087)	(350.655)	(266.816)	(563.800)
Treatment + Treat × GE	0.064	3141.795	1268.429	587.127	1541.658
P(Treat + Treat × GE ≠ 0)	0.008	0.011	0.004	0.093	0.007

Persistent effects of a "one-time" intervention...

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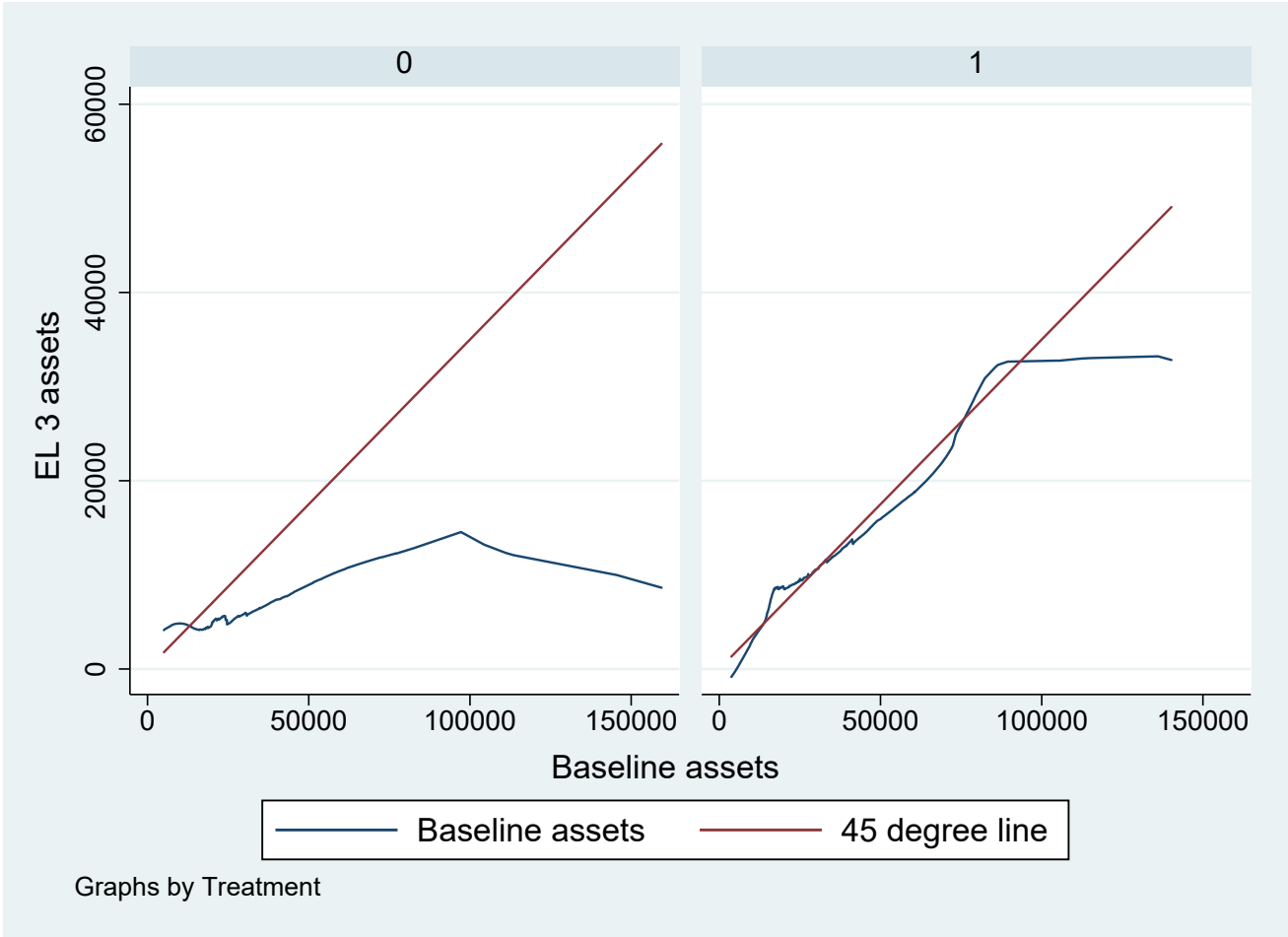
Eyeball evidence for S-curve?



Using the correlation between baseline (2005-6) and endline (2012) assets (wealth):

- In control, seems to be a single, low steady state
- In treatment, some entrepreneurs seem to have escaped

Dynamic Model of Gung-Ho Entrepreneurs

Goals from estimating a model:

1. Is there evidence for production non-convexities?
2. Does the model at *estimated parameters* have a poverty trap?
3. If so, what mass of people does MF move out of low steady state?

Timing:

- Enter period with wealth
- Borrowing and investment take place
- Production occurs, loans are repaid
- Dynamic decisions (consumption and savings) made
- Savings $\Rightarrow$ next period's wealth

Production technologies:

- Savings "under-the-mattress": earn r
- Traditional) technology: $Y_L(K) = A_L K^{\alpha}$
- Modern technology: $Y_H(K) = A_H(K - \underline{K})$
  - Minimum investment $\underline{K}$
  - $K \equiv$ fixed capital + working capital + wage bill

Step 1: Production Function Estimation

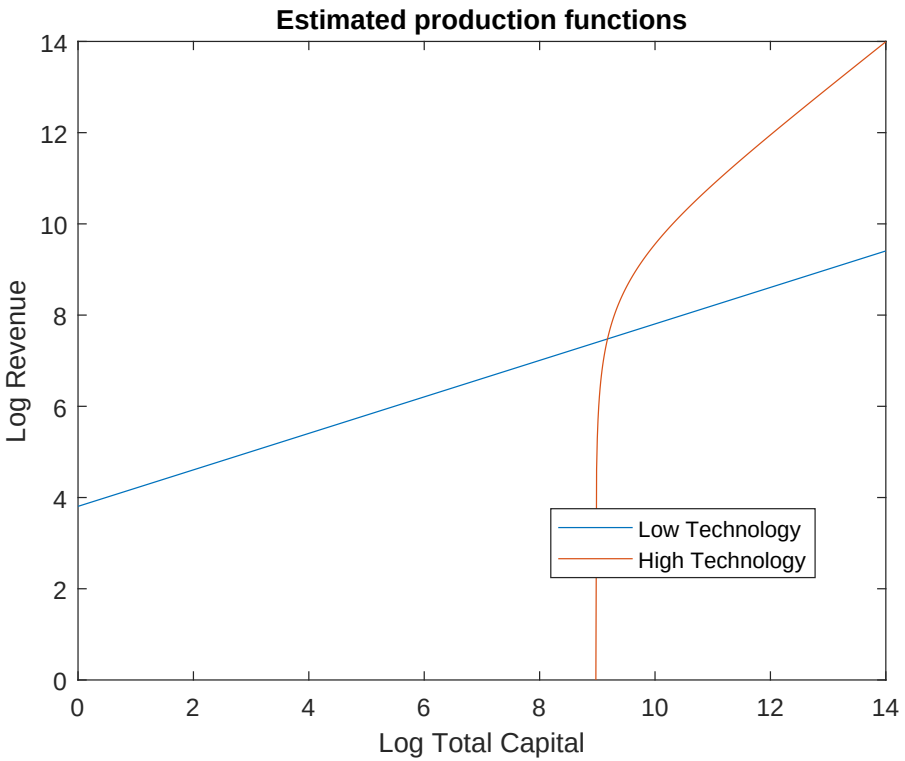
Estimate production parameters using experimental variation
Use only wave 1 data for production estimation

Production decisions are a function of wealth (and available credit), however; we do not observe baseline wealth.

- Assume rank invariance (treatment preserves rank in capital)
- $\Rightarrow$ treatment effect at every quantile pins down counterfactual investment w/o microfinance.
- Can predict revenues under the model in treatment vs. control
- GMM estimation using revenues as the moment condition

▸ GMM details

Production Function Results



Technologies:

$$Y_L(K) = A_L K^{\alpha}$$
$$Y_H(K) = A_H(K - \underline{K})$$

Estimated parameters:

$$A_L = 45$$
$$\alpha = 0.4$$
$$A_H \equiv 1$$
$$\underline{K} = 7900$$

Revenues cross at $K = 9414$.

- Profitable to switch at $K = 13500$ if opportunity cost is saving
- Switch at 18,500 if borrowing

▸ Bootstrap CIs ▸ Robustness

Step 2: Dynamics

Next, solve the dynamic program given production parameters.

Utility:

$$U = \sum \beta^t (c_t)^\rho$$

s.t.
$\omega = Y(K) + (1 - \delta) \times K - (1 + R) \times B + (1 + r) \times S$
$\omega_t = c_t + \omega_{t+1}$

Values:
$\beta = .85$, $\rho = 0.8557$
$\delta = .4$
$R = 0.25$, $r = 0$

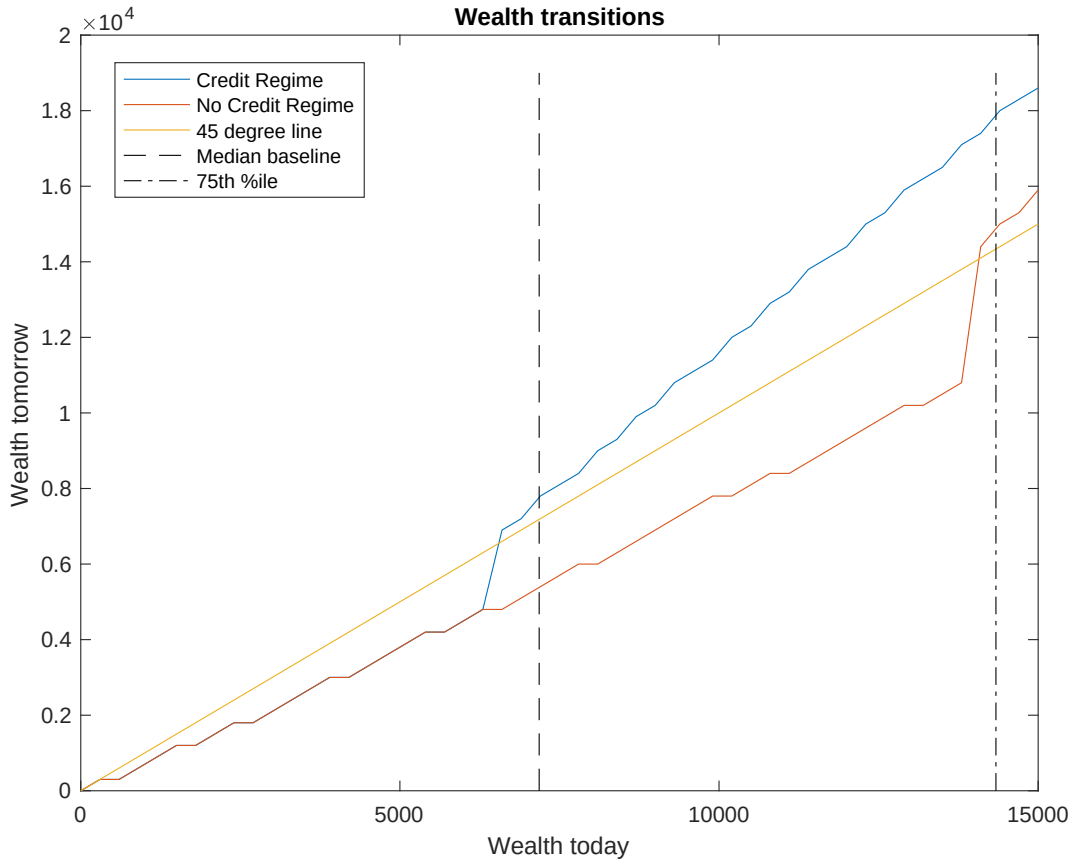
Caveats

Somewhat heroic exercise:

- Unobserved state variable
- Small sample
- Ignore capital-labor choice
- Abstract away from many forms of heterogeneity across firms
  - TFP
  - depreciation
  - optimal scale
  - etc.

Despite these shortcomings, can the model replicate key features in the data?

Wealth Policy Function



Estimated production function parameters consistent with a poverty trap! ▸ Empirical

- Wealth policy function is S-shaped
- Crosses the 45 degree line from below

Step 3: Predicted Treatment Effects

Can this simple model replicate the patterns observed in the data?

- Simulate model
- Compare to 2012 survey wave (not used in estimation)

Results:

- Capital:
  - Model: Rs. 8,053
  - Data: 7,342
- Log capital:
  - Model: 0.761
  - Data: 0.792

Can use model to decompose the treatment effect

- Treatment allows new individuals to escape the poverty trap: 73%
- Treatment allows businesses that had already cleared the poverty trap to expand faster: 27%

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Unpacking non-"GEs"

Recall that non-GEs in our RF results include:

- Consumption borrowers
- Entrepreneurs that began a business (18% do so by 2012 survey), in part, because of microfinance.

What kinds of businesses enter in response to MF?

- If scarce credit pre-MF is allocated to those with the highest marginal returns, then marginal entrant should have lower returns than incumbents.
- However, credit constraints may be binding for many reasons (low wealth, bias in lending, informal credit supply,...)

To look for evidence of selection, we compare new businesses (< 1yr) created **at the same time**, but with differential access to MF:

- some prior to Spandana entry ("GEs")
- and others after Spandana entry ("REs")

We infer where Spandana would have opened early/late in control using matched pair randomization

Results: Type vs. experience

Table 3: Overlapping sample results (endline 1)

	(1) Workers in largest business	(2) Assets (stock)	(3) Log expenses	(4) Log revenue	(5) Profit (Rs.)	(6) Index of business variables
Panel A: Entered entrepreneurship post-2006, pre-Spandana (GEs)						
Treatment	0.212*	900.734	0.488	1.008*	2801.011**	0.148**
	(0.123)	(829.002)	(0.456)	(0.567)	(1293.561)	(0.066)
Control Mean	0.033	2100.623	6.758	7.093	1164.737	-0.106
Control Std. Dev.	0.181	3961.748	2.853	2.959	6351.331	0.321
Observations	133	119	130	128	128	133
Panel B: Entered entrepreneurship post-2006, post-Spandana (REs)						
Treatment	-0.288	-1500.608	-0.566	-1.007	-1400.672	-0.183
	(0.265)	(1159.788)	(0.648)	(0.823)	(1286.628)	(0.112)
Control Mean	0.242	2539.005	6.377	6.719	1785.719	-0.021
Control Std. Dev.	1.110	4850.283	3.402	3.591	6797.191	0.490
Observations	164	145	158	154	154	164

Discussion

Two common views of entrepreneurship:

- "Gung-ho entrepreneur" theory
- Profitable business opportunities
- Scope for growth
- Relaxing credit constraints may jumpstart firm growth

vs. alternate view of "forced" entrepreneurship

- "Reluctant entrepreneur" theory
- Low profits
- Limited scope for growth
- Business may be a response to labor market frictions
- Relaxing credit constraints has limited value

Both types coexist in the population

Discussion

Evidence that some—but not all—households face poverty-trap dynamics due to fixed costs

- credit access, even in the short term, can help these households pay the fixed cost and escape the poverty trap
- but other households face other constraints (managerial ability, etc.)
  - and cannot transition to the "better" technology
- this heterogeneity makes it challenging to identify the fixed cost-based poverty trap empirically
- a unique experimental setting makes this possible in our case

Thank You

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