Assessing the distribution of impacts in global benefit-cost analysis

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Outline

- BCA
  - Separates analysis of efficiency & equity
  - Rationale
- Descriptive analysis of distributional effects
  - Over what domain (population characteristics)?
  - Of what outcome?
- Social welfare functions
  - Integrate efficiency & equity
  - Can approximate evaluation of policy with weighted BCA

Benefit-cost analysis

- Social net benefit = sum over population of net benefits to individuals
- Individual net benefit = monetary value to individual of all the consequences of the policy
  - If population sum > 0, individuals with positive net benefits could (in principle) compensate individuals with negative net benefits, so that everyone would have positive net benefits
    - Kaldor-Hicks compensation test
- Conventional BCA may not permit distributional analysis
  - Benefits and costs often estimated
    - Independently, as population totals
    - Cannot correlate individual benefits with costs
  - Transfer payments often not included
    - Not necessary to calculate population net benefits
    - Can be important for distribution

Rationale for separating efficiency & equity

- Efficiency: increase the size of the “social welfare pie”
  - In principle, everyone can have a bigger piece
- If distribution of resources or well-being is non-optimal, it can (presumably) be improved at lower cost by directed transfers than by reducing efficiency of other policies
  - Tax & transfer policies

Distributional analysis: over what domain?

- Need to identify population characteristics of concern
  - Income, wealth, poverty
  - Race, ethnicity, primary language
  - Gender
  - Age
  - Social class, occupation, education
  - Others
- Could have multidimensional domain
  - Race x income x region

Distributional analysis: of what?

- Distribution of net benefits is more relevant than separate distributions of benefits & of costs
  - Unequal or regressive distribution of costs may be fine if distribution of benefits is parallel
- Often easier to estimate distribution of benefits than of costs
  - Benefits: beneficiaries may be targeted or correlated with population characteristics
    - Specified health condition, location
    - If monetary value of benefit differs by subgroup, need to use appropriate valuation
  - Costs: if costs take the form of increased costs to firms, these are ultimately passed on to: firm owners, workers (lower wages or lower employment), customers (higher prices)
    - Incidence of costs may be difficult to trace

Describing distributional effects: curves & inequality metrics

- Multiple graphs and indices can be used to summarize distribution of net benefits (or other outcome)
- Table
- Lorenz curve & Gini index
  - Distribution of single attribute, often income
- Concentration curve & concentration index
  - Distribution of attribute against living standards (or other population characteristic)

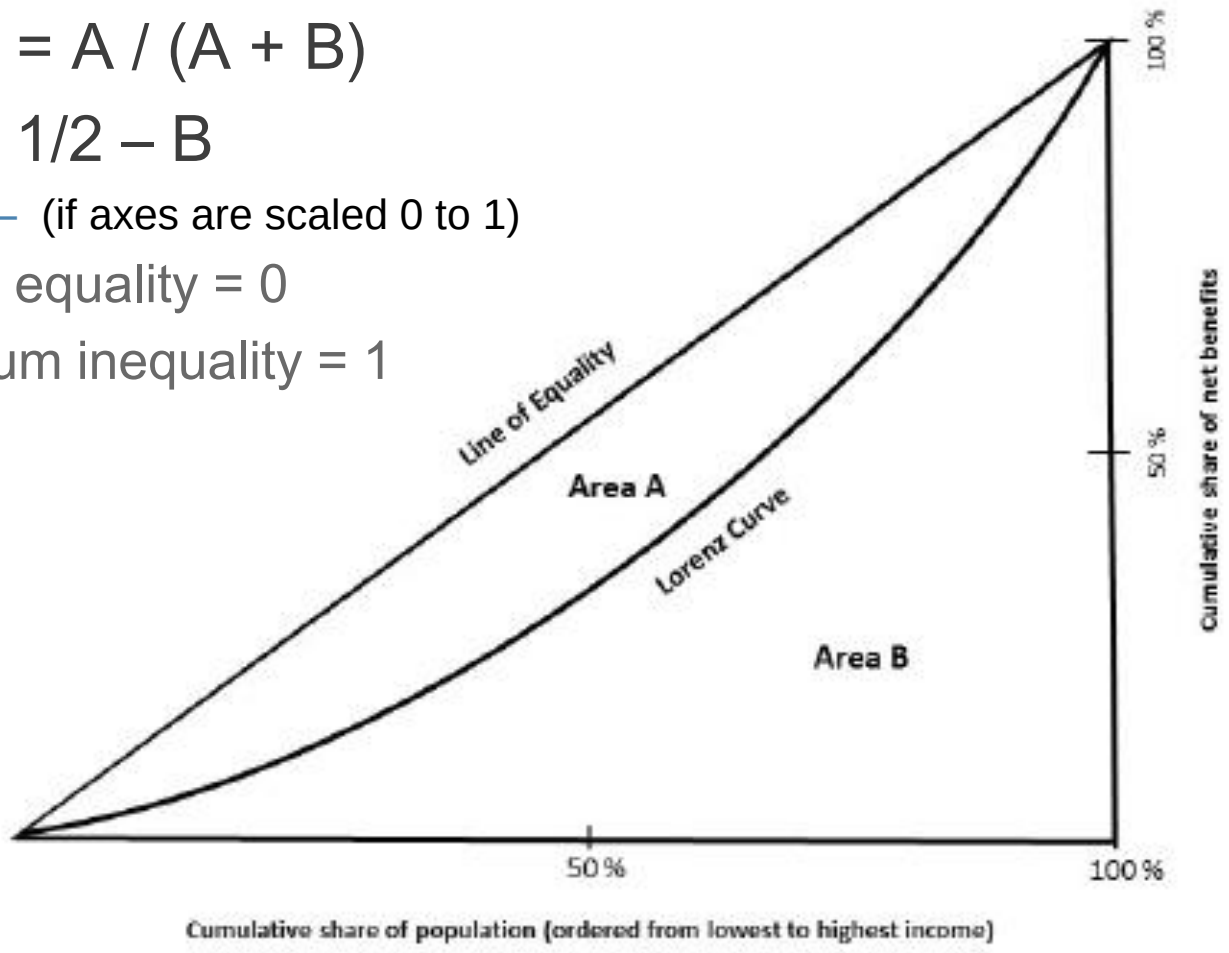
Table reporting outcomes by subpopulation

Table 3.1. Distribution of Net Benefits (stylized example; numbers provided soley for illustration)

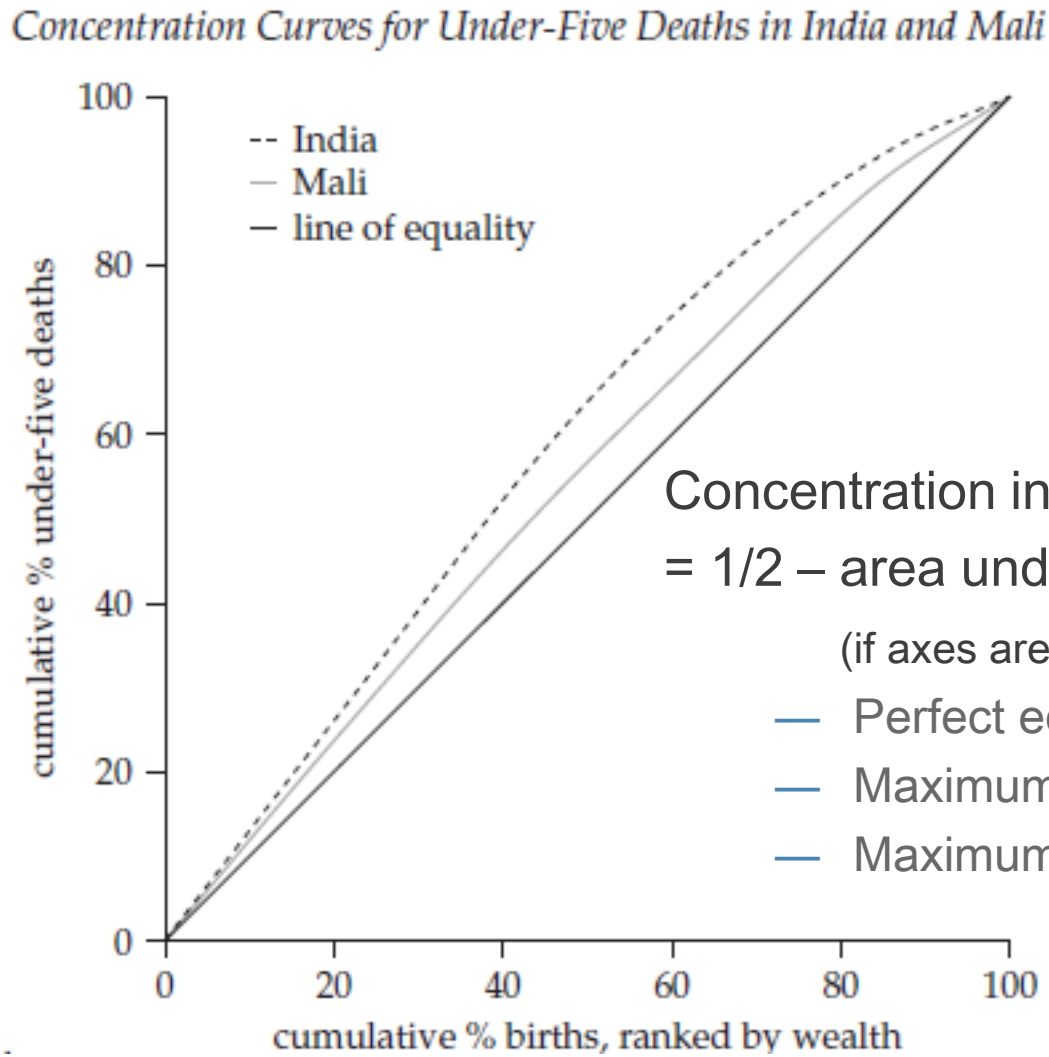
Income Range	Deaths Averted	Benefits (value of deaths averted)	Costs	Net benefits (benefits minus costs)
$0 – $500	10	$600,000	$100,000	$500,000
$500-$1,000	5	$310,000	$50,000	$260,0,000
etc.	etc.	etc.	etc.	etc.
Total				

Lorenz curve & Gini index

- Gini index = A / (A + B)
  = 1/2 – B
  - (if axes are scaled 0 to 1)
  - Perfect equality = 0
  - Maximum inequality = 1



Concentration curve



Concentration index

= 1/2 – area under curve

(if axes are scaled 0 to 1)

- Perfect equality = 0
- Maximum concentration on rich = 1
- Maximum concentration on poor = -1

Social welfare functions

- Requires an interpersonally comparable measure of wellbeing (and changes in wellbeing): w_i
- Social welfare is a function of the wellbeing of each person in the population
- Utilitarian: $W^U = \sum_{i=1}^{n} w_i$
  - If wellbeing is a concave function of income (diminishing marginal utility of income) then utilitarian SWF gives priority to poor over rich
- Prioritarian: $W^P = \sum_{i=1}^{n} g(w_i)$
  - g(•) is an increasing, concave function (steeper for small w than for large w)
  - Gives priority to people at low wellbeing
- Evaluation by SWF can be approximated by weighted BCA
  - Weight net benefits more for poor over rich, low wellbeing over high

Prioritarian transformation function