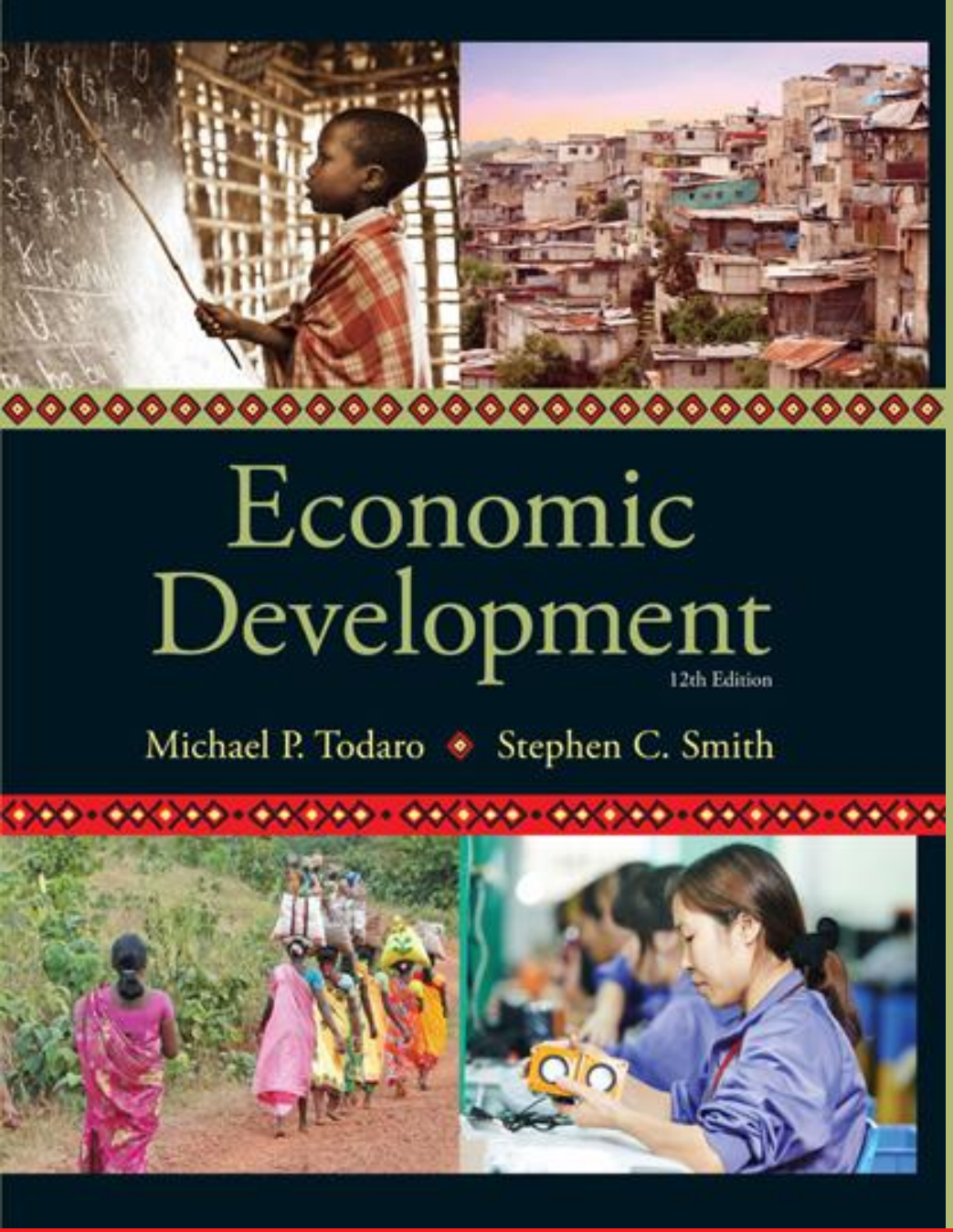


Chapter 8

Human Capital: Education and Health in Economic Development

8.1 The Central Roles of Education and Health

- Health and education are important objectives of development, as reflected in Amartya Sen's capability approach, and in the core values of economic development
- Health and education are also important components of growth and development – inputs in the aggregate production function

Education and Health as Joint Investments for Development

- These are investments in the same individual
- Greater health capital may improve the returns to investments in education
  - Health is a factor in school attendance
  - Healthier students learn more effectively
  - A longer life raises the rate of return to education
  - Healthier people have lower depreciation of education capital
- Greater education capital may improve the returns to investments in health
  - Public health programs need knowledge learned in school
  - Basic hygiene and sanitation may be taught in school
  - Education needed in training of health personnel

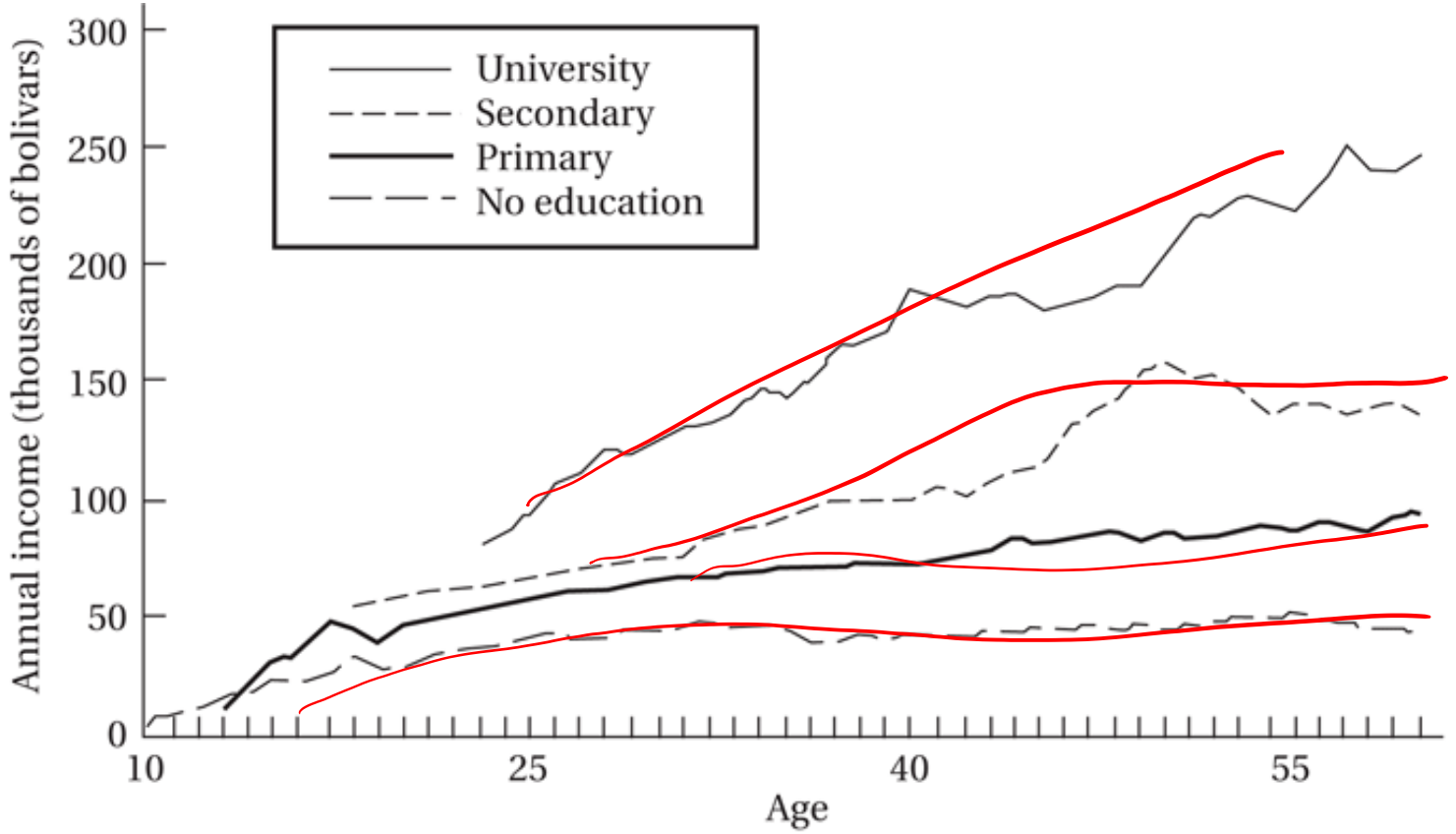
Improving Health and Education: Increasing Incomes Is Not Sufficient

- Increases in income often do not lead to substantial increases in investment in children's education and health
- But better educated mothers tend to have healthier children at any income level
- Significant market failures in education and health require policy action

8.2 Investing in Education and Health: The Human Capital Approach

- Initial investments in health or education lead to a stream of higher future income
- The present discounted value of this stream of future income is compared to the costs of the investment
- Private returns to education are high, and may be higher than social returns, especially at higher educational levels

Figure 8.1 Age-Earnings Profiles by Level of Education: Venezuela



Source: International Bank for Reconstruction and Development/The World Bank: *The Profitability of Investment in Education: Concepts & Methods* by George Psacharopoulos, 1995. Reprinted with permission.

Figure 8.2 Financial Trade-Offs in the Decision to Continue in School

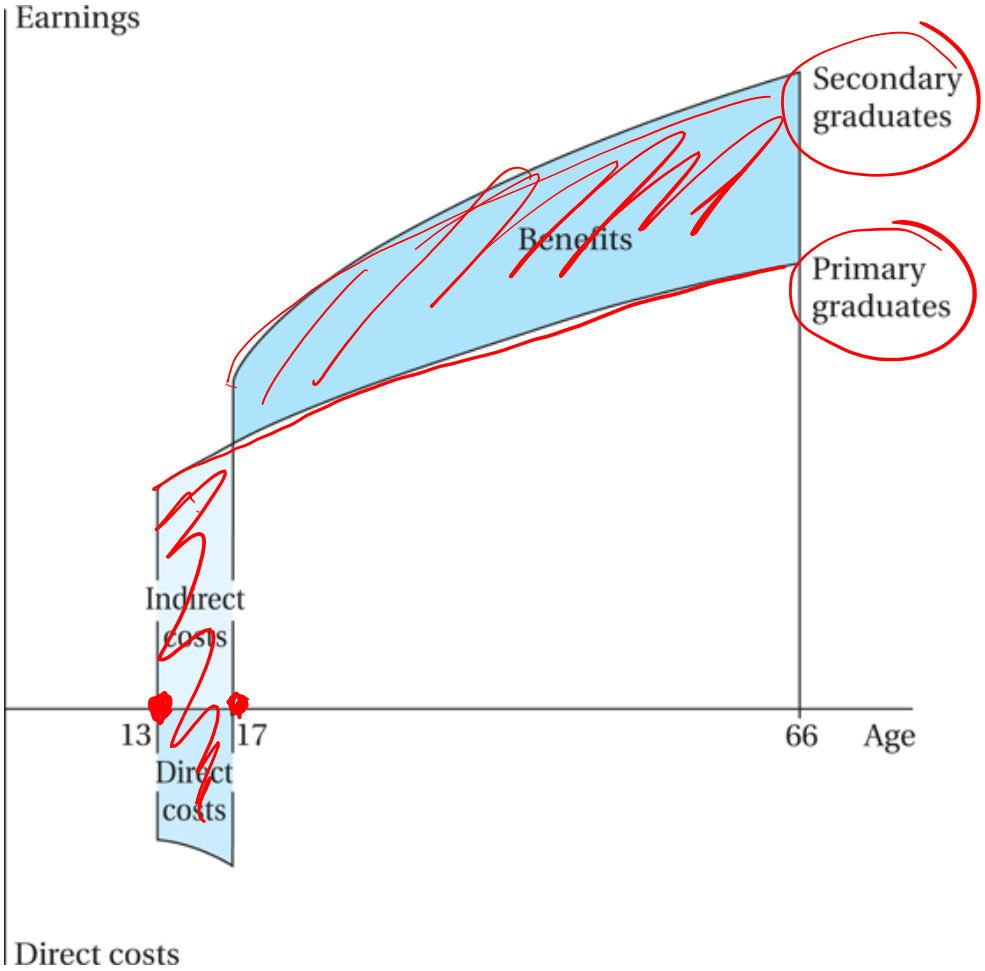


Table 8.1 Returns to Investment in Education by Level, Regional Averages (%)

	Social			Private		
Region	Primary	Secondary	Higher	Primary	Secondary	Higher
Asia[a]	16.2	11.1	11.0	20.0	15.8	18.2
MENA[b]	15.6	9.7	9.9	13.8	13.6	18.8
Latin America/Caribbean	17.4	12.9	12.3	26.6	17.0	19.5
OECD	8.5	9.4	8.5	13.4	11.3	11.6
Sub-Saharan Africa	25.4	18.4	11.3	37.6	24.6	27.8
World	18.9	13.1	10.8	26.6	17.0	19.0

[a] Non-OECD.
[b] Europe/Middle East/North Africa, Non-OECD
Source: George G. Psacharopoulos and Harry A. Patrinos, "Returns to investment in education: A further update," *Education Economics* 12, No. 2 (August 2004), tab. 1.
Note: How these rates of return were calculated is explained in detail in note 19 at the end of this chapter.

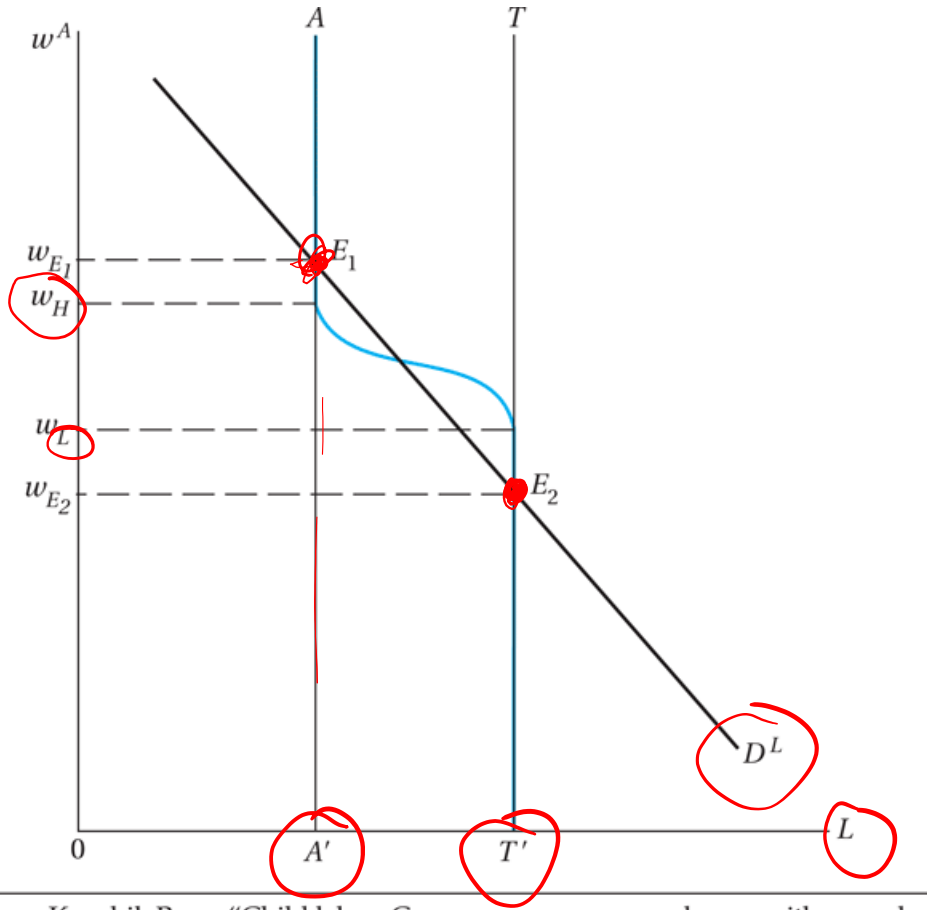
8.3 Child Labor

- Child labor is a widespread phenomenon
- The problem may be modeled using the "multiple equilibria" approach
- Government intervention may be called for to move to a 'better' equilibrium
- Sometimes this shift can be self-enforcing, so active intervention is only needed at first

Assumptions of the Child Labor Multiple Equilibria Model

- Luxury Axiom: A household with sufficiently high income would not send its children to work
- Substitution Axiom: Adult and child labor are substitutes (perfect substitutes in this model), in which the quantity of output by a child is a given fraction of that of an adult: $Q^C = \gamma Q^A$, $0 < \gamma < 1$.

Figure 8.3 Child Labor as a Bad Equilibrium



Source: From Kaushik Basu, "Child labor: Cause, consequence, and cure, with remarks on international labor standards," *Journal of Economic Literature* 37 (1999): 1101. Reprinted with the permission of the author and the American Economic Association.

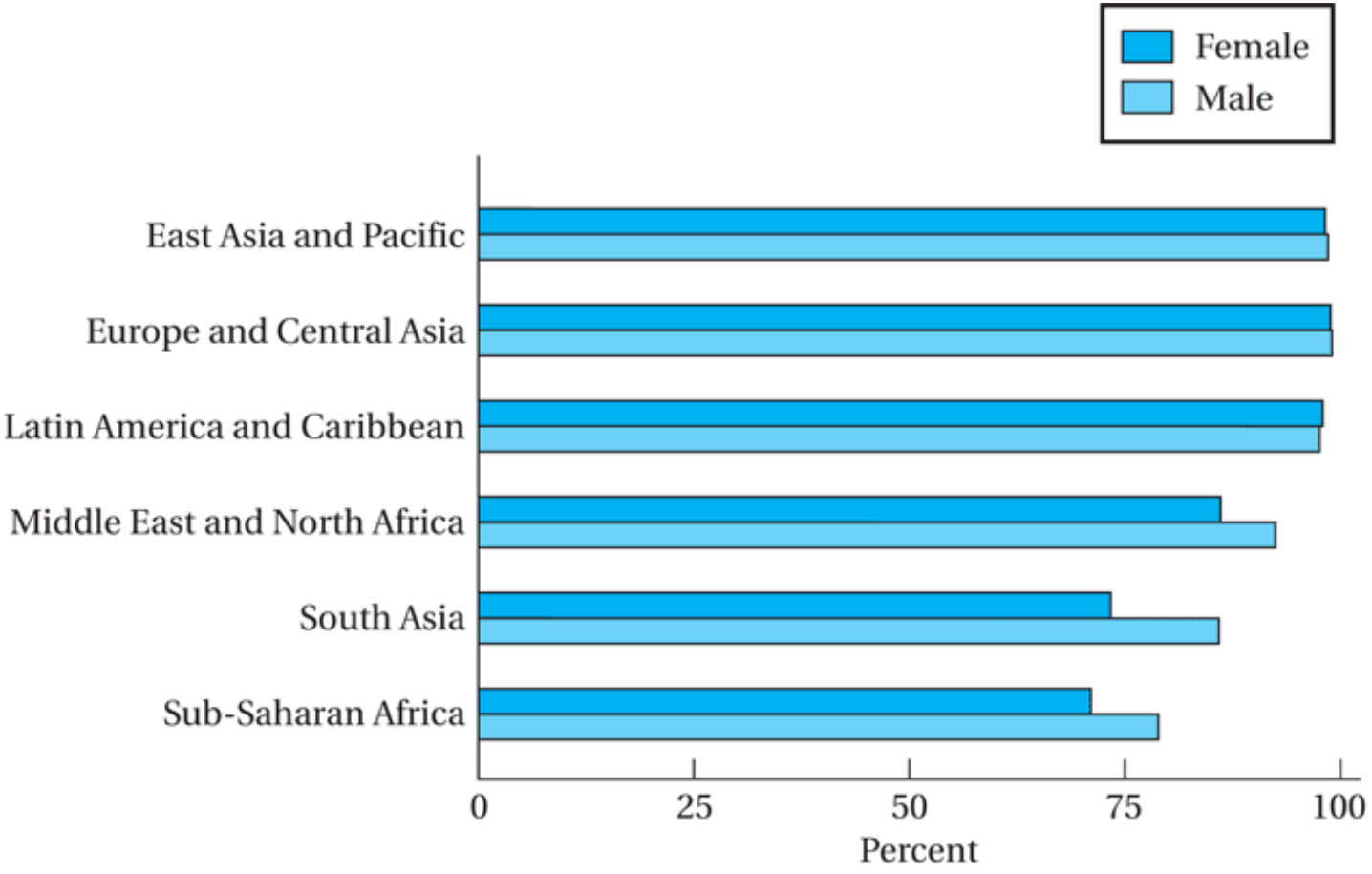
Other approaches to child labor policy

- The Chapter 8 Case Study: Get more children into school (as in Millennium Development Goals), e.g. new village schools; and enrollment incentives for parents such as in Progresa/ Oportunidades
- Consider child labor an expression of poverty, so emphasize ending poverty generally (a traditional World Bank approach, now modified)
- If child labor is inevitable in the short run, regulate it to prevent abuse and provide support services for working children (UNICEF approach)
- Ban child labor; or if impossible, ban child labor in its most abusive forms (ILO strategy; "Worst Forms of Child Labor Convention")
- Activist approach: trade sanctions. Concerns: could backfire when children shift to informal sector; and if modern sector growth slows

8.4 The Gender Gap: Discrimination in Education and Health

- Young females receive less education than young males in nearly every low and lower-middle income developing country
- Closing the educational gender gap is important because:
  - The social rate of return on women's education is higher than that of men in developing countries
  - Education for women increases productivity, lowers fertility
  - Educated mothers have a multiplier impact on future generations
  - Education can break the vicious cycle of poverty and inadequate schooling for women
  - Good news: Millennium Development Goals on parity being approached, progress in every developing region

Figure 8.4 Youth Literacy Rate, 2008



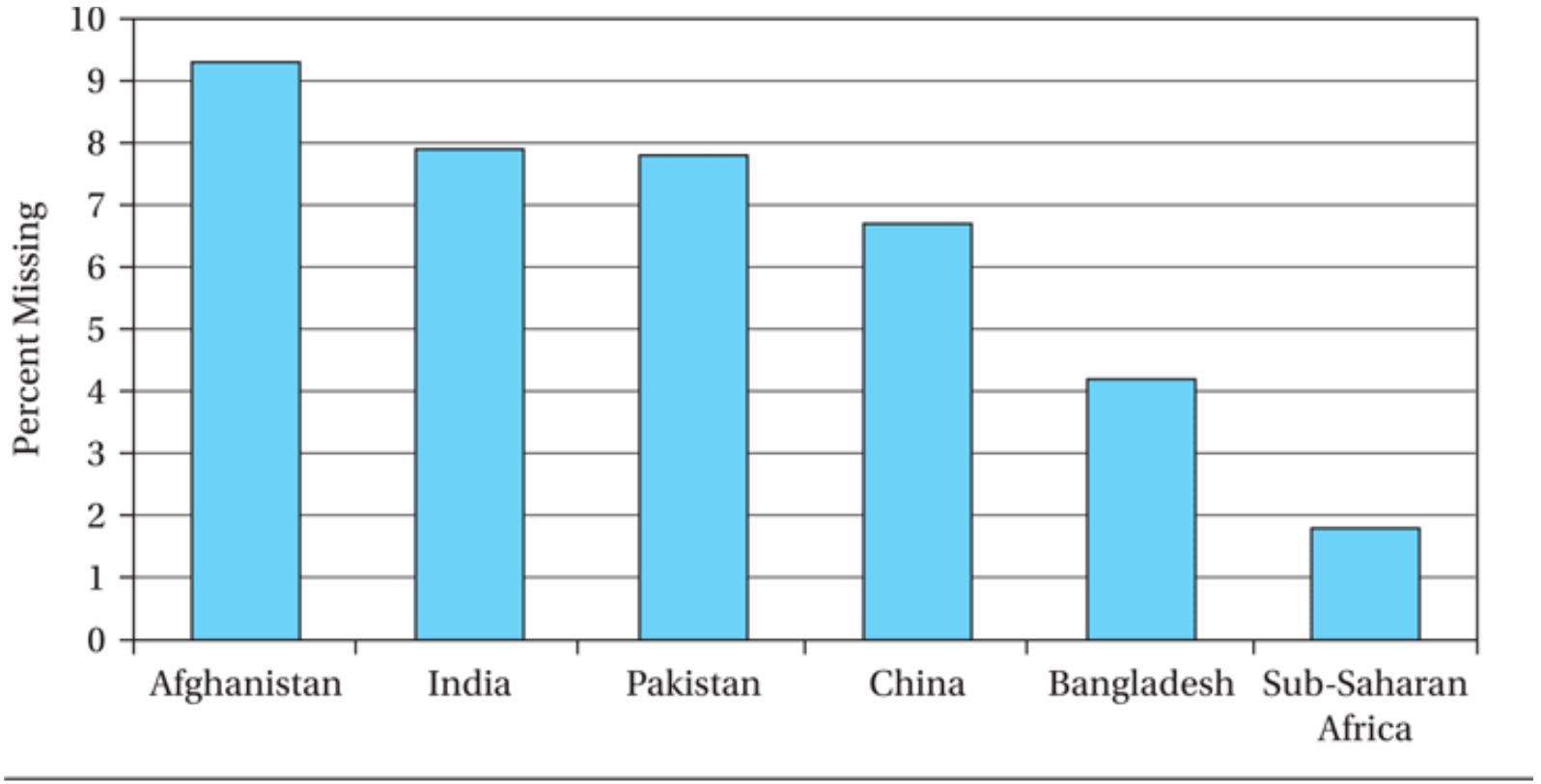
Source: International Bank for Reconstruction and Development/The World Bank, *World Development Indicators*, 2010. Reprinted with permission.

8.4 The Gender Gap: Discrimination in Education and Health (cont'd)

- Consequences of gender bias in health and education
  - Economic incentives and their cultural setting
  - "Missing Women" mystery in Asia

investigation!

Figure 8.5 Estimated Percent of Women "Missing"



Source: Stephan Klasen and Claudia Wink, "Missing Women: Revisiting the Debate," *Feminist Economics* 9, 2–3 (2003): 263–299.

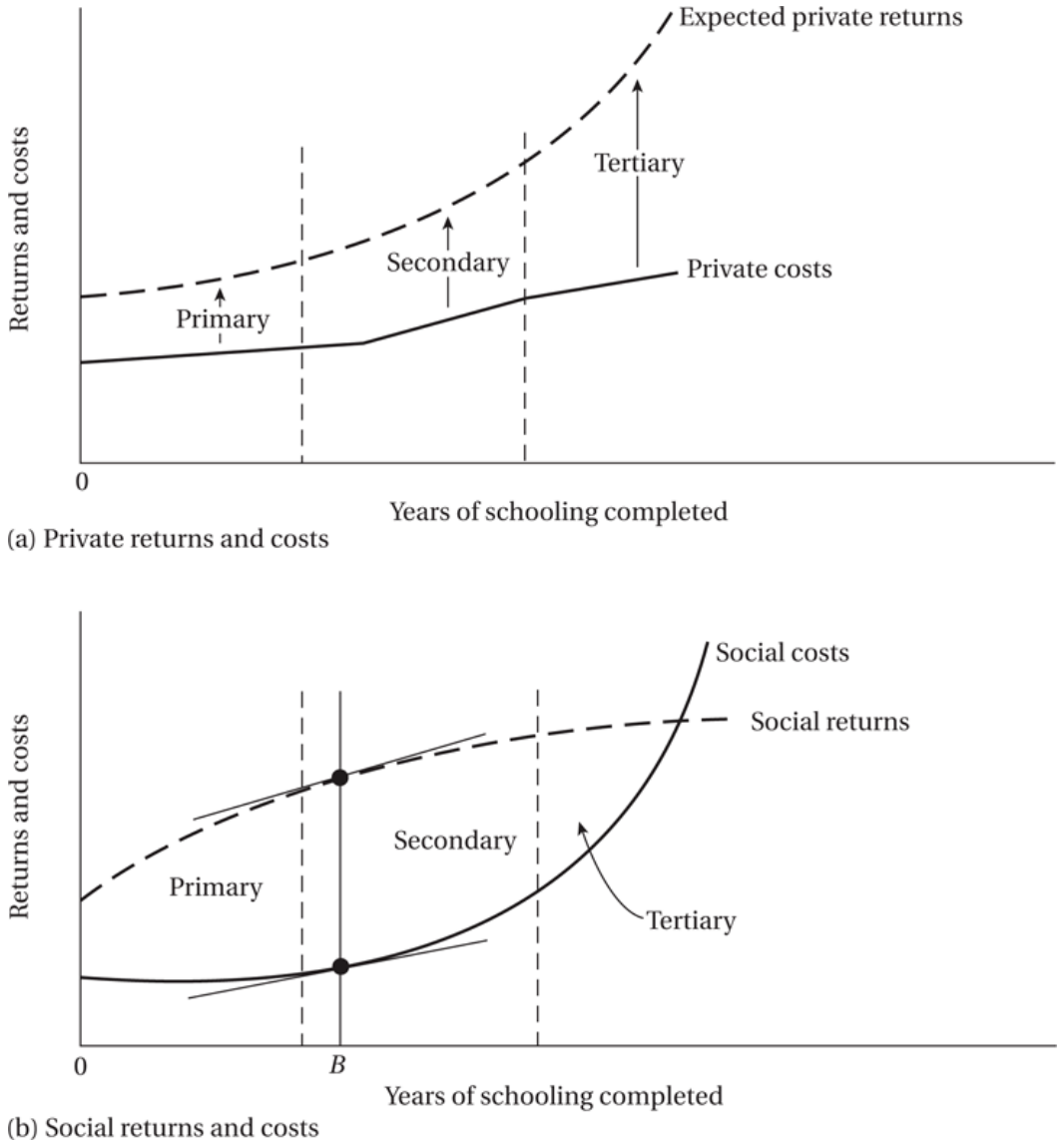
The "Missing Women" Crisis

- Research has concluded that in Asia at least 100 million women or more are "missing"
- If gender ratios were closer to normal levels based on biology, in comparison to other regions such as Europe, North America, or Latin America (or for that matter sub-Saharan Africa), that is the minimum number of additional women who would be alive in Asia alone
- Some women are also missing in Africa, but a much smaller proportion
- Reasons include inferior medical care for girls, and gender selective abortion or female infanticide

8.5 Educational Systems and Development

- Educational supply and demand: the relationship between employment opportunities and educational demands
- Social versus private benefits and costs
- Distribution of education
- Education, inequality, and poverty
- Education, Internal Migration, and the Brain Drain

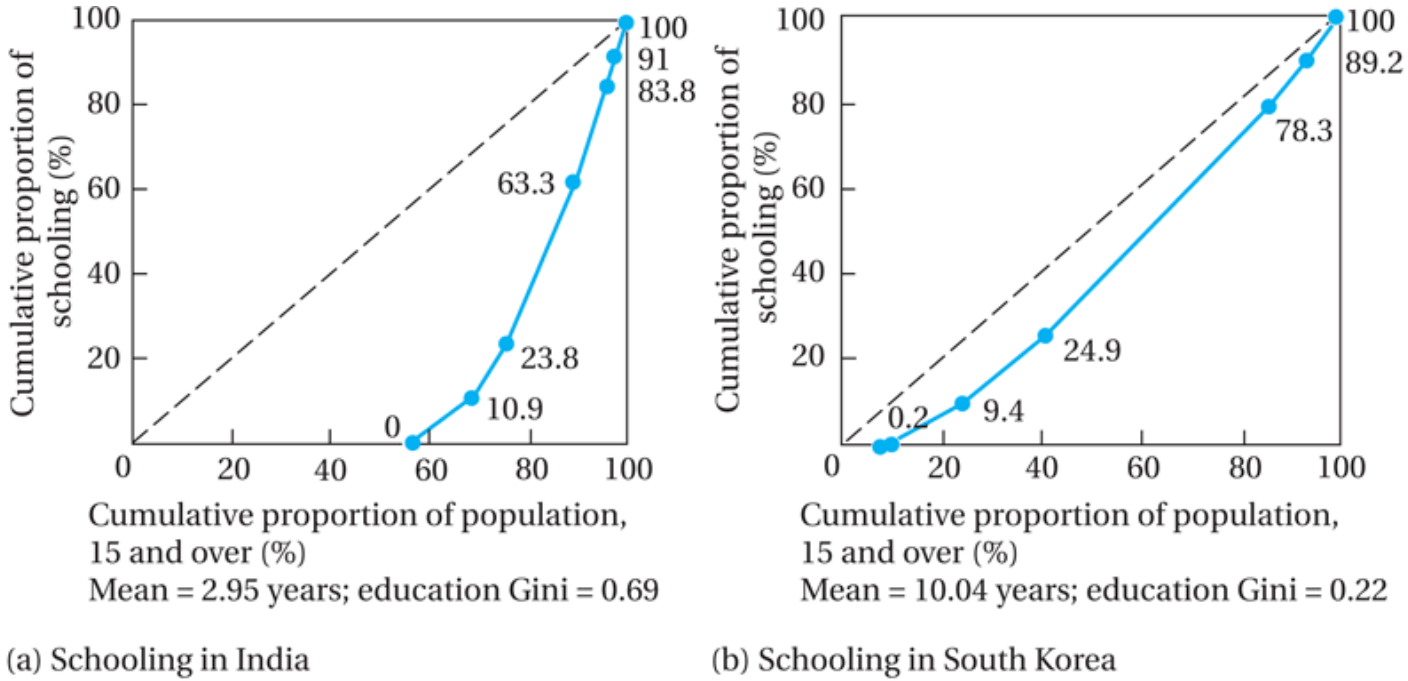
Figure 8.6 Private versus Social Benefits and Costs of Education: An Illustration



8.5 Educational Systems and Development (cont'd)

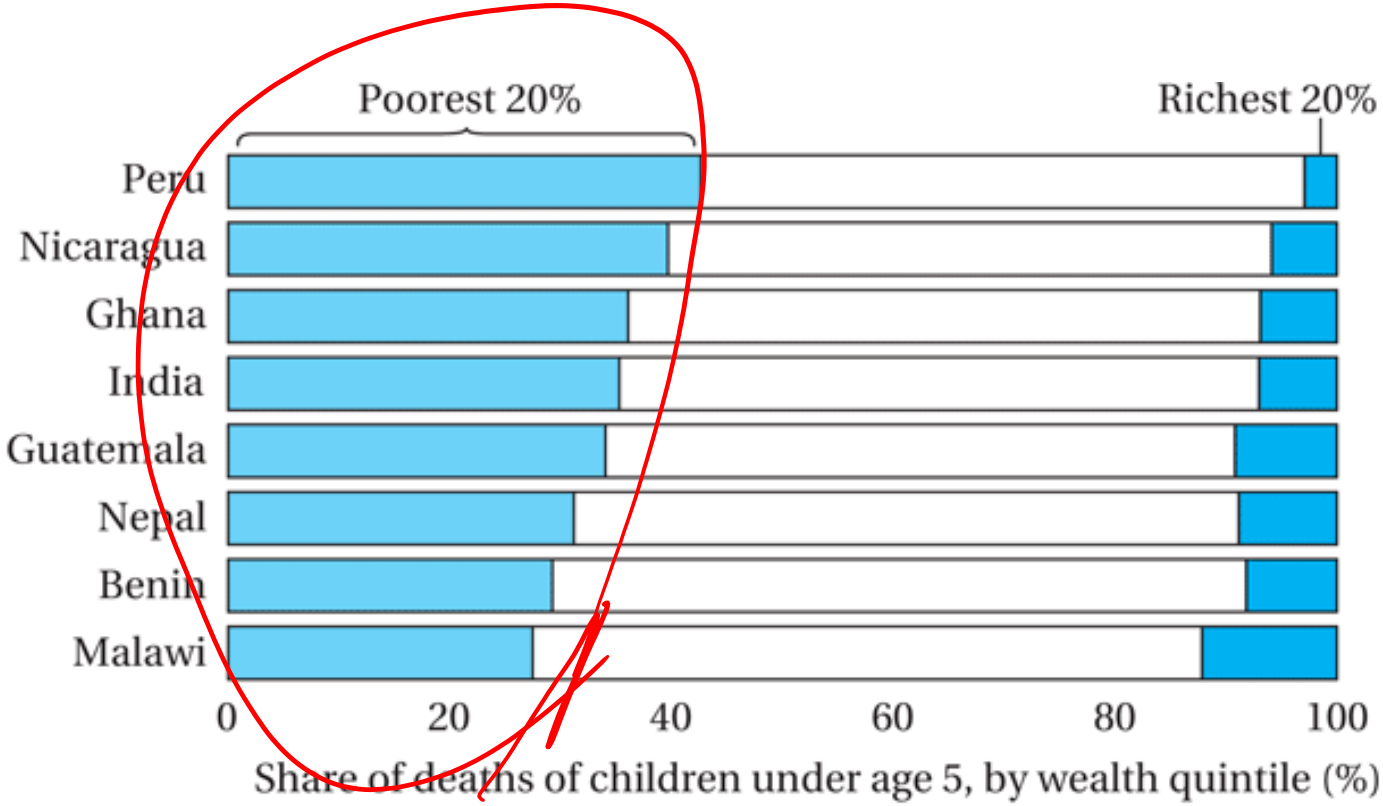
- Distribution of Education
  - Lorenz curves for the distribution of education
- Education, Inequality, and Poverty

Figure 8.7 Lorenz Curves for Education in India and South Korea



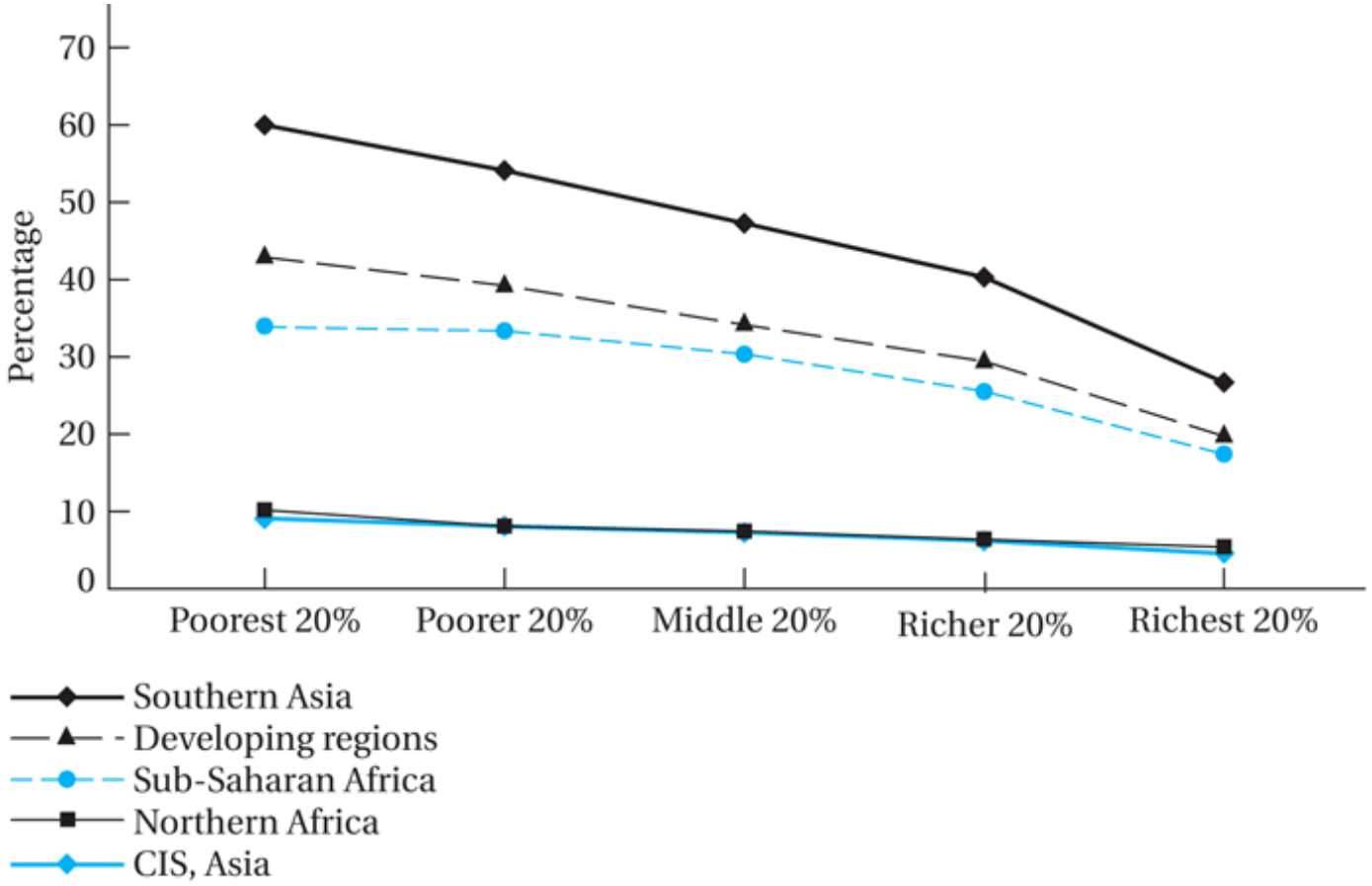
Source: From *The Quality of Growth.* Copyright © 2000 by World Bank. Reprinted with permission.

Figure 8.8 Children's Likelihood to Die in Selected Countries



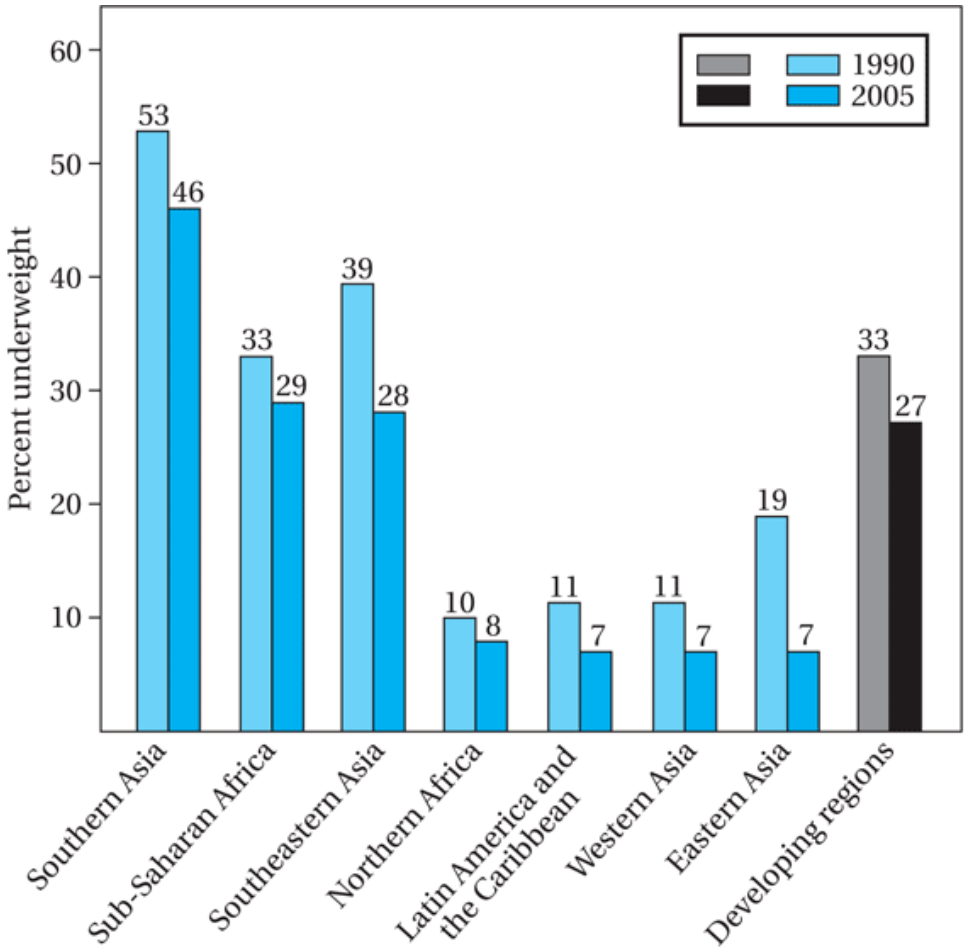
Source: Human Development Report, 2005, fig. 2.4. Reprinted with permission from the United Nations Development Programme.

Figure 8.9 Proportion of Children under 5 Who Are Underweight, by Household Wealth, around 2008



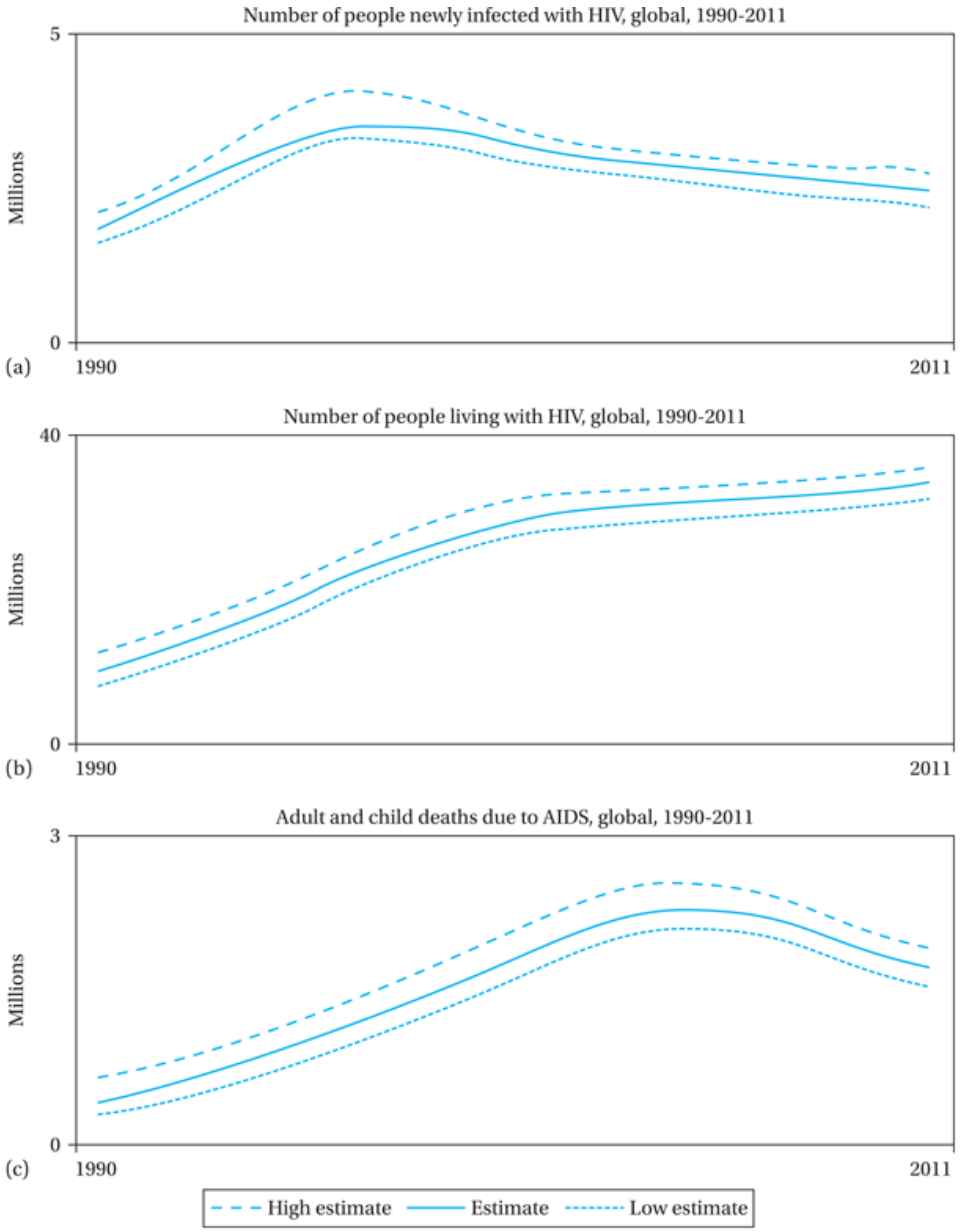
Source: From *Millennium Development Goals Report, 2010,* p. 14. Reprinted with permission from the United Nations.

Figure 8.10 Proportion of Children under 5 Who Are Underweight, 1990 and 2005



Source: Adapted from United Nations, *Millennium Development Goals Report, 2007* (New York: United Nations, 2007), p. 6.

Figure 8.11
Global HIV Trends 1990–2011



Source: 2012 UNAIDS Report on the Global AIDS Epidemic, Page 14; downloaded from http://www.unaids.org/en/resources/publications/2012/name,76121,en.asp.

Table 8.2 Regional HIV and AIDS Statistics, a Decade of Bending the Curve, 2011 versus 2001

Region	Adults and Children Living with HIV, 2011	People Living with HIV, 2001	People Newly Infected with HIV, 2011	People Newly Infected with HIV, 2001	Adult and Child Deaths Due to AIDS, 2011	Adult and Child Deaths Due to AIDS, 2005
Sub-Saharan Africa	23.5 million	20.9 million	1.8 million	2.4 million	1.2 million	1.8 million
MENA	300,000	210,000	37,000	27,000	23,000	20,000
South and South East Asia	4 million	3.7 million	280,000	370,000	250,000	290,000
East Asia	830,000	390,000	89,000	75,000	59,000	39,000
Oceania	59,000	38,000	2,900	3,700	1,300	2,300
Latin America	1.4 million	1.2 million	83,000	93,000	54,000	60,000
Caribbean	230,000	240,000	13,000	22,000	10,000	20,000
East Europe and Central Asia	1.4 million	970,000	140,000	130,000	92,000	76,000
West and Central Europe	900,000	640,000	30,000	29,000	7,000	7,800
North America	1.4 million	1.1 million	51,000	50,000	21,000	20,000
TOTAL	34.0 million	29.4 million	2.5 million	3.2 million	1.7 million	2.3 million

Source: Adapted from 2009 AIDS Epidemic Update, p. 11. © 2009 Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO).

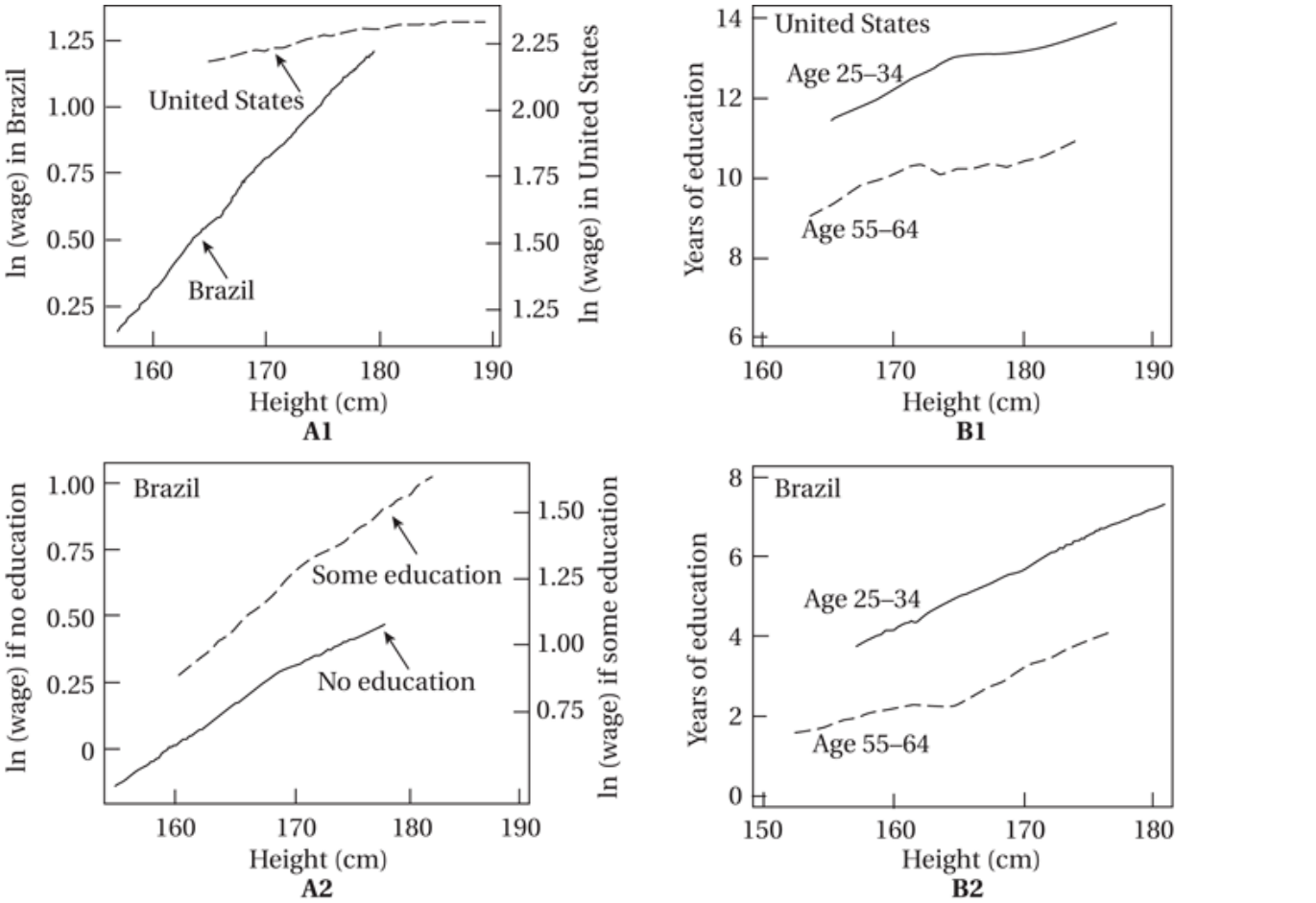
Table 8.3 Some Major Neglected Tropical Diseases

Neglected Disease	Symptoms and Effects	Global prevalance (millions)*	Regions with highest Prevalance/Risk
Roundworm (Ascariasis)	Malnutrition and intestinal obstruction in young children; Child stunting; Impaired cognition	820	East Asia and Pacific Islands, sub-Saharan Africa; India, South Asia, China, Latin America and Caribbean
Whipworm (Trichuriasis)	Colitis and inflammatory bowel disease; Child stunting and impaired cognition	465	Sub-Saharan Africa, East Asia and Pacific Islands, Latin America and Caribbean, India, South Asia
Hookworm infection	Severe iron deficiency anemia and protein malnutrition; anemia; Child stunting and impaired intellectual and cognitive development; Maternal morbidity and mortality in pregnancy	439	Sub-Saharan Africa, East Asia and Pacific Islands, India, South Asia, Latin America and Caribbean
Schistosomiasis	Bladder damage, intestine or liver inflammation; Chronic pain, anemia, malnutrition and stunting; Liver and intestinal fibrosis, kidney disease, female genital schistosomiasis	200+	Sub-Saharan Africa, Latin America and Caribbean
Lymphatic filariasis (elephantiasis)	Leg swelling, disfigurement, extreme pain	120	India, South Asia, East Asia and Pacific Islands, sub-Saharan Africa
Trachoma	Blindness	60 - 80	Sub-Saharan Africa, Middle East and North Africa
Onchocerciasis	Larvae in skin and eyes; Onchocerca skin disease; Blindness	30–40	Sub-Saharan Africa, Latin America and Caribbean
Leishmaniasis	Fever, weight loss, enlargement of the spleen and liver, and anaemia	12	India, South Asia, sub-Saharan Africa, Latin America and Caribbean
Chagas' disease	Heart and digestive problems	8+	Latin America and Caribbean
Trypanosomiasis (Human African)	Sleepiness, wwollen lymph nodes, weakness, psychiatric disorders, seizures	0.3	Sub-Saharan Africa

*Note: Population considered at risk generally much higher than current prevalence; Estimated DALYs are far higher than death rates

Sources: World Health Organization Website, Neglected Tropical Diseases website accessed Feb. 15, 2014: http://www.who.int/neglected_diseases/en/; infections in 2010 Rachel L Pullan, Jennifer L Smith, Rashmi Jasrasaria, and Simon J Brooke, "Global numbers of infection and disease burden of soil transmitted helminth infections in 2010", Parasites and Vectors, 2014; Peter Hotez, "A Plan to Defeat Neglected Tropical Diseases," Scientific American, Jan. 10, 2010, p90-96; Peter J Hotez, Alan Fenwick, Lorenzo Savioli, and David H Molyneux, "Rescuing the bottom billion through control of neglected tropical diseases, May 2, 2009 Lancet #379, p1570-75 ; Peter Hotez, "NTDs V.2.0: "Blue Marble Health"—Neglected Tropical Disease Control and Elimination in a Shifting Health Policy Landscape Blue Marble Health 2013 PLOS Neglected Tropical Diseases, www.plosntds.org, 1 November 2013, Vol. 7, No. 11 ,e2570; Peter Hotez et al., "Control of neglected tropical diseases," New England Journal of Medicine, 357: 1018–1027 (2007)

Figure 8.12 Wages, Education, and Height of Males in Brazil and the United States



Source: "Health, nutrition, and economic development," by John Strauss and Duncan Thomas, *Journal of Economic Literature* 36 (1998): 766–817. Reprinted with permission.

Note: ln (wage) stands for natural log of wage.

Disease Burden

- HIV/AIDS
- Malaria
- Parasitic Worms and Other "Neglected Tropical Diseases"

Mexican Program on Education, Health, and Nutrition (Progresa), Oportunidades Human Development Program

Some Basic Questions:

- What is the Progresa/Oportunidades program and what does it try to accomplish?
- How does it try to do so – what are the key program features?
- Why make transfers conditional? Benefits? Drawbacks?
- Specifically, how does Progresa work to improve nutrition?
- Specifically, how does Progresa work to improve education?
- What were the features of the original evaluation?

8.7 Health, Productivity, and Policy

- Productivity
  - Is there a connection with health?

- Health Systems Policy
  - Great variability in the performance of health systems at each country's average income level

Concepts for Review

- Acquired immunodeficiency syndrome (AIDS)
- Basic education
- Brain drain
- Conditional cash transfer (CCT) programs
- Derived demand
- Discount rate
- Educational certification
- Educational gender gap
- Health system
- Human capital
- Human immunodeficiency virus (HIV)
- Literacy
- Neglected tropical diseases
- Private benefits of education

Concepts for Review (cont'd)

- Private costs of education
- Social benefits of education
- Social costs of education
- World Health Organization (WHO)

Algebraic version of the schooling decision diagram

(Note: you can also do a rate of return calculation as in Endnote 19)

Net present value of Income Stream is given by

$$NPV = \sum_t \frac{Y_t - X_t - C_t}{(1+r)^t}$$

(Compare with Equation 11.10)

Where:

t is time (year) from present. (The present is time $t = 0$.)

Y_t is expected income from having gone to school, realized at time t

X_t is expected income from having NOT gone to school, at time t

C_t is the cost of going to school borne at time (if any)

r is the rate of discount used