# Education in developing countries

Doug Johnson

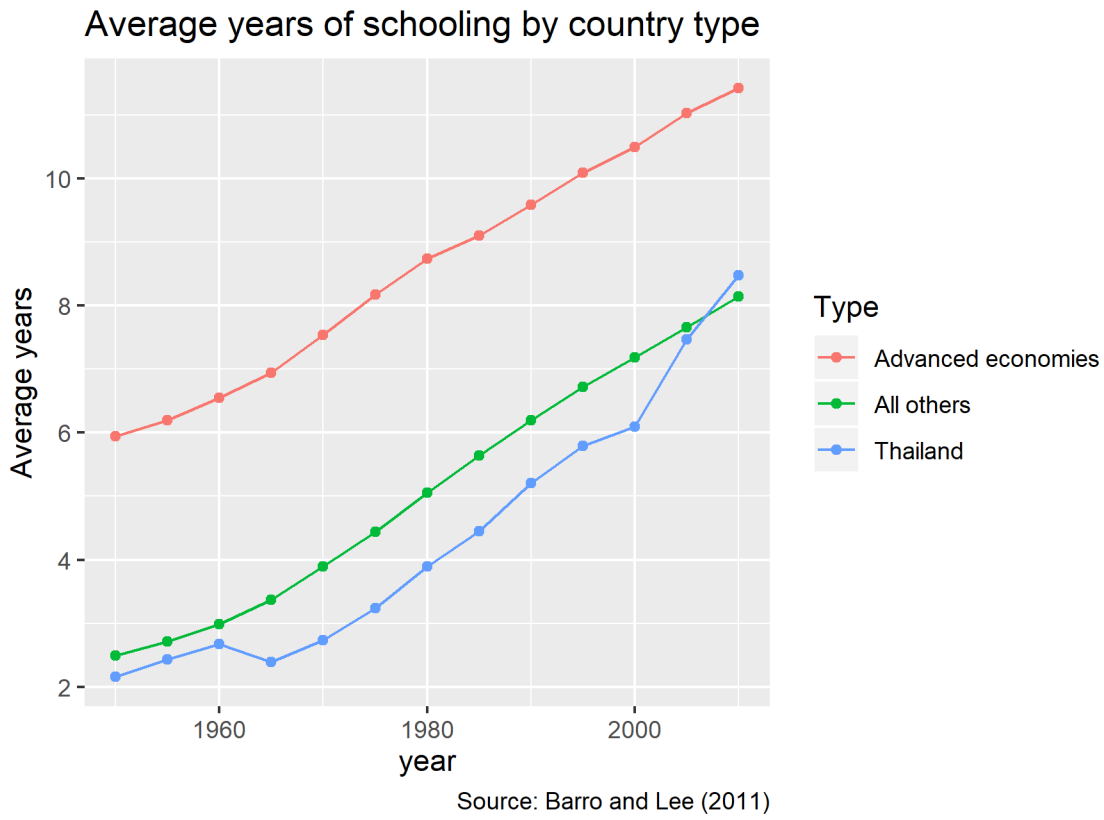
# My background

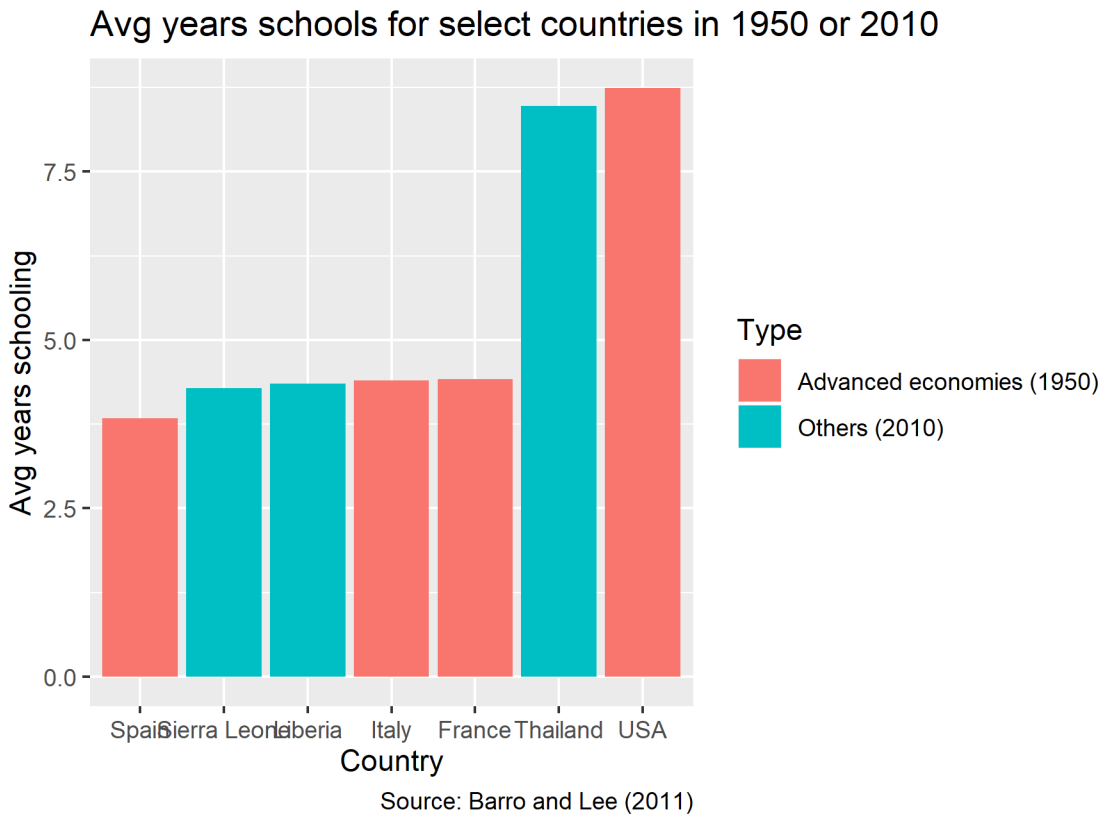
- What I do:
  - I conduct impact evaluations of social programs
  - I work across sectors, but mainly in education, social protection, health, and agriculture
- Currently a consultant at the World Bank. Previously worked at:
  - IDinsight
  - USAID
  - Abt Associates
  - The World Bank
- Most of my experience is in India and (to a lesser extent) Africa.

# Outline

- The past 50 years: lots of schooling, not much learning
- Why lack of learning matters
- The mystery of the missing effects
- The surprising effectiveness of (some) teachers and (certain types of) teaching
- Why improving teachers and teaching is so difficult

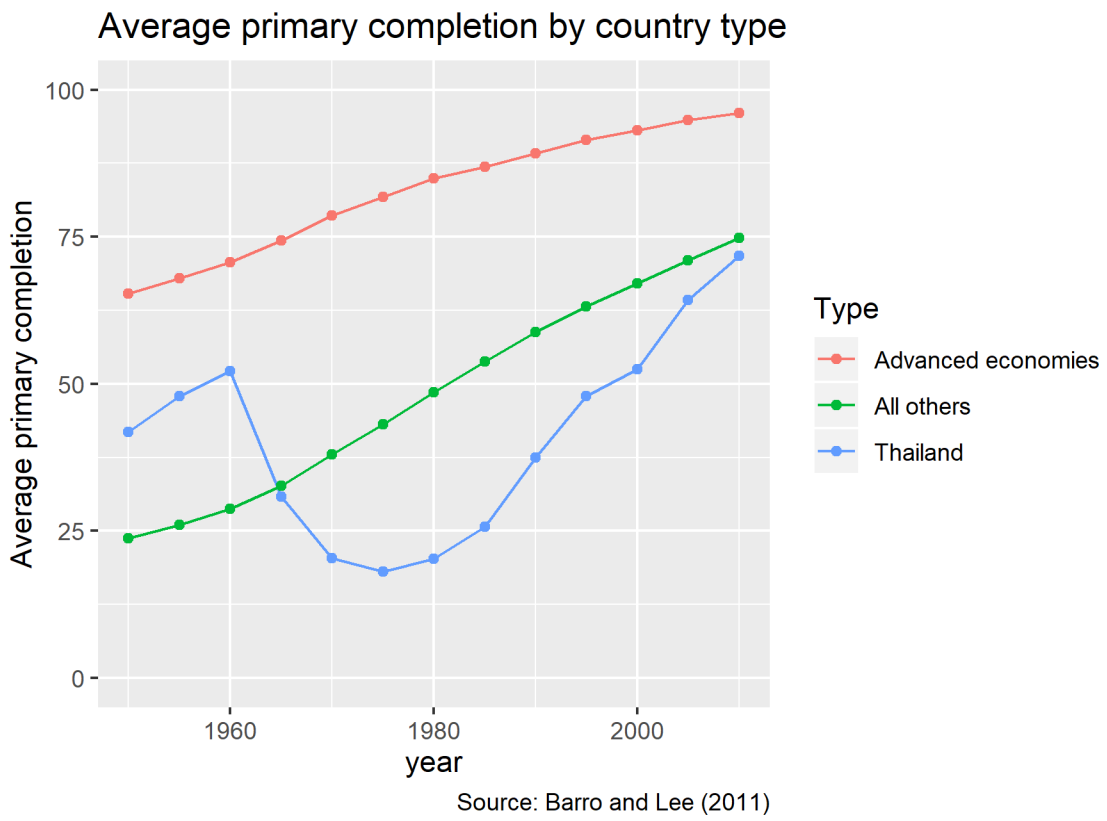
# Access to education has increased massively in past 50 years

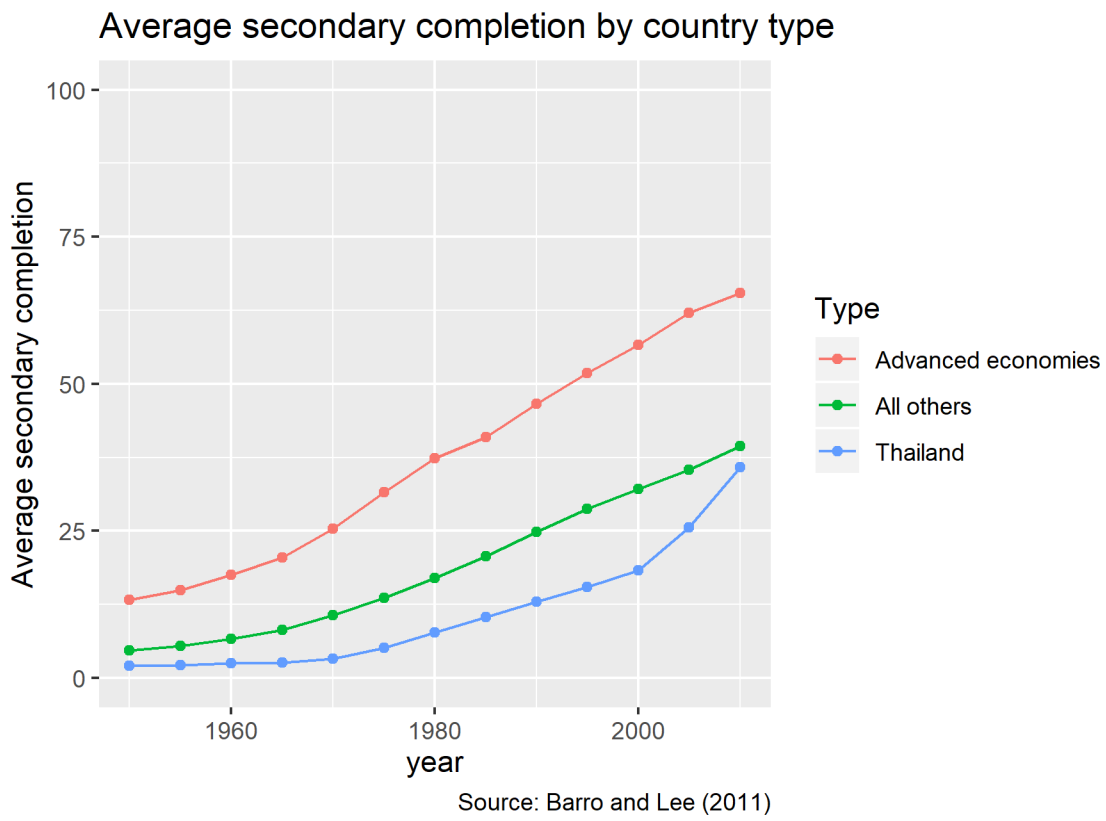



Note: The first few slides draw heavily from Lant Pritchett's excellent book "The Rebirth of Education: Schooling aint Learning"

# In dev countries, big increases in primary school enrolment

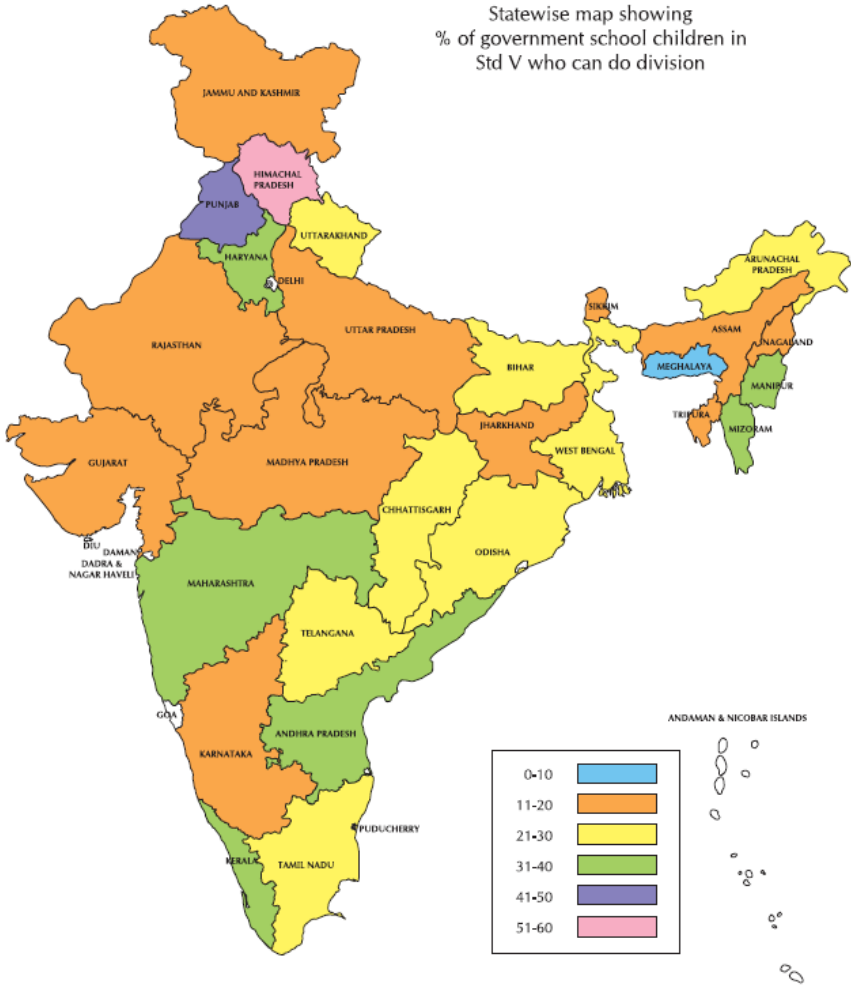


# …but schooling aint learning (1)

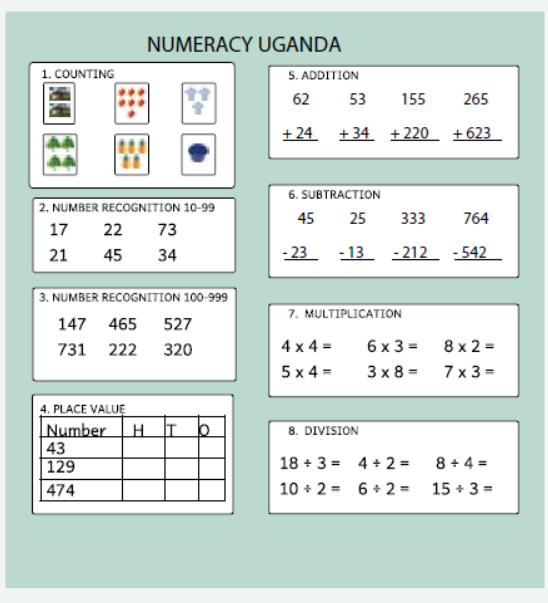
ASER Math Assessment

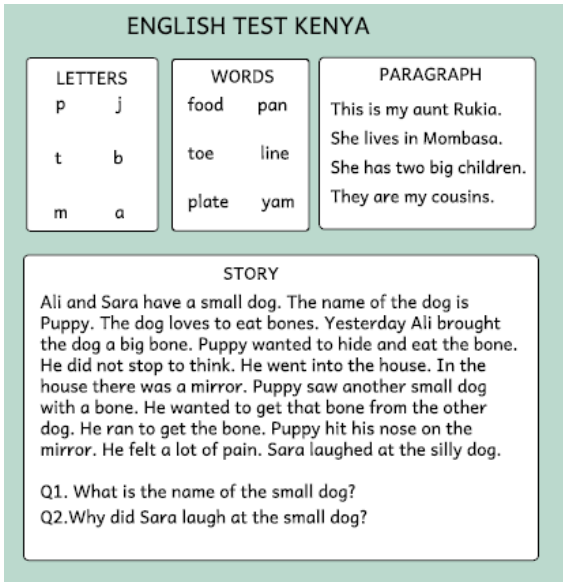
| Number recognition 1&9 | | Number recognition 10&99 | | Subtraction | | Division |
|---|---|---|---|---|---|---|
| 1 | 4 | 51 | 83 | 46 − 29 | 63 − 39 | 7)879 |
| 7 | 3 | 37 | 65 | 47 − 28 | 45 − 17 | 6)824 |
| 6 | 9 | 55 | 26 | 92 − 76 | 84 − 57 | 8)985 |
| 5 | 2 | 91 | 43 | 52 − 14 | 66 − 48 | 4)517 |
| | | 36 | 27 | | | |

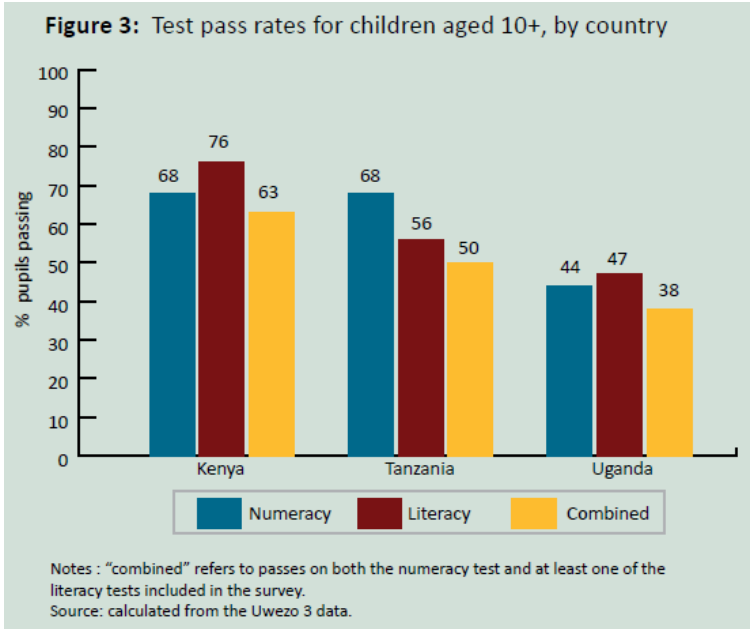


# …but schooling aint learning (2)

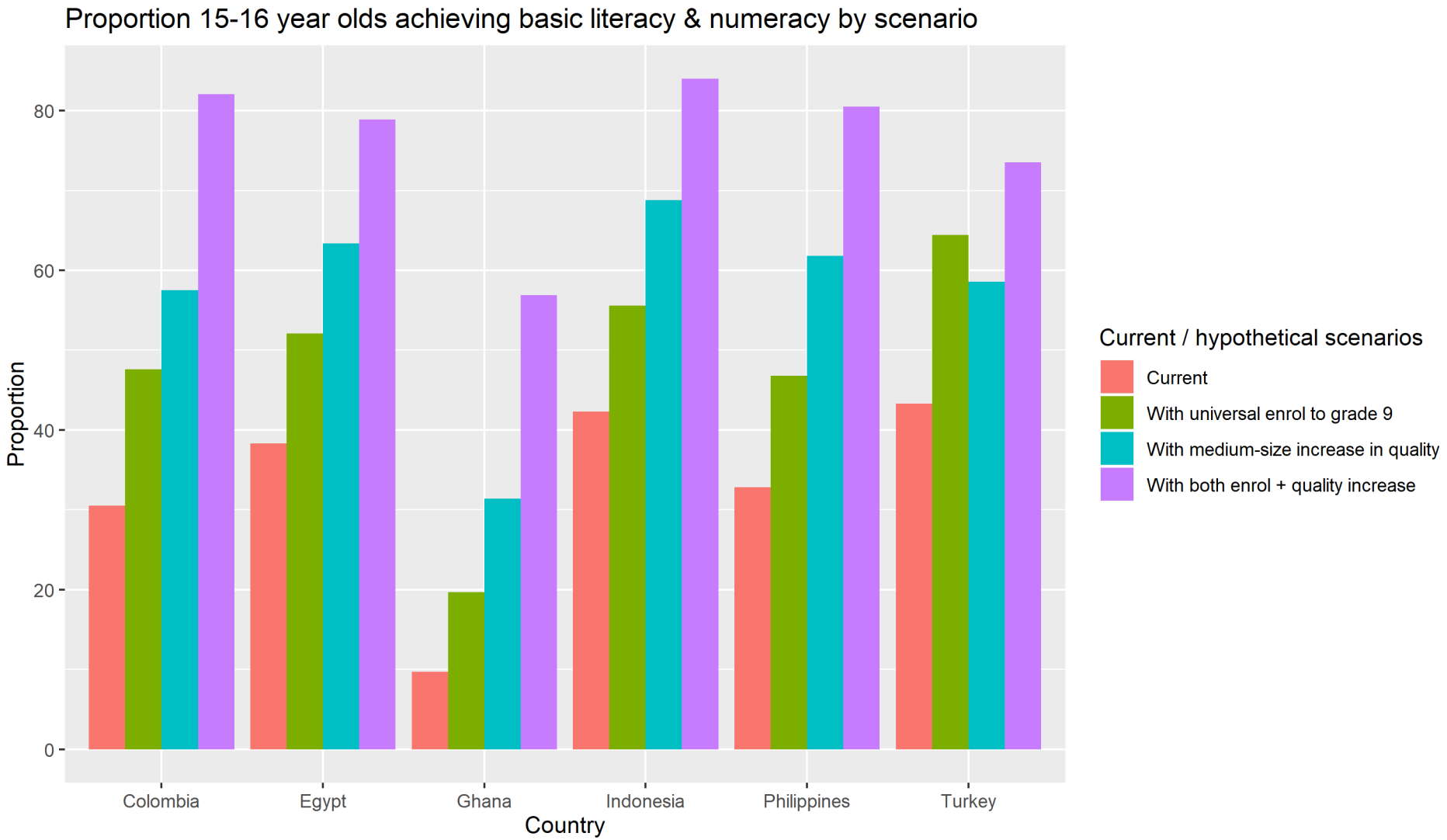
Uwezo Math and Reading Assessments



# Increasing enrolment is not sufficient



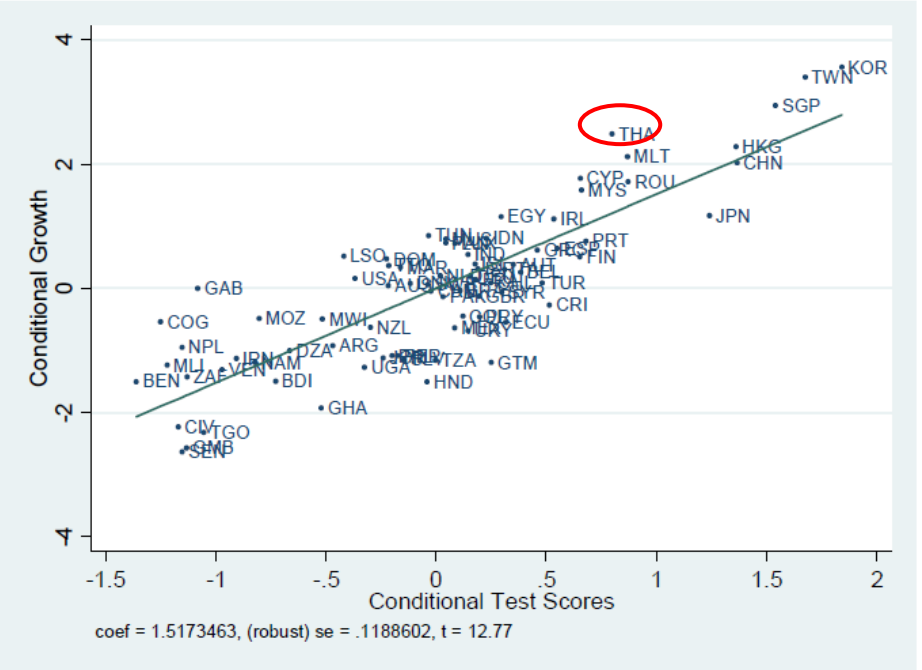

Lant Pritchett The Rebirth of Education: Schooling aint Learning table 2.4

# How important is learning?

- Most people agree that government has an ethical obligation to ensure access to education.
- But government has a lot of responsibilities
- So how important is education really?

# Answer: Ed is very important for long-term growth

- Hanushek and Woesmann (2009) estimate correlation between test scores and growth
- They regress
  - $g = \alpha H + \beta S + \gamma GDP + \delta X$
  - g is average growth from 1960-2000
  - H is average math & science score 1964-2003
  - S is years of schooling in 1960
  - GDP is GDP in 1960
  - X is controls such as fertility, openness, etc
- Test scores are highly predictive of growth
- Coeff on test scores is huge: one SD increase in test scores is associated with 1.2-2 ppts more growth! In open economies, 1 SD increase associated with 2.5 ppts more growth




Note: Added-variable plot of a regression of the average annual rate of growth (in percent) of real GDP per capita in 1965-2015 on the initial level of real GDP per capita in 1960 and average scores on international and regional student achievement tests.

# Ok, but is this causal?

- H and W show that results hold when instrumenting for test score using share of private school enrolment, centralization of decision-making, and other aspects of country ed system
- H and W also show that changes in test scores are associated with changes rates
- Finally, H and W show that, at micro-level, average test scores of home country appear to boost immigrant wages.

# So how do we increase education quality?

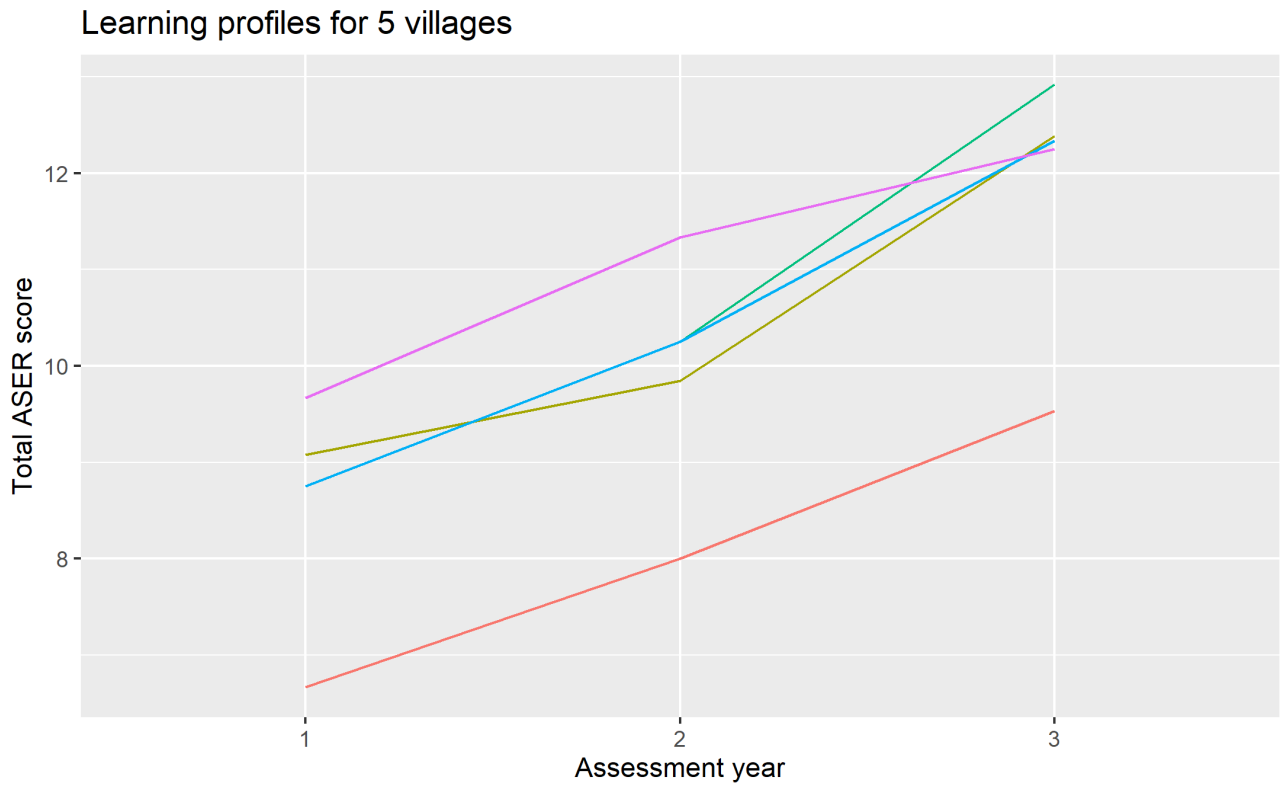
- A quick review…
  - Education is key to long term growth
  - Developing countries must improve quality, and not just further increase enrolment, to achieve substantial learning progress
- A logical next step:
  - Figure out what inputs are needed for learning
  - Buy more for government schools

# The mystery of the missing effects

- In 1960s, US govt commissioned sociologist James Coleman to analyze racial inequality in education in the US
- Coleman found that school resources (e.g. total funding, teacher qualifications, pupil-teacher ratio) were not correlated with student achievement.
- The methods used in the Coleman report were crude but subsequent more careful research has, for the most part, confirmed that more resources ≠ substantial increases in ed quality

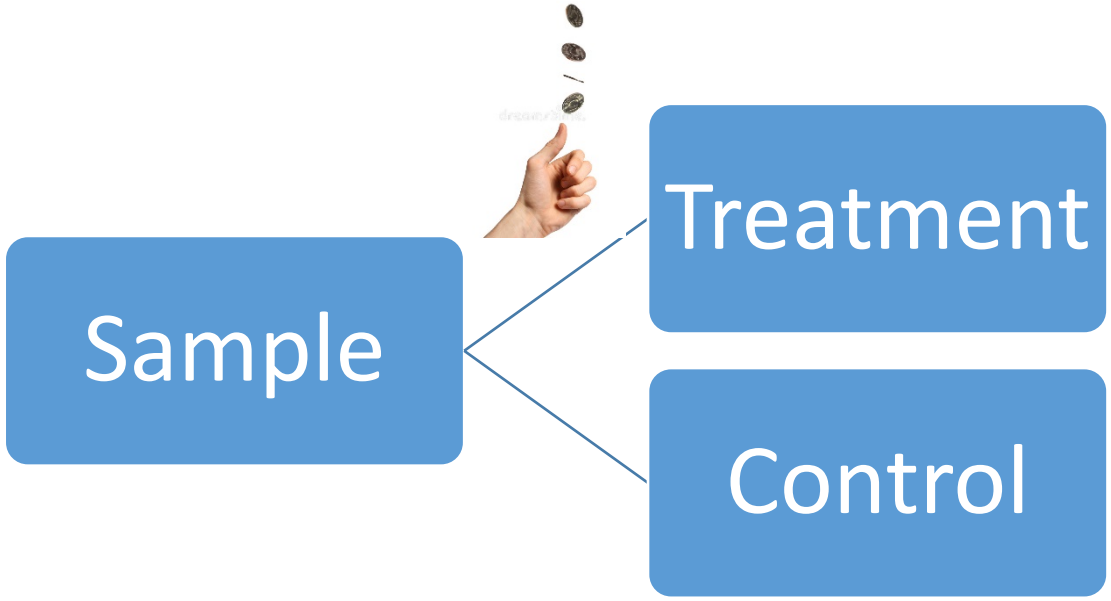
# Estimating the impact of ed policies / inputs

- To understand what really matters for learning, we need some way of measuring the impact of various policies / interventions on learning
- Yet estimating the impact of education policies is hard
  - Students learn in the absence of programs
  - Students who receive an intervention often quite different from other students (e.g. private school students vs public school)

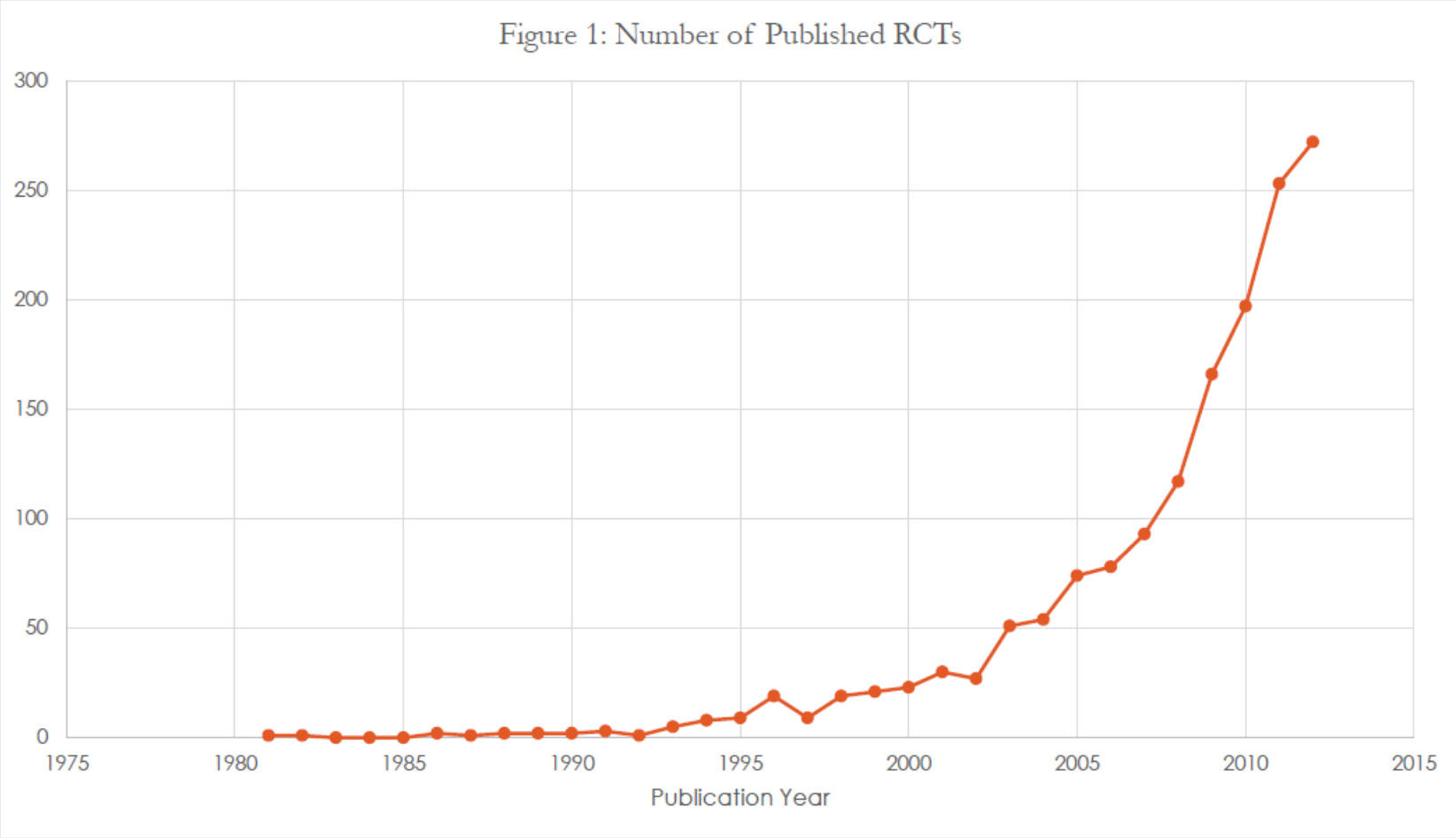


# Randomized Controlled Trials

- RCTs are the most rigorous option for estimating program impact
- Students / beneficiaries are randomly assigned to either treatment / control
- Due to randomization, on average, treatment and control will be very similar
- Randomization prevents selection bias but results may be corrupted by…
  - Attrition
  - Spillovers
  - Non-compliance



# RCTs use has soared in economics




Source: Cameron (2016) as cited in Duflo (nd)

# Value added models

- Randomizing is not always feasible
- Thus, researchers often must use “observational” (i.e. non-randomized) data
- In education, researchers often estimate a “value added” model (Todd and Wolpin, 2003)
  - $y_{i,t} = \alpha_1 x_{i,t} + \beta_{y_{i,t-1}} + \mu_{i,t}$
  - $y_{i,t}$ are test scores for child i in time t
  - $x_{i,t}$ are all inputs to learning in time t
- This model relies on lots of dubious assumptions, but seems to work Ok
  - Closely matches RCT evidence where both estimates exist
  - When used to estimate teacher effects, addition of controls doesn’t affect estimates and estimates are stable to teacher transfers (Chetty, Friedman, and Rockoff, 2014)
- The benefit of this model (compared to RCTs) is that you can estimate effect of any component of x you have data for (e.g. x might include school type, parent time, pedagogy)

Notes: See Todd and Wolpin (2003) for more info.

# What works -- teachers

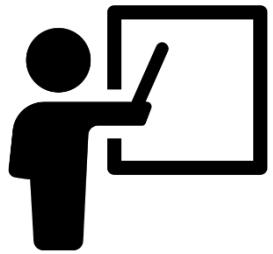
- Value add models can be used to estimate teacher effects by adding fixed effect dummies for each teacher
  - $y_{i,t} = \alpha_1 x_{i,t} + \gamma_{j\{i,t\}} + \beta_{y_{i,t-1}} + \mu_{i,t}$
  - $\gamma_{j\{i,t\}}$is a dummy for teacher j, who teachers child i in year t.
- Studies from across the US, Pakistan, all Ecuador all show large variation in teacher effectiveness
- Students taught by a good (75$^{th}$ percentile) teacher learn about twice as much as from a bad (25$^{th}$ percentile teacher)
- In the US, difference between a bad (5th percentile) and median (50$^{th}$) teacher is about $250,000 in lifetime earnings for students in a single class and year
- Surprisingly, teacher value add is almost completely uncorrelated with teacher qualifications, education, or other attributes. (This is why Coleman missed them.)

# What works -- teaching

- Results from RCTs and value-added models show that “pedagogy” interventions (i.e. interventions which change how teachers teach) can have large effects.
- Examples of pedagogy interventions with big effects include:
  - A remedial program in India (Banerjee et al, 2010)
  - An after-school personalized EdTech program in Delhi (Muralidharan, Singh, Ganimian, 2019)
  - Assigning children to different classes based on learning level in Kenya led to large gains for all children (Duflo, Dupas, and Kremer, 2011)

# Problem solved?

Good teachers



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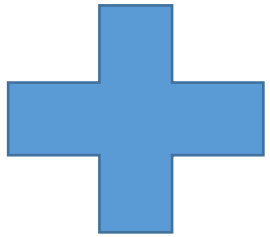
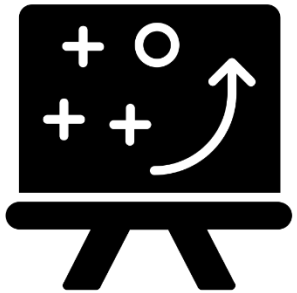
from Noun Project



Good teaching



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Learning

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# Unfortunately, getting this right in govt schools is not easy

- Good teachers are hard to spot and thus hard to recruit
  - Remember that teacher value add is not correlated with teacher characteristics*
  - Thus, it is hard to design rules to filter for good teachers
- Paying teachers more (without other changes) doesn't work
  - In most developing countries, government school teachers are paid much more than market rates and teacher compensation makes up more than half of total education spending (Crawfurd and Pugatch, 2020)
  - Indonesian government doubled teacher salaries and it had no short or medium term effect. (Rees et al, 2015)
- Training teachers (usually) doesn't work
  - Most teacher training programs don't result in (Popova et al 2016)

* One exception to this is early experience. In most contexts, having at least 2 years experience is correlated with value add. In addition, in Pakistan, teacher knowledge is correlated with teacher value add. (Bau and Das, 2018)

# Contract teachers – a potential fix?

- In many developing countries, govt teachers have low accountability and exert low effort
  - One survey found that govt school teachers are often absent and, even when they show up, don't do any work (Chaudhury et al, 2006)
- To increase teacher accountability and reduce cost, govts often hire "contract" teachers.
- Contract teachers typically have fewer qualifications, are paid much less, and have no job security
- Despite lower qualifications and less pay, RCTs of contract teacher programs show large effects (e.g. Duflo et al, 2015)

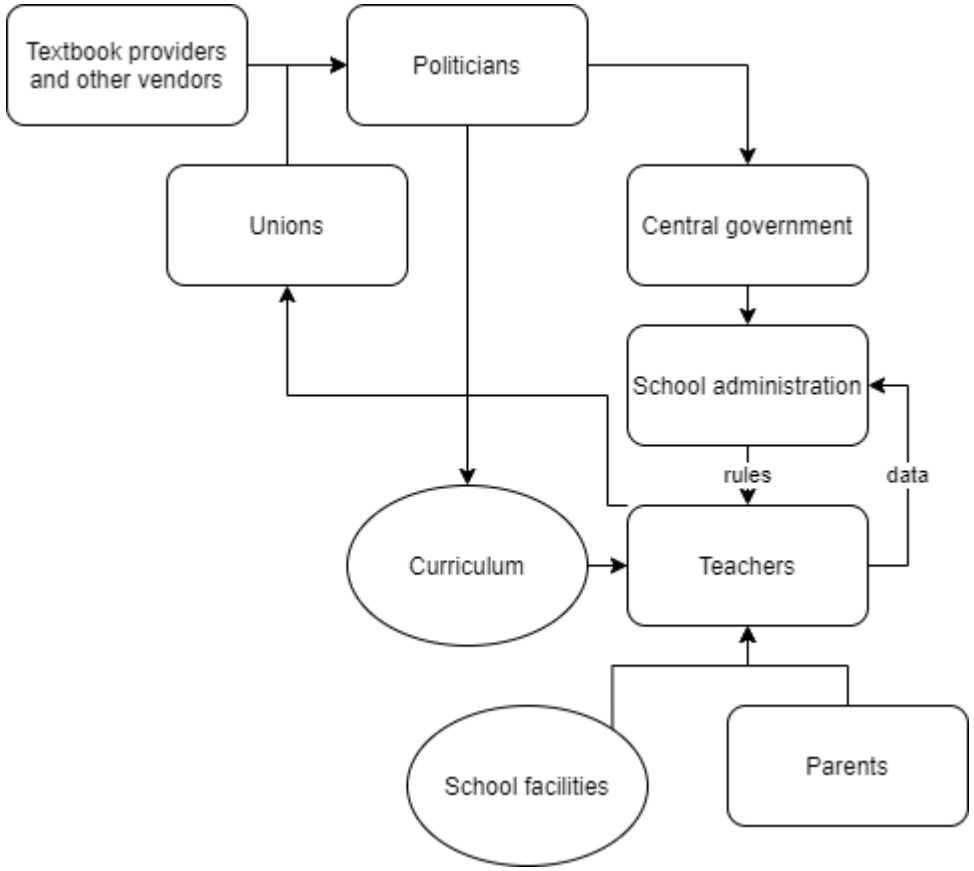
# Contract teachers and the challenges of scaling up

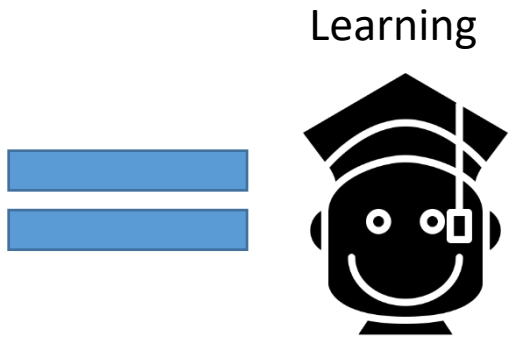
- Bold et al (2016) test what happens when a contract teacher program is scaled up
- Kenya introduced a major new contract teacher program that was eventually scaled to 18,000 govt schools
- Bold et al conducted RCT on a small subset of these schools
  - Control: 64 govt schools received no contract teacher
  - Standard treatment: 64 govt schools received a contract teacher who was managed by government
  - Non-profit treatment: 64 govt schools received a contract teacher who was managed by a non-profit
- The non-profit treatment arm saw big gains in learning. The standard treatment arm saw no increases.

# What happened in the standard treatment arm?

- The national teachers' union strongly opposed the contract teacher program
- They demanded civil service employment and union wages for all teachers
- The government eventually conceded to these demands (though after the RCT was over)
- Bold et al provide suggestive evidence that the *expectation* of being covered by a union contract reduced contract teachers' incentives / motivation

# A more realistic model of education systems



# Vouchers

- System reform is hard!
- A (potentially) easier option: outsource provision to the private sector through vouchers
- Even if we agree that government should provide quality education, that doesn't mean that they must operate schools themselves
- In many developing countries, private schools appear to do a better job for far less cost
  - Value added evidence from Pakistan shows modest effect of private effects
  - RCT evidence from India shows mid-size effect of private schools
  - In both countries, operating costs of private schools are far lower than govt schools

# Chile's voucher program – a cautionary tale

- In 1981, Chile introduced a massive school voucher program.
  - All private schools could receive public funding as long as they didn't charge fees
  - Funding to both public and private schools was based solely on number of students
- Pinochet's real motivation was likely to reduce the political power of teachers' unions
- Vouchers led to a huge increase in private school enrolment

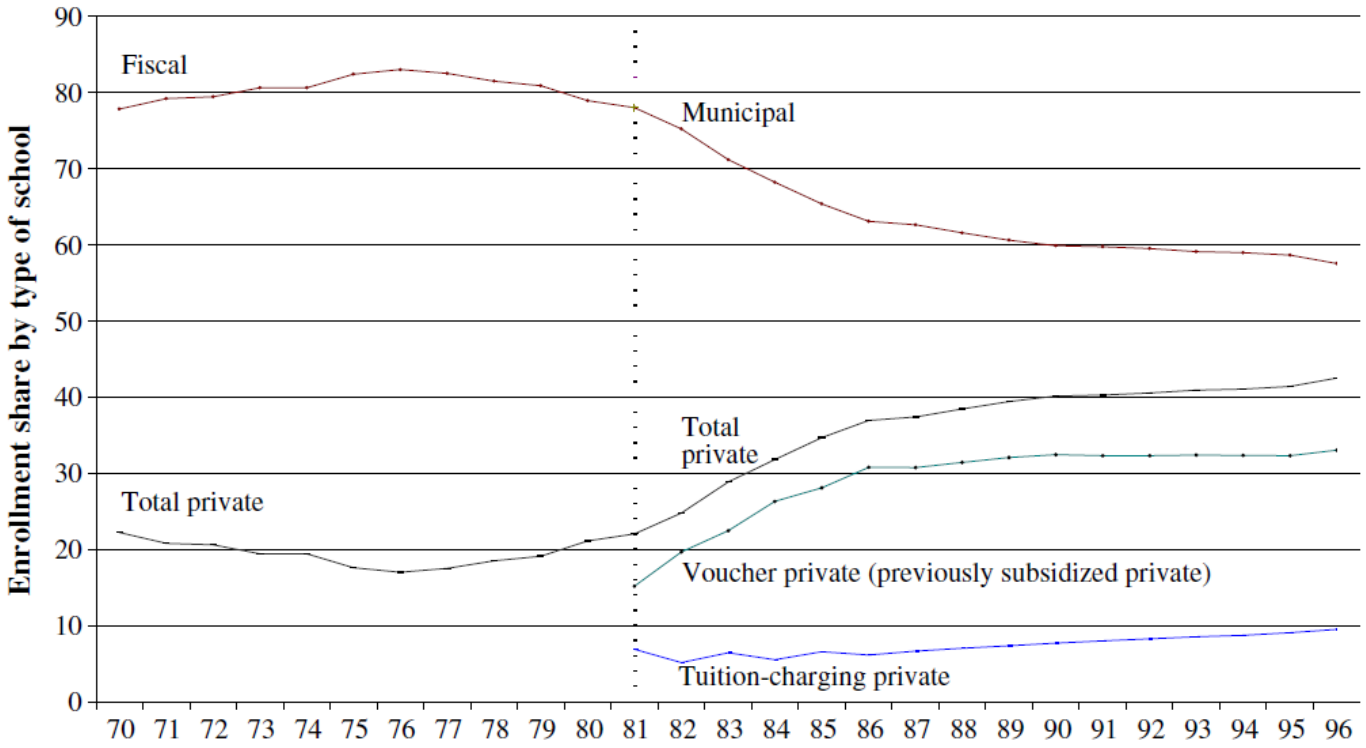



Fig. 1. National enrollment shares by sector, 1970–1996. Data assembled from several issues of the Ministry of Education's *Compendio Estadístico*.

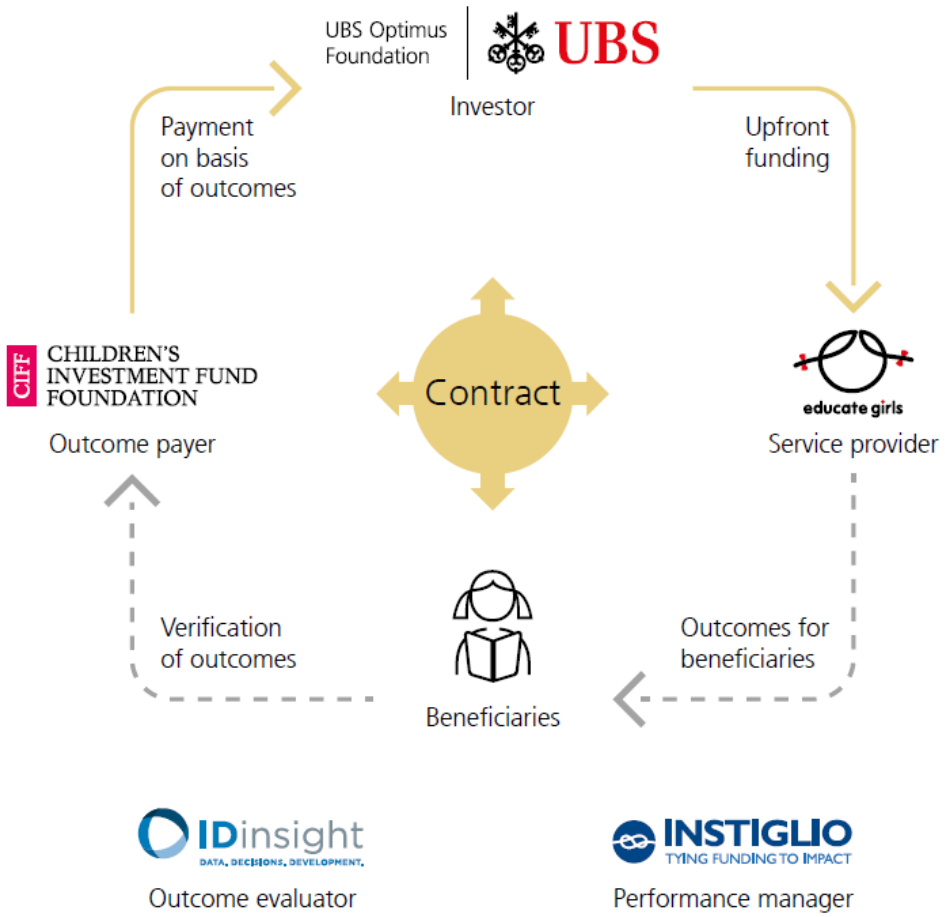
# Effects of the Chilean experiment

- Estimating effect of vouchers by comparing private schools students and govt school students is difficult
  - Private schools may “cream skim” (i.e. select best students)
  - Public schools may also perform better due to increased competition
- But if the voucher program is large enough, estimation is a bit easier – just look at change in test scores for *all* students (and assume no changes in absence of reform)
- Hsieh and Urquiola use a slightly more sophisticated version of this to estimate impact of Chilean reform
- They find no evidence that the reform improved test scores
- 15 years after the reform, Chilean students performed about the same compared to similar countries as before (despite much higher GDP growth)

# Development Impact Bonds

- Yet another option: pay only if you see results – i.e. “pay for performance”
- Basics of the DIB model
  - Funder pays based on performance (as assessed by evaluator)
  - Investor provides up-front cash
  - Service provider is responsible for implementing the program. This could be a school or any type of non-profit.
  - External evaluator rigorously assesses impact

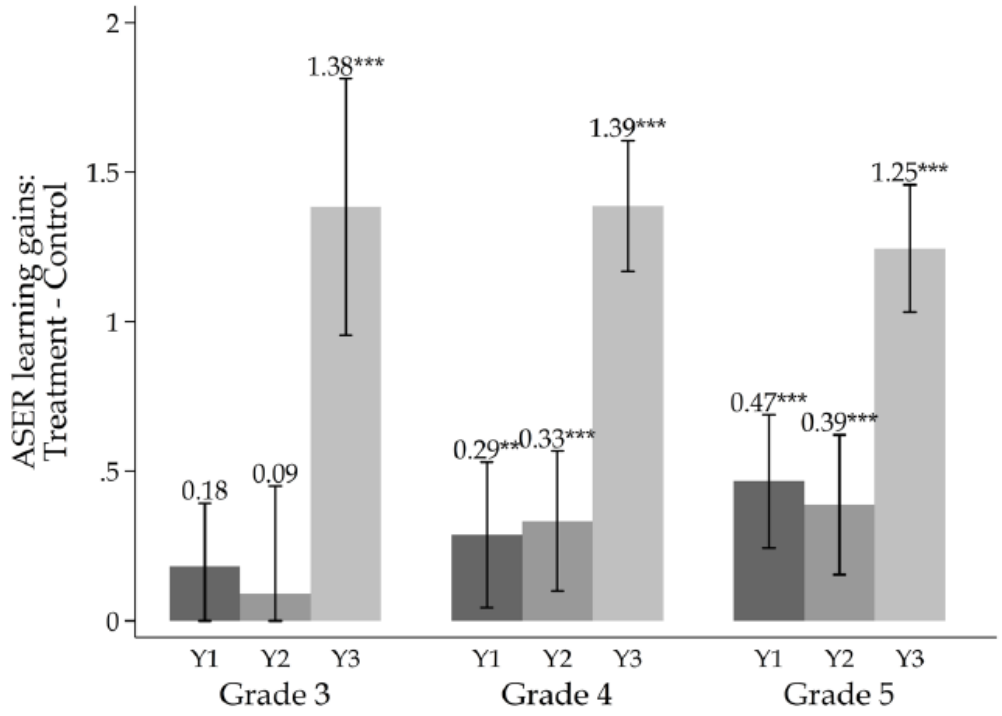
# The Educate Girls Development Impact Bond



# Impact of the EG DIB

- IDinsight conducted village-level RCT to estimate impact of the program
- Very low attrition and high data quality methods
- Overall impact on learning was medium to largish

**Figure 4: One-Year Average Treatment Effects by Grade and Year**




Note: * p < 0.1, ** p < 0.05, *** p < 0.01. Range bars denote 95% confidence intervals. Since we did not assess students at the beginning of grade 3 in Year 2 and 3, we calculate grade 3 treatment effects using baseline scores for those cohorts. The one-year comparison therefore assumes that any treatment effects for these cohorts occurred during Grade 3 only. The yearly average treatment effects for each cohort do not sum exactly to the overall average treatment effect for that cohort since the yearly average treatment effects do not account for students who have dropped out or have been retained.

Note: 1 ASER learning level is roughly .3 standard deviations

# But should DIBs be scaled?

- Evaluation showed that EG had an effect but unclear what the effect of the DIB was
  - If CIFF had just given EG the money, would the results have been as large?
  - If this hadn't been the first DIB (and there hadn't been a lot of press) would EG have had as much impact? (Partly in response to the positive press, EG received substantial additional funding)
- In addition, non-program costs were high
  - Total costs were approximately $1 million. This likely does not include cost of funder / investor staff time
  - Out of these costs, $400k went to EG. The rest was split between admin costs and eval costs.