

Development Economics

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Lectures III

May 2018

Education and Health are joint Investments:

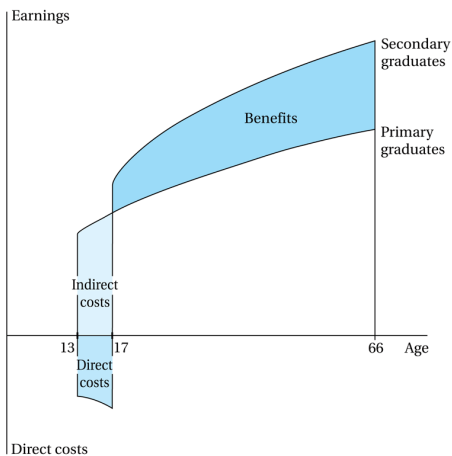
Greater health improves returns to investments in education:

- 1) Health is a factor in school attendance/Healthier students learn more effectively
- 2) A longer life raises return to education/Healthier people have lower depreciation of knowledge capital

Greater education capital may improve the returns to investments in health

- 1) Public health programs need knowledge learned in school
- 2) Basic hygiene and sanitation may be taught in school
- 3) Education needed in training of health personnel

Initial investments in health or education lead to a stream of higher future income. The PDV of this stream of future income is compared to the costs of the investment.



It is widely believed that returns are likely to be higher than in industrialized countries.

Private returns can be estimated starting from the following "Mincerian" regression,

$$\log(Y) = \alpha + \rho S + \beta_1 X + \varepsilon$$

where Y is income, S is years of schooling, X are controls(years on the job etc).

Social returns should be based on pre-tax earnings while the costs should include those borne by the public sector. Positive externalities are difficult to capture.

Sample Rates of Return to Investment in Education by Level of Education, Country, Type, and Region

Country Type and Region	Social Rate of Return (%)			Private Rate of Return (%)	
	Primary	Secondary	Higher	Primary	Secondary
Developing					
Sub-Saharan Africa	24	18	11	41	20
Asia	20	13	12	39	18
Latin America	18	13	12	26	18
Developed	14	10	9	22	18

Source: "Returns to Investment in Education: A Global Update" by George Psacharopoulos. *World Development*, Vol. 22, Sept 1994. Reprinted with permission.

Note: How these rates of return were calculated is explained in detail note 20 at the end of this chapter.

It is difficult to find good income data for the poor. Fink and Peet from Harvard find different results on private returns. They pool 61 nationally representative household surveys between 1985 and 2012 and find a return of 6.5%, with lower returns in rural areas, higher returns for females, higher returns in the years prior to 2000, and lower returns in Asian countries compared to Africa, Latin America, and Eastern Europe. They find lowest returns for primary education, and highest returns to tertiary education, consistent with recent evidence from developed countries. Overall, returns to education in developing countries seem to be similar or lower than those in high-income countries **with remarkably large amounts of heterogeneity across countries, time, and regions.**"Returns to Education in Low and Middle-Income Countries: Evidence from the Living Standards and Measurement Surveys" by G. Fink and E. Peet (Economics of Education Review, v. 49, Dec. 2015, p. 69-90)

Child Labor

Child labor is a widespread phenomenon

The problem may lead to “multiple equilibria”

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

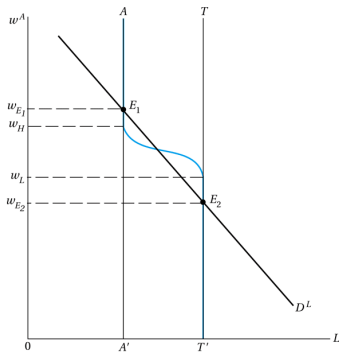
Assumptions of the Child Labor Multiple Equilibria Model

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: $Q_C = \gamma Q_A, 0 < \gamma < 1$.

Child Labor as a Bad Equilibrium

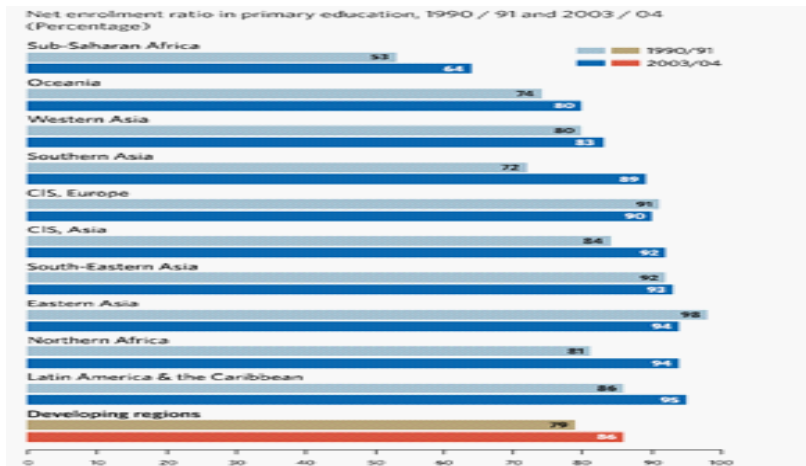
Labour supply of adults is fixed. In E_1 wage is high enough that no child has to work. In E_2 all have to work.



Source: From *Journal of Economic Literature* by Kaushik Basu. Copyright 1999 by the American Economic Association. Reproduced with permission of the American Economic Association via Copyright Clearance Center.

- 1) Get more children into school (Millennium Development Goals), e.g. new village schools; and enrollment incentives for parents.
- 2) Emphasize ending poverty generally (a traditional World Bank approach, now modified)
- 3) If child labor is inevitable in the short run, regulate it to prevent abuse and provide support services for working children (UNICEF approach)
- 4) Ban child labor; or if impossible, ban child labor in its most abusive forms (ILO strategy; "Worst Forms of Child Labor Convention")
- 5) trade sanctions. Concerns: could backfire when children shift to informal sector; and if modern sector growth slows

School enrollment, literacy, and other measures of human capital have increased dramatically in LDC following the incorporation of education in the Millenium Development Goals



However: no clear association between GDP growth and educational capital growth.

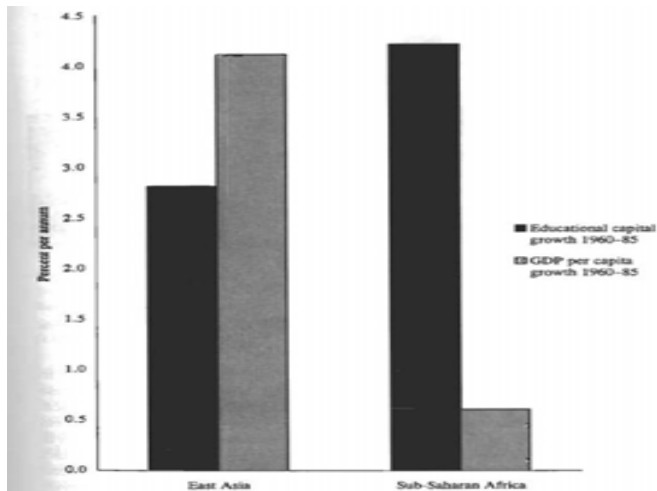


Figure 4.1
Where has all the education gone? Source: Prichett 1999

The Political Economy of Educational Supply and Demand:

Social versus Private Benefits and Costs

Why is human capital not a magic bullet

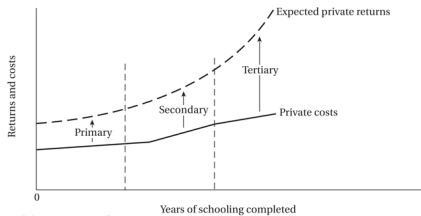
A-Incentives are crucial

1) In some circumstances education leads may even raise unemployment as it leads to no good job opportunity: unemployment is preferred to downgrading.

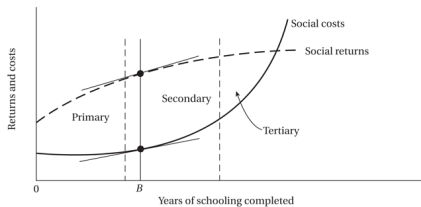
2) In some circumstances private benefits are positive but social benefits are negative or nil:- corruption or emigration

B-Benefits of human capital spending depend on complementary elements

- 1) Availability of books, medicine and beds
- 2) Presence and quality of professors and doctors
- 3) Even if free, there are hidden costs/opportunity cost of time/Transportation costs
- 4) O-Ring effects
- 5) Corruption can divert resources targeted to human capital



(a) Private returns and costs



(b) Social returns and costs

C-Inappropriate human capital investment systems in LDCs(also due to brain perspectives)

Education

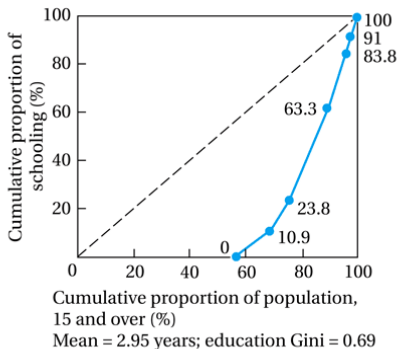
- 1)Greater pay off would be in Primary and Secondary education
- 2)Urban bias in high-end universities (in law) although the focus should be on practical courses useful in poor rural communities.
- 3)Diversion of research from important local problems and goals and from development of appropriate technology,such as low-cost preventive health care, low-cost housing, hospitals, schools Teaching and research of sophisticated mathematical models of nonexistent competitive economies instead of problems of poverty. . .

In particular in health systems:

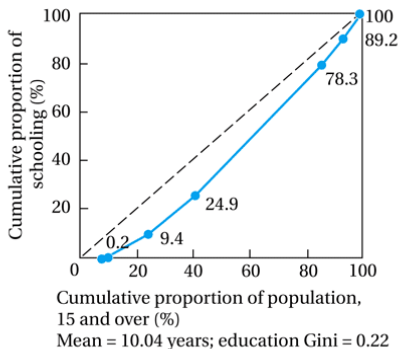
- 1)Urban bias in capital-intensive hospital although the focus should be on mobile cheap units for rural areas.
- 2) Bias toward rich-type of diseases: preference to specialize in heart diseases while tropical medicine is considered a second-rate specialty

Education Systems in LDCs typically amplify existing inequality.

Lorenz curves for the distribution of education



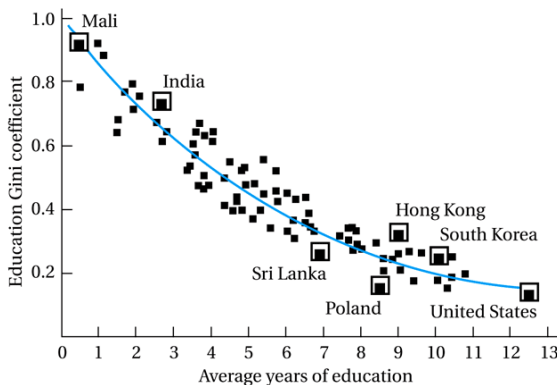
(a) Schooling in India



(b) Schooling in South Korea

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

Gini Coefficients for Education in 85 Countries



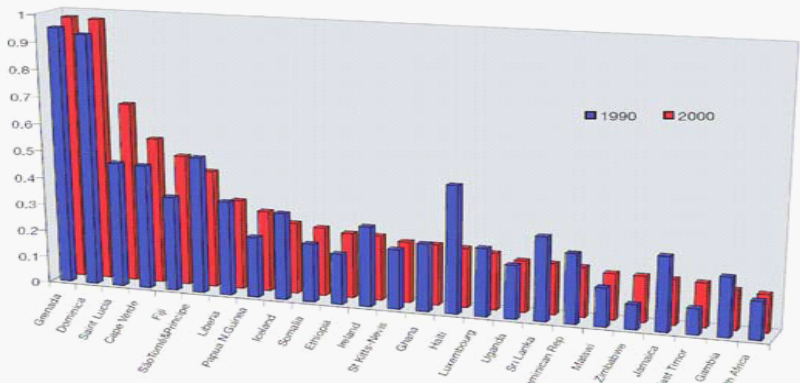
Source: From *The Quality of Growth*. Copyright © 2000 by World Bank. Reprinted with permission.

Summing up:

The educational systems of many developing nations act to increase rather than to decrease income inequalities as students from the middle- and upper-income brackets are represented disproportionately in secondary and university enrollments. Poor children face higher opportunity costs and much lower quality so drop out. Child labor poverty transmits poverty through generations.

This financial process of eliminating the relatively poor during their first few years of schooling is often compounded by the substantial tuition charged at the secondary level. The inequalitarian nature of many developing-country educational systems is compounded even further at the university level, which is often free or even subsidized. Finally style and approach of research and education, due to brain drain (or just wrong ethos and culture?), diverts the attention of the scientists, physicians, architects, engineers, and academics who remain in their homeland from local problems and goals.

Figure 3. Rate of medical brain drain - 25 most affected countries in 1990 and 2000



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. Economic incentives: Dowry system, patrilinearity. “Missing Women” mystery in Asia

Important to stop this because:

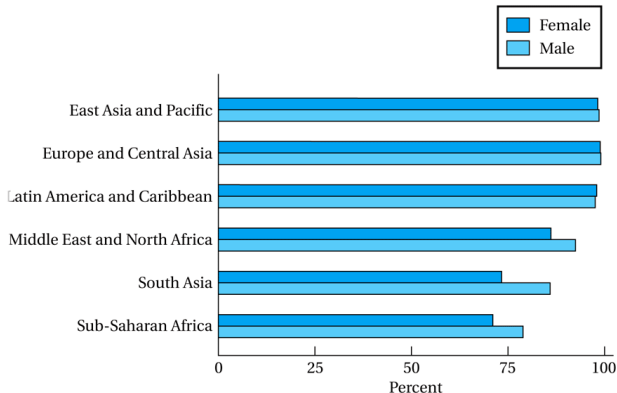
The social rate of return on women's education is higher than that of men in developing countries

Education for women lowers fertility

Educated mothers have a multiplier impact on future generations

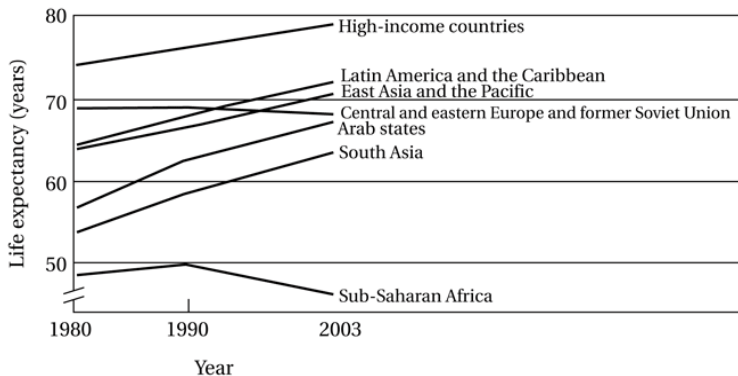
Good news: Millennium Development Goals on parity being approached, progress in every developing region

Youth Literacy Rate, 2008



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

Human Capital in the Form of Health

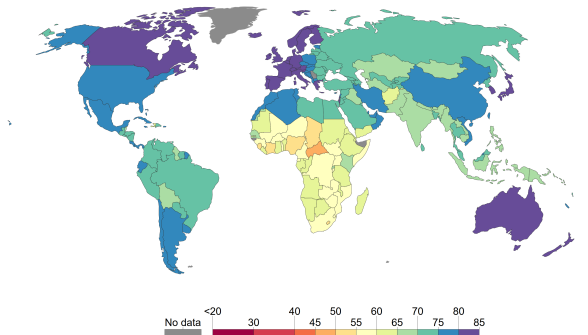


Source: From *Human Development Report, 2005*, fig. 1.1. Reprinted with permission from the United Nations Development Programme.

Life expectancy, 2013

Shown is period life expectancy at birth. This corresponds to an estimate of the average number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life

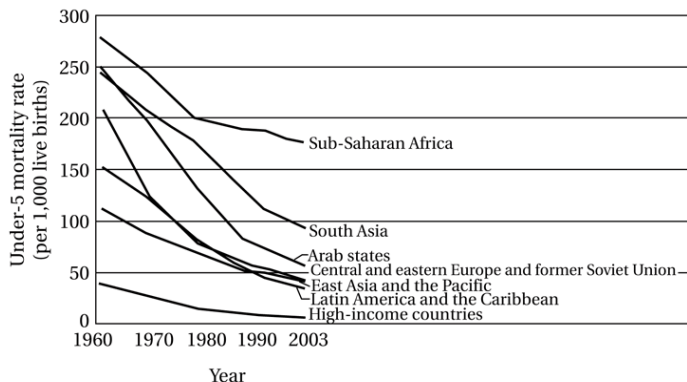
Our World
in Data



Source: Clio-Infra estimates until 1949; UN Population Division from 1950 to 2015

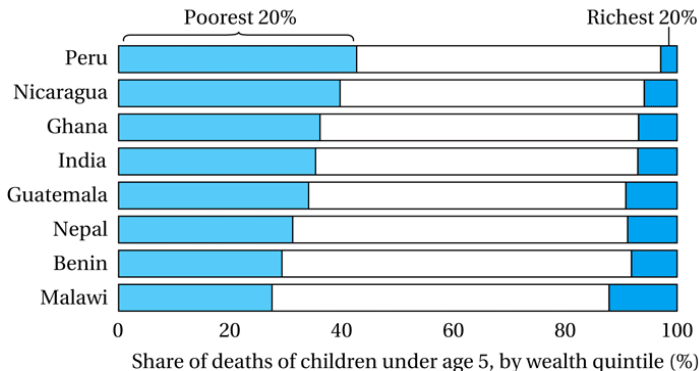
OurWorldInData.org/life-expectancy-how-is-it-calculated-and-how-should-it-be-interpreted/ • CC BY-SA

Under-5 Mortality Rates in Various World Regions



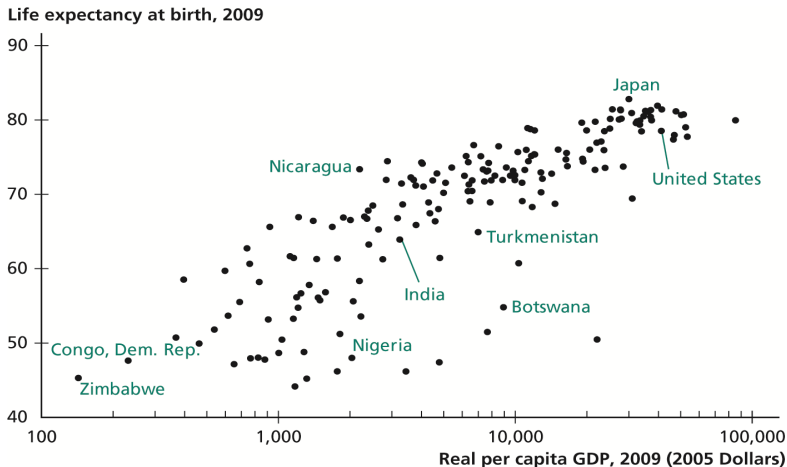
Source: From *Human Development Report, 2005*, fig. 1.2. Reprinted with permission from the United Nations Development Programme.

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.

Life Expectancy versus GDP per Capita

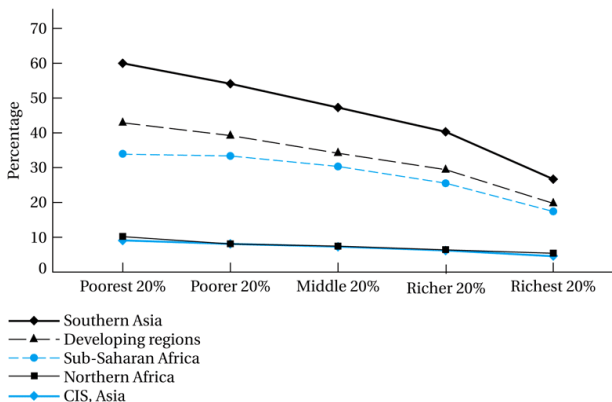


Under-5 Mortality Rates and Life Expectancy are key health measures. The global under-five mortality rate was more than halved between 1990 and 2015—from 91 per 1,000 live births to 43 (HDR 2016). The World Health Organization (WHO), the key United Nations agency concerned with global health matters, defines health as “a state of complete, physical, mental, and social well-being and not merely the absence of disease and infirmity.” This approach may put us on a better conceptual foundation but does not in itself provide a working measure. An alternative measure of health promoted by the WHO is the disability-adjusted life year (DALY), but difficult to measure and therefore controversial.

Disease burden: Three biggest killers: Tuberculosis. TB currently claims about 2 million lives each year.

AIDS. Now the leading cause of death of working age adults in the developing world (around 1 million in Sub-Saharan Africa) Malaria. Once in retreat, its most deadly strain is now making a big comeback, particularly in Africa; it still kills well over 1 million people each year, 70% of them children under age 5. Hepatitis B may now kill as many as 1 million people each year. Many other tropical diseases. All these diseases are now treatable! Malnutrition and absolute poverty weakens immunitarian system.

Proportion of Under-Five Children Who Are Underweight, by Household Wealth, around 2008

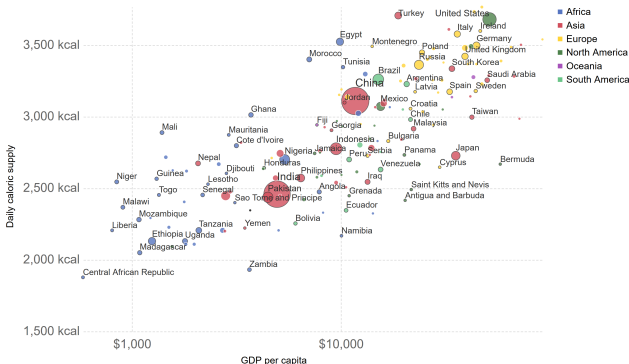


Source: From *Millennium Development Goals Report, 2010*, p. 14. Reprinted with permission from the United Nations.

Daily per capita supply of calories vs. GDP per capita, 2013

Daily per capita supply of calories, measured in kilocalories per person per day versus gross domestic product (GDP) per capita, measured in 2011 international-\$.

Our World
in Data

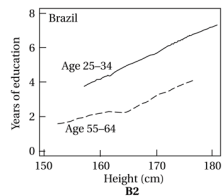
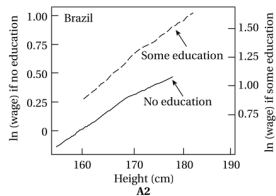
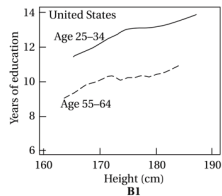
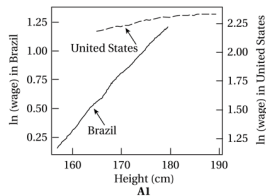


Do poor health conditions in developing countries also harm the productivity of adults? The answer is yes. Studies show that healthier people earn higher wages in LDC.

As countries develop, their people get bigger. Height of men in Great Britain rose by 9 centimeters in 1775-1975.

Such changes also in DEVC but started later and more rapidly. Height of South Korean men rose 5 centimeters in 1962-95.

Explanation: higher calories intake, better nutrition. Height good indicator of malnutrition, in utero and first years of life in LDC(In DC shortness reflect genes). Malnutrition that causes shortness also lowers abilities as a worker.



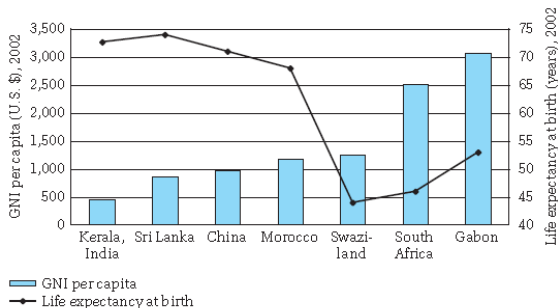
Source: "Health, nutrition, and economic development," by John Strauss and Duncan Thomas, *Journal of Economic Literature* 36 (1998): 766-817. Reprinted with permission.

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

A 1% increase in height is associated with a 7% increase in wages in Brazil. In the United States, a much smaller one, with a 1% increase in height associated with a 1% increase in wages. Also taller people receive significantly more education than shorter people.

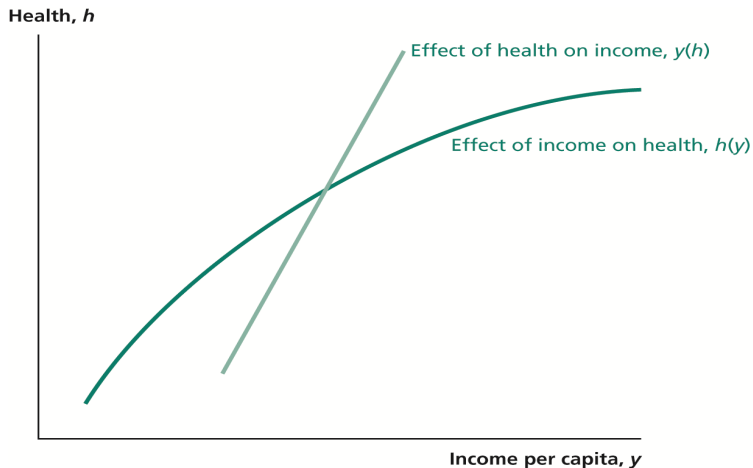
China and Sri Lanka, and some regions, such as Kerala state in India, have achieved life expectancies of more than 70 years despite their low-income status. At the same time, some middle-income countries, such as Brazil, South Africa, and Gabon, have lower life expectancies despite their much greater resources. The latter countries all have far more inequitable access to health care than China, Sri Lanka, and Kerala. The WHO compared health systems around the world, revealing great variability. For example, Singapore was ranked 6th, Morocco 29th, Colombia 22nd, Chile 33rd etc.—all of these developing countries ranked higher than the US. The study used five performance indicators to measure health systems in the 191 WHO member states to measure, the overall level and inequality of health of the population, and the performance of the health system in affecting both as well as the distribution of the health system's financial burden within the population.

FIGURE 8.15 GNI Per Capita and Life Expectancy at Birth, 2002



Source: International Bank for Reconstruction and Development/The World Bank, *World Development Indicators*, 2004. Reprinted with permission.

How Health Interacts with Income



A simple model of the relationship between health and income.

L = labor input per worker (hours of labor input, adjusting for the quality of the input)

h = health

y = earnings per worker

Assume labor is only input and earnings linearly related to labor: $y = wL$,

Health related to earnings (better nutrition) $h = Xy^\alpha$,

X = other factors which affect health (sanitation etc.)

A relation between workers' health and their labor input: $L = h^\beta$

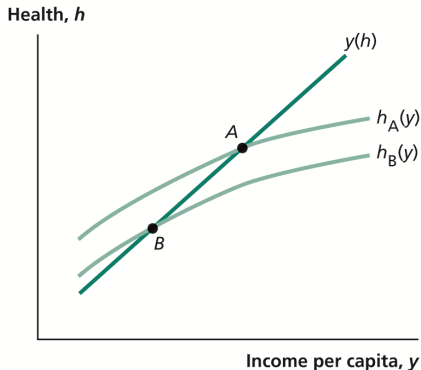
Three equations and three unknowns y, h, L

A feedback mechanism: health improvements (higher X) have a direct effect but also an indirect effect: healthier workers supply more "quality" labor (and earn higher wages not in this model); higher income feed back to even better health. Same for higher wages.

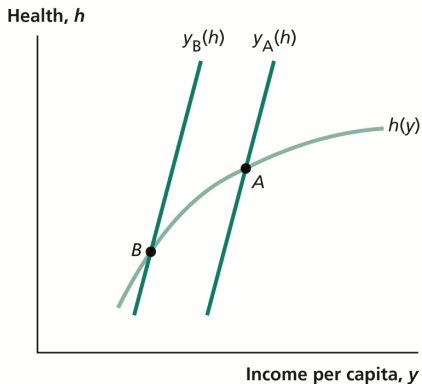
$y = (wX^\beta)^{1/(1-\alpha\beta)}$, $h = (w^\alpha X)^{1/(1-\alpha\beta)}$, $L = (w^\alpha X)^{\beta/(1-\alpha\beta)}$ By the way: obvious potential for multiple equilibria!

Health and Income per Capita. What is causing what? Two Views

(a) The Health View



(b) The Income View



According to the "income view" countries are unhealthy because they are poor (because of their failed institutions) Acemoglu, D., Johnson, S., Robinson, J. A. (2001). Colonial origins of comparative development: An empirical investigation. The American Economic Review, 91(5), 1369–1401.

According to the "health view" countries are poor because they have an unhealthy environment (e.g very high malaria ecology index). McArthur, John W., Sachs, Jeffery D. (2001). Institutions and geography: NBER Working Paper 8114, NBER, USA.