Economic Approaches to Poverty and Inequality

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Outline

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Early History: Measuring Poverty in the UK

- Non-bureaucratic support (or not) for the destitute (family, community, local religious institutions)
- Europe: bureaucratisation in 16th and 17th centuries (UK: dissolution of the monasteries under Henry VIII $\rightarrow$ social problems $\rightarrow$ Old Poor Law mandates parishes of Church of England to provide for the poor).
- Information gathered and utilised locally but determined liability for taxation
- Example: 1691 William and Mary's four shilling Quarterly Poll instituted by act of Parliament 'for raiseing money by a Poll payable quarterly for One year for the carrying on a vigorous War against France'.

Early History: Measuring Poverty in the UK

- 1696: Gregory King (Herald and Political Arithmetician) compiled *Natural and Political Observations and Conclusions upon the State and Condition of England*.
  - 55% of the population of England and Wales **'insolvent'** (excused from William and Mary's Quarterly Poll)
  - 17% in receipt of Poor Relief

- 1806 : Patrick Colquhoun (Scottish businessman and lawyer) compiled *Treatise on Indigence*
  - 1,320,716 of total population of England 8,872,980 (15%) **'indigent'** (not directly comparable)
  - 1,040,716 (11%) in receipt of Poor Relief

- Examples of **headcount measures**: what number or proportion of the population are poor?

Booth's *Maps Descriptive of London Poverty*

- Elementary Education Acts of 1870 and 1880 made education compulsory for children aged 5 – 10.
- School Boards created; School Board Visitors "perform [. . .] a house-to-house visitation; [. . .] They are in daily contact with the people, and have a very considerable knowledge of the parents of the school children, especially of the poorest amongst them, and of the conditions under which they live."
- Charles Booth (businessman and social reformer) 1887 - 1891 compiled information from School Board Visitors into *'Maps Descriptive of London Poverty'*
- Booth's classification: 30.7% of Londoners living in poverty (varying between 13.5% in Hampstead to 48.9% in Holborn and St George's-in-the-East).
- Methodological advance: explicit identification of a **poverty line**, calculation of **proportion** living in poverty and **comparison** across parishes.

Booth's *Maps Descriptive of London Poverty*

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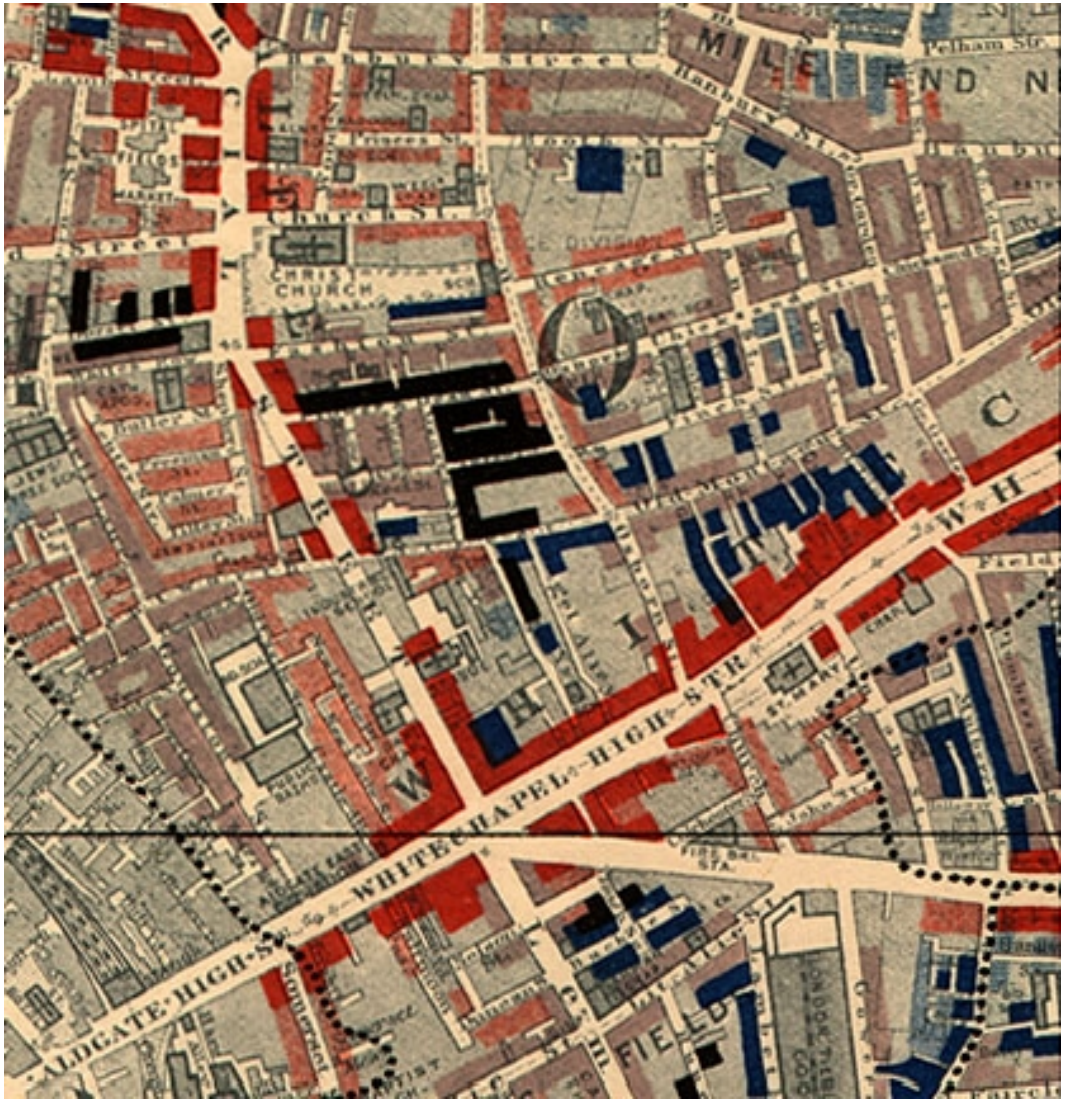

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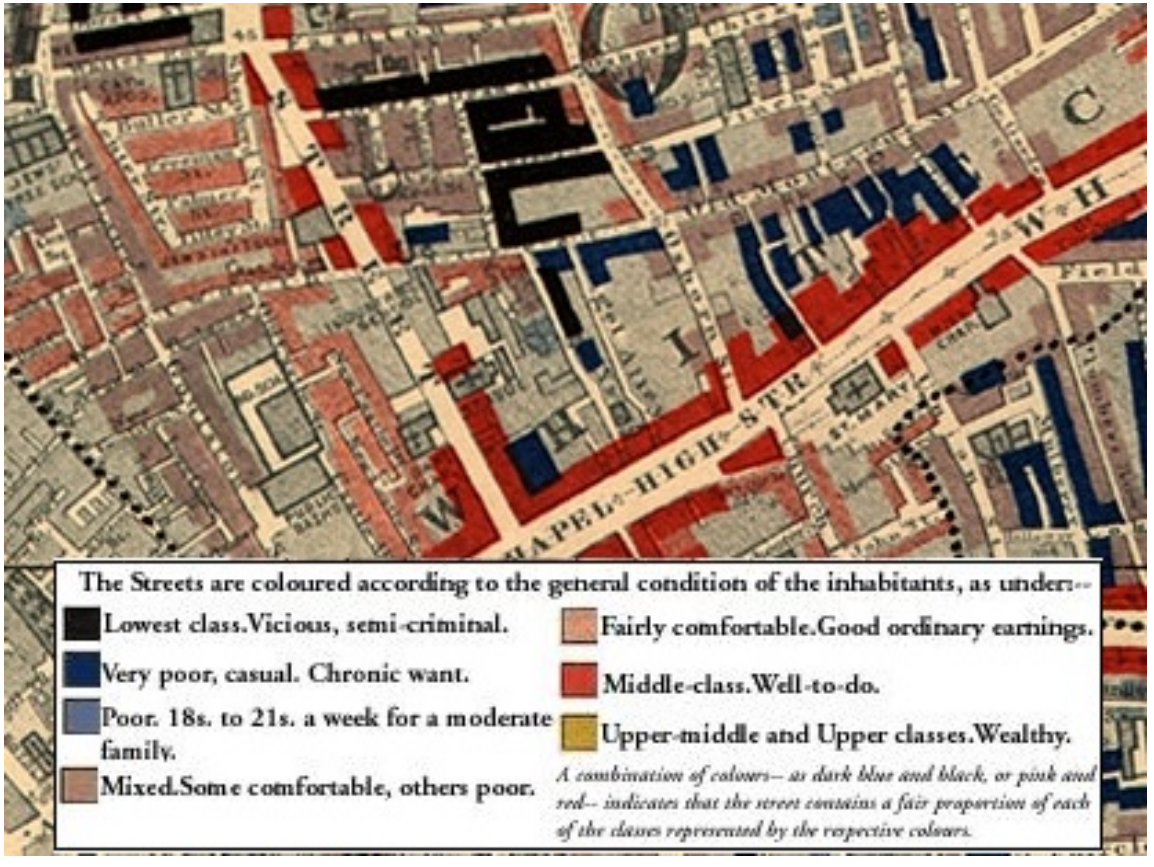
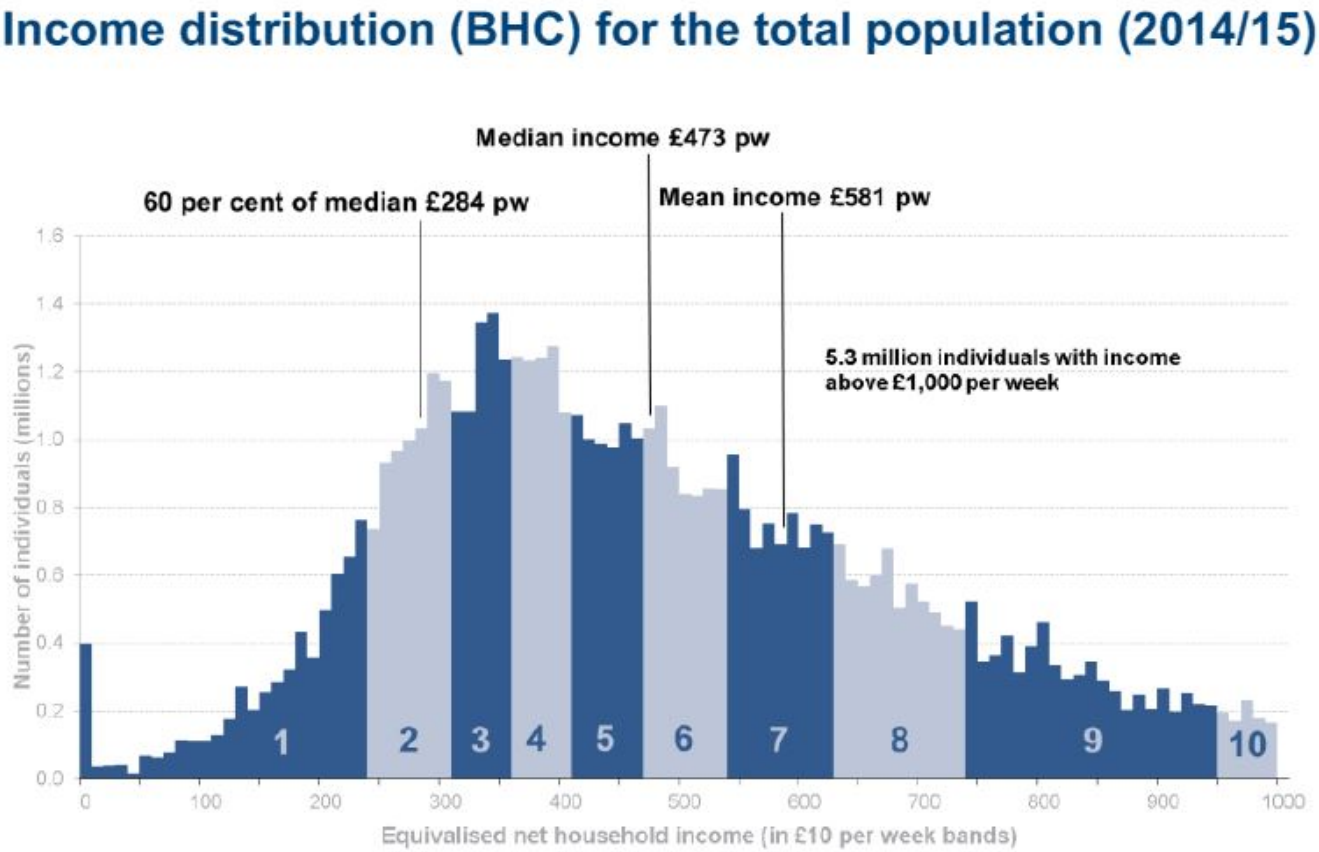


Rowntree's *Poverty : a study of town life*

- 1902 study of York:
  - Representative of smaller urban populations
  - Complement to Booth's conclusions 'in respect of the metropolis'
- Primary result (subjective): 27.8 per cent of the population of York living in poverty ('obvious want and squalor')
- Methodological innovations:
  - **Household survey** collected 'information about the housing, occupation, earnings [and composition] of every wage-earning family in York'
  - Combined information on physiological requirements, rents and composition of the diet of the poor to determine a **poverty line**
- 9.9 per cent of the population of York living below poverty line

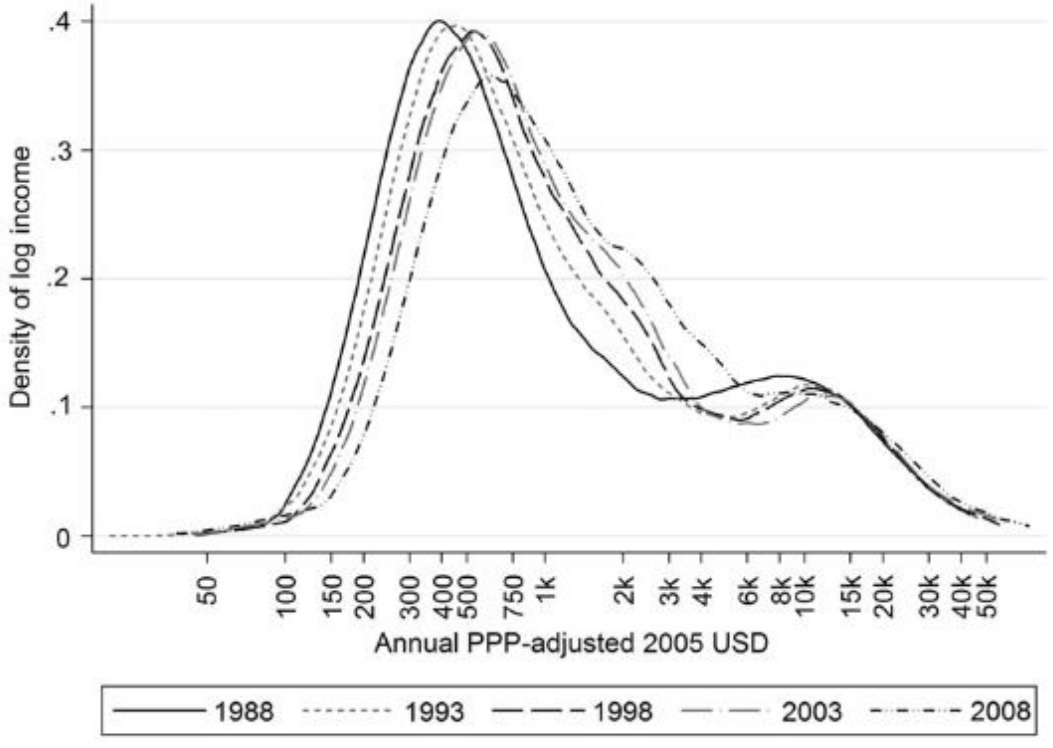
Thinking about the whole distribution (UK)



Source: UK Department for Work and Pensions (2016)

Thinking about the whole distribution (World)

FIGURE 2. The Global Distribution of Income over Time

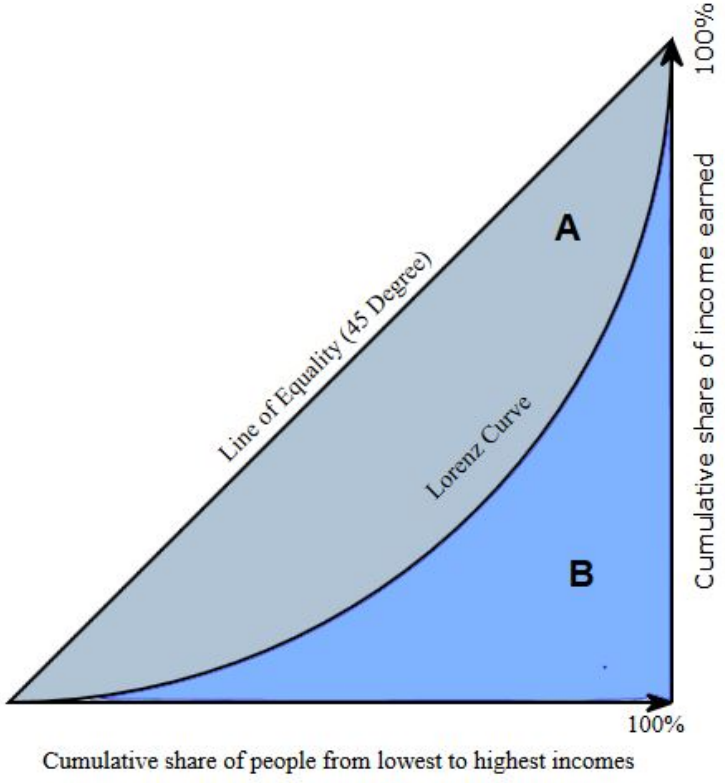


Notes: Population-weighted; on logarithmic x-axis.
Source: Authors' analysis based on data described in the text.

Source: Milanovic and Lakner (2015), *World Bank Economic Review*

Early 20-C Inequality Measurement

- 1905: Max Otto Lorenz (American economist) *Methods of measuring the concentration of wealth* introduced the **Lorenz Curve**



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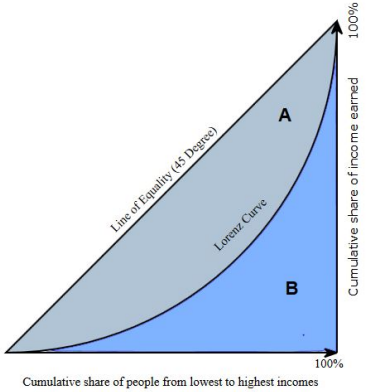


- 1912: Corrado Gini (Italian economist) introduced the **Gini Measure** $G = \frac{A}{A+B}$.
- 1920: Hugh Dalton (British economist and politician) formalised principles for inequality measurement:
  - Principle of transfers
  - Principle of proportionate additions to income
  - Principle of proportionate additions to persons

What to Measure, and How?

- Poverty and inequality are related to wellbeing.
- A general principle: As economists we want to respect individuals' preferences when measuring wellbeing.
- And we are very nervous about asserting that we can observe anything more than preferences (for example, 'utility').
- But **Arrow's Impossibility Theorem** tells us that it is impossible to aggregate information about many individuals' preferences if we have only *ordinal* information.
- We need:
  - Information that is **comparable** across different individuals
  - We need to be able to state tradeoffs between individuals with different characteristics
- Not impossible! (Amartya Sen's 1998 Nobel lecture). But requires explicit ethical choices.

Data for Welfare Measures

- Recall early 20-C studies were based on **census** data
- Extremely expensive to collect!
- Development of statistical methods in 1920s: we can get just as good results with a **sample**, provided it is large enough and random or representative.
- Representative household surveys becoming widespread
  - Developed countries: mid 20-C
  - Developing countries: late 20-C
- (Relatively) straightforward to collect data on incomes in developed countries.
- **Angus Deaton** received 2015 Nobel Prize in Economic Sciences *"for his analysis of consumption, poverty, and welfare"*.
  - *"...Deaton's focus on household surveys has helped transform development economics from a theoretical field based on aggregate data to an empirical field based on detailed individual data."*

Angus Deaton, 2015 Nobel Laureate

Illustration: © Johan Jarnestad/The Royal Swedish Academy of Sciences

Data for Welfare Measures

A comprehensive developing-country household survey (eg World Bank – LSMS) will cover:

- Household composition
- Individual characteristics (health, education, occupation)
- Livelihoods strategies (agricultural production, informal sector activities, formal sector activities)
- Consumption expenditure
  - Food: purchased, own-production and gifts and transfers
  - Other durable and non-durable goods and services
- Household assets
- Housing characteristics

Note: use of consumption expenditure as welfare measure.

- Measured with greater accuracy than income
- Reflects consumption-smoothing

Late 20-C Consensus on Measurement Theory

Ideal approach to develop measures:

- Identify appropriate **data**
- Identify appropriate measurement **principles**
  - (May be called properties or axioms)
- **Characterise** the class (family) of measures that satisfy those principles
  - (Difficult but fun applied mathematical research)
- Apply to data and interpret!

Framework

- Assume we have information (income, consumption, or more complex) about each of n individuals, we call this a **profile**:

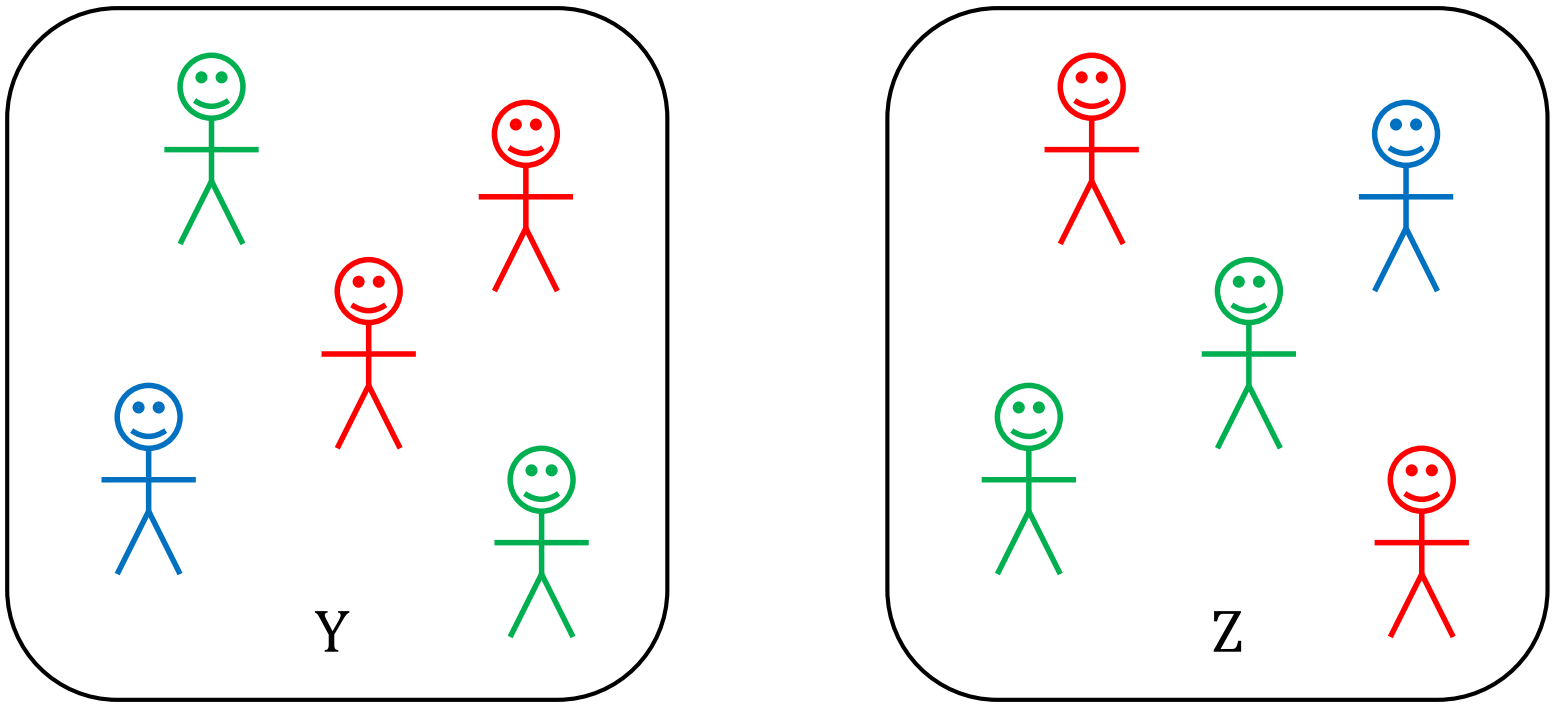
$$X = (x_1, x_2, \ldots, x_n) \subset \mathcal{X}$$

- $\mathcal{X}$ is the set of all possible profiles.
- A poverty, inequality or social welfare ordering $\precsim$ is an ordering of the set $\mathcal{X}$: $X \precsim Y$ is read 'profile X contains less poverty (inequality/ social welfare) than profile Y'.
- A poverty, inequality or social welfare measure is a *function* $f : \mathcal{X} \to \mathbb{R}$ that maps from profiles to a real number.
- f **represents** an ordering $\precsim$ if $f(X) \leq f(Y)$ exactly when $X \precsim Y$.

Principles for Poverty Measurement

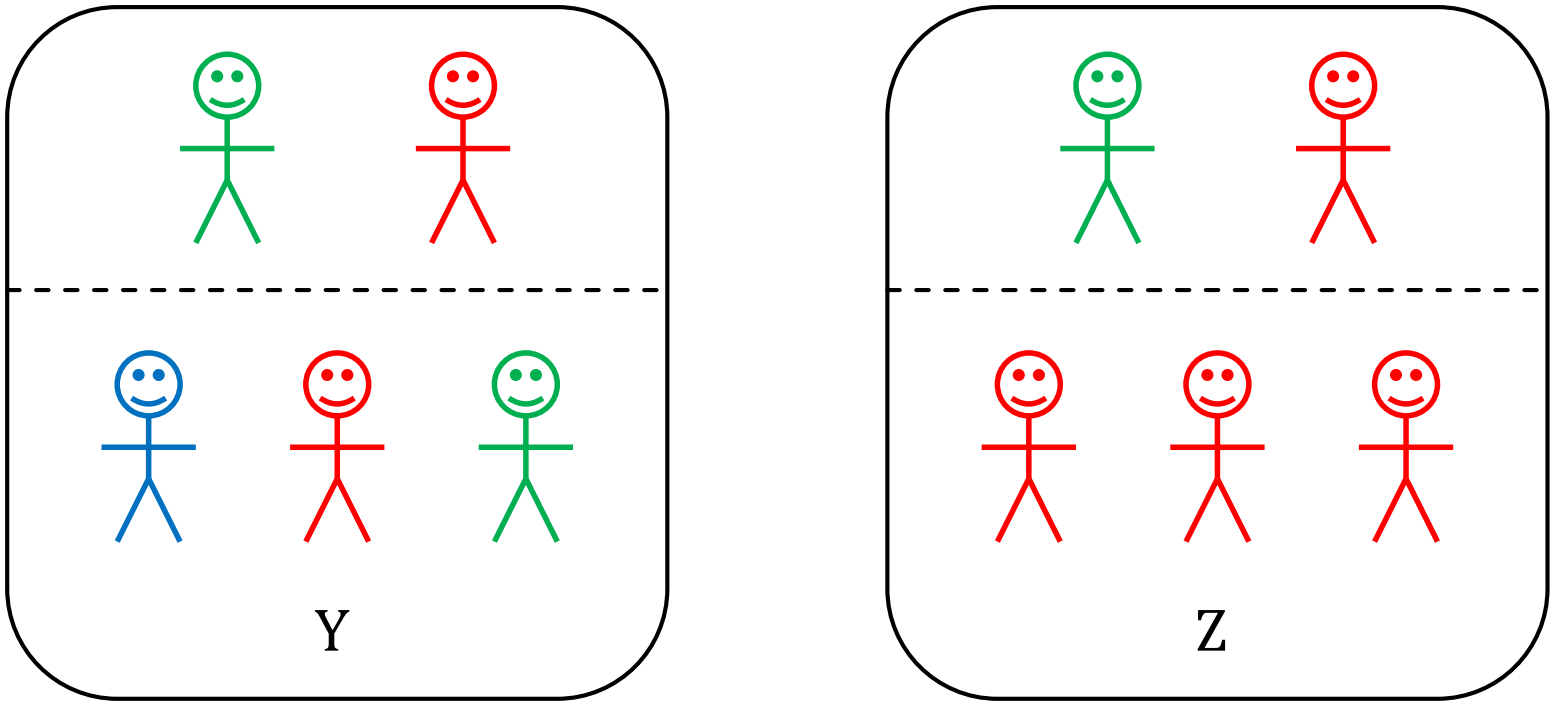
- **Anonymity/Symmetry** the measure of poverty does not change if we interchange any two individuals' characteristics.
- **Focus** the measure of poverty does not change if we change a non-poor person's characteristics.
- **Monotonicity** poverty decreases if we make a poor person better off.
- **Principle of Population** poverty remains unchanged if we duplicate the population and its characteristics.
- **Subgroup consistency** if poverty increases in a subgroup of the population and remains unchanged in the rest of the population then it increases overall.
- (Perhaps) **Principle of Transfers** poverty decreases if we make a transfer to a poor person from someone who is richer.

Anonymity



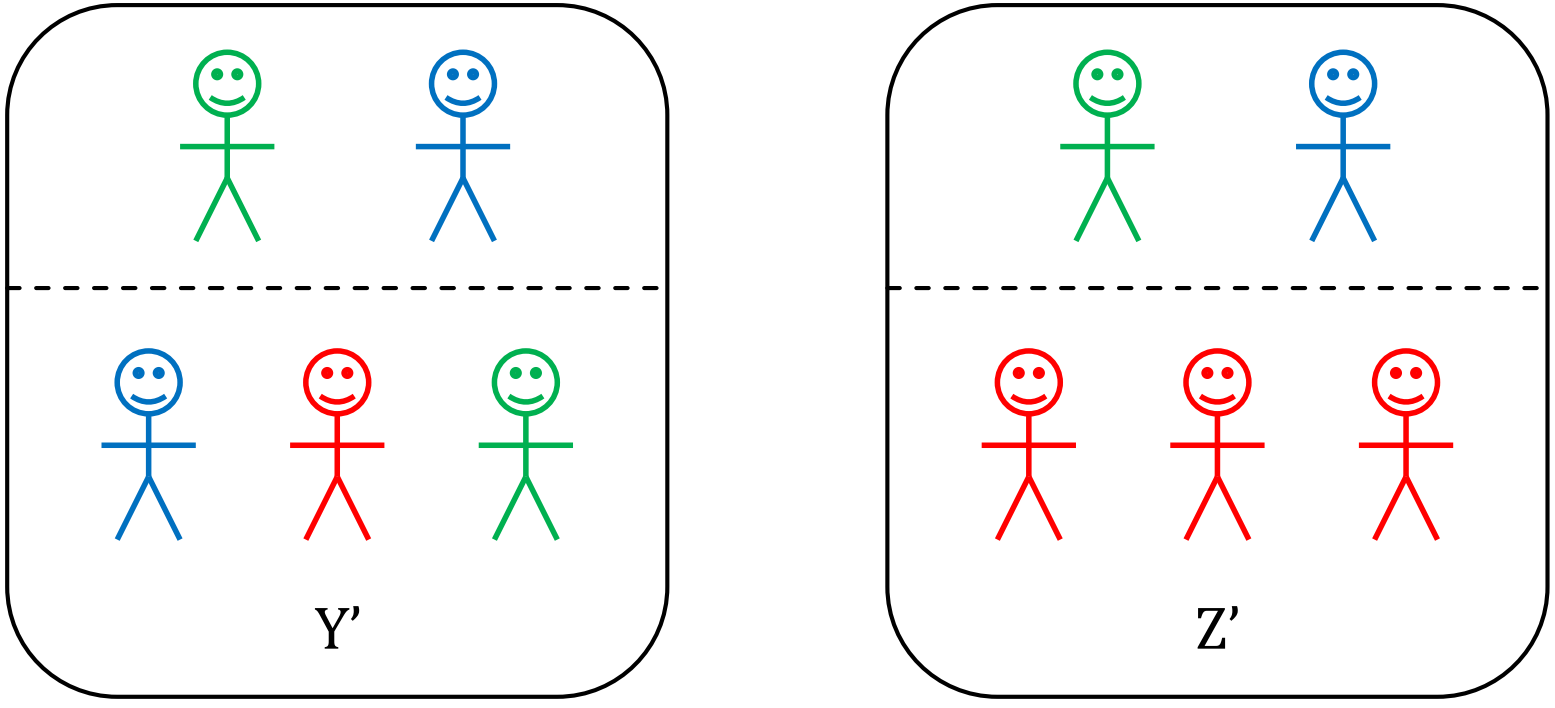
$$Y \sim Z$$

Subgroup Consistency



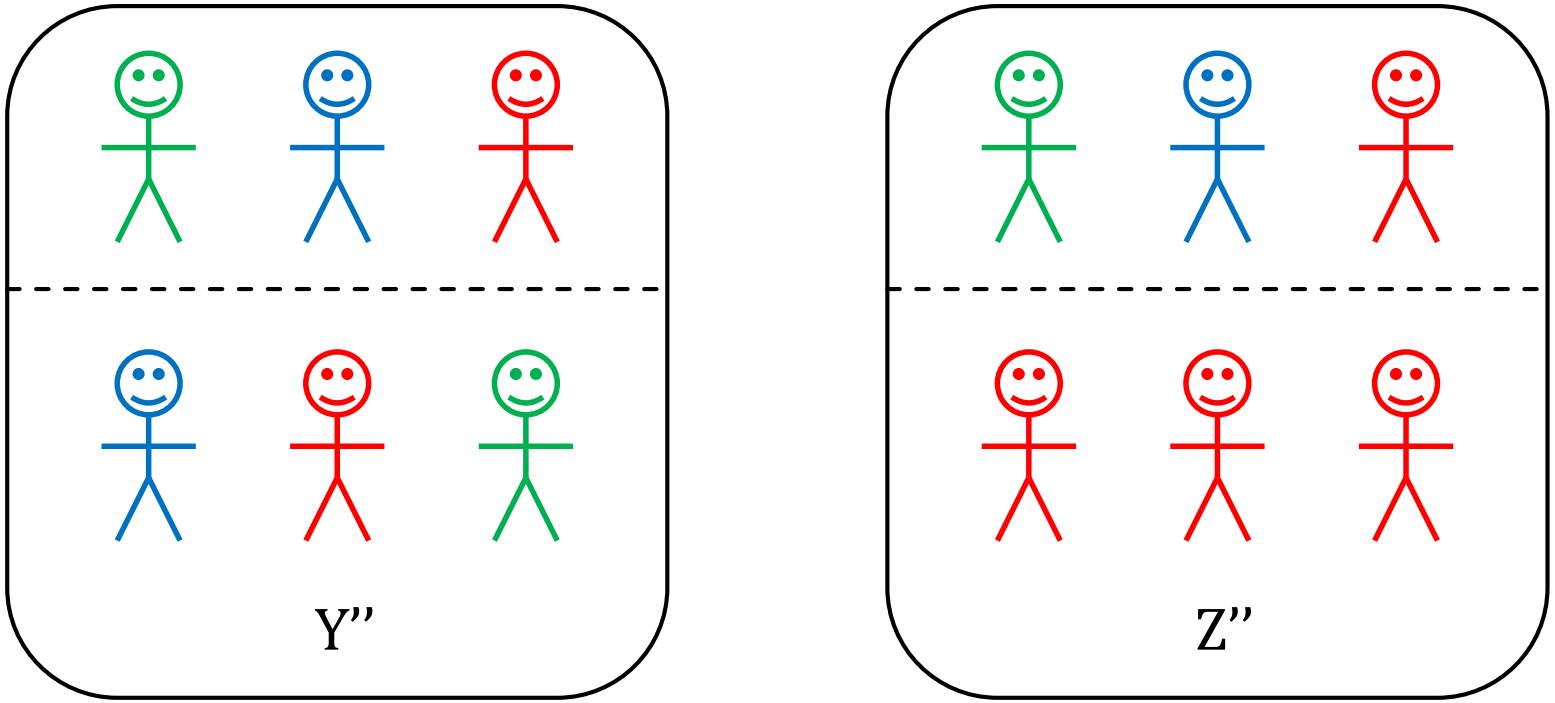
If $Y \precsim Z$

Subgroup Consistency



then $Y' \precsim Z'$

Subgroup Consistency



and $Y'' \precsim Z''$

Late 20th Century Consensus (Poverty)

- Vector of individual incomes $x = (x_1, x_2, \ldots, x_n)$, poverty line z.
- The framework: Sen (1976) distinguished *identification* and *aggregation*.
- Many measures suggested 1976–1984; some have nice properties, some do not.
- FGT (1984) introduced P_α family: nice properties and conceptually straightforward $\rightarrow$ gold standard
- Meanwhile Foster and Shorrocks (1991) characterised *entire class* of unidimensional measures with nice properties (anonymity, focus, population, subgroup consistency):

$$P(x; z) = \frac{1}{n} \sum_{i=1}^{n} \phi(x_i)$$

where $\phi(x_i)$ is non-increasing, zero above z and continuous except possibly at z.

Late 20th Century Consensus (Poverty)

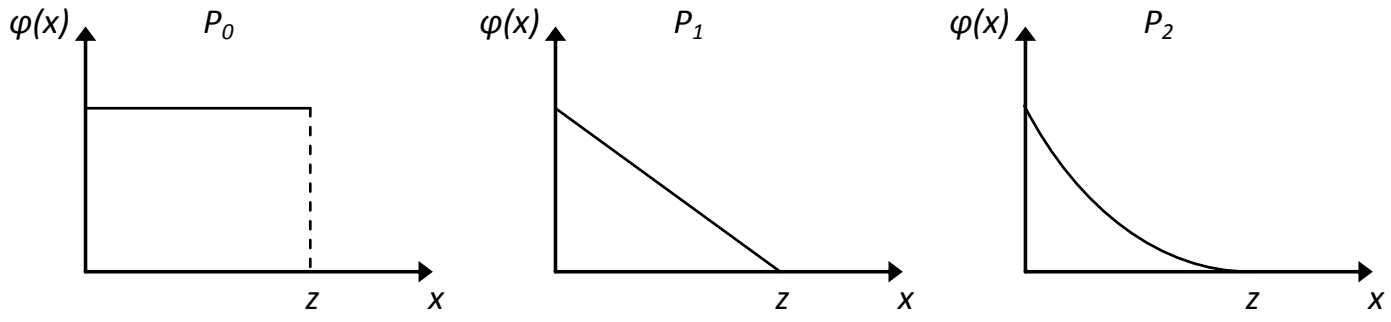
- Class of unidimensional measures with nice properties:

$$P(x;z) = \frac{1}{n}\sum_{i=1}^{n}\phi(x_i)$$

  where $\phi(x_i)$ is non-increasing, zero above z and continuous except possibly at z.
- Basic properties (anonymity, focus, population, subgroup consistency) **plus**
  - Monotonicity if $\phi(x_i)$ is decreasing below z (e.g. P_1).
  - Transfer if if $\phi(x_i)$ is convex below z (e.g. P_2).
- P_α measures belong to this class but do not exhaust it! – but well-established.
- Little further exploration of this class...

Late 20th Century Consensus (Poverty)

ϕ functions for P_α measures:



Implicit interpersonal tradeoffs:

- $\alpha = 0$: tradeoffs not well defined.
- $\alpha = 1$: perfect substitution between different poor people.
- $\alpha = 2$: imperfect substitution between different poor people.

Multiple Dimensions of Poverty

Rationale:

- If we lived in a world of complete and perfect markets (first fundamental welfare theorem) then individual command over income can be argued to be a sufficient measure of wellbeing.
- But we do not! Consumption of health, education etc. . .

Approaches:

- Dashboard (MDGs etc)
- Aggregate: over society/within dimension first (Human Poverty Index: HDR 1997 – 2009)
- Aggregate: over dimensions/within individual-first (Tsui 2002, Bourguignon and Chakravarty 2003, Alkire and Foster 2010, Multidimensional Poverty Index: HDR 2010 onward).

Multiple Dimensions of Poverty

Aggregating over dimensions/within individual-first retains the general functional form:

$$P(x; z) = \frac{1}{n} \sum_{i=1}^{n} \phi(x_i)$$

but now the x_i's are vectors of individual indicators in multiple dimensions; requires detailed, representative household survey

Example MPI: Data from DHS, ϕ is an indicator function (0,1) of {a weighted average of indicator functions representing 'poverty' according to the following indicators} being greater than 1/3:

- Health (nutrition, child mortality)
- Education (years of schooling, enrollment)
- Living standards (6 standard DHS indicators)

Principles for Social Welfare Measurement

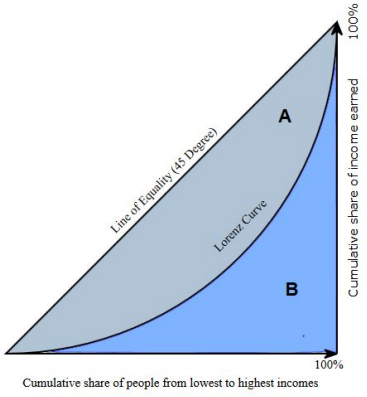
- **Anonymity/Symmetry** the measure of welfare does not change if we interchange any two individuals' characteristics.
- **Focus** – does not apply.
- **Monotonicity** welfare **increases** if we make **anyone** better off.
- **Principle of Population** poverty remains unchanged if we duplicate the population and its characteristics.
- **Subgroup consistency** if welfare increases in a subgroup of the population and remains unchanged in the rest of the population then it increases overall.
- **Principle of Transfers** welfare **increases** if we make a transfer to a poorer person from someone who is richer.

Principles for Inequality Measurement

- **Anonymity/Symmetry** the measure of inequality does not change if we interchange any two individuals' characteristics.
- **Monotonicity, focus** – do not apply
- **Principle of Population** inequality remains unchanged if we duplicate the population and its characteristics.
- (Perhaps) **Decomposability** inequality may be decomposed into within- and between-group components.
- **Principle of Transfers** inequality decreases if we make a transfer to a poorer person from someone who is richer.
- **Principle of Relative Incomes** inequality remains unchanged if everyone's income increases in proportion.

Late 20-C Inequality Measurement

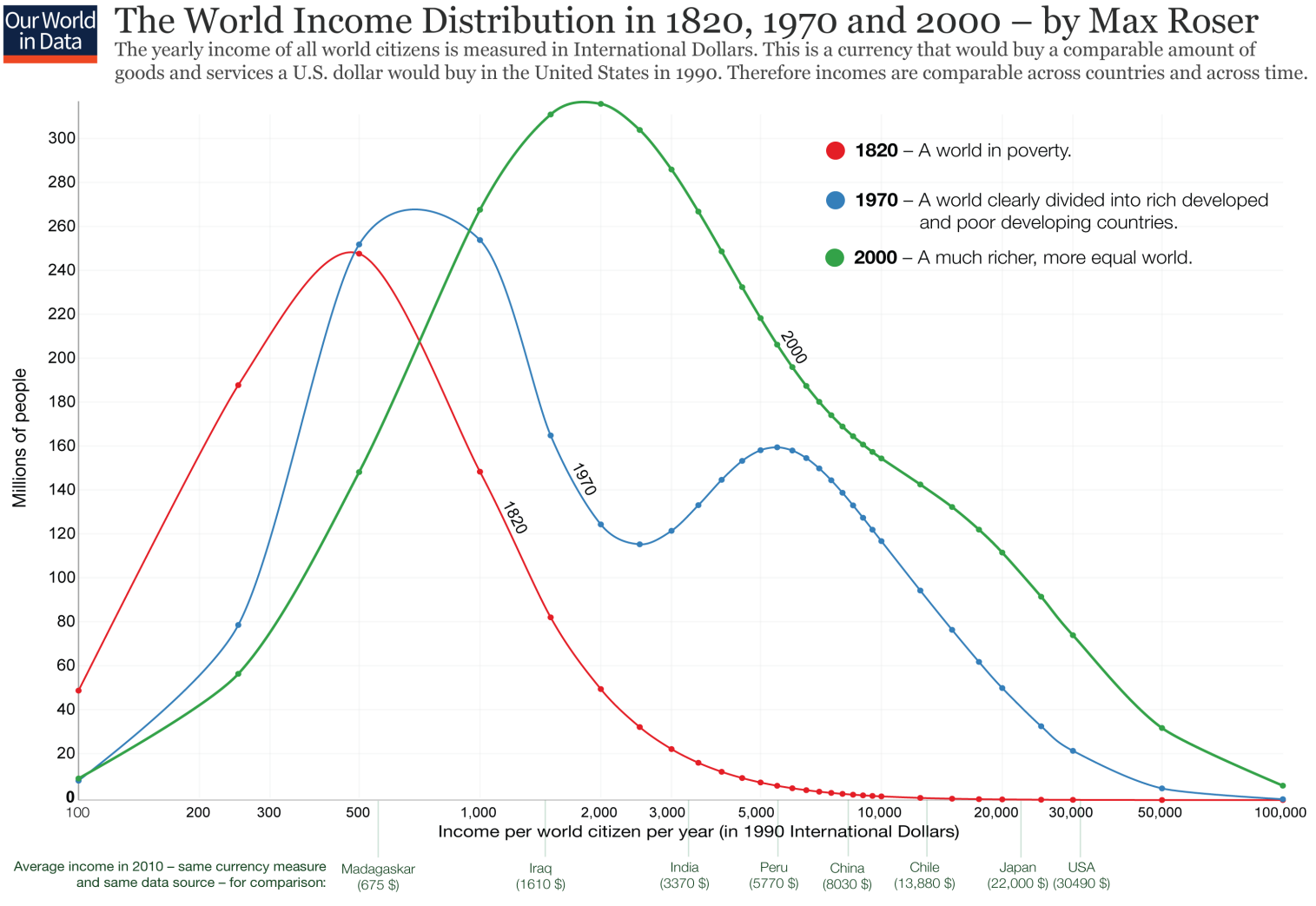
- Recall the **Gini Measure** $G = \frac{A}{A+B}$.



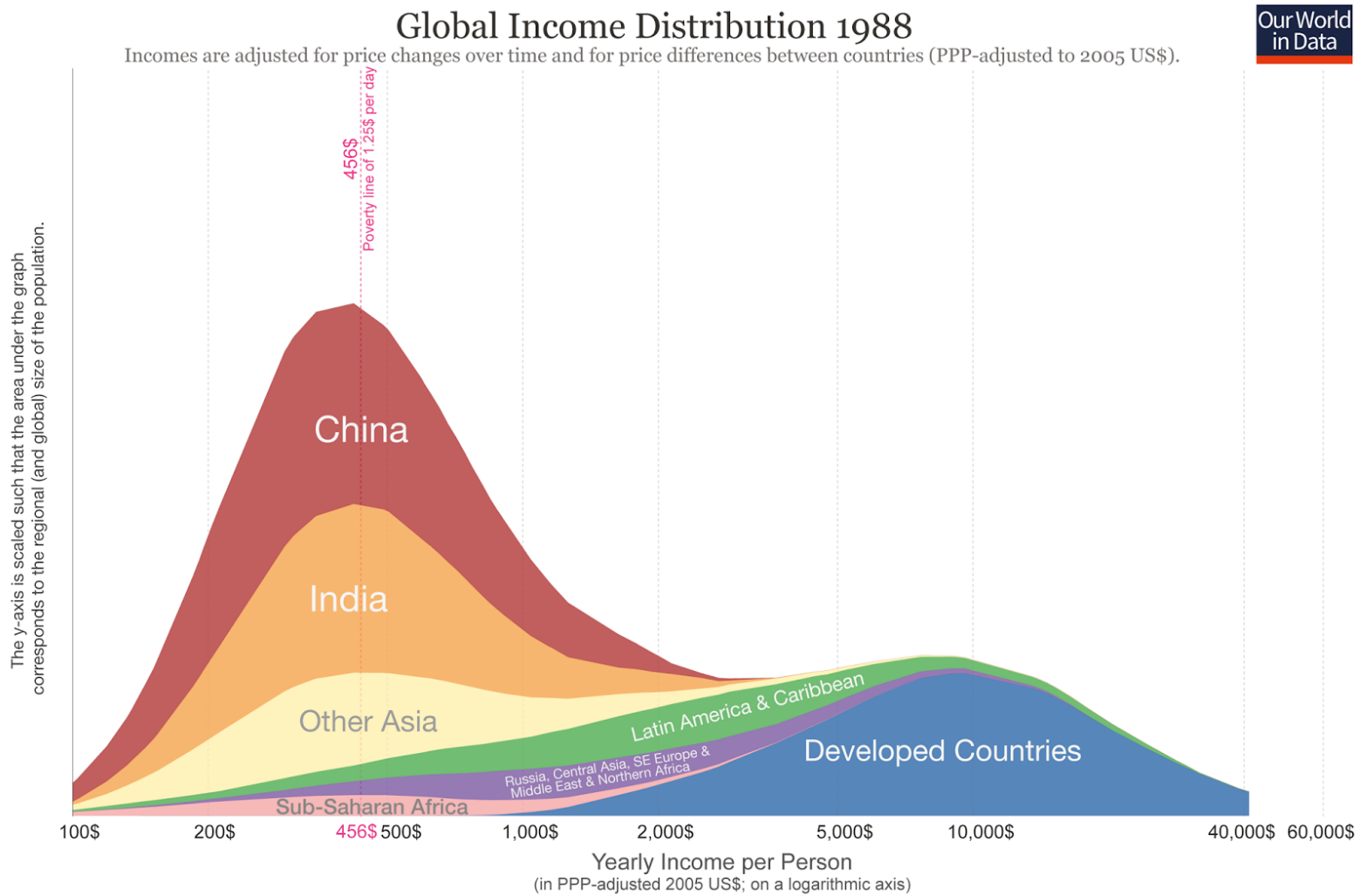
  - Satisfies most desired principles
  - But not decomposable into within- and between-group inequality
- Other measures suggested and developed:
  - Atkinson's family of inequality measures
  - Theil measures
  - Generalised Entropy measures

Outline

World Income Distribution



World Income Distribution



Data source: Lakner and Milanovic (2015) – *Global Income Distribution: From the Fall of the Berlin Wall to the Great Recession*, World Bank Economic Review.
The interactive data visualization is available at OurWorldinData.org. There you find more visualizations on this topic.

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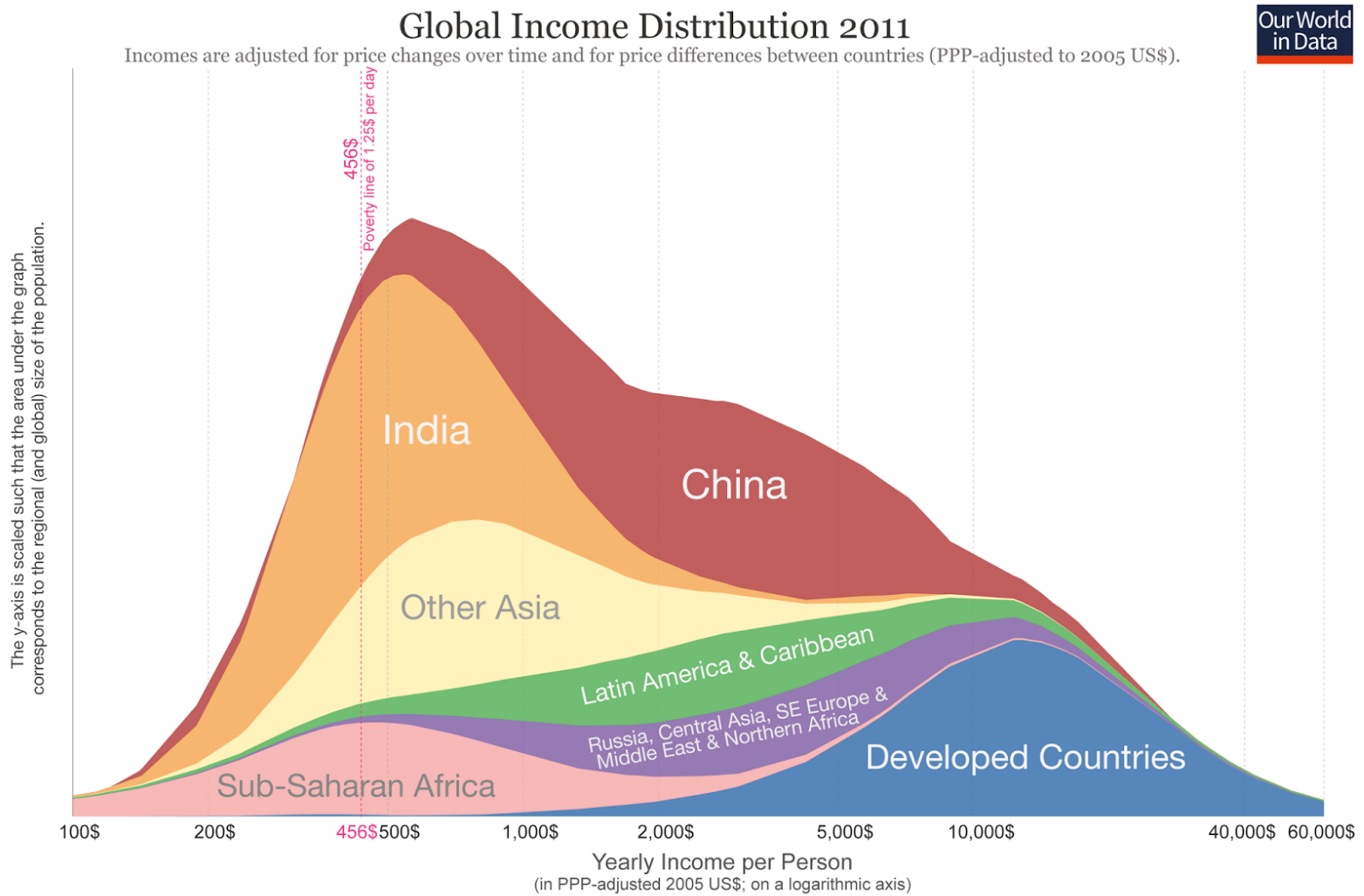

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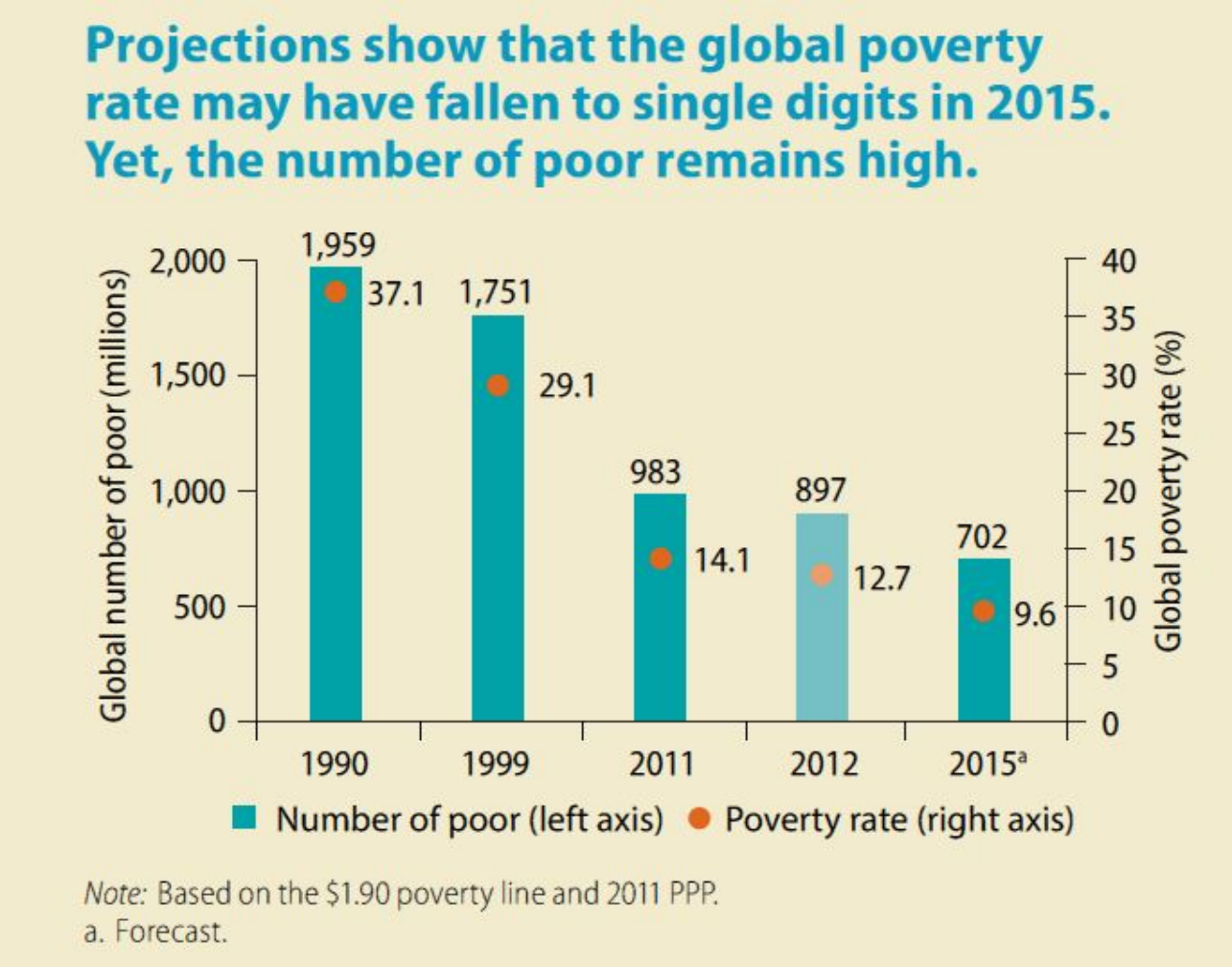
Global Extreme Poverty



Source: World Bank (2015), *Global Monitoring Report 2015*

Global Extreme Poverty

What does the global poverty line of $1.90 represent?

- Based on national poverty lines of 15 very poor countries.
- Income needed for sufficient calories to survive, plus small allowance for other necessities.
- $1 in 1990: World Development Report
- $1.08 in 1993 PPP US dollars
- $1.25 in 2005 PPP US dollars
- $1.88 in 2011 PPP US dollars

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