14.771: Introduction

Esther Duflo, Ben Olken

TA: Ed Davenport

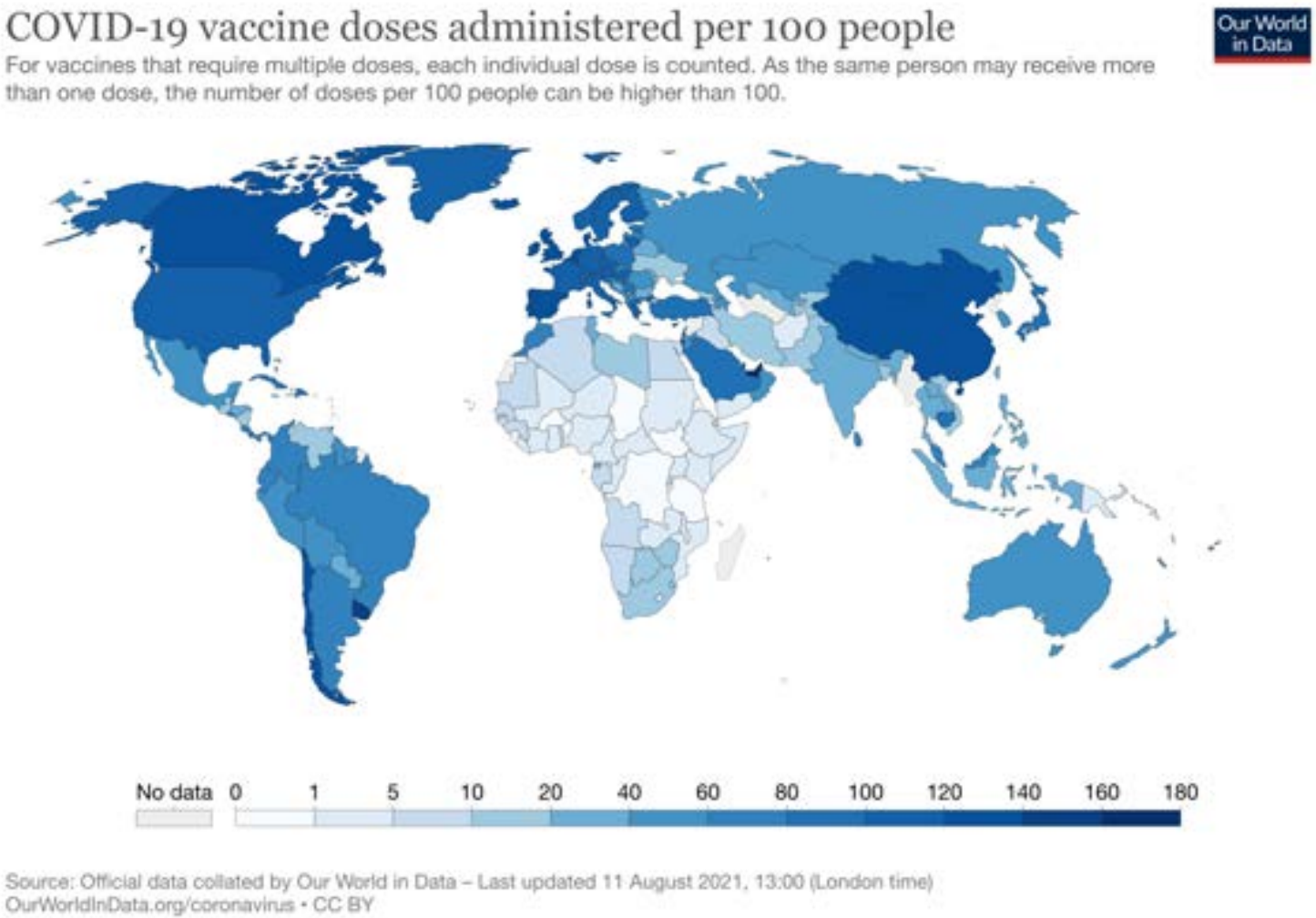
There are astonishing differences between countries

- World Bank uses Growth National Income (not GDP). What is the difference with GDP?
- What is the PPP adjustment?
- Richest country in the world...?
  - Macao. GNI per capita? $123,380
  - Followed by Singapore ($92,270) Qatar ($91,670) Bermuda ($86,600) Luxembourg ($79,670) Switzerland ($73,800)
  - Oh well they are special regions, tax havens or petro empires
  - Next? Norway: $72,920, the US $66,080
- Poorest country in the world?
  - Burundi $790
- What is the ratio between the income in Norway and Burundi? 92.

Understanding income differences

- These income differences matter for well-being outcomes as well:
  - Under five mortality in Norway? 2 deaths per 1,000 live births
  - Infant mortality in Burundi? 57 deaths per 1,000 live births
  - Although income is neither necessary nor sufficient.
    - Compare Norway and the US
    - Compare Sri Lanka and Guatemala

COVID-19 vaccination



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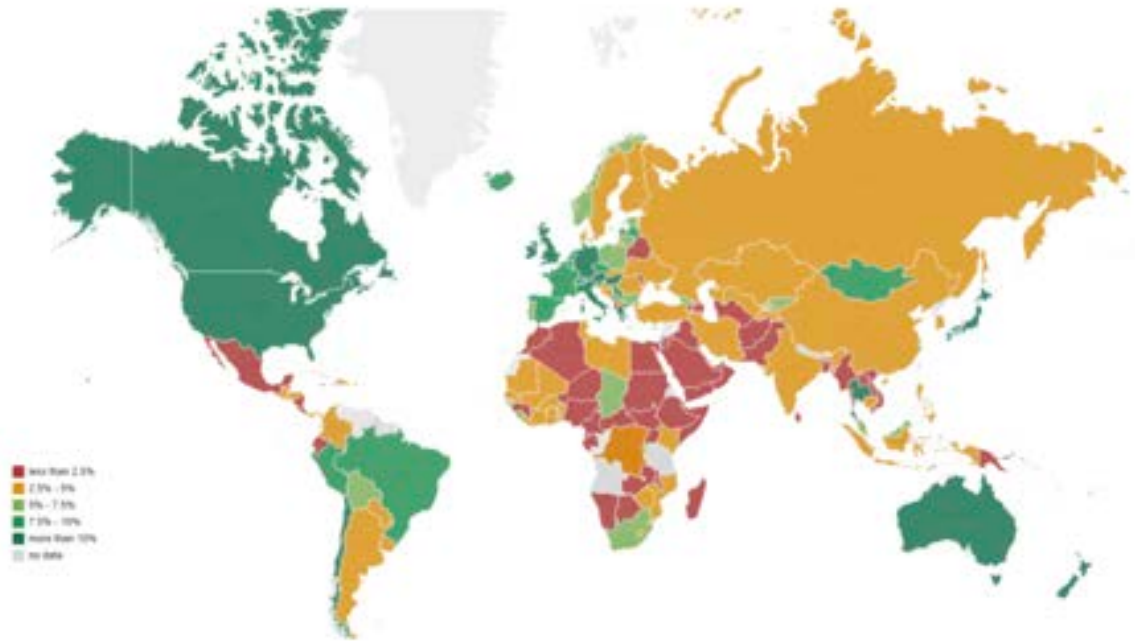
Fiscal response

Additional Spending and Forgone Revenue in Response to the COVID-19 Pandemic

(Percent of 2020 GDP)

Budgetary fiscal support to people and firms has varied widely across countries.



Source: IMF (2021)

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There are also massive differences in growth rates

- Per-capita GDP in constant USD:

Country	1960 GDP p.c.	2010 GDP p.c.	Avg. growth
China	192		
Burundi	214		
Pakistan	305		
Indonesia	690		
Kenya	538		

There are also massive differences in growth rates

- Per-capita GDP in constant USD:

Country	1960 GDP p.c.	2010 GDP p.c.	Avg. growth
China	192	4,561	6.54%
Burundi	214		
Pakistan	305		
Indonesia	690		
Kenya	538		

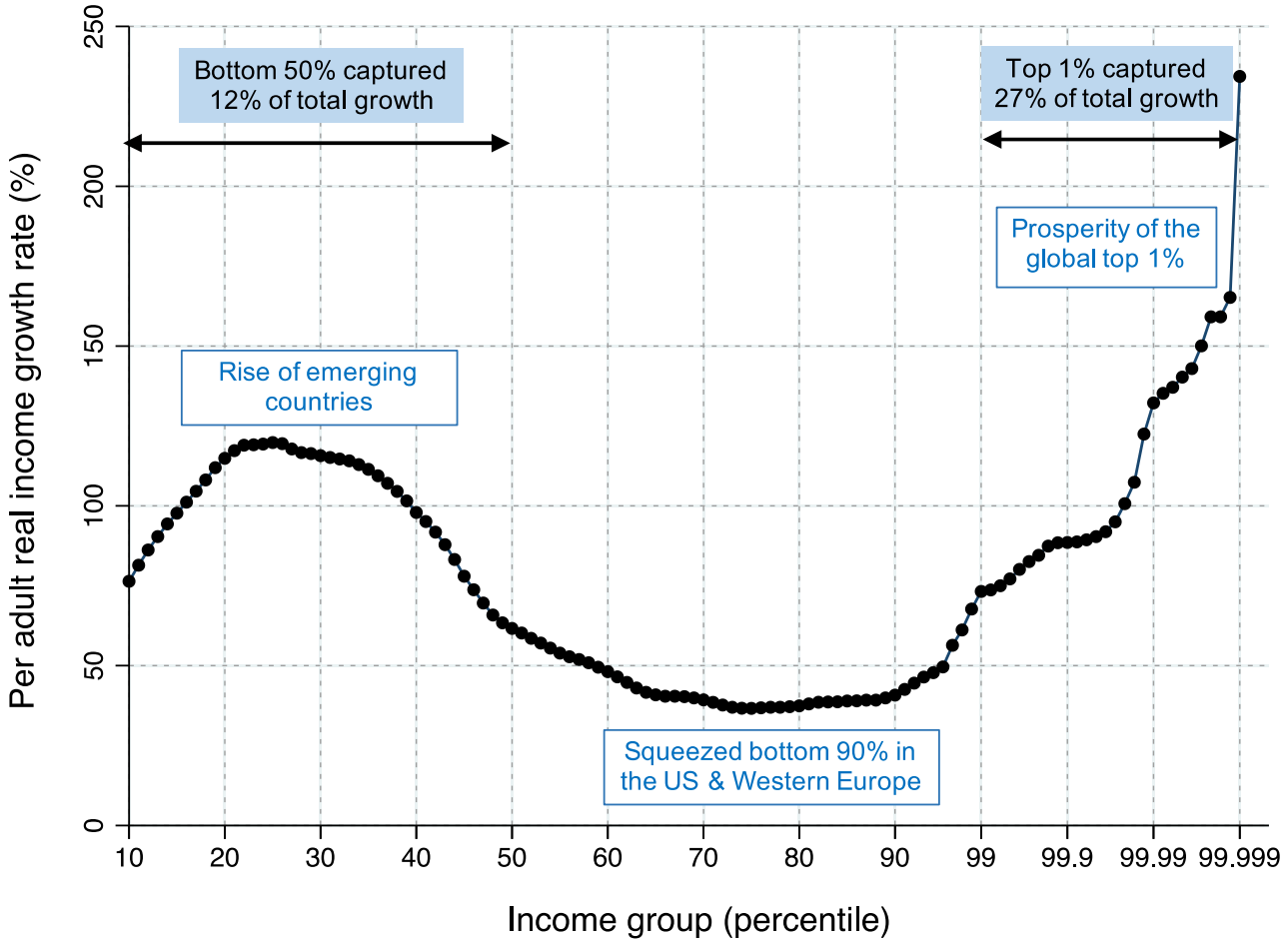
There are also massive differences in growth rates

- Per-capita GDP in constant USD:

Country	1960 GDP p.c.	2010 GDP p.c.	Avg. growth
China	192	4,561	6.54%
Burundi	214	231	0.15%
Pakistan	305	1,040	2.48%
Indonesia	690	3,113	3.06%
Kenya	538	967	1.18%

Source: Our World In Data, GDP per capita (constant 2010 US$)

What happened in emerging economies is biggest overlooked secret of the past few decades



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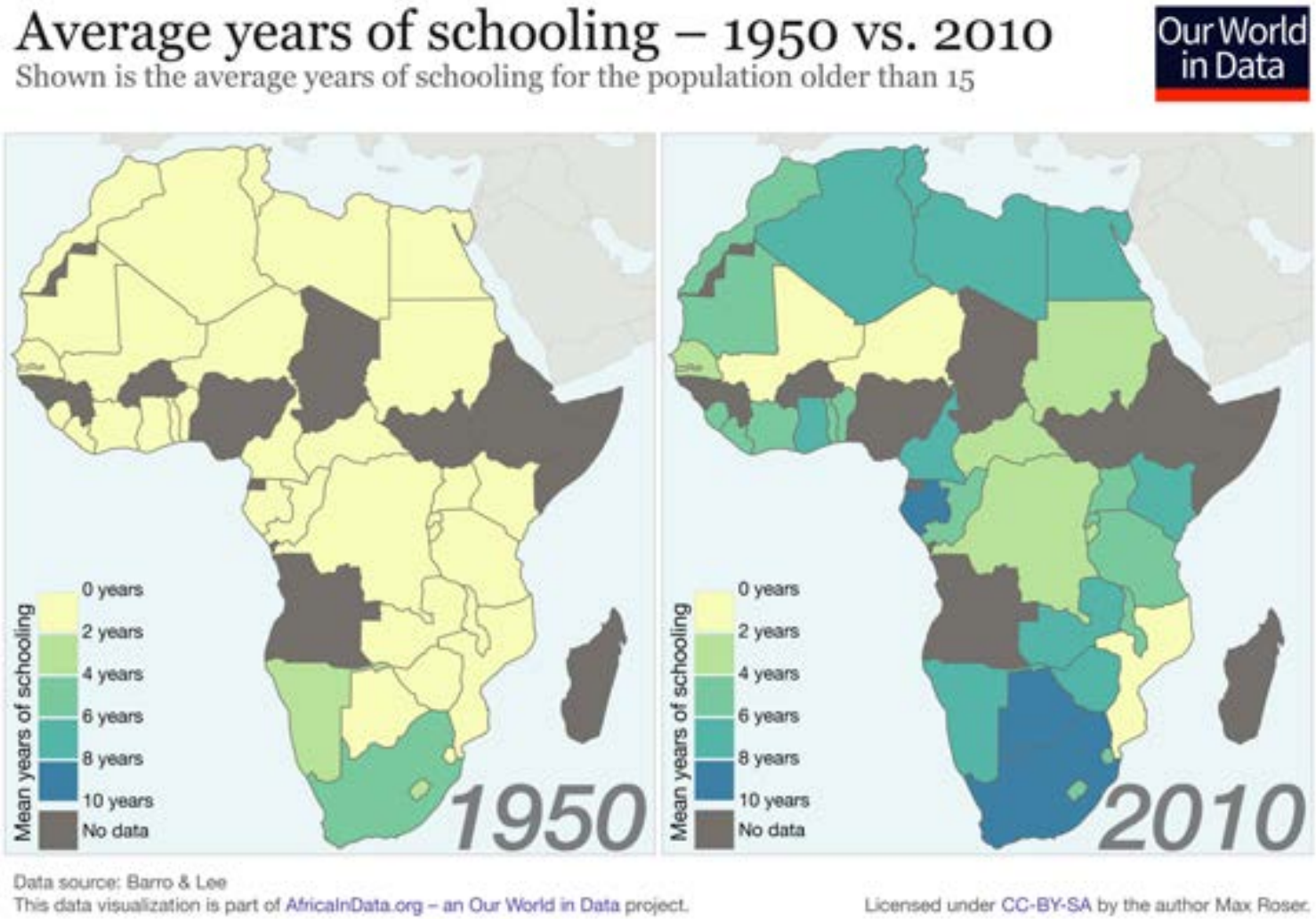
Getting better



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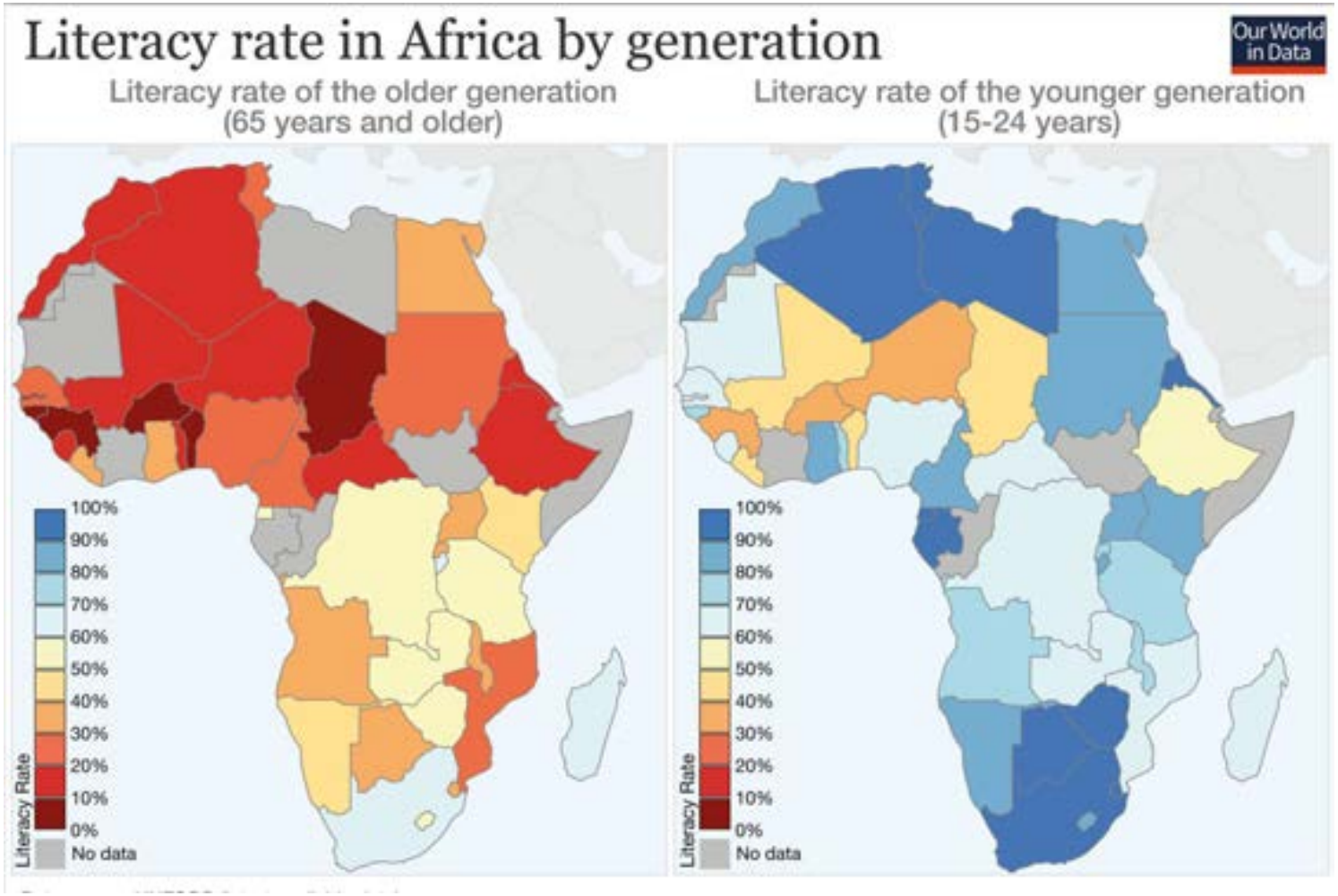
Getting better



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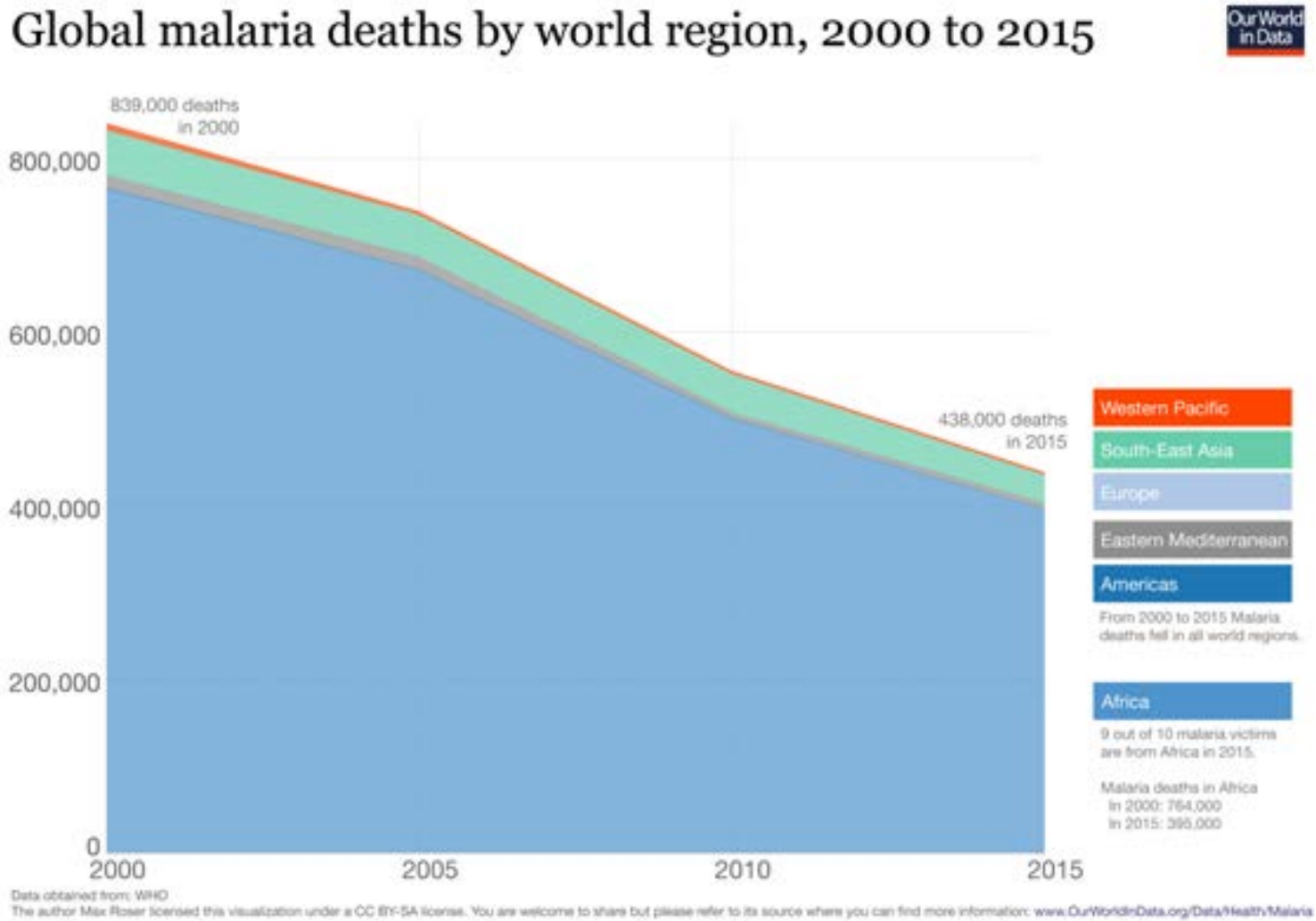
Getting better



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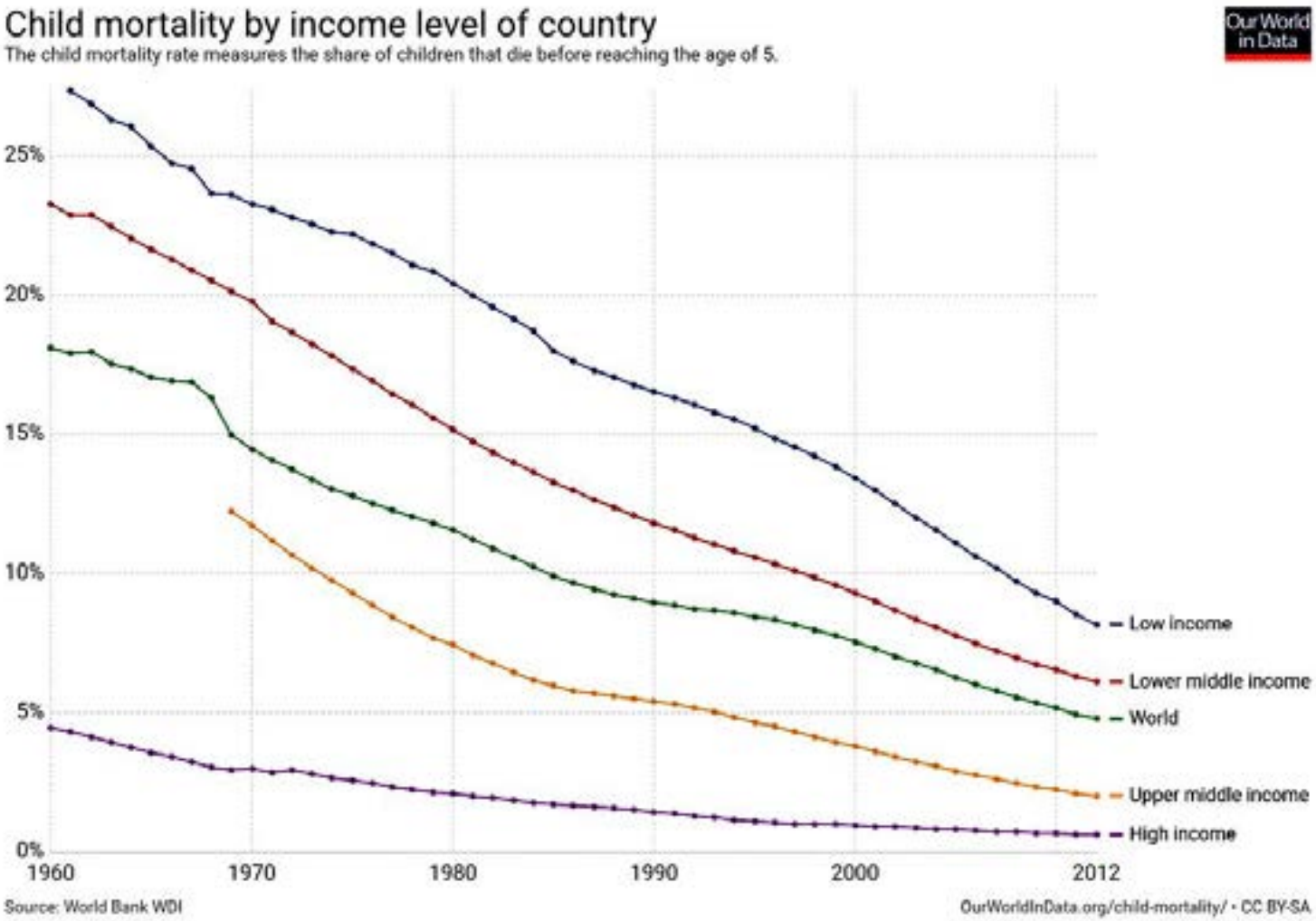
Getting better



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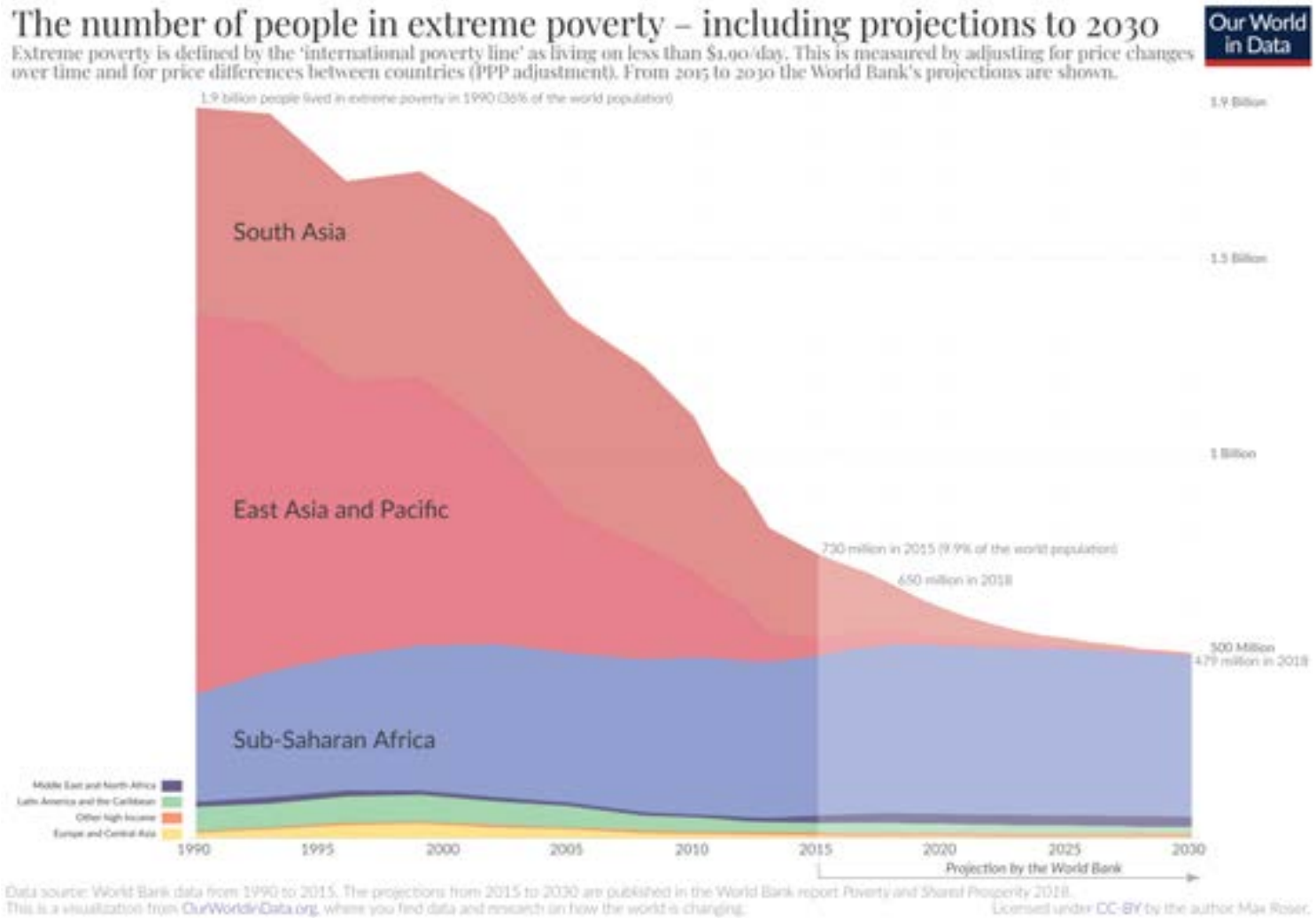
But what is coming next? Projection before COVID



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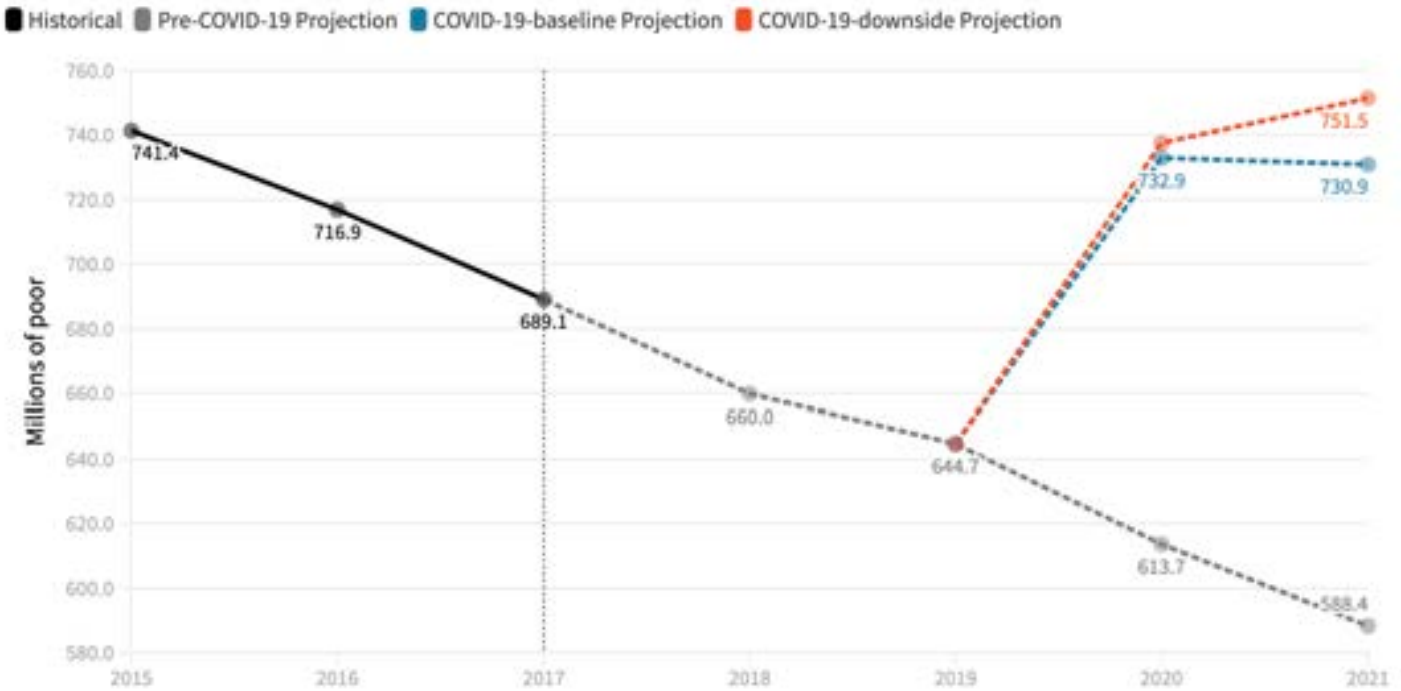
But what is coming next? Projection after COVID



Source: Lakner et al (2020) (updated), PovcalNet, Global Economic Prospects.
Note: Extreme poverty is measured as the number of people living on less than $1.90 per day. 2017 is the last year with official global poverty estimates. Regions are categorized using PovcalNet definition.

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Source: Lakner et al (2021)

Understanding income differences

- The point of this class is to begin to understand these massive income differences, in three respects:
  - Why are some countries so poor and some countries so rich?
  - What are the particular economic problems faced by countries that are poor, and how do we model and understand these phenomena?
  - And from a policy perspective, what could potentially be done to help solve the particular market failures that arise because countries are poor?
  - What went right ?
  - What risk going wrong? Is the COVID-19 crisis reversal here to stay?

The macro vs. micro perspectives

- The macro perspective is to focus on the aggregate income differences themselves.
- Start with an aggregate production, i.e.

$$y = Af(k, h)$$

  where k is capital per-capita and h is human capital per-capita
- The idea of "development accounting" is is to see how much this simple macro production function explains.
  - If for most of per-capita income differences are driven by k, for example, then one view is that the answer to poverty is pretty simple: just give the developing world more k. Likewise for h.
  - If it's mostly driven by A it's much harder to know what to do.
- This is related to the philosophy of the World Bank in the 1960s:
  - The view was the that problem is that poor countries don't have enough k and are credit-constrained
  - So the World Bank will just ease credit constraints, given them tons of k and h (dams and schools) and then they will be rich

What does this accounting exercise tell us?

- Mankiw, Romer, Weil (1992) implemented this by famously regressing y (income per capita) on proxies for k (savings rate), h (enrollment rate), and population growth (from Solow model), and found that 80% of the difference in income per capita across countries can be explained by observable factors: savings rate (which affects steady-state k), investment in human capital (which affects steady state h), and population growth
- However, subsequent work suggests this was too optimistic:
  - Klenow and Rodriguez-Clare (1997): Using better data on h, and calibrating rather than estimating the parameters of the production function, find that around 50% or more of the variation in levels is due to variation in A. And as much as 90% if you do it in growth!
  - Caselli (2005): Similarly, concludes that about $\frac{2}{3}$ of the variation is due to A
- This is problematic, because it is much harder to know how to affect the residual ("a measure of our ignorance")

Causality

- Also, note that A, k and h are correlated (this is one of the problems with MRW that Klenow and Rodriguez-Clare point out; Bills and Klenow focus on the correlation between h and A)
- Recall our simple production function

$$y = Af(k, h)$$

- In steady state (e.g. of a Ramsey model), the return on capital has to be equal to the discount rate ρ, so

$$A\frac{\partial f}{\partial k} = \rho$$

  otherwise people would save more.
- This means that an exogenous increase in A will lead to an endogenous response of k. Same applies to h.

Causality matters

- If k responds to A in equilibrium, you can't do the naive World Bank 1960s policy of increasing k
- If you increase k beyond the steady state level, returns will be low, and the economy will adjust endogenously and move back to its previous point over time.
- Same applies to h:
- Instead you need to increase A.

So why do some countries have high A and others do not?

- One answer is that it's historical:
  - Acemoglu, Johnson, Robinson (2001, 2002); La Porta, Lopez de Silanes, Shleifer, Vishny (many papers): Very long run factors matter: Who colonized you? Did they decide to stay?
- Another is that it is geography (Jeff Sachs): malaria, heat, no access to water
- Since all these factors are fixed how do they explain variations in growth rates that we observe, including for a given country over time. See Bangladesh for example.

What about using variation in macro-economic policies?

- If it's not long-run factors, then maybe variation in policies lead to variation in the growth rate in A.
  - Such as? Monetary policy, fiscal policy, quality of business environment, protection of property rights, corruption, etc. etc.
- There was an enormous industry in the 1990s trying to run "growth regressions" to understand this

What about using variation in macro-economic policies?

- But there are some fundamental problems with this approach: Thoughts?
  1. There are only 180 countries and many, many variables. So you quickly run out of power, and it's hard to choose which regressions are right. Read Sala-I-Martin's 1997 paper "I Just Ran Four Million Regressions."
  2. Even more important, all these policies are endogenously determined (e.g. why do some countries have good fiscal policy and some bad?) and also very coarsely defined at the macro level (what is "education?")
- Moreover, the basic approach doesn't really seem to explain the facts, even descriptively:
  - Easterly et al (1993) "Good policy or good luck": If you look decade by decade, these macroeconomic policies tend to be pretty highly correlated, but growth experiences aren't.

Should we believe the aggregate production function?

- Let us go back to the aggregate production function:

$$y = Af(k, h) \tag{1}$$

- What justifies the aggregate production function is the assumption that each factor (human capital, capital) gets allocated to its most productive use: the marginal return of every investment is equalized (Solow).
- This assumption can be tested. How? Is it true that the returns to capital are equalized within an economy? We can look at the returns to capital in various places.
- But it turns out it's not true! Returns to capital (and human capital) vary much more within countries than across countries.
- Moreover, there appears to be more heterogeneity in returns in developing countries than in developed countries (Hsieh and Klenow 2009), which suggests that market imperfections may be larger in developed countries than in developing countries

Heterogeneity in returns

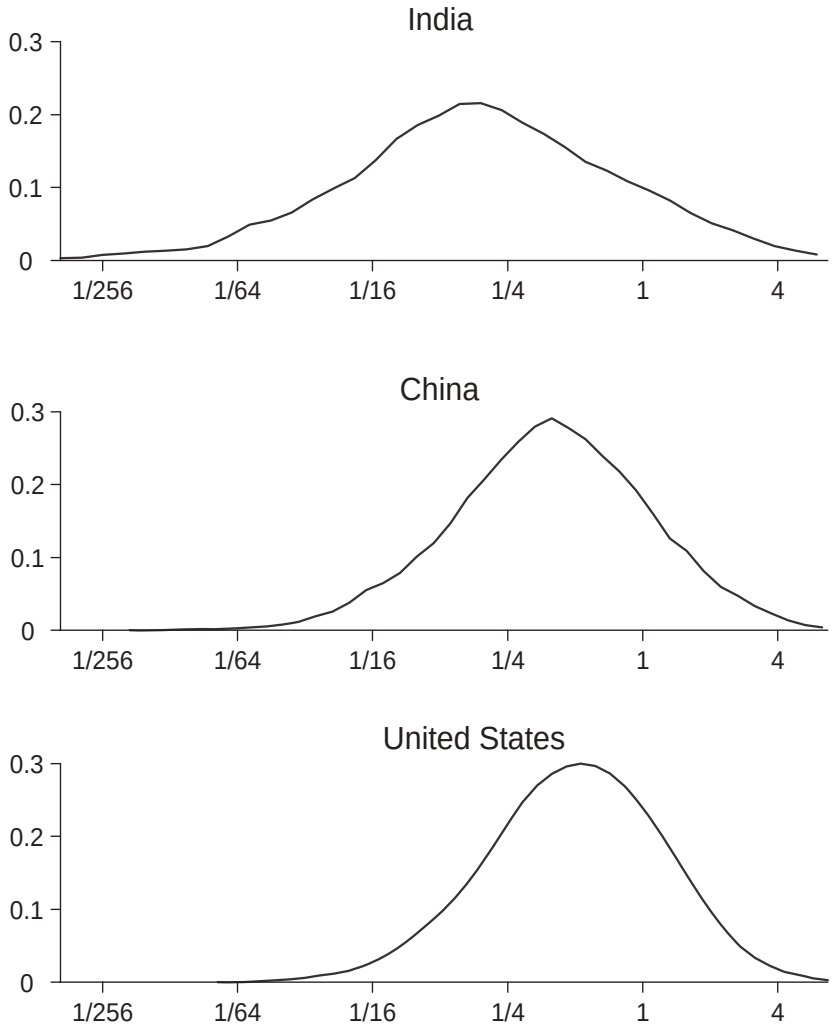

FIGURE I
Distribution of TFPQ

the United States. Table II provides TFPR dispersion statistics for a number of country-years. The ratio of 75th to 25th percentiles of TFPR in the latest year are 2.2 in India, 2.3 in China, and

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So where are we now?

2. Deconstructing the aggregate production function

- Therefore a fundamental source in the difference in productivity across countries is the fact that both h and k are misallocated due to a number of factors,
- Heterogeneity in h and k (within and across countries) motivates much of what we will study in this course, over the two semesters:
  - Is there something fundamentally different about poverty: poverty traps.
  - Understanding where h comes from, heterogeneity in h, why people are not investing optimally: education, health, nutrition
  - Understanding heterogeneity in k: credit and savings, land
  - Understanding the allocation of labor: labor markets
- We will also look at A specifically: technology , organization of firms (spring semester)
- We will be looking at the role for policy along the way, but will conclude with a look specifically at the public sector and its role at the end of this semester.

An overview of the course, and a few fun facts

Poverty traps

- Does being poor keep you poor?
- The S-curve ▸ Balboni et al
- But why?

An overview of the course

Human Capital (h): The demand side. How people chose to invest in human capital

- The neoclassical (Barro-Becker) model: in the long run, we will all be rich (or poor...); the same, anyway.
  - Parents invest in the human capital of their children, they care directly about their utility, and they pay attention to expected returns and costs
  - What does this have to do with the price of tea in China? Much, it turns out ▸ Qian,2008
- Limits to the neo-classical model: non-convexities and credit constraints, the family, lack of information and trust, imperfectly rational decision making, etc.
  - A secret family planing intervention is much more likely to lead to contraceptive use than a couple intervention ▸ Ashraf et al, 2014
  - A kilogram of lentils increase immunization rates! ▸ Banerjee et al, 2010

Overview of the course

Human Capital (h) The supply side

- Education
  - ▸ ASER scores over time
  - Why are schools so terrible?
- Health
  - ▸ Das et al, 2016 : evidence from audit patient (presenting asthma and angina)
  - Why are doctors so terrible?

Overview of the course

Human Capital (h): Labor markets

- How efficient are rural labor markets in allocating labor?
- If workers cannot easily migrate or shift occupation, volatility will be exacerbated for the poor : ▸ Jayachandran, 2006

Overview of the course

Capital (k): Land markets

- How do land markets work in developing countries, and what are the issues in effectively allocating land?
- Two specific issues in detail:
  - Sharecropping as an optimal response to risk sharing and credit constraints, and the inefficiencies that creates
  - Property rights, and the problems caused by insecure property rights over land
    - Barbed wires, cow trampling, and investment in land improvement

    ▸ Hornbeck

Overview of the course

Capital (k): Credit markets

- Is there heterogeneity in the return to capital? Is that caused by credit market imperfections?
- Issues with credit markets:
  - Moral hazard and adverse selection in credit markets
  - Microcredit as a (possible) solution to monitoring problems in credit – does it work, and if so, what are the features of microcredit that make it work
    - Well, not really if you mean by this that it increases profits ▸ Profits or consumption....
  - Understanding other intermediaries in credit markets (e.g. banks)

Overview of the course

Productivity (A): Technology

- Does technology matter for the poor?
  - At least for the price of fish ▸ Jensen
- How do people learn about technologies, and do problems in technology diffusion explain heterogeneity in A?

Overview of the course

The public sector

- What is the role of the public sector in developing countries?
- Why is it so ▸ small
- What are the problems with redistribution in a developing country context? What is the optimal shape of a transfer?
- Are there problems providing public goods?

Overview of the course-spring semester

Productivity (A): Firms

- Firms are not as productive as they could be.... photo
- How do firms function in the absence of effective contract enforcement?
- What are the implications of credit market imperfections, labor market imperfections, etc for the organization of firms?
- Why is there misallocation across firms?
- Is heterogeneity in management practices a reason that productivity is low? If so can improving management improve A directly?

Overview of the course-spring semester

Other macro topics

- Social networks
- Migration
- Trade within and across countries

Course requirements

- Grading
  - Problem sets (25%).
  - Replication and research proposal (25%)
  - Final exam during exam week (40%) . Don't book your plane ticket before the end of that week please.
  - Class participation (10%), including written comments on one paper per week.
-

Note....

- If you're not an MIT Economics PhD student, have not yet spoken to us, please talk to me after class or email us with your background and why you would like to take the class.
  - Note that all auditors need to do all problem sets and all starred readings, and commit to attend all classes.

Figure IId – Tea Yield and Tea Procurement Price

Source: FAO

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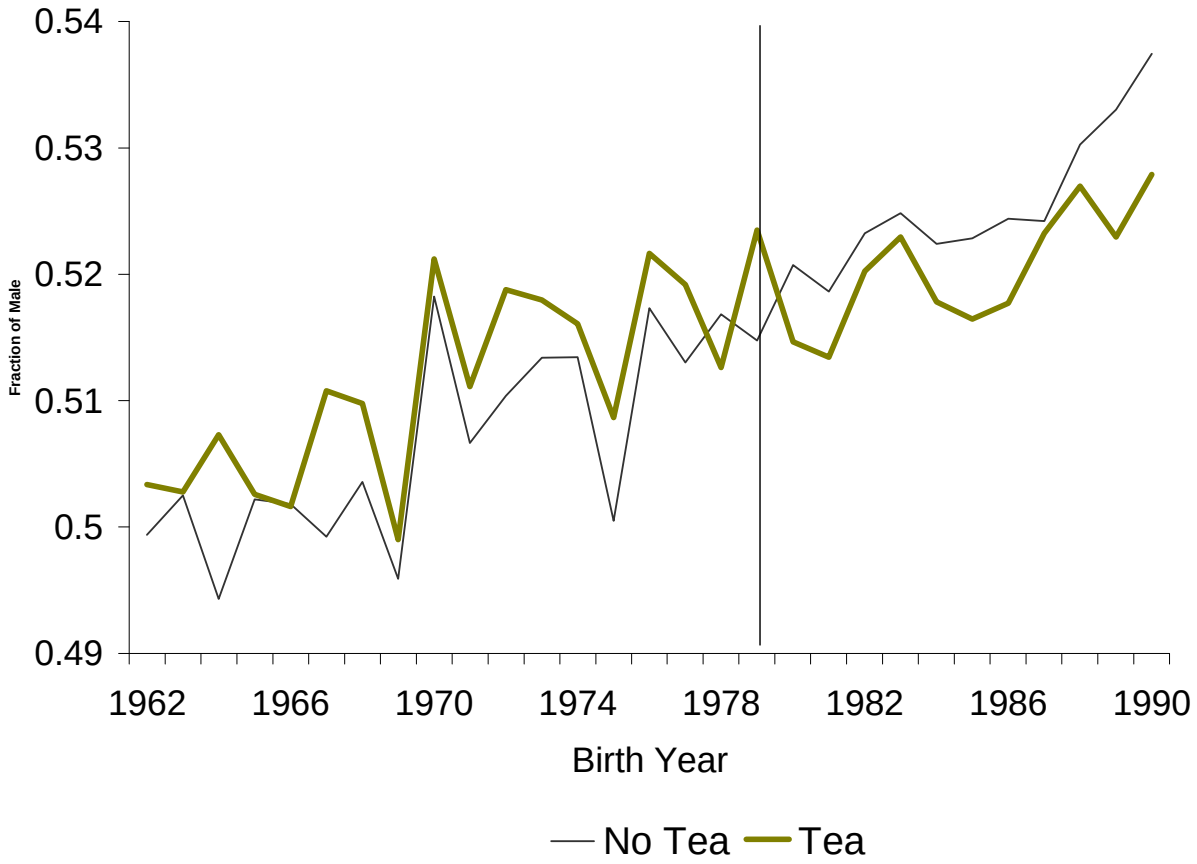
Figure IIIb – Fraction of Males in Counties which Plant Some Tea and Counties which Plant No Tea



Source: 1% Sample of 1990 Population Census; Note: Tea counties are defined as all counties that plant some tea

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back

TABLE 3—EFFECT OF PRIVATE INFORMATION TREATMENT ON HOUSEHOLDS IN WHICH BOTH HUSBAND AND WIFE DO NOT WANT A CHILD IN NEXT TWO YEARS

	All women		Responders		Nonresponder	
	Voucher redeemed (1)	Received injectable (2)	Voucher redeemed (3)	Received injectable (4)	Voucher redeemed (5)	Received injectable (6)
Panel A. Without controls						
Assigned to Couple treatment	−0.103**	−0.065	−0.259***	−0.213***	−0.041	−0.014
	(0.049)	(0.040)	(0.095)	(0.077)	(0.059)	(0.048)
Panel B. With controls						
Assigned to Couple treatment	−0.097*	−0.061	−0.274**	−0.253***	−0.051	−0.020
	(0.051)	(0.041)	(0.120)	(0.094)	(0.063)	(0.049)
Observations	419	419	106	106	290	290
Mean of outcome variable among individual treatment	0.531	0.244	0.650	0.300	0.483	0.214

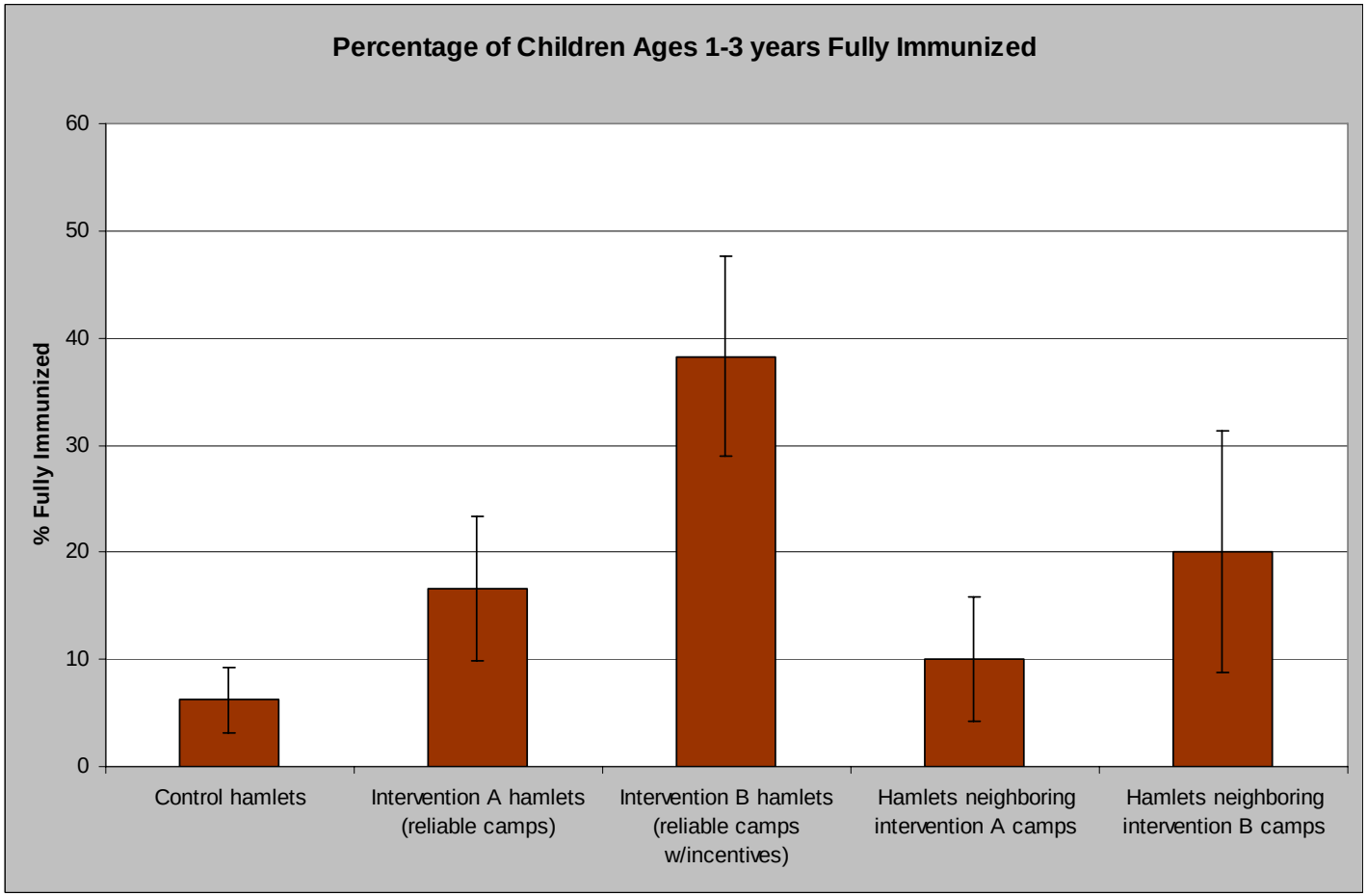
Notes: A responder is defined as a women who doesn't want a child in the next two years who believes her husband wants to have more children than they currently have and who also believes her husband wants more children than she does. Nonresponders didn't satisfy these requirements and didn't have missing information on the relevant variables. Controls include: age, husband's age, education, husband's education, number of children, wife's ideal number of children, husband's ideal number of children, using injectables at baseline, using pill at baseline, using any hormonal contraceptive at baseline, wife's monthly income, husband's monthly income, difference in desired fertility of couple, wife knows when she is most fertile, woman's age > 40, time since last birth, difference between husband's and wife's total number of children, and compound indicators. Missing values for controls were replaced with a zero and dummy variables for missing values were included in the regression. A voucher was "redeemed" if there is a record of a voucher use by a woman in the study at the Chipata Clinic.

***Significant at the 1 percent level.

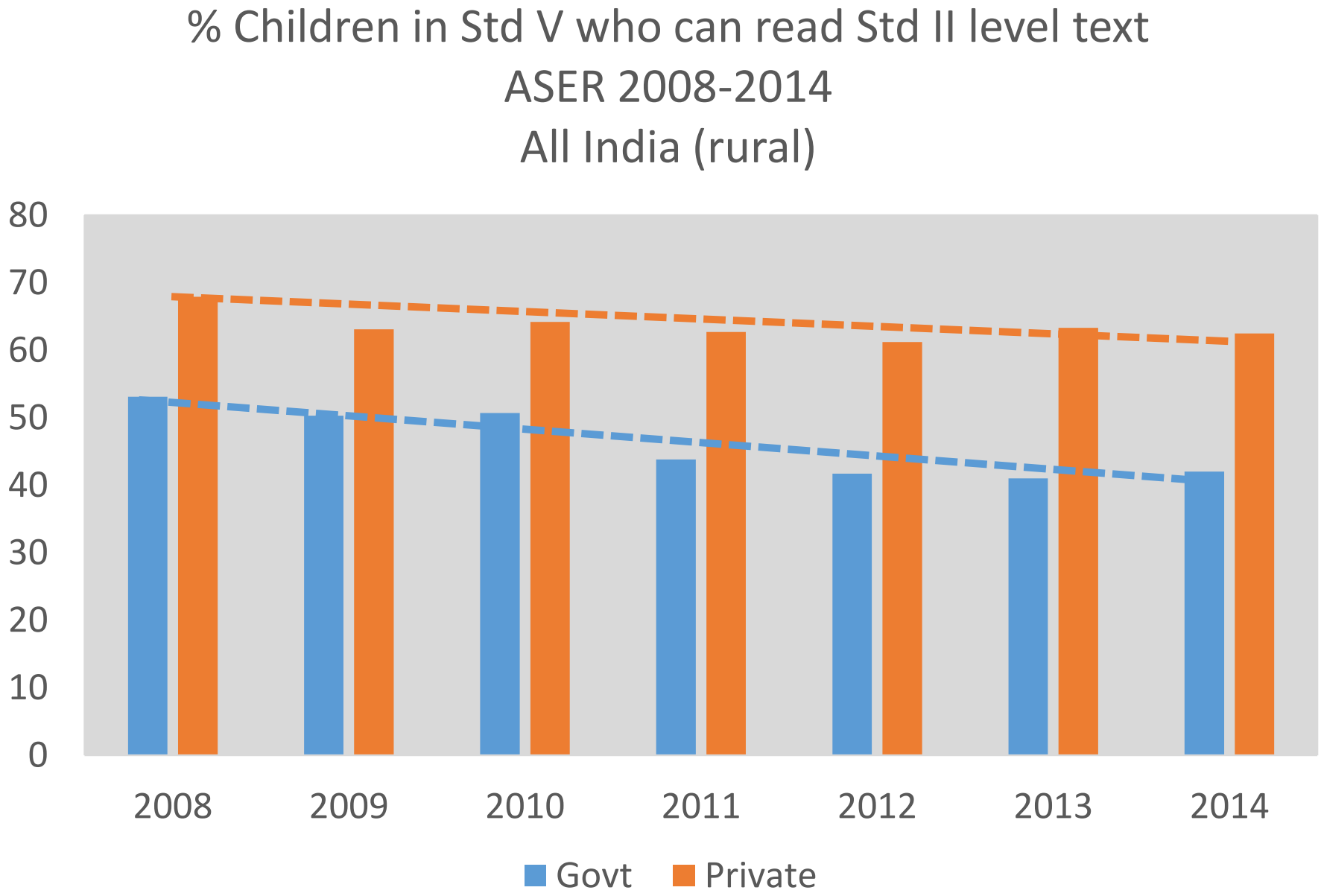
**Significant at the 5 percent level.

*Significant at the 10 percent level.

Figure 2: Percentage of children 1-3 years fully immunized by intervention status

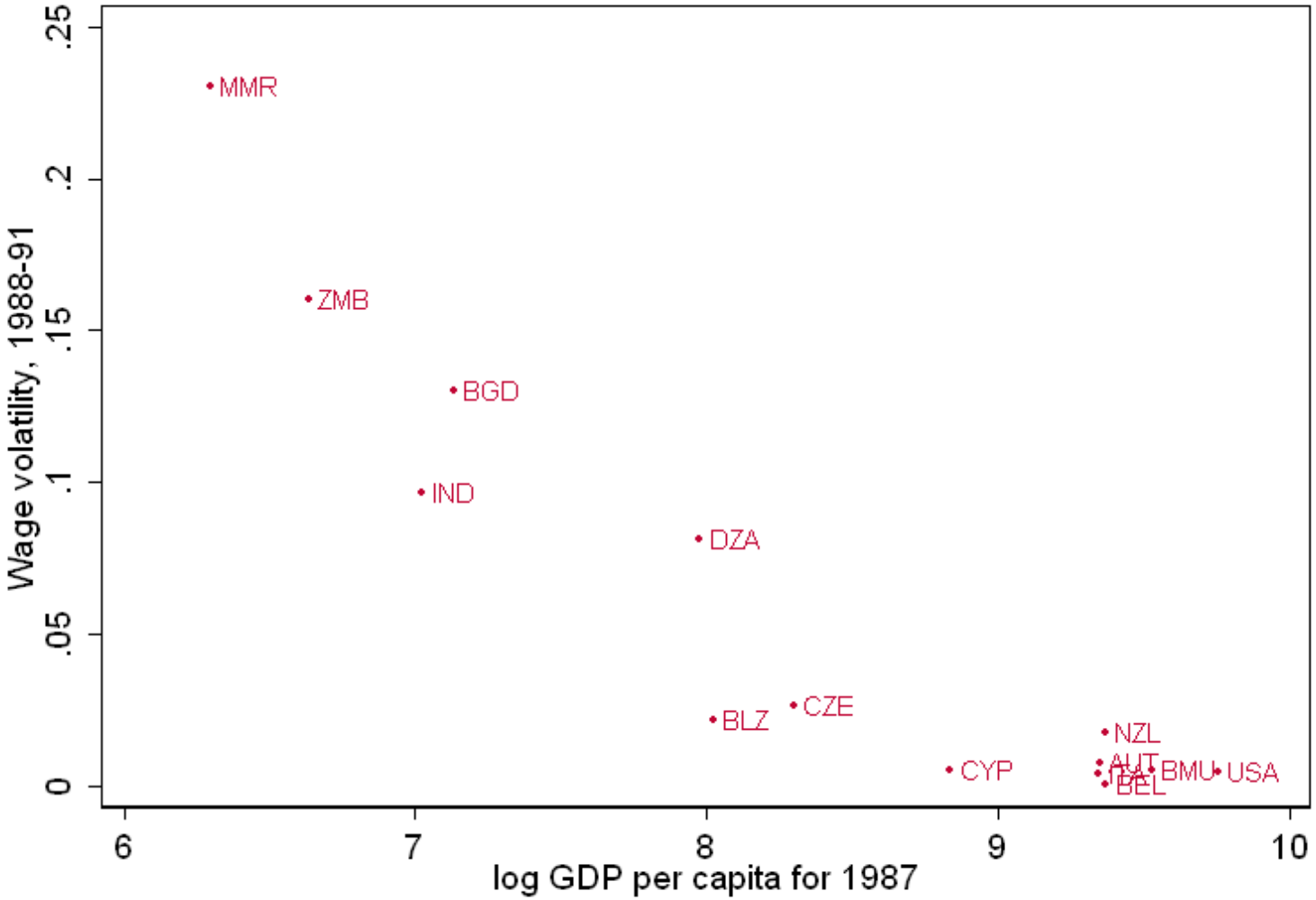


Note: Fully immunized is defined as reporting 5 or more immunizations. Weighted means are reported, and the bars reflect the 95% clustered confidence interval.


% Children in Std V who can read Std II level text
ASER 2008-2014
All India (rural)
80
70
60
50
40
30
20
10
0
2008
2009
2010
2011
2012
2013
2014
Govt
Private

Column1	Public	Private
Has MBBS degree	0.25	0.07
No Medical training	0.61	0.68
Time spent (minutes)	2.4	3.7
Gave a diagnosis	0.26	0.43
Correct diagnosis (conditional)	0.135	0.15
Correct diagnosis (unconditional)	0.058	0.039

Figure 1: Agricultural Wage Volatility Versus Gross Domestic Product



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They are typically dirty and disorganized

Garbage outside the plant

Garbage inside a plant

Flammable garbage in a plant

Chemicals without any covering

Figure 4: Estimated Changes in the Improvement Intensity of Farmland, +/- 2 Standard Errors, Relative to a County with 0% Woodland

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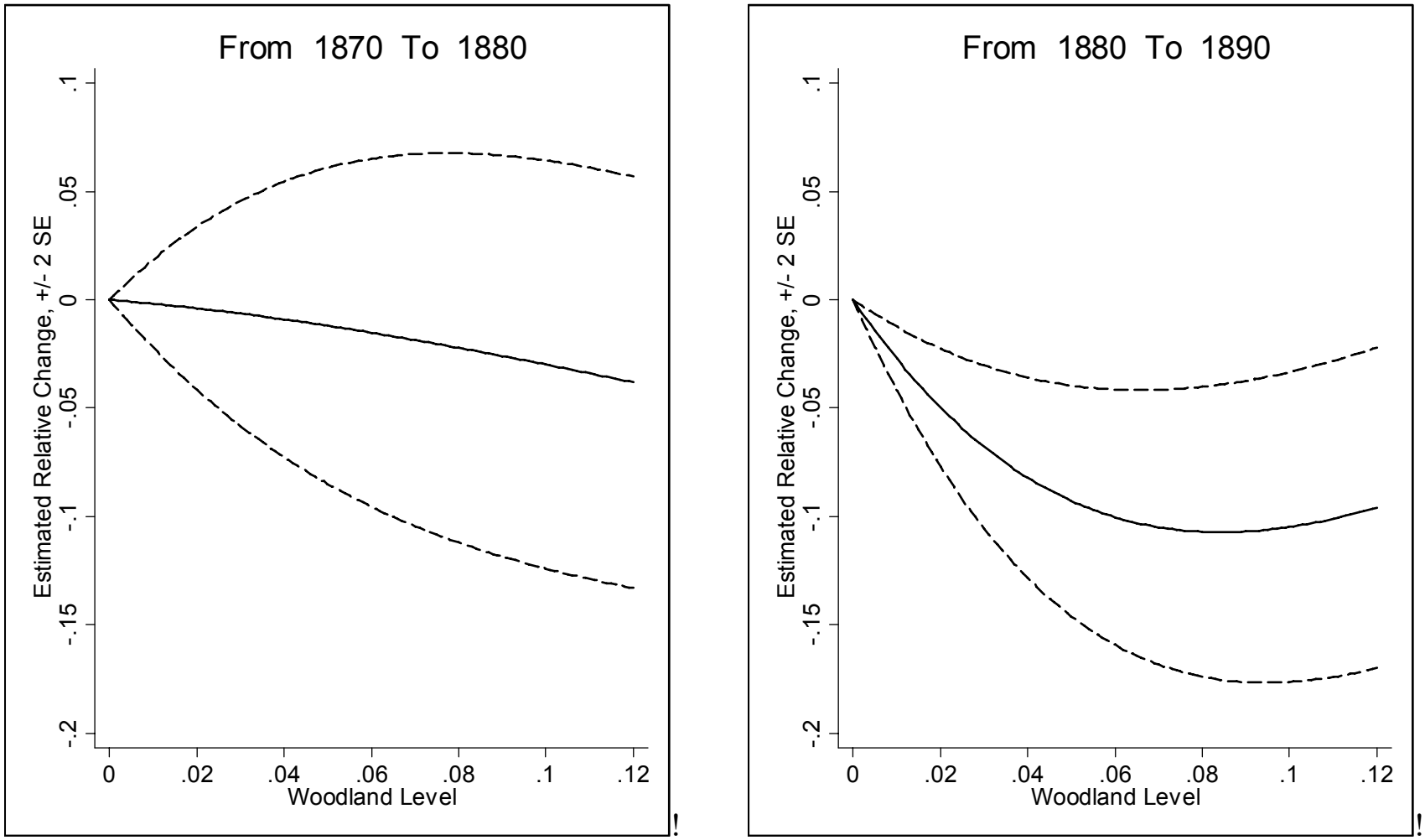

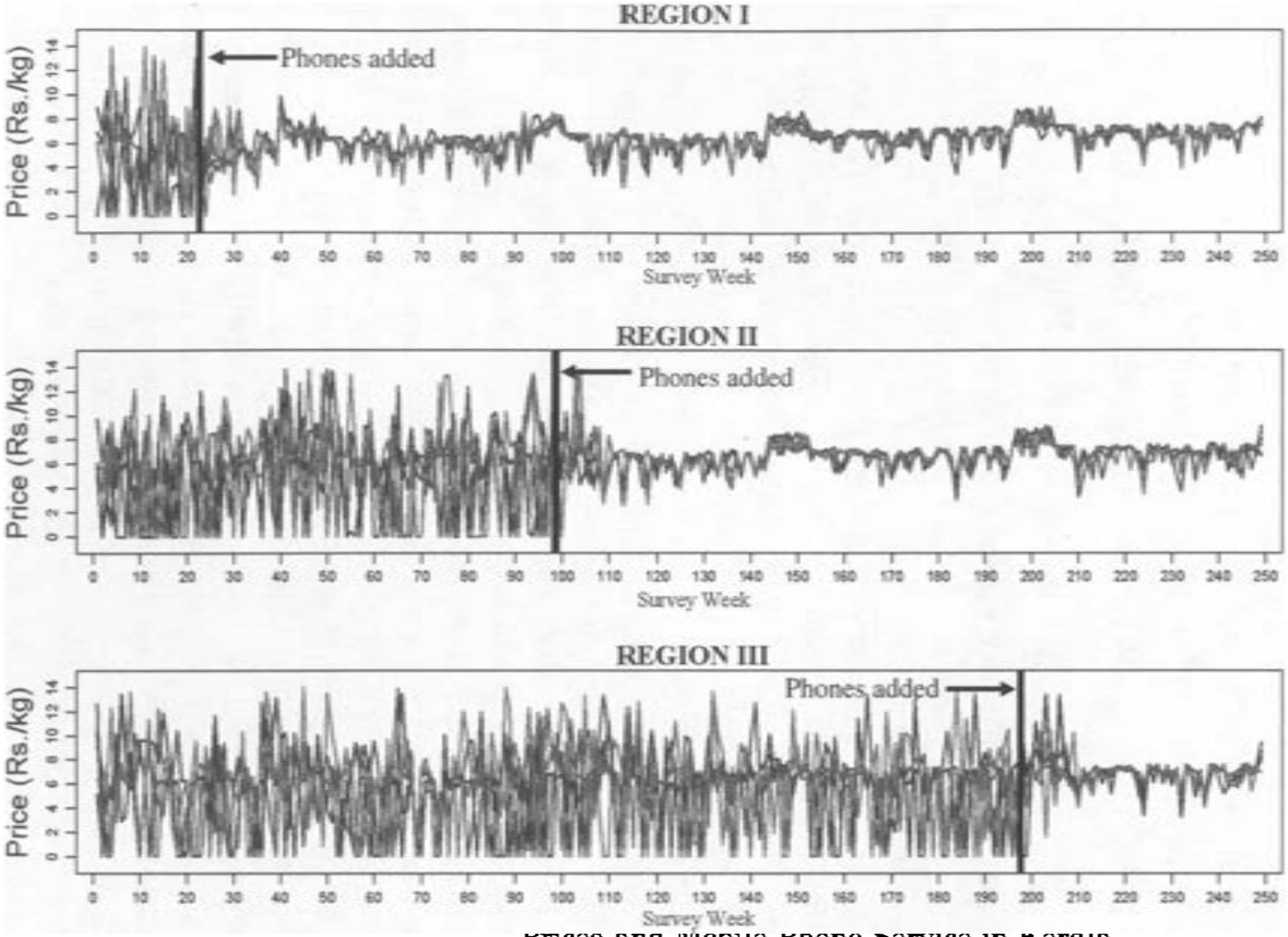

Prices and Mobile Phone Service in Kerala

Data from the Kerala Fisherman Survey conducted by the author. The price series represent the average 7:30–8:00 A
for average sardines. All prices in 2001 Rs.

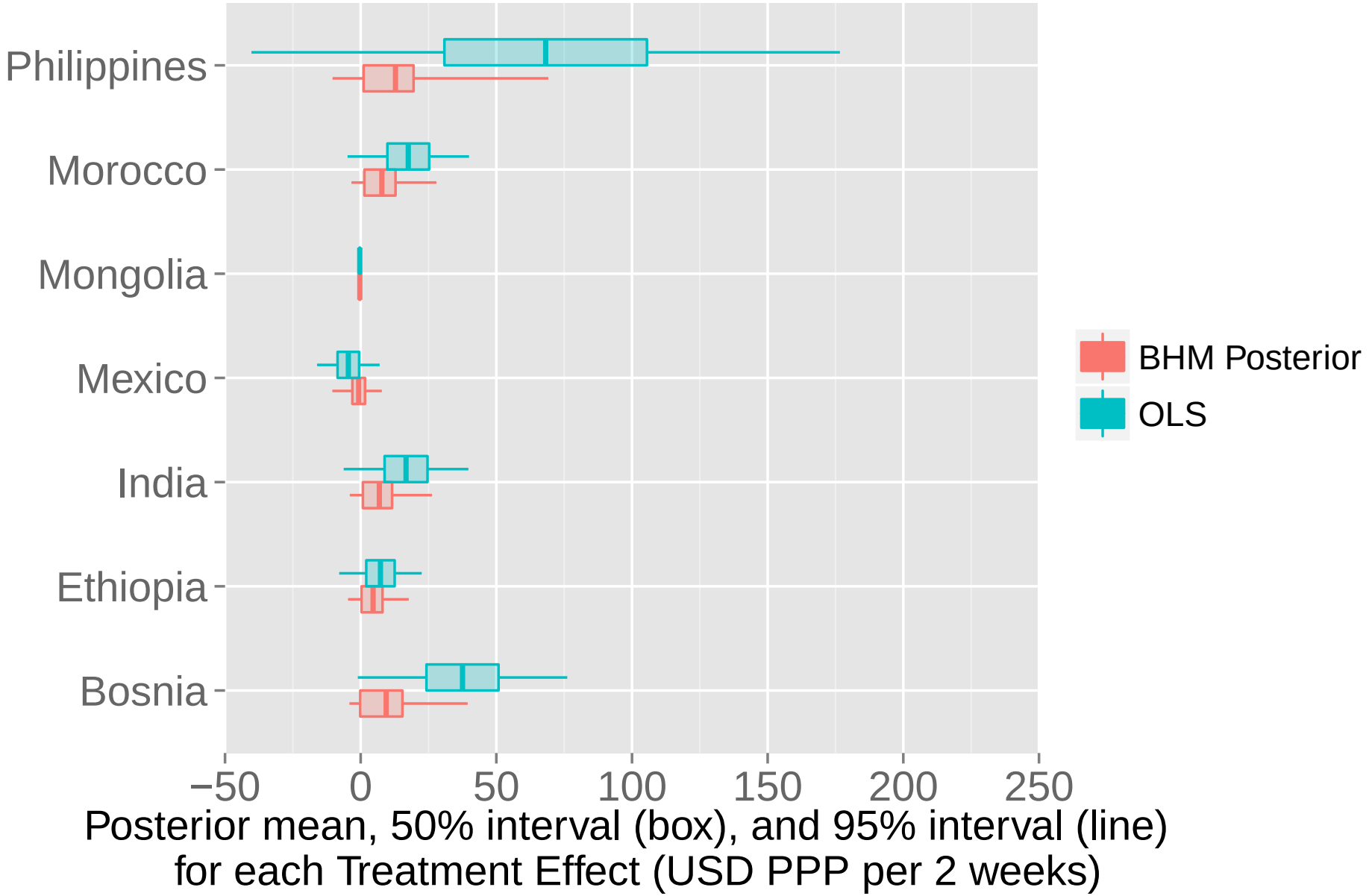

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Table 1
Sources of government revenue (1996–2001).

GDP per capita	Tax revenue (% of GDP)	Income taxes (% of revenue)	Corporate income tax (% of income taxes)	Consumption and production taxes (% of revenue)	Border taxes (% of revenue)	Inflation rate	Seignorage income (% of revenue)	Informal economy (% of GDP)
<$745	14.1	35.9	53.7	43.5	16.4	10.6	21.8	26.4
$746–2975	16.7	31.5	49.1	51.8	9.3	15.7	24.9	29.5
$2976–9205	20.2	29.4	30.3	53.1	5.4	7.4	6.0	32.5
All developing	17.6	31.2	42.3	51.2	8.6	11.8	16.3	30.1
>$9,206	25.0	54.3	17.8	32.9	0.7	2.2	1.7	14.0

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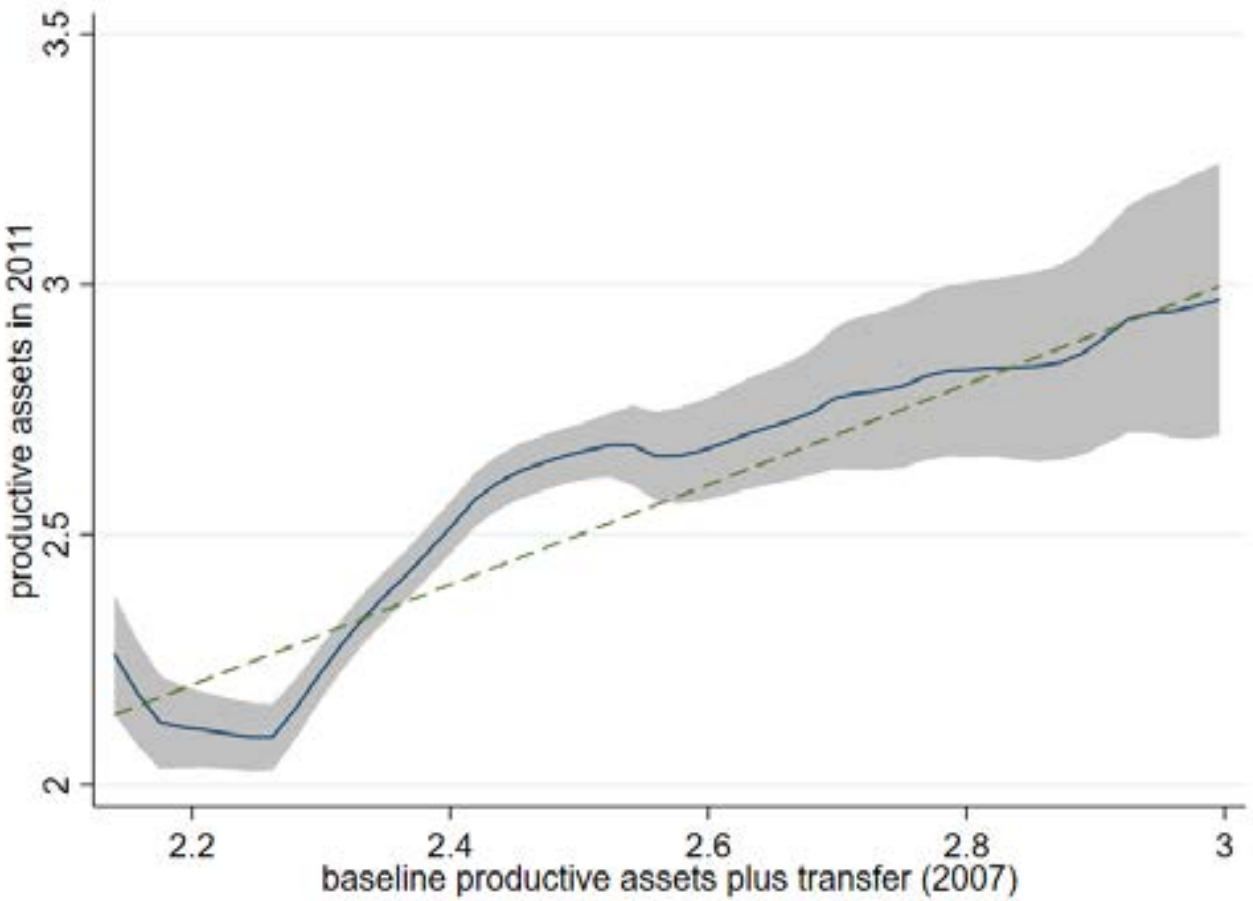
Figure 4: Local Polynomial Estimates of the Transition Equation



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References I

Facundo Alvaredo, Lucas Chancel, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman, *The elephant curve of global inequality and growth*.

Nava Ashraf, Erica Field, and Jean Lee, *Household bargaining and excess fertility: an experimental study in zambia*, American Economic Review **104** (2014), no. 7, 2210–37.

Daron Acemoglu, Simon Johnson, and James A Robinson, *The colonial origins of comparative development: An empirical investigation*, American economic review **91** (2001), no. 5, 1369–1401.

_____, *Reversal of fortune: Geography and institutions in the making of the modern world income distribution*, The Quarterly journal of economics **117** (2002), no. 4, 1231–1294.

ASER, *Aser trends over time 2006-2014*.

Clare Balboni, Oriana Bandiera, Robin Burgess, Maitreesh Ghatak, and Anton Heil, *Why do people stay poor?*

Abhijit Vinayak Banerjee, Esther Duflo, Rachel Glennerster, and Dhruva Kothari, *Improving immunisation coverage in rural india: clustered randomised controlled evaluation of immunisation campaigns with and without incentives*, Bmj **340** (2010).

Nicholas Bloom, Benn Eifert, Aprajit Mahajan, David McKenzie, and John Roberts, *Does management matter? evidence from india*, The Quarterly Journal of Economics **128** (2013), no. 1, 1–51.

Mark Bils and Peter J Klenow, *Does schooling cause growth?*, American economic review **90** (2000), no. 5, 1160–1183.

Francesco Caselli, *Accounting for cross-country income differences*, Handbook of economic growth **1** (2005), 679–741.

References II

Jishnu Das, Alaka Holla, Aakash Mohpal, and Karthik Muralidharan, *Quality and accountability in health care delivery: audit-study evidence from primary care in india*, American Economic Review **106** (2016), no. 12, 3765–99.

William Easterly, Michael Kremer, Lant Pritchett, and Lawrence H Summers, *Good policy or good luck?*, Journal of monetary economics **32** (1993), no. 3, 459–483.

Roger Gordon and Wei Li, *Tax structures in developing countries: Many puzzles and a possible explanation*, Journal of public Economics **93** (2009), no. 7-8, 855–866.

Chang-Tai Hsieh and Peter J Klenow, *Misallocation and manufacturing tfp in china and india*, The Quarterly journal of economics **124** (2009), no. 4, 1403–1448.

Richard Hornbeck, *Barbed wire: Property rights and agricultural development*, The Quarterly Journal of Economics **125** (2010), no. 2, 767–810.

IMF, *Database of country fiscal measures in response to the covid-19 pandemic*, 2021, Data accessed on August 13, 2021. https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19.

Seema Jayachandran, *Selling labor low: Wage responses to productivity shocks in developing countries*, Journal of political Economy **114** (2006), no. 3, 538–575.

Robert Jensen, *The digital provide: Information (technology), market performance, and welfare in the south indian fisheries sector*, The quarterly journal of economics **122** (2007), no. 3, 879–924.

Peter J Klenow and Andres Rodriguez-Clare, *The neoclassical revival in growth economics: Has it gone too far?*, NBER macroeconomics annual **12** (1997), 73–103.

References III

Rafael La Porta, Florencio Lopez-de Silanes, and Andrei Shleifer, *The economic consequences of legal origins*, Journal of economic literature **46** (2008), no. 2, 285–332.

Christoph Lakner, Nishant Yonzan, Daniel Gerszon Mahler, R Andres Castaneda Aguilar, and Haoyu Wu, *Updated estimates of the impact of covid-19 on global poverty: Looking back at 2020 and the outlook for 2021*, World Bank Data Blog (2021).

Rachael Meager, *Understanding the average impact of microcredit expansions: A bayesian hierarchical analysis of seven randomized experiments*, American Economic Journal: Applied Economics **11** (2019), no. 1, 57–91.

N Gregory Mankiw, David Romer, and David N Weil, *A contribution to the empirics of economic growth*, The quarterly journal of economics **107** (1992), no. 2, 407–437.

Nancy Qian, *Missing women and the price of tea in china: The effect of sex-specific earnings on sex imbalance*, The Quarterly Journal of Economics **123** (2008), no. 3, 1251–1285.

Xavier Sala-i Martin, *I just ran four million regressions*, 1997.

World Bank, *World development indicators: World view*, Data accessed on August 13, 2021. http://wdi.worldbank.org/tables.

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