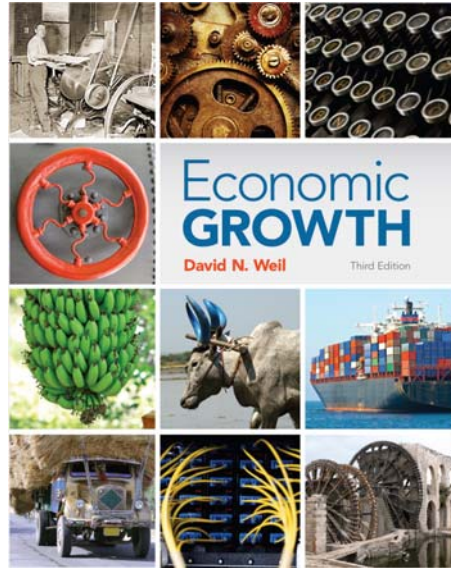


Chapter 4

POPULATION AND ECONOMIC GROWTH



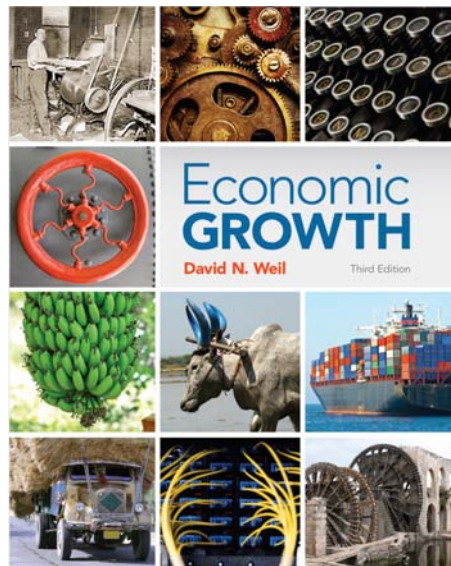
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Chapter 6

HUMAN CAPITAL



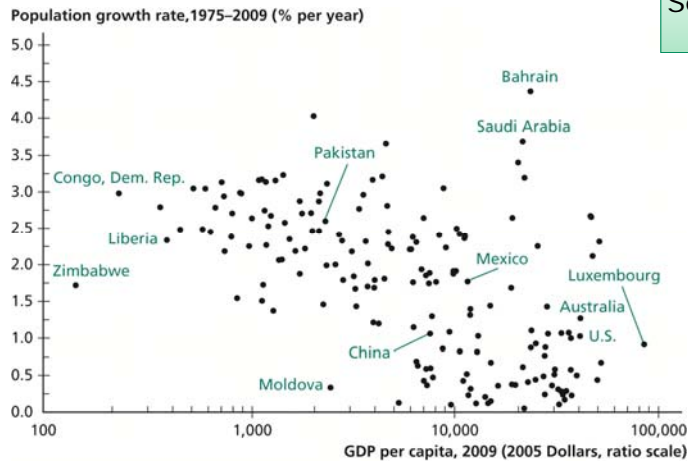
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Relationship Between Income per Capita and Population Growth

See Gapminder

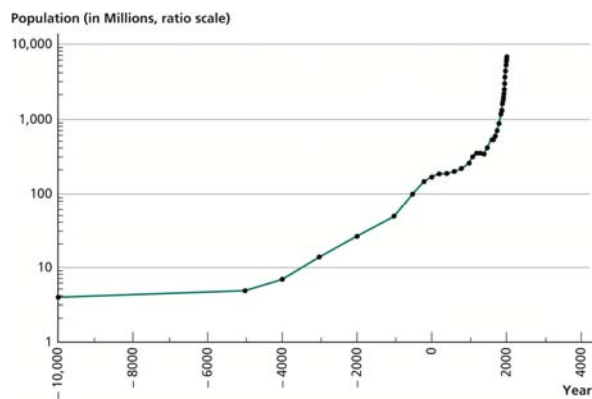


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World Population, from 10,000 B.C. to A.D. 2010



Source: Kremer (1993).

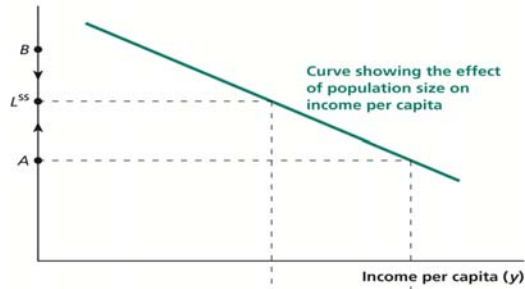
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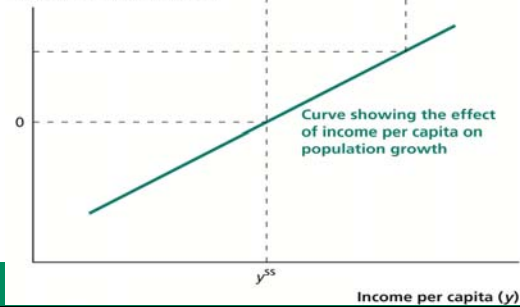
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The Malthusian Model

(a) Relationship Between Income per Capita and Population Size
Size of population (L)



(b) Relationship Between Income per Capita and Population Growth
Growth rate of population

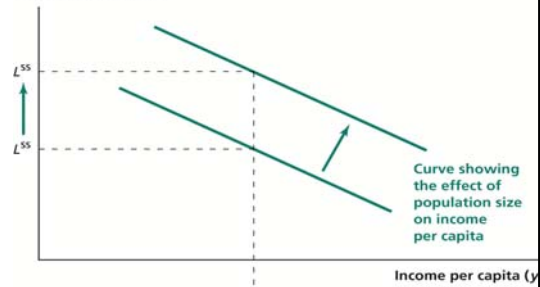


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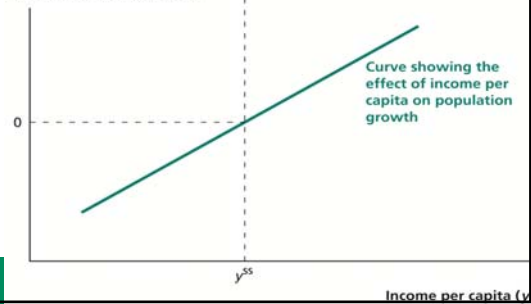
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Effect of Productivity Improvement in the Malthusian Model

(a) Relationship Between Income per Capita and Population Size
Size of population (L)



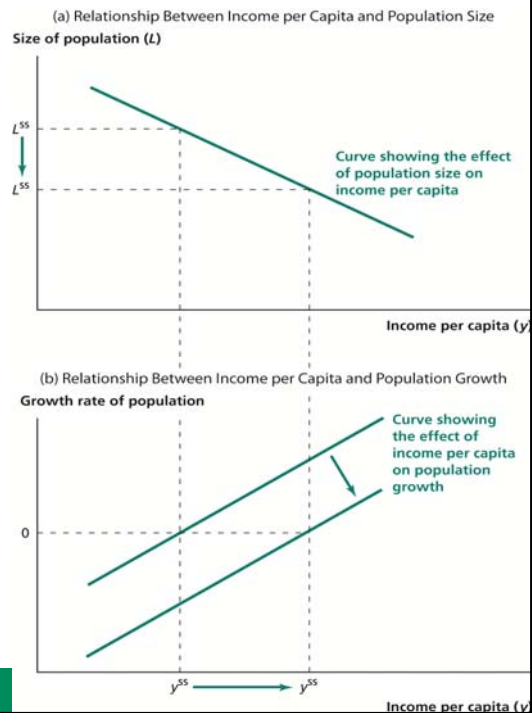
(b) Relationship Between Income per Capita and Population Growth
Growth rate of population



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Effect of “Moral Restraint” in the Malthusian Model

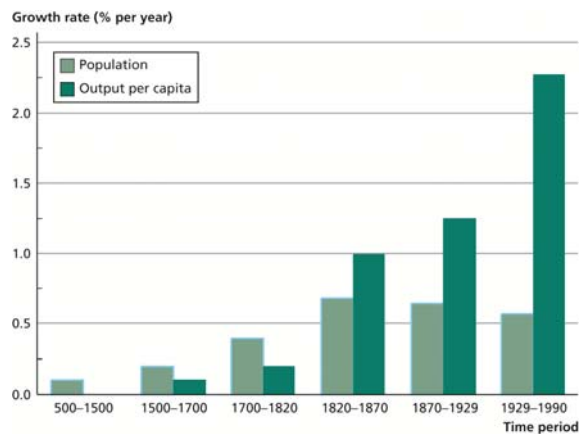


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Breakdown of the Malthusian Model in Western Europe

Reduced fertility: the motives

- Mortality reduction
- Income and substitution effect of children
- Cost of children rises while benefits decline
- Quantity-quality trade off



Source: Galor and Weil (2000).

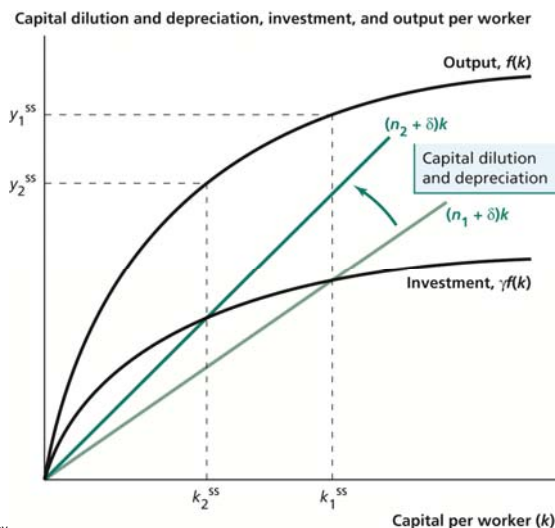
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The Solow Model Incorporating Population Growth: Capital dilution

The figure shows how raising the population growth rate from n_1 to n_2 affects the steady-state level of capital per worker (k) and the steady-state level of output per worker (y).



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Population growth and capital dilution

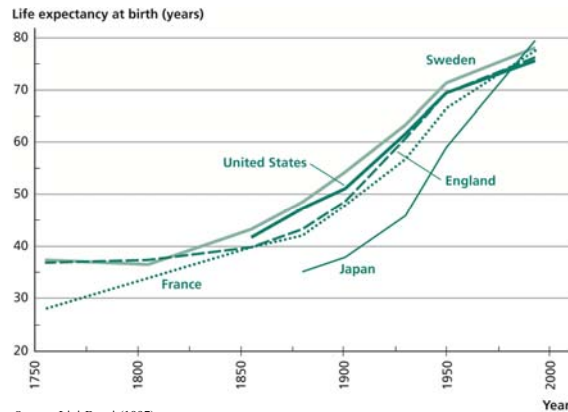
- The Solow model extended to incorporate population growth explains how higher population growth can lower income per capita through the channel of capital dilution
- The Solow model can therefore partially account for the negative correlation between income per capita and population growth

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Life Expectancy in Developed Countries



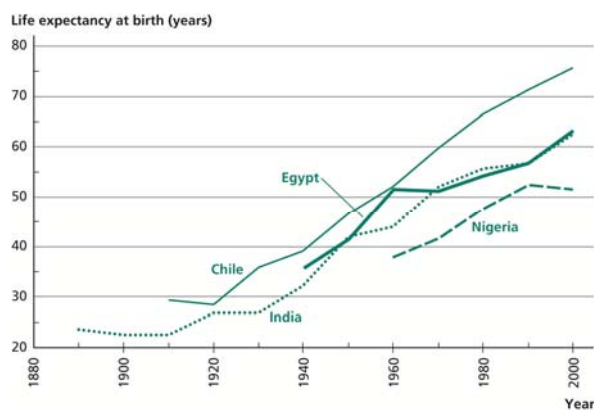
Source: Livi-Bacci (1997).

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Life Expectancy in Developing Countries



Source: Kalemli-Ozcan (2002).

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Demographic transition: a tale of two traps...

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Country report

3/5 pages, cover included, if any
One page devoted to a statistical overview of the socio-economic background

Eligible countries

- EU28
- Enlargement candidates
 - » [Albania](#), [Bosnia and Herzegovina](#), [the former Yugoslav Republic of Macedonia](#), [Iceland](#), [Kosovo*](#), [Montenegro](#), [Serbia](#), [Turkey](#)
- European Neighbouring countries
 - » [Algeria](#), [Armenia](#), [Azerbaijan](#), [Belarus](#), [Egypt](#), [Georgia](#), [Israel](#), [Jordan](#), [Lebanon](#), [Libya](#), [Moldova](#), [Morocco](#), [Palestine](#), [Syria](#), [Tunisia](#), [Ukraine](#)

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EUROPEAN NEIGHBOURHOOD POLICY

EU cooperation with its neighbours



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Cases

Report on a EU country for an extra EU multinationals

Report on a candidate country for a government body of a EU country

Report on a EN country for an ONG based in EU

Report on either a candidate or a EN country for EU institutions (a DG for example)

Others?

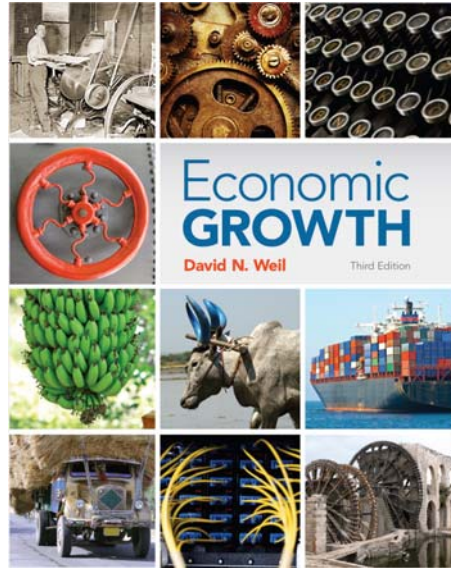
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Chapter 6

HUMAN CAPITAL



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Human capital as an input

- We focus on qualities of people who are productive
- We concentrate on qualities which are produced, as with physical capital also human capital is itself produced
- Human capital earns returns (even though workers have to work to get it whilst capital owners can relax on a beach)
- Human capital depreciates
- Human capital can have two forms: health and education

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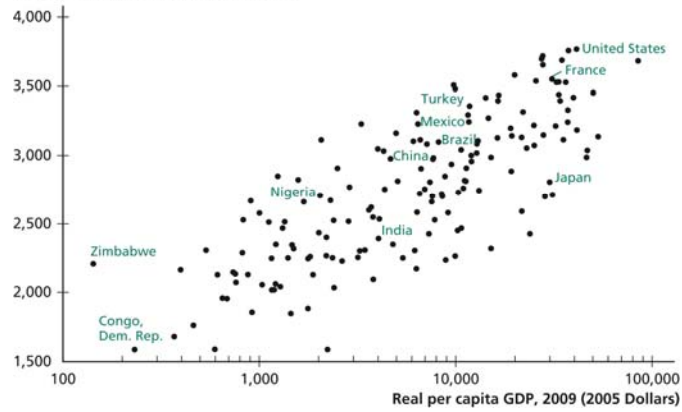
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Human capital as a form of health

Nutrition versus GDP per Capita



Daily per capita supply of calories, 2007

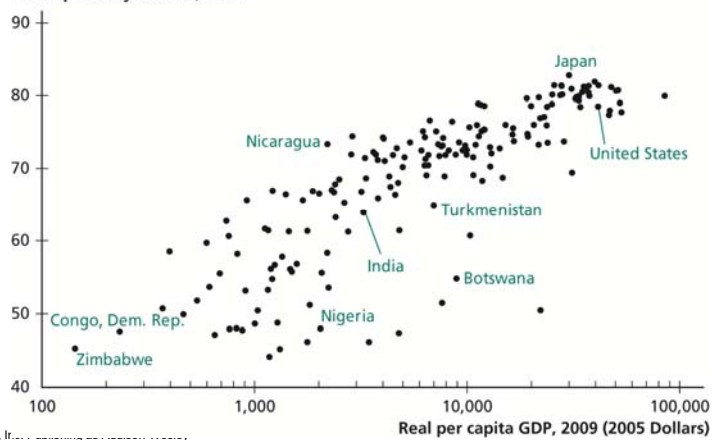


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Life Expectancy versus GDP per Capita

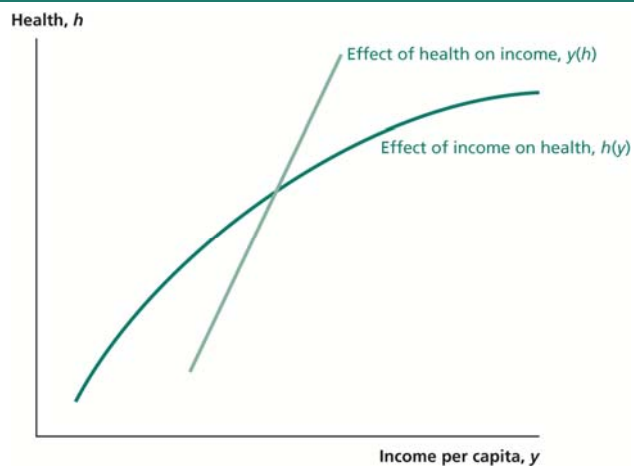


Life expectancy at birth, 2009



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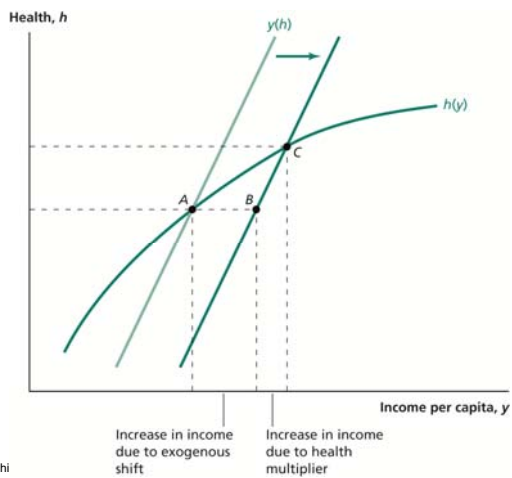
How Health Interacts with Income



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6-21

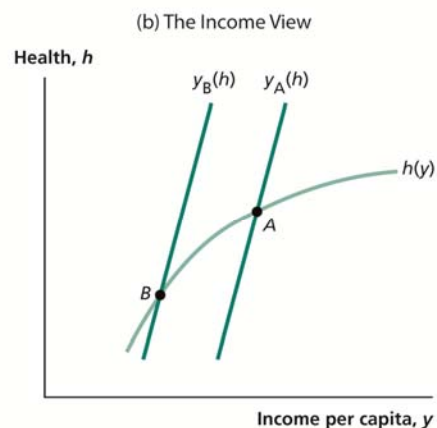
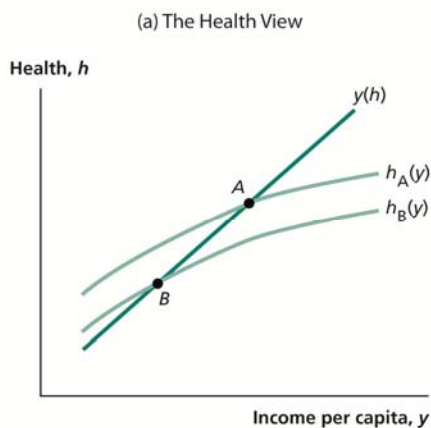
Effect of an Exogenous Shift in Income



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Health and Income per Capita: Two Views



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Human capital in the form of education Changes in the Level of Education, 1975-2010



| | | Percentage of the Adult Population with | | | | |
|----------------------|------|---|--------------|----------------------------|------------------------------|---------------------------|
| | | Average Years of Schooling | No Schooling | Complete Primary Education | Complete Secondary Education | Complete Higher Education |
| Developing Countries | 1975 | 3.2 | 47.4 | 32.9 | 8.1 | 1.6 |
| | 2010 | 6.7 | 20.8 | 68.8 | 31.5 | 5.3 |
| Advanced Countries | 1975 | 8.0 | 6.2 | 78.8 | 34.9 | 8.0 |
| | 2010 | 11.0 | 2.5 | 94.0 | 63.9 | 16.6 |
| United States | 1975 | 11.4 | 1.3 | 94.1 | 71.1 | 16.1 |
| | 2010 | 12.4 | 0.4 | 98.8 | 85.4 | 20.0 |

Source: Barro and Lee (2010). Data for population 25+.

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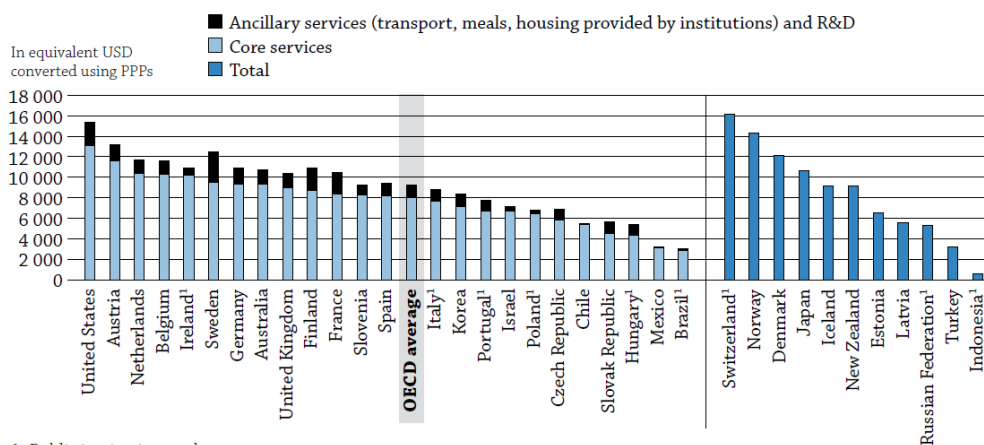
Education as an investment



- It is costly (6% of GDP in US, 4.5% in Italy)
- Not only in terms of money but especially in terms of opportunity costs (this is true mostly for developing countries)
- The return to education is wage...a wage premium

Chart B1.1. Annual expenditure per student by educational institutions, by type of service (2011)

In equivalent USD converted using PPPs, based on full-time equivalents, for primary through tertiary education

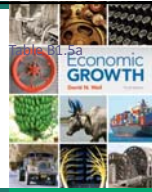


1. Public institutions only.

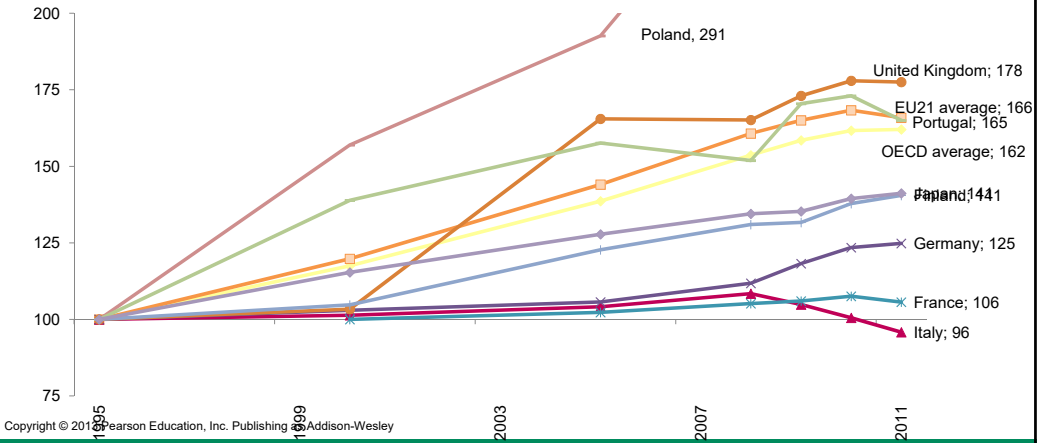
Countries are ranked in descending order of expenditure per student by educational institutions for core services.



Change in per student expenditure total, constant prices(1995 = 100)



Indice di variazione (1995 = 100)



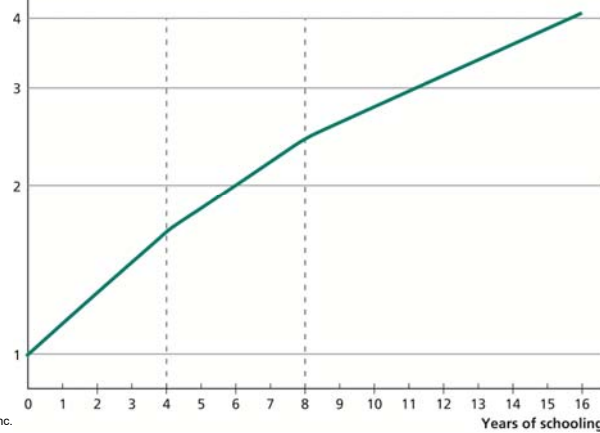
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Effect of Education on Wages



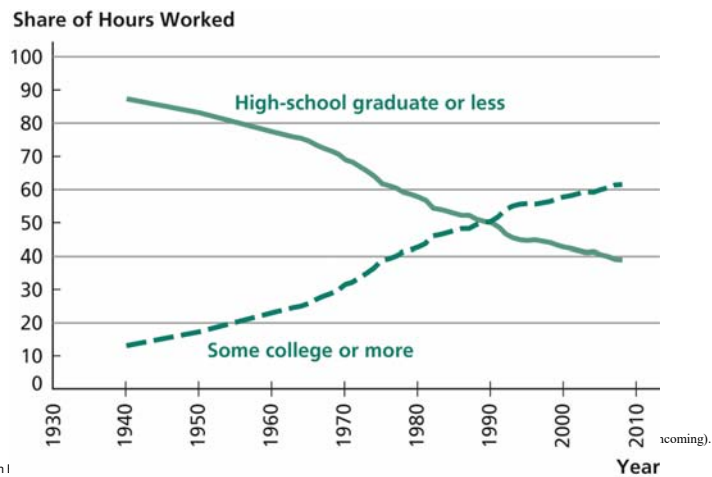
Wage relative to no schooling (ratio scale)



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Share of Hours Worked by Education Level, 1940–2008



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Ratio of College Wages to High-School Wages



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Breakdown of the Population by Schooling and Wages



| Highest Level of Education | Years of schooling | Wage Relative to No Schooling | Percentage of the Population | |
|----------------------------|--------------------|-------------------------------|------------------------------|--------------------|
| | | | Developing Countries | Advanced Countries |
| No Schooling | 0 | 1.00 | 20.8 | 2.5 |
| Incomplete Primary | 4 | 1.66 | 10.4 | 3.4 |
| Complete Primary | 8 | 2.43 | 18.0 | 12.3 |
| Incomplete Secondary | 10 | 2.77 | 19.3 | 17.8 |
| Complete Secondary | 12 | 3.16 | 23.2 | 37.4 |
| Incomplete Higher | 14 | 3.61 | 2.9 | 9.9 |
| Complete Higher | 16 | 4.11 | 5.3 | 16.6 |

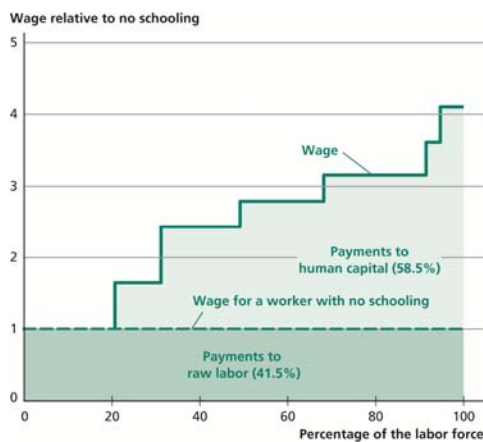
Source: Barro and Lee (2010).

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Share of Human Capital in Wages in Developing Countries

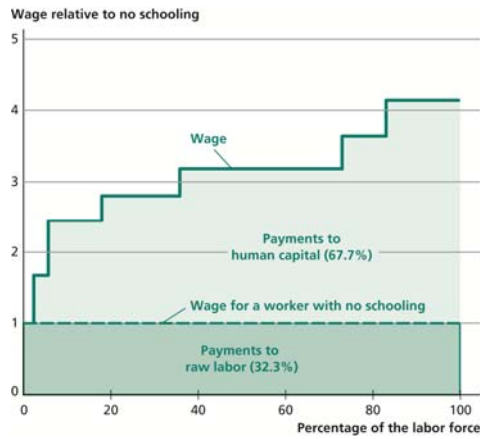


Remember alpha in the Solow model



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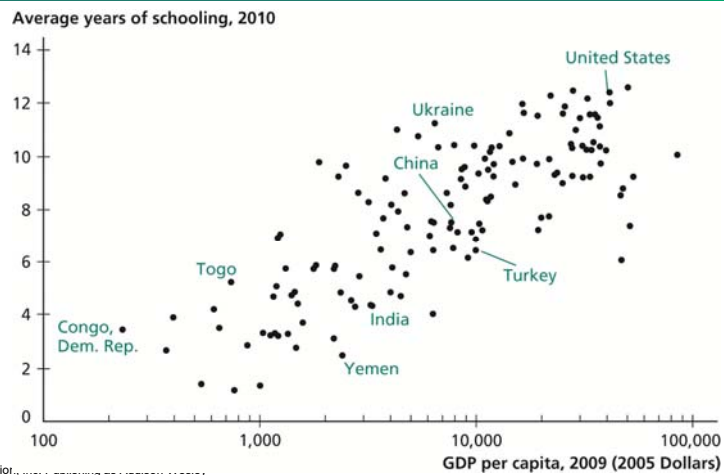
Share of Human Capital in Wages in Advanced Countries



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Average Years of Schooling versus GDP per Capita



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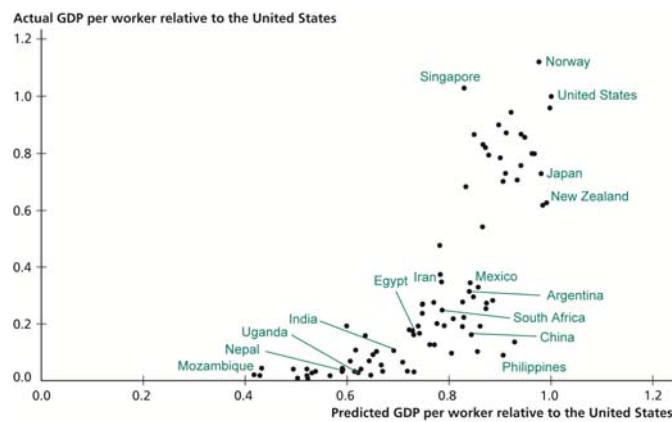
Table A7.3a. **Private costs and benefits for a man attaining tertiary education (2010)**

As compared with a man attaining upper secondary or post-secondary non-tertiary education, in equivalent USD converted using PPPs for GDP

| | Year | Direct costs (1) | Foregone earnings (2) | Total costs (3) | Gross earnings benefits (4) | Income tax effect (5) | Social contribution effect (6) | Transfers effect (7) | Unemployment effect (8) | Grants effect (9) | Total benefits (10) | Net present value (11) | Internal rate of return (12) | |
|--------------|-----------------|------------------|-----------------------|-----------------|-----------------------------|-----------------------|--------------------------------|----------------------|-------------------------|-------------------|---------------------|------------------------|------------------------------|-------|
| OECD | Netherlands | 2010 | -14 646 | -95 834 | -110 480 | 442 661 | -197 999 | -26 901 | 0 | 10 736 | 13 770 | 242 267 | 131 787 | 7.2% |
| | New Zealand | 2010 | -9 384 | -43 347 | -52 731 | 193 910 | -62 325 | -3 875 | -86 | 358 | 3 039 | 131 021 | 78 290 | 7.3% |
| | Norway | 2010 | -1 086 | -47 946 | -49 032 | 274 357 | -107 528 | -23 197 | 0 | 23 000 | 4 690 | 171 321 | 122 289 | 8.2% |
| | Poland | 2010 | -7 343 | -16 928 | -24 270 | 376 155 | -30 873 | -75 986 | 0 | 38 492 | 2 228 | 310 015 | 285 745 | 24.6% |
| | Portugal | 2010 | -4 627 | -16 181 | -20 808 | 324 887 | -89 461 | -36 243 | 0 | 17 564 | m | 216 746 | 195 937 | 18.3% |
| | Slovak Republic | 2010 | -6 183 | -15 019 | -21 202 | 290 121 | -51 866 | -40 961 | 0 | 38 465 | 1 226 | 236 985 | 215 783 | 21.4% |
| | Slovenia | 2010 | -3 564 | -26 242 | -29 806 | 447 946 | -110 866 | -96 037 | 0 | 19 992 | 259 | 261 294 | 231 488 | 17.1% |
| | Spain | 2010 | -8 864 | -28 219 | -37 083 | 178 900 | -52 903 | -14 033 | 0 | 41 874 | 3 791 | 157 629 | 120 546 | 11.2% |
| | Sweden | 2010 | -3 560 | -50 291 | -53 851 | 209 467 | -84 430 | -9 281 | 0 | 8 454 | 7 735 | 131 945 | 78 094 | 7.4% |
| | Switzerland | | m | m | m | m | m | m | m | m | m | m | m | m |
| | Turkey | 2005 | -1 061 | -9 402 | -10 463 | 106 985 | -18 682 | -16 424 | 0 | 2 761 | m | 74 640 | 64 177 | 19.3% |
| | United Kingdom | 2010 | -20 162 | -47 655 | -67 817 | 413 163 | -89 124 | -49 107 | -4 303 | 40 284 | 5 225 | 316 138 | 248 322 | 14.3% |
| | United States | 2010 | -61 135 | -44 678 | -105 813 | 628 922 | -210 898 | -55 768 | 0 | 100 046 | 27 162 | 489 463 | 383 649 | 15.4% |
| | OECD average | | -10 563 | -40 755 | -51 318 | 347 075 | -105 528 | -38 085 | -777 | 29 016 | 6 181 | 236 602 | 185 284 | 13.9% |
| EU21 average | | -6 258 | -41 078 | -47 335 | 361 801 | -112 936 | -45 075 | -1 123 | 31 620 | 6 135 | 239 503 | 192 167 | 15.1% | |
| Italy | 2008 | -7 285 | -50 608 | -57 893 | 408 011 | -159 562 | -41 835 | 0 | 3 295 | 3 330 | 213 239 | 155 346 | 8.1% | |
| Japan | 2007 | -37 215 | -66 750 | -103 965 | 326 614 | -64 523 | -36 039 | 0 | 20 931 | m | 246 983 | 143 018 | 7.4% | |
| Korea | 2010 | -19 211 | -34 019 | -53 231 | 379 884 | -47 160 | -25 602 | 0 | 12 407 | m | 319 528 | 266 298 | 12.8% | |

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Predicted versus Actual GDP per Worker



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Important factors to explain figure 6.12

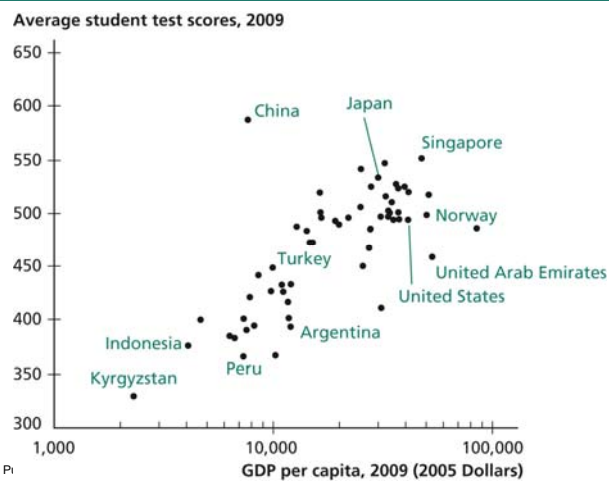


- Quality of schooling
- Externalities

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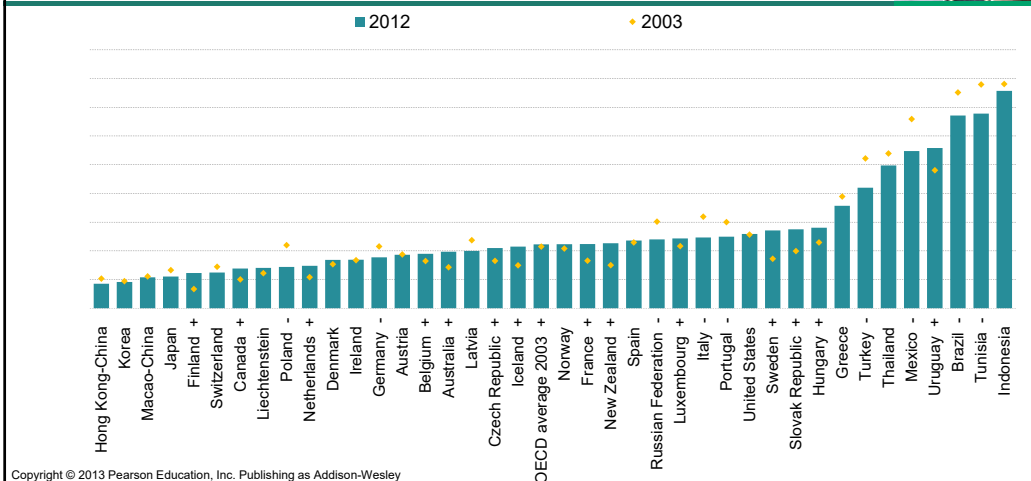
Student Test Scores versus GDP per Capita



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Percentage of low performers in Maths, PISA 2003-2012



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