Economic Approaches to Poverty and Inequality

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Outline

Concepts and Measurement
   Historical Background
   What to Measure, and How?
   Aggregate Measures of Poverty and Inequality

Present-Day Poverty and Inequality
   Global Poverty and Inequality
   Developed Countries (OECD)

Economics: Why, and What to do?
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Economics: Why, and What to do?
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 → social problems → 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*

- 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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Booth’s *Maps Descriptive of London Poverty*
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)

Thinking about the whole distribution (World)

Figure 2. The Global Distribution of Income over Time

Early 20-C Inequality Measurement

- 1905: Max Otto Lorenz (American economist) *Methods of measuring the concentration of wealth* introduced the Lorenz Curve.
Early 20-C Inequality Measurement

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

- 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
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

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.”
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**:

\[
X = (x_1, x_2, \ldots, x_n) \subset X
\]

▶ \( X \) is the set of all possible profiles.

▶ A poverty, inequality or social welfare ordering \( \preceq \) is an ordering of the set \( X \): \( X \preceq Y \) is read ‘profile \( X \) contains less poverty (inequality/ social welfare) than profile \( Y \).’

▶ A poverty, inequality or social welfare measure is a **function** \( f : X \rightarrow \mathbb{R} \) that maps from profiles to a real number.

▶ \( f \) represents an ordering \( \preceq \) if \( f(X) \leq f(Y) \) exactly when \( X \preceq Y \).
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 $Y \preceq Z$
Subgroup Consistency

\[ Y' \prec Z' \]
Subgroup Consistency

\[ Y'' \preceq Z'' \]
Late 20th Century Consensus (Poverty)

- Vector of individual incomes $x = (x_1, x_2, \ldots, x_n)$, poverty line $z$.
- Many measures suggested 1976–1984; some have nice properties, some do not.
- FGT (1984) introduced $P_\alpha$ family: nice properties and conceptually straightforward → 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 $z$. 

$\phi$
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. \( P_2 \)).

▶ \( P_\alpha \) measures belong to this class but do not exhaust it! – but well-established.

▶ Little further exploration of this class...
Late 20th Century Consensus (Poverty)

\( \phi \) functions for \( P_\alpha \) measures:

\[ \begin{align*}
\phi(x) & \quad P_0 \\
z & \quad x \\
\phi(x) & \quad P_1 \\
z & \quad x \\
\phi(x) & \quad P_2 \\
z & \quad x
\end{align*} \]

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)
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, \( \phi \) 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
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Economics: Why, and What to do?

The yearly income of all world citizens is measured in International Dollars. This is a currency that would buy a comparable amount of goods and services a U.S. dollar would buy in the United States in 1990. Therefore incomes are comparable across countries and across time.

- **1820** – A world in poverty.
- **1970** – A world clearly divided into rich developed and poor developing countries.
- **2000** – A much richer, more equal world.

Average income in 2010 – same currency measure and same data source – for comparison:
- Madagascar (675 $)
- Iraq (1610 $)
- India (3370 $)
- Peru (5770 $)
- China (9000 $)
- Chile (13,880 $)
- Japan (22,000 $)
- USA (30,490 $)

Data source: [Clio-Infra.eu](http://www.Clio-Infra.eu) via van Zanden et al. (2014) – How Was Life?, OECD.

The interactive data visualisation is available at [OurWorldinData.org](http://OurWorldinData.org). There you find the raw data and more visualisations on this topic. Licensed under CC-BY-SA by the author Max Roser.
World Income Distribution

Global Income Distribution 1988
Incomes are adjusted for price changes over time and for price differences between countries (PPP-adjusted to 2005 US$).

The interactive data visualization is available at OurWorldInData.org. There you find more visualizations on this topic. Licensed under CC-BY-SA by the authors Zdenek Hynek and Max Roser.
Global Income Distribution 2011

Incomes are adjusted for price changes over time and for price differences between countries (PPP-adjusted to 2005 US$).

- India
- China
- Other Asia
- Latin America & Caribbean
- Russia, Central Asia, SE Europe & Middle East & Northern Africa
- Developed Countries

Yearly Income per Person (in PPP-adjusted 2005 US$; on a logarithmic axis)

Global Extreme Poverty

Projections show that the global poverty rate may have fallen to single digits in 2015. Yet, the number of poor remains high.

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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