Measuring inequality: why health attainments and shortfalls are not "two sides of the same coin"

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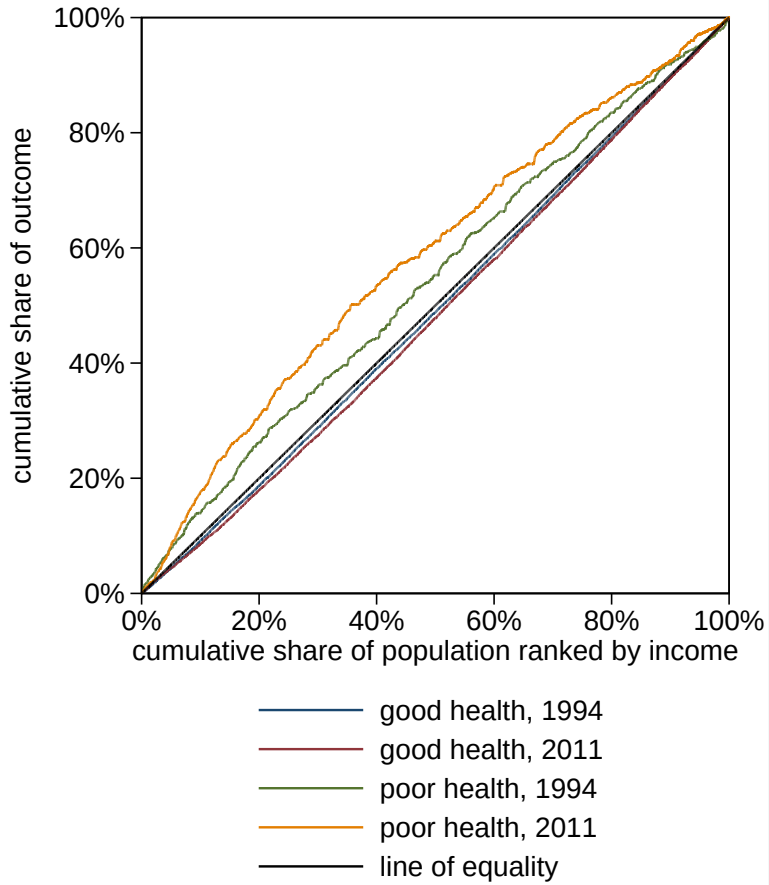
Session outline

- Measuring inequality: why health attainments and shortfalls are not "two sides of the same coin"
  - measuring inequality: concentration curve and concentration index
  - Why is choosing the inequality measure so difficult?
- Understanding the vertical equity judgements underpinning health inequality measures
  - description of different correction approaches
  - behavior of different inequality measures given different distributions
  - description of implied equity judgments
- Lies, damned lies, and health inequality measurements
  - considerations/policy implications for choosing inequality measures
  - suggestions/conclusions

The concentration curve: a real world example

- concentration curve shows cumulative distribution of (health) variable *y*
- left figure, concentration curves for 2011:
  - right figure: 60% individuals with unsatisfactory health are concentrated among the worse-off 50% (orange curve)
  - BUT 48% individuals with good health are concentrated among the worse-off 50% (red curve)



source: the author, based on data from the Socio-Economic Panel (SOEP v28)

The concentration index: what it actually measures

- concentration index C derived from Gini index
- measure of income-related inequality
- C measures twice the area between concentration curve and line of equality
- C is bounded in the $(-1; 1)$ interval
- C is calculated as

$$C = \frac{2}{n\mu} \sum_{i=1}^{n} y_i r_r - 1$$

- C is positive if y is concentrated among the rich
- C is negative if y is concentrated among the poor
- C is zero if there is no income-related inequality

Binary variables and the limits of the concentration index

- concentration index and potential outcomes depend on underlying variable
- common task to measure distributions of dichotomous outcomes:
  - diseases (ill/not ill)
  - vaccines (received vaccine/did not receive vaccine)
  - utilization of (preventive) care (used/did not use)
- measuring inequalities in dichotomous outcomes involves some challenges
- outcome with prevalence $\mu = \frac{\sum y(=\text{number of cases})}{n(=\text{total population})}$ can only be concentrated among the best-off (worst-off) $n * \mu$ individuals
- concentration among less people is impossible
- only $n * \mu$ people can be affected
- C for binary variables therefore limited:

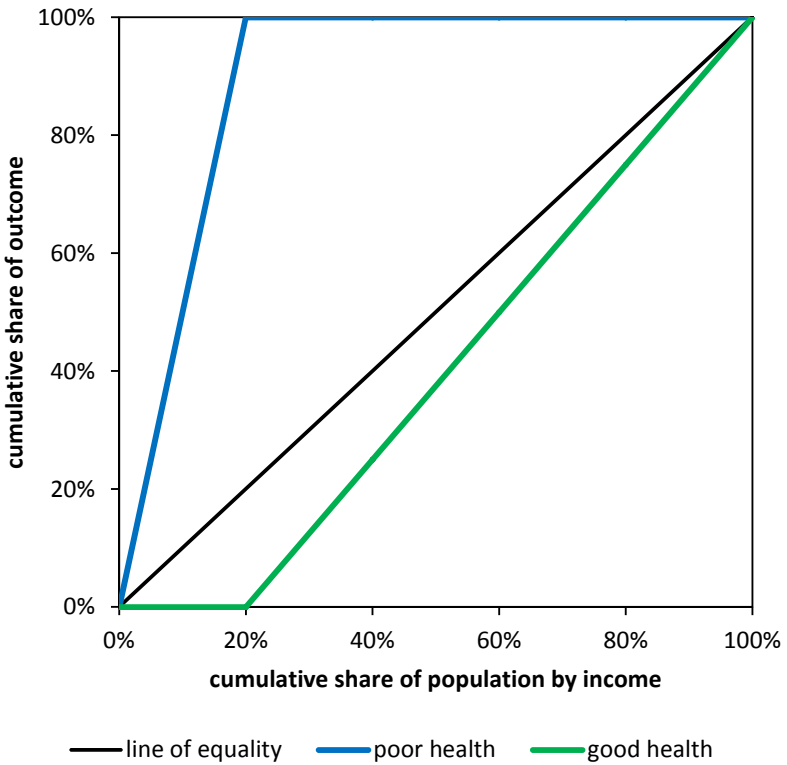
$$|C| \leq 1 - \mu$$

Choice of good or poor health matters

- the choice of good or poor health matters
- if only few people are sick:
  - good health cannot be concentrated among a small group
  - bad health can
- concentration index of good or poor health may indicate rather different magnitude of inequality
- the limits of the concentration index

$$|C| \leq 1 - \mu$$

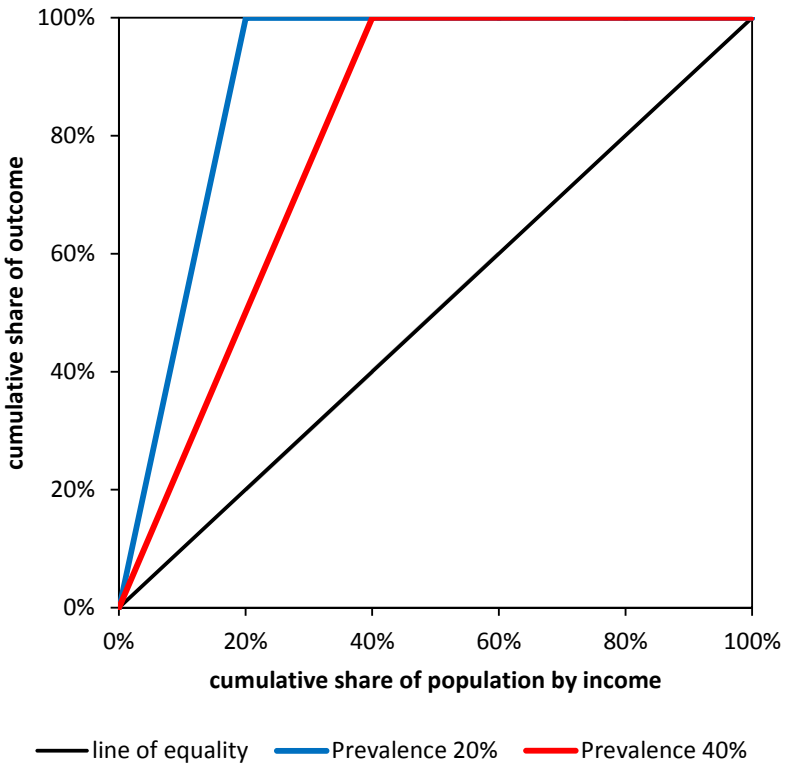
imply that good and poor health are not the two sides of the same coin



source: the author

Prevalence matters

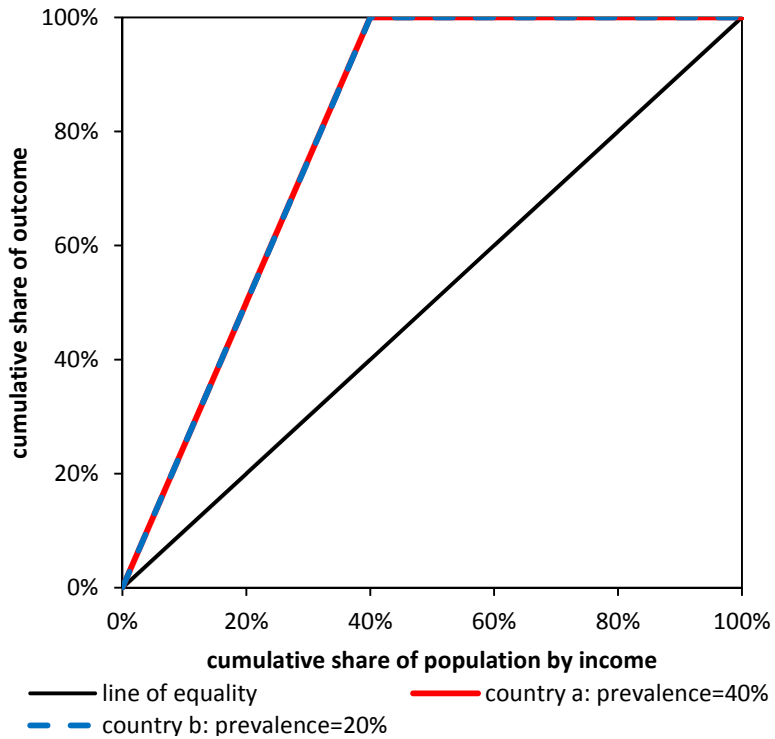
- example: two countries, similar health distributions, but very different concentration indices
  - maximum possible inequality is a concentration among worst/best-off 20%
  - for higher prevalence, e.g. $\mu = 40\%$, maximum possible inequality is a concentration among the worst/best-off 40%
  - comparing inequality measures for different samples may be misleading where prevalence differs
- note: "similar health distributions" is already a normative value judgment



source: the author

Prevalence and distribution: why C may be ambiguous

- example: two countries, different situations but exactly the same concentration curves and indices
  - country a has prevalence $\mu_a = 20\%$
  - country b has prevalence $\mu_b = 40\%$
  - prevalence among the worst-off 40% in country a is 50%
  - prevalence among the worst-off 40% in country b is 100%
  - concentration index $C_a = C_b = .6$



source: the author

Potential solution: rescale the concentration index

- various approaches were proposed to tackle this potential ambiguity
- all aim to make inequality measures comparable across different (sub-) samples (countries, age-groups, regions, ...)
- potential solutions:
  - concentration index C: just don't bother
  - Wagstaff-index $W = \frac{1}{1-\mu} C$: rescale such that the most unequal case is 1 or -1
  - Erreygers-index $E = 4\mu C$: use a rescaled absolute measure, most unequal case is 1 or -1 but its reaction to redistributions differs from W
- choice of inequality measure is a value judgment
- there is no "value neutral descriptive statistic"

THANK YOU