EDUCATION

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

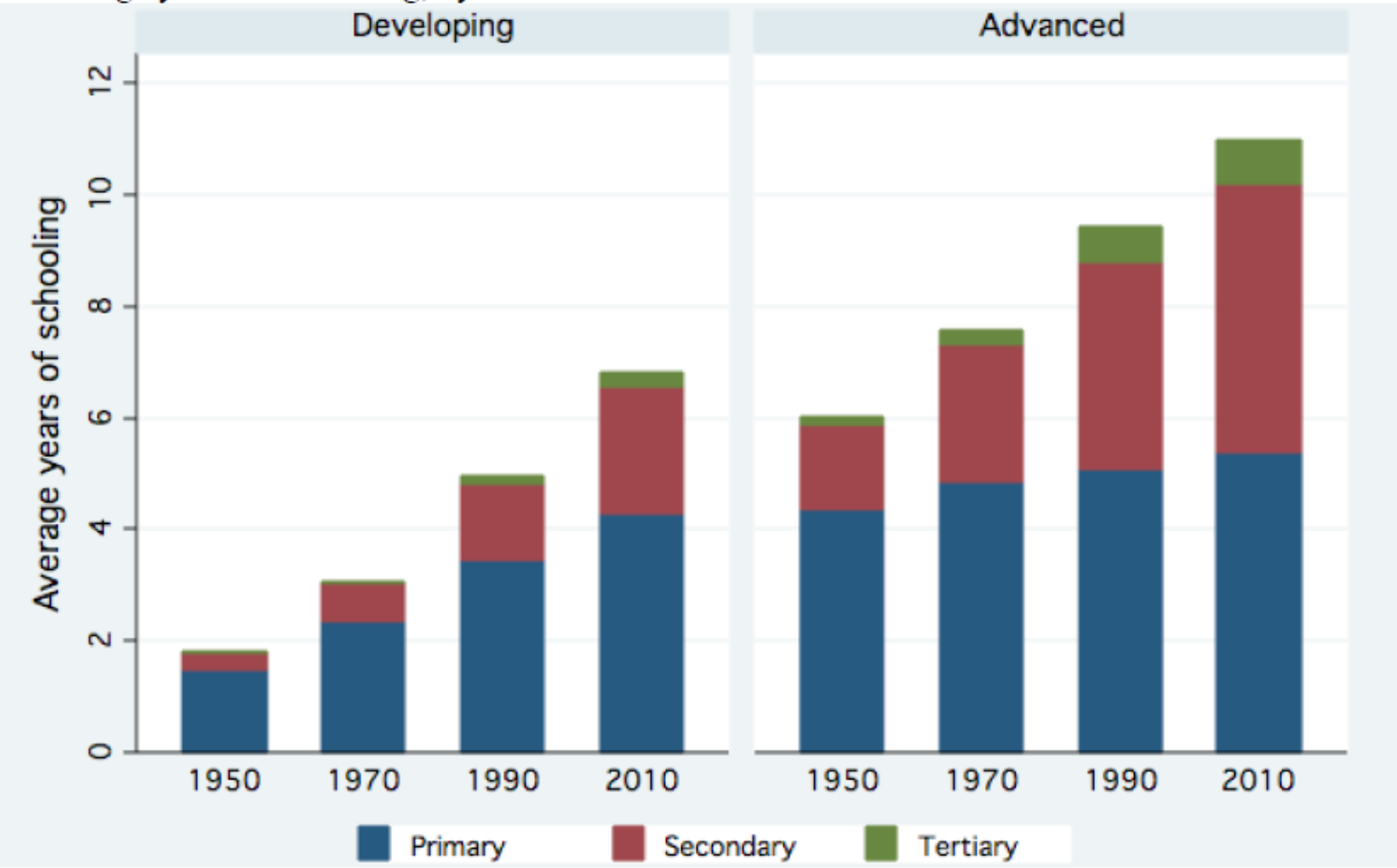
[a]Due to insufficient data for 1970, the values for Europe and Central Asia refer to 1980.

[b]Values refer to the late 1990s.

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

Education Attainment of Population Age over 15

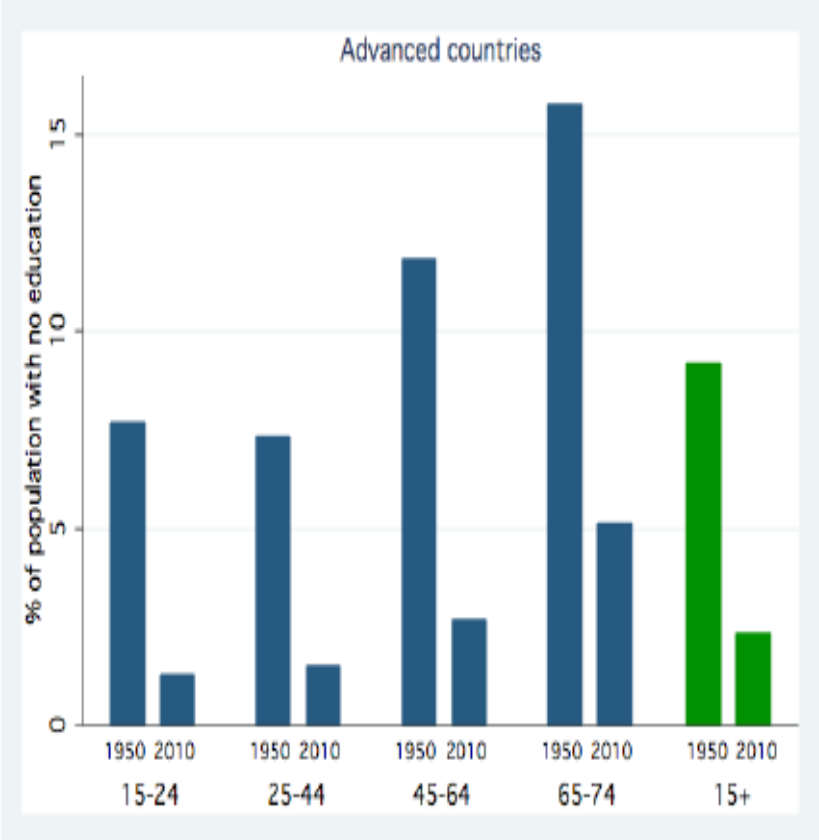
a. Average years of schooling, by educational level

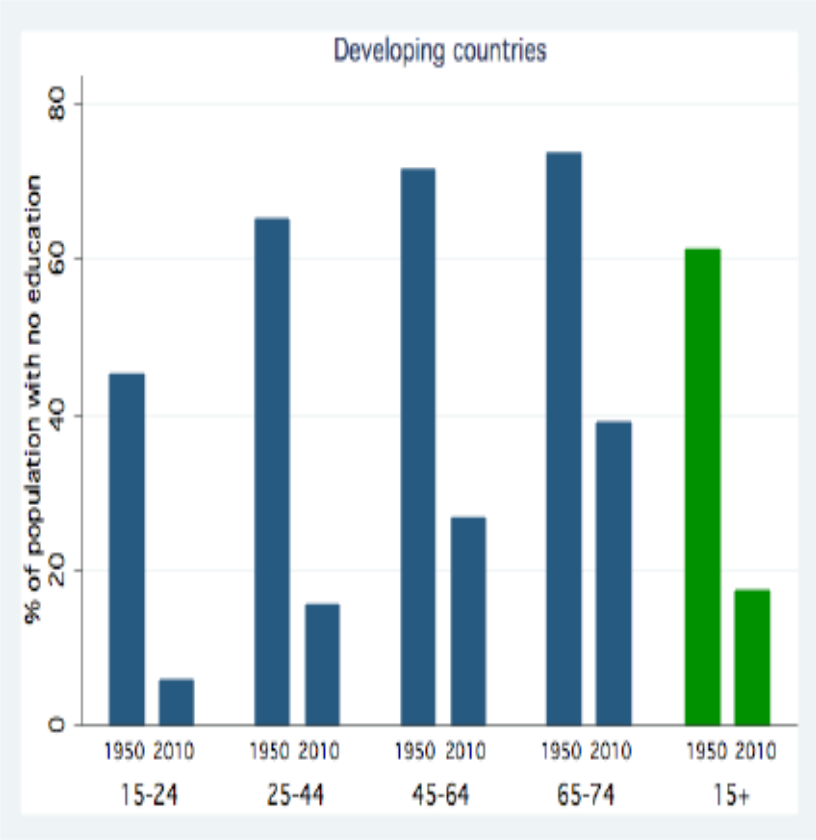


Note: Advanced countries = Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, USA, United Kingdom.

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

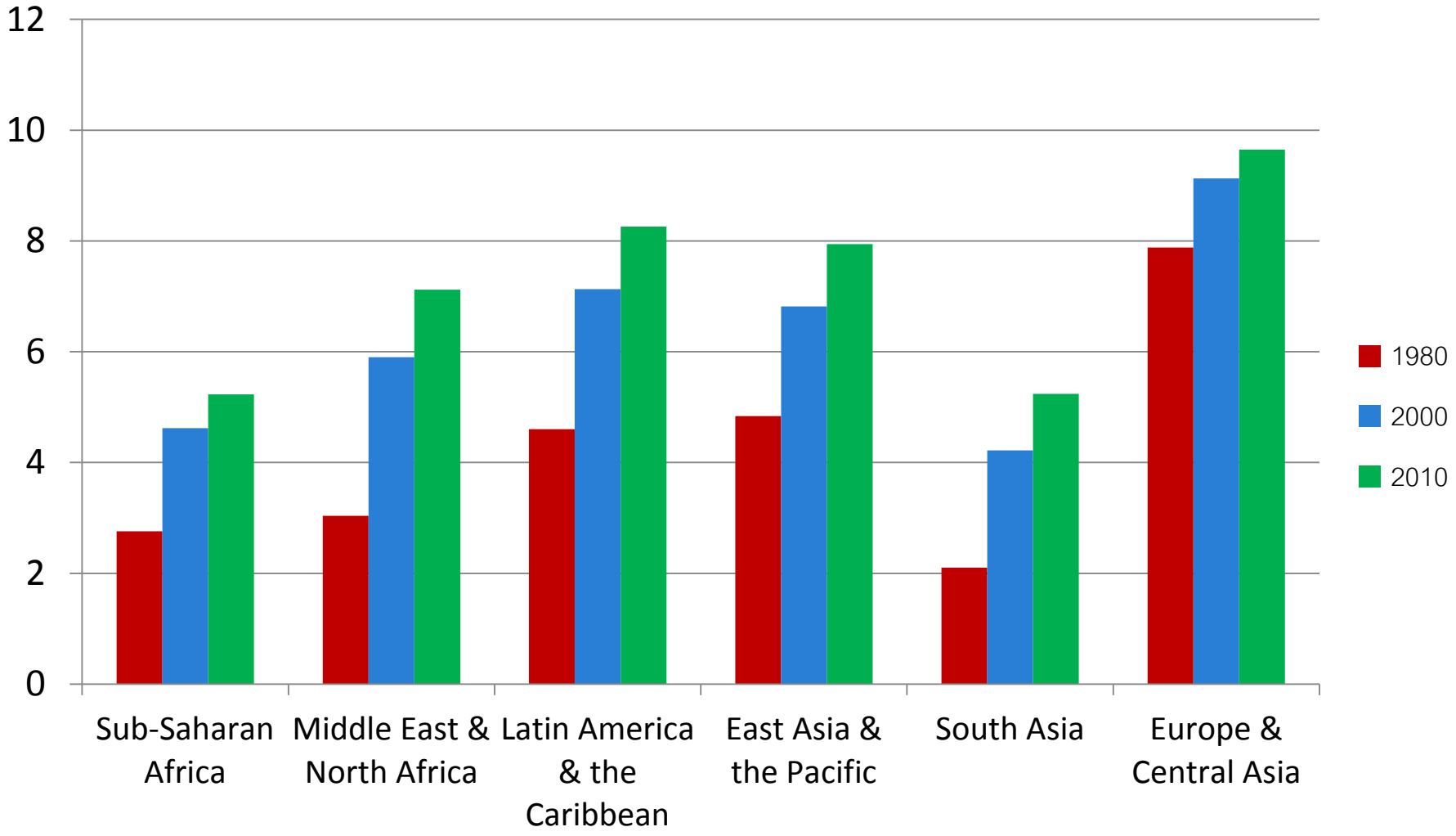
Proportion of Population Age 15+ with *No Schooling*, by age group





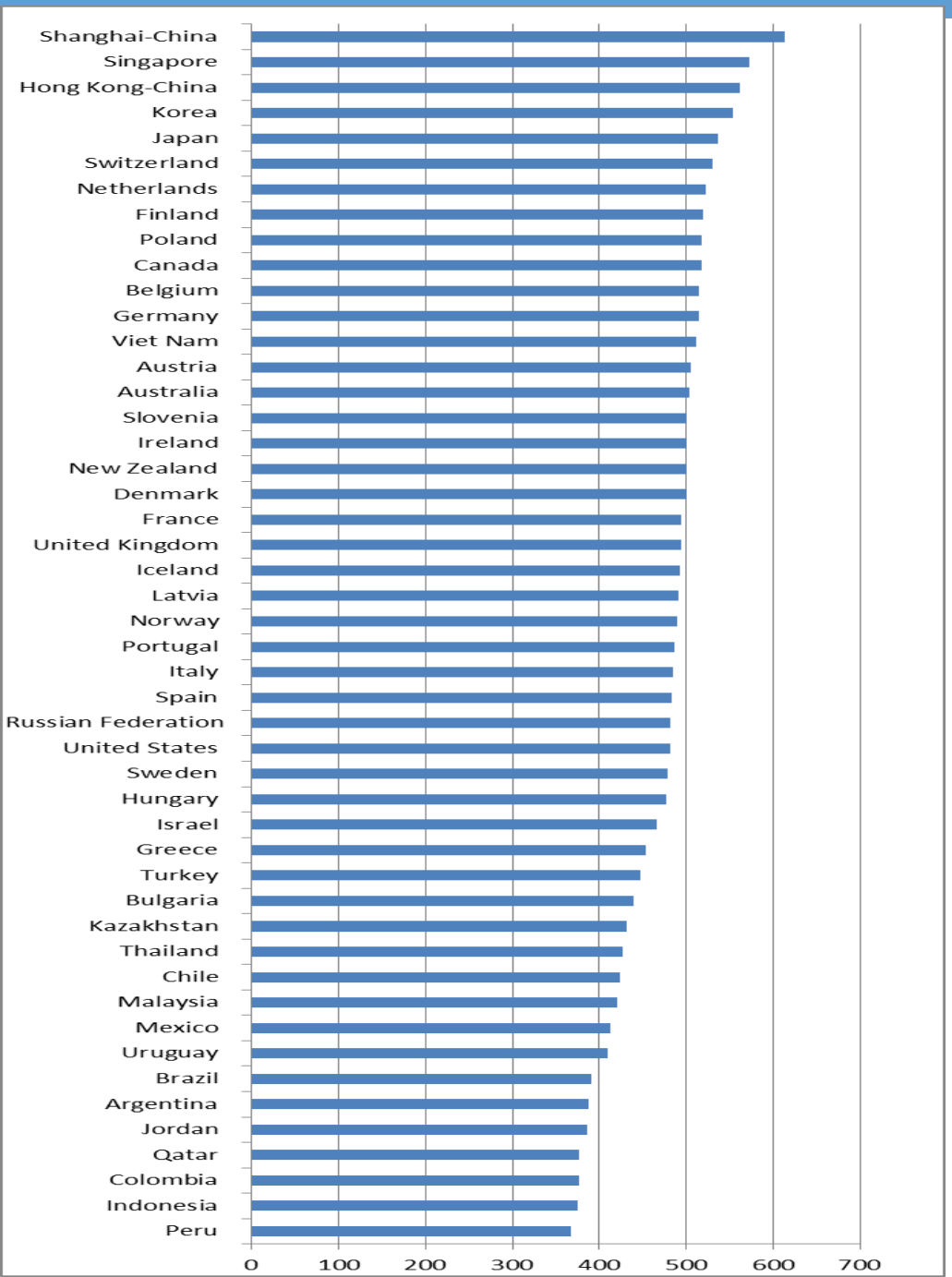
Source: http://www.nber.org/papers/w15902

Average Years of Total Schooling for Adults Age 15+



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

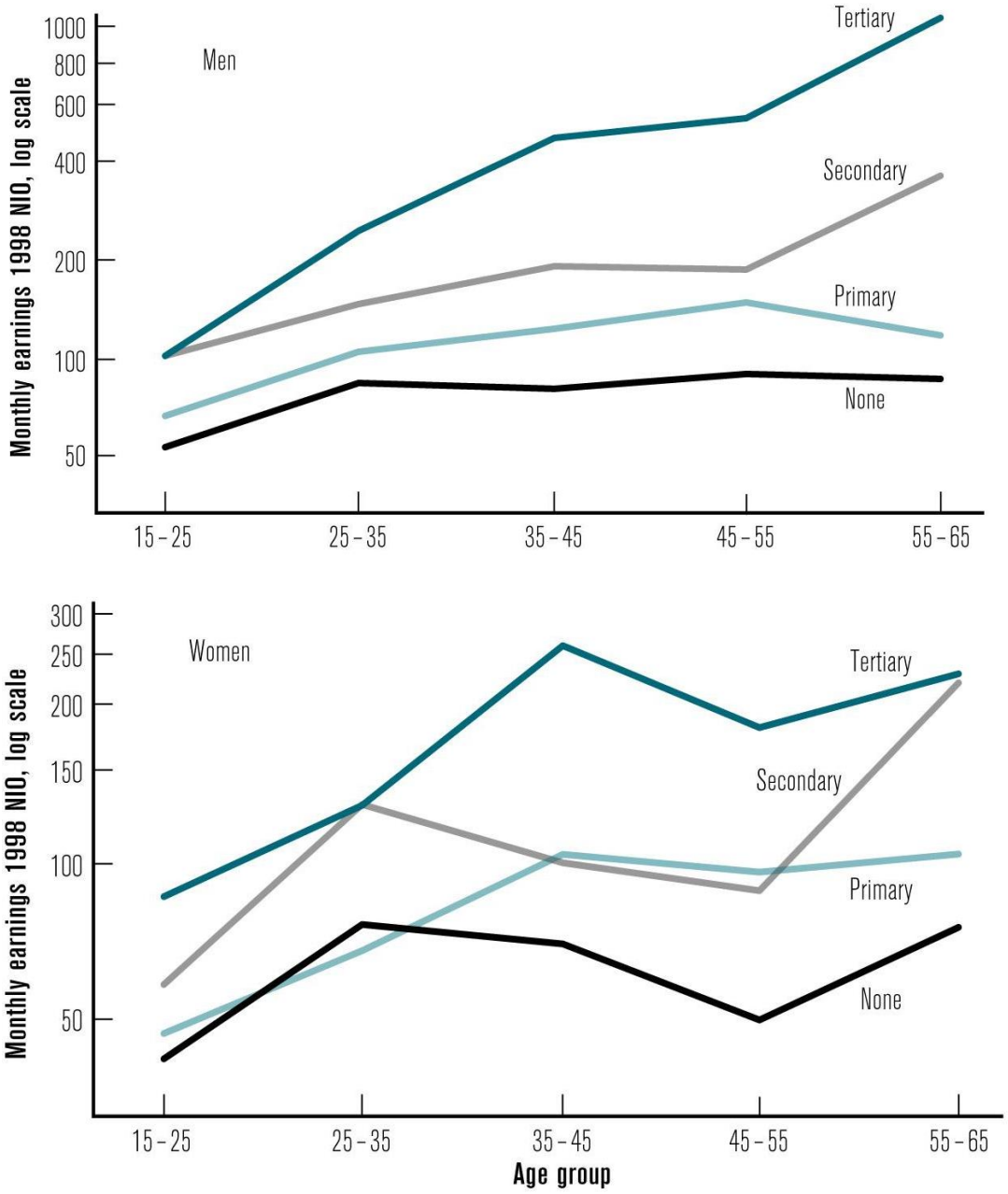
Sample question:

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

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

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

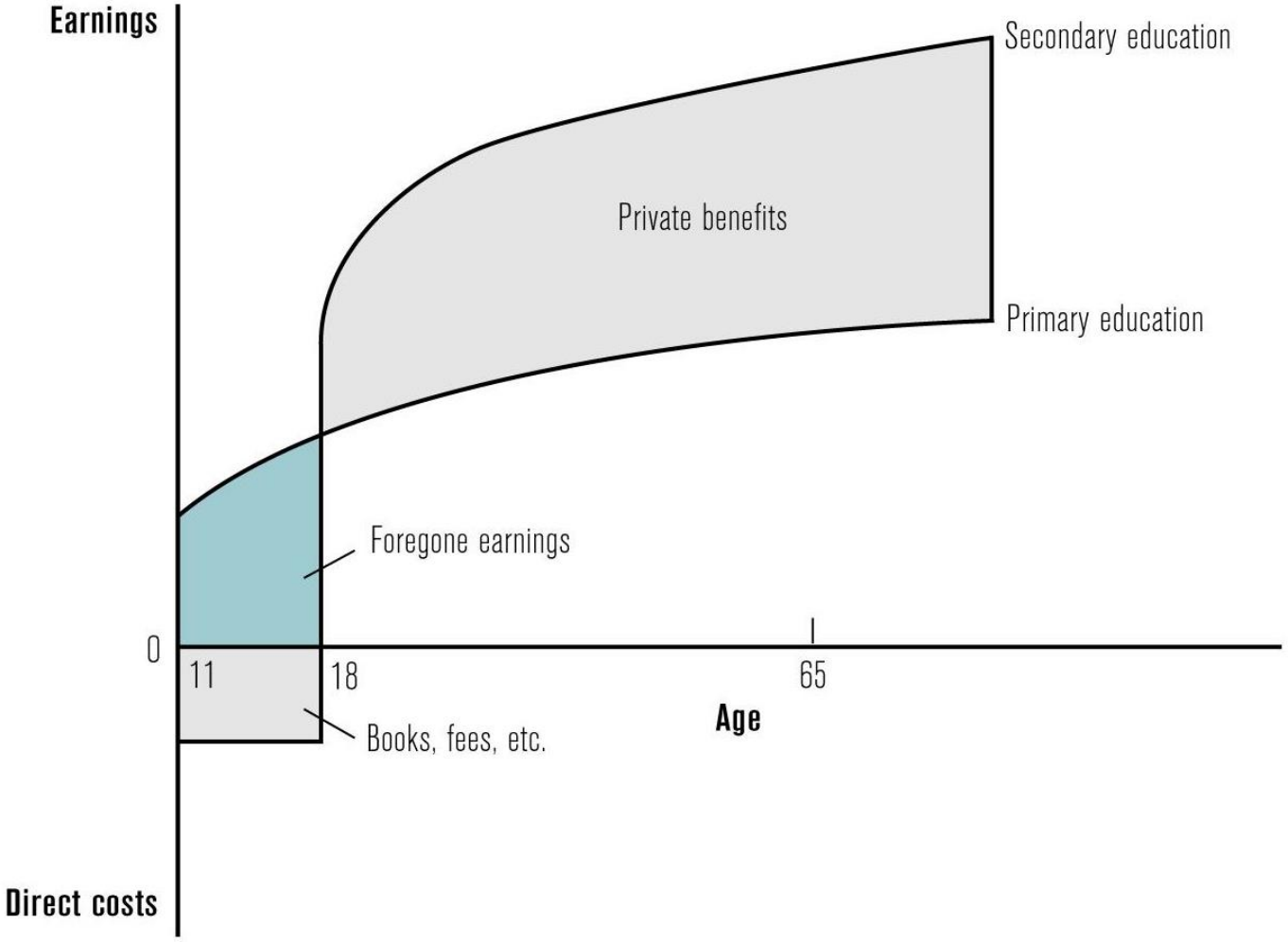
by Age, Education, and Gender in Nicaragua, 1998

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,

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

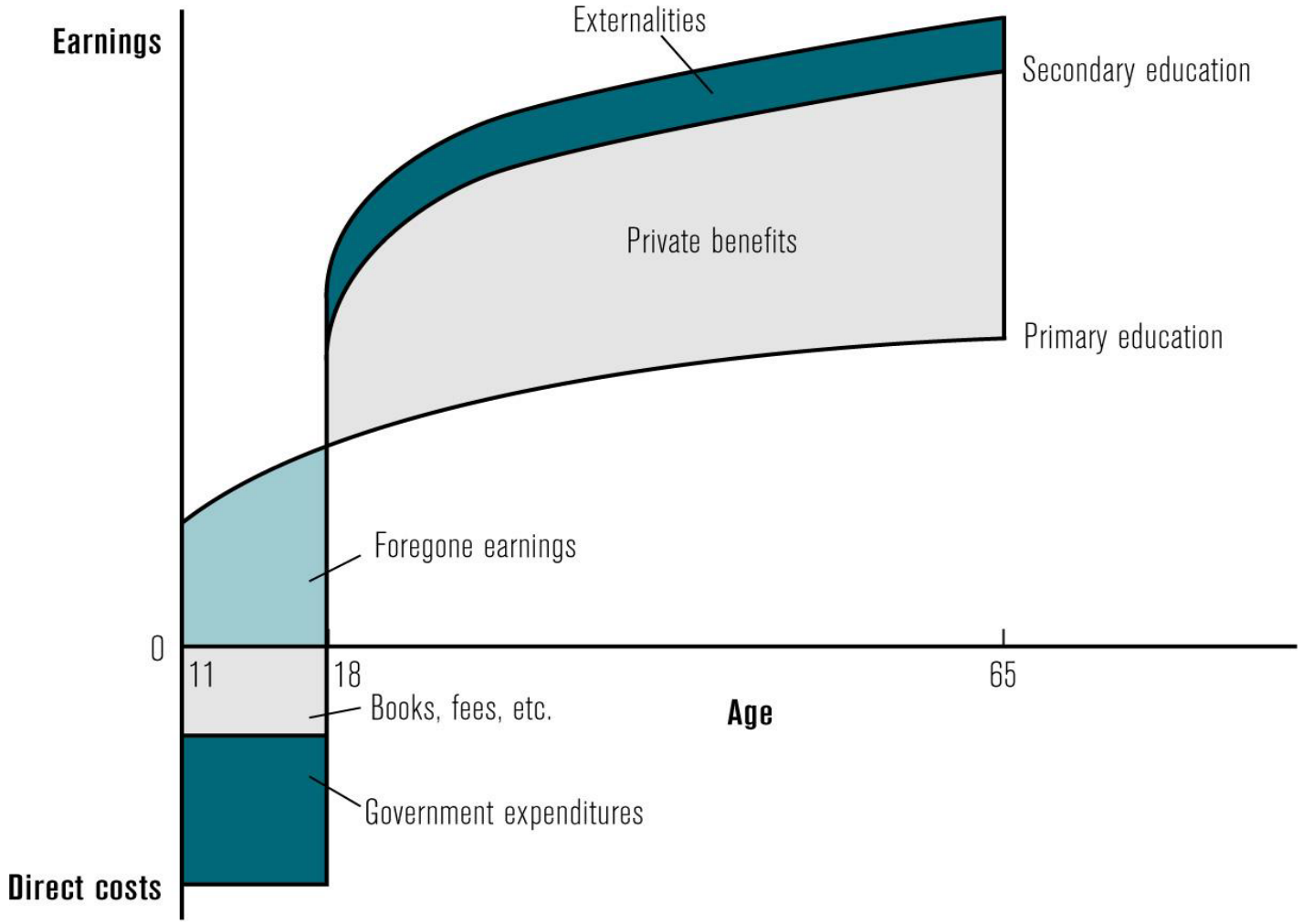
Determinants of Private Returns to Schooling



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 privates 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. Psacharopoulus 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?

Discussion

- To what level of education (primary, secondary, or tertiary) should the government provide to its citizen, particularly in the context of developing countries?

PUZZLES

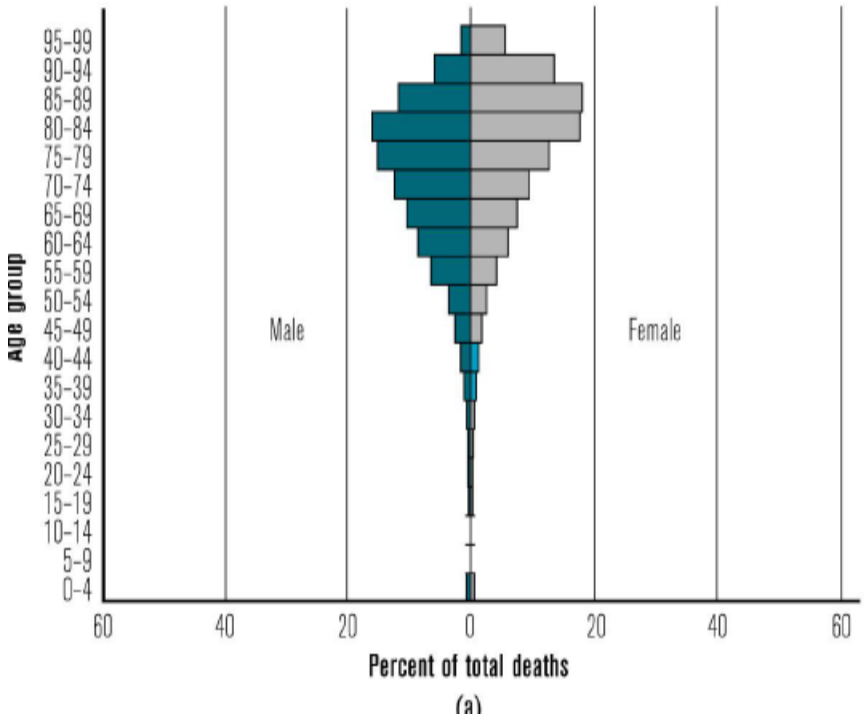
- Microeconomic puzzle: schooling in many developing countries often produces little in the way of learning, but there still is an association between schooling and earnings and rate of returns to education. Why?
- Macroeconomic puzzle: there has been a rapid growth in schooling throughout the world (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?

Problems with the Supply of Education

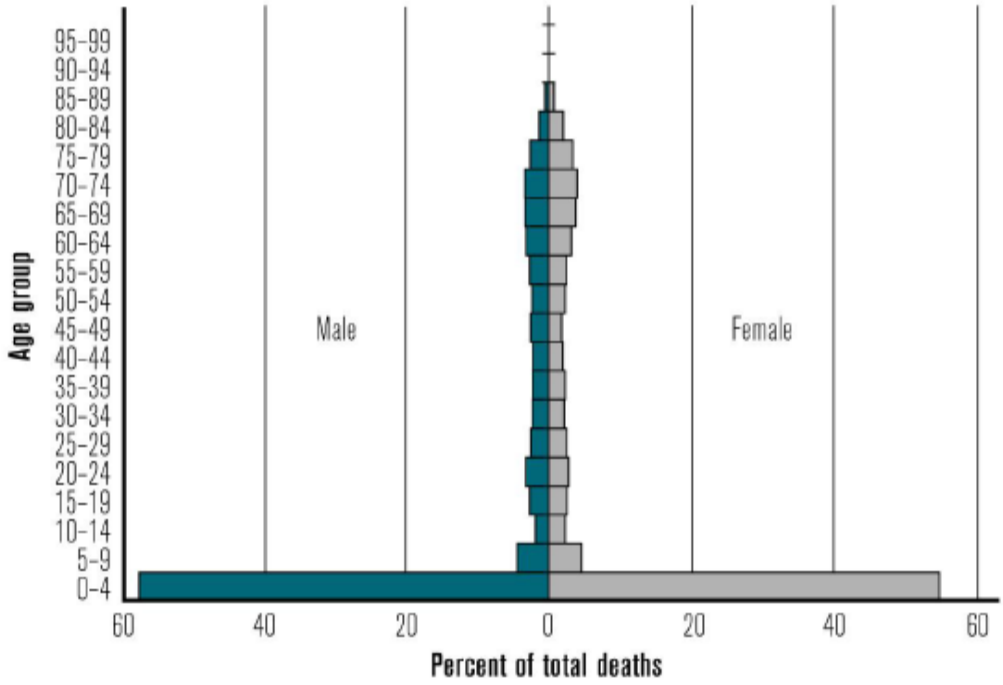
- Underinvestment
  - Public spending on education is likely to be cut first if there is fiscal crisis.
- Misallocation
  - Spending on tertiary schooling tends to be higher than spending on primary or secondary education levels
- Inefficient use of resources
  - Should we spend on building new schools or on recurrent expenditures?
  - Examples: “deworming” in Kenya, provision of textbooks (RCT)
- Absent teachers
  - Example: Use of cameras to monitor teacher absence in India

HEALTH

Distribution of Age and Deaths, 2005



Denmark



Sierra Leone

Poor health outcomes are correlated with income levels, but which causes which?

Health Measures

- **Mortality** measures deaths in a population
  - Ex: Under-five mortality rate is the probability (in terms of 'per 1000 live births') that a child born dies before reaching age five
- **Morbidity** measures rates of disease and illness.
  - Ex: Prevalence of HIV-infected cases
- **Life expectancy** is the average number of years that the person is expected to live.
- **Health-adjusted life expectancy (HALE)** is a measure of life expectancy that takes into account disability-impaired living.

Transition in Global Health

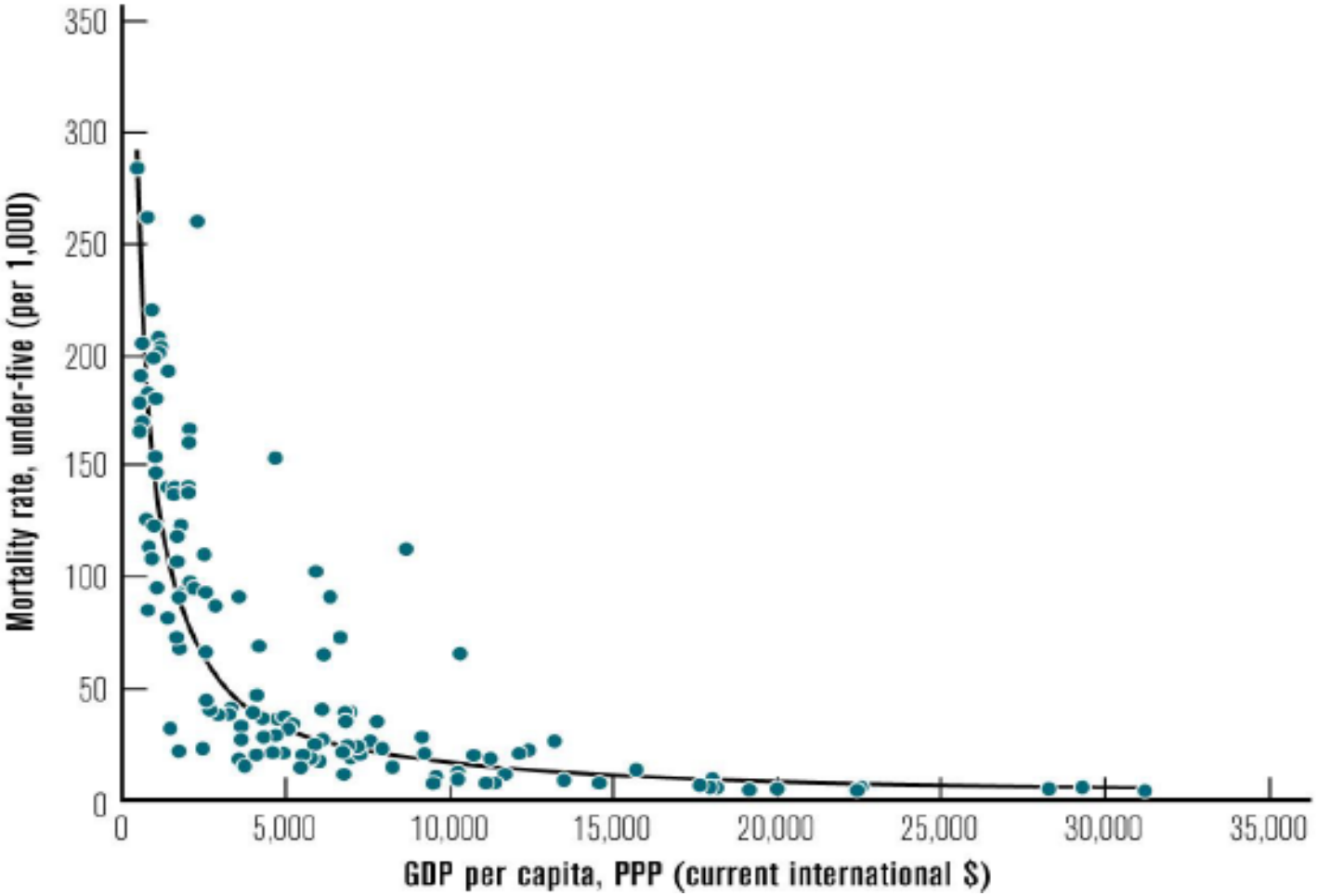
- All regions of the world experienced gains in life expectancy since 1960, but some countries in Sub-Saharan Africa saw declines since the 1990s due to HIV/AIDS.
- In many developing countries, life expectancy has risen and fertility has fallen.
  - Lower youth dependency ratio, but higher elderly dependency ratio
- "Epidemiological transition": (i) age of pestilence and famine, (ii) the age of receding pandemics, (iii) the age of degenerative and human-made diseases
- In the 20th century, there has been a major shift in causes of death and disability from infectious disease to non-communicable disease.

Health, Income, and Growth

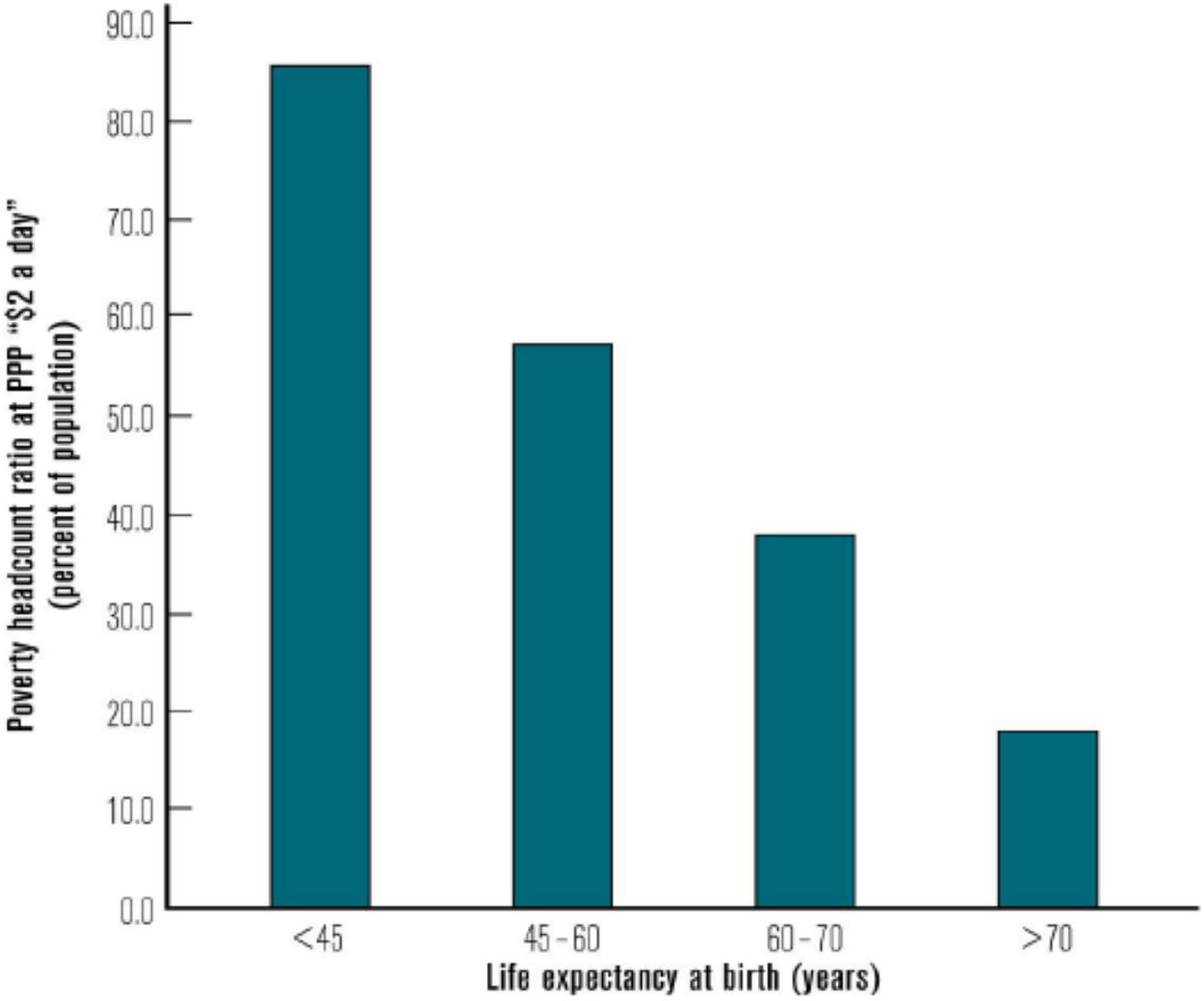
- The relationship between health and income growth is bidirectional.
  - Higher income and growth means more resources available in the economy, so individuals can spend more on goods and services that directly or indirectly improve health.
  - Improved health leads to faster economic growth, higher incomes, and reduced poverty.

Discussion: Should we promote health or economic growth first?

Child Mortality and Income



Poverty and Life Expectancy, 1998-2003



Income and Health

- As income rises, there is greater ability to build public health clinics and hospitals, trains more doctors and nurses, and pay for public health services (e.g. immunization campaign).
- Prichett & Lawrence's article "Wealthier Is Healthier" suggests that improvements in income, holding other factors constant, lower child mortality and increase life expectancy.
- Caution: there's no evidence that economic growth will improve health *without deliberate public action*.
  - So, the problem might be "lack of information" or "weak belief" (Banerjee & Duflo).
  - Examples: Use of ORT and bed nets

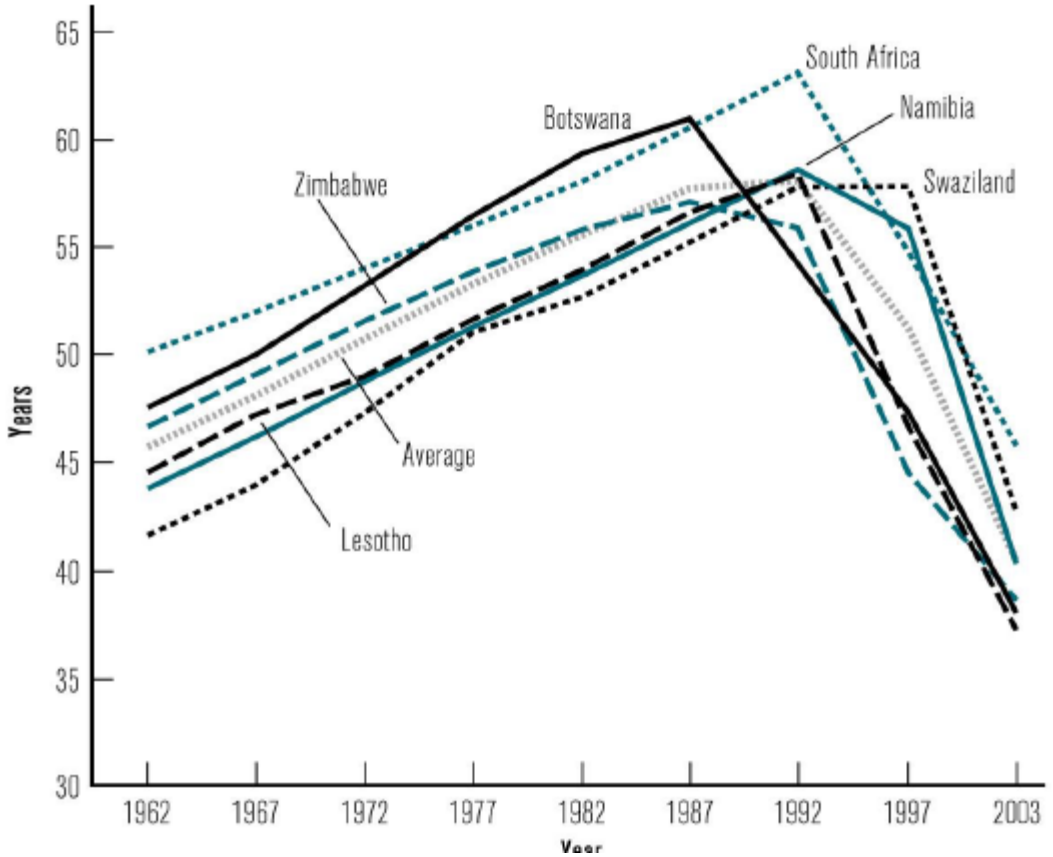
Health and Productivity

- Q: How does better health lead to economic growth?
  - Productivity gains and increased investment
  - Healthier workers are not only more productive, but also loses fewer workdays due to illness.
  - Better health means less opportunity costs for care-takers in the household
- A family member's health can affect children's education.
  - No need to rely on child labor
  - Child's health has a direct effect on his/her own schooling.
  - There's evidence that childhood health can affect labor productivity later in life.

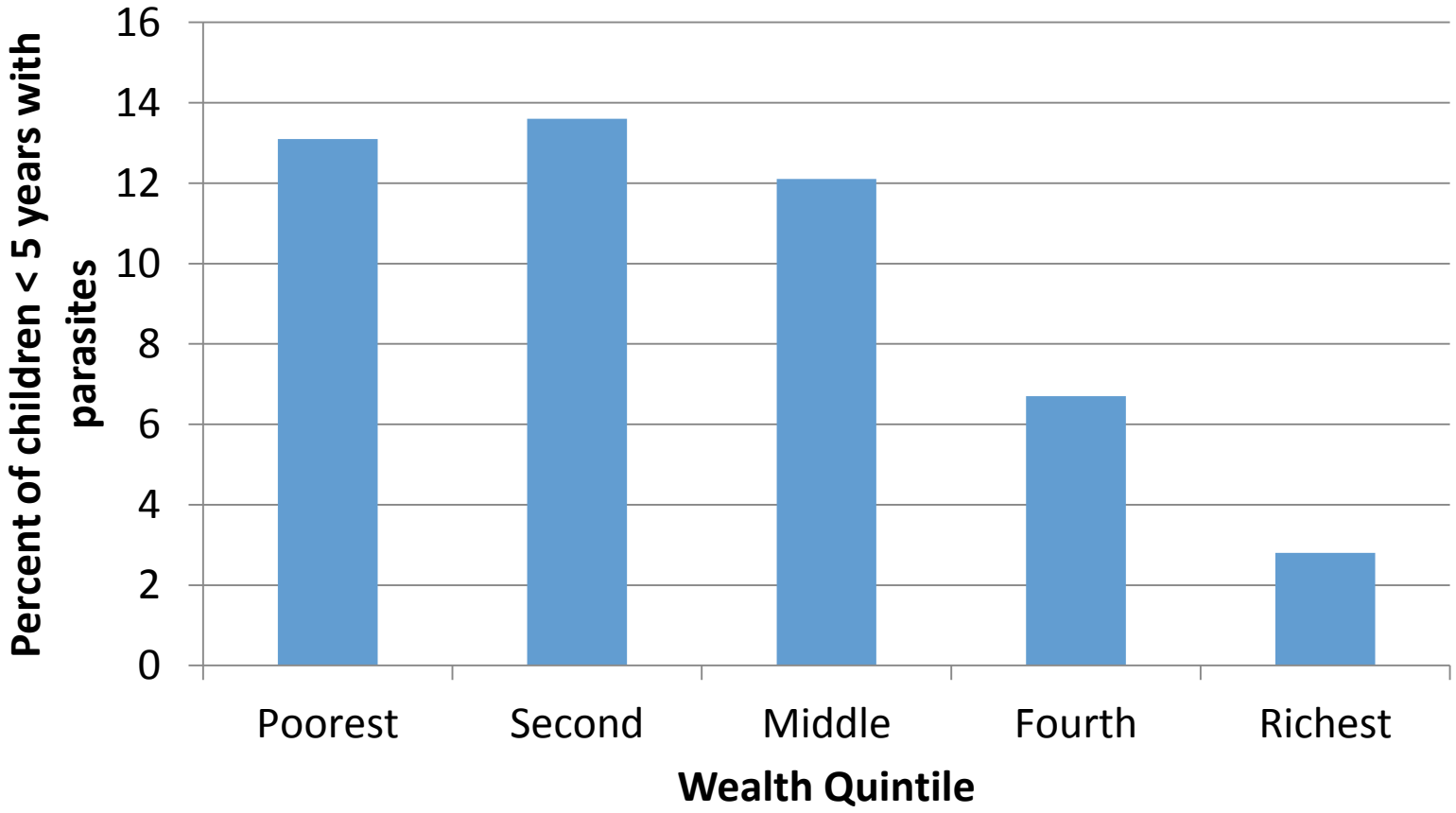
Three Critical Diseases

- HIV/AIDS
  - First leading causes of deaths in Sub-Saharan Africa
  - Combating HIV/AIDS requires strong national & international commitment with both political and economic initiatives.
- Malaria
  - Malaria can have substantial economic costs, but malaria intervention programs are very cost-effective.
- Tuberculosis (TB)
  - TB is airborne disease and can be more prevalent among the poor who live in overcrowded condition.
  - The economic costs of TB can be substantial due to lost work for the patient and caregivers, treatment costs, etc.

Life Expectancy at Birth in Selected Most-HIV Affected Countries (1962-2003)



Malaria Parasite Prevalence in Children in Zambia (2008)



Source: http://www.nmcc.org.zm/files/ZambiaMIS2008Final.pdf