

Growth and Development: Poverty Traps

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Lecture Notes for PhD Growth and Development (EC8510)

The Persistence of Poverty

- ▶ How does one reconcile persistent poverty with the convergence view?
- ▶ Is convergence slow?
- ▶ Is it conditional convergence?
- ▶ Is it a poverty trap, and if so, what is the mechanism?

The Persistence of Poverty

- ▶ A generic story of poverty traps:
 - ▶ y depends on some choices x , but x also depends on y through either an income effect, or through saving and accumulation.
- ▶ Following [Ghatak \(2015\)](#) we will distinguish between two kinds of poverty traps
 - ▶ External Frictions
 - ▶ Scarcity

External Frictions

- ▶ The poor and non-poor are the same in terms of potential (ability, preferences, etc.).
- ▶ The poor simply operate in an unfavorable environment or with low endowments.
 - ▶ Production function $q = Af(x)$
 - ▶ low x , bad A (conditional convergence)
 - ▶ However, true A' is worse than potential A
 - ▶ There may be poverty traps – if you start poor, you tend to stay poor

External Frictions

- ▶ “External frictions” prevent the poor from making the best use of their endowments
 - ▶ Market frictions, e.g., credit market frictions
 - ▶ Government frictions, e.g., bad infrastructure, insecure property rights
 - ▶ Social frictions, e.g., social norms, relating to gender, caste, etc.
- ▶ Temporary phenomenon if external environment can be made more favorable.
- ▶ Otherwise the poor may be trapped in poverty.

External Frictions

- ▶ \Rightarrow Poverty is inefficient as well as inequitable.
- ▶ A combination of individual rationality and market forces should work to utilize any potential gains
- ▶ The question is, what policies will remove the frictions that prevent this from happening?

Behavior Driven by Scarcity

- ▶ Even if there were no external frictions, the poor are subject to different pressures and constraints than the non-poor.
- ▶ This drives them into making choices that are very different.
- ▶ These choices can reinforce poverty
- ▶ It is tempting to call this view a “behavioral” perspective of poverty; however, it is a broader phenomenon.
 - ▶ Even if all individuals are rational, choices under extreme scarcity can reinforce poverty

Behavior Driven by Scarcity

- ▶ E.g. at very low income levels, subsistence considerations may rule out saving and investment
- ▶ \Rightarrow poverty is “efficient” and there are no self-correcting mechanisms that can be unleashed
- ▶ Either redistribute, focus on policies that will change behavior, or ignore.

A Benchmark Model with No Frictions & Homothetic Preferences

- ▶ Production depends on a single non-labor input x given by a standard neoclassical production function,

$$q = Af(x)$$

- ▶ A denotes the productivity parameter which could be driven by skills, ability, infrastructure, institutions, etc.
- ▶ The price or rental rate of this input is r

A Benchmark Model with No Frictions & Homothetic Preferences

- ▶ An individual has an endowment \bar{x}
- ▶ x = (physical/human) capital k or land
- ▶ The profits of this individual are

$$\pi = \max_x Af(x) - rx$$

- ▶ With perfectly competitive markets income is,

$$\begin{aligned} y &\equiv \pi + r\bar{x} \\ &= Af(x^*) - rx^* + r\bar{x} \end{aligned}$$

A Benchmark Model with No Frictions & Homothetic Preferences

- ▶ The individual's endowment of x does not matter for productive efficiency
 - ▶ If low endowments: buy, rent in, or borrow.
 - ▶ If high endowments: sell, rent out, or lend.
- ▶ Individual's final disposable income reflects endowments
- ▶ With perfect markets and no non-convexities, there is **separation** between productive efficiency and individual economic outcomes.

A Benchmark Model with No Frictions & Homothetic Preferences

- ▶ We may still care about an individual's income falling below some minimum threshold.
- ▶ If so, there is a role for redistributive transfers.
- ▶ This will not have any effect on productivity for the recipient.

Infinite Horizon Model

- ▶ Introduce dynamics into the one-period model to allow for savings and capital accumulation over time
- ▶ Current endowments of wealth \bar{k} = result of past choices
- ▶ Preferences are homothetic and people save at a constant rate s , as in the Solow model
- ▶ Alternatively, individuals live for one period, and pass on a constant fraction s of their wealth as a bequest to the next generation

Infinite Horizon Model

- ▶ Assume individuals have preferences over consumption and bequests given by:

$$U(c, b) = \log c + \beta \log b, \beta \geq 0$$

- ▶ Maximize utility s.t. $c + b \leq y$ and define $s \equiv \frac{\beta}{1+\beta}$
- ▶ y is total income, including that from inherited assets
- ▶ Could alternatively derive it from the behavior of a forward-looking infinitely lived decision maker under some conditions

Infinite Horizon Model

- ▶ There is a constraint $b \geq 0$
- ▶ This is equivalent to an inter-temporal borrowing constraint: a poor parent cannot borrow on behalf of her child.
- ▶ Interpret x as physical or financial capital, k
- ▶ Let k_t denote the capital endowment in time t
- ▶ Assume that capital depreciates fully after use.

Infinite Horizon Model

- ▶ Bequests of generation t determines capital endowments in period $t + 1$: $b_t = k_{t+1}$

- ▶ With perfect capital markets we get,

$$k_{t+1} = s(\pi + rk_t)$$

- ▶ Assuming $sr < 1$ we get convergence
- ▶ Convergence is the anti-thesis of poverty traps

Infinite Horizon Model

- ▶ If deep parameters are the same $(s, A, f(\cdot)) \rightarrow$ initial endowment of k does not matter in the long run.
- ▶ In the short-run initial endowments matter for individual income, but not for productive efficiency
- ▶ If deep parameters are different \rightarrow individuals converge to different steady states:
conditional convergence

Departing from the Benchmark Model

- ▶ We will go through two departures:
 - ▶ External frictions constrain choices due to market imperfections or technological non-convexities.
 - ▶ Non-homothetic preferences: the poor make diff' choices even absent external frictions.

Capital Market Imperfections

- ▶ Suppose capital markets are imperfect
- ▶ For simplicity, let us assume that there are no capital markets
- ▶ We could allow intermediate levels of capital market imperfections.
- ▶ Can be generated by one of the standard channels of credit market frictions, e.g. ex ante or ex post moral hazard

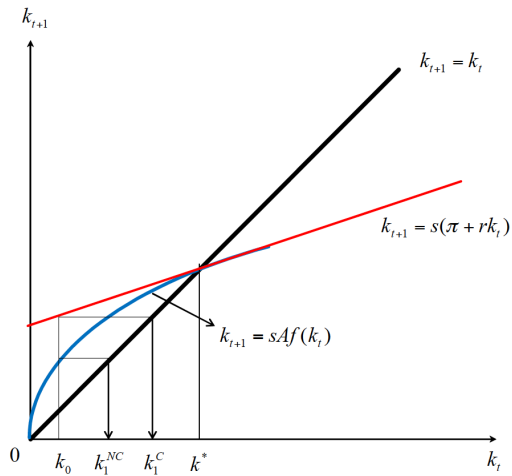
Capital Market Imperfections

- ▶ In the one-period model the separation result breaks down
- ▶ Output is now $q = Af(\bar{k})$
- ▶ In the infinite-horizon model, no capital markets = the standard Solow model with constant saving
- ▶ As we assume capital fully depreciates, the modified transition equation is,

$$k_{t+1} = sAf(k_t)$$

- ▶ We still get convergence, but it is slower than when capital markets are available.

Capital Market Imperfections



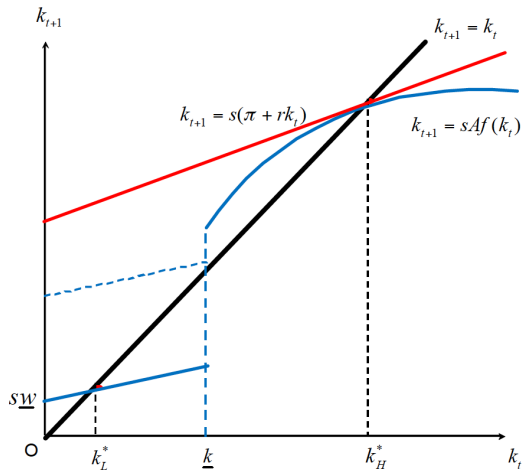
Non-Convexities in the Production Technology

- ▶ Introduce start-up costs

$$q = Af(k) \text{ for } k \geq \underline{k}, \underline{w} \geq 0 \text{ otherwise}$$

- ▶ $\underline{w} < Af(\underline{k})$ is the return from subsistence activity
- ▶ Can still save and the slope will be sr
- ▶ In this case, there will be multiple steady states

Non-Convexities in the Production Technology



Non-Convexities in the Production Technology

- ▶ With perfect capital markets it is possible to borrow \underline{k} or more
- ▶ No poverty trap
- ▶ Alternatively, if s or \underline{w} or r are high enough, then you can save your way out of the poverty trap
- ▶ Otherwise you are stuck at the low steady state k_L^*

Non-Convexities in the savings technology or A

- ▶ Without capital markets the wealth transition equation is,

$$k_{t+1} = sAf(k_t)$$

- ▶ Suppose everyone has the same s , in terms of preferences.
- ▶ But, imperfect property rights (easy to steal from the poor) means only the wealthy are able to save efficiently.
- ▶ In this case we can get poverty traps without technological non-convexities
- ▶ Similar result for A if there are complementary inputs such as skills or infrastructure

Friction-Driven Poverty Traps – Take-Away Points

- 1) no single friction is sufficient to trap individuals in poverty
 - ▶ We require some other departure from the standard framework (e.g., non-convexities)
- 2) If capital is the only input, or all other inputs have perfect markets, the capital frictions are *necessary* for friction-driven poverty traps to emerge independent of any other frictions.
- 3) if other inputs are needed and these markets have frictions that cannot be overcome via the capital market, then direct intervention in the market of this input would be warranted.

Departures from the Benchmark Model – Non-Homothetic Preferences

- ▶ When preferences are non-homothetic then one can have poverty traps that are driven by income effects only.
- ▶ The main idea is that there are no external frictions to be fixed to help people get out of poverty
- ▶ People are trapped in poverty because insufficient endowments and not exogenous frictions prevent them from making the best use of their endowments

Departures from the Benchmark Model – Non-Homothetic Preferences

- ▶ Not “behavioral” poverty trap, e.g., poverty traps that arise from behavioral biases only, e.g., loss aversion, hyperbolic discounting
- ▶ Behavioral factors are possible, but you generate poverty traps with standard preferences (Banerjee and Mullainathan, 2010; Bernheim, Ray, and Yeltekin, 2013).
- ▶ We call them scarcity driven poverty traps instead.

Scarcity-Driven Poverty Traps

- ▶ Output is given by $q = Af(k)$ and capital markets are perfect.

- ▶ As such, the income of an individual is,

$$y_t = \pi + rk_t$$

- ▶ where

$$\pi = \max_k Af(k) - rk$$

- ▶ Suppose there are no external frictions whatsoever, barring bequests being non-negative.

Scarcity-Driven Poverty Traps

- ▶ As before, agents derive utility from consumption c and from bequests b
- ▶ In addition, we allow individuals to consume a luxury good z
- ▶ The utility function is given by,

$$U(c, b) = \log c + \beta \log(b + B) + \gamma \log(z + Z)$$

- ▶ $B > 0$, $Z > 0$, $\beta \in [0, 1]$, and $\gamma \in [0, 1]$
- ▶ We assume that the marginal utility of bequests at $b = 0$ is higher than the marginal utility of luxury goods when $z = 0$

$$\frac{\beta}{B} > \frac{\gamma}{Z}$$

Scarcity-Driven Poverty Traps

- ▶ c = basic consumption, b = money passed on to children, and z = luxury good (durables, leisure activities, etc.)

z is not essential for survival but consumed more as income goes up.

- ▶ Our assumption ensures that for low levels of income, all income is spent on c , for moderate levels of income it is split between c and b , and for high levels of income it is split between c , b , and z .
- ▶ As before, $k_{t+1} = b_t$
- ▶ The budget constraint is,

$$c_t + b_t + z_t = \pi + rk_t$$

Scarcity-Driven Poverty Traps

- We can derive two income thresholds, \underline{y} and \bar{y} , with corresponding thresholds for capital,

$$\underline{k} \equiv \frac{B - \beta\pi}{\beta r}$$

$$\bar{k} \equiv \frac{(1 + \beta)Z - \gamma B - \gamma\pi}{\gamma r}$$

$$\bar{k} > \underline{k}$$

follows from our assumption,

$$\frac{\beta}{B} > \frac{\gamma}{Z}$$

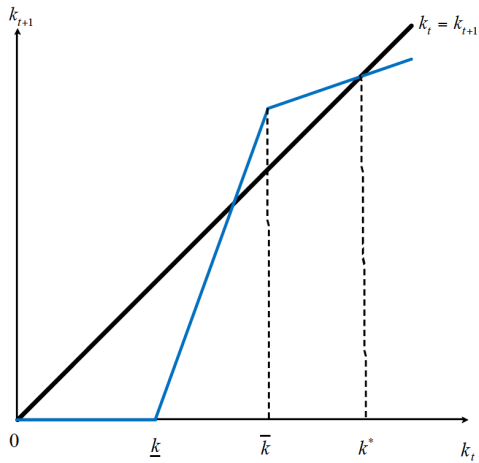
Scarcity-Driven Poverty Traps

- ▶ Using the fact that $k_{t+1} = b_t$, we will have that,

$$\begin{aligned}k_{t+1} &= 0 \text{ for } k \leq \underline{k} \\&= \frac{\beta}{1+\beta}(rk_t + \pi) - \frac{B}{1+\beta} \text{ for } \underline{k} \leq k \leq \bar{k} \\&= \frac{\beta}{1+\beta+\gamma}(rk_t + \pi) - \frac{(1+\gamma)B - \beta Z}{1+\beta+\gamma} \text{ for } k_t \geq \bar{k}\end{aligned}$$

- ▶ We assume that $\frac{\beta}{1+\beta}r > 1 > \frac{\beta}{1+\beta+\gamma}r$ and $B - \beta\pi > 0$ to generate a productivity trap.
- ▶ If $k_t < \underline{k}$, don't save at all and so have $k^* = 0$.
- ▶ If $k_t > \bar{k}$, grow rapidly until luxury consumption kicks in, then converge to high steady state.

Scarcity-Driven Poverty Traps



Scarcity-Driven Poverty Traps

- ▶ The sources for these kind of poverty traps can be more general than the specific channel developed above
- ▶ For example, the scarce resource in question may be time, or attention span, or cognitive capacity, rather than physical or financial capital
- ▶ Suppose individuals can allocate time between generating current income, and spending it with their children to develop their human capital (h).
- ▶ Assume income depends on human capital only, and physical or financial capital plays no direct role in production.

Scarcity-Driven Poverty Traps

- ▶ Consider, the budget constraint is,

$$c_t \leq wh_t(T - l_t)$$

- ▶ l_t is the time spent with children, and h_t is human capital at time t .
- ▶ w is an exogenously given wage rate per unit of human capital
- ▶ Also, let $h_{t+1} = h_t l_t$ be the transition equation for human capital
- ▶ For similar preferences,

$$\log c_t + \beta \log(l_t + B) + \gamma \log(z + Z)$$

low levels of h_t , individuals may choose $l = 0$, resulting in a poverty trap

Scarcity-Driven Poverty Traps

- ▶ It is possible to extend the scarcity channel to consider how it interacts with insufficient intergenerational altruism, as well as various behavioral biases.
- ▶ Interpret b broadly as any investment in the productive capacity or welfare of children.
- ▶ Suppose that society puts a greater weight (say $\tilde{\beta}$) on the welfare of children than parents do (β), where $\tilde{\beta} > \beta$.
- ▶ With scarcity, the gap between social and parental optimal will be larger when parents are poorer.

Scarcity-Driven Poverty Traps

- ▶ Everyone is subject to biases, but low incomes exacerbate bias, or, their negative consequences.
- ▶ Introduce an inessential consumption good (e.g., tobacco or alcohol) ν and add the term $\delta \log(\nu + V)$ (where $\delta \in [0, 1]$ and $V > 0$) to the utility function and make the assumption $\frac{\delta}{V} > \frac{\beta}{B}$.
- ▶ This is similar to what [Banerjee and Mullainathan \(2010\)](#) call a temptation good.

Scarcity-Driven Poverty Traps

- ▶ Individuals will spend all their income on c for very low levels of k , but now will spend some of their income on v as k crosses a threshold, and only for a higher threshold will they choose a positive value of b .
- ▶ Previously, a cash transfer to increase the financial resources of a poor family above \underline{k} would have been sufficient to help them escape the poverty trap.
- ▶ Now there is an intermediate range of k such that an unconditional cash transfer will be partly frittered away on v .

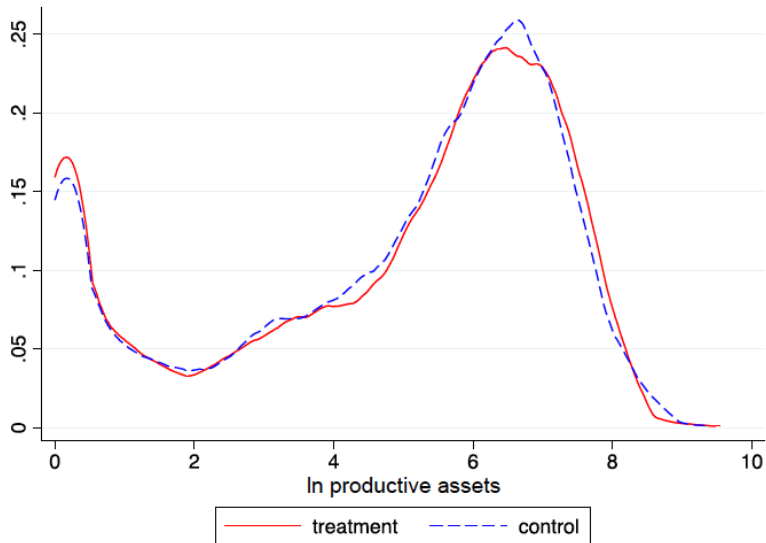
Scarcity-Driven Poverty Traps – Take-Away Points

- 1) poverty traps can exist even without any external frictions
- 2) as the root cause of scarcity-driven poverty is scarcity, the most obvious policy implication is a lump-sum transfer to the poor.
 - ▶ With external frictions there are likely strong complementarities between policies that fix these frictions and lump-sum transfers
- 3) if there are grounds for paternalistic interventions, unconditional lump-sum transfers may not be the most efficient form of intervention.

Why do People Stay Poor? Balboni et al. (2022)

- ▶ Do people stay poor because they are only able to do bad jobs, or do they do bad jobs because they are poor?
- ▶ Hard to distinguish, but very different policy implications.
- ▶ Balboni et al. (2022):
 - ▶ use an RCT providing variation in a large asset transfer program in Bangladesh over 11 years to test directly for a poverty trap.
 - ▶ Estimate a structural model of occupational choice to back out the implied misallocation.

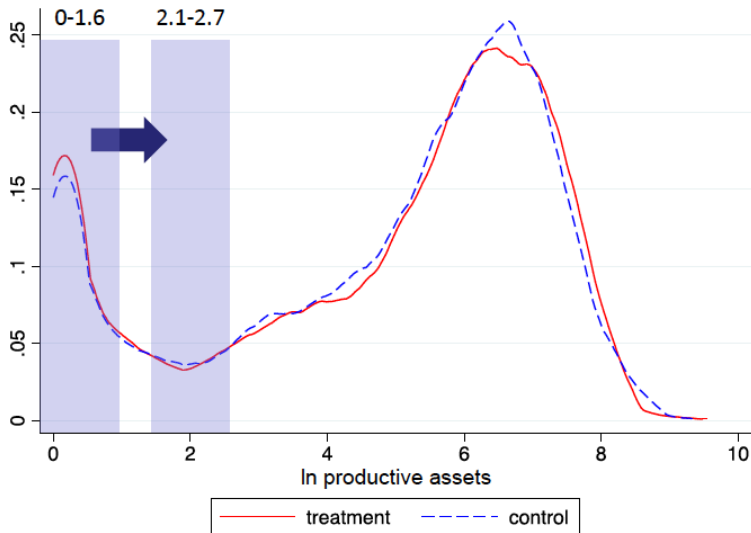
The Distribution of Productive Assets is bimodal



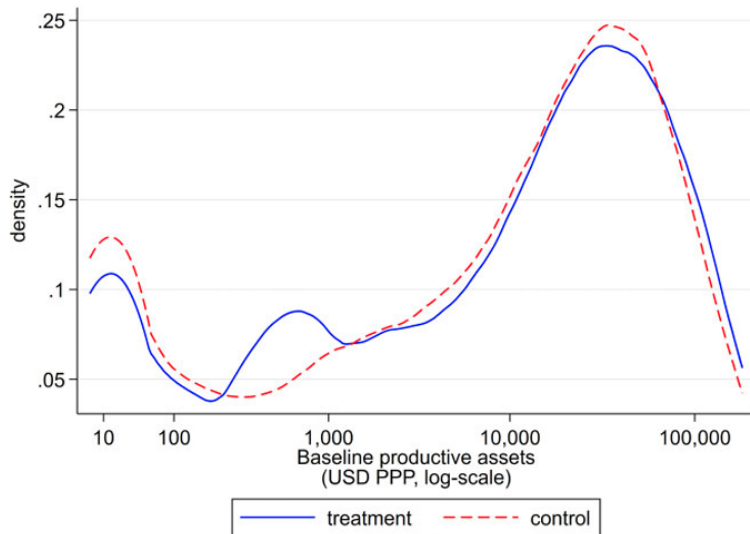
BRAC's Targeting the Ultra-Poor Program

- ▶ Randomly allocated across villages.
- ▶ Beneficiaries are the poorest women in these villages
- ▶ Program transfers a large asset (a cow) and training

Program moves the poorest into the lowest density area



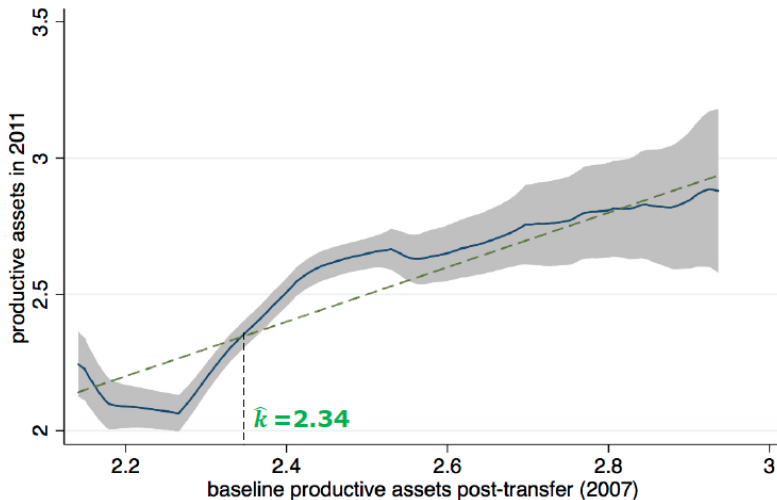
Program moves the poorest into the lowest density area



Their Test

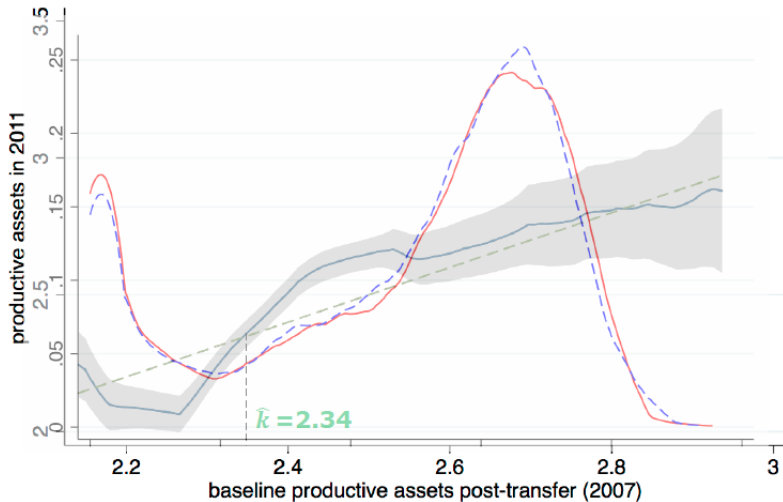
- ▶ Poverty traps and differential productivity are observational the same in steady state
- ▶ But they produce different transition equations
- ▶ A necessary condition is that the transition equation isn't concave
 - ▶ Test using the fact that beneficiaries differ slightly in baseline assets
 - ▶ Exploit to estimate transition equation from k_{2007} to k_{2011}
 - ▶ Test predictions of poverty trap model up to 11 years post-transfer

The Transition Equation is S-Shaped



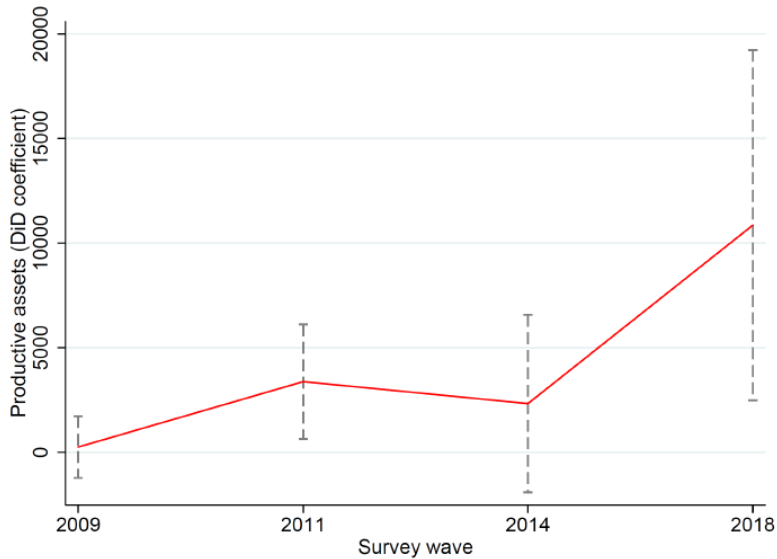
Sample includes treated ultra-poor households with baseline productive assets < 18,000 BDT.

The unstable steady state is at the point of lowest density

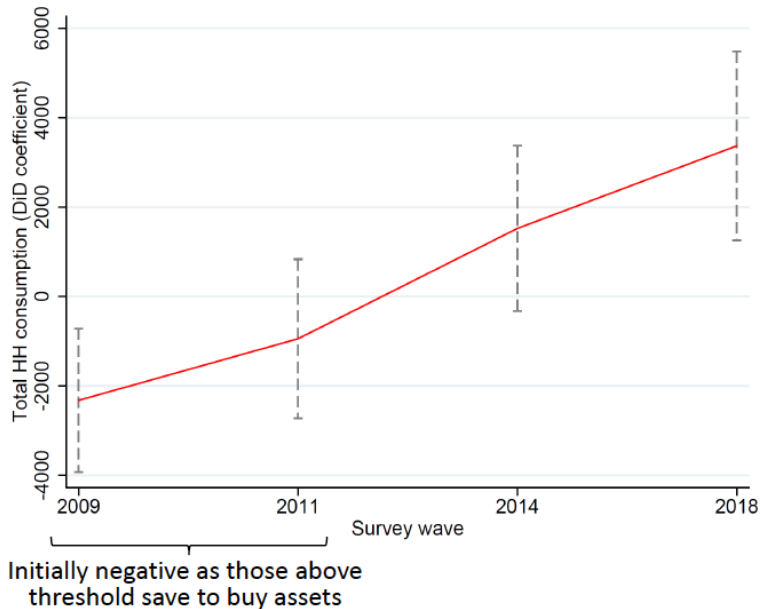


Sample includes treated ultra-poor households with baseline productive assets < 18,000 BDT.

Differences in productive assets grow over time



Differences in productive assets grow over time



Conclusions

- ▶ Poor people are not unable to take on more productive employment activities, they just lack the required capital
- ▶ Misallocation results suggest lack of opportunity prevents 96% from engaging in optimal occupation
- ▶ The existence of a poverty threshold implies that only transfers large enough to push beneficiaries past the threshold reduces poverty in the long run
- ▶ Key policy conclusion – to tackle persistent poverty, need big push policies that tap into the talents of the poor rather than just propping up their consumption