Persistence of Poverty and Anti-Poverty Policies

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Two Views of Poverty - External Frictions View

- The poor is just like the non-poor in terms of their potential (that includes ability, preferences) and they simply operate in an unfavourable environment or with low endowments
  - In terms of a production function $q = Af(x)$ - low x, bad A (conditional convergence).

- The best known statement of this view is Schultz's phrase "poor but rational".

- Modern development economics has extended this view by studying various frictions that impede the smooth functioning of markets as well as technological non-convexities that make it disadvantageous to be poor or operating at very low scales.
  - The true A' is worse than potential A
  - There may be poverty traps - if you start poor, you tend to stay poor

- We lump these together and call them "external frictions" (along with frictions that arise from poor governance, infrastructure etc) that prevent the poor from making the best use of their endowments through exchanges in the marketplace or through technology.
  - Market frictions
  - Government Frictions
  - Social Frictions
- To the extent this can be fixed by placing a poor individual in a favourable external environment, it will be a transient phenomenon but otherwise the poor may be trapped in poverty.

- In a sense, in this view the phenomenon of poverty, other than being *inequitable*, is also *inefficient*: a combination of individual rationality and market forces should work to utilize any potential gains (e.g., lost income from insufficient investment in human capital) and the question is, what policies will remove the frictions that prevent this from happening.

Two Views of Poverty - Behaviour Driven by Scarcity

- A very different view of poverty is, even if there were *no external frictions*, the poor are subject to different pressures and constraints from the non-poor and that drives them into making *choices* that are very different, and more importantly, that can reinforce poverty.

- It is tempting to call this view "poor but *behavioural*" but we are going to argue that this is a broader phenomenon

- Even if all individuals are rational in the neoclassical sense, choices under extreme scarcity can reinforce the tendency of the poor to stay poor due to *non-homothetic preferences*, or *strong income effects*.

- For example, at very low income levels, subsistence considerations may rule out the feasibility of saving at a reasonable rate, and investing money in health and education to secure a better for future for themselves and their children.

- In this view, poverty is "efficient" and there are no self-correcting mechanisms to be unleashed with suitable supply-side policies

- Either redistribute, or focus on policies that will change behaviour (or, ignore!)

What We Plan to Do - 1. Classify Individual Poverty Traps

- Develop a conceptual framework and a simple unifying model that distinguishes between what we call "friction-driven" and "scarcity-driven" poverty traps corresponding to the two views of poverty discussed above.

- Focus on poverty traps at the level of the *individual*: two individuals who are identical in all respects but only differ in their initial wealth may end up with different steady state incomes, and do not look at *aggregate* level poverty traps, which could operate at the economy-wide level.

- Why is this useful?

- To understand anti-poverty policies:

- Distinctive policy implications of these two kinds of poverty traps.
  - In both cases, lump-sum transfers work (under some conditions)
  - But in the former, poverty also being "inefficient", creates room for "supply-side" policies
  - Also, in the latter, there is room for "paternalistic" interventions

What We Plan to Do - 2. Policy Implications

- Suppose policymaker has some resources (which are costly due to distortionary taxes & alternative uses of public funds) & wants to help the poor escape poverty

- For the most part, we can assume the policymaker's objective function is the same as the individual's preferences, but in some cases there may be grounds for having paternalistic preferences.

- Relative merits of alternative *forms* of transfers to the poor, namely, the relative merits of *unconditional* and *conditional cash transfers*, as well as *in-kind transfers*.

- Separate out the resource transfer part with the friction-fixing part.

- If the source of poverty is scarcity rather than frictions, the obvious policy implication is a lump-sum transfer to the poor but to the extent scarcity and frictions coexist, there are strong complementarities between policies that increase the purchasing power of the poor and intervene to remove a friction.

- However, to the extent the preferences of the individual differ from that of the policymaker (which can be due to behavioural biases or insufficient intergenerational altruism or gender bias), unconditional lump sum transfers will not be the most efficient form of intervention and there may be a case for conditional cash transfers.

1. Benchmark Model with No Frictions & Homothetic Preferences

1.1 One-Period Model

- Suppose production depends on a single non-labour 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

- The price or rental rate of this input is r

- An individual has an endowment $\overline{x}$

- We can think of x as (physical/human) capital k or land

- The profits of this individual are

$$\pi = \max_{x} Af(x) - rx\,.$$

- With perfectly competitive markets his income is:

$$y \equiv \pi + r\overline{x}.$$

- This shows that the individual's endowment of x does not matter for *productive efficiency.*

- Through rental or sales (in a one-period model they are equivalent), they adjust to maximize efficiency

- Of course, an individual's final disposable income reflects endowments.

- With perfect markets and no non-convexities, we have **separation** between productive efficiency and individual economic outcomes.

- To the extent we care about an individual's income falling below some minimum threshold, i.e., poverty, there is a case for redistributive transfers, but they will not have any positive productivity impact on the recipient.

1.2 Infinite Horizon Model

- Introduce dynamics in the one-period model to allow for savings and capital accumulation over time

- Current endowment of the capital stock $\overline{k}$ (equivalent to wealth in this model) is the result of past choices rather than being exogenously given.

- Preferences are homothetic and people save at a constant rate s, as in the Solow model.

- Alternatively, individuals live for one period, pass on a constant fraction s of their wealth as bequests to the next generation.

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

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

- Maximize subject to $c + b \leq y$ and define $s \equiv \frac{\beta}{1+\beta}$

- y (to be distinguished from q) is total income, including that from inherited assets

- Could alternatively derive it from the behaviour of forward-looking infinitely-lived decision maker under some conditions

- There is a constraint: $b \geq 0$

- Even if capital markets are perfect as such, in most societies negative bequests are not permissible by law and violations of this are considered morally offensive, such as bonded labour.

- This is equivalent to an inter-temporal borrowing constraint: a poor parent cannot borrow on behalf of her child

- Let us focus on the interpretation of x as physical or financial capital k

- Let k_t denote the capital endowment in time t

- Assume capital depreciates fully after use

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

- With perfect capital markets we get

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

- Denoted by red line in the figure below

- Assuming $sr < 1$ we get convergence.

- Convergence is the anti-thesis of poverty traps

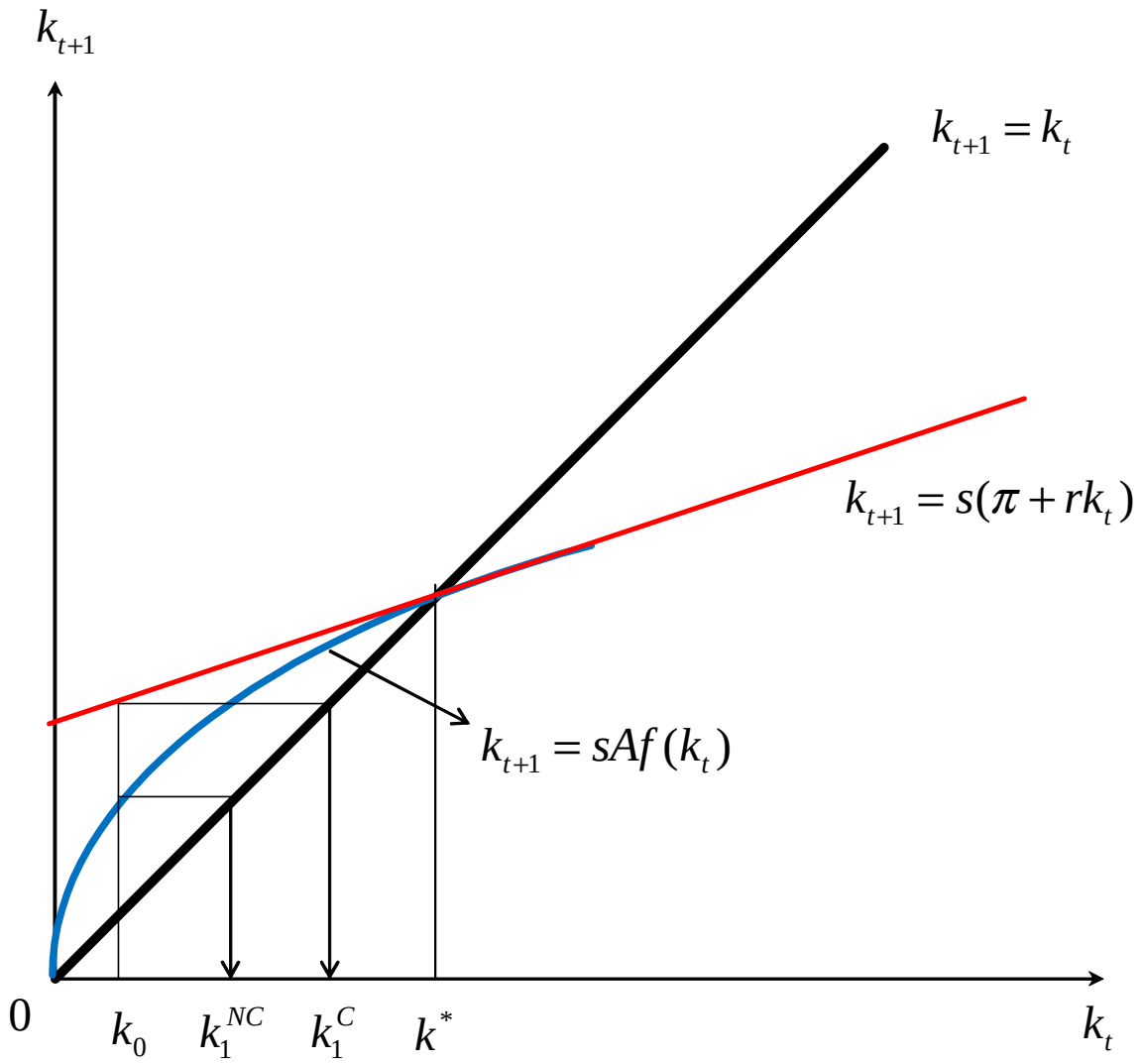

Figure 1: Convergence in the Solow Model

- If the deep parameters are the same (s, A, $f(.)$) then initial endowment of k does not matter in the long-run

- In the short-run initial endowments matter for individual income, but not productive efficiency

- Of course, if these parameters are different then individuals converge to different steady states: **conditional convergence**

2. Departures from Benchmark Model - External Frictions

- Relax various assumptions of the benchmark model to allow the possibility that two individuals who are *identical in all respects except for their initial endowment of capital (or wealth),* k_0, can end up with different levels of incomes and capital stocks in steady state, which is a formal way of describing a poverty trap

- Multiple stable steady states, initial conditions matter, one-shot policies may have long-run effects

2.1 Capital Market Imperfections

- Suppose capital markets are imperfect.

- For expositional simplicity, let us assume that there are no capital markets.
  - Could allow intermediate levels of capital market imperfections, where the amount of capital that an individual can use is some multiple of her initial capital stock, i.e., σk_0 where $\sigma > 1$ (and not too large so that capital market frictions do have bite)
  - Can be generated by one of the standard channels of credit market frictions, such as *ex ante* or *ex post* moral hazard

- In the one-period model the separation result breaks down: output is now $q = Af(\overline{k})$.

- Turning to the infinite-horizon model, the case of no capital markets is equivalent to the standard Solow model where individuals save a constant fraction of their income to accumulate capital over time.

- As we assume capital fully depreciates, the modified transition equation is:

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

- Depicted by blue curve in Figure 1

- We still get convergence- with capital markets convergence is speeded up

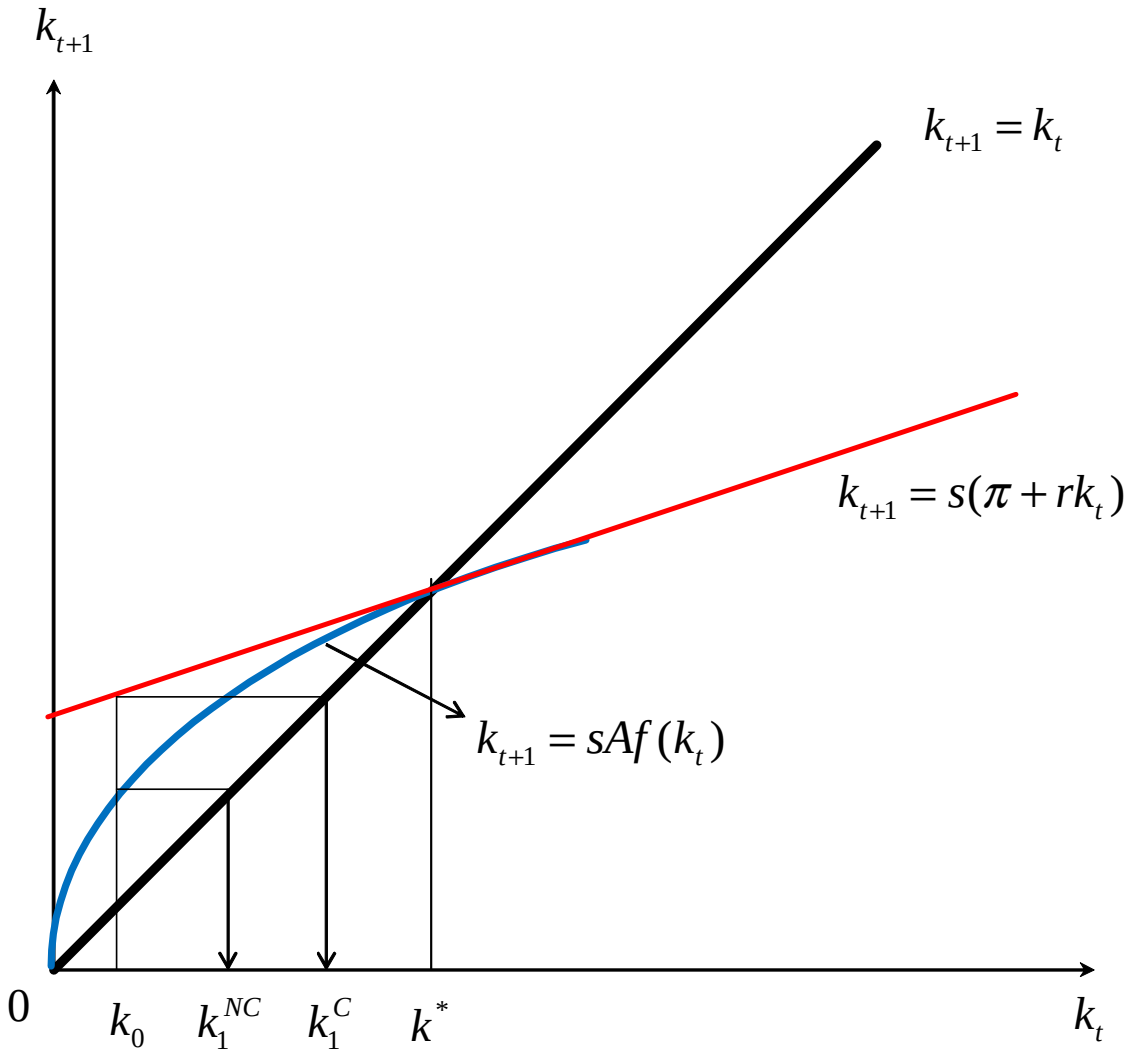

Figure 1: Convergence in the Solow Model

2.2 Non-convexities - in the Production Technology

- For example, let us introduce set-up costs
- $y = Af(k)$ for $k \geq \underline{k}$, $= \underline{w} > 0$ otherwise.
- $\underline{w} < Af(\underline{k})$ is returns from subsistence activity
- You can still save up: sr will be slope
- In this case, there will be multiple steady states (Figure 2)

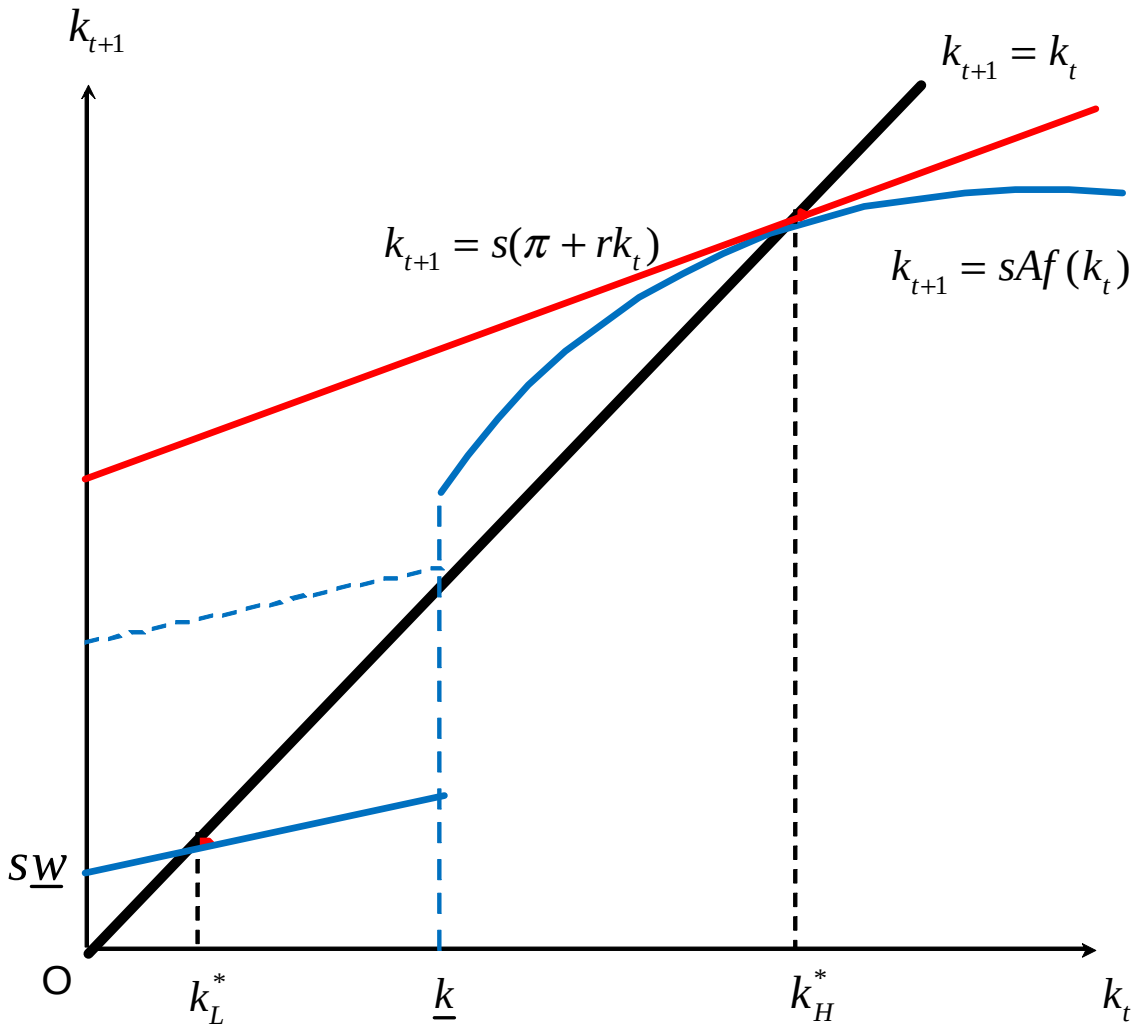

Figure 2: Non-convergence in the Solow Model

- With perfect capital markets, it is possible to borrow $\underline{k}$ or more, and there is no poverty trap.

- Or, if s or $\underline{w}$ or r are high enough, then can save your way out of the poverty trap

2.3 Non-convexities in the savings technology or A

- Recall that without capital markets the wealth transition equation is:

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

- Suppose everyone has the same s as far as preferences go, but due to imperfect property rights (easy to steal from the poor), only the wealthy are able to save effectively (similarly, for A, which captures complementary inputs such as skills or infrastructure)

- Will get poverty traps without any technological non-convexities.

2.4 Imperfections in Other Markets

- Let us augment the basic one-period model by adding an additional input, h which we will refer to as human capital (but can be interpreted as other inputs such as land)

- Suppose the initial endowment of human capital of an individual is $\overline{h}$ and that h can be obtained from a competitive market at cost ρ per unit.

- Output is now

$$q = Af(k, h).$$

- His profits are $\pi = q - rk - \rho h$.

- Profit-maximization yields the standard first-order conditions:

$$\begin{aligned} f_k(k,h) &= r \\ f_h(k,h) &= \rho. \end{aligned}$$

- The optimal levels of $\hat{k}$ and $\hat{h}$ can be solved from these as functions of r and ρ and as before, the endowment of the individual will not matter in determining productive efficiency, although it will matter for the income of the individual.

- A rental or sales market will achieve the efficient allocation and in the absence of specific contracting frictions, these are equivalent.

- Even if there is a cash-in-advance constraint that applies for inputs other than capital - namely, they must be paid for in advance in cash - our conclusion is unchanged so long as capital markets are perfect.

- Now let us assume that there is no market for h while the market for k operates just as before.

- In that case,

$$f_k(k, h) = r$$

- The optimal choice of $\hat{k}$ will depend on h.

- For convenience, let us assume the Cobb-Douglas production function: $q = Ak^{\alpha}h^{\beta}$ with $\alpha, \beta \in (0, 1)$ and $\alpha + \beta \leq 1$.

- In this case, solving the above equation explicitly for k as a function of r and h we get

$$\hat{k} = \left(\frac{A\alpha}{r} h^{\beta}\right)^{\frac{1}{1-\alpha}}$$

- Net output (taking into account the cost of physical capital) is:

$$q - rk = A^{\frac{1}{1-\alpha}} \left(\frac{\alpha}{r}\right)^{\frac{\alpha}{1-\alpha}} (1-\alpha)\, h^{\frac{\beta}{1-\alpha}} \equiv \phi(h).$$

- Now the individual's income is net output plus interest earned on owned capital at time t:

$$y_t = \phi(h_t) + rk_t.$$

- The equation of motion for k_t is:

$$k_{t+1} = s\left(\phi(h_t) + rk_t\right) \text{ for all } k \geq 0.$$

- The interesting question, is how does h_t evolve over time.

- One extreme possibility is it is transmitted perfectly and intact from generation to generation:

$$h_{t+1} = h_t = h.$$

- In that case, by definition there will be (perfect) history-dependence in terms of the level of human capital.

- In this case, k would converge to a steady-state level:

$$k^* = \frac{s\phi(h)}{1 - sr}$$

- This is conditional convergence as different families will have permanently different levels of h.

- A less extreme possibility - suppose income can saved and spent on investing in h, similar to how savings is used to accumulate k.

- Even though in a given period, h cannot be rented or bought to be used in production, it can be "produced" for the next period by saving a certain fraction of income (e.g., investing in the education of children).

- Let

$$h_{t+1} = \gamma y = \gamma \left(\phi(h_t) + r k_t \right)$$

- $\gamma \in (0, 1)$ and $s + \gamma < 1$ to ensure that total saving (in k and h) as a fraction of income is less than 1.

- The accumulation equation for h is identical to that for k, up to a multiplicative constant:

$$h_{t+1} = \frac{\gamma}{s} k_{t+1}.$$

- The equation of motion of k in this case is:

$$\begin{aligned} k_{t+1} &= s \left(\phi(h_t) + r k_t \right) \\ &= s \left(\phi \left(\frac{\gamma}{s} k_t \right) + r k_t \right). \end{aligned}$$

- This allows us to characterize the steady state level of k^* by standard arguments:

$$k^* = \frac{s\phi\left(\frac{\gamma}{s}k^*\right)}{1 - sr}$$

- h too converges to

$$h^* = \frac{\gamma}{s}k^*.$$

- What is interesting to note is none of the cases above we get poverty traps.

- Of course, this conclusion changes if there are non-convexities in the relationship between h and y. Suppose the production function is

$$\begin{aligned} q &= \overline{A}k^{\alpha} \text{ for } h \geq \widehat{h} \\ &= \underline{A}k^{\alpha}, \text{ otherwise} \end{aligned}$$

- $\widehat{h} > 0$ and $\overline{A} > \underline{A} > 0$.

- The only change from above is now net output as a function of h as captured by $\phi(h)$.is no longer a smooth and continuous function but has a discrete jump at $h = \hat{h}$.

- Now income y is given by:

$$\begin{aligned} y_t &= \left(\overline{A}\right)^{\frac{1}{1-\alpha}} \left(\frac{\alpha}{r}\right)^{\frac{\alpha}{1-\alpha}} (1-\alpha) + rk_t \text{ for } h \geq \widehat{h} \\ &= (\underline{A})^{\frac{1}{1-\alpha}} \left(\frac{\alpha}{r}\right)^{\frac{\alpha}{1-\alpha}} (1-\alpha) + rk_t, \text{ otherwise.} \end{aligned}$$

- If h shows full persistence, then clearly we can get poverty traps: dynasties for which h is less than $\widehat{h}$ will converge to a low income steady state, and those with a higher level of h to a high income steady state.

- If h can be accumulated by a fraction γ of income, $h_{t+1} = \gamma y_t$ (and $k_{t+1} = sy_t$ as in all cases) and both the human and physical capital transition equations will be piecewise linear with discrete jumps at $h_t = \hat{h}$ and $k_t = \frac{s}{\gamma}\hat{h}$, respectively.

- The transition equation for h is given by:

$$h_{t+1} = \gamma \left\{ A^{\frac{1}{1-\alpha}} \left(\frac{\alpha}{r} \right)^{\frac{\alpha}{1-\alpha}} (1-\alpha) + \frac{sr}{\gamma} h_t \right\}$$

- A takes the values $\overline{A}$ or $\underline{A}$, depending on whether $h_t \geq \widehat{h}$ or $h_t < \widehat{h}$.

- There will be a parallel transition equation for k.

- By familiar arguments, we may have two stable steady states, i.e. a poverty trap may exist as we have depicted in Figure 3

- However, as noted in the context of a single input production technology and non-convexities earlier, one can have a unique steady state in the same environment, depending on parameter values (dashed line)

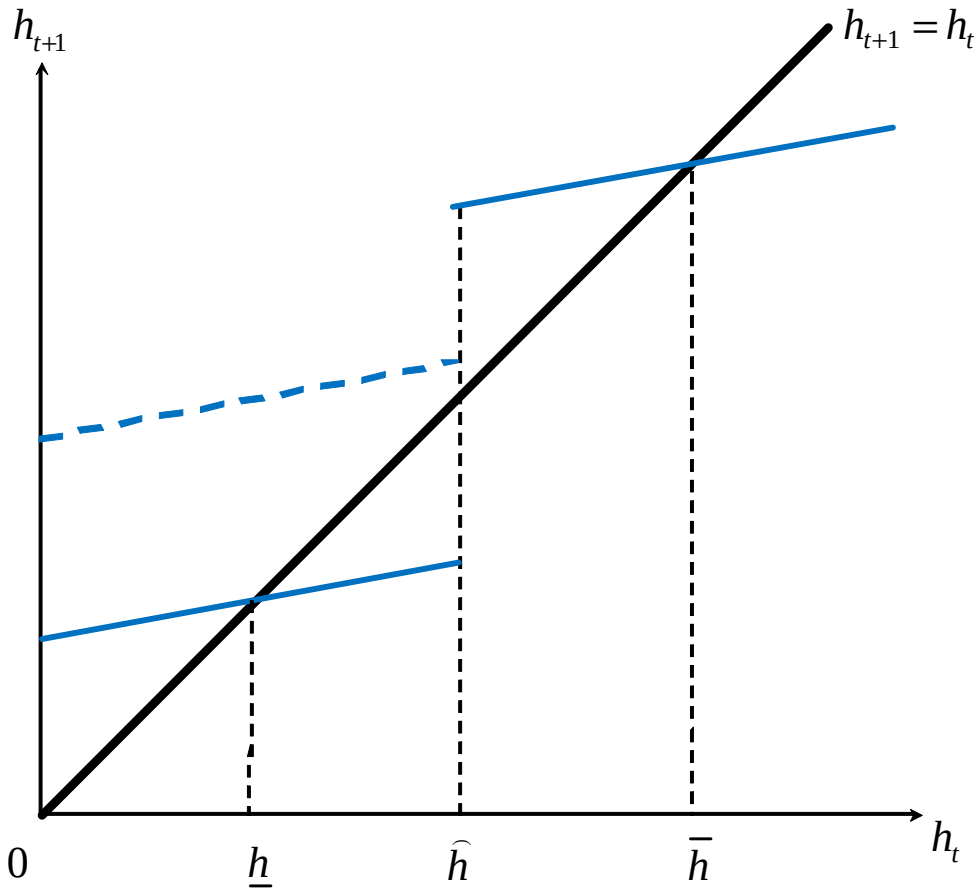

Figure 3: Human capital & poverty traps

- Let us examine what assumptions drive this kind of a poverty trap.

- We are assuming capital markets are perfect as far as k is concerned and that it can be bought, sold, rented and accumulated without any friction.

- The market for h is imperfect however, and that is clearly driving the results.

- If h could be bought or rented without any constraints, we would get unconditional convergence as we saw above.

- When h can only be autarchically "produced" by saving out of current output, this reflects a market failure that prevents individuals who have a higher endowment of human capital from transmitting it to children of families where parents have a lower endowment of human capital, e.g., through a perfect market for education.

- Alternatively, if h is interpreted as land and not human capital, the presumption is, a land-poor individual cannot rent or lease in land due to some institutional failure but it is possible to accumulate it by buying it from their savings.

- However, to the extent this input h can be accumulated through savings, capital market frictions implicitly show up, since what can be accumulated through savings can presumably be bought by a loan - restrictions on intertemporal transfers

Friction-driven Poverty Traps - Take Away Points

- First, no single friction is sufficient to trap individuals in poverty
  - Whether it is capital market frictions or restrictions on inter-temporal resource allocation as implied by the constraint that bequests have to be non-negative, we would require some other departure from the standard framework (e.g., non-convexities)
  - That is why the fact that some studies fail to find any direct evidence of lumpiness of investments *or* find that microfinance loans have not been effective in reducing poverty significantly, *alone* is not sufficient to conclude that there is limited empirical support in favour of poverty traps (as Kraay and McKenzie, 2014 argue).

- Second, if capital is the only input or all other inputs have perfect rental or sales markets so that capital is, in effect, a "sufficient" input (for example, in the presence of cash-in-advance constraints), then capital market frictions or restrictions on inter-temporal resource allocation are *necessary* for friction-driven poverty traps to emerge independent of any other frictions.

- Third, if inputs other than capital are needed for production (such as human capital or land) and these markets are subject to imperfections that cannot be overcome via the capital market, then direct intervention in the market of this input would be warranted.

3. Departures from 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 there is no external friction that can be potentially fixed to help people get out of a poverty trap.

- People are trapped in poverty because insufficient endowments (we focus on money, but it could alternatively be time or attention span) and not exogenous frictions that prevent them from making best use of their endowments through exchange in the marketplace.

- We avoid calling this class of poverty traps "behavioural" poverty traps because it may be confused with those arising from behavioural biases *only* (e.g., loss aversion, hyperbolic discounting).

- That is certainly a possible channel, but it is possible to generate these kinds of poverty traps with standard preferences as well, as the model below indicates (e.g., Banerjee and Mullainathan, 2010, and Bernheim, Ray, and Yeltekin, 2013).

- We call them scarcity driven poverty traps instead

Modifying the Benchmark Model

- Output is given by $q = Af(k)$ and that capital markets are perfect, and so 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

- As before, let us assume agents derive utility from consumption c and from bequest b.

- In addition, we allow individuals to consume a luxury good z.

- The utility function is given by:

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

- $B > 0$, $L > 0$, $\beta \in [0, 1]$, 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 $z = 0$.:

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

- We can think of c as basic consumption, b as money passed on to children, and z, a luxury good (durables, a vacation) which is not essential for survival but is consumed 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 finally, for high levels of income it is split between c, b, and z.

- Total income at time t is

$$y_t = \pi + rk_t$$

- As before, $k_{t+1} = b_t$.

- The budget constraint is

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

- It is straightforward to derive that there will be two income thresholds, $\underline{y}$ and $\overline{y}$, and corresponding thresholds for capital

$$\begin{aligned} \underline{k} &\equiv \frac{B - \beta\pi}{\beta r} \\ \overline{k} &\equiv \frac{(1+\beta)\, Z - \gamma B - \gamma\pi}{\gamma r} \end{aligned}$$

- We can show that

$$\overline{k} > \underline{k}$$

- Follows from our assumption

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

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

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

- Depicted in Figure 4

- We assume that $\frac{\beta}{1+\beta}r > 1 > \frac{\beta}{1+\beta+\gamma}r$ and $B - \beta\pi > 0$ (which is likely in economies with low productivity, namely, a low level of A) to generate a poverty trap.

- In particular, families that start poor (capital stock less than $\underline{k}$) don't save at all and therefore, have a steady state capital stock of 0, those who start with more than $\underline{k}$ grow rapidly up to the point where the saving rate falls (as luxury consumption kicks in) and they converge to a high capital stock (k^*)

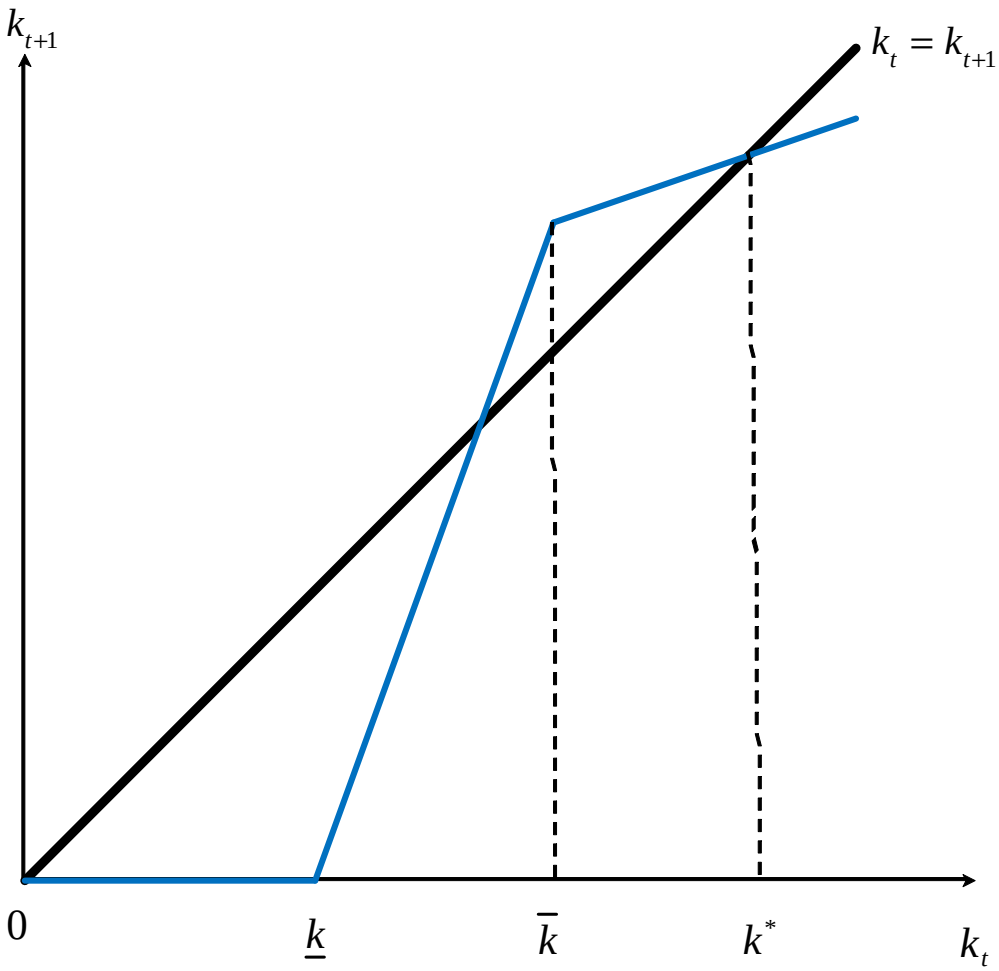

Figure 4: Income effects & poverty traps

- The sources for these kinds of poverty traps that emerge if choices are non-homothetic in income, can be more general than in 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.

- The budget constraint is:

$$c_t \leq w h_t \left(T - l_t\right)$$

- l_t is the time spent with children, and h_t is human capital at time t.

- w is the exogenously given wage rate per unit of human capital, so that someone with twice as much human capital will earn twice as much for the same amount of time spent working.

- Also, let $h_{t+1} = h_t l_t$ be the equation of motion of human capital

- Suppose preferences are similar as before:

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

- It is straightforward to check that, for low levels of h_t, individuals may choose $l = 0$ and we can have a poverty trap.

- One issue is the role of the non-negativity of b.

- Suppose we allow $b < 0$ (but less than $-B$)

- That is, parents can borrow against the earnings of their children which the children will have to pay off

- However, unless this borrowing can be used to invest in the human capital of children that will generate returns in the next period, this option cannot improve matters. In particular, now instead of $b = 0$, for low levels of assets, $b < 0$ will be a steady state under certain conditions.

- It is possible to extend the scarcity channel to consider how it interacts with insufficient intergenerational altruism, as well as various behavioural biases.

- Interpreting b broadly as any investment in the productive capacity or welfare of children, suppose society puts a greater weight (say, $\hat{\beta}$) on the welfare of children (or, in the case of gender bias, a greater weight on the welfare of female children) than parents do (namely, β) where $\hat{\beta} > \beta$.

- Paternalistic view - "I'm one of the undeserving poor: that's what I am. ...I don't need less than a deserving man: I need more. I don't eat less hearty than him; and I drink a lot more." *Pygmalion*, George Bernard Shaw, 1916.

- Given the income effect identified under the scarcity channel, we can readily see that the gap between the socially optimal level of investment and what will be chosen by parents will be larger, the poorer are the parents.

- Similarly, we can allow individuals to have behavioural biases in addition to the channel of limited time or attention span

- Has to be that not that only the poor are subject to these kinds of biases, but that low incomes exacerbate these biases, or, their negative consequences.

- Introduce an inessential consumption good (e.g., tobacco or alcohol) v and add the term $\delta \log(v + V)$ (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.

- By a familiar argument, individuals will spend all their income on c for very low levels of k, but now they will spend some of their income on v as k crosses a threshold, and only for a higher threshold they will choose a positive value of b.

- Earlier, a cash transfer to increase the financial resources of a poor family above $\underline{k}$ would be sufficient to help them escape the poverty trap but now, there is an intermediate range of k such that an unconditional cash transfer will partly get frittered away on v

Take Away Message - Scarcity-Driven Poverty Traps

- First, poverty traps can exist even without any external frictions due to the operation of strong income effects in the behaviour of individuals.

- Second, as the root cause of scarcity-driven poverty is scarcity, the most obvious policy implication is a lump-sum transfer to the poor but if there are external frictions to fix (say, in capital markets or in health or education) then these can go together, but there are likely to be strong complementarities between these kinds of policies

- Third, to the extent there are grounds for a paternalistic intervention, because the preferences of the individual is different from that of the policymaker (which can be due to behavioural biases or insufficient intergenerational altruism or gender bias), unconditional lump sum transfers may not be the most efficient form of intervention and there may be a case for other policy instruments (e.g., conditional cash transfers).

4. Theory to Policy

- Three broad categories of anti-poverty policies

1. Enabling the poor greater access to markets

2. Improving the access of the poor to public services and infrastructure

3. Explicitly redistributive in nature.

- All through, in discussing their relative merits we ignore implementation issues (e.g., targeting and self-selection) as well as externalities

Examples

- Reducing transactions costs in specific markets (e.g., savings, credit, insurance), providing inputs which are not readily available in the market (e.g., training specific skills), improving access to information, and reforming property rights.

- Various measures to improve accountability and reduce leakage and corruption in the provision of public services like health and education.

- Directly transferring resources to the poor, in cash or in kind.

- Forms of transfers
  - Cash transfers can be unconditional, or conditional on children attending school and family members receiving preventative health care (e.g., Progresa, renamed Opportunidades and now, Prospera, in Mexico, and Bolsa Familia in Brazil) or in-kind (e.g., food, sanitation, education, health services provided free or at a subsidized rate to the poor).
  - We will refer to the these as UCTs, CCTs, and IKTs.

Lesson 1: Other than access to capital and savings, or an UCT no other *single* intervention is likely to get rid of poverty traps.

- More broadly, this reflects the standard economic argument that unless we know what is the specific friction, it is best to leave it to the recipient to decide what she will do with the savings or loan, or the cash transfer.

- Only in an extreme case where some critical non-capital input (e.g., training or land) is not available in the market or is very costly, and the income generation technology is non-convex with respect to it, there are grounds for intervening directly to make that input accessible to help overcome poverty traps.

- This is one of the arguments behind the recent policy interest in UCTs.

- For example, the work of GiveDirectly in Kenya, a charity that gives no-strings attached cash grants, equivalent to almost two year's worth of local income, to the poor has received a lot of attention.

- While long term impacts are yet to be known, at least in the short-run the impacts are quite good in terms helping build assets, encouraging investment in and generating revenue from businesses (Haushofer and Shapiro, 2013).

- In addition, several studies using randomized field experiments have highlighted the importance of capital and access to a savings technology.

- A well-know study by De Mel et al (2008) have found high potential rates of return to capital in small business among Sri Lankan microenterprise owners that far exceed formal sector interest rates.

- Another important study show that providing access to non interest-bearing bank accounts led to significant increase in savings, productive investments and private expenditures (Dupas and Robinson, 2013).

Lesson 2: Even with these policies, at best poverty traps in a narrow sense will be eliminated, i.e., two individuals who, except for income or wealth, are identical will not end up very differently in the long-run. But if other markets are underdeveloped (e.g., acquiring skills), infrastructure is poor, then neither will do very well.

- In terms of our model the main problem is A is low, i.e., the problem of conditional convergence remains and individuals who are otherwise identical but live in better environments (in terms of market access, infrastructure) will do better.

- As noted above, cash transfers or facilitating borrowing or saving will have limited impact on incomes if markets for certain critical (non-capital) inputs are not developed.

- Ghatak, Mitra, Kumar (2014) who study the bicycle programme in Bihar found that the poorer sections, who lived in more remote areas with little market access did prefer in-kind transfers to cash.

- In such circumstances, a direct intervention in improving A (or, encouraging migration from a low A to a high A area) may be the best policy, and an excessive focus on poverty traps can distract our attention from this more basic problem.

- Indeed, even if there does not exist multiple steady states, the elasticity of response to changes in certain policies can be quite high.

- The steady-state level q is $q^* = (A)^{\frac{1}{1-\alpha}} s^{\frac{\alpha}{1-\alpha}}$, i.e., the steady state output is a *convex* function of A and so elasticity of response to policy changes could be quite high.

Lesson 3: A mix of interventions that relax the budget constraints of the poor *and* remove certain external frictions are likely to yield significantly high returns compared to an intervention that addresses only one of these problems

- For example, if we fix financial markets or give a large cash grant, and improve access to training or infrastructure, gains are likely to be much higher than these individual interventions.

- Recall from our model that $q = Af(k)$, i.e., k (or h) and A are complements.

- Indeed, Bandiera et al (2013) find that sizable transfers of assets and training to impart skills in Bangladesh enable the poorest women to shift out of agricultural labor and into running small businesses, which persists and strengthens after assistance is withdrawn, and leads to a 38% increase in earnings.

- Similarly, Blattman et al (2014) find that cash transfers coupled with business training very effective among impoverished Ugandan women.

- In contrast, McKenzie and Woodruff (2014) review training business owners from a dozen randomized experiments and find little lasting impact on profits or sales.

Lesson 4: Some interventions (e.g., credit, savings) are likely to have similar effects, and it is important to diagnose which constraint is more binding.

- For example, if the main problem facing the poor is they do not have access to a good savings technology (with or without self-commitment problems), then availability of small loans to be paid in short installments via microfinance may help them smooth consumption or purchase durables, but a better solution yet might be to improve their ability to save.

- Indeed, Dupas and Robinson (2013) find that the take-up for their savings package is very high (87%), in contrast to the relatively low take-up rate in most rigorous studies of microfinance (e.g., 27% in the study by Banerjee et al (2014) of a microfinance in India) and this suggests that access to a good saving technology may be a higher priority for the poor.

Lesson 5: CCTs may be preferred to UCTs when the individual's preference and the policymakers preference differs.

- Could be due to the presence of behavioural biases (e.g., excessive weight on temptation goods or present consumption), insufficient intergenerational altruism, or gender bias

- Even though there isn't that much evidence that the poor fritter the money away (Evans and Popova, 2014), there is fairly compelling evidence that CCTs are more effective than UCTs in raising educational outcomes.

- Baird et al (2013) studied twenty-six UCTs, five UCTs, and four programmes that ran both in parallel and found that school enrolment rose by 41% on average across all the CCT programmes, while under the UCT programmes, the increases was 25%.

- This does not necessarily mean CCTs are better in welfare terms than UCTs, but as with taxes or subsidies on a specific good or service, it does affect behaviour through the standard combination of price and income effects.

- Also, if the amount the poor invest on children (b in our model) depends on income (y) or wealth (k) in a way that is convex over some region, then given the complementarity between A and k noted above, combining a UCT with a policy that directly tackles a friction on the supply side (say, better schools or health facilities) or raises overall productivity A, is likely to yield higher returns than a policy (with a comparable budget) that makes a cash transfer conditional on individuals undertaking a certain minimum investment in b.

- However, if indeed the underlying grounds for paternalism are strong or externalities are significant, then arguments in favour of CCTs continue to be valid.

Extensions

1. Restrictions on Inter-Temporal Transfers

- There is a sense in which we are assuming an inter-temporal capital market imperfection when discussing technological non-convexities in physical or human capital.

- Since saving out of income does help accumulate h or k, in principle, individuals could be forward looking, and as capital markets are being assumed to be perfect, they should be able to borrow and/or save at temporarily high rates to get over the hump at $\hat{h}$

- Suppose individuals live for two periods, and x must be invested in the current period to be of productive use in the next period.

- In the current period, individuals are endowed with an exogenous level of capital x_0 and rental markets are not useful given the lagged nature of the production process.

- Therefore, current output is $q_0 = Af(x_0)$ and the next period output is $q_1 = Af(x)$ where x is chosen by the individual.

- We can view x as physical or human capital, although the particular lag structure suggests human capital to be a better example.

- Individuals value present and future consumption c_0 and c_1 and the utility function is

$$\log c_0 + \beta \log c_1.$$

- We could interpret c_1 as the consumption of next generation, in which case savings should be interpreted as bequests.

- The intertemporal budget constraint in this two period model is

$$c_0 + \frac{c_1}{r} + x \leq q_0 + \frac{q_1(x)}{r}.$$

- The budget constraint can be written as

$$c_0 + \frac{c_1}{r} \leq q_0 + \frac{q_1(x)}{r} - x$$

- It follows immediately that independent of their preferences over present and future consumption, individuals will choose x to maximize their lifetime resources.

- The optimality condition in the choice of x is

$$Af'(x) = r.$$

- The result holds even if the production technology is non-convex with respect to x.

- Suppose investment is a binary decision $x \in \{0, 1\}$ and the cost of investment is normalized to 1.

- Without investment, output is q_0 but with investment, it is $q_0 + \triangle$.

- This is similar to the model with human capital that we saw above - so long as $\triangle > r$ individuals would undertake the investment.

- To the extent bequests are required to be non-negative, this puts a constraint on inter-temporal resource allocation which is separate from what is usually meant by capital market frictions.

- Even if capital markets are perfect as such, in most societies negative bequests are not permissible by law and violations of this are considered morally offensive, such as bonded labour.

- Coupled with other frictions (e.g., non-convexities in the production technology), this can lead to poverty traps.

- This is an extension of the **separation** result mentioned in the core-model to a two-period setting - with perfect markets, individual preferences or endowments should not affect the efficiency of resource allocation

- You can separate redistributive considerations from efficiency considerations

- Also, implicitly assumes that consumption decisions (c_0 or c_1) do not affect $q_1(x)$ - if it does, then separation breaks down.

- In the above model, let $q_1(x)$ be $q_1(x, c_1)$ instead (interpretation - efficiency wages)

- Immediately, initial wealth will matter for x as it affects c_1 and c_2

2. Fully Forward-Looking Preferences

- A reasonable question to ask is, rather than having warm-glow type preferences where parents care about the bequests they pass on to their children, suppose they cared about the utility of their children (Barro-Becker altruistic preferences)

- By a standard recursive argument becomes equivalent to an individual maximizing the present discounted value of the utility stream of current and future generations in a forward-looking way.

- To the extent unless present consumption exceeds a certain level, individuals fail to put any weight on the utility of the next generation, the possibility of no bequests at low levels of income will continue to hold.

- There are several ways of modelling this, e.g., follow Uzawa (1968) where the poor are assumed to discount the future too heavily.

- Alternatively, one could introduce a probability of survival from period to period that depends on consumption, and only when consumption exceeds some minimum level, it takes the value of 1 (Chakrabarty, 2012).

- Suppose the individual maximizes

$$\sum_{t=0}^{\infty} \beta^t \ln(c_t)$$

subject to

$$a_{t+1} = (1+r)(a_t + y - c_t).$$

- The Euler equation is

$$\frac{c_{t+1}}{c_t} = \beta(1+r).$$

- If β is less than $\frac{1}{1+r}$ then he will run down his assets, with falling consumption levels, and will eventually just consume at the subsistence level

- If β is greater than $\frac{1}{1+r}$ then he will accumulate assets, with rising consumption levels

- If β depends on c we can readily see the possibility of multiple steady-states.

3. **Occupational Choice Model with Borrowing Constraints**

- **Beyond Solow**: **Occupational Choice Model with Borrowing Constraints:**

- Banerjee-Newman, 1993; Galor-Zeira, 1993

- We do the version in Ghatak and Jiang (JDE, 2002)

- Infinitely lived families, each generation lives for one period

- Population is size is normalized to 1, no population growth.

- Start of with wealth endowment of a_{it} & labor endow. of 1.

- Split end of period income into consumption $c_{it} = (1 - s)y_{it}$ & bequest $b_{it} = sy_{it}$ for next generation, which then becomes their initial endow. a_{it+1}.

- Save £1, get £$(1 + r)$ in the next period.

- Suppose there are three occupations:

- Subsistence: requires no investment, only labor, produces $\underline{w}$

- Worker: work for someone else at market wage w

- Entrepreneur produces q units of output using
  - Capital $I > 0$ (for training or buying a machine)
  - Two units of labor (his own labour and one hired labourer).

- The entrepreneurial technology is more efficient: $q - rI > 2\underline{w}$.

- A key assumption here is the presence of a technological indivisibility

Occupational Choice

- (a) Subsistence : The agent earns some income by using her labor endowment to produce $\underline{w}$ with the subsistence technology. She puts her inherited wealth in the bank, which yields $ra_{i,t}$. Therefore her income is

$$y_{i,t}^{S} = \underline{w} + ra_{i,t}.$$

- (b) Worker : The agent works for an entrepreneur for wage income w_t (which is determined endogenously). She puts her inherited wealth in the bank, which yields $ra_{i,t}$. Therefore her income is

$$y_{i,t}^{W} = w_t + ra_{i,t}.$$

- (c) Entrepreneur : The agent invests an amount I to start a firm and hires 1 worker to produce an output q with certainty. Her job is to monitor the worker. The agent's income as an entrepreneur is the output of the project less wage and capital costs:

$$y_{i,t}^{E} = q - w_t + r(a_{i,t} - I).$$

Credit Markets

- Enforcement Problem. A borrower may default on her loan (namely, $r(I - a)$), but the cost of this action is that she gets caught with some probability π & then has to pay a fixed non-monetary cost of F due to imprisonment or social sanctions.

- Thus only those individuals get loans whose wealth satisfies the incentive compatibility constraint (ICC):

$$\begin{aligned} (\ q - w_t) - r(I - a_{i,t}) &\geq (q - w_t) - \pi F \\ \text{or, } a_{i,t} &\geq I - \frac{\pi F}{r}. \end{aligned} \tag{1}$$

  Set $\pi = 0$ for notational simplicity, so no borrowing possible.

Labor Market & Static Equilibrium

- The wage rate at which entrepreneurs are indifferent between working as wage laborers or hiring workers is given by

$$\overline{w} = \frac{q - rI}{2}.$$

- Labor supply:

$$\begin{aligned}
0 \text{ if } w_t &< \underline{w} \\
[0, G_t(I)] \text{ if } w_t &= \underline{w} \\
G_t(I) \text{ if } w_t &\in (\underline{w}, \overline{w}) \\
[G_t(I), 1] \text{ if } w_t &= \overline{w} \\
1 \text{ if } w_t &> \overline{w}.
\end{aligned}$$

- Labor demand:

$$\begin{aligned} 0 \text{ if } w_t &> \overline{w} \\ [0, 1 - G_t(I)] \text{ if } w_t &= \overline{w} \\ 1 - G_t(I) \text{ if } w_t &< \overline{w}. \end{aligned}$$

- They look odd, but they have the standard slopes (driven entirely by extensive margin, no intensive margin effect)

- Generically, two types of equilibria, high wage & low wage, depends on wealth distribution. See Figures 5 and 6.

Bequests and Dynamics of Wealth Distribution

- With the knowledge of an individual's occupational choice and that the wage rate can take only two values ($\underline{w}$ and $\overline{w}$), we can write down the difference equations describing the evolution of a dynasty i's wealth as:

$$\begin{aligned} a_{i,t+1}(a_{i,t} \mid w_t = \underline{w}) &= s[ra_{i,t} + \underline{w}] && \text{if } a_{i,t} < I \\ &= s[r(a_{i,t} - I) + \ q - \underline{w}] && \text{if } a_{i,t} \geq I \\ a_{i,t+1}(a_{i,t} \mid w_t = \overline{w}) &= s[ra_{i,t} + \overline{w}] && \forall a_{i,t}. \end{aligned}$$

- Assume $sr < 1$ to make sure these are stable.

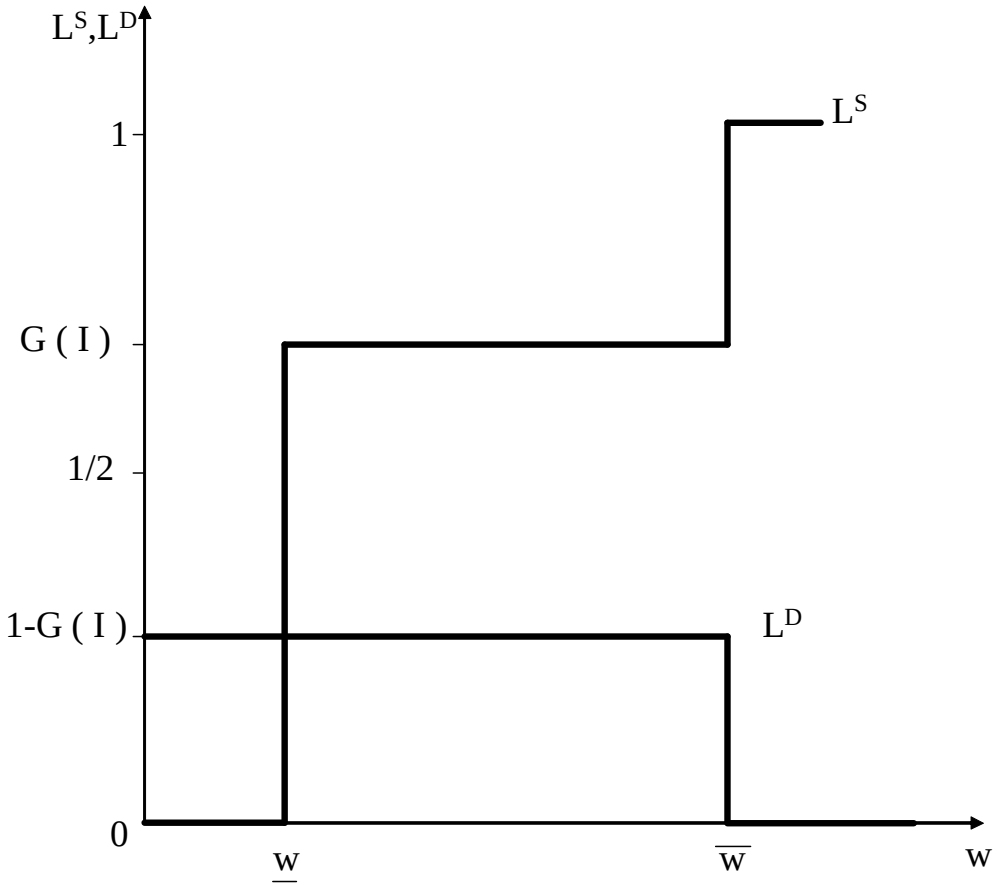

Fig 5: Low wage equilibrium

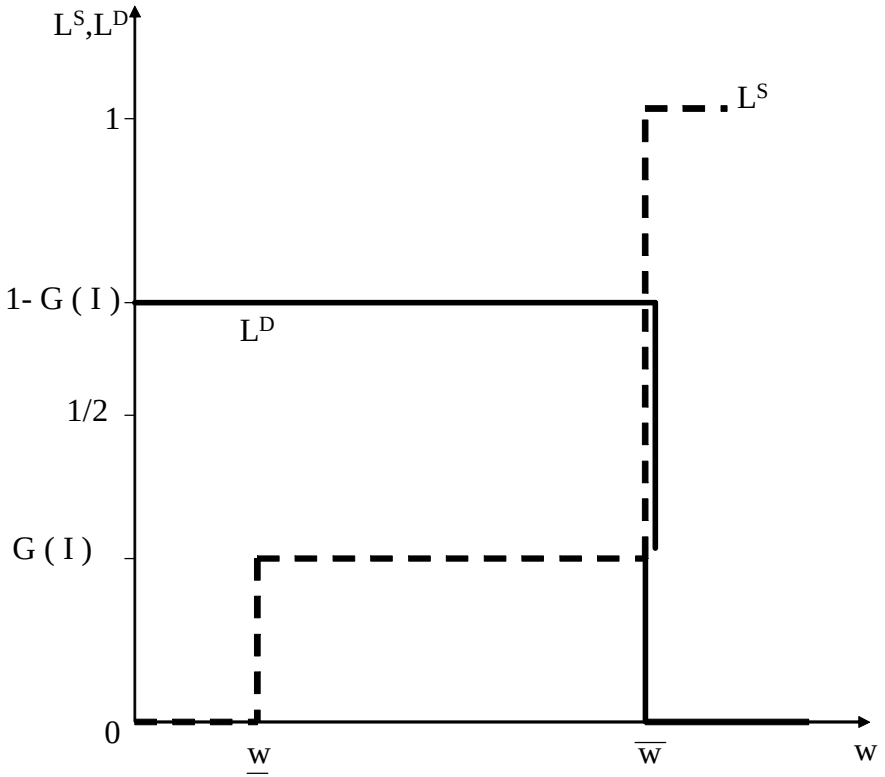

Fig 6: High wage equilibrium

Long Run Behavior of Economy

- Let $a^J(w)$ be the stationary point of the difference equation describing the wealth transition of a dynasty engaged in occupation J (where $J = S, W, E$ denotes the three occupations : subsistence, worker and entrepreneur) when the wage rate is w.

- Then we have

$$\begin{aligned} a^S(w) &= \frac{s\underline{w}}{1-sr} \text{ for all } w. \\ a^W(\underline{w}) &= \frac{s\underline{w}}{1-sr} \\ a^E(\underline{w}) &= \frac{s(q-rI-\underline{w})}{1-sr} \\ a^W(\overline{w}) = a^E(\overline{w}) &= \frac{s(q-rI)}{2(1-sr)}. \end{aligned}$$

- By Assumption 1, $a^E(\underline{w}) > a^E(\overline{w}) = a^W(\overline{w}) > a^W(\underline{w})$.

- Its best being an entrepreneur when the wage is low, and its worst being a worker in this case

- If the wage is high, its the same whether you are entrepreneur or worker, but this must lie between the above two thresholds

- Given that the difference equations are stable, we should be able to predict the long run wealth distribution and the long run equilibrium wage rate

- Bad news: the transition equations depend on the wage rate, & they in turn depend on the wealth distribution (non-linear)

- Good news: we can show that the wage rate can change at most once.

- If w is constant then we have a simple linear system

- Intuition: there is no relative downward mobility.

- If dynasty i is richer than j at time t, the same holds at time $t + 1$

- So can focus just on the median dynasty.

- But if this dynasty is poor at time t & becomes rich at $t+1$, the high wage will be reached, & it will stay rich in the future as well

- Analogously, if this dynasty is rich at time t & becomes poor at $t+1$, the low wage will be reached, & it will stay poor in the future as well.

- This means

Proposition 1: Given any initial wealth distribution, there exists a unique stationary wealth distribution to which it converges.

- Once the initial distribution is given, there is only one wage that can prevail in the long run, & so we can work out the long run distribution

- This is good news, but it does not say that there is a unique stationary wealth distribution for any given wealth distribution

- What it says is that there cannot be any cycles - once you have a initial distibution, there is a unique stationary state the system will head toward

- But there can be several stationary states overall

- For the same parameters regarding technology $(q, \underline{w}, I)$, preferences (s) & markets (π, F) what wage (high/low) will result & so which long run distribution you converge to depends on the initial distribution.

- This is characterized in

Proposition 2 : The initial distribution of wealth matters in determining the stationary distribution of wealth and the long run equilibrium wage rate if and only if

$$s(\ q - \underline{w}) \geq I \geq \frac{s\underline{w}}{1 - sr}.$$

Otherwise the economy converges to a high wage equilibrium (if $I < \frac{s\underline{w}}{1-sr}$) or a subsistence equilibrium (if $I > s(\ q - \underline{w})$) irrespective of initial conditions.

- Where do we get these inequalities from?

- $s(\ q - \underline{w}) \geq I$ is equivalent to $a^E(\underline{w}) = \frac{s(q - rI - \underline{w})}{1 - sr} \geq I$.

- $I \geq \frac{s\underline{w}}{1 - sr}$ is equivalent to $a^W(\underline{w}) \leq I$.

- In Figure 7 (a) we depict a situation where long run equilibrium has low wages, high inequality and low levels of per capita income

- In Figure 7 (b) we depict a situation where long run equilibrium has high wages, zero inequality and high levels of per capita income

- What is interesting is, if the condition mentioned in Proposition 2 holds, then for the same set of parameters, both types of long run equilbria are possible

- If you started unequal (in particular, $G(I) > \frac{1}{2}$), you end up as in Figure 7(a)

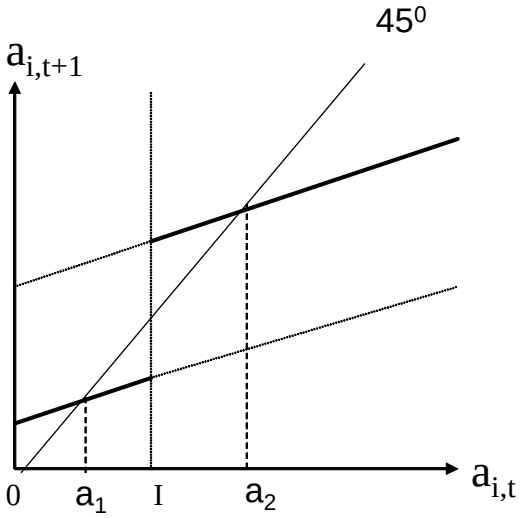

Fig. 7(a)

($w_t=\underline{w}$)

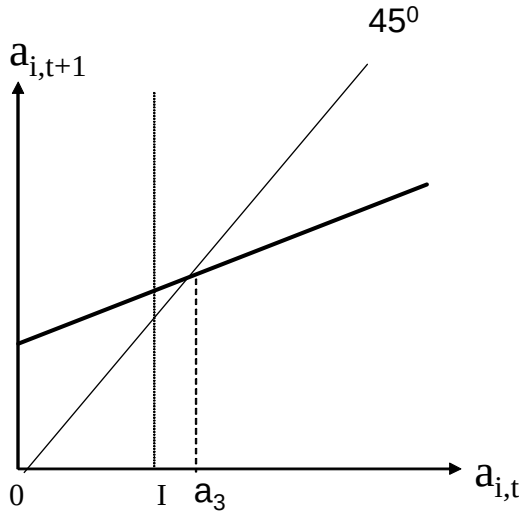

Fig. 7(b)

($w_t=\overline{w}$)

- If you started equal (in particular, $G(I) \leq \frac{1}{2}$), you end up as in Figure 7(b)

- Big implication: History matters i.e. convergence may not occur

- If you start too unequal, the wage will be low, upward mobility will be low & so converge to a low wage equilibrium with a small class of rich people & a large class of poor people.

- We don't need endogenous wages for this story: add a skilled wage w_s and an unskilled wage w_u and suppose I is the cost of getting skill

- Then can tell a similar story

- Here endogenous wages are accentuating the problem

- What parameters make "poverty traps" more likely?
  - Obvious ones: high I, low q, low s.
  - Less obvious: high $\underline{w}$. While it makes upward mobility for the very poor easier, it makes capital accumulation for the rich harder.
  - Also, if you increase F or π then capital market will improve.

- Now we formally prove why inequality can hurt development if capital markets are imperfect:

Proposition 3 : For parameter values for which initial conditions matter, the greater is the fraction of the population who are initially poor, the lower is steady state income.

- Total income of the economy:

$$Y = G(I)w + \{1 - G(I)\}\{\ q - w - Ir\}$$

- Decreasing in the number of non-entrepreneurs (workers + subsistence earners)

- Several implications are worth noting:
  - Credit market imperfections have real costs - long run per capita GNP is lower.
  - One shot policies can permanently raise the total income of the economy.
  - Lower per capita income is also associated with greater inequality so that redistribution can improve efficiency.
- Banerjee and Duflo (2003): negative relationship between growth and inequality lagged by one period
- Greater inequality - less investment - lower growth (consistent with above model)

- Policy Implications
  - Use of lotteries. ROSCAs an example.
  - Redistribution: can't be any redistribution, only those that aim to increase the number of entrepreneurs.
  - Credit subsidies
  - Improving institutions so that credit market works better - better courts, better titles (the de Soto effect)