Human Capital - Health and Education

EC 390 - Development Economics

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Central Role of Education and Health

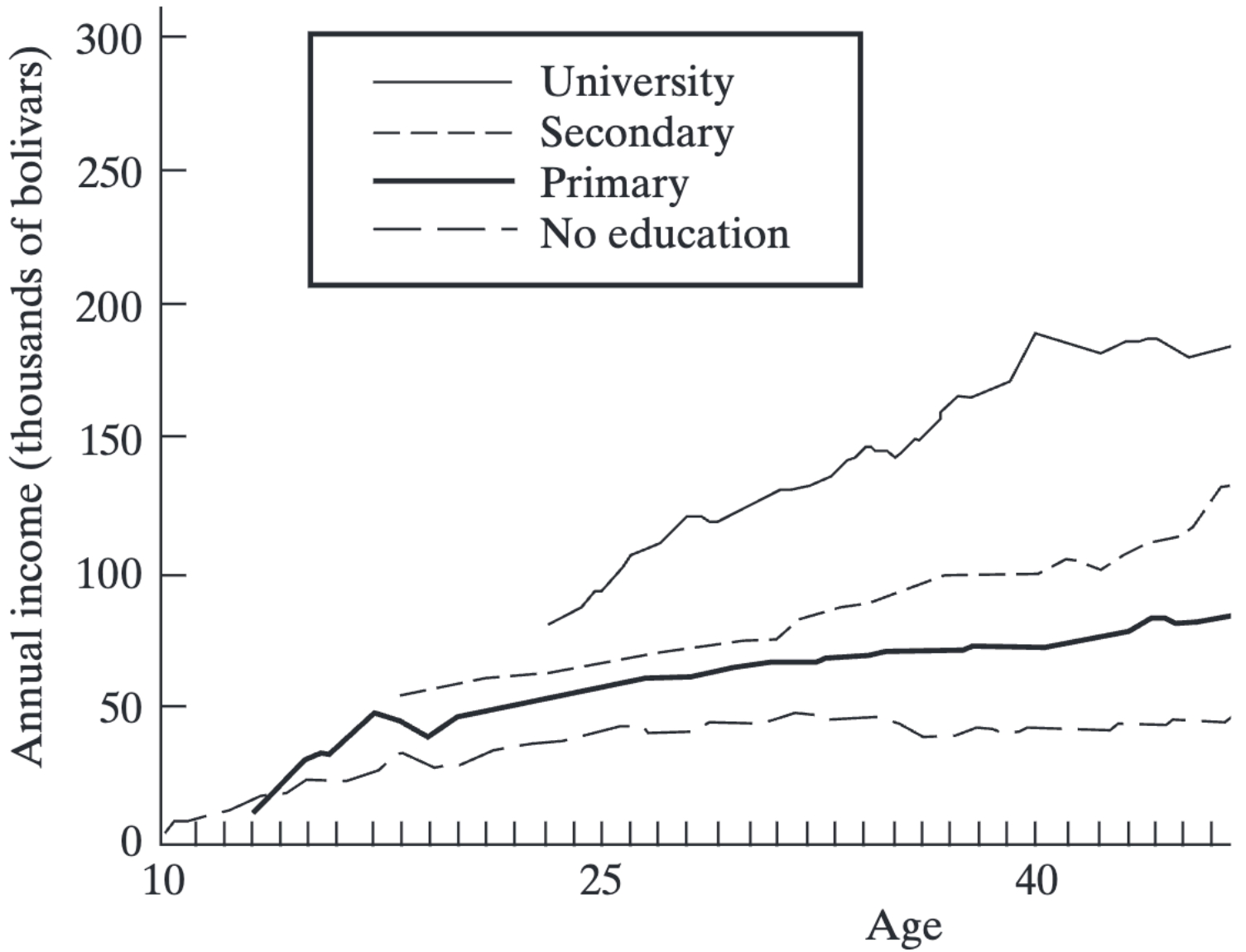
Education and Health

Education and Health are basic **objectives of development**

- A **healthy and educated** is desirable for growth
- Modern economies tend to produce healthy and educated inviduals

- Further, we can think of **education and health** as **investments**
- You **invest** in a university degree because it will **pay off eventually**
- You **invest** in eating healthy beacuse it will **pay off eventually**
- In developing countries, these investments can have **large pay-offs**
- But these pay-offs happen **in the future**

Education and Health



Education and Health

Greater incomes are associated with **higher education levels**

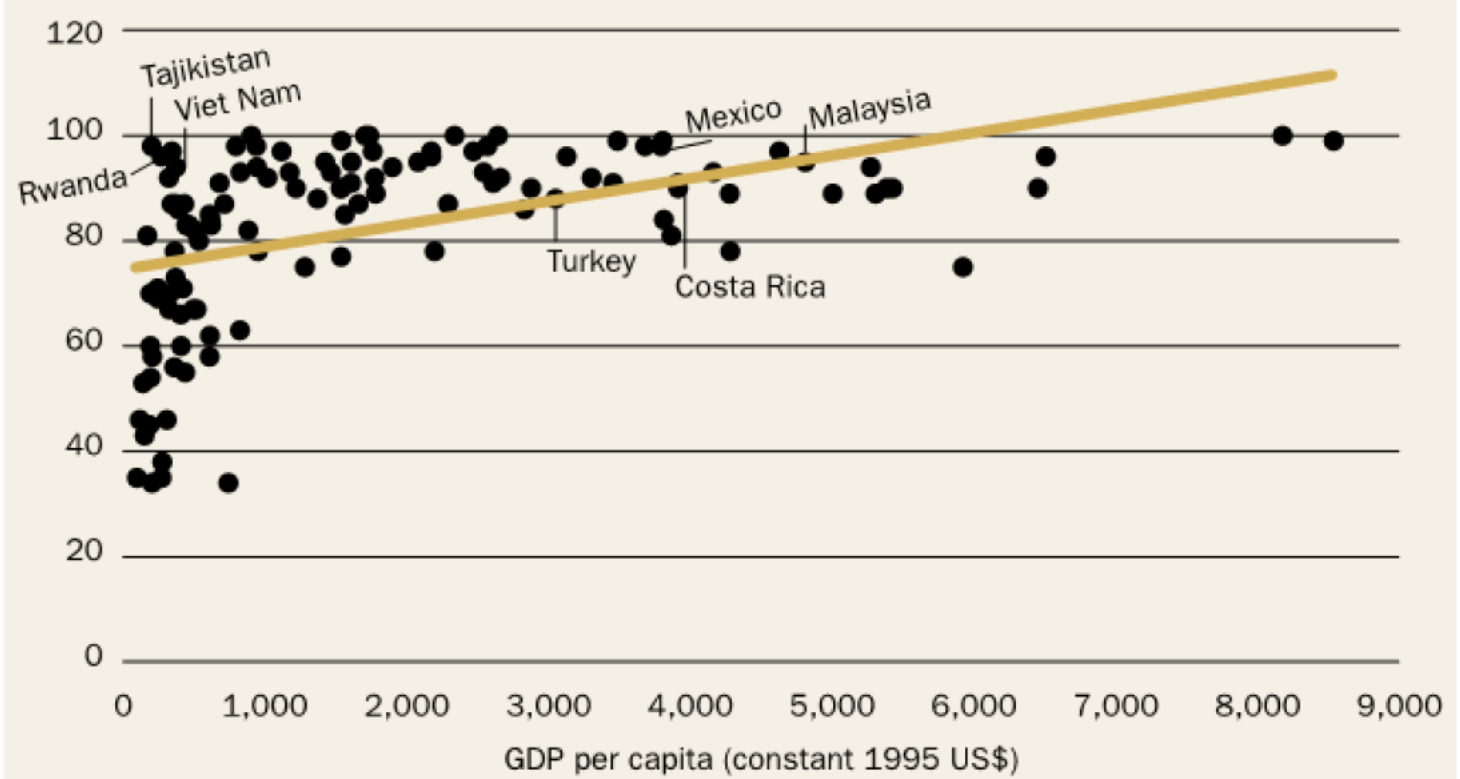
- More factors at play for low-income countries

Figure 5.1

Countries with higher per capita GDP tend to have higher primary enrollment rates

Net primary enrollment (%)

Source: Author's calculations based on data from World Bank 2004b.



Education and Health

Greater incomes are associated with **higher education levels**

- More factors at play for low-income countries

Table 2: Private Returns to Schooling by Income Group

Country income level	Overall rate of return (%)	Mean years of schooling
Low	9.3	5.0
Middle	9.2	7.0
High	8.2	9.2
World average	8.8	8.0
Notes: Country per capita income levels based on World Bank (2016) classifications in 2015 US$: low = $1045 or less; middle = $1046-$12,735; high = $12,736 or more		

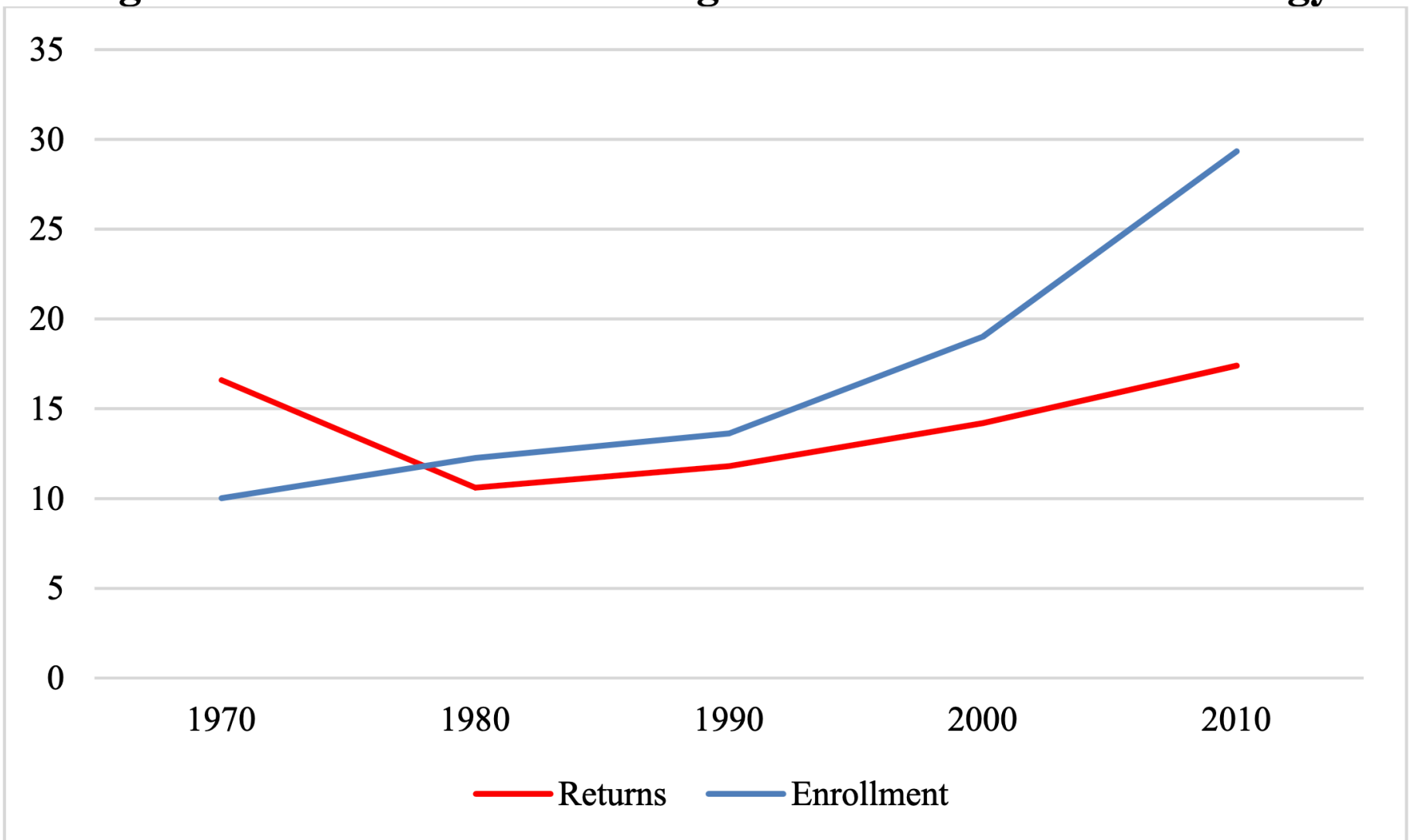
Education and Health - Regions

Table 3: Private Returns to schooling by region

Region	Overall rate of return (%)	Mean years of schooling
Latin America and Caribbean	11.0	7.3
Sub-Saharan Africa	10.5	5.2
East Asia and Pacific	8.7	6.9
South Asia	8.1	4.9
Advanced Economies	8.0	9.5
Europe and Central Asia	7.3	9.1
Middle East and North Africa	5.7	7.5
World average	8.8	8.0

Education Interacting with Technology

Figure 5: The Race between Higher Education and Technology



Education Interacting with Technology

Figure 8: Average returns to schooling and average mean of education over time

Human Capital Approach

Human Capital

Definition: Catch-all term we use in economics to refer to education, health, skills, and other human capacities that can raise productivity

Human capital can be acquired **through investment**

- Education
- Health care
- Training, therapy, etc.
- They affect **productivity, income, happiness, and lifespan**
- We may not directly talk about education or health, but rather the **human capital** it creates

Complementarities

Health and Education investments have large **complementarities**

- If children are **malnourished or have high mortality**, **education investment** will not be as effective
  - Poor health in children leads to:
    - Low school attendance
    - Less attention in class
    - Lower lifetime earnings and returns to investment
- To effectively **increase human capital**, we need **investments in both health and education** simultaneously

Unfortunately, invetsments take considerable time to pay off

Invest Now, Returns Later

Invest Now, Returns Later

Investing in education means that we **expect higher earnings in the future** than we would have obtained otherwise

- These **future income gains** must be compared with the **total costs incurred** to understand it as an investment

- Education costs include direct costs:
  - tuition costs
  - books and uniforms
- And indirect costs:
  - **foregone income**

Let's Model It

Formally, we can write the **Discounted Value of Education** where E **is income with extra education**, N **is income without extra education**, t is year, i is the **discount rate** and this is summed over expected years of working life:

$$\text{DVE} = \frac{E_t - N_t}{(1+i)^t}$$

We do this because these decisions are not equivalent across individuals

- People with **higher discount rates** will be **less likely to invest in education**

  They value the increase in the future income less than current income

Discounted Value Example

Let's find out if being here is worth it

- Suppose that your earnings with a degree will be 100 $(E = 100)$
- Without a degree, your earnings will be 20 $(N = 20)$
- Suppose your discount rate is 20%, you value the future 20% less than the present $(i = 0.2)$
- Lastly, suppose you will earn your degree in 4 years $(t = 4)$

We put it all together in the DVE equation:

$$DVE = \frac{E_t - N_t}{(1+i)^t} = \frac{100 - 20}{(1.2)^4} = 38.6$$

The additional 80 dollars "future you" would earn with extra education is only worth **38.6 to "present you"**

Discounted Value Example (v2)

We can adapt this equality to model other things as well **, we just need a start and end value**

And we can solve for any of the components if we have the other information

Let us find the discount rate such that we are **indifferent** the future value of 2 extra dollars in 5 years from now

$$DVEM = \frac{2}{(1+i)^5} = 1$$

Discounted Value Example (v2)

$$DVEM = \frac{2}{(1+i)^5} = 1$$

$$2 = (1+i)^5$$
$$\sqrt[5]{2} = 1 + i$$
$$\sqrt[5]{2} - 1 = i$$
$$i \approx 0.149$$

To be indifferent between 2 dollars in 5 years and 1 dollar today, we would need to have a discount rate of

$$\sim 14.9\%$$

Discounted Value of Education

Why do we care about discount rates when thinking about economic development?

- Why might someone with a lower income have a higher discount rate?
  - If you are very worried about your current situation, the value you place on something in the distant future is very small
- Consider a subsistence farmer:
  - Do they send their children to school, which will pay off later in their lives (and allow them to take care of their parents)?
  - Or do they keep them at home to help farm the land, which will pay off tomorrow?
- Clearly, income and discount rates are **negatively correlated**

Investing in Education

Hopefully you can see why **saving and investing** is a difficult decision to make

But thankfully, when possible, progress has been made

- There might be more pressing matters that require resources
- Solely based on expected return value, it **might not be worth it**
- If we do **invest**, what's truly to say things will pay-off as we expect?

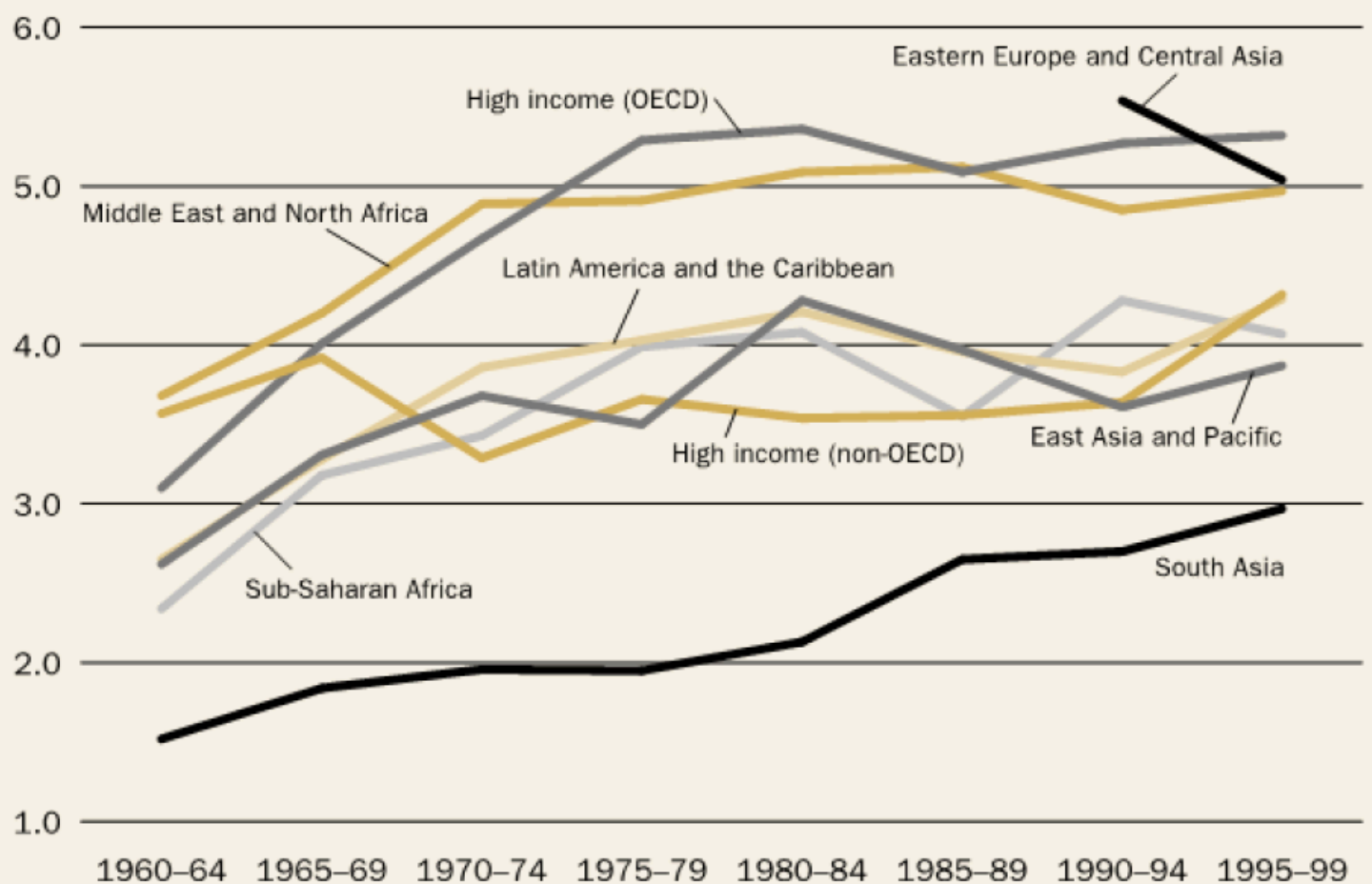
Improvements in Education

Figure 3.1

Public spending on education has risen in the past 40 years, but it varies widely across regions

Percent of GDP, five-year averages, 1960–99

Source: World Bank 2002.



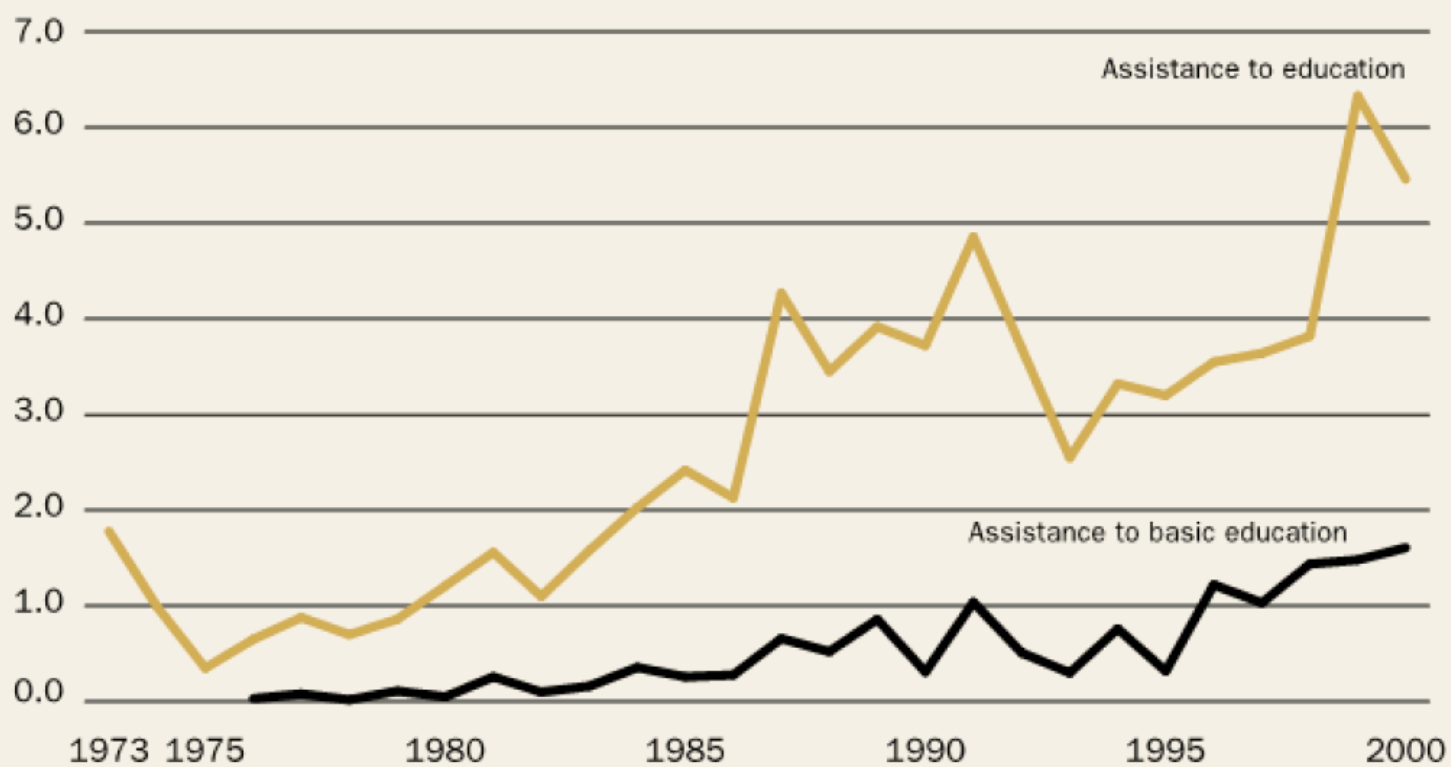
Improvements in Education

Figure 3.2

Bilateral official development assistance for education has risen, too

Share of developing countries' aggregate GDP (%)

Source: OECD Creditor Reporting Service.



Improvements in Education

Table 4.1

Primary completion rates, by region and gender, 1990 and 2000

Percent

Region	1990			2000[a]		
	Girls	Boys	Total	Girls	Boys	Total
East Asia and the Pacific	92	97	96	98	98	97
Europe and Central Asia	85	95	90	93	95	93
Latin America and the Caribbean	71	64	69	85	81	83
Middle East and North Africa	71	84	78	78	86	83
South Asia	59	77	68	63	84	74
Sub-Saharan Africa	43	57	50	46	56	51
All developing countries	65	79	73	76	85	81

Note: Figures are population-weighted averages.

a. For some countries the last available year is 1999.

Source: Bruns, Mingat, and Rakotomalala 2003, based on World Bank database on primary school completion.

Social Versus Private Benefits and Costs

Education plays a key role in the ability of a developing country to absorb modern tech and develop the capacity for self-sustaining growth and development

And like much of everything else, there are cost, benefits, and spillovers to consider

- We try to alter the **incentives** of individuals to get them to pursue more education
- However, the **optimal education decision** for an individual does not necessarily correspond to the **socially optimal level of education**

Social Versus Private Benefits and Costs

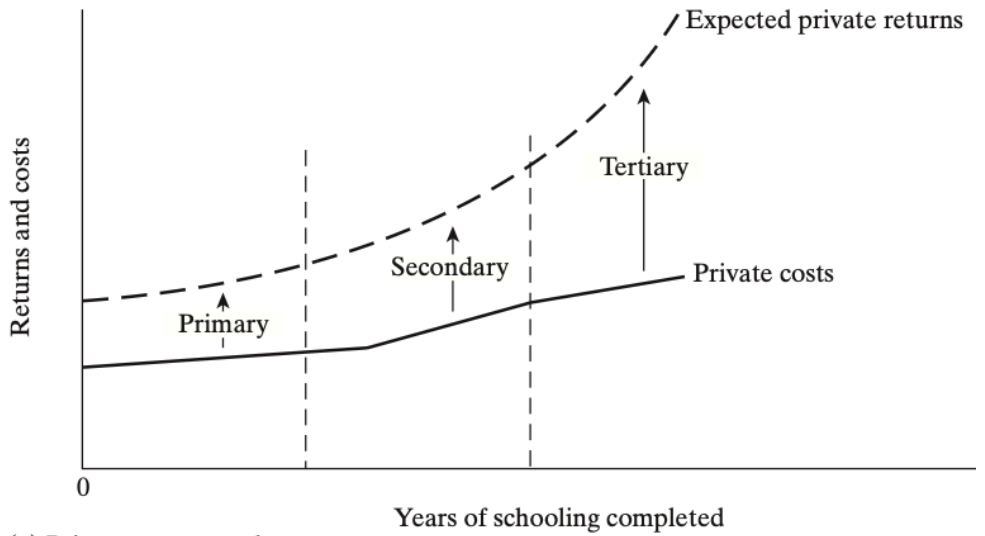
Private (individual) returns grow faster than **social returns**

- Individuals benefit from education by earning more money and gaining higher quality skills
- Society only benefits from part of the individual's increased income and education

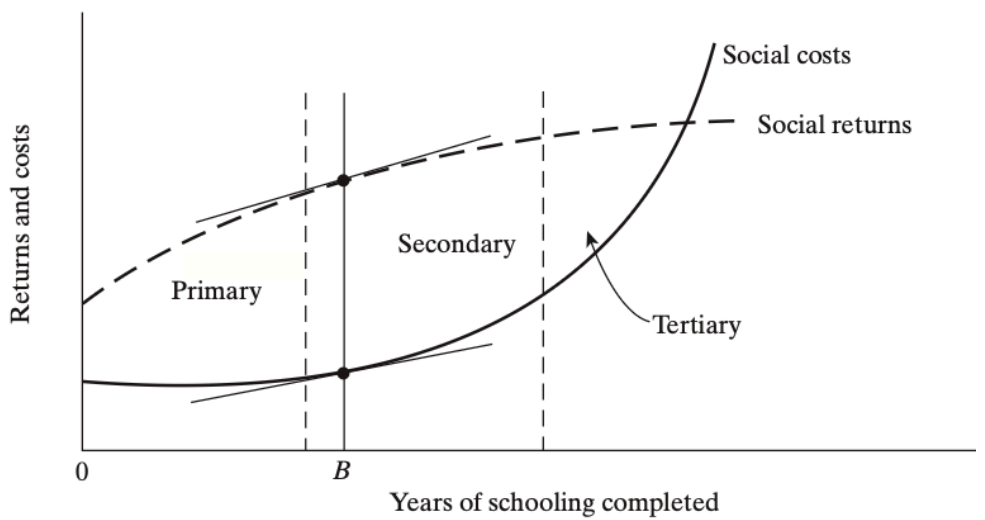
Social costs grow more quickly than private costs

- **Higher cost of capital** and recurrent costs of higher education (post-primary) is very costly
- Subsidization of higher education reduces costs for individuals and increases costs for society

Private and Social Benefits



(a) Private returns and costs



(b) Social returns and costs

Private and Social Benefits

- Optimal education choice happens when:

slope of returns and slope of costs are the same

marginal benefit = marginal cost

Given our setup, this means that the **socially optimal level of education** is less than **individually optimal level of education**

- This is why the Millenium Development Goal focuses on **Primary Education**, not university education

Education Has Increased

- In 1990, halve of the world's countries had achieved universal primary education, up from 28% in 1960
- Median primary enrollment increased from 80% to 99% in 1990
- Median secondary enrollment rates have increased from 13% in 1960 to 45% in 1990
- In 1960, 29 countries had no college students and by 1990 only 3 had no college students

Has Education Failed?

Despite these advances in availability of education, the growth effects have been dissapointing

- At the very least, they have been less than expected
- Studies have concluded that although education is important, there is a weak association with growth

What's the lesson here?

- **We are good at controlling specific outcomes**
  - We know how to increase test scores
  - We know how to increase enrollment rates
- **But we are not very good at generating growth through education**
  - It could be that educaton has strong complementarities with other institutions/services
    - Health, Safety, Environment, etc.

But **maybe we shouldn't only worry about growth**, education improves well-being nonetheless

Child Labor

The Children DO NOT Yearn for the Mines

Gender Gap

Health