Development Economics (EC9C0)

Week 1: Poverty

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EC9C0: Intro

Welcome to EC9C0!

The plan for Part 1 of the module

- Week 1: Poverty
- Week 2: Firms
- Week 3: Workers
- Week 4: Climate change
- Week 5: Gender and social protection

Assessment for Part 1

- A referee report of a development economics paper of your choice related to one of the six research areas above;
- A two-page research idea related/building on/inspired by this paper.

This assessment is due on 23 April 2025, at 12pm.
E-submission on Tabula.

You are encouraged to discuss your choice with me first (you can book a slot *here*).

Teaching

- Lectures on Tuesday 12-2pm and Thursday 2-4pm;
- Highly interactive
  - In the first few lectures, we will have open discussion of key questions;
  - We will then try a few mock referee reports / research ideas.

Let’s start with today’s topic.

Poverty is one the greatest problems of our times

- We live in a world of plenty.
- But many people do not enjoy high living standards, nor the freedoms and comforts that come with them.
- The UN has set the goal of ending extreme poverty by 2030.

$\rightarrow$ Understanding how policy can help people escape poverty is one of the most important tasks of economics.

Our approach

We will use a mix of theory, methods and empirical evidence:

- We will explore how poverty is measured and how it has been changing
- We will discuss key theories of poverty and derive their policy implications
- We will discuss the main methods available to test these theories empirically and to evaluate related policies
- We will critically analyze the results of key studies

Roadmap

Definition, measurement, correlates and trends

Anti-poverty interventions and their impacts

A model of poverty trap based on asset accumulation

Discussion

Papers to read

What is poverty?

In these lectures, we will define poverty as not having sufficient economic resources to meet one's basic needs.

$\rightarrow$ We will equate poverty with low consumption.

This is not the only way to define poverty:

- We can instead focus on the capabilities that people have (e.g. the ability to live a healthy life) or on their perceptions.
- Or we can measure people's relative standing in society.

However, this approach has been hugely influential!

The Economist

JUNE 1ST–7TH 2013

economist.com

Why Washington would have hated DC

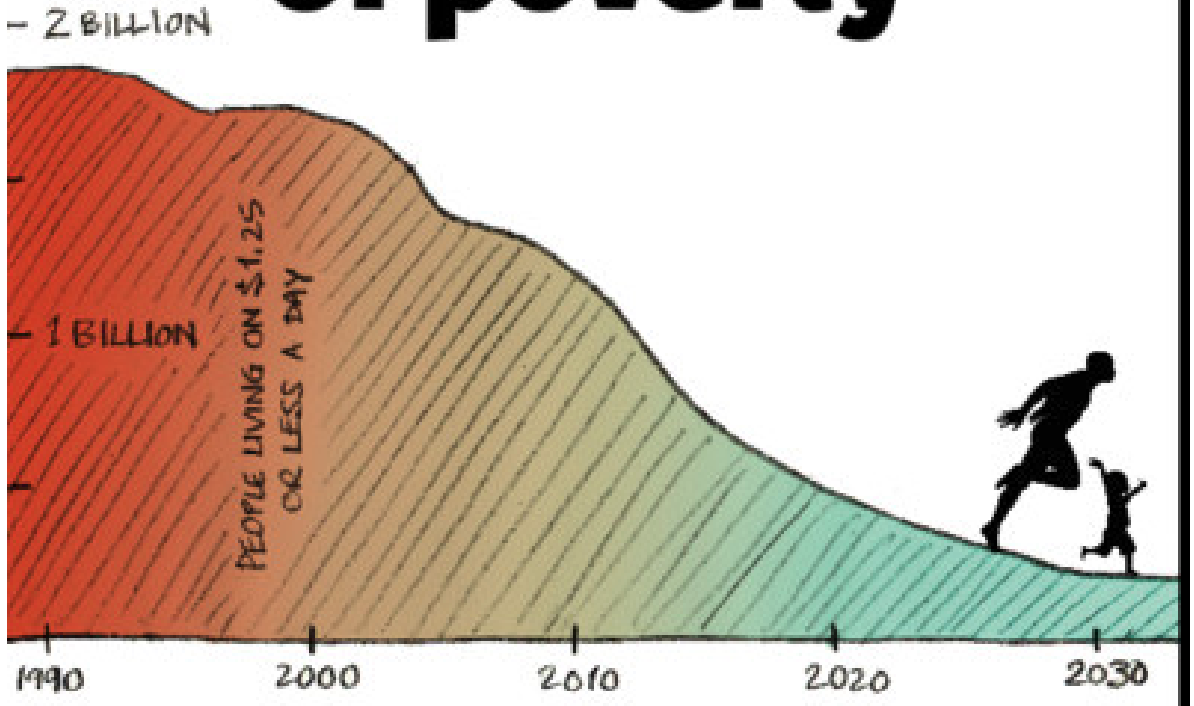
Liberalism's British comeback

Electric-car flops

Shadow banking in China

Firms that will fly you to Mars

Towards the end of poverty




end poverty
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The poverty-line approach

One reason for the popularity of this approach is that it suggests a simple and transparent way of measuring poverty.

The key decision to be made is where to set the 'poverty line' z.

All adult individuals who consume less than z per day are considered 'poor'.

Three intuitive measures of poverty

Assume there are n people, and each person has consumption x_i, there are q people for whom $x_i < z$, and $x_i^* = min(x_i, z)$.

The **poverty rate** q/n measures the *incidence* of poverty.

The **poverty gap** $\frac{1}{n}\sum_n \frac{z-x_i^*}{z}$ measures the *intensity* of poverty.

The **squared poverty gap** $\frac{1}{n}\sum_n (\frac{z-x_i^*}{z})^2$ gives greater weight to the poorest of the poor.

(If you want to learn more about these measures and their alternatives, watch this video)

What poverty line should we use?

In 1990, the World Bank set a poverty line of 1 USD worth of consumption per day (PPP, 1985 prices).

This was calculated by taking the average between the poverty lines of 8 different low-income countries.

This is a very low poverty line, capturing extreme poverty: the inability to secure basic nutrition and shelter.

In 2015, the line was revised to 1.9 USD per person per day (PPP, 2011 prices).

The correlates of poverty

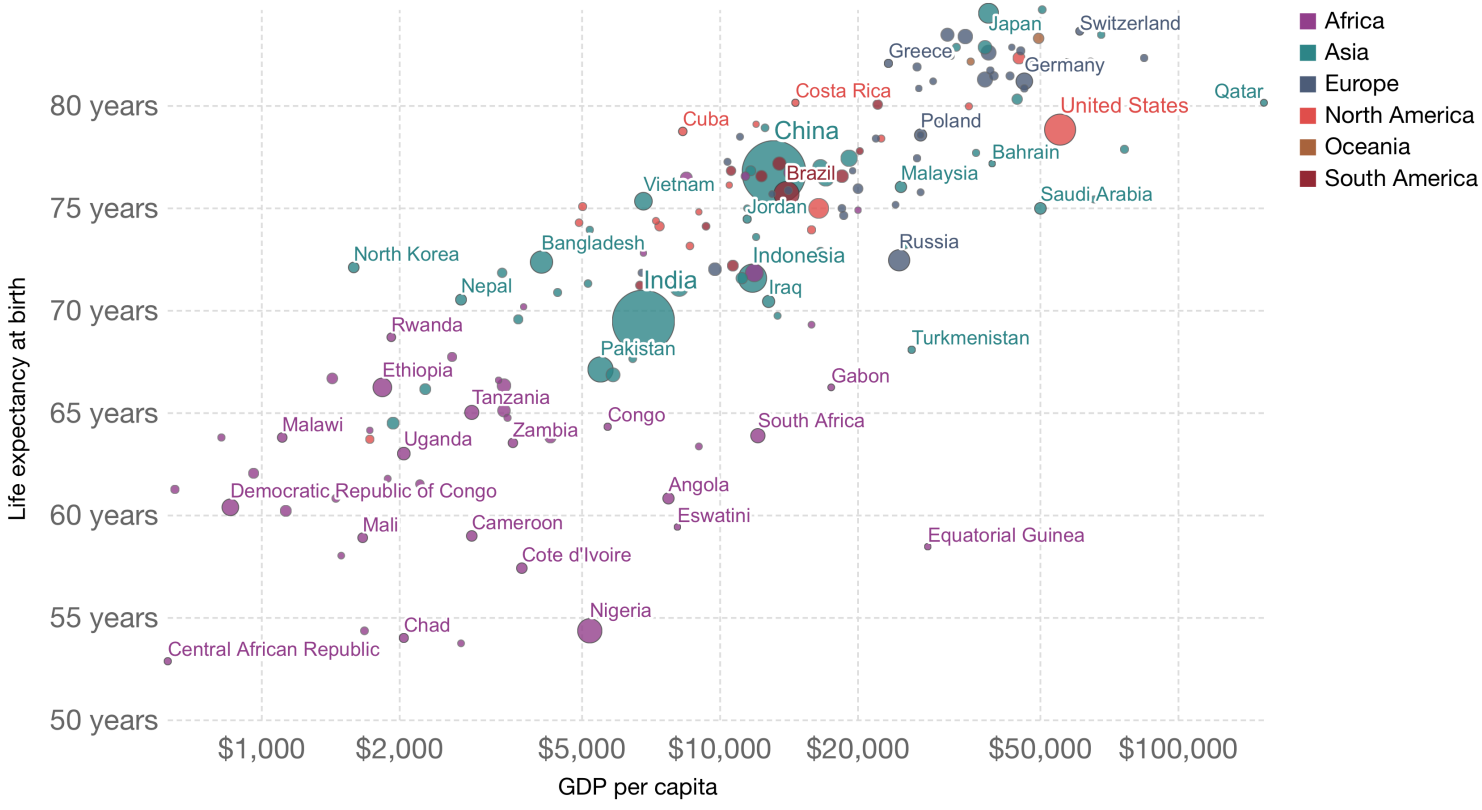
As you may expect, living with such low level of consumption takes a very big toll on people.

Poverty is typically associated with:

- malnutrition,
- low levels of education,
- low access to electricity,
- poor health.

Life expectancy vs. GDP per capita, 2018

GDP per capita is measured in 2011 international dollars, which corrects for inflation and cross-country price differences.



Source: Clio-Infra & UN Population Division, Maddison Project Database 2020 (Bolt and van Zanden (2020))
OurWorldInData.org/life-expectancy • CC BY

What type of economic lives do people live on less than 1$ a day?

Banerjee and Duflo (2007) document how individuals below a 1.25$-a-day poverty line earn their income and spend their money (using household surveys from 13 different countries).

Some key findings include:

- The poor are often engaged in self-employment.
- Multiple, low-scale-low-return activities.
- Limited access to credit, savings and insurance markets.
- Frequent short-term migration.

More recent evidence suggests that the poor also have limited access to labor markets.

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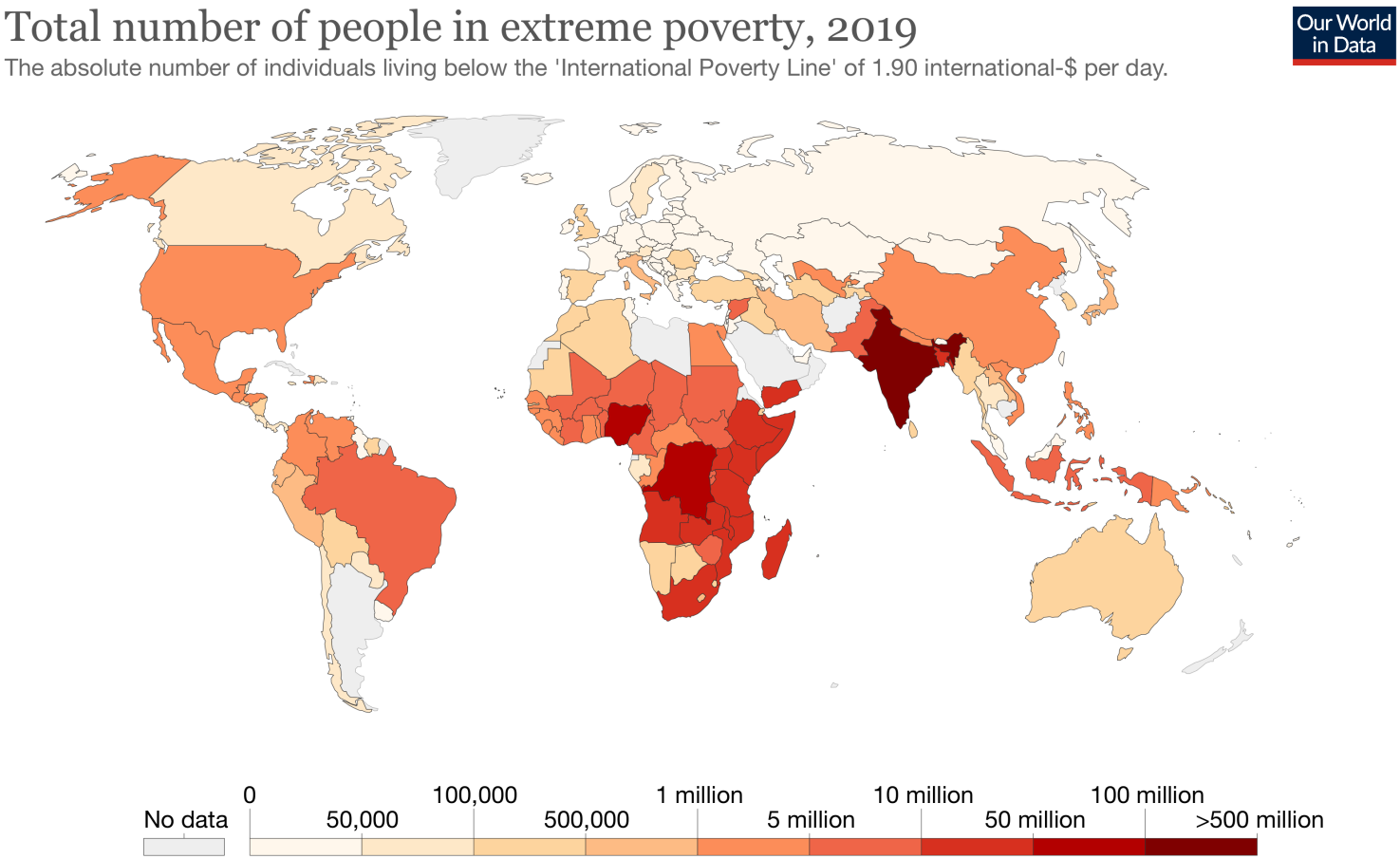
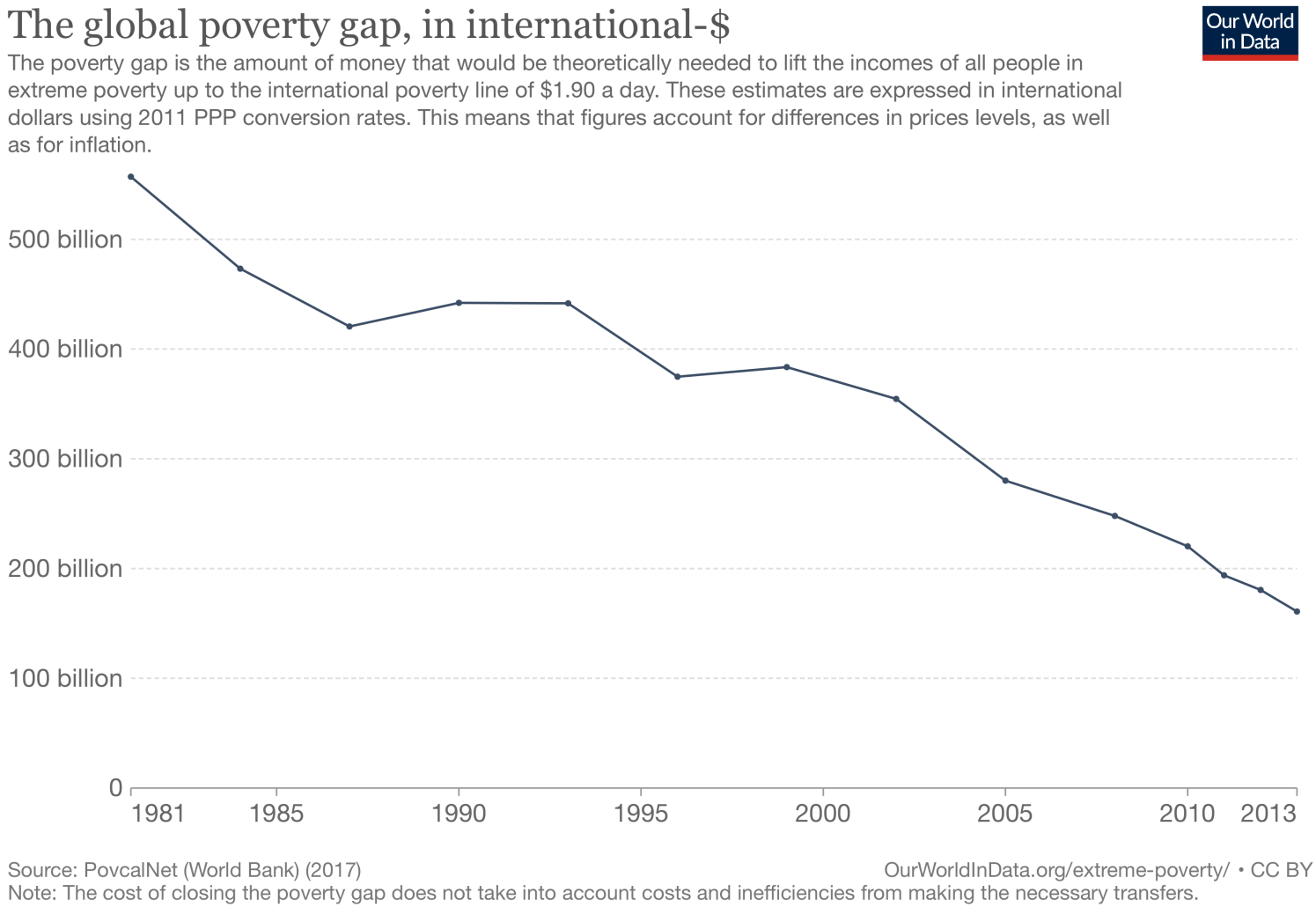
In 2019, about 650 million people (8.4% of the world population) lived on less than 1.90$ a day

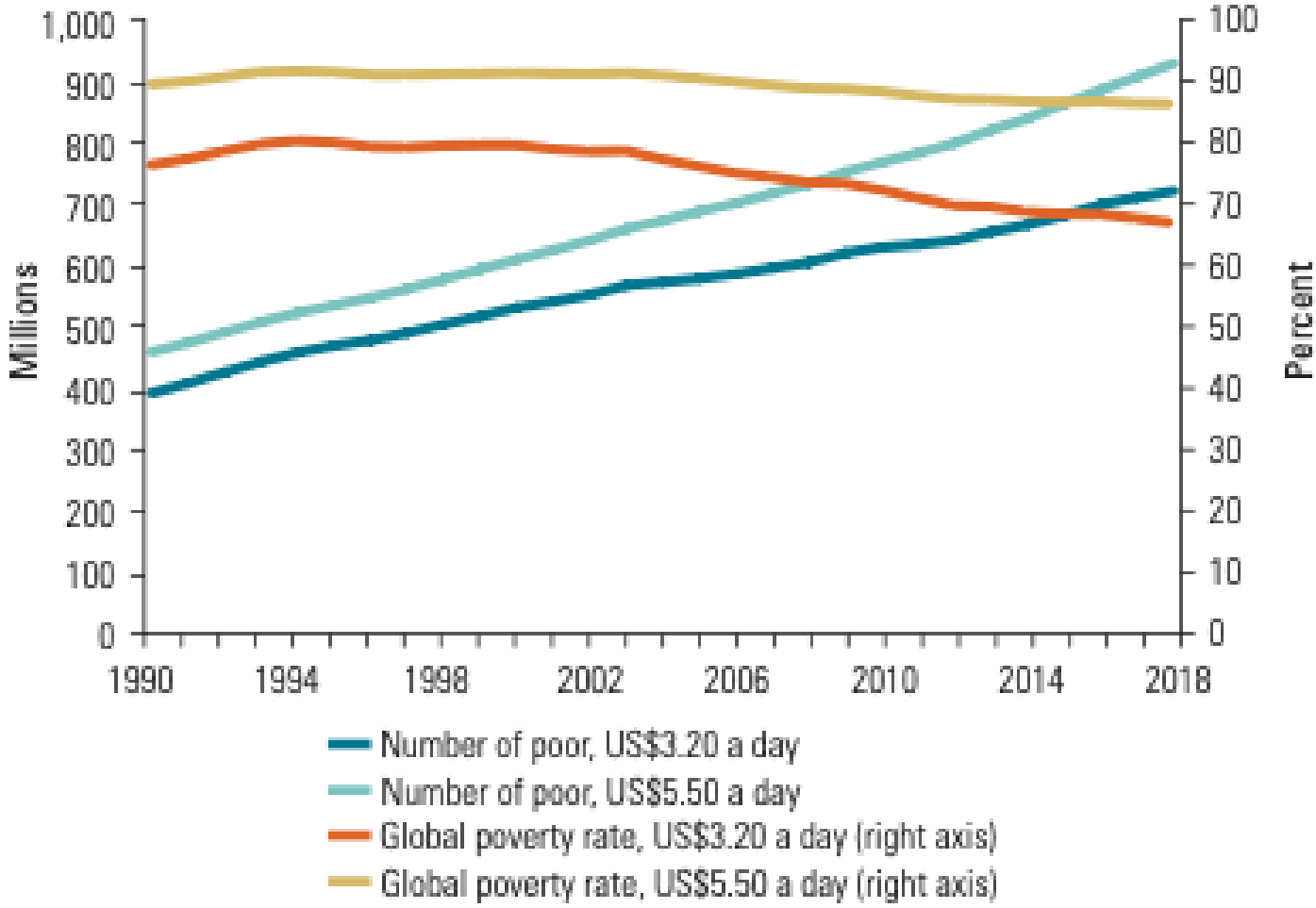


Closing the poverty gap would cost less than 200 billion per year

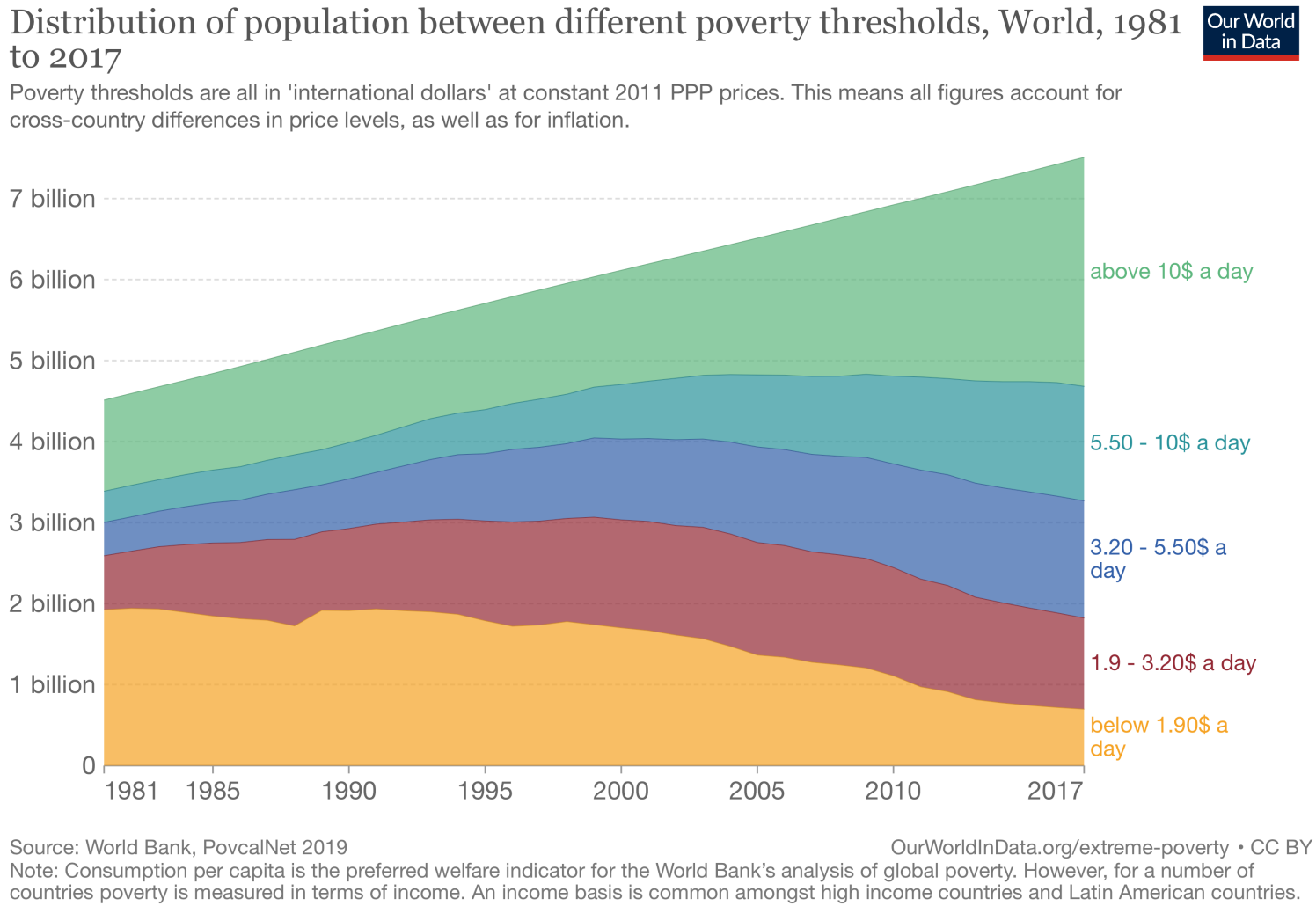


More than 90% of the world population lives on less than 5.5$ a day

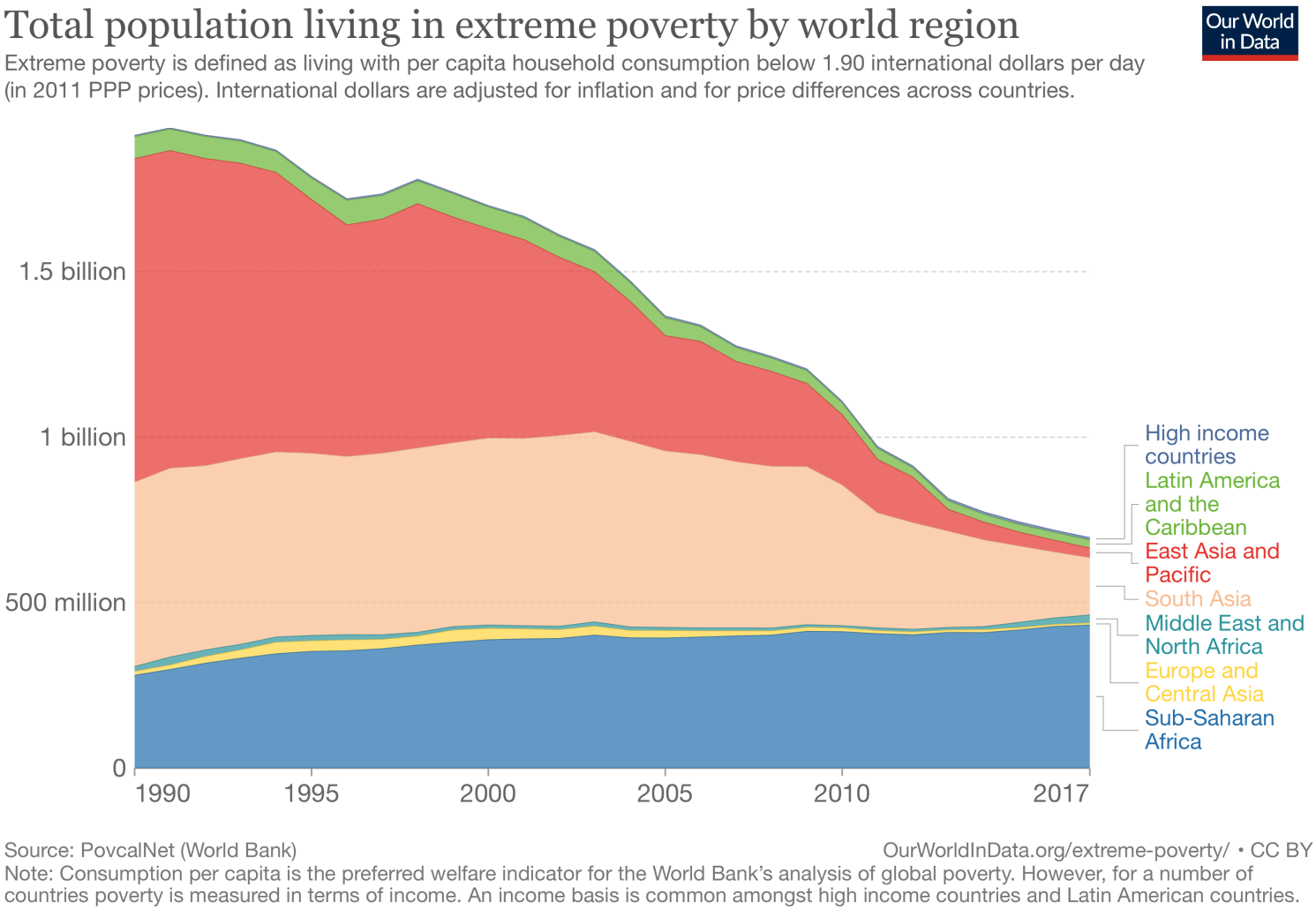
FIGURE 1.9 Poverty Rates and Number of Poor, US$3.20-a-Day and US$5.50-a-Day Poverty Lines, Sub-Saharan Africa, 1990–2018



The rate of poverty and the number of people living in poverty has been falling rapidly, for any poverty line

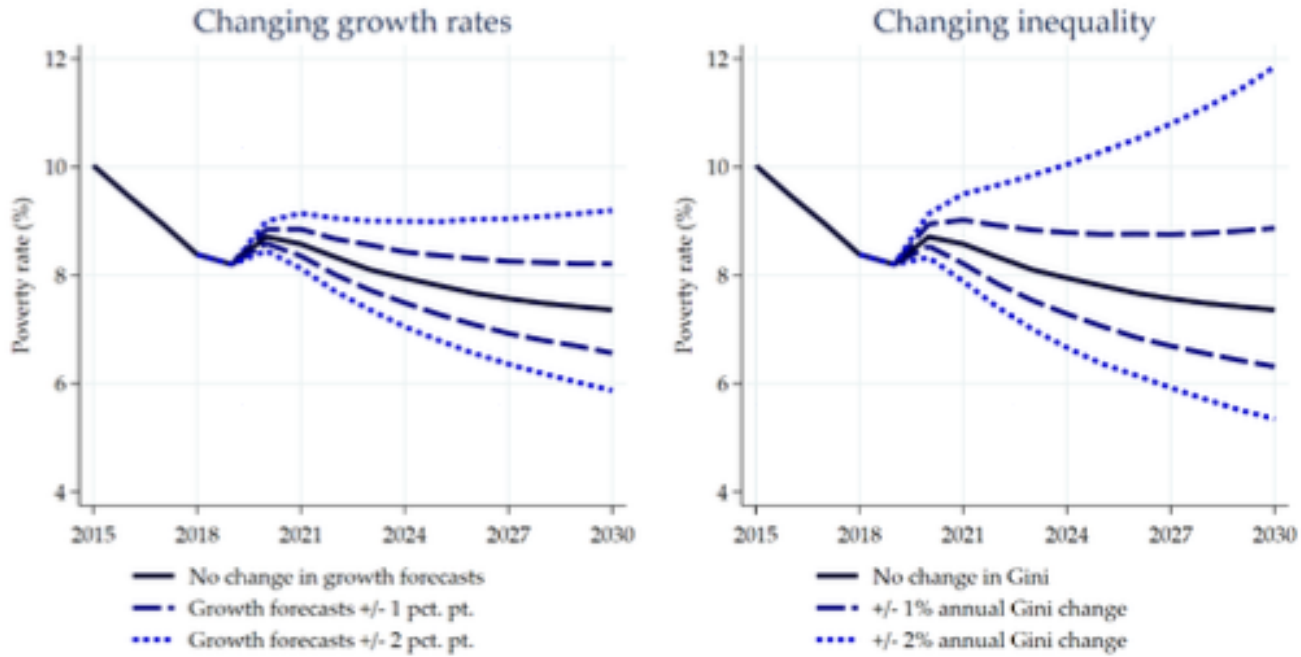


But the decline in extreme poverty is slowing down



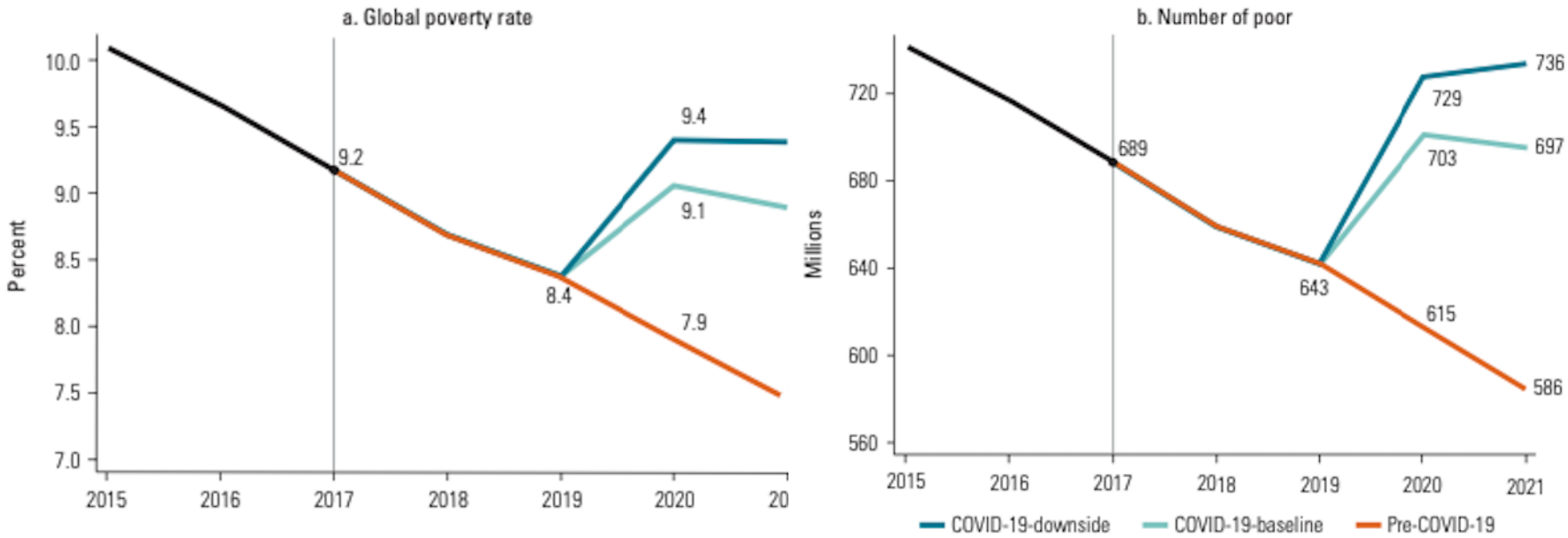
And the world is not on track to meet the goal of ending extreme poverty by 2030

Figure 7: Simulations of global poverty under different growth and Gini scenarios



This figure is from Lakner et al. 2020

COVID and climate change are compounding the problem



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Three types of interventions to combat poverty

We will look at:

1. Cash transfers (focus on *financial capital*);
2. Graduation (focus on *physical capital* and *occupation*);
3. Deworming (focus on *human capital*).

1. Cash transfers

- Blattman et al. (2014) evaluate the impacts of the YOP program through an RCT (an unsupervised cash transfer worth 1 year of income).
- Sample: 535 groups of young people who applied and were eligible for the program. Group participants earn on average 1$ a day.
- Half these these groups where randomly selected to receive the program.
- The other half receives no transfer

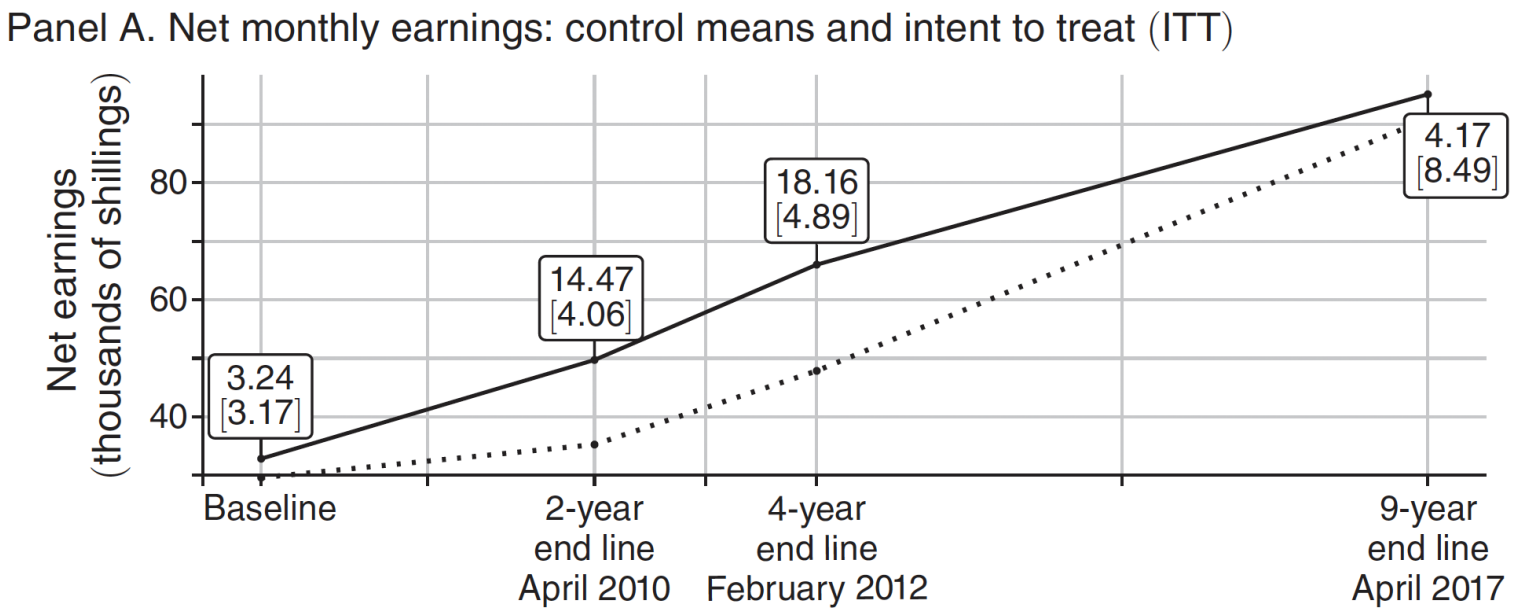
Key results

TABLE III

DESCRIPTIVE STATISTICS AND INTENT-TO-TREAT ESTIMATES OF PROGRAM IMPACT ON KEY OUTCOMES

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	2010 (2-year endline)				2012 (4-year endline)			
			ITT, with controls				ITT, with controls	
	Control mean	Obs	Coeff.	Std. err.	Control mean	Obs	Coeff.	Std. err.
Transfers								
Treated (group received YOP cash transfer)	0.000	2,677	0.886	[0.019]***				
Received non-YOP transfer or program	0.160	2,005	0.015	[0.019]	0.016	1,868	0.026	[0.009]***
Value of non-YOP program (000s 2008 UGX)	23.0	2,005	61.8	[19.082]***				
Investments								
Enrolled in vocational training	0.152	1,999	0.532	[0.023]***				
Hours of vocational training received	49.0	1,999	340.5	[22.521]***				
Business assets (000s 2008 UGX)	290.2	2,005	377.0	[78.217]***	392.8	1,868	225.0	[62.601]***
Employment								
Average employment hours per week	24.9	2,005	4.1	[1.070]***	32.2	1,864	5.5	[1.284]***
Agricultural	13.9	2,005	−1.2	[0.755]	18.8	1,864	0.4	[0.945]
Nonagricultural	11.0	2,005	5.3	[0.867]***	13.5	1,864	5.1	[0.998]***
Skilled trades only	2.9	2,005	4.7	[0.612]***	2.8	1,864	3.8	[0.548]***
No employment hours in past month	0.100	2,005	−0.011	[0.015]	0.05	1,868	−0.022	[0.009]***
Engaged in any skilled trade	0.170	2,005	0.272	[0.025]***	0.22	1,868	0.261	[0.026]***
Works ≥ 30 hours a week in a skilled trade	0.04	2,005	0.054	[0.013]***	0.03	1,868	0.037	[0.013]***

Long term impacts in Blattman et al. (2020)



2. Graduation programs

- Banerjee et al. (2015) evaluate the impacts of a 'graduation program' designed to tackle extreme poverty.
- They run RCTs in 6 different countries (Ethiopia, Ghana, Honduras, India, Pakistan, Peru), with 10,400 participants.
- Study participants are identified using Participatory Wealth Ranking. 48% of them consume less than 1.25$ per day.
- They interview participants three times: (i) before the start of treatment, (ii) a few months after treatment ends, (iii) more than a year after treatment ends.

The intervention

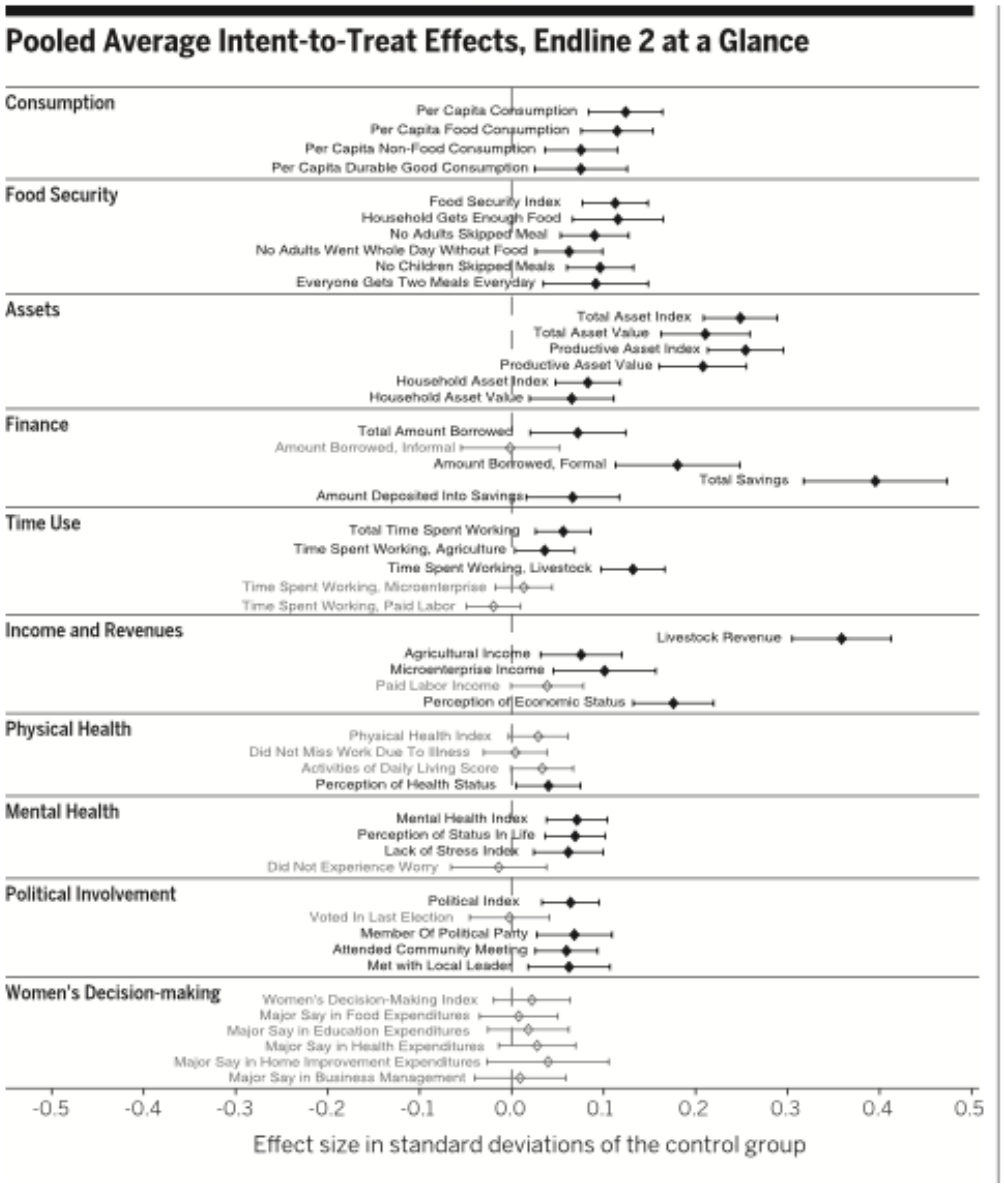
The treatment group is offered an intervention that includes:

- a productive asset (often livestock)
- cash or food support to consumption
- training on how to use the productive asset
- basic health education
- regular visits
- a savings account

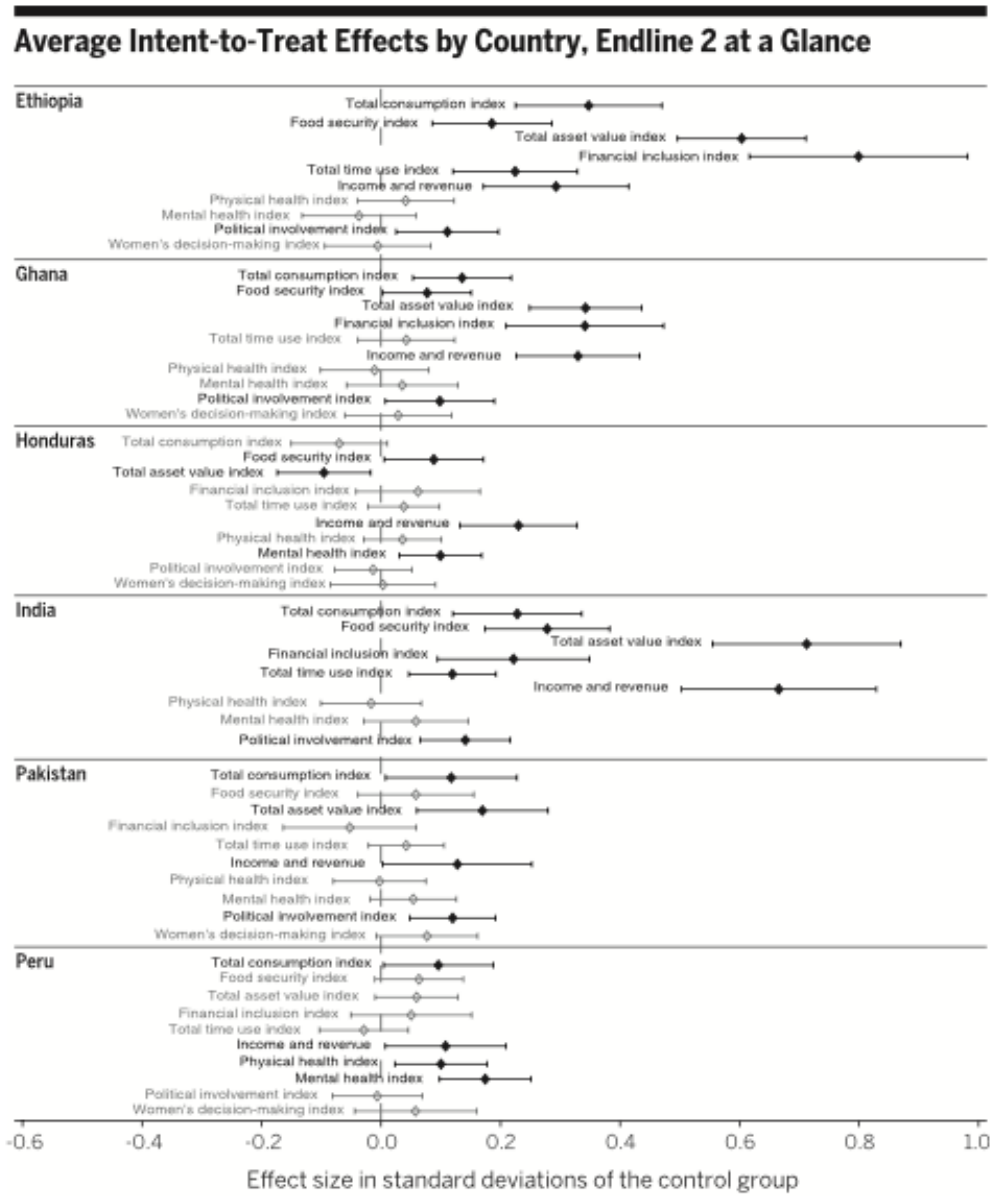
The control group is not offered the program.

This is a costly, ‘big-push’ program, motivated by a poverty-trap model of poverty.

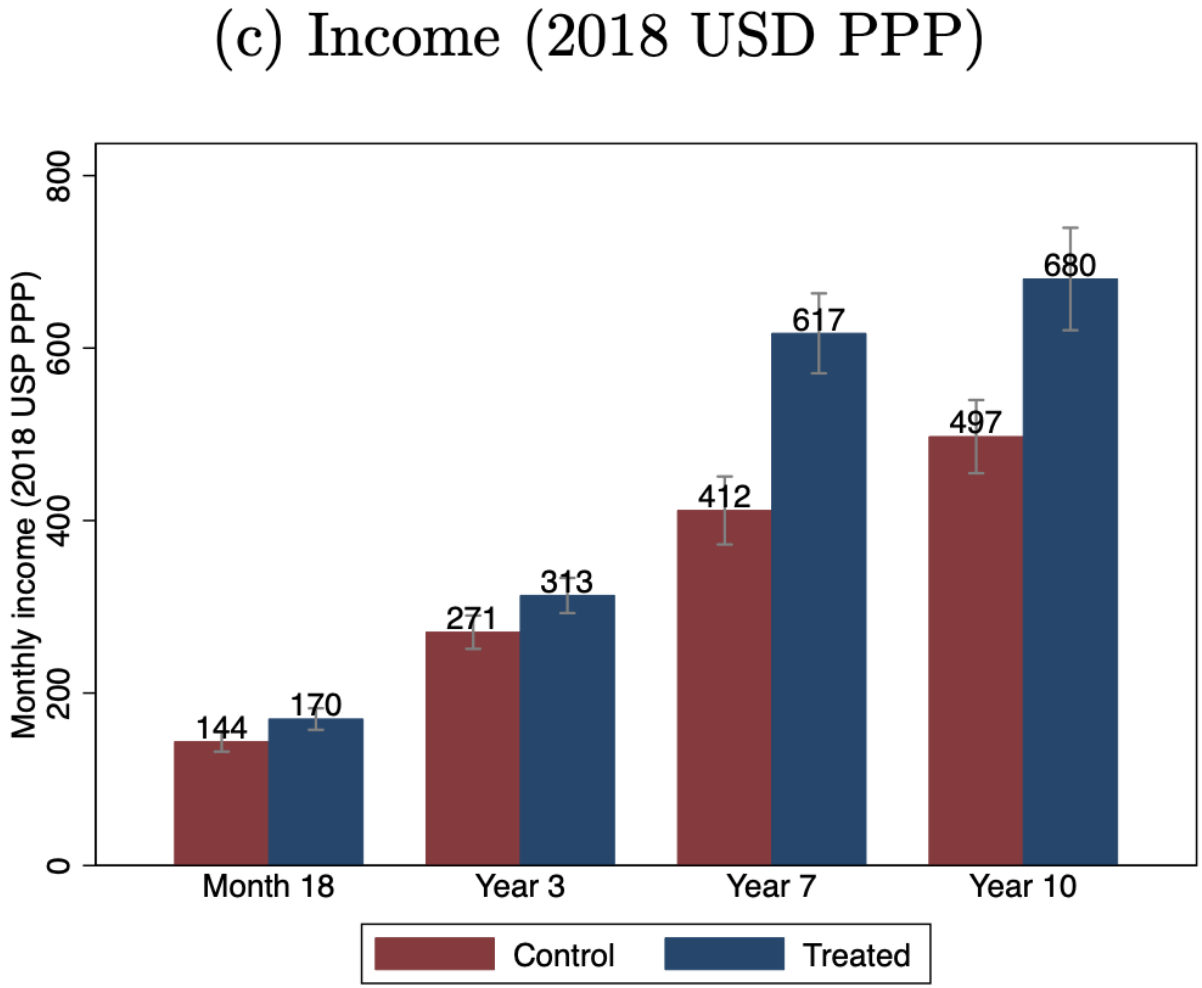
The results for the pooled sample



The results country-by-country



Long term impacts for India in Banerjee et al 2020



3. Deworming

- Hamory et al. (2021) evaluate the impacts of a deworming intervention offered 20 years ago to selected schools in Kenya.
- They use an RCT: 50 schools were randomly selected to receive 2/3 years of additional deworming treatment for their students.
- 25 control schools did not receive the intervention.
- Hamory et al. run surveys 10, 15 and 20 years after treatment, and manage to track 86 percent of the original study participants at least once.

Channels of impact

- Intestinal worm infections affect one out five individuals in the world.
- They have a number of serious direct health consequences for children: they can reduct growth, cause weakness and anaemia.
- They also can have serious indirect consequences, mainly, they reduce schooling attendance (Kremer and Miguel 2004)
- One year of treatment for one student costs 1 $.

Impacts 10 to 20 year after treatment

Table 1. The 10- to 20-y deworming treatment effects on consumption and earnings, KLPS-2, KLPS-3, and KLPS-4

	(1) Full sample	(2) Female	(3) Male	(4) Older	(5) Younger
A: Annual per capita consumption (KLPS-3 and KLPS-4)					
Treatment (λ_1)	305*	89	513*	886***	−179
	(159)	(134)	(304)	(223)	(185)
Control mean	2,156	1,715	2,594	1,908	2,381
Treatment effect (%)	14.15	5.21	19.76	46.44	−7.52
Treatment *P* value	0.058	0.505	0.096	0.000	0.337
FDR q value	0.132	0.630	0.623	0.001	0.290
Number observations	4,794	2,473	2,321	2,402	2,341
B: Annual individual earnings (KLPS-2, KLPS-3, and KLPS-4)					
Treatment (λ_1)	80	41	118	258**	−75
	(76)	(62)	(133)	(108)	(100)
Control mean	1,218	674	1,728	1,177	1,242
Treatment effect (%)	6.53	6.02	6.84	21.93	−6.07
Treatment *P* value	0.297	0.515	0.376	0.019	0.451
FDR q value	0.175	0.630	0.630	0.030	0.292
Number of observations	13,624	6,826	6,798	6,791	6,780
C: Annual per capita household earnings (KLPS-4)					
Treatment (λ_1)	239*	36	439*	565**	−22
	(129)	(107)	(252)	(232)	(171)
Control mean	1,296	973	1,623	1,082	1,501
Treatment effect (%)	18.44	3.68	27.06	52.17	−1.48
Treatment *P* value	0.069	0.738	0.086	0.017	0.897
Number of observations	4,074	2,099	1,975	2,039	1,982

A summary of the interventions

Paper	Intervention	Population	Cost	Time frame	Δ π	Δ c
Blattman et al.	Cash transfer	Young poor, Uganda	Large	4 year	38%	0.18 SD
Blattman et al.				9 year	≈ 0	≈ 0
Banerjee et al.	Asset transfer	Poor in 6 countries	Large	2 year	37%	5% (0.12 SD)
Banerjee et al.				10 year	0.3 SD	0.6 SD
Hamory et al.	Deworming pill	School children, Kenya	Very small	20 year	18%	14%

Are these results surprising? Do they tell us anything about the nature of poverty?

In the next section, we will explore a model proposed in Ghatak (2015) that will help us answer this question.

The model will show what economic environments trap people in poverty.

Roadmap

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A model of poverty trap based on asset accumulation

- Asset accumulation without a poverty trap
- A poverty trap determined by external constraints

Discussion

Papers to read

A benchmark model without poverty traps

- A representative agent uses capital k to produce output q. She has an initial capital endowment of $\bar{k}$.

- Two key assumptions:
  1. There are no market frictions. E.g. capital can be borrowed.
  2. Returns to capital are diminishing.

$\rightarrow$ In this model, the poor operate efficiently and eventually escape poverty.

$\rightarrow$ Poverty interventions can speed-up this process, but in the long-run make no difference to the distribution of income.

The one-period version of the model

$$q = Af(k) \tag{1}$$

where A is technology and f is a standard production function.

The rate of interest is r. Profits are given by $Af(k) - rk$.

k^* is the capital level that maximises profits.

Given perfect capital markets, we have these three results:

- The agent uses capital level k^*. If $k^* - \bar{k} > 0$, she borrows capital; If $k^* - \bar{k} < 0$ she lends capital.
- The agents' *profits* are $\pi(k^*) = Af(k^*) - rk^*$.
- Her *income* is given by $y = \pi(k^*) + r\bar{k}$.

Key lessons of the one-period model

1. Differences in endowments $\bar{k}$ do not affect profits, only differences in technologies do.

2. Differences in endowments affect income.

$\rightarrow$ If you redistribute endowments, you will change incomes but not profits.

An infinite-horizon model

Assume a constant saving rate s. Capital changes over time according to this transition equation:

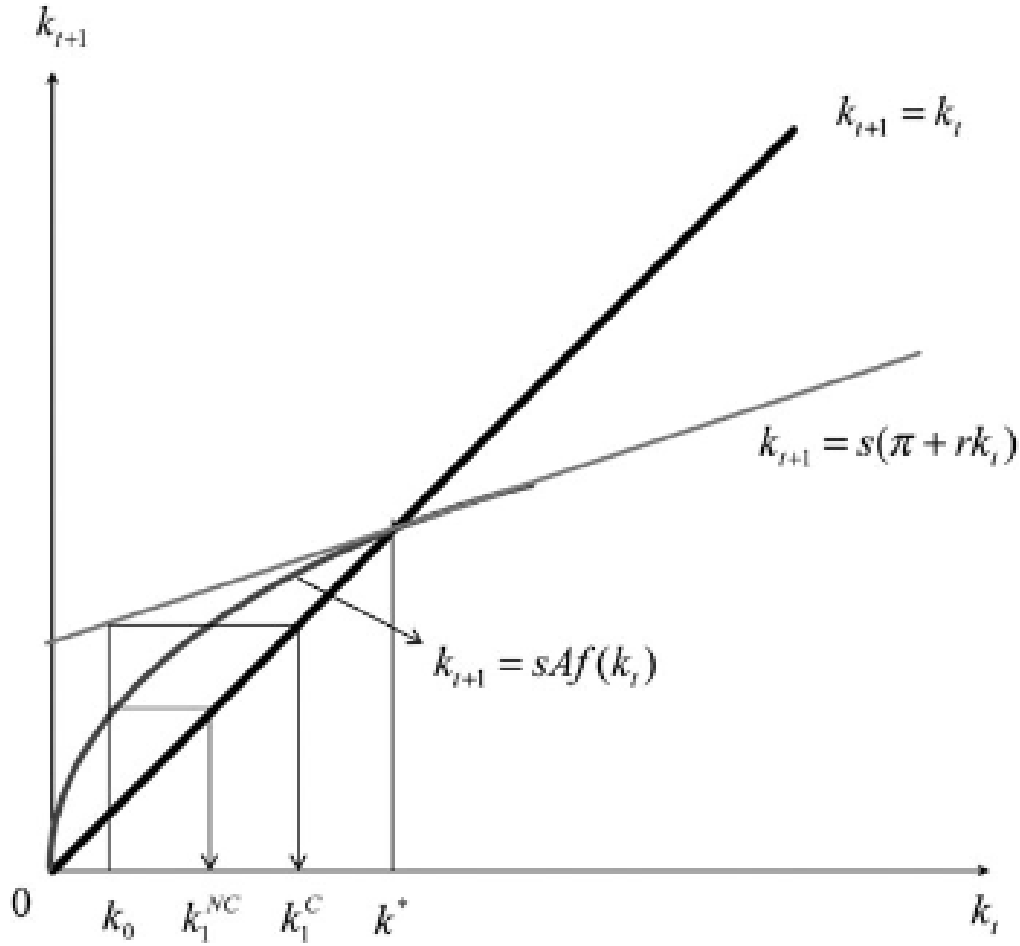
$$k_{t+1} = s(\pi + rk_t) \tag{2}$$

The stead-state level of capital is given by:

$$k^* = \frac{s\pi(k^*)}{1 - sr} \tag{3}$$

And thus, in steady state, income is given by:

$$y = \pi(k^*) + rk^* \tag{4}$$


k_{t+1}
$k_{t+1} = k_t$
$k_{t+1} = s(\pi + rk_t)$
$k_{t+1} = sAf(k_t)$
0
k_0
k_1^{NC}
k_1^{C}
k^*
k_t

Key lessons of the infinite-period model

1. Over time, the poor accumulate capital and converge on the efficient capital stock.

2. Differences in endowments do not affect long-run income.

$\rightarrow$ If you redistribute endowments, you will change short-term incomes but not long-run incomes.

$\rightarrow$ If you redistribute endowments, you will not change profits.

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We will consider two external constraints

1. Capital market imperfections: it is not possible to borrow.

2. Non-convexities in production: e.g. returns-to-scale make production at low scale inefficient.;

These constraints are ‘external’ in the sense that they relate to markets and technologies.

Introducing capital market imperfections

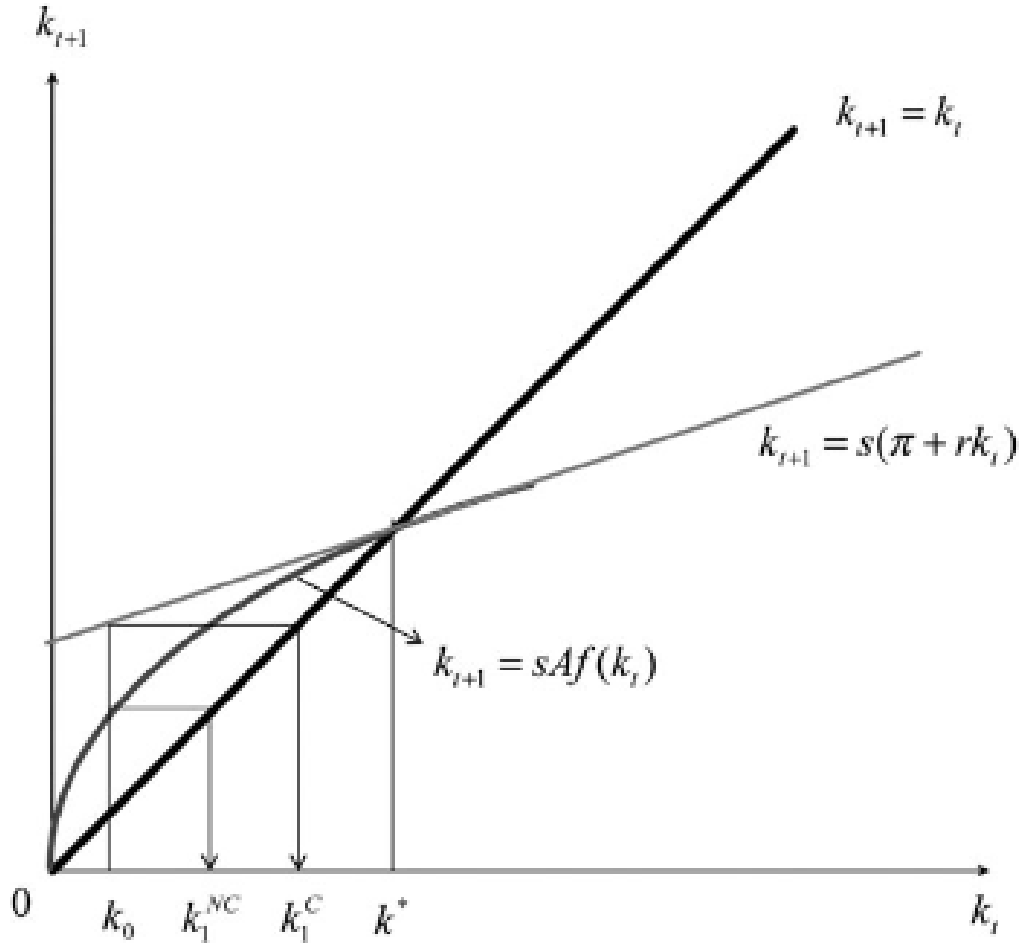
Suppose agents cannot borrow or lend. So, at time t, k_t is used in production. If $k_t < k^*$, the agent operates at an inefficient scale.

Capital now changes according to:

$$k_{t+1} = s(Af(k_t)) \tag{5}$$

Gradually, the capital stock grows to reach k^*.

The profits and incomes of the poor are only temporarily low.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0
k_0
k_1^{NC}
k_1^{C}
k^*
k_t

Introducing non-convexities

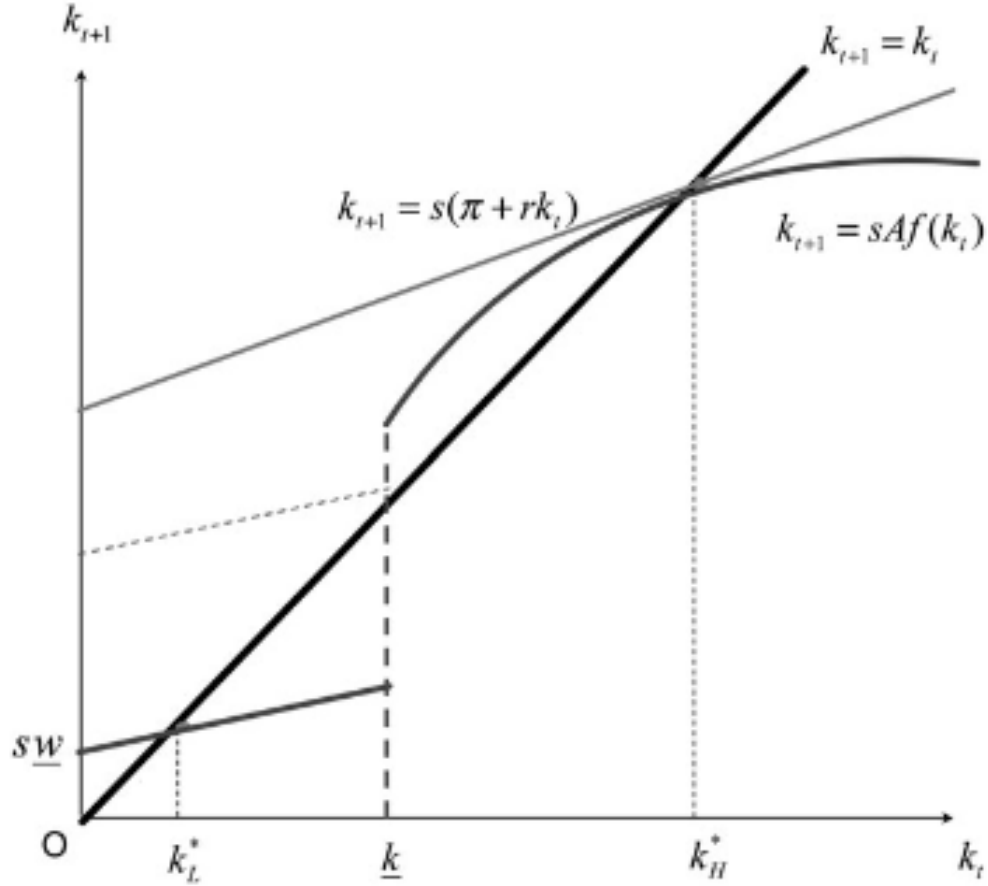
Suppose now that capital markets work smoothly, but that agents have the following production function:

$$q = \begin{cases} Af(k_t) & k_t \geq \underline{\text{k}} \\ \underline{\text{w}} & \text{otherwise} \end{cases} \tag{6}$$

$\underline{\text{k}} < k^*$ is the minimum level of capital to make production viable. Below $\underline{\text{k}}$, the agent gets a minimum return $\underline{\text{w}}$ for their labor.

If capital markets are perfect, this will not generate a trap.

Poor agents will borrow capital to operate at k^*, and will steadily accumulate own capital.


k_{t+1}
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$k_{t+1} = s(\pi + rk_t)$
$k_{t+1} = sAf(k_t)$
$s\underline{w}$
O
k_L^*
$\underline{k}$
k_H^*
k_t

Combining imperfect capital markets and non-convexities

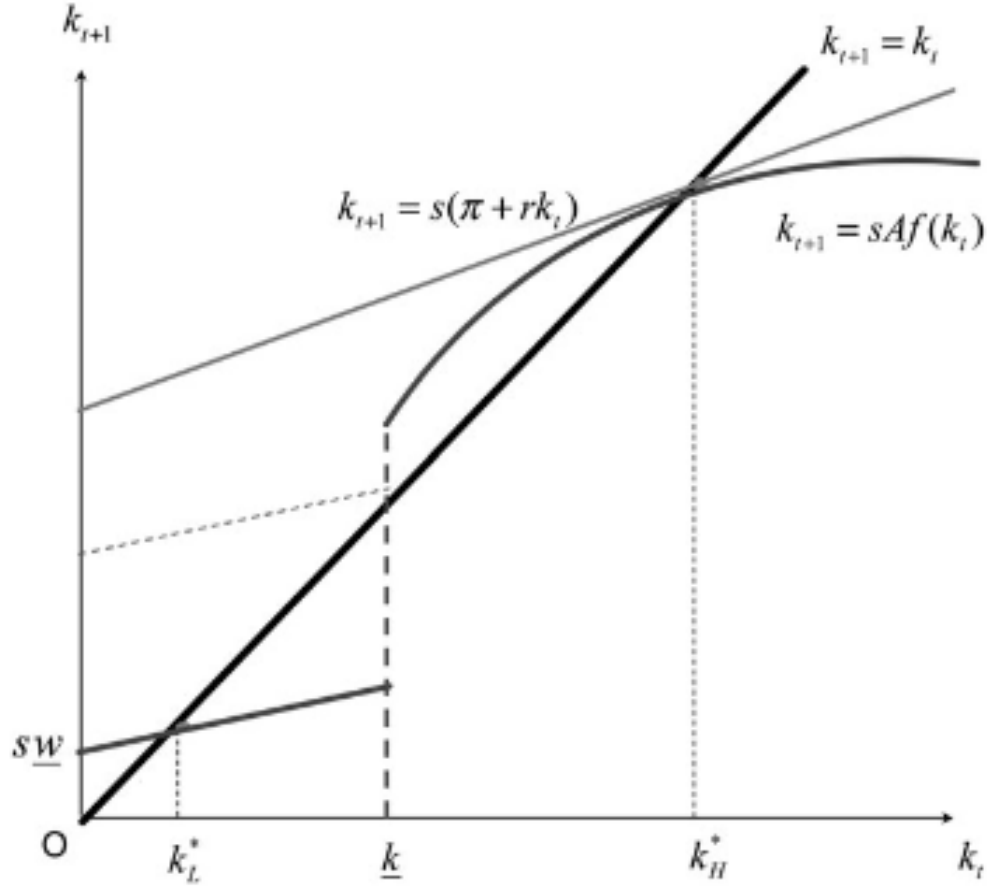
Now capital grows according to:

$$k_{t+1} = \begin{cases} s(Af(k_t)) & k_t \geq \underline{\mathrm{k}} \\ s(\underline{\mathrm{w}} + k_t) & \text{otherwise} \end{cases} \tag{7}$$

There may be two steady states: k_H^* and k_L^*.

- Those with $k_0 \geq \underline{\mathrm{k}}$, accumulate capital up to k_H^*.
- Those with $k_0 < \underline{\mathrm{k}}$, will converge to k_L^*.

$\rightarrow$ This generates a poverty trap: initial wealth determines steady-state income and profit.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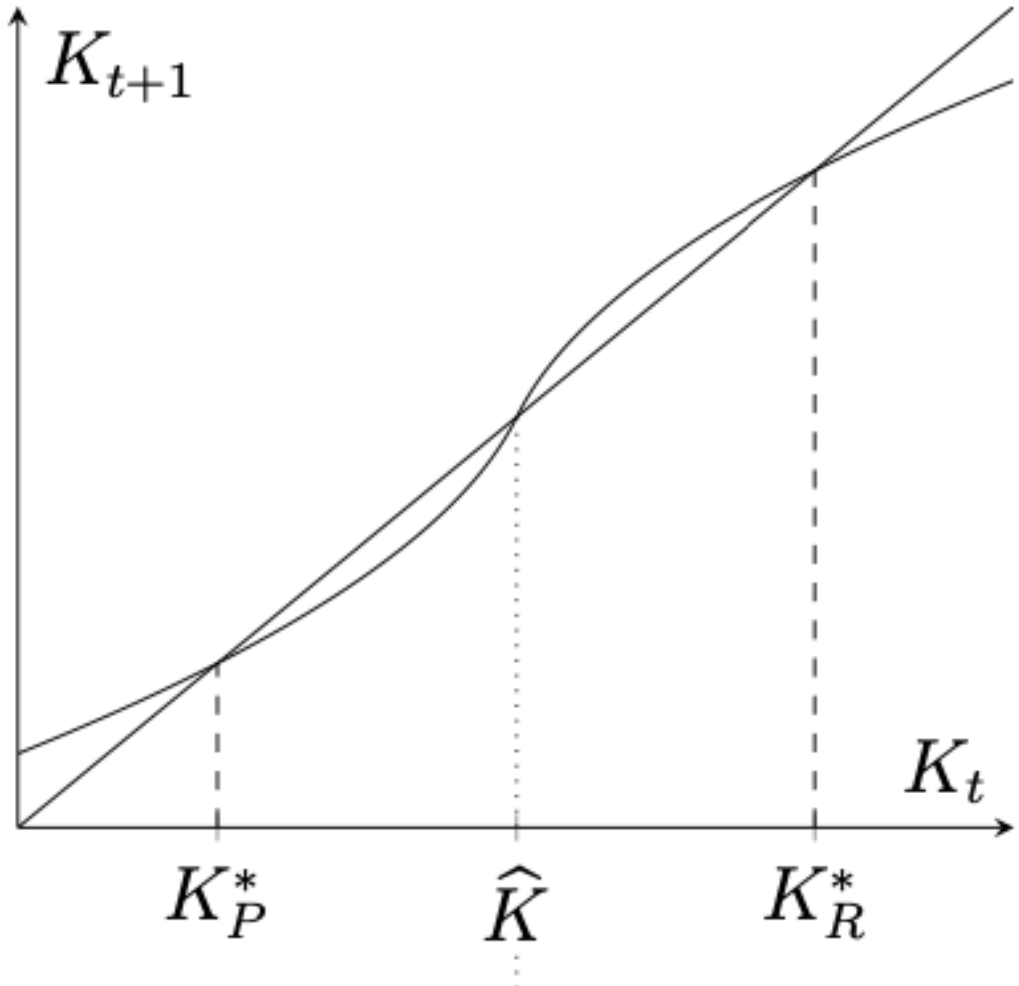
$s\underline{w}$
O
k_L^*
$\underline{k}$
k_H^*
k_t

An alternative transition equation that generates a poverty trap: the S-shaped curve



Key lessons of the model with capital market imperfections + non-convexities

- The poor and the rich have different steady states. This is both *inequitable* and *inefficient*.

$\rightarrow$ A grant that pushes capital above $\underline{k}$ can have permanent effects. If capital remains below $\underline{k}$, the effect will dissipate.

$\rightarrow$ A credit intervention can also help people escape poverty, but only if the poor can borrow above $\underline{k}$, at interest rate r.

Other reasons why poverty traps may emerge

1. Production requires human capital h, there are non-convexities in the return to h, and h cannot be borrowed.

2. Individuals can borrow, but cannot leave negative bequests.

Discussion

1. What reduced form evidence do we need to establish the existence of a poverty trap?

2. Does the existing evidence establish that poverty traps exist?

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Key reading

(*) Ghatak, Maitreesh. Theories of poverty traps and anti-poverty policies. The World Bank Economic Review 29, (2015): S77-S105.

Blattman, Christopher, Nathan Fiala, and Sebastian Martinez. Generating skilled self-employment in developing countries: Experimental evidence from Uganda. The Quarterly Journal of Economics 129, no. 2 (2014): 697-752.

Blattman, Christopher, Nathan Fiala, and Sebastian Martinez. The Long-Term Impacts of Grants on Poverty: Nine-Year Evidence from Uganda's Youth Opportunities Program. American Economic Review: Insights 2, no. 3 (2020): 287-304.

Banerjee, A. et al. (2015). A multifaceted program causes lasting progress for the very poor: Evidence from six countries. Science, 348(6236).

Hamory, Joan et al. Twenty-year economic impacts of deworming. Proceedings of the National Academy of Sciences 118, no. 14 (2021).

Optional reading

The Our World in Data entry on global poverty: `https://ourworldindata.org/extreme-poverty`.

Kraay, Aart, and David McKenzie. Do poverty traps exist? Assessing the evidence. Journal of Economic Perspectives 28, no. 3 (2014): 127-48.

Thank you!