



**THE WORLD BANK**  
IBRD • IDA | WORLD BANK GROUP

# THE HUMAN CAPITAL INDEX

#INVESTinPeople



# THE HUMAN CAPITAL INDEX

*A framework that quantifies the contribution of health and education to the productivity of the next generation of workers*

Presented by: Nicola Dehnen, World Bank,  
Chief Economist Office for Human Development

JRC Week on Composite Indicators and Scoreboards  
Ispra, Italy, November 9<sup>th</sup> 2018



HUMAN  
CAPITAL  
PROJECT

# WILL ACCELERATE MORE AND BETTER INVESTMENTS IN PEOPLE GLOBALLY

1. **Human Capital Index:** Make the case for investment in the human capital of the next generation.
2. **Measurement & Research:** Improve measurement and research and provide analysis to support investments in human capital formation.
3. **Country Engagement:** Support countries to prepare national strategies that accelerate progress on human capital.

# THE HUMAN CAPITAL INDEX: ROADMAP OF PRESENTATION

1. Motivation of the Human Capital Index
2. Components of the Human Capital Index
3. Aggregation Methodology and Coverage
4. Data Dissemination and Country Engagement
5. Data Availability and Visualization

# WHY A HUMAN CAPITAL INDEX?

## MOTIVATION

- Investing in human capital is key to ending extreme poverty and creating more inclusive societies.
- However, investments in human capital, especially of children, pay economic returns far into the future.
- Because the benefits are distant but the costs are immediate, policymakers may not sufficiently prioritize investments in human capital.

# HUMAN CAPITAL INDEX: COMPONENTS

“

*How much human capital can a child born today expect to acquire by age 18, given the risks to poor health and poor education that prevail in the country where she lives?*

”

Three ingredients reflect building blocks of the next generation's human capital:



## SURVIVAL

Will children born today survive to school age?



## SCHOOL

How much school will they complete and how much will they learn?



## HEALTH

Will they leave school in good health, ready for further learning and/or work?

# CRITERIA FOR INDEX COMPONENTS

1. **Outcome-based:** Measure intermediate health & education outcomes, not simply policy inputs like spending
2. **Coverage:** Broad cross-country coverage and reasonably frequent updates
3. **Salience:** Responsive to policy changes in the short-to-medium run to provide incentives for action
4. **Coherence:** Meaningful units and a logical rationale for aggregating across components
5. **Ownership:** Strong World Bank engagement with countries on Index

# COMPONENTS OF THE HUMAN CAPITAL INDEX: **SURVIVAL**

## 1. Survival

- Measured using under-5 mortality rates
- Source: UN Interagency Group on Child Mortality Estimation

# COMPONENTS OF THE HUMAN CAPITAL INDEX: **SCHOOL**

## 2. **School** component of index combines quantity and quality

- **Quantity:** Expected number of years of school a child born today can expect to achieve by age 18, given current enrollment rates (max of 14 years)

Source: *UNESCO, supplemented by WB staff-provided data*

- **Quality:** Measured using international test scores harmonized to common scale; Source: *Based on new research at the World Bank*
- Combine into *Learning-Adjusted Expected Years of School*

# COMPONENTS OF THE HUMAN CAPITAL INDEX: **HEALTH**

**3. Health** is measured using two proxies for the overall health environment

- **Stunting:** Fraction of children under 5 below normal height-for-age;  
Source: UNICEF-WHO-WB Joint Malnutrition Estimates
- **Adult Survival Rates:** Fraction of 15 year-olds who survive to age 60  
Source: UN Population Division

# AGGREGATION: COMBINING INDICATORS INTO INDEX

- The components are combined into a single index by converting them into contributions to productivity (based on large empirical literature on returns to education and health).
- HCI is expressed in terms of worker productivity relative to benchmark of complete education and full health
  - Resulting index has values from 0 to 1
  - A country's score is its distance to “frontier” of complete education and full health. If it scores 0.7 in the HCI, this indicates that the future earning potentials of children born in that respective country will be 30 percent below of what they could have achieved with complete education and full health.

# AGGREGATION OF THE HUMAN CAPITAL INDEX



## SURVIVAL

Children who don't survive don't grow up to become future workers

X



## SCHOOL

Contribution of quality-adjusted years of school to productivity of future workers

X



## HEALTH

Contribution of health (adult survival rate and stunting) to productivity of future workers

=



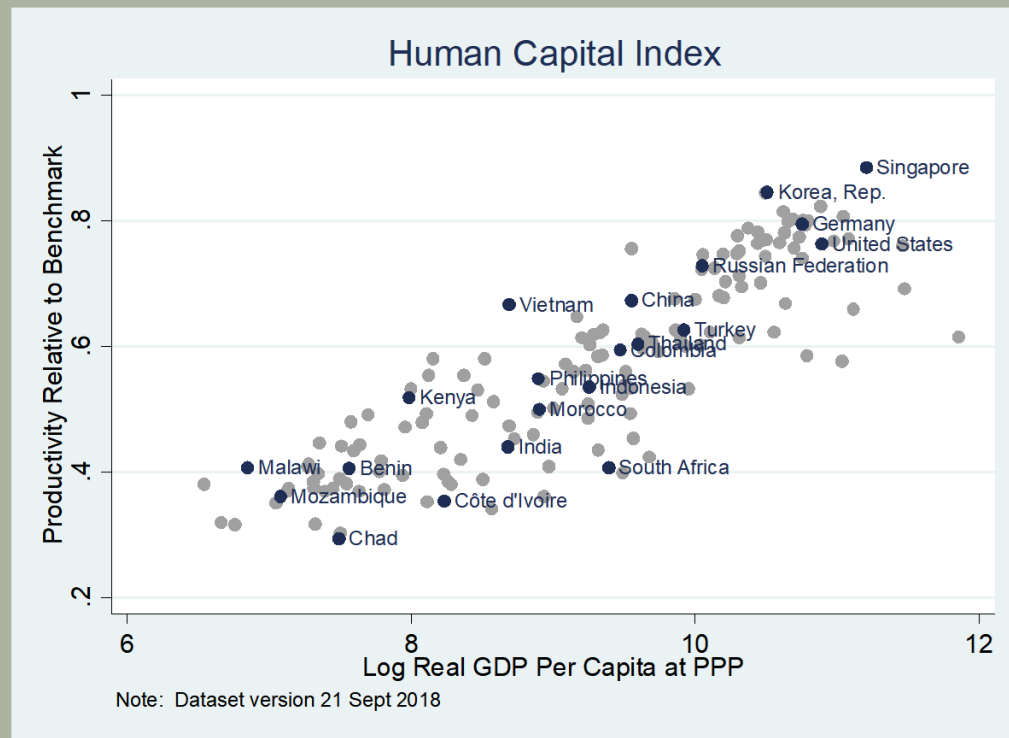
## HCI

**Productivity of a future worker**  
(relative to benchmark of complete education and full health)

# HUMAN CAPITAL INDEX: COVERAGE

- HCI covers **157 countries**
- Increase of coverage possible due to thorough data review process involving WB Country Offices Staff

## HUMAN CAPITAL INDEX



Source: World Bank staff calculations

# DATA DISSEMINATION & COUNTRY ENGAGEMENT

- Human Capital Index launched at Annual Meetings in Bali in October 2018
- Before and after launch of HCI: Close collaboration and engagement with countries to support country-specific policy implementation
- Countries are working with the World Bank through nominated focal points in government.
- Identification of national priorities for accelerating progress on human capital, based on each country's own development plans → not prescriptive of the type of policies since index based on outcomes
- Scaling up measurement and research to improve the measurement of human capital outcomes

# HUMAN CAPITAL INDEX: DATA AVAILABILITY AND VISUALIZATION

- Human Capital Project Webpage:  
<http://www.worldbank.org/en/publication/human-capital>
  - Human Capital Index Data Map
  - Human Capital Index Video
  - Country Profiles for 157 countries
  - Disaggregated data by gender
- [Human Capital Index Project Report](#)
- Human Capital Index Database:  
<https://datacatalog.worldbank.org/dataset/human-capital-index>

**THANK YOU!**

**#InvestinPeople**



**#INVESTinPeople**



# HUMAN CAPITAL OF AN INDIVIDUAL

- Based on standard measure of human capital per worker from development accounting literature:

$$h_i = e^{\phi s_i + \gamma z_i}$$

where:

- $h_i$  is human capital of individual  $i$
- $s_i$  is quality-adjusted years of school of individual  $i$
- $z_i$  is *latent health* of individual  $i$  (mapping to stunting, ASR, to come)
- $\phi, \gamma$  are “returns” to education and health

# HUMAN CAPITAL INDEX: DISTANCE TO THE FRONTIER

- For ease of interpretation express HCI *relative to benchmark of complete education* ( $s^*$ ) and full health ( $p^*, z^*$ )

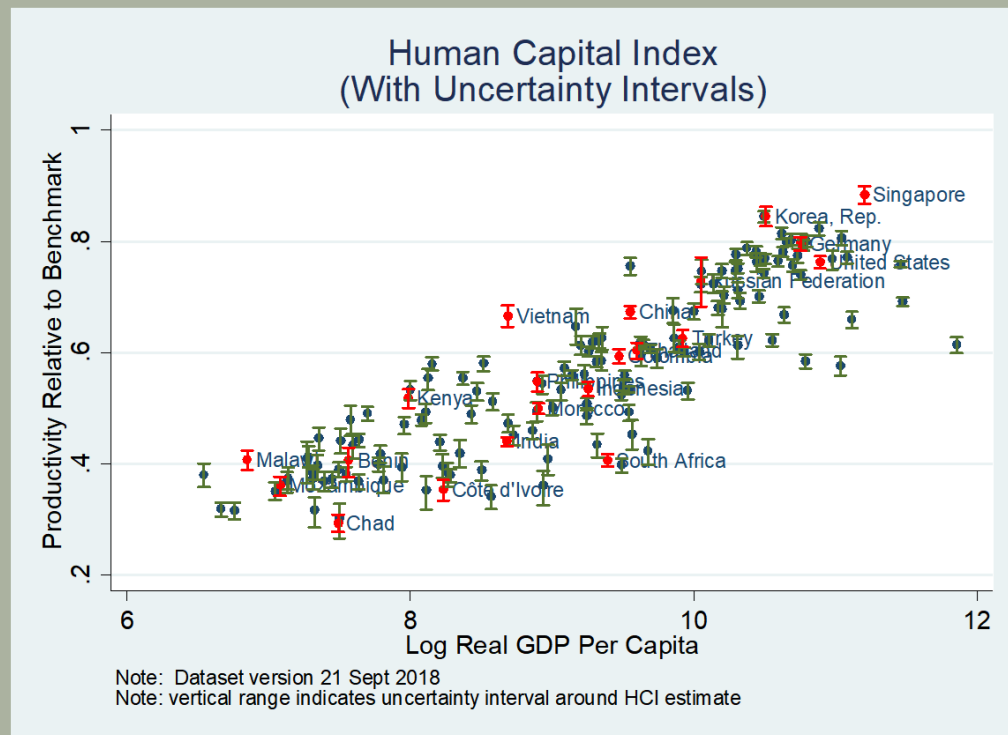
$$HCI = \frac{p}{p^*} \times e^{\phi(s_{NG} - s^*)} \times e^{\gamma(z_{NG} - z^*)}$$

- HCI measures productivity as a future worker of a kid born today relative to this benchmark, i.e.  $0 < HCI \leq 1$

# HUMAN CAPITAL INDEX: COVERAGE

- Intervals reflect uncertainty in measurement of HCI components
- Differences between countries that are small compared to uncertainty intervals should not be overinterpreted

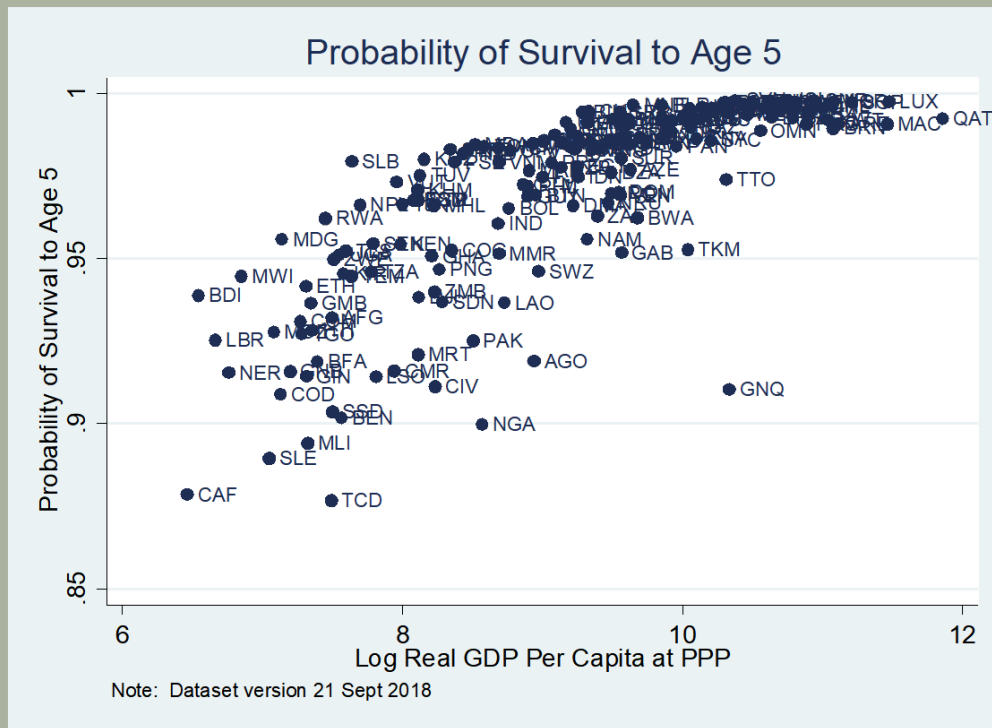
## HUMAN CAPITAL INDEX



Source: World Bank staff calculations

# HCI INGREDIENTS 1: SURVIVAL TO AGE FIVE

- Based on under-5 mortality rates from UN Child Mortality Estimates
- Most of variation in survival rates is driven by differences in infant mortality rates



Source: UN Interagency Group on Child Mortality Estimation

# HCI INGREDIENTS 2A:

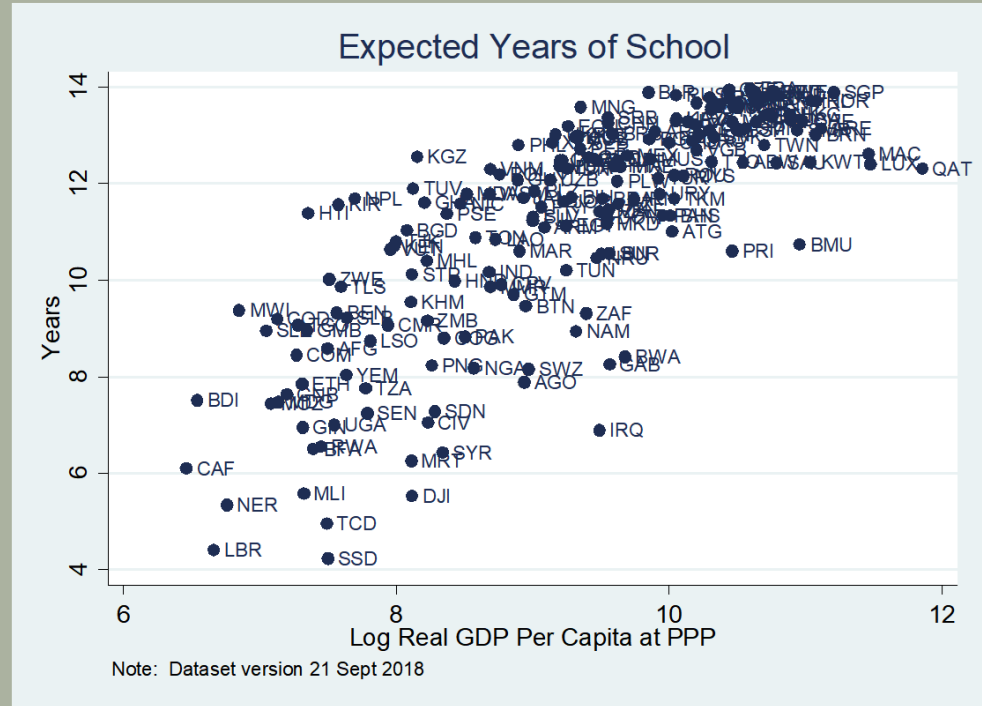
## EXPECTED YEARS OF SCHOOL

- Number of years of school that a child who starts preschool at age 4 will obtain by her 18th birthday, given current enrollment rates
- Calculation requires enrollment rates by age that are not readily available for large set of countries – instead approximate using repetition-adjusted enrollment rates by level of school:
  - Pre-primary enrollment: 4-5 year-olds
  - Primary enrollment: 6-11 year-olds
  - Lower secondary enrollment: 12-14 year-olds
  - Upper secondary: 15-17 year-olds
- Maximum possible is 14 years

# HCI

## INGREDIENTS 2A:

### EXPECTED YEARS OF SCHOOL



Source: Enrollment rates from UNESCO, supplemented by World Bank staff-provided data

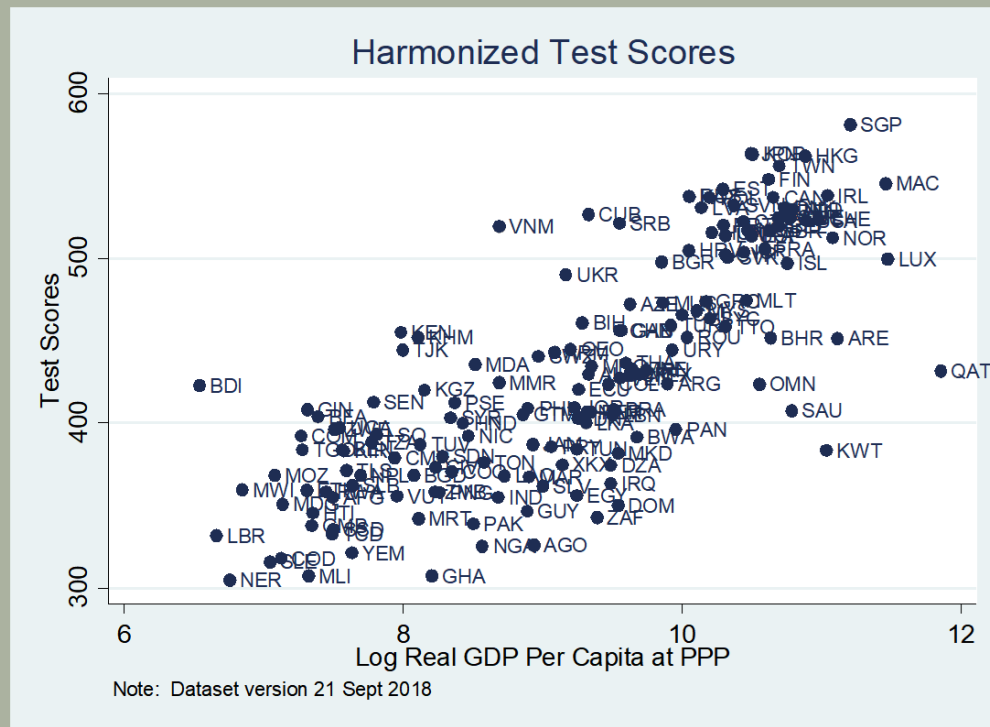
# HCI INGREDIENTS 2B:

## LEARNING

- Patrinos and Angrist (2018) provide new dataset of “harmonized learning outcomes (HLO)” for over 160 countries, harmonizing test scores from:
  - International testing programs: PISA/TIMSS/PIRLS
  - Regional testing programs: Latin American Laboratory for Assessment of the Quality of Education (LLECE); Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ); Program of Analysis of Education Systems (PASEC)
  - Other testing programs: Early Grade Reading Assessments (EGRA)
- Country-level scores from different programs converted to TIMSS-equivalent scores using average ratio of scores in set of countries participating in both tests
  - Scale ranges from 300 (minimal attainment) to 625 (advanced attainment)

# HCI INGREDIENTS 2B: LEARNING

- Distribution of Countries by Type of Most Recent Test



Source: Patrinos and Angrist (2018)

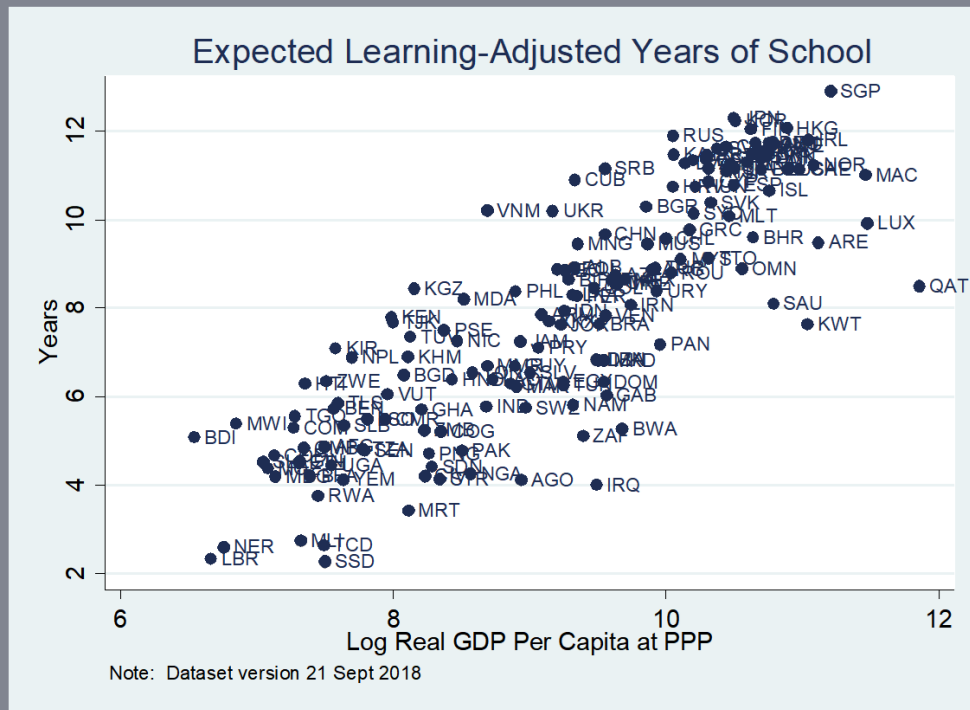
# COMBINING TEST SCORES AND YEARS OF SCHOOL

- Combine harmonized learning outcome and years of school into “learning-adjusted years of school”

$$\text{Learning-Adjusted Years of School} = (\text{Score}/625) \times \text{Expected Years of School}$$

- Methodology developed in WDR (2018) and Filmer, Rogers, Angrist and Sabarwal (2018)
- Learning-Adjusted Years “discount” expected years of school by a factor reflecting how much children are likely to learn, given current test scores.

# QUALITY-ADJUSTED SCHOOL YEARS

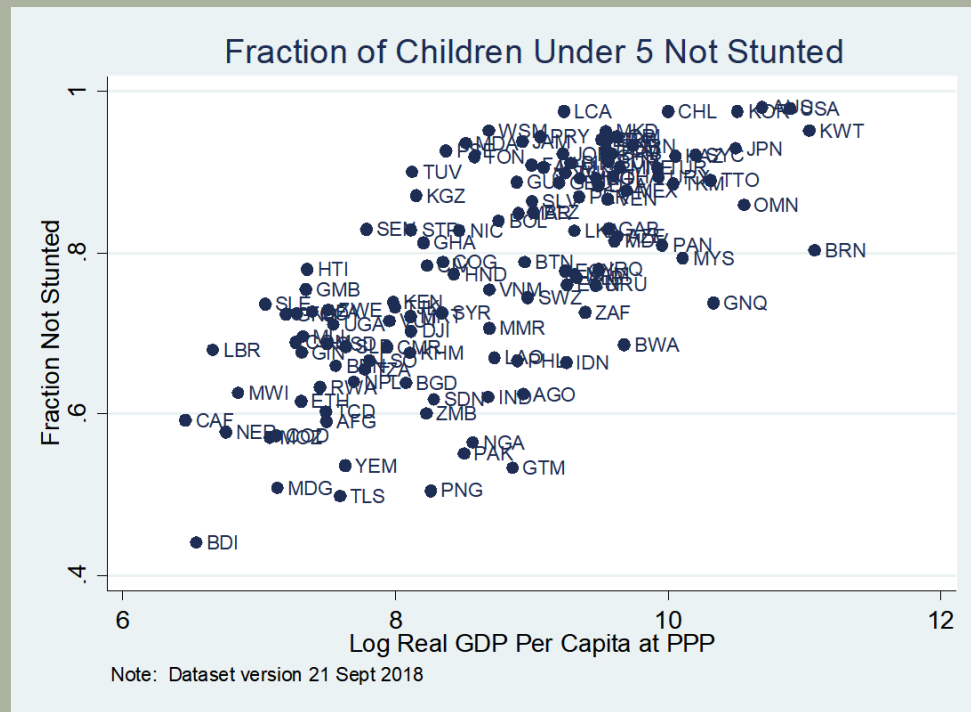


Source: World Bank staff calculations

# HCI INGREDIENTS 3: HEALTH

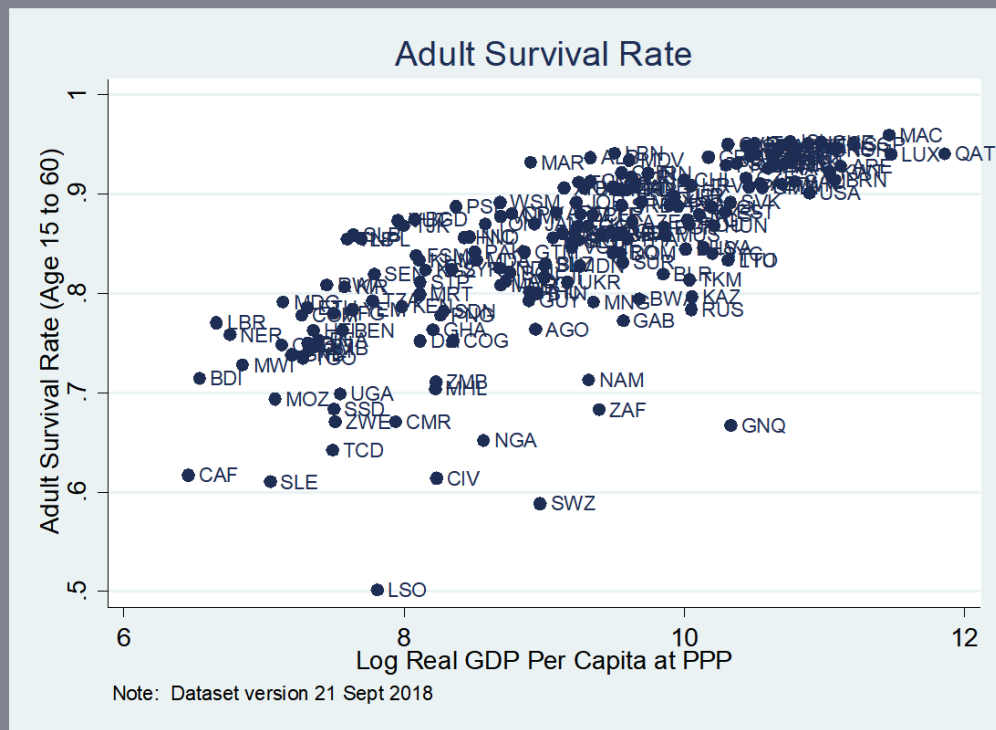
- Health matters for kids' ability to stay in school and learn (already captured in education component of index), and also matters directly for their eventual productivity as workers
- HCI includes two broad indicators of overall health environment:
  - Stunting Rate: Fraction of kids under 5 more than 2 reference standard deviations below reference median height-for-age
    - UNICEF-WHO-WB Joint Malnutrition Estimates, May 2018 update
    - based on direct survey measurement
  - Adult Survival Rate (ASR): Fraction of 15 year-olds who survive to age 60
    - UN Population Division
    - Based on vital registries (where available), otherwise estimated based on limited available mortality data and model life tables

# STUNTING



Source: WHO-UNICEF-World Bank Joint Malnutrition Estimates

# ADULT SURVIVAL RATES



Source: UN Population Division