EDUCATION

Lecture 4/2

EC461 Semester 2/2021

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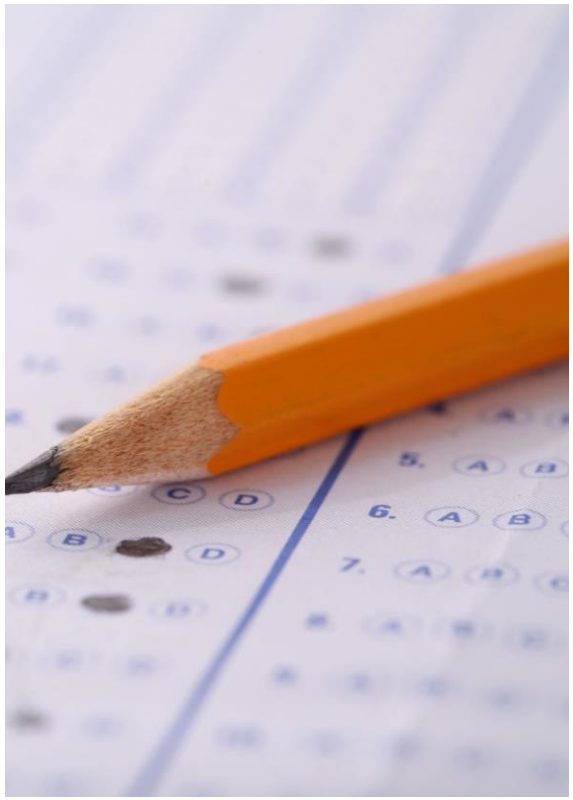
OUTLINE (4-2)



- Benefits of education
- School quality
  - Enrollment
  - Performance (test score)

BENEFITS OF EDUCATION

Table 1.1 Examples of education's benefits

	Individual/family	Community/society
Monetary	Higher probability of employment Greater productivity Higher earnings Reduced poverty	Higher productivity More rapid economic growth Poverty reduction Long-run development
Nonmonetary	Better health Improved education and health of children/family Greater resilience and adaptability More engaged citizenship Better choices Greater life satisfaction	Increased social mobility Better-functioning institutions/service delivery Higher levels of civic engagement Greater social cohesion Reduced negative externalities

Source: WDR 2018 team.

https://www.worldbank.org/en/publication/wdr2018

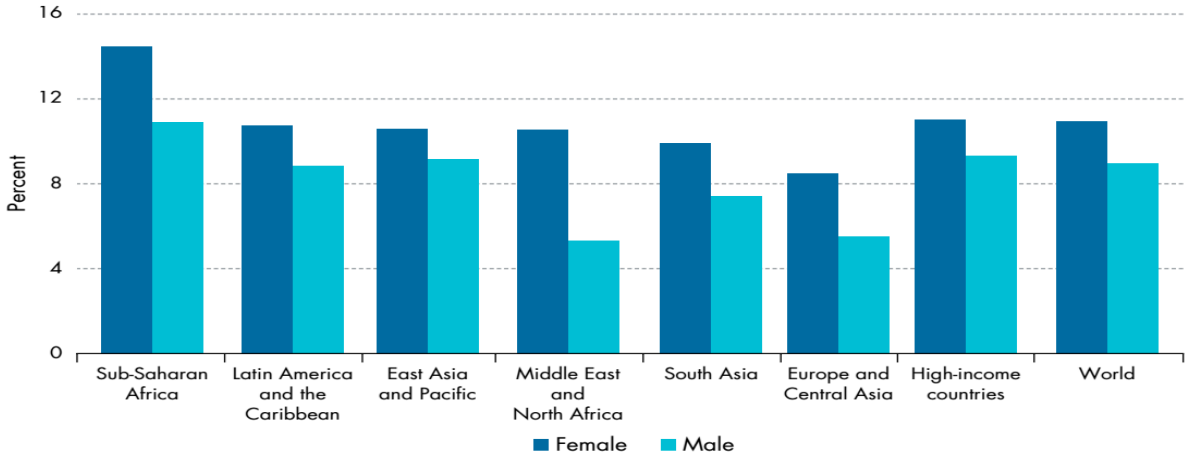
BENEFITS OF EDUCATION

- Human capital is a key determinant of both growth and the ability of individuals to participate in the growth process (inclusion)
- But education also matters intrinsically – central to Amartya Sen's "capabilities" view of development
  - Allows people to live more empowered lives regardless of economic returns
  - Education (& health) therefore have a special place in development
- Why should there be policy intervention in education?
  - Sub-optimal demand: information, credit constraints, risk/uncertainty, discount rates of parents vs children vs society, spillovers
  - Sub-optimal supply: coordination failures
  - Governments typically run public education systems to address these market failures
  - Education for All (EFA) has been a top global development priority

SCHOOLING & SKILL & WAGE

Figure 1.1 More schooling is systematically associated with higher wages

Median percentage increase in wages associated with each additional year of schooling, by country group and gender

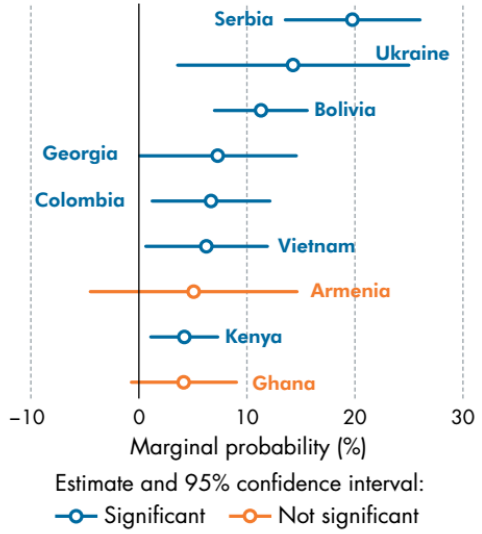


Source: WDR 2018 team, using data from Montenegro and Patrinos (2017). Data at http://bit.do/WDR2018-Fig_1-1.

Note: Figure is based on the latest available data, 1992–2012. Regions do not include high-income countries.

Figure 5.7 Workers with higher literacy proficiency are more likely to enter white-collar jobs

Marginal probability of entering high-skill white-collar jobs relative to blue-collar jobs when scoring at level 2 or above in literacy proficiency, for all workers in urban areas of participating countries (2011–14)



Source: WDR 2018 team, using data from World Bank's STEP Skills Measurement Program (http://microdata.worldbank.org/index.php/catalog/step/about). Data at http://bit.do/WDR2018-Fig_5-7.

Box 1.1 Schooling as human capital formation or as a signaling device?

Why is education associated with higher earnings? Unlike the human capital model, which posits that education increases a worker's productivity, the signaling model of education states that individuals acquire education credentials to signal a high ability to potential employers. Having a university degree does signal perseverance, grit, and ability—all valuable skills for the labor market.

But the human capital acquired typically drives the link from schooling to earnings, as different types of evidence show. First, the returns to an additional year of schooling for those who drop out without a high school or university diploma are as large as for those who complete the degree. Second, the wage differentials across education levels rise with age, whereas signaling theory suggests they should fall, because the usefulness of the signal component would presumably decline with age. Finally, education is an expensive screening strategy.

If education worked only as a screening device, individuals with the same years of schooling should have similar outcomes regardless of the skills they acquired, which is not the case.[a] In many countries, individuals with higher measured skills have been consistently shown to earn more than their lower-skilled peers who have the same amount of schooling.[b] In Mexico, those high school graduates with higher test scores are substantially less likely to be unemployed three years after leaving school (among those who did not go to university) than their lower-scoring peers.[c]

Source: WDR 2018 team.

a. Layard and Psacharopoulos (1974).
b. For example, see the results for Organisation for Economic Co-operation and Development (OECD) countries in Hanushek and others (2015) and Valerio and others (2016). For individual countries such as Ghana, see Glewwe (1991), or for South Africa, see Moll (1998).
c. de Hoyos, Estrada, and Vargas (2017).

SCHOOL QUALITY

- Enrollment vs. Test score
- Enrollment is not translating into learning outcomes

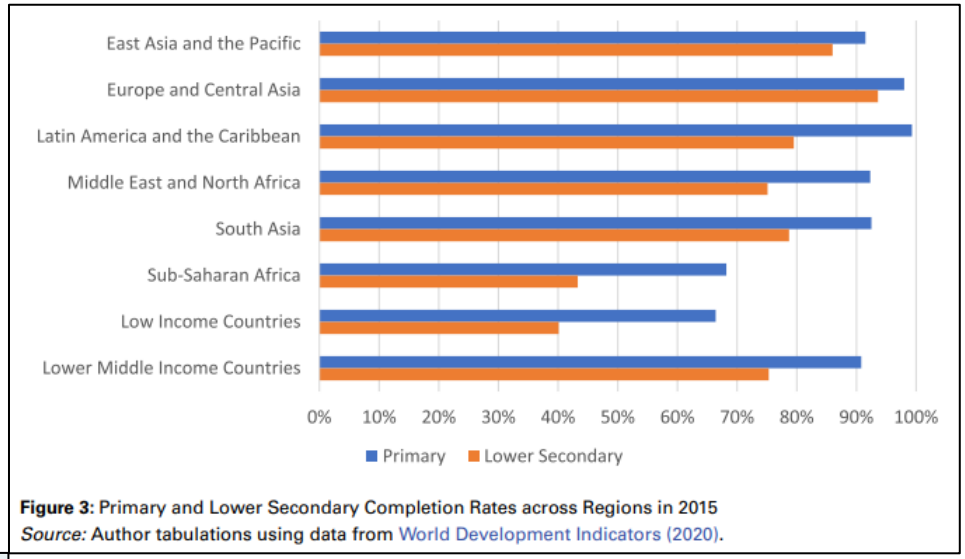
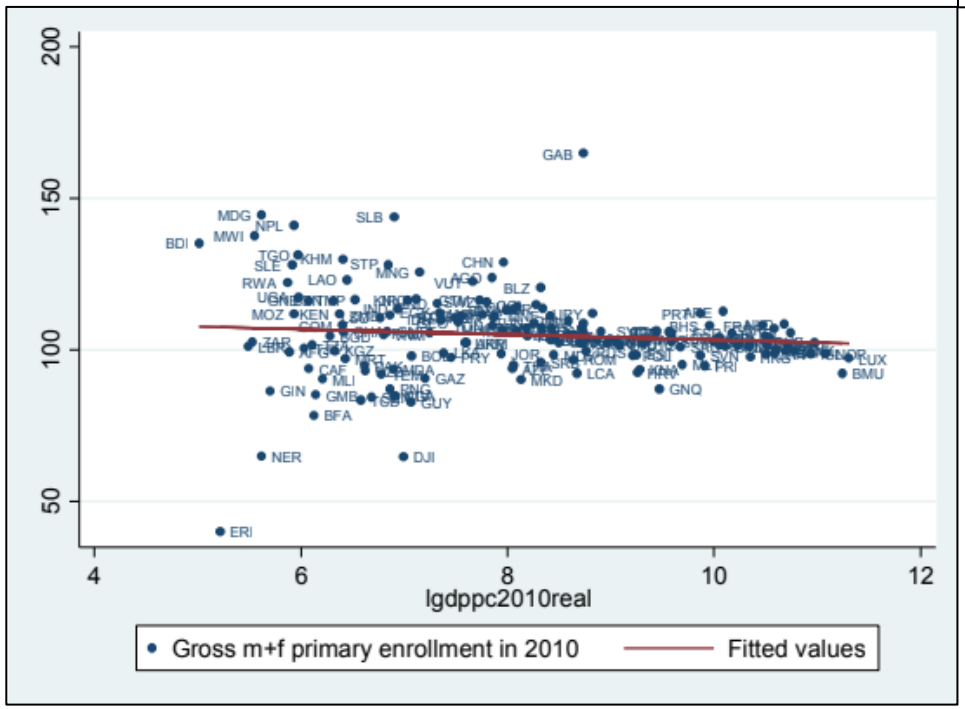


Figure 3: Primary and Lower Secondary Completion Rates across Regions in 2015
Source: Author tabulations using data from World Development Indicators (2020).



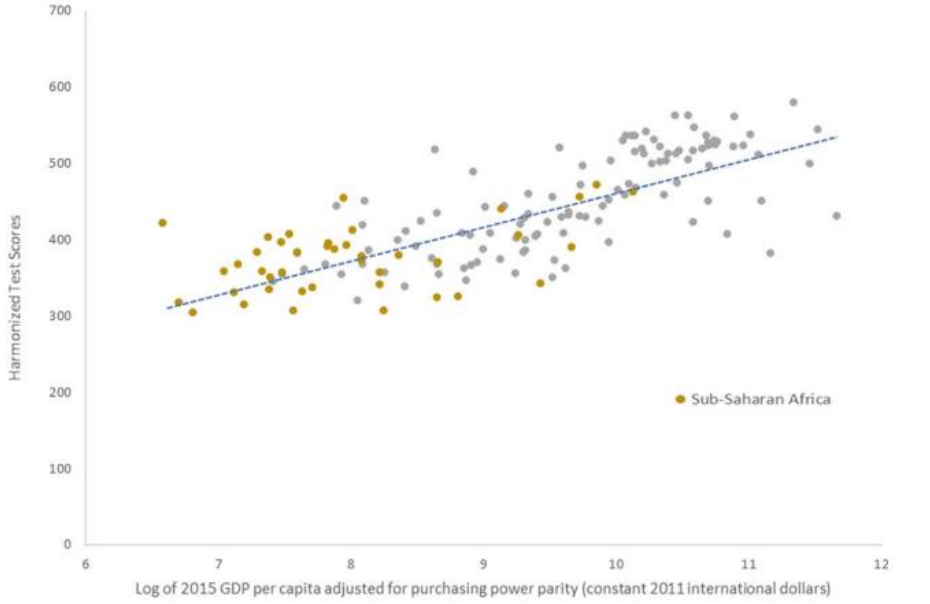
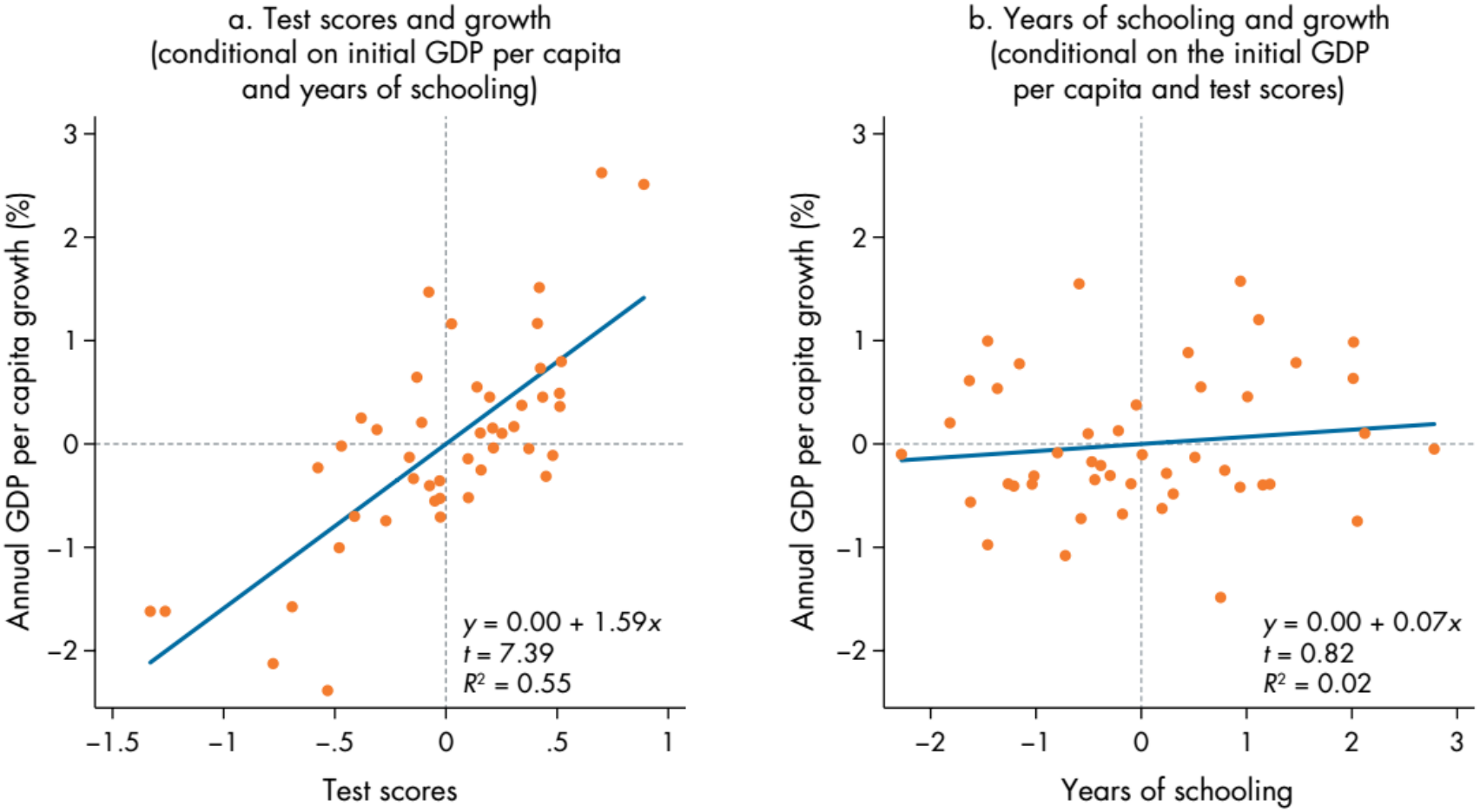


Figure 4: Test Scores for Countries at All Income Levels around the World Relative to Countries in Sub-Saharan Africa
Source: Authors' construction using the harmonised test scores from the Human Capital Project (World Bank, 2018b,c).

Figure 1.5 What matters for growth is learning

Annual average per capita growth in GDP, 1970–2015, conditional on test scores, years of schooling completed, and initial GDP per capita

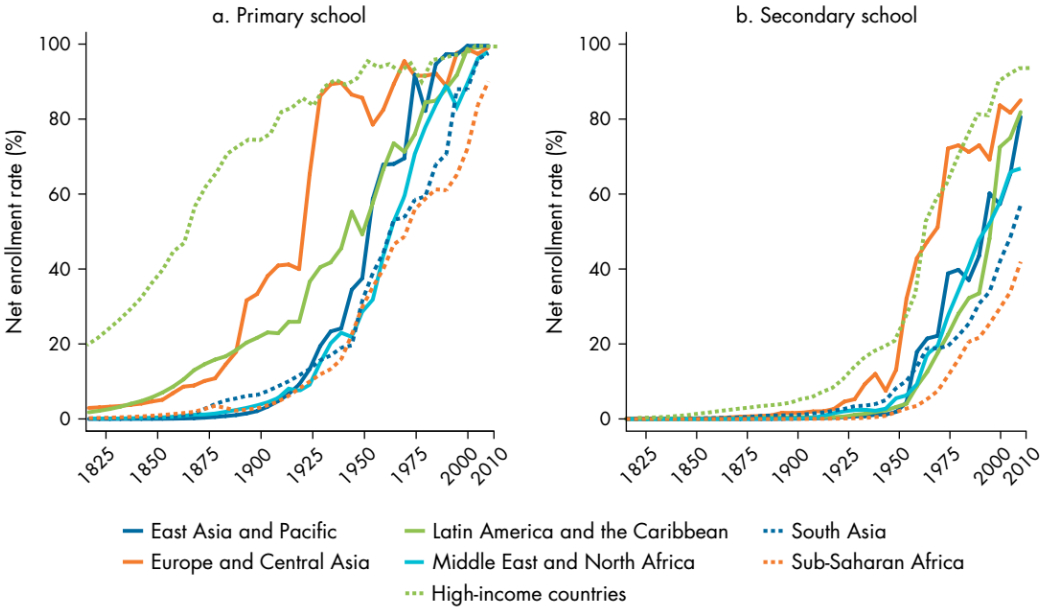


Source: WDR 2018 team, using data on test scores from Hanushek and Woessmann (2012) and data on years of schooling and GDP from the World Bank's World Development Indicators (database), 2017. Data at http://bit.do/WDR2018-Fig_1-5.

SCHOOL ENROLLMENT (PRIMARY+SECONDARY) INCREASES IN MANY COUNTRIES

Figure 2.1 School enrollments have shot up in developing countries

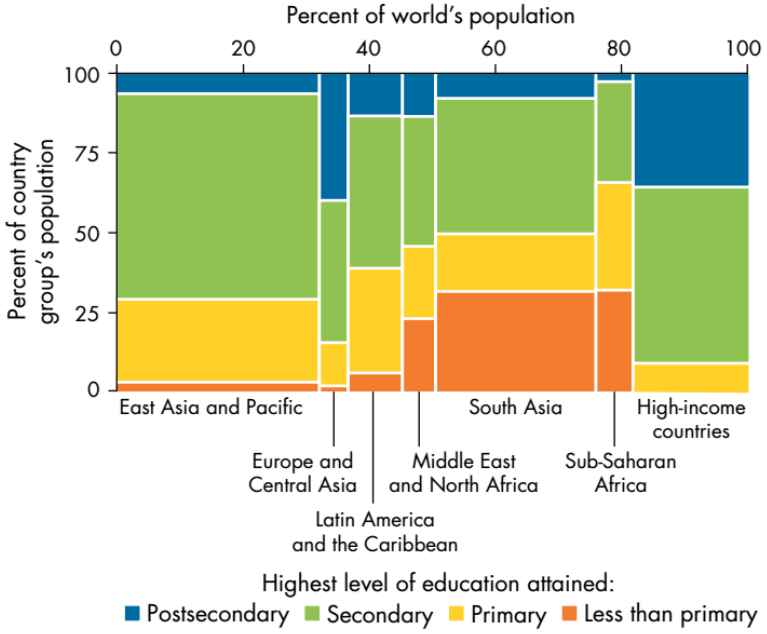
Net enrollment rates, by country group (1820–2010)



Source: WDR 2018 team, using data from Lee and Lee (2016). Data at http://bit.do/WDR2018-Fig_2-1.

Figure 2.2 Most of the world's population with less than a primary education is in South Asia, but rates are similar in Sub-Saharan Africa

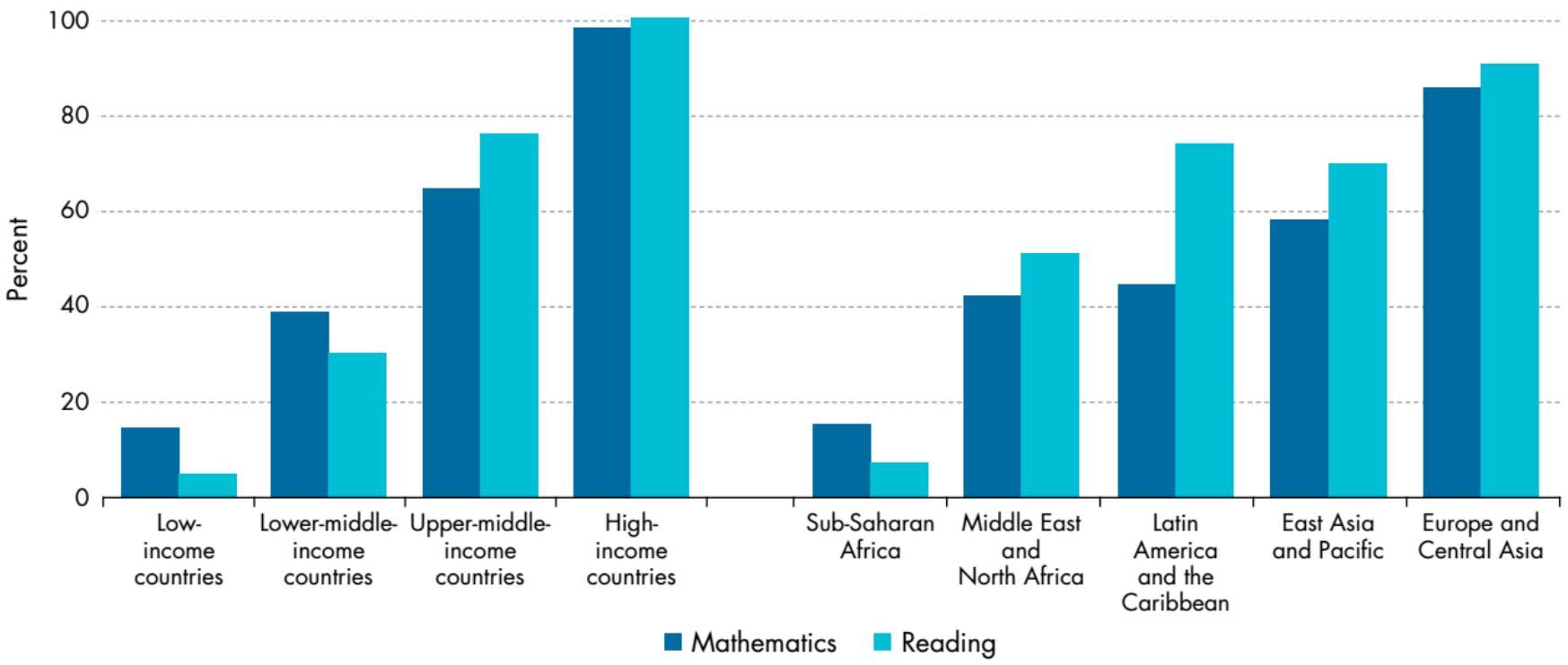
Stock of educational attainment (ages 15–64), by country group (2010)



Source: WDR 2018 team, using data from Lee and Lee (2016). Data at http://bit.do/WDR2018-Fig_2-2.

Figure O.5 The percentage of primary school students who pass a minimum proficiency threshold is often low

Median percentage of students in late primary school who score above a minimum proficiency level on a learning assessment, by income group and region



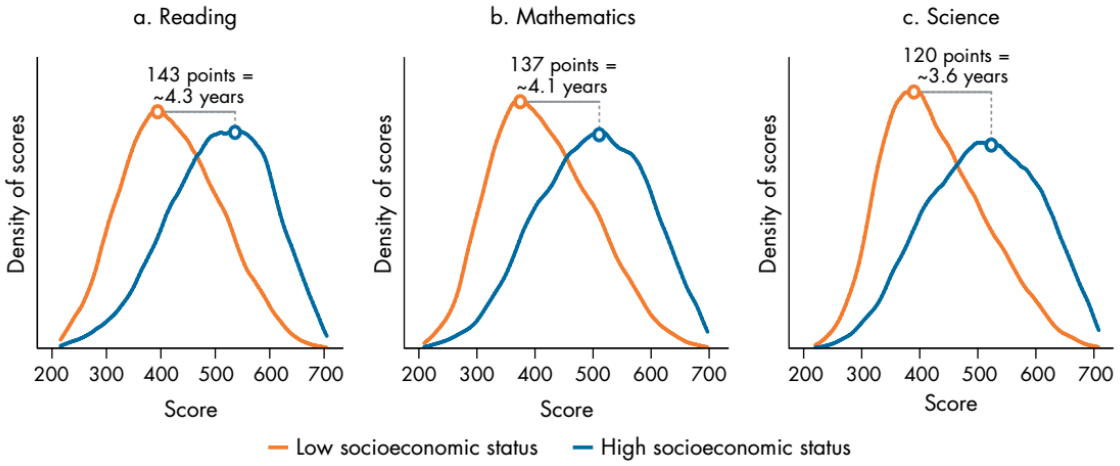
Source: WDR 2018 team, using "A Global Data Set on Education Quality" (2017), made available to the team by Nadir Altinok, Noam Angrist, and Harry Anthony Patrinos. Data at http://bit.do/WDR2018-Fig_O-5.

Note: Bars show the unweighted cross-country median within country grouping. Regional averages exclude high-income countries. India and China are among the countries excluded for lack of data. Minimum proficiency in mathematics is benchmarked to the Trends in International Mathematics and Science Study (TIMSS) assessment and in reading to the Progress in International Reading Literacy Study (PIRLS) assessment. Minimum proficiency in mathematics means that students have some basic mathematical knowledge such as adding or subtracting whole numbers, recognizing familiar geometric shapes, and reading simple graphs and tables (Mullis and others 2016). Minimum proficiency in reading means that students can locate and retrieve explicitly stated detail when reading literary texts and can locate and reproduce explicitly stated information from the beginning of informational texts (Mullis and others 2012).

PERFORMANCE INEQUALITY

Figure 3.7 Family socioeconomic status significantly affects students' average PISA scores

Distribution of scores on PISA 2015 across 69 countries (pooled) for students from the bottom and top quintiles of socioeconomic status, by subject

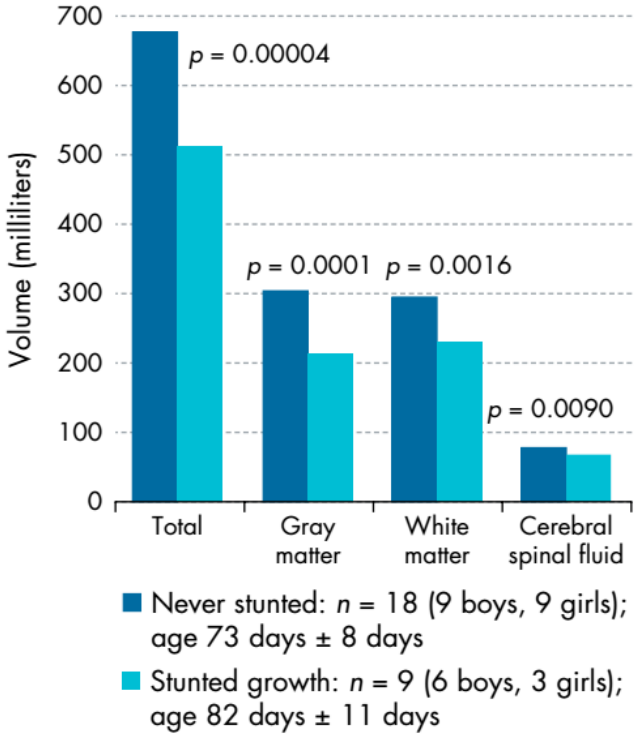


Source: WDR 2018 team, using data from Programme for International Student Assessment (PISA) collected in 2015 (OECD 2016a). Data at http://bit.do/WDR2018-Fig_3-7.

Note: A year of education is assumed to equal roughly 33 points on the PISA exam in this analysis, and the gap is calculated as the difference between modal averages of the top and bottom quintiles for each subject.

Figure S2.1 Severe deprivation affects brain structure and function from early in life

Total white and gray matter in infants, by stunting status



Source: WDR 2018 team, using data from Nelson and others (2017). Data at http://bit.do/WDR2018-Fig_S2-1.

Note: Data obtained from infants 2–3 months old in Dhaka, Bangladesh, using magnetic resonance imaging (MRI). Graph depicts two groups of infants: 18 not stunted (not malnourished) and 9 stunted (malnourished). Graph shows (from left to right) total amount of brain volume; total amount of gray matter, where most neural computations are performed; total amount of white matter, which transmits electrical signals between gray matter and affects brain function and learning (that is, the information pathways of the brain); and cerebral spinal fluid, which protects the brain and spinal cord from injury and infection and is generally involved in many aspects of brain health.

WHAT IS SCHOOL QUALITY?

- Structure – the Education Production Function (following Todd and Wolpin 2003)
- $A = f(S, F, \mu)$ (suppressing time subscripts)
- A =achievement (test-score), S = school inputs, F = Family inputs, μ= unobserved "ability", f is the "Technology"
- MP of all inputs in production fn is positive
- Examples of school inputs – resources, class size, #teachers, teacher skills, textbooks, peer quality, school management
- Examples of family inputs – books at home, parental encouragement/ help
- Education policy typical focuses on school inputs

EDUCATION PRODUCTION

- A = f(S, F, μ)
- Measuring the variables in the production function is not trivial
- A : typically measured by test scores. BUT
  - Which subjects (or domains of learning)? What about "non-cognitive skills" (e.g. grit, creativity etc.)?
  - Scaling and psychometrics (Classical test theory and Item Response Theory)
  - Measurement error
  - Student test-taking effort matters
  - Do schools/teachers/ students have an incentive to manipulate the test?

EDUCATION PRODUCTION

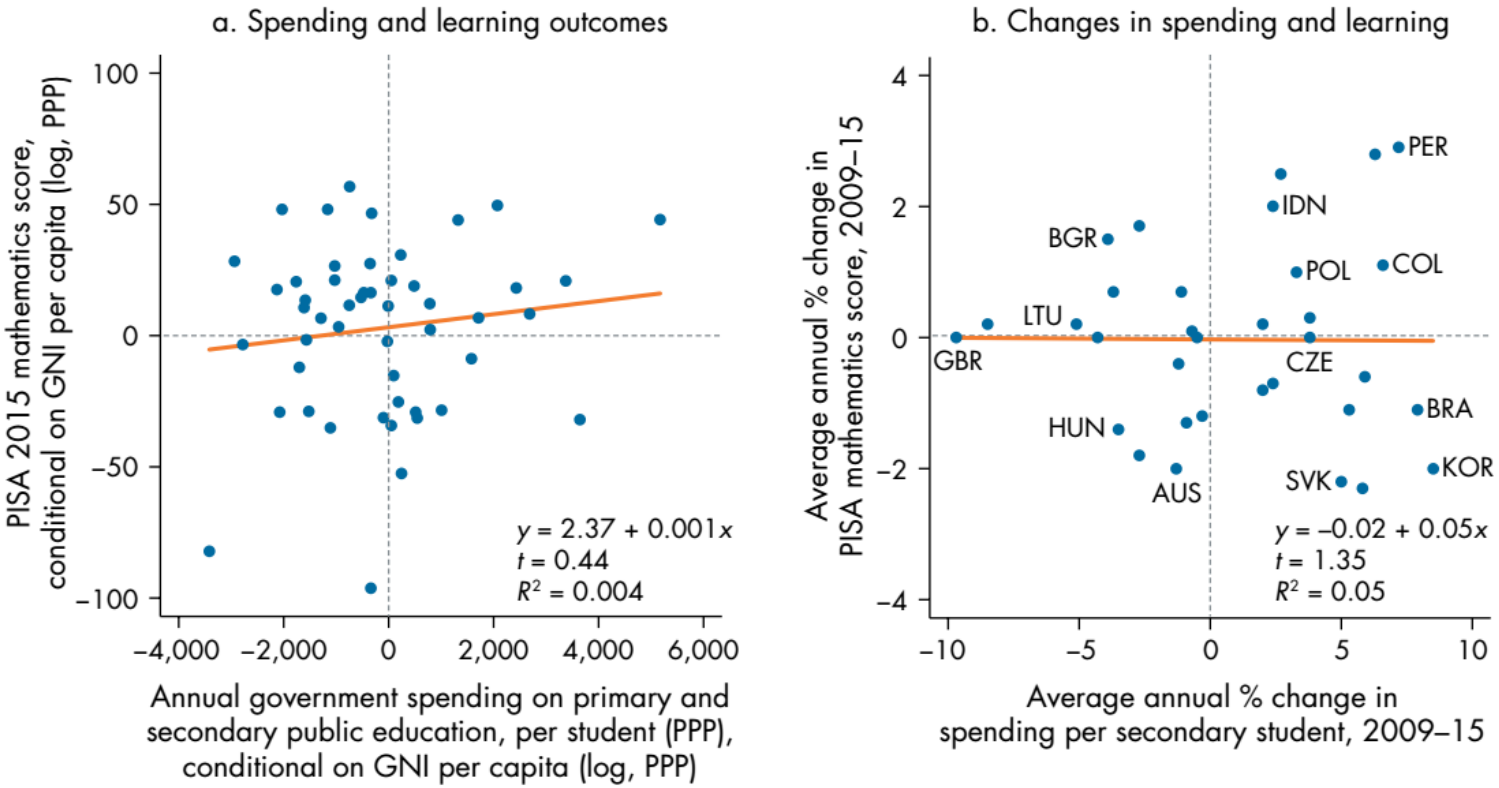
- $A = f(S, F, \mu)$
- S and F are also hard to measure– we use surveys, admin data.
  - **Hawthorne effects** and logistics/practical constraints can be important impediments
    - Example collecting teaching observations or teacher content knowledge
    - Technology e.g. video recording of teachers in the classroom can be useful (more innocuous).
- Ability is unobserved– try to proxy with measures such as Raven's matrices, or differenced out when we have panel data

Note: Hawthorne effect is a type of reactivity in which individuals modify an aspect of their behavior in response to their awareness of being observed

EDUCATION PRODUCTION

- With the basic Education PF we might be tempted to think that we can focus on policies that increase input levels in order to improve learning outcomes.
- Challenges
  - Which input is the binding constraint?
  - What if more than one input is binding?
  - Some constraints might be very difficult to alleviate e.g. Teacher content knowledge
- Suggest that understanding the structure of Education PF is important
  - But difficult to get good empirical estimates from observational data
  - Unobserved ability (μ) likely correlated with school inputs (sorting)

Figure 9.2 Simple associations between education spending and learning are weak

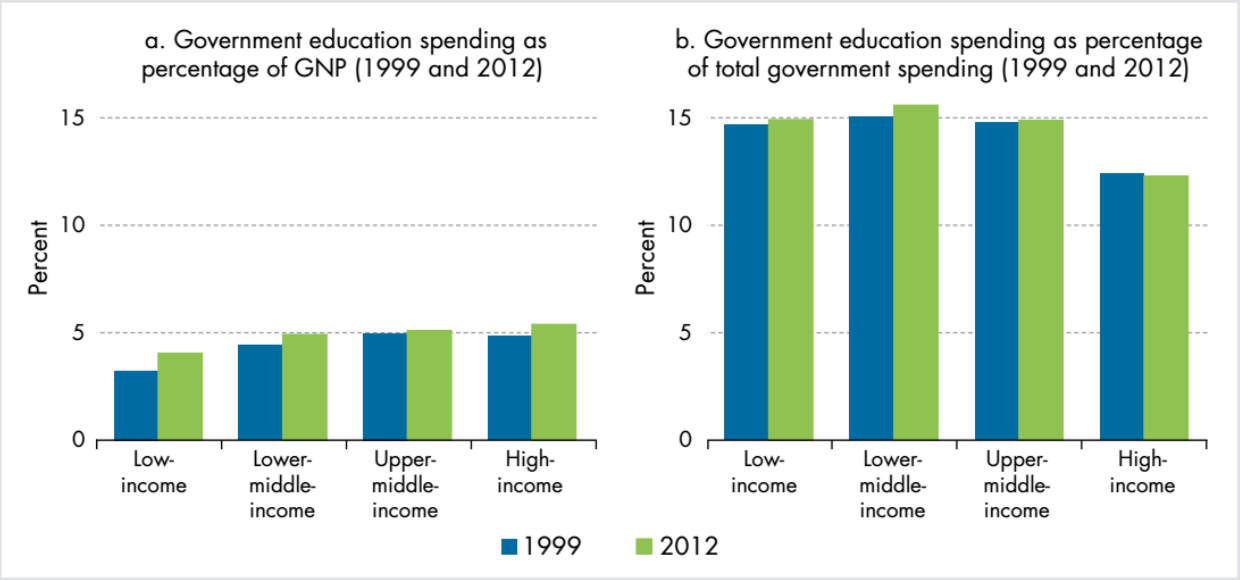


Sources: WDR 2018 team, using data from OECD (2016); UIS (2017); World Bank (2017a). Data at http://bit.do/WDR2018-Fig_9-2.

Note: AUS = Australia; BGR = Bulgaria; BRA = Brazil; COL = Colombia; CZE = Czech Republic; GBR = United Kingdom; HUN = Hungary; IDN = Indonesia; KOR = Republic of Korea; LTU = Lithuania; PER = Peru; POL = Poland; SVK = Slovak Republic. GNI = gross national income; PISA = Programme for International Student Assessment; PPP = purchasing power parity U.S. dollars.

WHY EDUCATION SPENDING AND LEARNING ARE WEAK

Figure S6.1 Governments devote a large share of their budgets to education



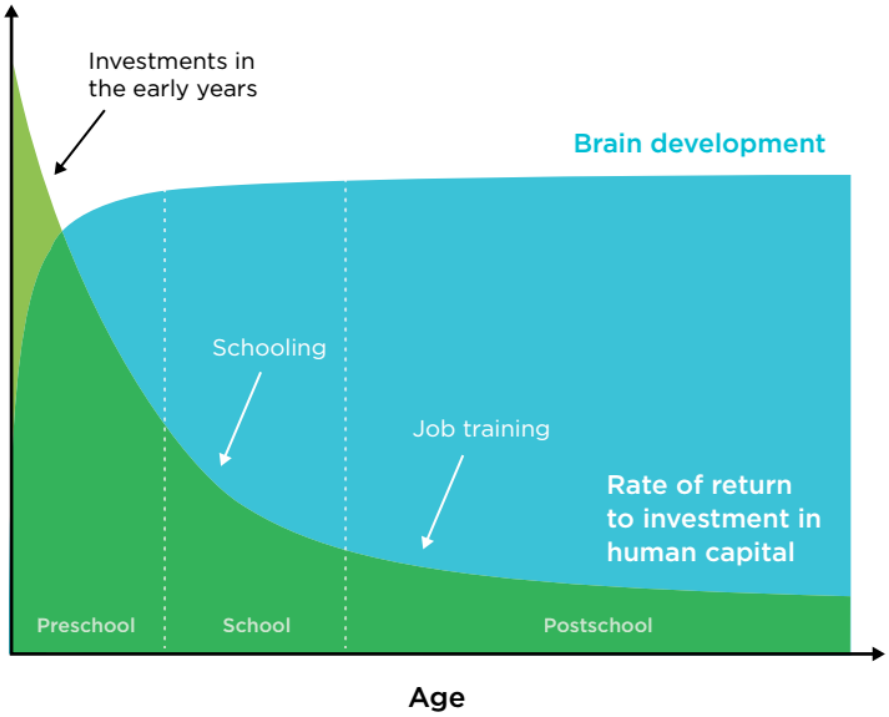
Source: UNESCO (2015). Data at http://bit.do/WDR2018-Fig_S6-1.

Note: Median values are shown. GNP = gross national product.

- Spending is not allocated equitably.
- Funds do not reach schools or are not used for their intended purposes.
- Public spending can substitute for private spending.
- Decisions on the use of public funding are not coherently aligned with learning.
- Government agencies lack the capacity to use funding effectively

SOME EFFORTS TO IMPROVE SCHOOLING (DEMAND SIDE)

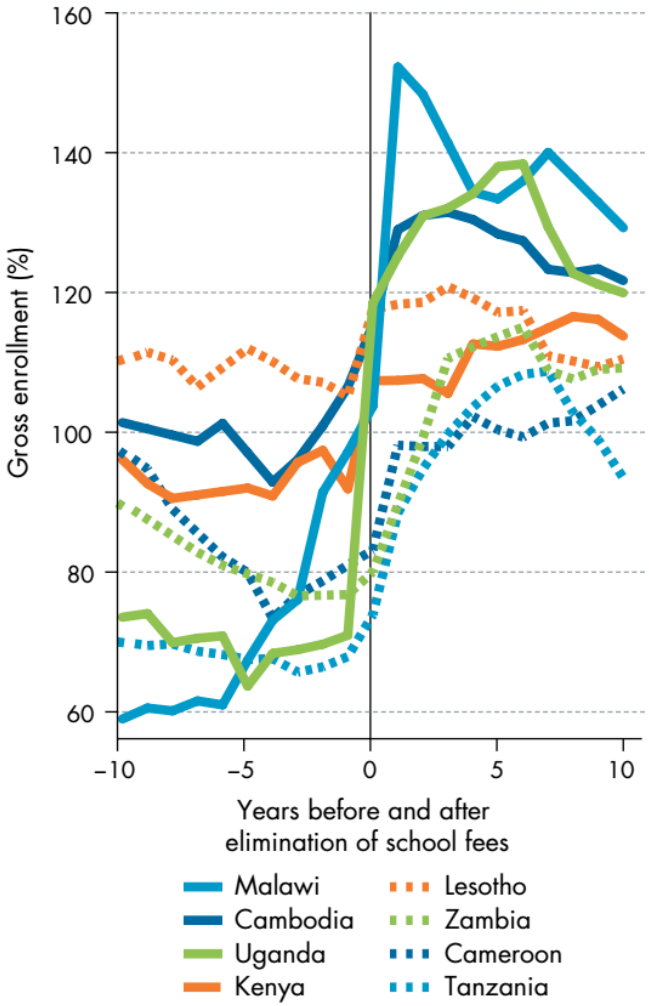
Figure 5.1 Investments in high-quality programs during children's early years pay off



Source: WDR 2018 team, based on Carneiro, Cunha, and Heckman (2003); Martin (2012).

Figure 5.4 What happens when school fees are eliminated? Evidence from eight countries

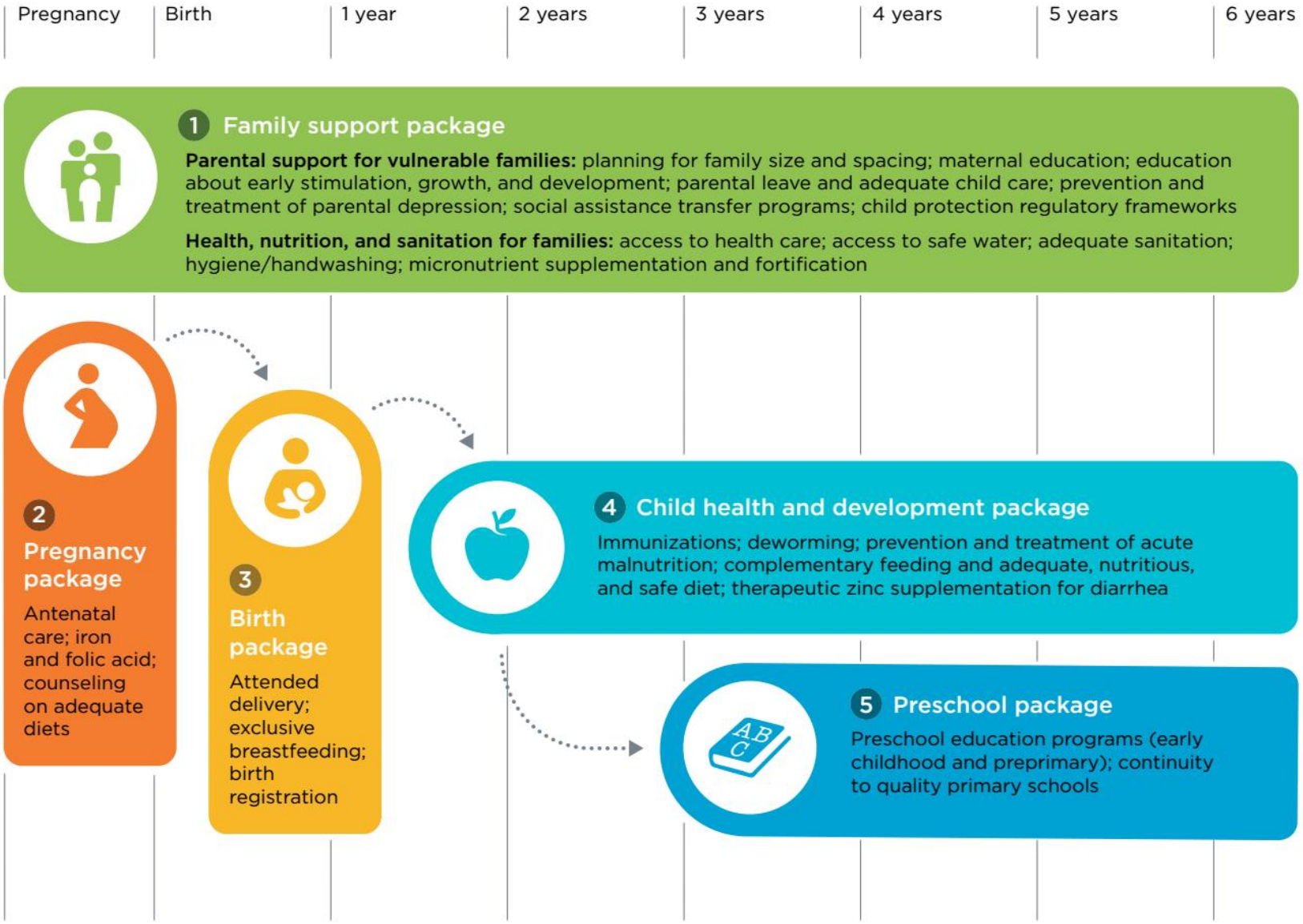
Gross enrollment in years before and after elimination of school fees, selected countries



Source: WDR 2018 team, using data from World Bank (2017); year of policy change from Bentaouet Kattan (2006). Data at http://bit.do/WDR2018-Fig_5-4.
Note: Vertical line indicates last year with fees. Gross enrollment rates include students whose age exceeds the official age group for a particular education level, and so the rate may exceed 100 percent.

Figure 5.3 Integrated programs through the early years are necessary for proper child development

Key interventions for young children and their families



Source: Denboba and others (2014).

Table 5.1 Models of human behavior can guide actions to improve learner preparation: Some examples

Synthesis principle	Where this fails	Models that identify a mechanism behind this failure	Approaches that address the modeled mechanism
Provide early child nutrition, care, stimulation, and learning opportunities.	Just one in five children in low-income countries attend preschool. One in four children worldwide are stunted.	*Information failure:* Stakeholders may not be aware of relative returns to early investments or how to support early development.	In Jamaica, a program taught caregivers to provide psychosocial stimulation that improved stunted children's developmental scores and later life outcomes.
		Simple optimization with liquidity and credit constraints: Parents are aware but lack the resources to invest.	In Mexico, a conditional cash transfer program improved cognitive and motor development.
		Behavioral (mental bandwidth): Stress of poverty undermines parenting capacity.	In Argentina, Bangladesh, China, and Uganda, center-based programs improved children's outcomes.
Lower school costs; boost motivation and effort.	263 million children remain out of school. Many countries still charge fees for lower secondary school, and primary school, while usually tuition-free, still entails cash outlays in many settings.	*Simple optimization with liquidity and credit constraints:* Parents are aware but lack the resources to invest in any or all children.	In Cambodia, providing scholarships to girls dramatically increased enrollment.
		Information failure: Youth and parents may underestimate the returns to education.	In the Dominican Republic and Madagascar, providing information on the returns to education improved enrollment and learning.
		Behavioral (hyperbolic discounting): Youth may recognize the value of education but plan to invest later (yet "later" never comes).	In Pakistan, reporting child test scores to parents increased enrollment and learning outcomes.
Ensure that, where needed, remediation is the first step in further education and training.	Many skills training programs assume prerequisite skills that youth do not have.	*Information failure:* Training programs receive imperfect signals about the quality of incoming learners.	In U.S. community colleges, improving course placement accuracy and support services helped increase students' long-term performance.
		Simple optimization (on the part of training centers): Remedial students are highly likely to drop out.	In the United States, bridge programs help learners move past remediation quickly.

Source: WDR 2018 team.