

Facts about Education and Growth

- What is the relation between
 - Education levels and GDP levels
 - Secondary Education
 - Primary Education
 - Education levels and subsequent GDP growth
 - Growth in education and growth in GDP.

Resolving the puzzles: Easterly's take

- How does he explain the level on level findings?
- How does he explain the growth on levels findings?
- How does he explain the lack of a relationship in the growth on growth findings?
- “education is another magic formula that has managed to live up to expectations”

School Construction: Indonesia (Duflo) - Set Up

- The INPRES school construction program
- Second five year plan (1974-79) -Oil shock
 - A large program:
 - 61,807 primary schools constructed from to 1973/74 to 1978/79
- Number of schools multiplied by 2.1 schools for every 500 children
- *A change* in policy: Before 1973, no construction, ban on recruiting for public service positions
- A program meant to favor low-enrollment regions
- Allocation rule: number of schools constructed in a district proportional to the number of children (ages 7 to 12) not enrolled in primary school

Data and sources of variation

- SUPAS 95: A survey done in 1995, after the children educated in these schools have completed their schooling, and have started working
 - 150,000 men born 1950-1972
- Variables: education, year and region of birth, wages

Sources of variation

- Two factors affect the intensity of the program.
 - Year of birth:
 - Born in 1962 or earlier: 12 or older in 1974. Not exposed to the program.
 - Born in 1967: 7 in 1974, 12 in 1979. Some exposure to the program.
 - What would we find if we compare the education of those born before and after 1962? Would this be a good measure of the impact of the program? Why?
 - Region of birth
 - The government was targeting low enrollment regions => substantial variation in program intensity across districts
 - What would we find if we compare regions with high and low construction? Would this be a good measure of the impact of the program? Why?

The “Difference in Differences” methodology

- Basic idea
 - Suppose that there are two regions in the data: a “high program” region, and a “low program” region
- Suppose that we have the age group of the individuals:
 - “young people” born after 1967, who could fully benefit from the schools
 - “old people” born before 1962, who could not benefit at all from the schools

Construction of DD

PANEL B: Experiment of interest

		Years of education		
		Level of program in		
		Region of birth		
		h: High	l: Low	Difference
age in 1974	y: 2 to 6	Dyh	Dyl	Dyh-Dyl
	o: 12 to 17	Doh	Dol	Doh-Dol
	Difference	Dyh-Doh	Dyl-Dol	DD

$$DD = Dyh - Dyl - Doh + Dol$$

- The DD can be interpreted as a causal effect of the program if in the absence of the program, the increase in educational attainment would have been the same for low and high regions

Control experiment

- Duflo checked that the assumption was not rejected in the available data
- Suppose we fill the same boxes, but compare the “OLD” to the “VERY OLD”
- Neither of them benefited from the program
 - What do we expect to see if the assumption is satisfied?
 - What do we expect to see if the assumption is not satisfied?

	Years of education			Log(wages)		
	Level of program in			Level of program in		
	Region of birth			Region of birth		
	High	Low	Difference	High	Low	Difference
(1)	(2)	(3)	(4)	(5)	(6)	
Panel A: Experiment of Interest						
Aged 2 to 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)
Aged 12 to 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						
Aged 12 to 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)
Aged 18 to 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)

- These are simple comparisons of means, and estimates are quite imprecise
- One can add a lot of covariates and generalize this logic to a regression

Coefficients of interactions

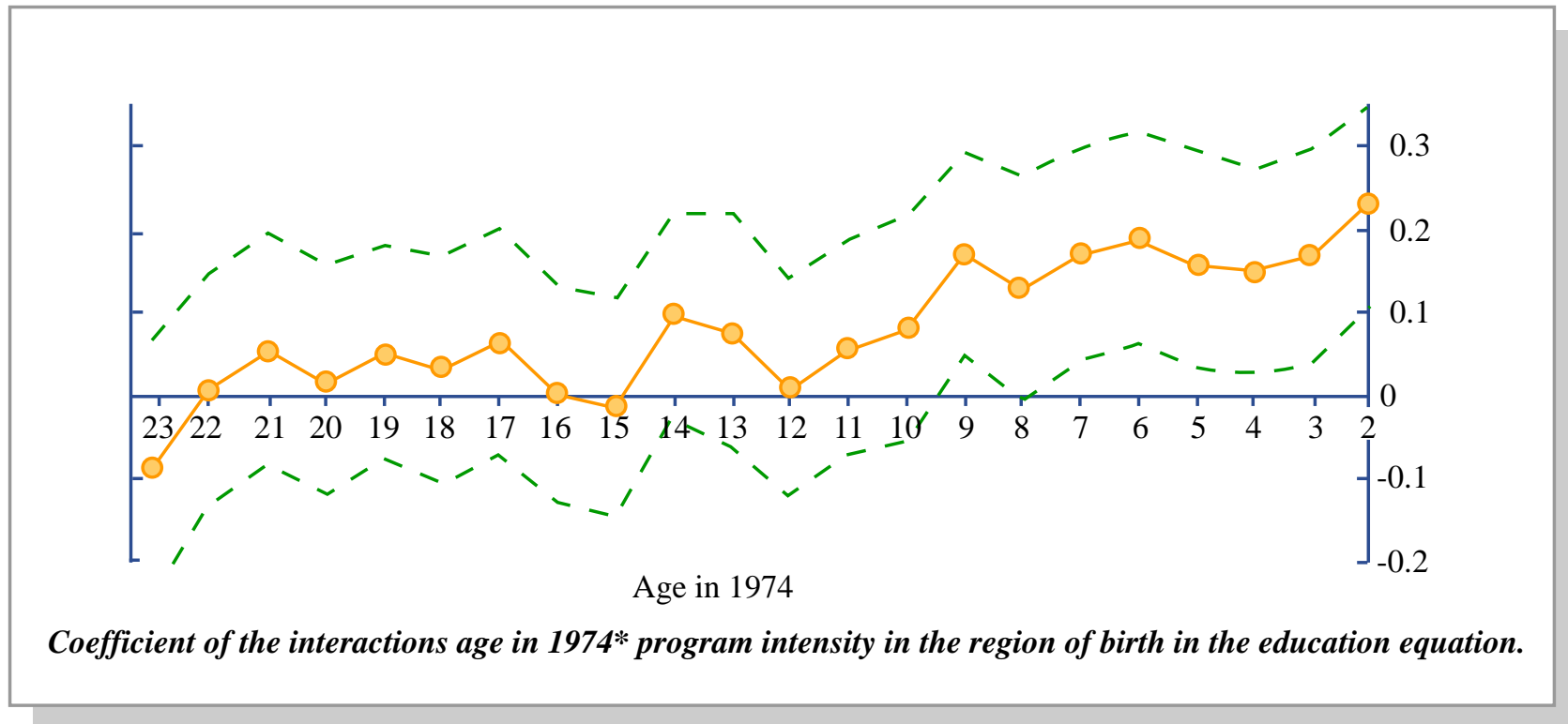


Figure by MIT OCW.

- Do the same for wage: Get the same patterns

Our take: 1

- Supply side programs can work
- Nothing would work in some places
- A number of the countries that expanded education the most had either civil wars or mad dictators: Angola, Madagascar, Mozambique, Sudan, Senegal, Zambia
- There is nothing that would have worked in those countries
- Take a policy that supposedly promotes “incentives”:
Trade liberalization.
 - Rodrik lists Haiti and Sierra Leone among the countries that liberalized their trade the most.
 - Their growth performance was dismal
- The only useful thing you can do in these countries is help them return to political normalcy

Our take: 2

- Quality education is getting harder and harder to deliver
 - Rising price of teachers
 - Falling returns to primary education
- The need for innovative solutions