ECON 184

Education and Health

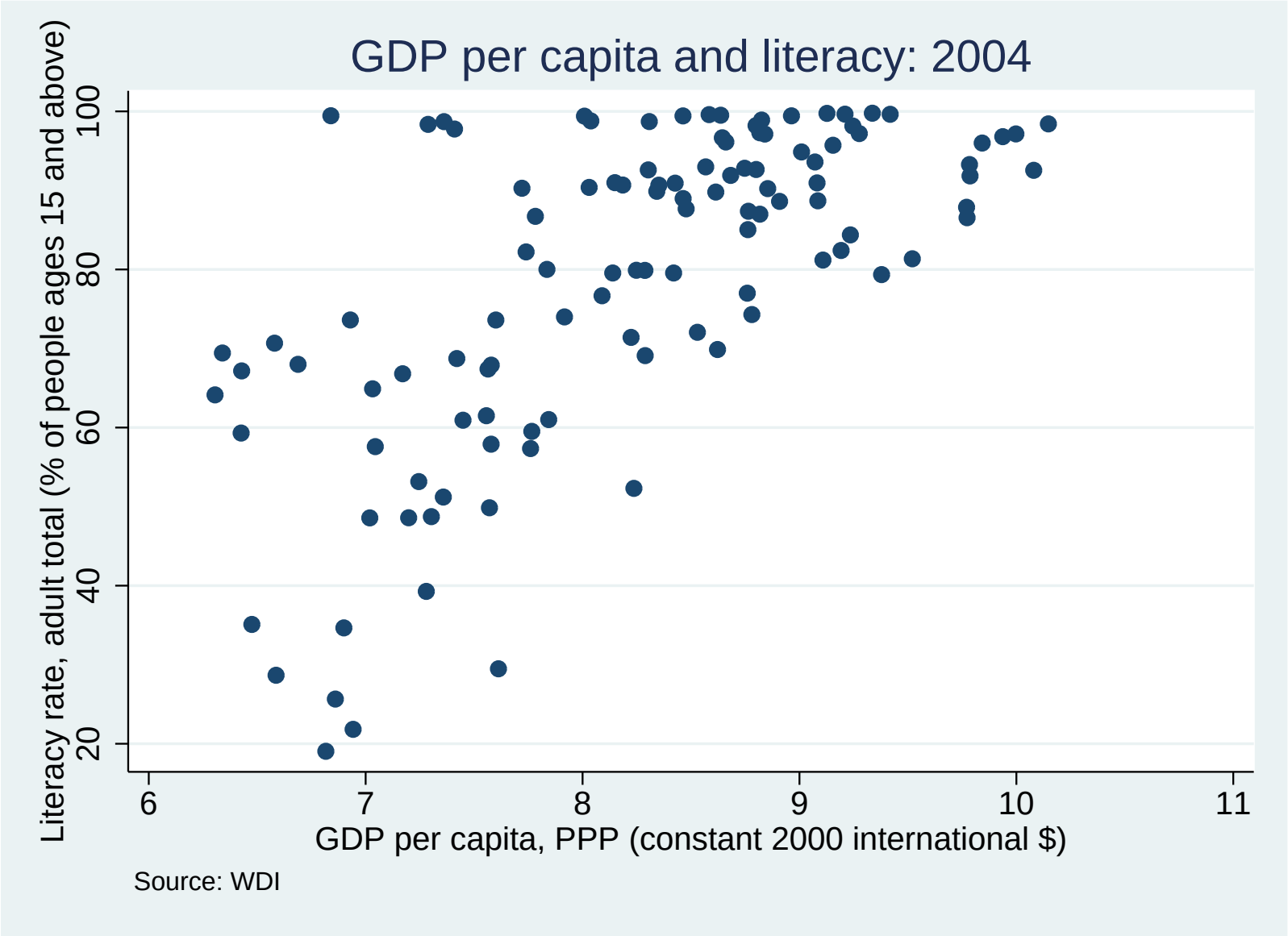
Contents

Education

1 Why education?

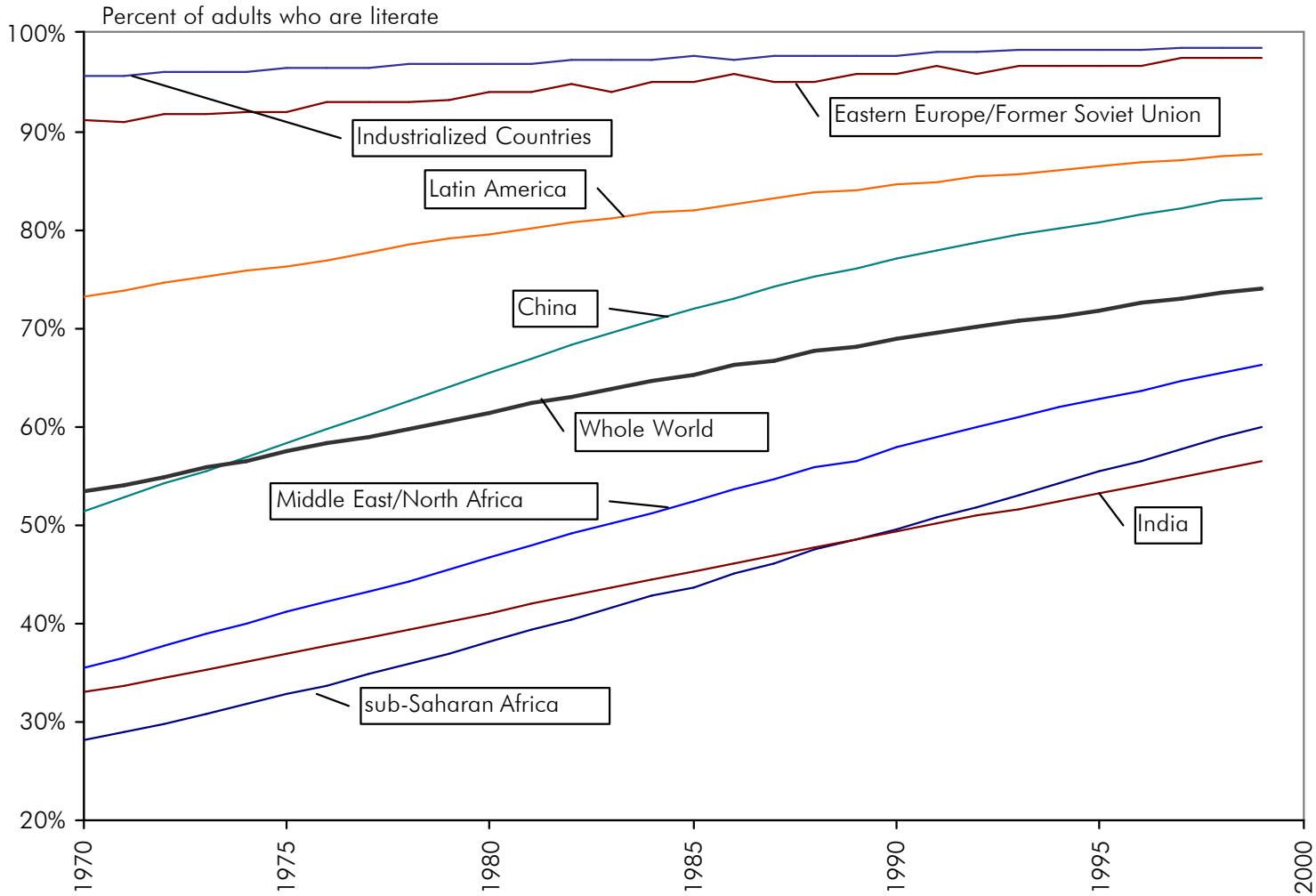
- The quality of the labor force is important.
- When schooling is higher income is higher.
- Private and social returns to schooling.
- Other reasons?

2 Recent trends


GDP per capita and literacy: 2004
Literacy rate, adult total (% of people ages 15 and above)
20
40
60
80
100
6
7
8
9
10
11
GDP per capita, PPP (constant 2000 international $)
Source: WDI

Facts in Figures from the Center for Global Development
Figure 6, downloaded from www.cgdev.org

Literacy rates have increased in most countries over the last generation, but even today about one in four adults is unable to read and write.



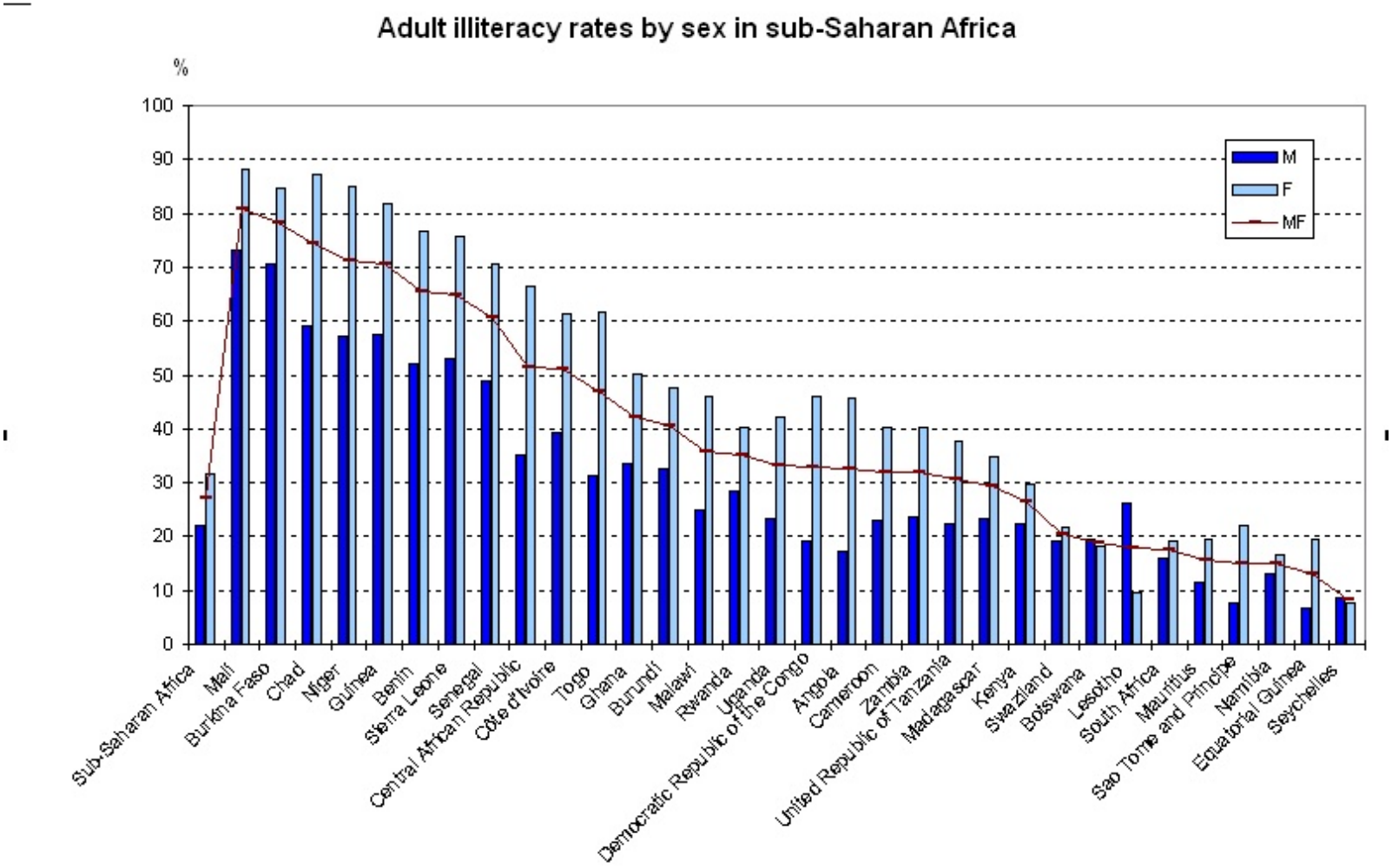
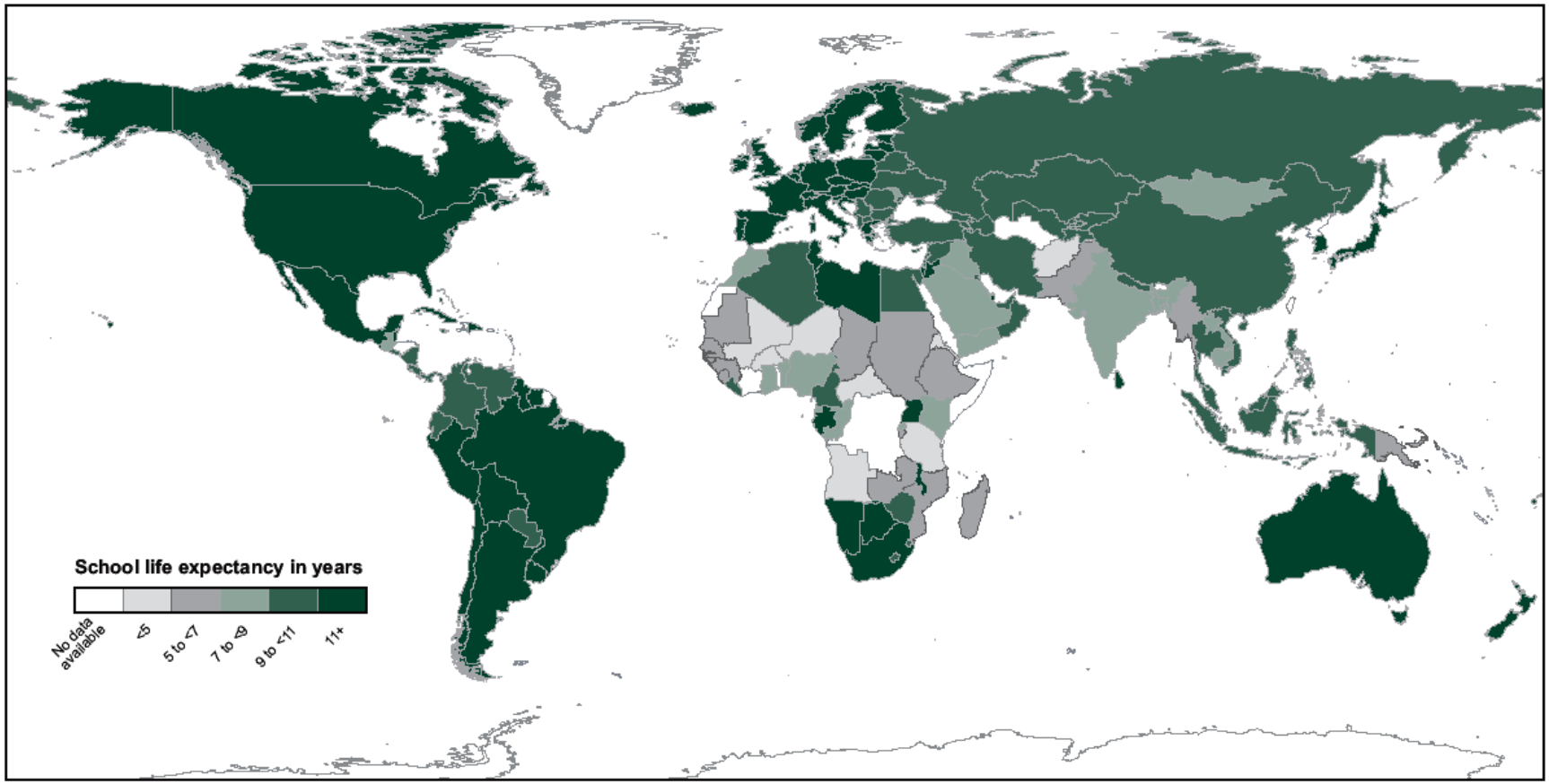

Adult illiteracy rates by sex in sub-Saharan Africa
%
100
90
80
70
60
50
40
30
20
10
0
M
F
MF
Sub-Saharan Africa
Mali
Burkina Faso
Chad
Niger
Guinea
Benin
Sierra Leone
Senegal
Central African Republic
Côte d'Ivoire
Togo
Ghana
Burundi
Malawi
Rwanda
Uganda
Democratic Republic of the Congo
Angola
Cameroon
Zambia
United Republic of Tanzania
Madagascar
Kenya
Swaziland
Botswana
Lesotho
South Africa
Mauritius
Sao Tome and Principe
Namibia
Equatorial Guinea
Seychelles

Figure 3. How long can children expect to stay in school?

Average school life expectancy in years for primary to secondary education by country, 2001



Source: *UNESCO Institute for Statistics, Table 4.*

Notes: *Data refer to 2001 for 133 countries, 2000 for 38 countries, and 1999 for 7 countries. For details see Table 4. For Central African Republic, Guinea, Madagascar, Mali, Morocco, Nigeria, Uganda and Yemen, UIS estimates were imputed with a margin of error sufficiently small for the presentation in this map, but too large for inclusion in Table 4.*

3 A model for education investments

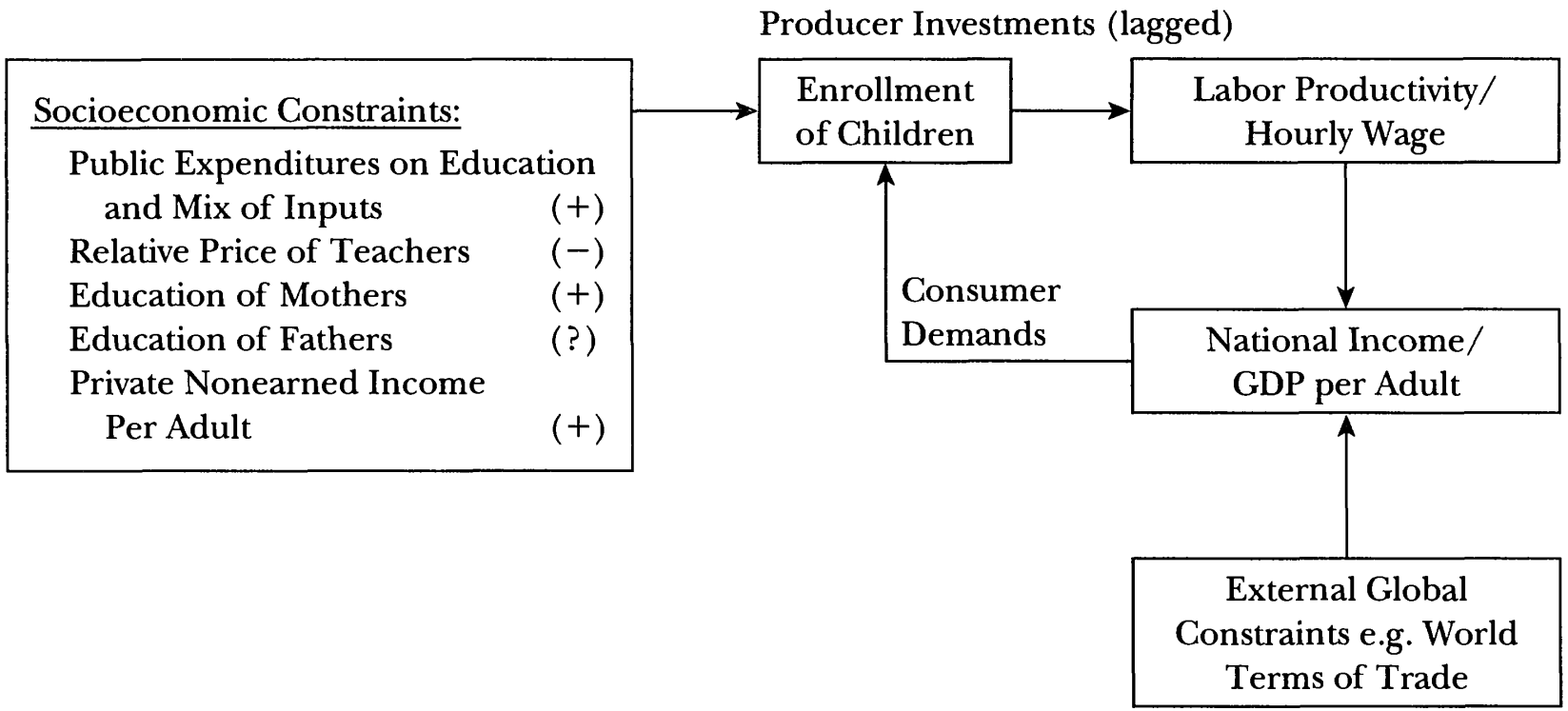
- Consider the case of households with limited resources.
- Whether to send a child to kindergarten, primary or secondary schools can thought as evaluating costs and benefits of such investments.
- Key variables are the parents' permanent income, education level and attitudes and values toward education.
- For example, more educated parents will tend to have a higher propensity to send their children to kindergarten.
- Similarly, children with parents that value education highly will tend to attend kindergarten at higher rates.

- Costs:
  - Indirect: Child's forgone income.
  - Direct cost of education: fees.
  - Children living in areas with limited supply of kindergartens (or schools) might be constrained due to the lack of space or their parents might pay a higher cost to send them to these facilities.

Schooling in Africa (Schultz, 1999)

Figure 1

Determinants and Consequences of Accumulating Educational Human Capital



3.1 Problems with aggregate analysis

- Measurement errors in education and health data.
- Health and education are interrelated.
- Inclusion of other variables.
- Studies find an association between education and growth that is "too big".

3.2 A microeconomic approach

- Schultz (1999) uses household surveys from Ghana and Côte d'Ivoire.
- Estimates the returns of human capital on wages.
- Separated for males and females.
- Problems:
  - Omitted variables and heterogeneity (upward bias).
  - Measurement error (downward bias)
- Solution?

- Use instrumental variables as an exogenous source of variation.
- Follows Strauss (1986) using local relative prices of food, distance to local schools and medical facilities, community infrastructure on health and sanitation, parent's education and whether they work on agriculture to predict individual-level human capital.

- Equation

$$w_i = \alpha + \beta HC_i + \gamma X_i + e_i$$

- HC_i are measures of human capital: years of education, migration from birthplace, height (meters), body mass index.

Table 1

Alternative Estimates of Human Capital Wage Returns for Schooling, Mobility and Nutrition-Health: Côte d'Ivoire and Ghana, 1985–1989[a]

Country, Sample, Year, Sex Estimator (Sample Size)	*Years of Education*	*Migration from Birthplace*	*Height in meters*	*Weight to Height Squared (BMI)*
Côte d'Ivoire (LSMS: 1985–1987)				
Males (1692)				
OLS: Wage Effects	.109	.715	.862	.0451
	(16.4)	(8.73)	(2.00)	(4.55)
IV: Wage Effects	.107	.691	−1.05	.159
	(3.88)	(3.09)	(.56)	(3.00)
Females (1180)				
OLS: Wage Effects	.0730	.891	.416	.0613
	(7.18)	(8.26)	(.62)	(6.88)
IV: Wage Effects	.0731	.961	−4.35	.0950
	(3.58)	(4.80)	(1.78)	(2.50)
Ghana (LSMS: 1987–1989)				
Males (3414)				
OLS: Wage Effects	.0437	.348	1.48	.0530
	(9.86)	(6.75)	(5.02)	(6.80)
IV: Wage Effects	.0445	.218	5.69	.0793
	(2.46)	(2.26)	(3.45)	(1.95)
Females (3400)				
OLS: Wage Effects	.0375	.531	1.29	.0420
	(7.26)	(8.46)	(3.63)	(7.63)
IV: Wage Effects	.0356	.361	7.48	.0981
	(2.69)	(2.98)	(3.44)	(4.11)

[a] The coefficients reported are those on the four human capital inputs in a logarithmic hourly wage function, which include age dummies, regions of birth, ethnic/language group, and season. Beneath OLS coefficients are reported in parentheses t statistics, and beneath IV (instrumental variable) estimates are asympototic t statistics.

Source: Schultz (1996, Tables 1 and 2).

Private returns to years of education

- Are the returns the same for all school levels?
- Use same datasets to evaluate the market returns (wages) of an additional year of schooling within each school level.
- What are the main problems with this approach?

- Few men and women work for a wage. Those working for a wage might be different than nonwage workers.
- Also, it is harder to measure earnings and hours of work for self-employed people.
- Strategy: ownership of land or financial and business assets affect "participation" but not market wage offers.
- Re-estimate previous equations incorporating this assumption.

- Equation

  $w_i = \alpha + \theta_1 YRSPRIM_i + \theta_2 YRSSEC_i + \theta_3 YRSHIG_i + \gamma X_i + e_i$

- $YRSPRIM_i$, $YRSSEC_i$ and $YRSHIG_i$ are the years of schooling within primary, secondary and higher education.

Table 2

Estimates of Private Wage Return to Years of Schooling in Côte d'Ivoire and Ghana by Sex, Without and With Statistical Correction for Sample-Selection Bias[a]

Country, Year, Sex and Estimator (Sample Size)	*Primary*	*Secondary*	*Higher*
Côte d'Ivoire (LSMS: 1985–87)			
Males			
OLS: Wage Effects	.140	.274	.224
(1,452)	(11.5)	(15.3)	(18.0)
ML: Selection Corrected Wage Effects	.116	.241	.200
(7,832)	(7.03)	(10.3)	(11.5)
Females			
OLS: Wage Effects	.109	.243	.224
(376)	(4.08)	(7.45)	(9.95)
ML: Selection Corrected Wage Effects	.078	.209	.202
(9,099)	(1.26)	(2.71)	(4.22)
Ghana (LSMS: 1987–1989)			
Males			
OLS: Wage Effects	−.013	.070	.118
(1,471)	(.72)	(3.15)	(15.1)
ML: Selection Corrected Wage Effects	−.013	.079	.123
(5,605)	(.78)	(2.73)	(9.23)
Females			
OLS: Wage Effects	−.010	.145	.104
(454)	(.34)	(3.95)	(8.30)
ML: Selection Corrected Wage Effects	−.012	.142	.101
(6,067)	(.31)	(2.97)	(2.07)

[a] The coefficients reported are those on the variable years of education completed at each school level, in a logarithmic hourly wage function, which also includes experience (age-schooling-7), experience squared, and several regional dummy variables (capital city, north, central, south, and other urban). The estimation sample is restricted to wage and salary earners between the ages of 15 and 65. The ordinary least squares (OLS) estimates of the education coefficients are reported first, follow by the maximum likelihood (ML) estimates of the joint probit model for participation as a wage or salary worker (not reported) and the conditional log wage function. See text for discussion of identification restrictions, and Schultz and Tansel (1997) for a review of the data and report of paralled ML estimations with the inclusion of adult health disability. Beneath the OLS estimates in parentheses are *t* ratios and beneath the ML estimates are asymptotic *t* ratios.

- Higher schooling levels have higher returns.
- Different returns for different countries.
- There is little scarcity of primary school workers in Ghana.
- Thus, few gains from primary education unless keep investing until secondary or higher education.

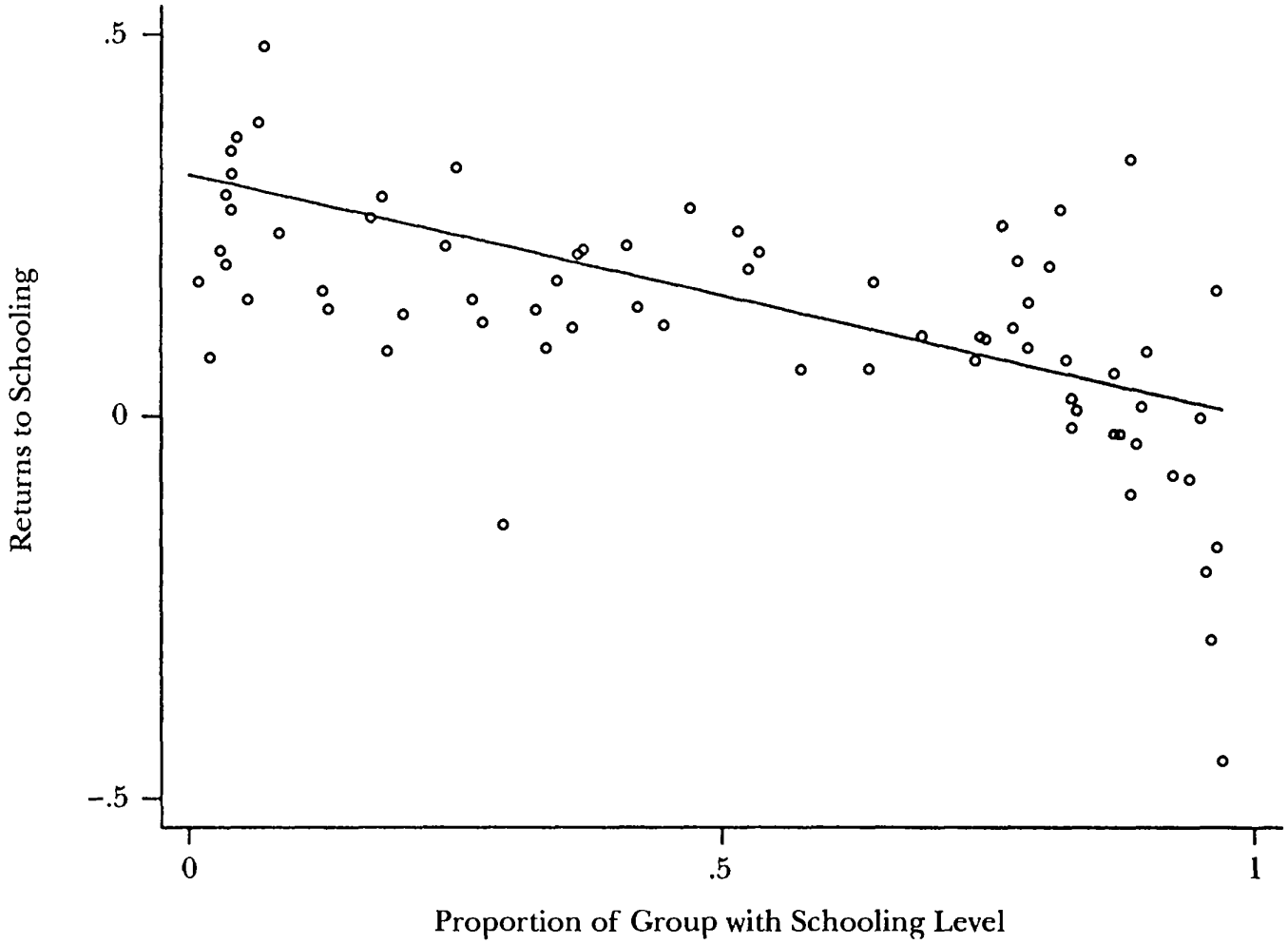
The South African experiment

- Apartheid regime restricted access to education to black South Africans.
- This restriction was independent of the demand for labor.
- Using data from SA LSMS from 1993 (1 year before the elections) to estimate returns to education for blacks and whites.

- Findings:
  - An additional year of primary education increase wages by 6.2% and 8.4% for African women and men of all ages.
  - For whites is -3.4% and -1.2%, respectively.
  - For secondary are 25% and 16% for women and men, while 5.2% and 8.4% for whites.
  - The figures for higher education are 40% and 29% for Africans and 13.9% and 15.1% for whites.
- Why do we observe these differences?

Figure 3

Effect of Rationed Supply on Returns: South Africa



Source: Mwabu and Schultz (1995).

Household with multiple children. How to decide? (Kevane, Ch. 9)

- If the parents' goal is to maximize their offspring's lifetime utility they will send the "smarter" child to kindergarten.
- Parents wanting to equalize outcomes would prefer to send the child with the lowest "ability" to kindergarten.
- Other factors:
- Preferences over gender. They could come from parental preferences or social norms.
- Responses to environment: what to do when the labor market discriminate against women?

4 Policies

Bribing parents

- Despite gains in recent decades school enrollment is low in most countries.
- The lack of schooling is higher in rural areas and for girls.
- Conditional Cash Transfers (CCT) programs try to create incentives for parents to send their children to school.
- CCT condition money transfers to "good behavior." Take your child to school and you will get money (bribing.)

- CCT are currently implemented in several countries but few examples from SSA.
- In most cases is the mother, not the father, the one who receives the money.
- These programs seem to be effective: school enrollment increases when households receive CCTs.
- But what about school achievement? High school graduation? labor market impacts? Poverty?

Not just quantity

- Increasing enrollment and school attendance are important.
- But just like with any investments, the returns depend on whether you have a valuable resources.
- Two factors are key: time to generate returns and an environment that rewards them.
- When life expectancy is low, the incentives to go to schools and acquire education decrease.
- Also, in the absence of a competitive labor market college degree could have a lower return compared to "connections."
- Finally, it is not just investment in the quantity of education what matters.

- Quality matters too.

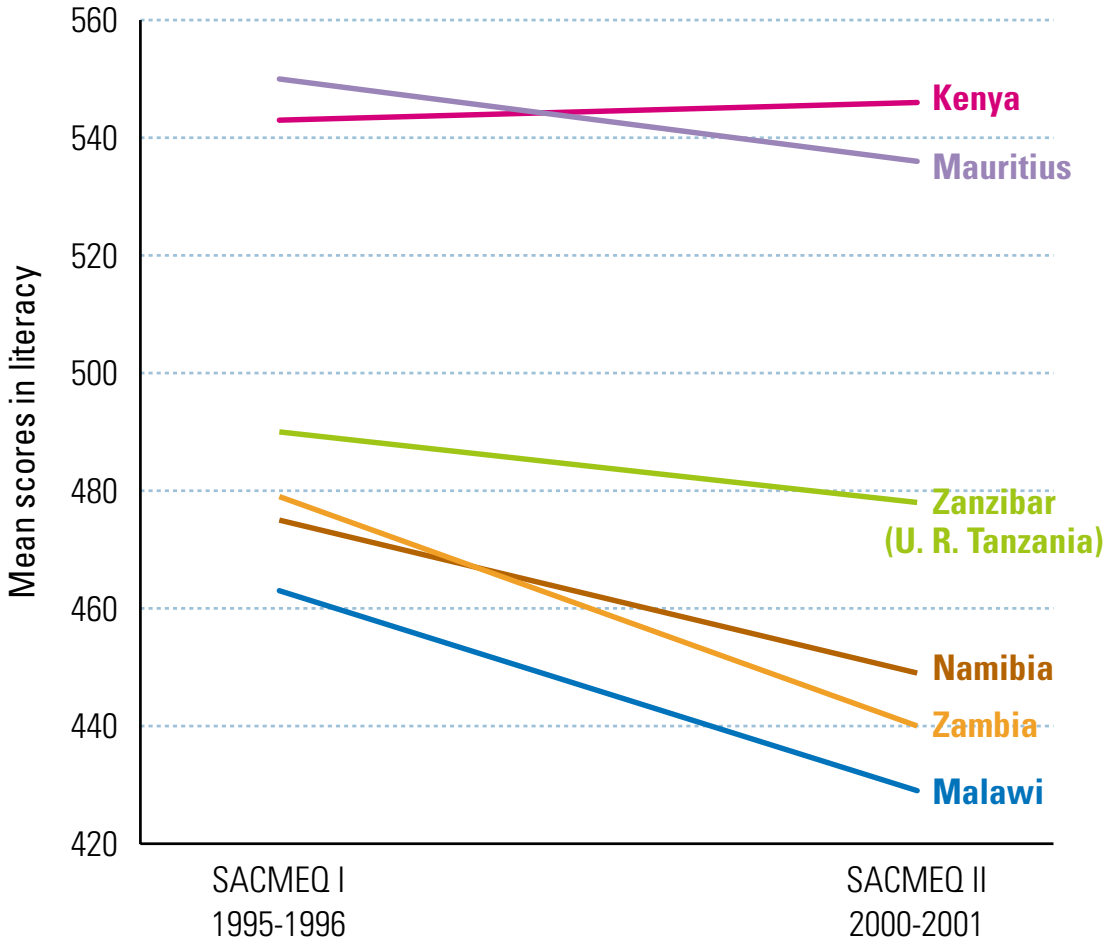
Table 2.1: Estimated returns to a standard deviation increase in cognitive skills

Study	Country	Estimated effect[1]	Notes
Glewwe (1996)	Ghana	0.21** to 0.3** (government) 0.14 to 0.17 (private)	Alternative estimation approaches yield some differences; mathematics effects shown to be generally more important than reading effects, and all hold even with Raven's test for ability.
Jolliffe (1998)	Ghana	0.05 to 0.07*	Household income related to average mathematics score with relatively small variation by estimation approach; effect from off-farm income with on-farm income unrelated to skills.
Vijverberg (1999)	Ghana	uncertain	Income estimates for mathematics and reading with non-farm self-employment; highly variable estimates (including both positive and negative effects) but effects not generally statistically significant.
Boissiere, Knight and Sabot (1985); Knight and Sabot (1990)	Kenya	0.19** to 0.22**	Total sample estimates: small variation by primary and secondary school leavers.
Angrist and Lavy (1997)	Morocco	uncertain	Cannot convert to standardized scores because use indexes of performance; French writing skills appear most important for earnings, but results depend on estimation approach.
Alderman et al. (1996)	Pakistan	0.12 to 0.28*	Variation by alternative approaches and by controls for ability and health; larger and more significant without ability and health controls.
Behrman, Ross and Sabot (forthcoming)	Pakistan	uncertain	Estimates of structural model with combined scores for cognitive skill; index significant at .01 level but cannot translate directly into estimated effect size.
Moll (1998)	South Africa	0.34** to 0.48**	Depending on estimation method, varying impact of computation; comprehension (not shown) generally insignificant.
Boissiere, Knight and Sabot (1985); Knight and Sabot (1990)	UR Tanzania	0.07 to 0.13*	Total sample estimates: smaller for primary than secondary school leavers.

Notes: *significant at .05 level; **significant at .01 level.

1. Estimates indicate proportional increase in wages from an increase of one standard deviation in measured test scores.

Figure 2.4: Changes in literacy scores between SACMEQ I and II in six African countries



Source: Postlethwaite (2004)