

ECO 330: Economics of Development

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Education in Developing Countries

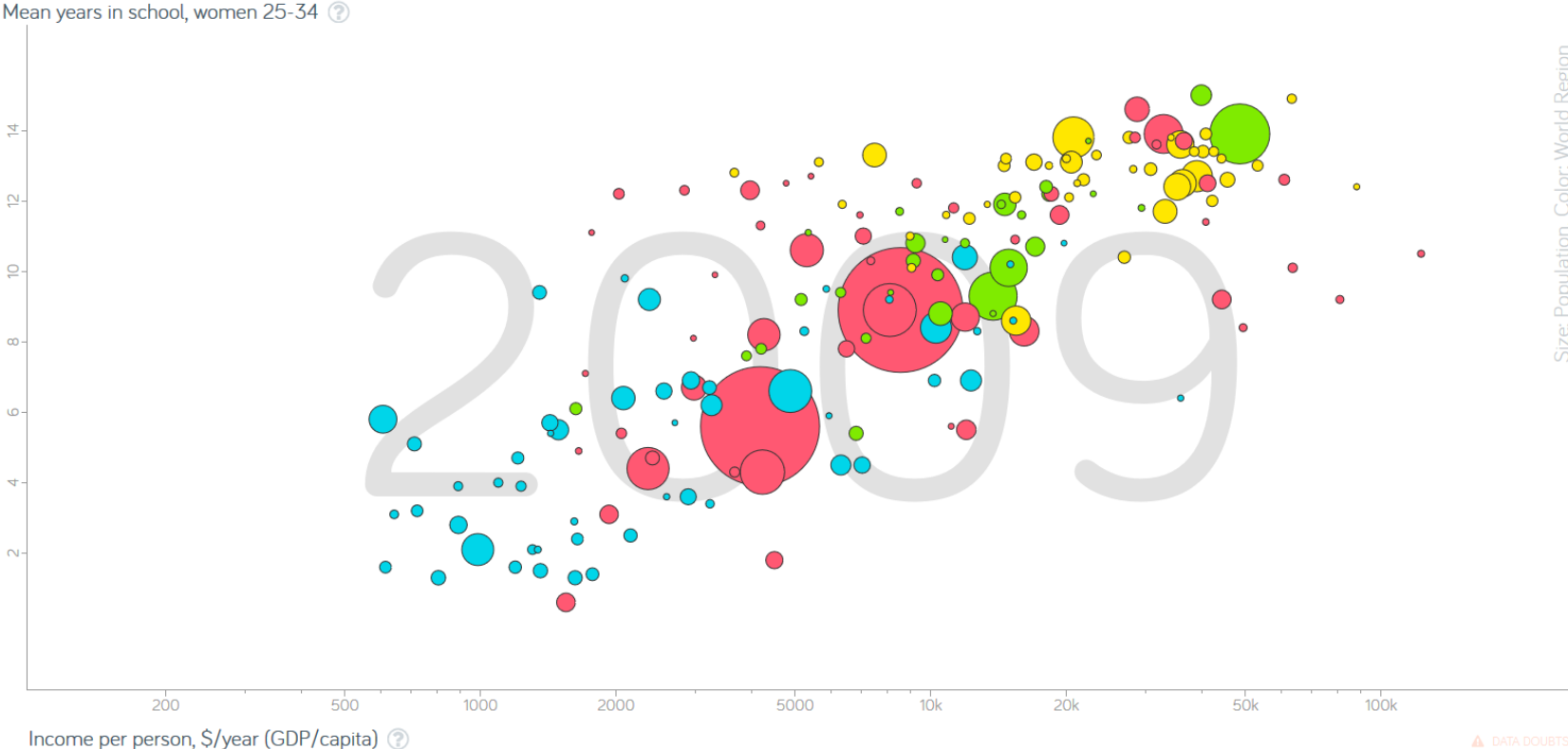
Education often touted as possible way to reduce poverty and increase social mobility

- Strong correlation between average education levels and development
- However, many difficulties in delivering education to developing countries

How sure are we that education matters?

- Educated \Rightarrow Rich or Rich \Rightarrow Educated? Or outside factor affecting both?
- Typically don't have good instruments for IV regressions, so causality can be hard
- Will look at alternative approaches, including random assignment

Mean Years in School (Women, 25+) vs GDP/Capita



Education Gap

By almost all measures of education gap, developing countries lag.

- **Primary School Gap:** Differences in education among 5-11 year olds (elementary)
- **Secondary School Gap:** Differences in education among 12-19 year olds (high school)
- **Education Quality Gap:** Differences in quality of education across countries
- **Gender Education Gap:** Differences in educational attainment between genders

Net vs Gross Enrollment Rates

Can measure enrollment rates two ways:

Net Enrollment Rates: Only includes students of given age

$$\text{Net Primary Enrollment} \equiv \frac{\text{Number 5 – 11 Year Olds in Primary School}}{\text{Number of 5 – 11 Year Olds}}$$

Gross Enrollment Rates: Numerator is all students, denominator only for given age

$$\text{Gross Primary Enrollment} \equiv \frac{\text{Number Students (All Ages) in Primary School}}{\text{Number of 5 – 11 Year Olds}}$$

- Gross Enrollment can be over 100 (early enrollment and grade repeats)

Education Gaps: Primary School

Primary School Gap: Differences in education among 5-11 year olds (elementary)

- Higher in developing countries, but relatively high everywhere
- Significant progress made towards goal of universal primary education

Gross primary school enrollment is over 100

- Almost everybody gets primary education, but not necessarily at expected age

Gross Primary School Enrollment Rates (2010)

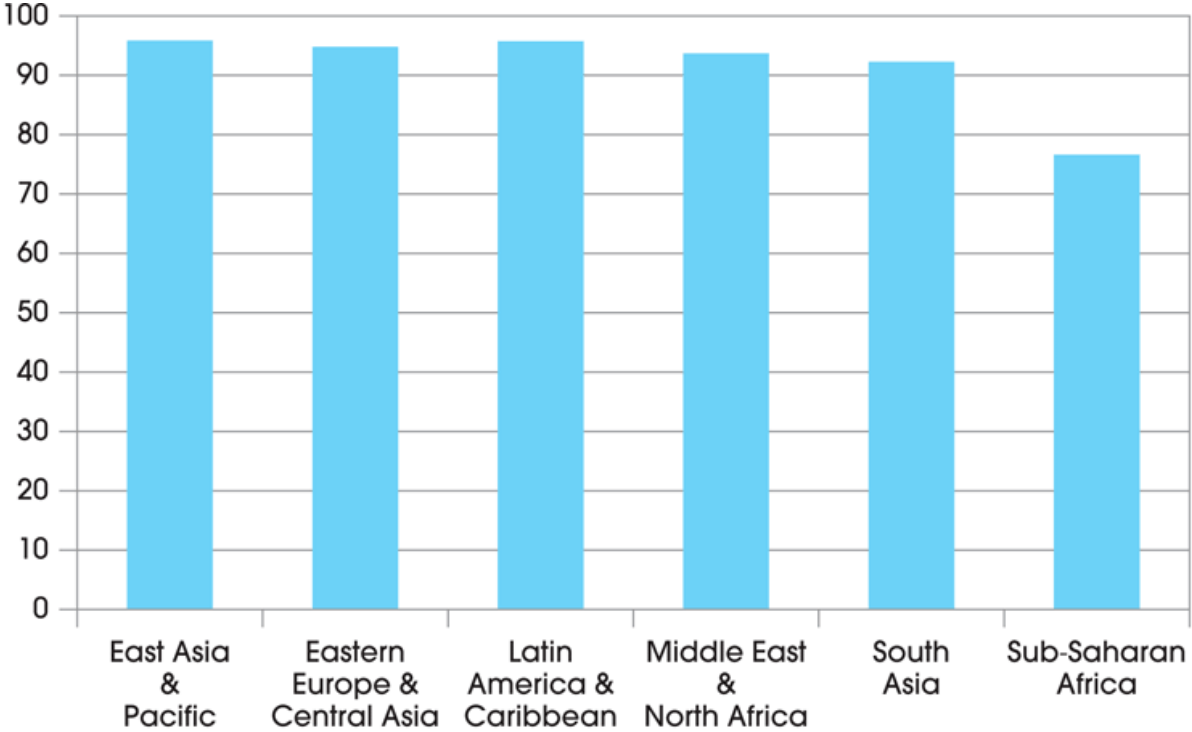
Area	1980	1990	2000	2002	2005	2010
World	97	101	102	103	107	106
Country group						
Low-income	83	87	95	94	102	105
Middle-income	106	112	109	112	113	106
High-income	102	103	102	101	100	110
Region						
Sub-Saharan Africa	80	73	86	95	92	99
Middle East/North Africa	87	95	95	97	103	105
Latin America	105	104	130	123	118	114
South Asia	77	95	98	97	110	106
East Asia	111	119	106	113	114	110
Eastern Europe and Central Asia	99	98	94	98	102	100
Europe (Euro area)	106	105	104	104	104	105

Big gains reducing primary education gap

Gross primary enrollment rates measure enrolled primary-school pupils as a percentage of children of primary-school age. The gap between rich and poor countries has generally been eliminated.

Source: The World Bank, World Development Indicators, primary gross enrollment rates, 2012.

Net Primary School Enrollment Rates (2010)



Net enrollment rates are above 90% in all regions of the world except sub-Saharan Africa.

Source: The World Bank, World Development Indicators, 2012.

Average Years of School for Adults

Area	1950	1960	1970	1980	1990	2000	2010
Income level							
Developed	6.22	6.81	7.74	8.82	9.56	10.65	11.03
Developing	2.05	2.55	3.39	4.28	5.22	6.15	7.09
Region							
Middle East and North Africa	0.76	1.07	1.78	3.04	4.58	5.9	7.12
Sub-Saharan Africa	1.28	1.52	2.02	2.76	3.93	4.62	5.23
Latin America	2.57	3.07	3.82	4.6	5.79	7.13	8.26
East Asia and Pacific	1.77	2.5	3.66	4.84	5.6	6.82	7.94
South Asia	1.02	1.16	1.59	2.1	3.41	4.22	5.24
Eastern Europe and Central Asia	4.83	5.56	6.69	7.88	8.85	9.13	9.65

Measured in average years of schooling, the education gap for adults in developed versus developing nations is still quite large even though it has declined significantly.

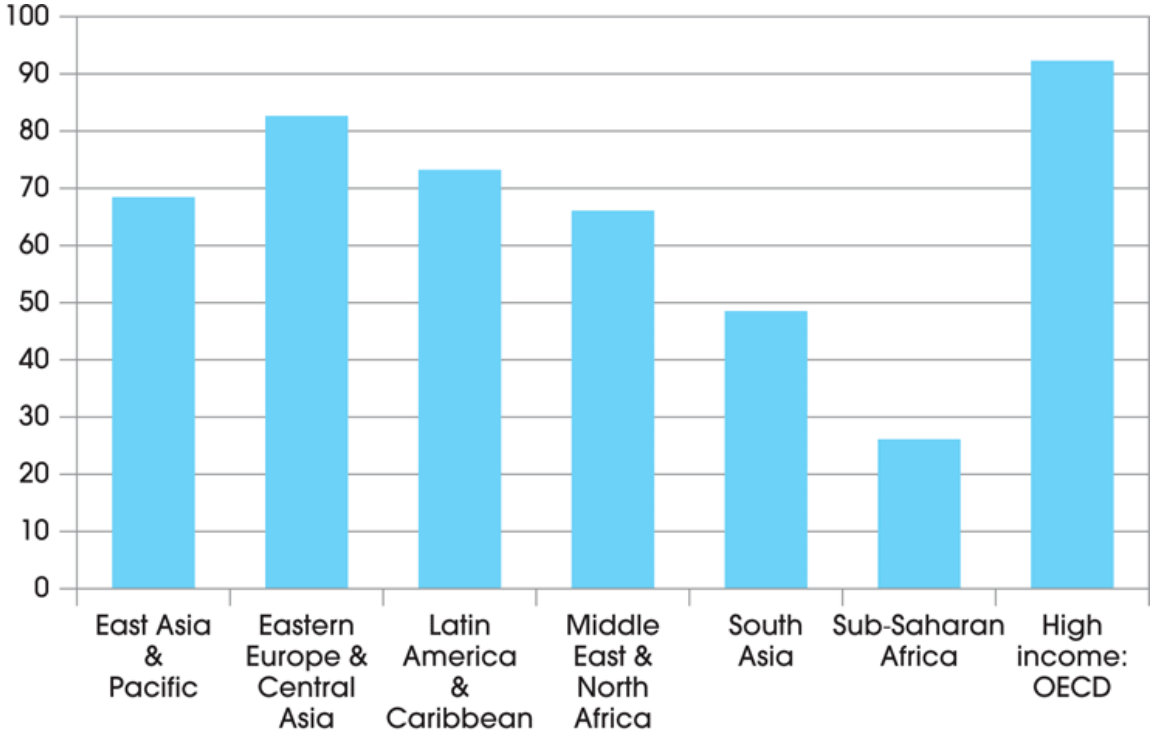
Source: Data from Robert J. Barro and Jong-Wha Lee, "A New Data Set of Educational Attainment in the World, 1950–2010" (working paper 15902, National Bureau of Economic Research, April 2010). The data can be downloaded from www.barrolee.com.

Education Gaps: Secondary School and Gender

Secondary School Gap: Differences in education among 12-19 year olds (high school)

- High in the richest countries, but lower everywhere else
- Still very low in Sub-Saharan Africa

Net Secondary School Enrollment Rates (2010)



The secondary-school enrollment gap is large, with average enrollment rates in sub-Saharan Africa and South Asia below 50%.

Source: The World Bank, World Development Indicators, 2012.

Education Gaps: Secondary School and Gender

Secondary School Gap: Differences in education among 12-19 year olds (high school)

- High in the richest countries, but lower everywhere else
- Still very low in Sub-Saharan Africa

Gender Education Disparities: Differences in educational attainment between genders

- In developing countries women have less access to education
- Little difference in middle income and rich countries

Gender Disparities in Education **Completion** Rates (2005)

Area	Primary completion, 2005%		Youth literacy rate, 2005%	
	Boys	Girls	Boys	Girls
Country group				
Low-income	79	69	80	67
Middle-income	96	95	97	95
High-income	98	97	99	99
Region				
Sub-Saharan Africa	63	53	78	68
Middle East/North Africa	86	86	89	77
Latin America	98	99	96	96
South Asia	86	77	80	63
East Asia	98	98	98	97
Eastern Europe and Central Asia	93	91	99	99

There is a gender gap in primary school completion and literacy rates in low-income countries that is concentrated in sub-Saharan Africa and South Asia.

Source: The World Bank, World Development Indicators, 2012.

Education Gap: Education Quality

Education Quality Gap: Differences in quality of education across countries

- School quality varies significantly both within and across countries
- Only 80% of primary-school teachers in low-income countries receive teacher training
- Lack of school supplies in developing countries
- Larger class sizes and more teacher absenteeism in developing countries

Primary School Class Sizes (2010)

Area	Pupil-teacher ratio: primary 2010
Country group	
Low-income	43
Middle-income	24
High-income	14
Region	
Sub-Saharan Africa	43
Middle East/North Africa	22
Latin America	22
South Asia	40
Eastern Asia	18
Europe and Central Asia	15
Euro Area	13

Classes sizes over 3 times larger in developing countries

Class sizes in primary schools are more than twice as large in low-income countries compared to high-income countries. Sub-Saharan Africa and South Asia have the largest class sizes.

Source: The World Bank, World Development Indicators, 2012.

Primary School Teacher Absenteeism Rates (2006)

	Primary schools
Ecuador	14
India (average over 14 states)	25
Indonesia	19
Papua New Guinea	15
Peru	11
Zambia	17
Uganda	27

25% of time, teachers are absent from primary schools

The absenteeism rate is the percentage of teaching staff who are supposed to be present in schools but have not come to work on the day of an unannounced visit. It includes staff whose absence is "excused."

Sources: Nazmul Chaudhury, Jeffrey Hammer, Michael Kremer, Karthik Muralidaran, and F. Halsey Rogers, "Missing in Action: Teacher and Health Worker Absence in Developing Countries," *Journal of Economic Perspectives* 20, no. 1 (2006): 91–116. Printed with permission of American Economics Association.

Establishing Causality for Education

How do we know education helps development?

- Tough to establish cross-country causality
- Can look within countries, to see causal impact of education on individuals

Need to think about Costs and Benefits of Education, including who bears them

Costs and Benefits of Education

Benefits:

Higher earnings for individuals as result of human capital.

Externalities are benefits to society. Often estimated to be large (e.g. reducing crime).

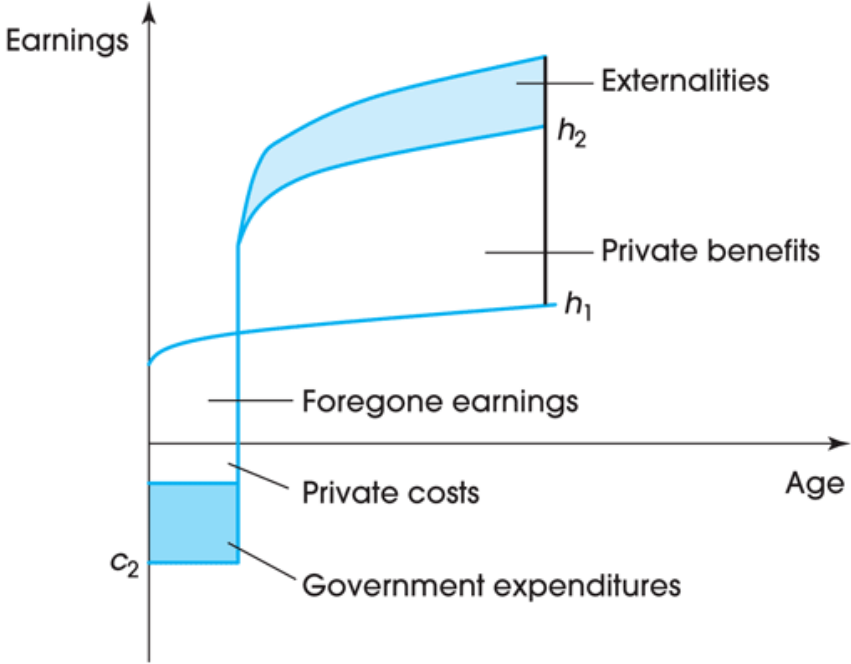
Costs:

Forgone earnings that individuals could have made by working instead of school

Private school costs (tuition, school supplies, etc) of the individual

Government expenditures on the education system

Costs and Benefits of Education



Curve h_1 represents the earnings over time of someone without education. Someone who invests in human capital will have earnings curve h_2 minus costs of education c_2 . Because of externalities (the shaded area above h_2), the return to education is higher than the private return. This justifies the government funding portion of the cost of education (blue box next to c_2).

Returns to Education

Difficult to quantify returns to education due to **selection issues**

- Students most likely to go to school are those most likely to benefit from it

Can look at **natural experiments** and **randomized assignment**

- **Natural Experiment:** Examine policies that affected feasibility of going to school
- **Randomized Assignment:** Randomly select volunteers and give them access to education

Natural Experiment: Differences in Differences [Duflo (2001)]

Between 1974-1978 there was a large Indonesian School Construction Program

- Only young children were able to benefit from this school expansion
- Compare differences between young children and teenager in areas that received school construction versus not school construction
- Also compare teenagers versus adults to make sure not just a general trend

Children in areas that received schools did much better in outcomes.

- Difference between children in teenagers also higher in areas that received schools

Natural Experiment: Differences in Differences [Duflo (2001)]

	Years of education			Log wage		
	Level of program in region of birth			Level of program in region of birth		
	High (1)	Low (2)	Difference (3)	High (4)	Low (5)	Difference (6)
Panel A: Experiment of Interest						
Ages 2–6 in 1974	8.49 (0.043)	9.76 (0.037)	–1.27 (0.057)	6.61 (0.0078)	6.73 (0.0064)	–0.12 (0.010)
Ages 12–17 in 1974	8.02 (0.053)	9.40 (0.042)	–1.39 (0.067)	6.87 (0.0085)	7.02 (0.0069)	–0.15 (0.011)
Difference	0.47 (0.070)	0.36 (0.038)	0.12 (0.089)	–0.26 (0.011)	–0.29 (0.0096)	0.026 (0.015)
Panel B: Control Experiment						
Ages 12–17 in 1974	8.00 (0.054)	9.41 (0.042)	–1.41 (0.078)	6.87 (0.0085)	7.02 (0.0069)	–0.15 (0.011)
Ages 18–24 in 1974	7.70 (0.059)	9.12 (0.044)	–1.42 (0.072)	6.92 (0.0097)	7.08 (0.0076)	–0.16 (0.012)
Difference	0.30 (0.080)	0.29 (0.061)	0.013 (0.098)	0.056 (0.013)	0.063 (0.010)	0.0070 (0.016)

Difference between children and teenagers in schooling and wages as adults

Children who were young enough to benefit from the school construction program had 0.12 more years of schooling and an average wage 2.6% higher. This represents a $2.6 / 0.12 = 21.7\%$ return per extra year of education.

Source: Esther Duflo, “Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment,” *The American Economic Review* 91, no. 4 (2001): 798. (Note: The sample was taken from individuals who earn a wage.) Printed with permission of American Economics Association.

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Difference between Teens and Adults is not statistically significant, so not just a trend

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Returns to Education: Randomized Assignment

Several Studies in United States that study education returns using randomized assignment

- Offer a program that gives improved access to education
- From volunteers that apply to program, randomly select who gets the improved access
- Compare outcomes between people that received treatment and those that didn't

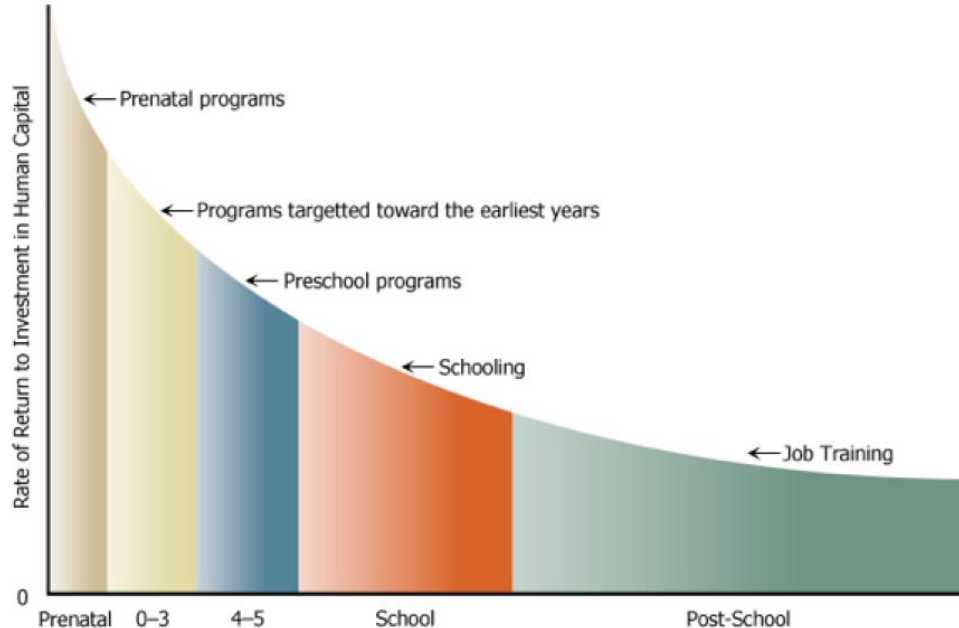
Example Programs:

- [Moving to Opportunity Program](#): Let people move to neighborhoods with less poverty
- [Headstart Programs](#): Services for early childhood development for low-income families

Returns to Education in the United States

There have been lots of studies on returns to education in United States

- Find that the highest returns are from investing at young ages



Reforms to Improve Education

What policies appear effective in improving education?

Reducing Education Costs often lead to higher enrollment and attendance for poor families

- Give money to poor families to send their children to school
- Provide meals in school to increase attendance
- Subsidize uniforms and textbooks

Decreasing corruption and increasing accountability

- Policies that make it so teachers show up to school (e.g. cameras in the classroom)
- Make sure that money for schools is not siphoned off due to corruption

Corruption in Uganda

	Mean	Median	Standard deviation	Maximum	Minimum	Number of observations
All schools						
1995	23.9	0.0	35.1	109.8	0.0	229
2001	81.8	82.3	24.6	177.5	9.0	217
	1995	2001				
Regions						
Central	24.3	92.8	In 1995 only 23% of School Grant Money made it to Schools In 2001 that increased to 81.8%			
North	26.7	102.4				
Northwest	11.2	90.3				
West	24.0	71.6				
Southwest	21.1	83.3				
East	20.1	62.4				
Northeast	36.0	73.4				

Data from 1995 show the percentage of capitation grants that schools effectively received. Data from 2001 show the percentage the schools received after the Ugandan media campaign that disclosed the capitation grants' rate of delivery.

Source: Data from Ritva Reinikka and Jakob Svensson, (2005). "Fighting Corruption to Improve Schooling: Evidence from a Newspaper Campaign in Uganda," *Journal of the European Economic Association* 3, no. 2-3 (2005): 262.

Additional Reforms to Improve Education

Some policies have had mixed success

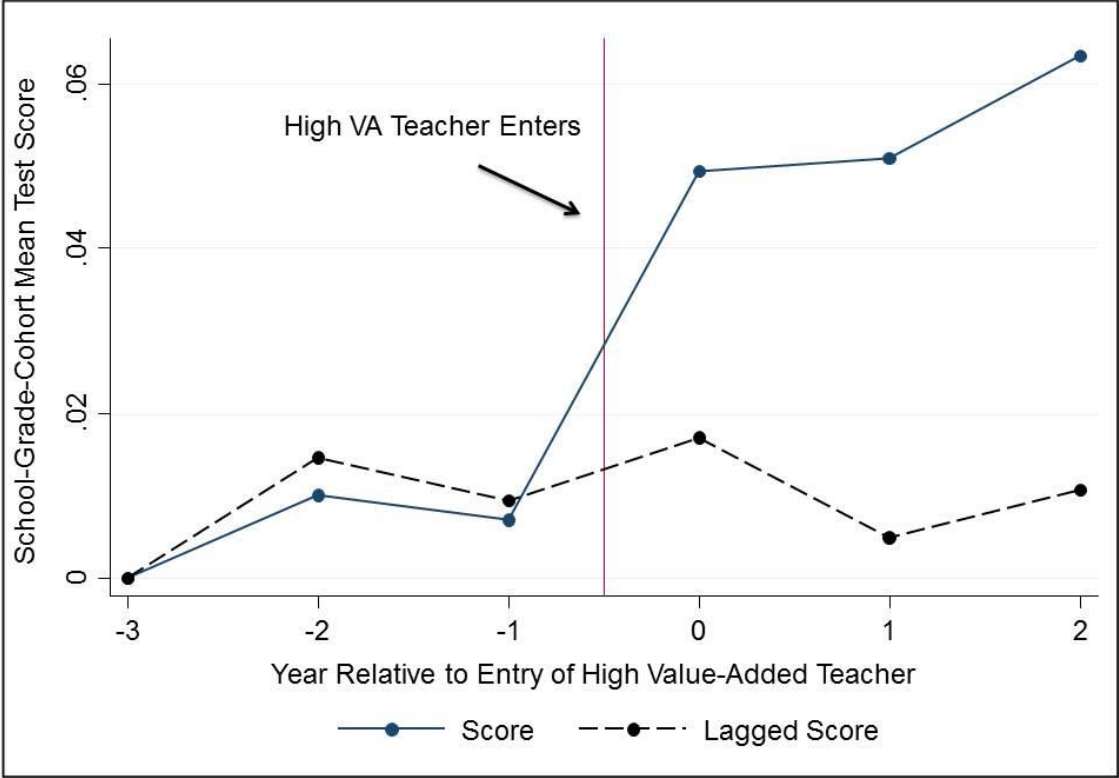
Vouchers allow students choice of school they go to

- Meant to increase competition between public and private schools to improve options
- Often find success for children that receive vouchers, for example in Columbia
- School quality may not change. Public schools can end up worse due to less resources.

Teacher Incentives

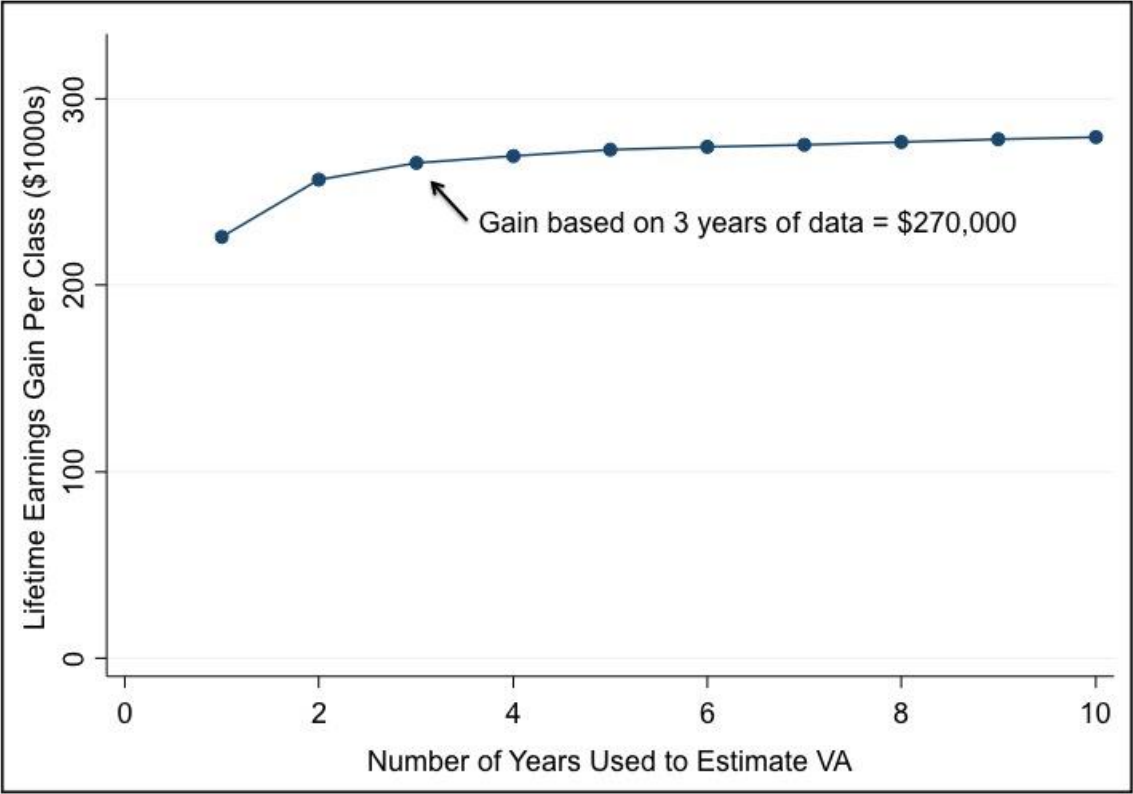
- Lots of evidence that having good teachers matters a lot, and having bad teachers hurts
- Rewards based on test scores may lead to “teaching to the test” without increasing quality

Teacher Quality Leads to Higher Average Test Scores



High Value Added teachers improve average test scores at schools they join

Teacher Quality Leads to Higher Income of Students



Gains from replacing bottom 5% teacher with average quality teacher