MEASURING HEALTH INEQUALITIES

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Topics

- Measuring SEP
- Measuring interventions, and combining them
  - Composite coverage indicator
  - Co-coverage
- Measuring inequalities
  - Which measures and how to calculate – focus on
    - CIX = concentration index
    - SII = slope index of inequality
  - Shape of inequality – linear, top, bottom
- Assessing trends in inequalities
  - Changes in absolute and relative measures
  - Putting it all together

What we already know

- Equity is based on judgment
- We measure inequalities
- Health is a difficult concept
- We measure more concrete indicators
  - Health status
    - infant mortality rates, undernutrition
  - Access and use of health services
    - number of times tried to get appointment, number of medical consultations
  - Coverage by health interventions
    - Contraception
    - Antenatal care
    - Vaccines

Multiple dimensions in inequality

- Gender
- Sexual orientation
- Age
- Ethnicity
- Education
- Area of residence
- Socioeconomic position / wealth

Issues in measurement of stratifiers

- Gender and age – these are easy
- Sexual orientation
  - People may be reluctant to tell the truth
  - Potential for discrimination, even violence
  - Usually calls for special data collection strategies
- Ethnicity
  - Potential for discrimination, even violence
  - There is great interest in inequalities by ethnicity
  - Available in a few surveys
- Education
  - Easy to ask, but subject to error
- Area of residence, region – also easy to record

Measuring SEP

- Education (as a proxy of SEP)
  - Easy to measure, unbalanced groups
- Income
  - Measured with error, unstable over time, problematic in rural areas
- Consumption
  - Popular with economists, stable over time, very difficult to measure
- Occupation
  - Commonly used in HICs; changing, multiple or informal jobs make this problematic in LMICs setting

Asset indices

- SEP without tears (Filmer & Pritchett, 1998): use
  - Household possessions, dwelling construction materials, access to infrastructure (water, sanitation, electricity), educational achievement – all easy to measure indicators (assets)
  - An information dimensionality reduction technique (factor analysis) to produce one single combination of the above to obtain a proxy of permanent income of each household
- PROS – easy to collect info and to calculate, robust in terms of addition of irrelevant indicators, relates well to consumption
- CONS – sensitive to choice of assets, relative classification only, puts rural households in lower position

In DHS & MICS

- Wealth index is readily available
- Based on a list of assets that include
  - Household possessions
  - Building materials
  - Infrastructure
- The list varies by survey
- The score is derived using principal components analysis
- Quintiles are calculated for households
  - The poorest quintiles include more individuals, esp. children
    - Higher fertility rates
  - For specific analysis there is the need to recalculate the quintiles for individuals, always taking sample weights into account

Measuring intervention coverage

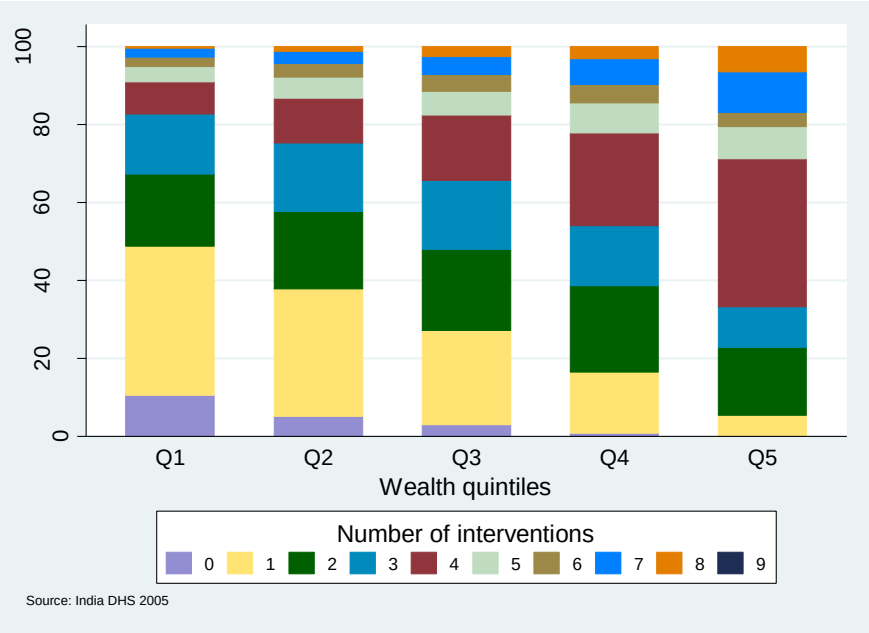
- Single indicator approach
  - Selected indicators are measured individually
    - E.g. SBA, ANC, immunization
  - Discussed in detail previously

- Combined indicator approach
  - Co-coverage: how many interventions each child/mother received
  - Composite coverage: average results of a set of indicators

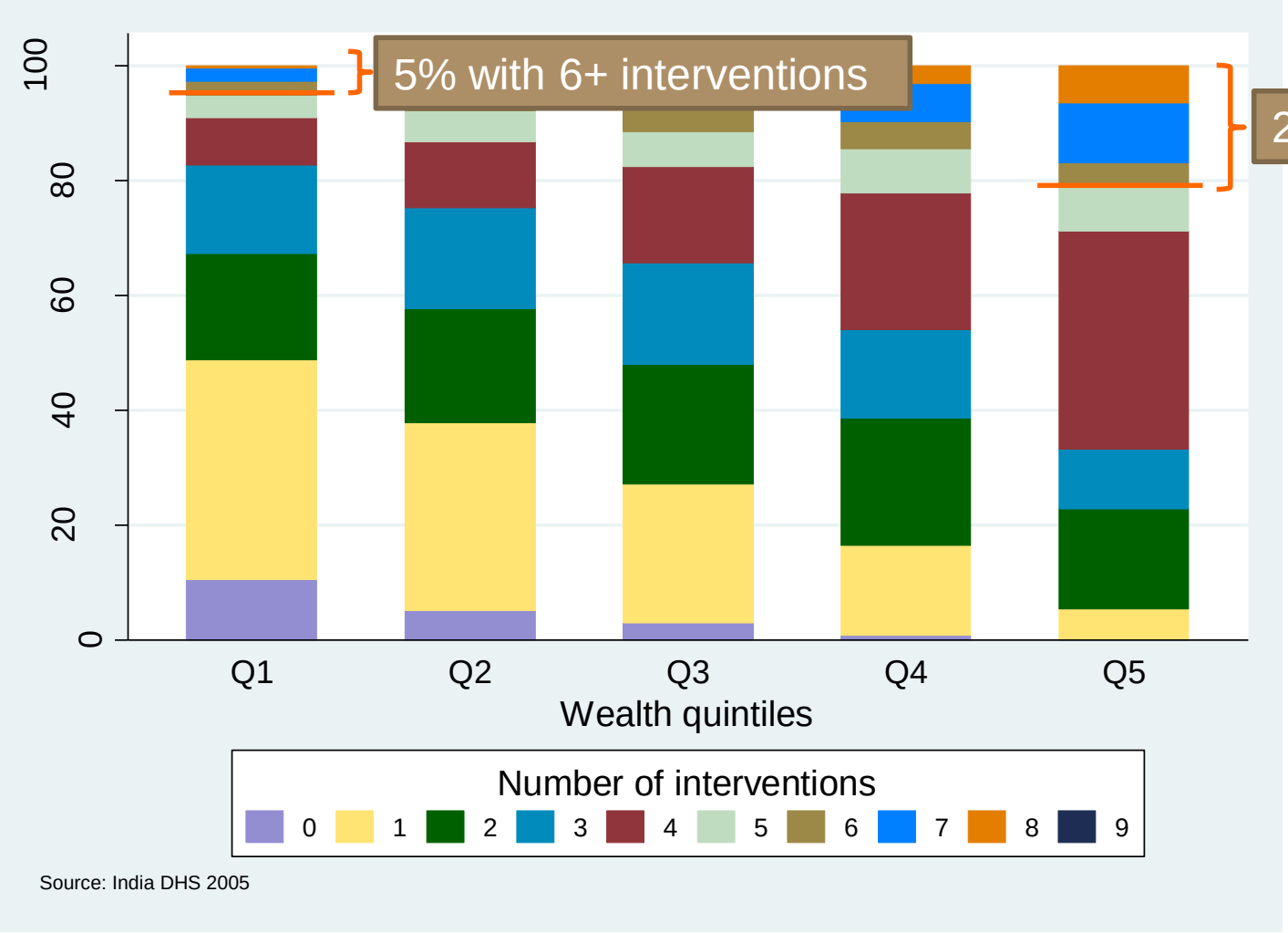
We detail these two in the sequence

Co-coverage

- A set of 9 health interventions were selected
  - BCG, DTP3, measles vaccine, ITN (child)
  - ANC, vitamin A, tetanus vaccine, SBA (mother)
  - Safe water (household)
- The number of interventions received by each child/mother is summed up
- Proportions of each count presented by wealth quintiles



Co-coverage in India 2005



Source: India DHS 2005

Composite coverage index

- Originally proposed as the coverage gap
  - Not well received/understood by policy makers
- Weighted average of 8 interventions
  - equal weights to 4 stages in the continuum of care
    - family planning
      - demand satisfied
    - maternal and newborn care
      - skilled birth attendant, 1+ antenatal care by skilled provider
    - vaccination
      - DPT3 x 2, measles, BCG
    - case management of sick children
      - ORT for diarrhea, care for pneumonia

$$CCI = {}^{1}/_{4}\left(FPS + \frac{SBA + ANCS}{2} + \frac{2DPT3 + MSL + BCG}{4} + \frac{ORT + CPNM}{2}\right).$$

Mean CCI by wealth quintile

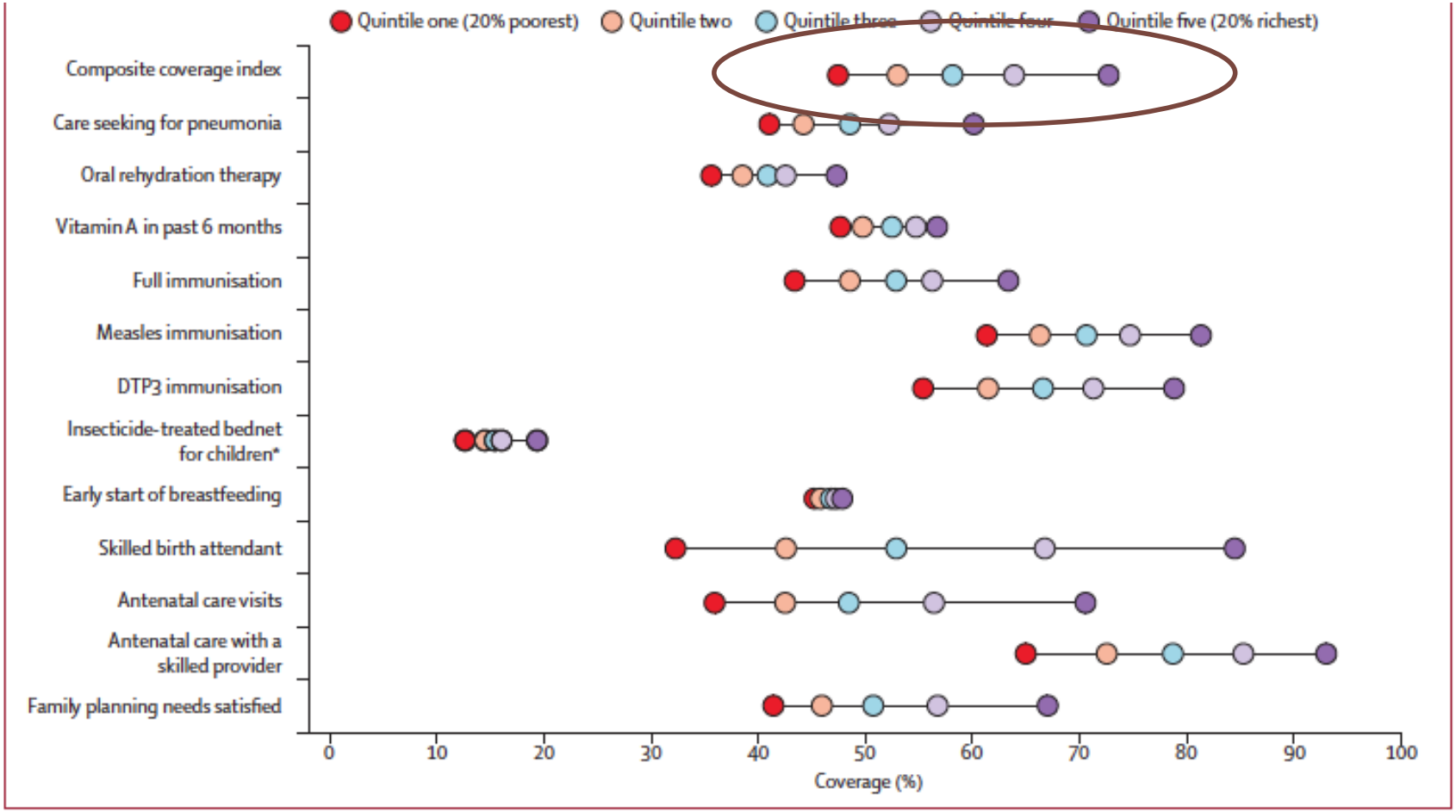
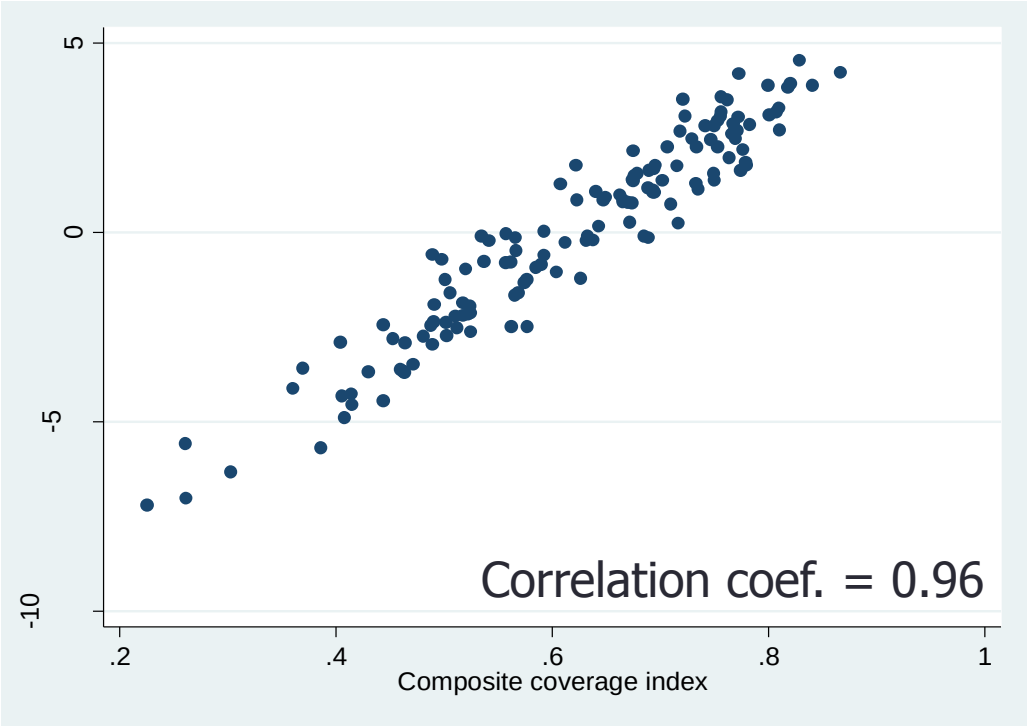


Figure 1: **Mean coverage in each wealth quintile for the studied interventions in 54 Countdown countries**

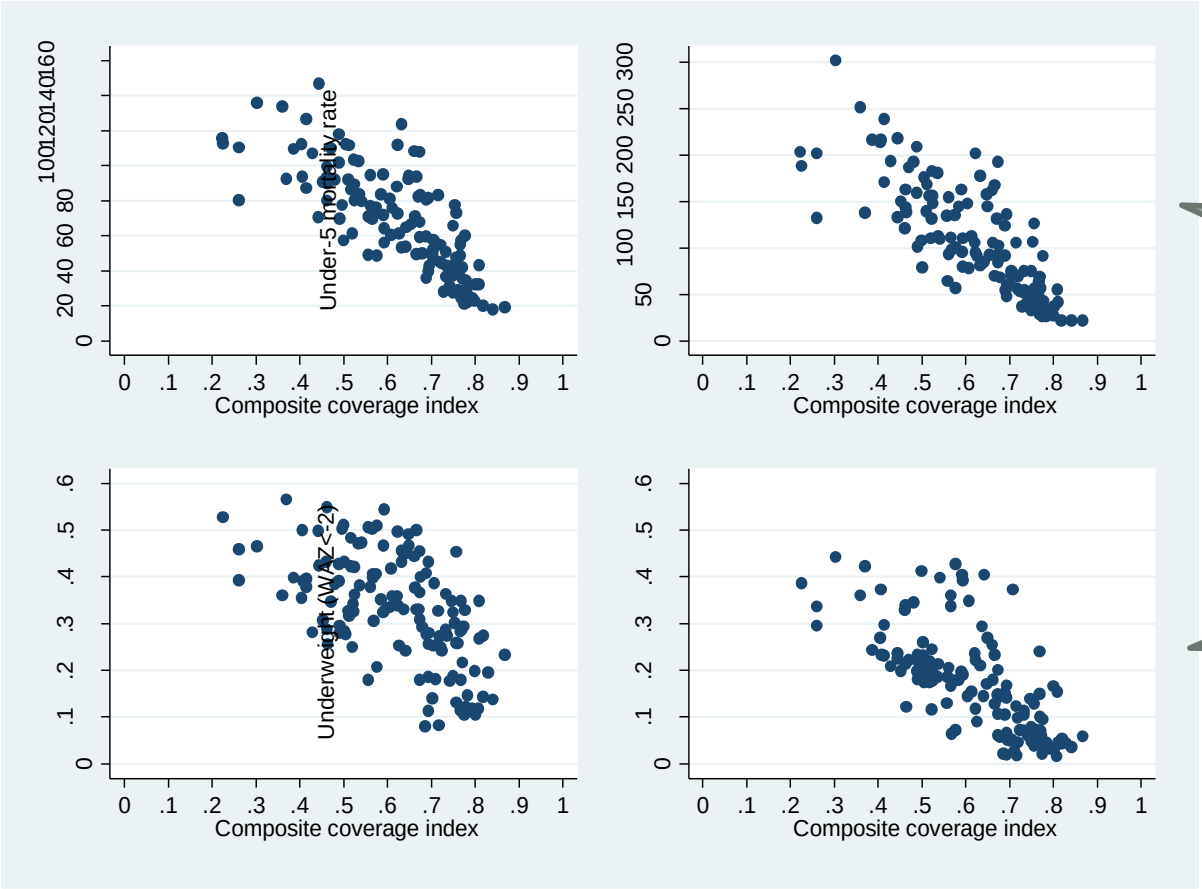
Coloured dots show the average coverage in each wealth quintile. Q1 is the 20% poorest wealth quintile; Q5 is the 20% richest. The distance between quintiles 1 and 5

How well the CCI resumes overall info?

- We used principal components analysis to combine information on 15 health interventions for 138 surveys
- The resulting score was compared to the CCI



How well the CCI relates to health status?



Correlations around 0.8 for mortality

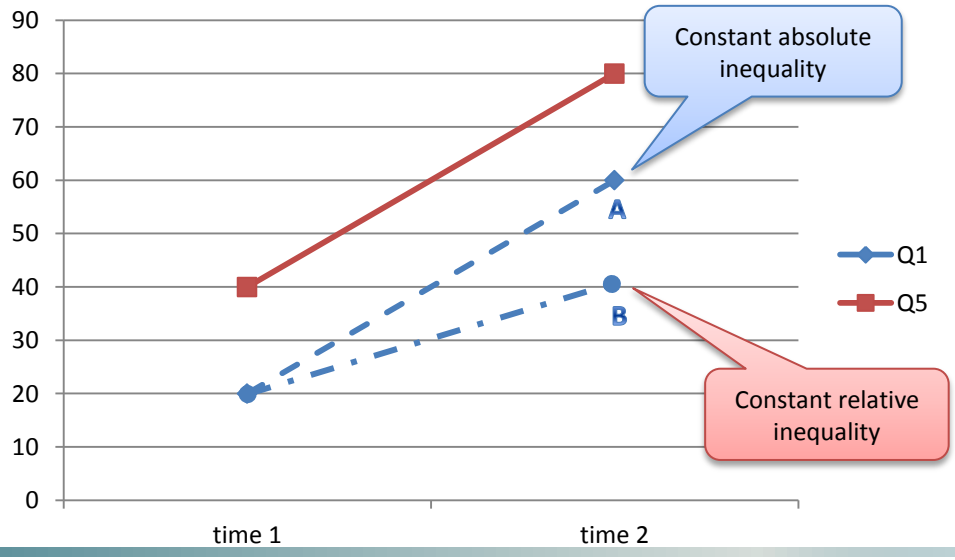
Correlations between 0.6-0.7 for undernutrition

Flavors of inequalities

- Absolute and relative
  - When comparing two groups one can measure
    - Distance = absolute, by difference
    - Ratio = relative, by division
- Absolute inequality
  - How far one group from the other
  - Tends to decrease when the one group achieved the limit
- Relative inequality
  - How many times one group better than another
  - Behaves strangely when one group close to the limit
    - Especially approaching zero (mortality, for instance)

Inequality – absolute or relative

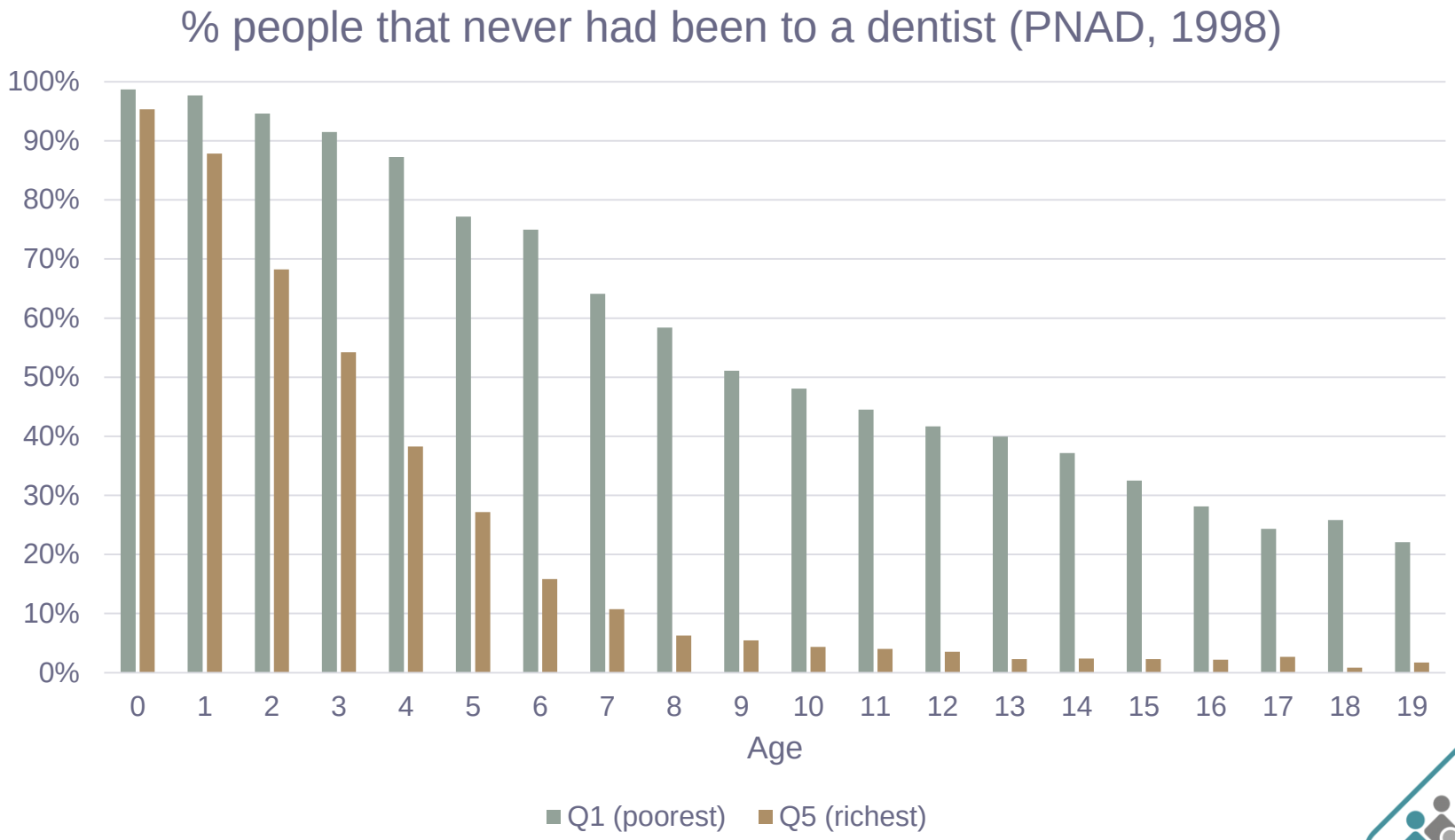
- Absolute inequality
  - Remains constant when all groups increase or decrease by the same amount (+ or – Y)
- Relative inequality
  - Remains constant when all groups increase or decrease by the same factor (× Y)



Measures of inequality

- Dozens of measures available
  - Indicates that no one is a clear winner!
- Simplest measures – ratio and difference
  - Do not take into account intermediate groups, only the extremes of distribution, thus insensitive to changes in part of the population
  - Not always the extremes will present lowest/highest coverage
- More complex measures
  - Deal with the whole population
  - Based on several ideas
    - Concentration, variance, statistical models

Let's start simple



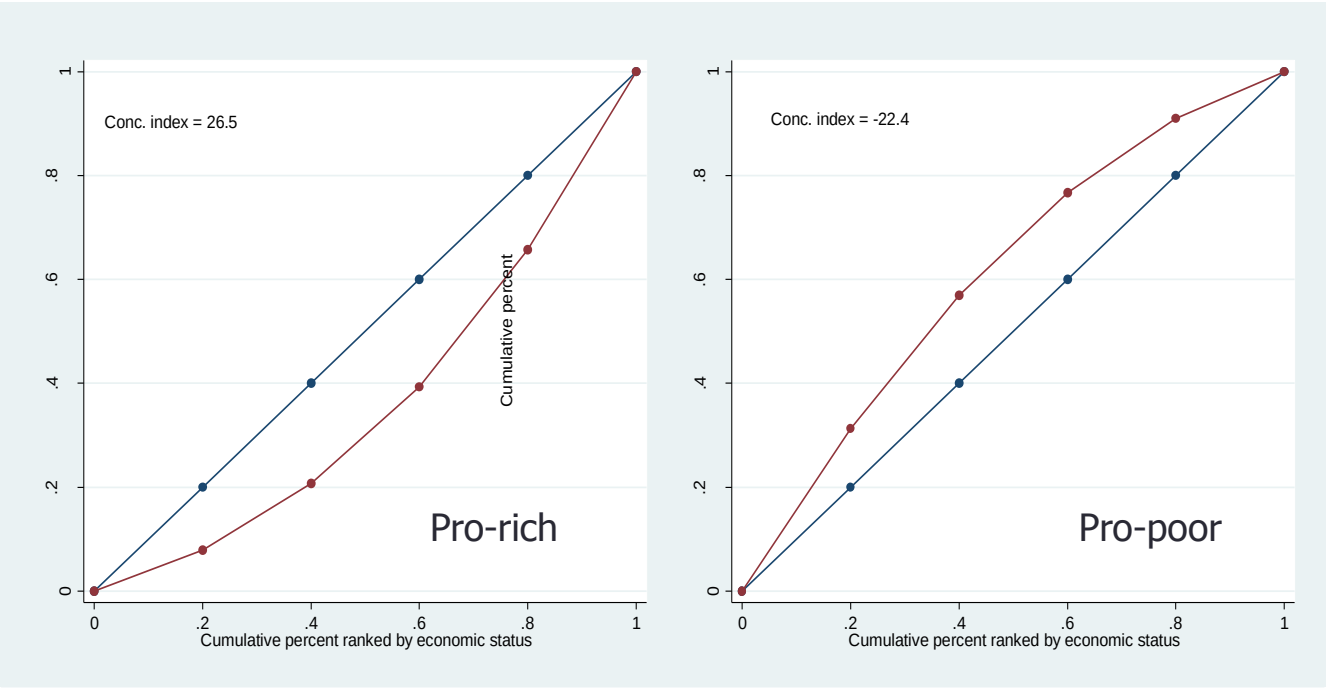
Inequalities measured differently

Different interpretations?

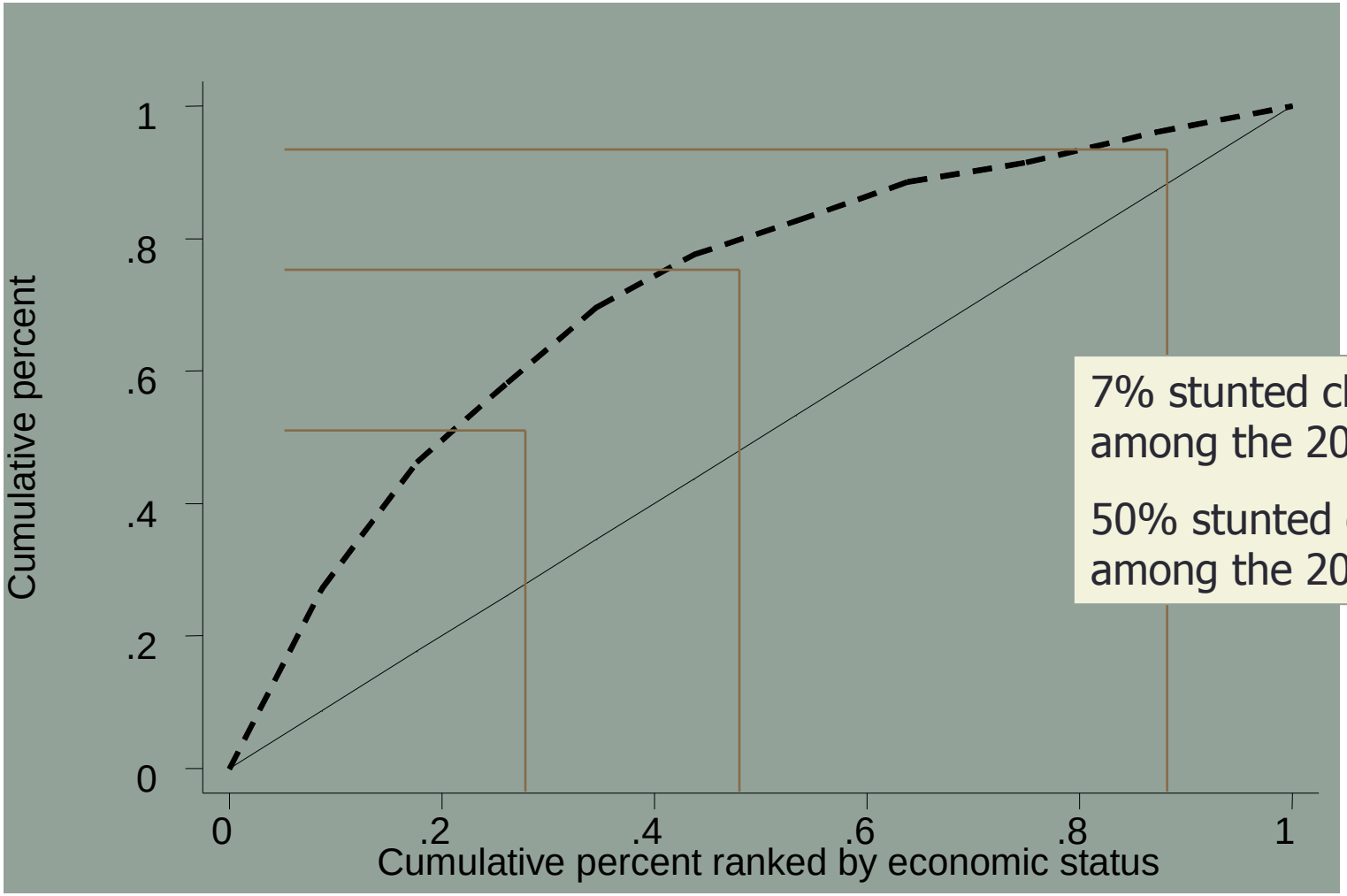
- Are the measures giving conflicting messages?
- Are inequalities increasing or decreasing?
- For the moment, let's leave this as such
- And explore other measures
  - That take into account the full distribution

Concentration index (relative)

- CIX: twice the area of the concentration curve that shows cumulative distribution of outcome for increasing wealth.
  - Positive: pro-rich
  - Negative: pro-poor



A closer look - stunting

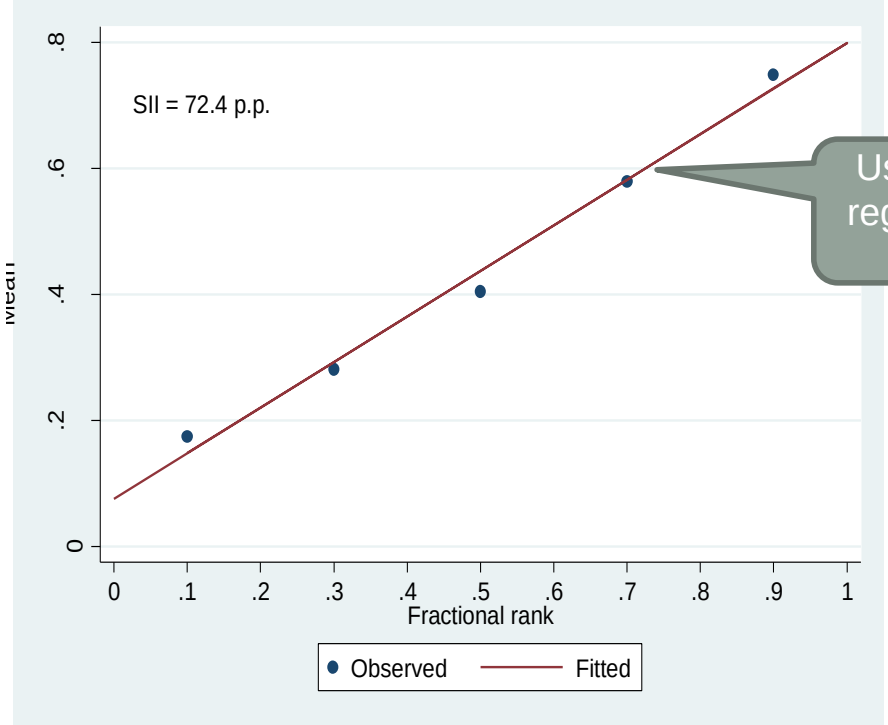


7% stunted children among the 20% richest

50% stunted children among the 20% poorest

Slope index of inequality (absolute)

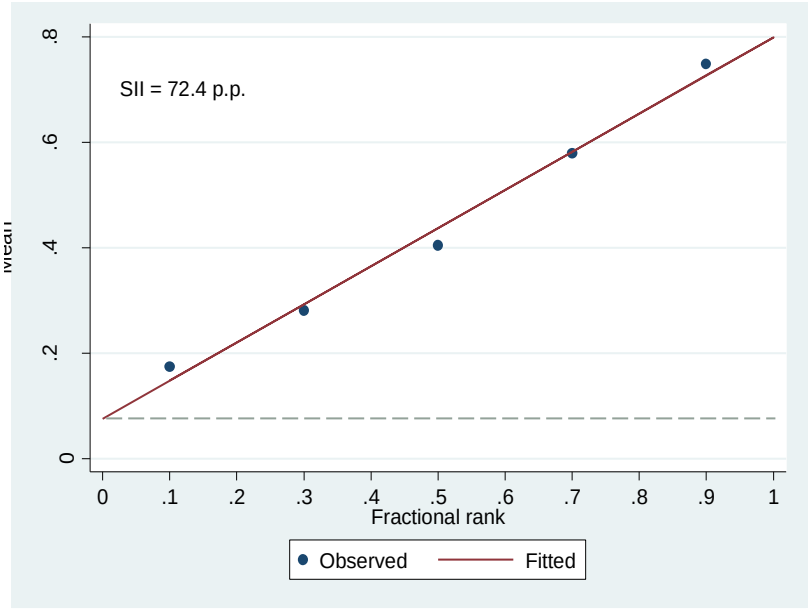
- SII: the slope of the regression of outcome on midpoints of wealth groups.



Usually estimated by linear regression, best if done with logistic regression

SII – a closer look

- The slope index of inequality (SII)
  - For absolute inequality



SII: the slope of the regression of outcome on midpoints of wealth groups. Interpreted as the difference between the fitted coverage for the top and bottom of the wealth scale.

A few caveats

CIX

- scale dependent, bounded
  - Careful when comparing different characteristics
  - The higher the coverage, more limited the variation of the CIX

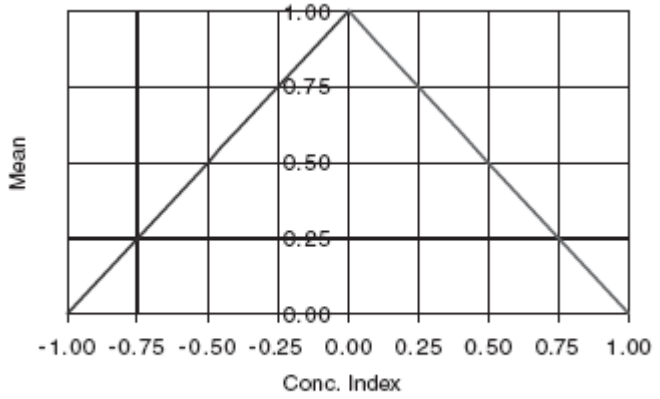
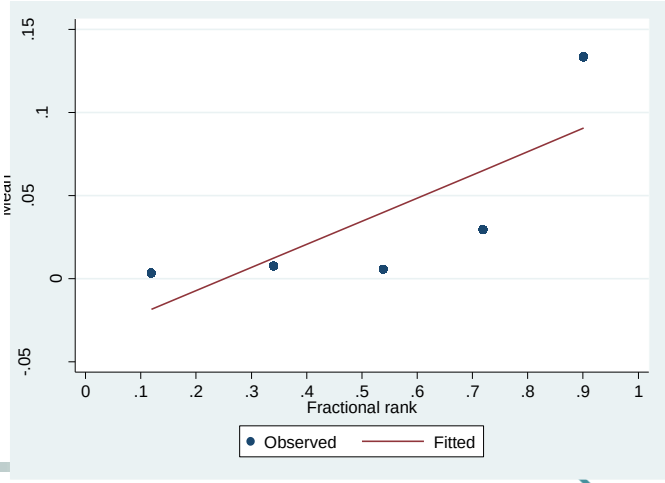


Figure 1. The bounds on the value of the concentration index

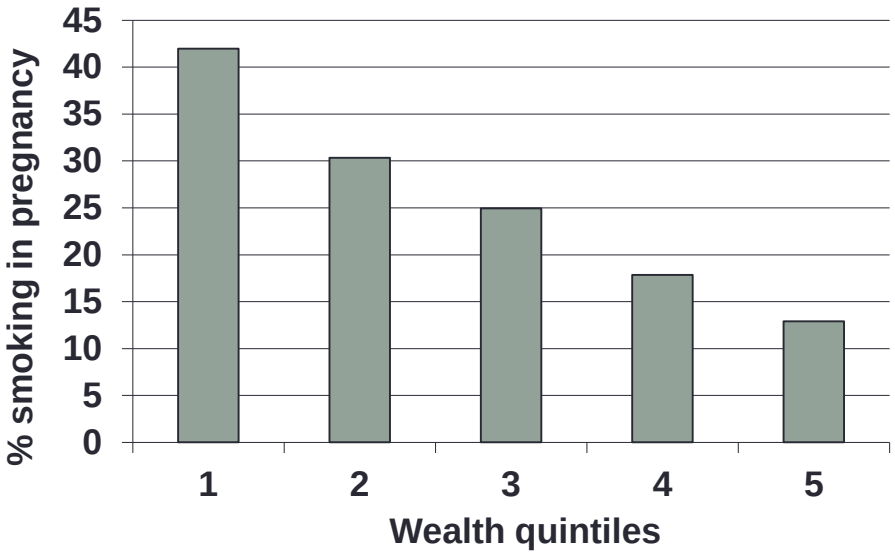
Wagstaff, 2005.

SII

- For proportions, may result in predictions out of [0,1]
  - Need to use logistic regression
- Relationship may not be linear
  - Logistic regression may help again



Another issue: choice of grouping can make a difference



Ratio: 3,3
Difference: 29,1

Ratio: 4,2
Difference: 32,9

But for CIX, whole sample is used
CIX = -21.7

Summary points

- There has been considerable progress regarding how to measure SEP in surveys, how to measure inequalities and how to interpret their magnitude and time trends
- Conclusions
  - That there is no single measure of inequality, and recommend that at least one absolute and one relative measure should always be presented
  - Absolute and relative measures of inequality are complementary in the interpretation of change in inequality
  - Measures that are limited to comparison of extreme groups should be complemented by measures that take into account the full distribution