

HUMAN CAPITAL: EDUCATION

EE 462 Development Macroeconomics

Topics

- Trends and Pattern
- Education As An Investment
- Education and Economic Growth

Trends and Patterns

Some concepts:

- ***Gross enrollment rates***: the total number of children enrolled in a given school category divided by the number of children of the age group for that level of schooling (e.g. relevant age group for primary school is 6-11 years)
- ***Net enrollment rates***: enrollments of only those of the relevant age group
- ***Grade survival rates***: how many children actually complete a certain grade level
- ***Education attainment***: the highest level (or degree) of education that an individual has completed.

Changes in Schooling, Gross Enrollment Rates by Regions, 1970-2000

REGION	PRIMARY		SECONDARY		TERTIARY	
	1970	2000	1970	2000	1970	2000
East Asia and Pacific	89.4	111.4	23.8	66.4	1.1	14.4
Europe and Central Asia	99.3 ^a	99.5	86.2 ^a	85.6	30.9 ^a	46.0
Latin America and Caribbean	107.2	124.7	27.6	84.8	6.2	22.6
Middle East and North Africa	70.1	95.6	23.5	70.3	4.4	20.7 ^b
South Asia	70.6	94.8	23.0	48.0	4.2	10.0
Sub-Saharan Africa	51.0	81.7	6.3	25.7 ^b	0.8	3.6 ^b
High income	100.0	101.9	75.0	106.0	26.2	61.1

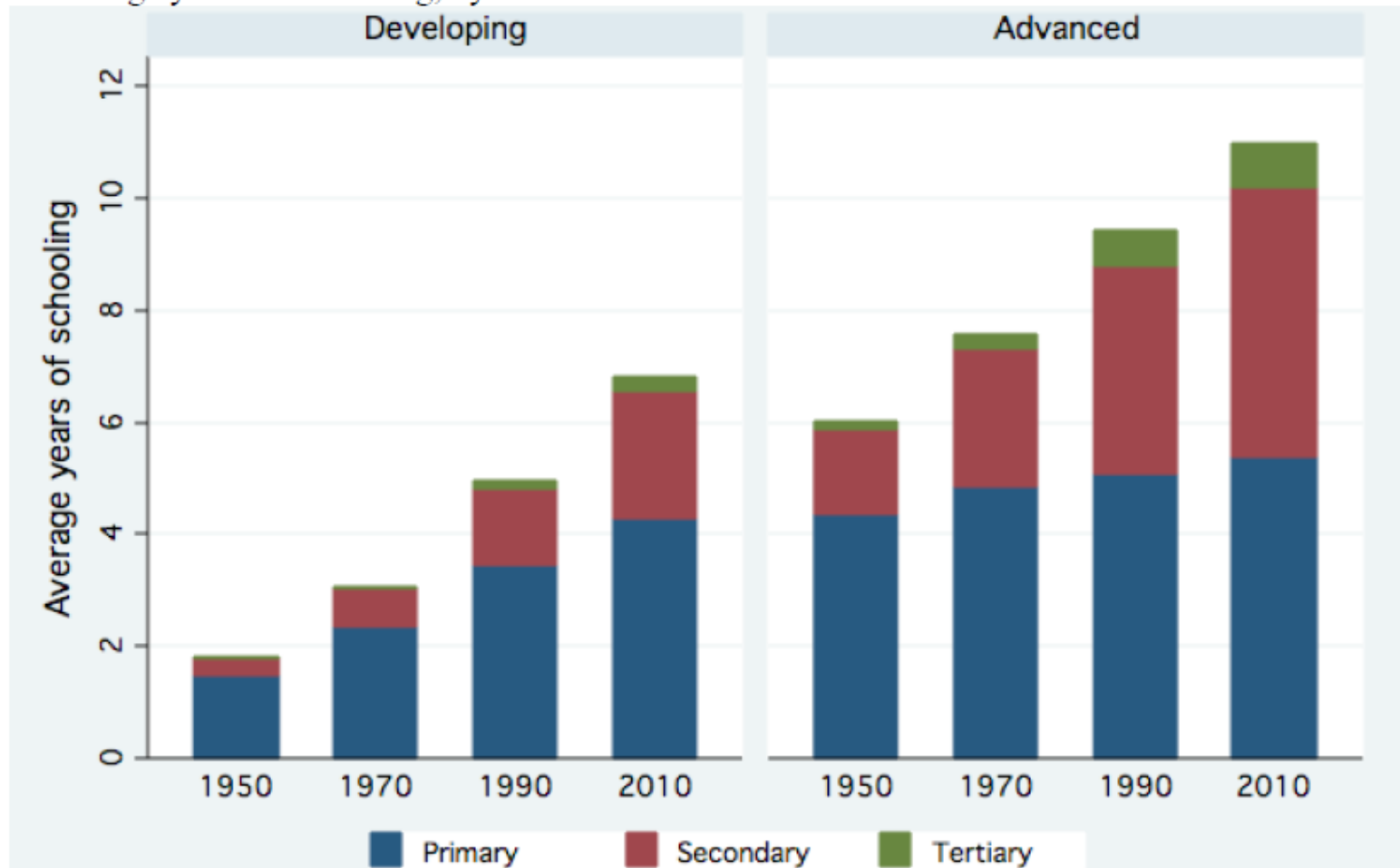
^aDue to insufficient data for 1970, the values for Europe and Central Asia refer to 1980.

^bValues refer to the late 1990s.

Source: World Bank, *World Development Indicators Online*.

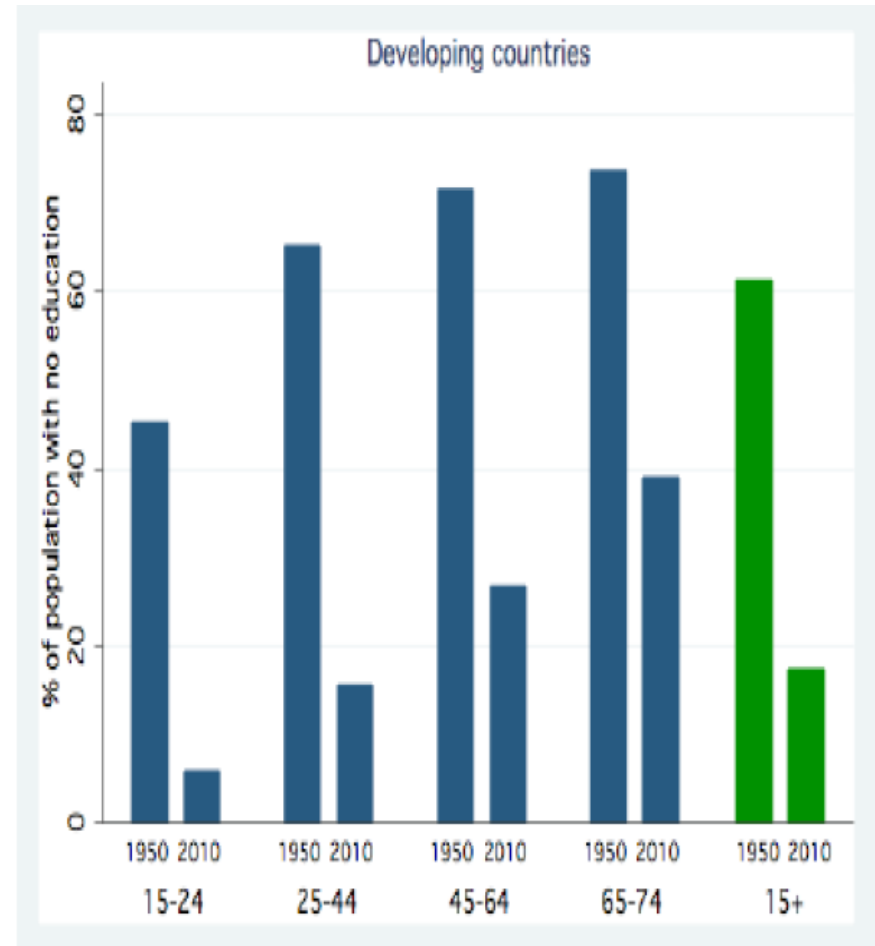
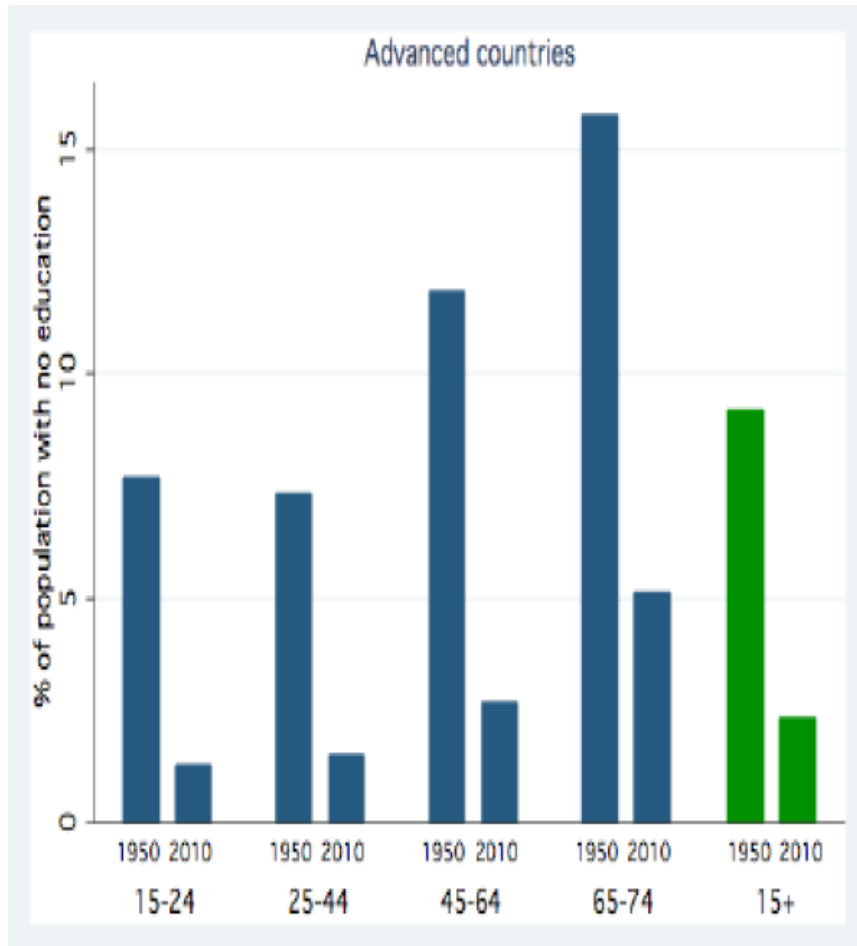
Education Attainment of Population Age over 15

a. Average years of schooling, by educational level



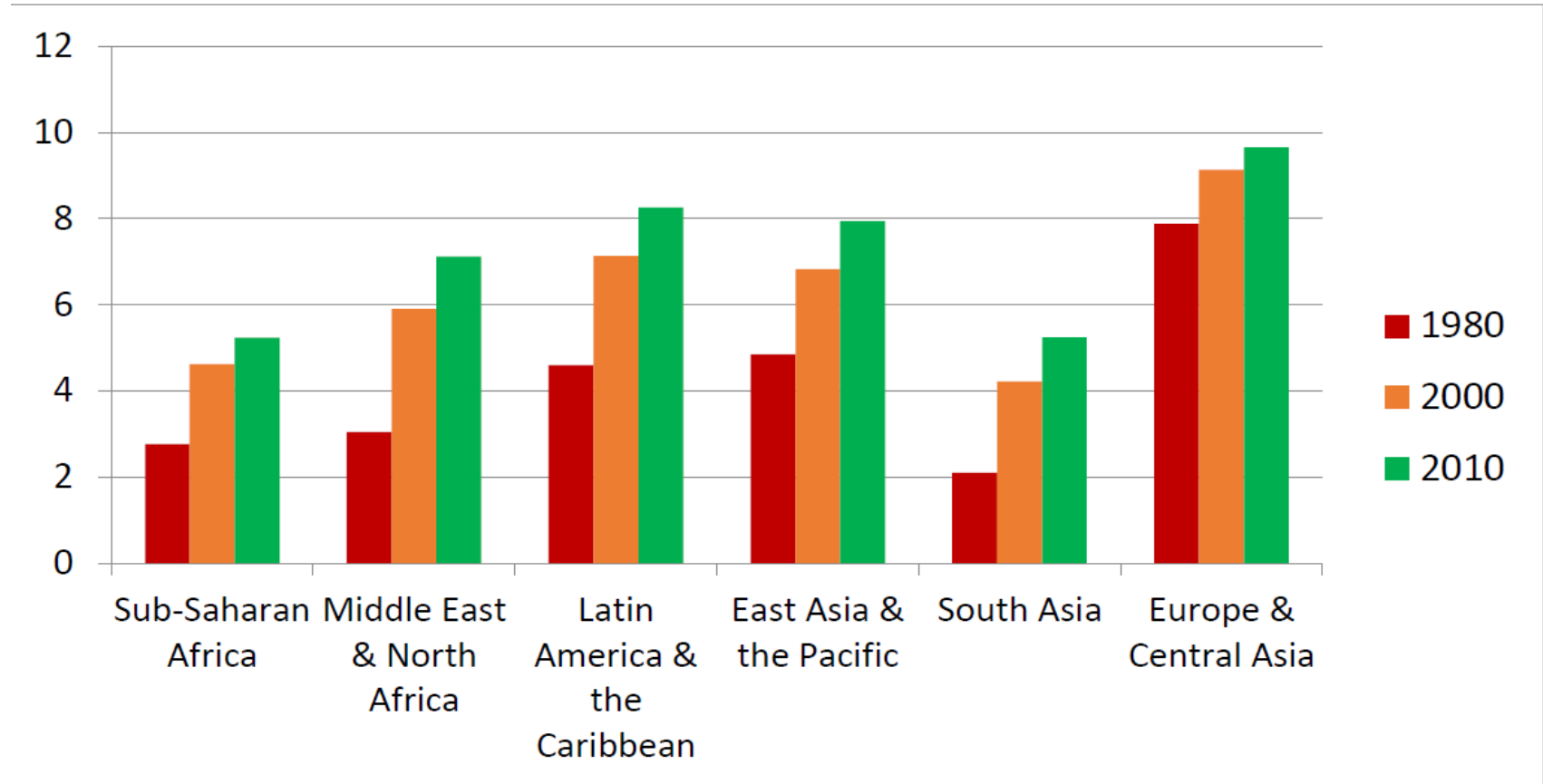
Note: Advanced countries = Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, USA, United Kingdom.

Proportion of Population with No Education



Source: <http://www.nber.org/papers/w15902>

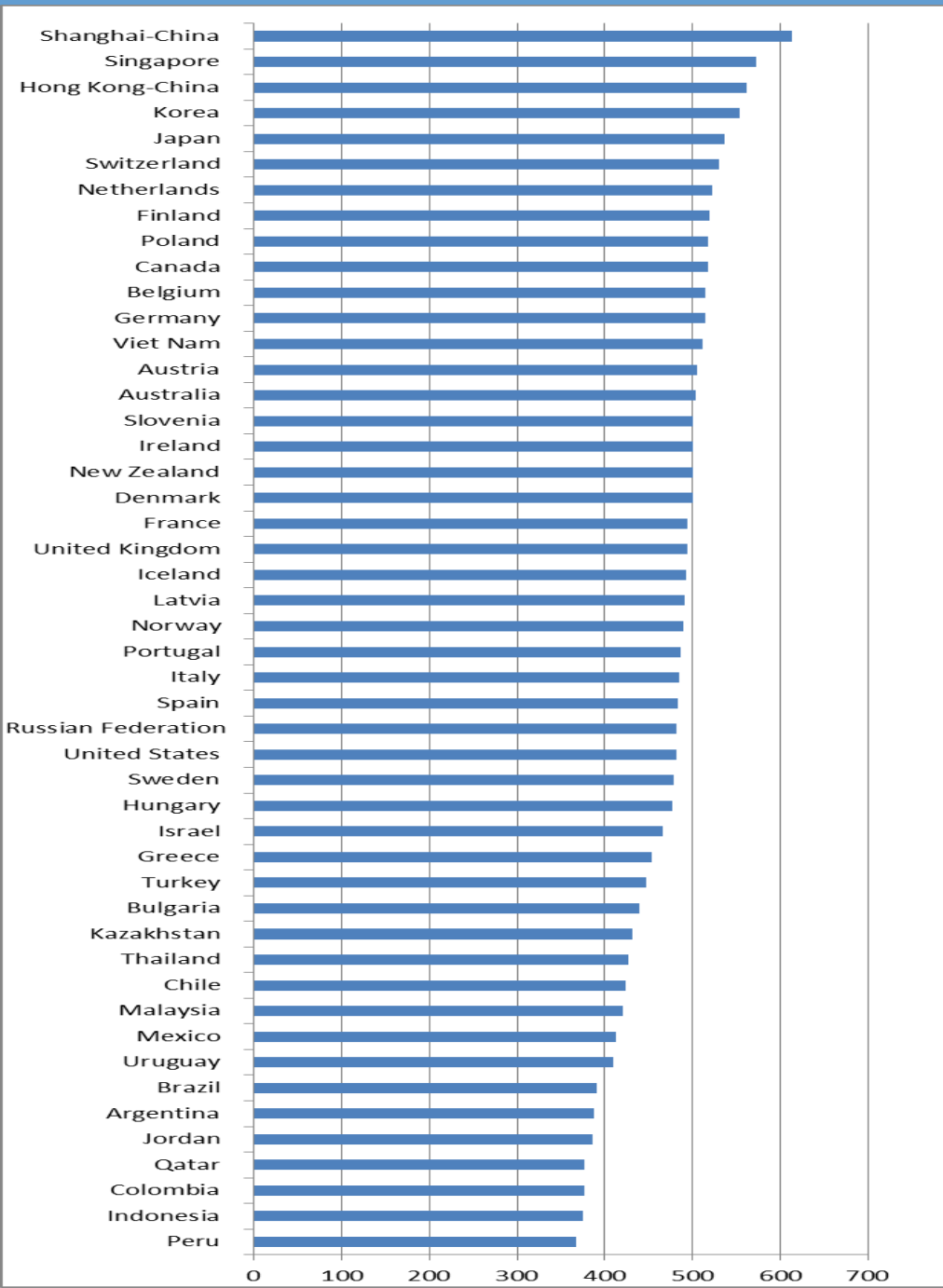
Average Years of Schooling for People Age 15+



Source: World Development Indicators

Schooling versus Education

- *Schooling is only a means to an end, but the real goal is education.* – skills individuals acquire from time spent studying and learning.
- One source of information on learning outcomes is the **Programme for International Student Assessment (PISA)**.
- There is a gap between rich and poor nations in educational quality.
- Problems in developing countries may have more to do with quality (which could result from expanding quantity)
 - Too many unqualified teachers, absenteeism among students and teachers, insufficient teaching resources



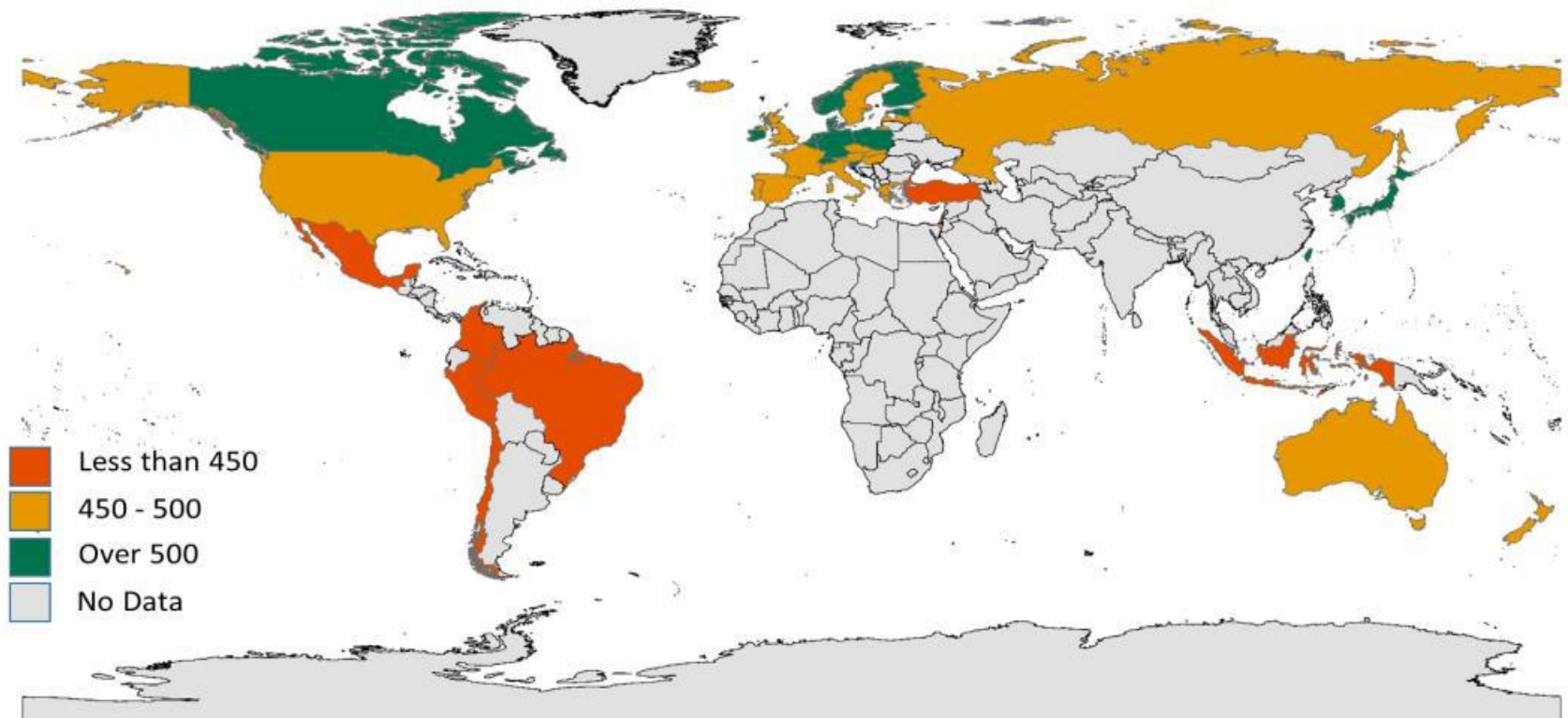
Learning Outcomes: 2012 PISA Math Score of Students age 15 years

Sample question:

“Three-fifths of the students in a class are girls. If 5 girls and 5 boys are added, which statement is true?”

- There are more girls than boys.
- There are the same number of girls as boys.
- There are more boys than girls.
- You cannot tell whether there are more boys or girls from the information provided.

PISA Scores in 2015

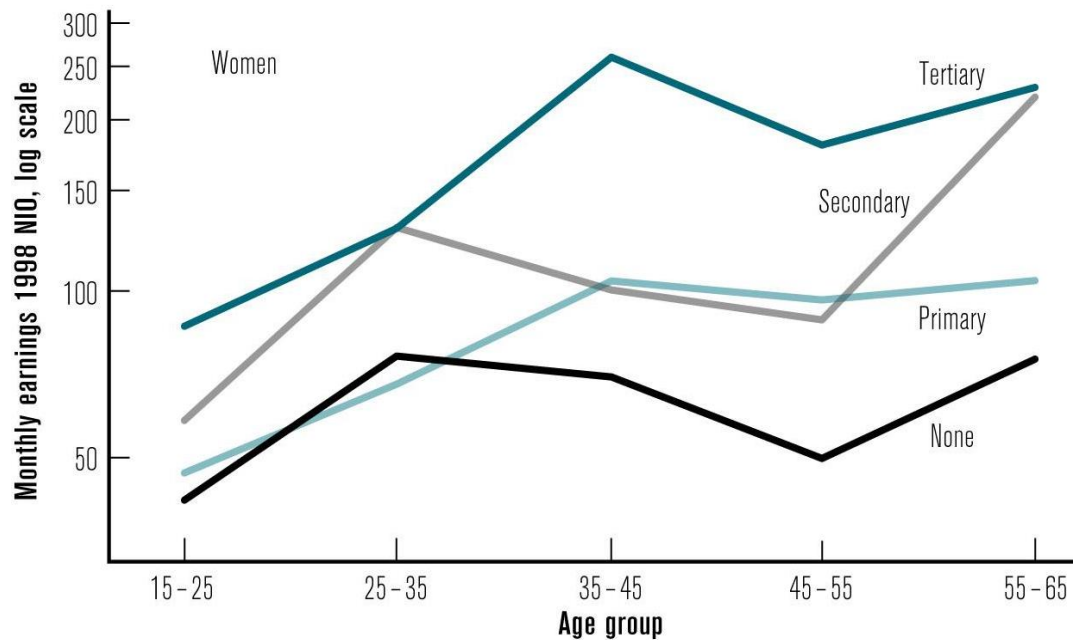
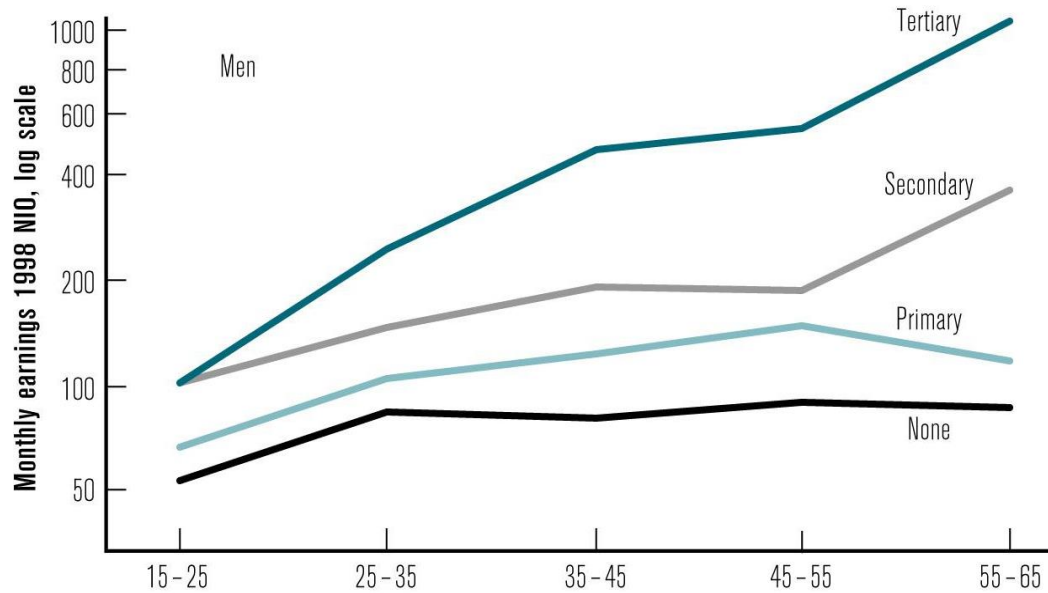


<https://data.oecd.org/pisa/science-performance-pisa.htm#indicator-chart>

Education As An Investment

- Education is an investment.
- Schooling produces human capital.
- It is expected that **investments in human capital** will yield a positive return (*i.e. more educated are more productive and better compensated*).
- General tendency:
 - Earning rises with educational levels; those with more education tend to have *higher age-earnings* profiles.
 - At every education level, women tend to earn less than men. Why?

Age Earnings Profiles by Age, Education, and Gender in Nicaragua, 1998

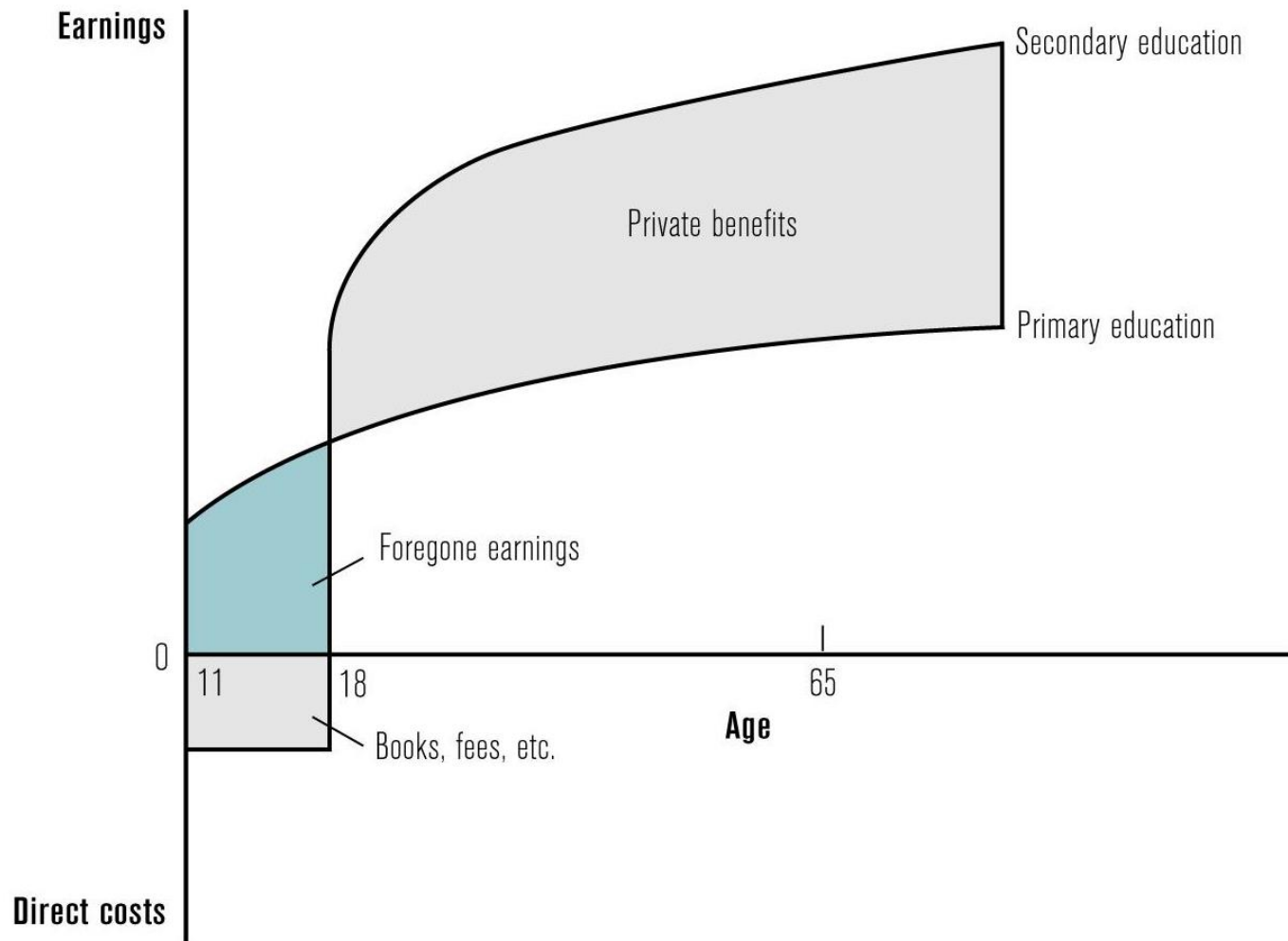


Benefits and Costs of Education

- *Private pecuniary benefits* of education are the earnings the individual expects to receive beyond what they would have earned without that level of education.
 - Sum of present Value of all future private benefits: $PV_B = \sum_{t=1}^n B_t / (1 + i)^t$
- *Costs* of education include direct costs (e.g. tuition) and indirect costs (or opportunity costs).
 - Sum of present value of all anticipated private costs: $PV_C = \sum_{t=1}^n C_t / (1 + i)^t$
- **Internal rate of return** is the rate (r) that which equates PV_B to PV_C . That is,

$$\sum_{t=1}^n (B_t - C_t) / (1 + r)^t = 0$$

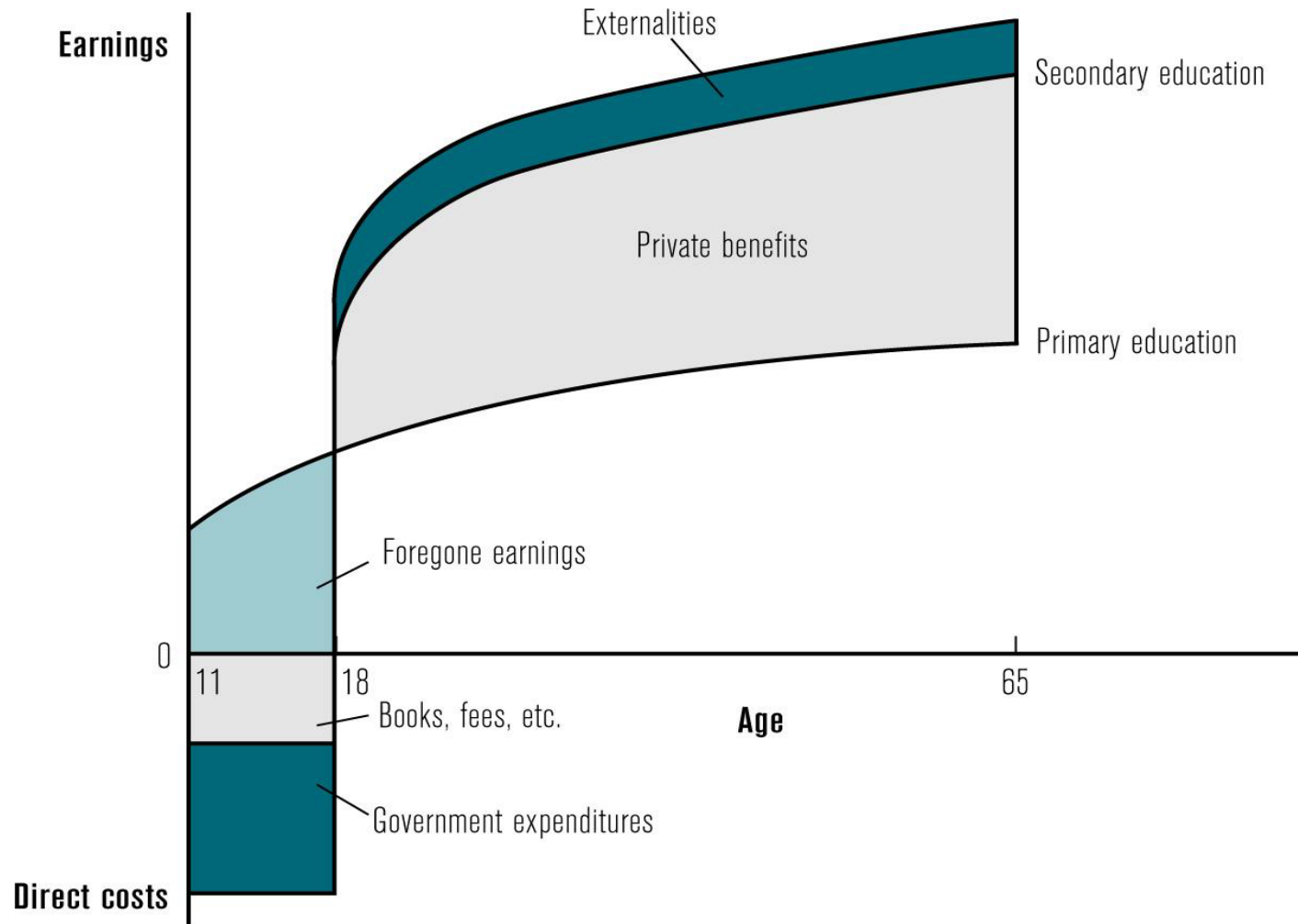
Determinants of Private Returns to Schooling



External Benefits of Education

- Education is also a social investment. So, there's a **social return** to schooling.
 - **Costs**: other costs borne by the society (e.g. payment for free primary school, construction of schools, etc.)
 - **Benefits**: schooling produces **positive externalities** – benefits that accrue to members of society above and beyond the benefits to the individual who receives the education
 - What are examples these positive externalities? Could they contribute to development?
- The private sector or markets will under produce education if left to themselves.
- The fact that education has positive externalities justifies public provision or subsidy of education.

Determinants of Social Returns to Schooling



Returns to Schooling by Level and Country Income Group

INCOME CATEGORY	PRIVATE RATE OF RETURN			"SOCIAL" RATE OF RETURN		
	PRIMARY	SECONDARY	TERTIARY	PRIMARY	SECONDARY	TERTIARY
Low income	25.8	19.9	26.0	21.3	15.7	11.2
Middle income	27.4	18.0	19.3	18.8	12.9	11.3
High income	N.A.	12.2	12.4	N.A.	10.3	9.5

Notes: These estimates of "social" rates of return account for only government expenditures on schooling and do not include estimates of any positive externalities resulting from schooling.

Given the small number of workers in high-income nations with only primary educations, most studies of high-income nations do not provide estimated rates of return to primary education.

Source: G. Psacharopoulos and H. Patrinos, "Returns to Investment in Education: A Further Update," *Education Economics* 12, no. 2 (August 2004).

Q1. why are "social" rate of return smaller than private rate of return?

Q2. why the rate of return on primary education greater than that of secondary education?

PUZZLES

- Microeconomic puzzle: schooling in many developing countries often produces little in the way of learning, but there still is an association between schooling and earnings and rate of returns to education. Why?
- Macroeconomic puzzle: there has been a rapid growth in schooling throughout the world (and **convergence in schooling**), but there has been a **divergence in per capita income**.
 - Schooling is not the only factor that affects economic growth.
 - In bad environment, those with more education may engage in rent seeking and other activities that are “socially dysfunctional”.
 - Other explanations?

Education and Economic Growth (1)

- There is a bi-directional between education and economic growth.
- Education may stimulate economic growth through several channels:
 - Education is an investment in human capital.
 - May subject to diminishing return
 - Investment in education may generate positive externalities.
 - Explain long-run economic growth
 - Education provides human capital needed for R&D activities.
 - Schumpeterian's assumption of "creative destruction"

Education and Economic Growth (2)

- Economic growth can affect education through:
 - Economic growth will reduce the incidence of “child labor”
 - Possibility to reverse the “brain drain” problem
 - The best policy is to change the faulty institution and unattractive conditions that lead highly educated people to leave their home countries