L7: Measuring Inequality and Poverty

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Focus on a topic central to development economics: inequality and poverty

Start with *measurement* of each of these: conceptual and statistical problems, various indices

Then discuss some *key facts* about how inequality and poverty vary across the globe, and historical changes

**Readings:** DR text Ch 6,7,8 relevant sections; BBG Ch 1,4
The Need for Precise Measurement

- Need to evaluate important dimension of development: how unequally is per capita income distributed? what is the extent of poverty?
- Lot of development and aid programs depend on these measures
- Governments are evaluated on the basis of their success in reducing poverty or inequality
- Contentious debates in public policy often center around different measurement methods
Measuring Living Standards: Conceptual Issues

- How should living standards of a given household be measured?
- Problems with income measure:
  - Transitory fluctuations, which overstate inequality
  - Lifecycle variations, also overstate inequality
- Better to use consumption rather than income for these reasons
- Not ideal: lifetime income or consumption would be better, but this is usually infeasible
Measuring Living Standards: Conceptual Issues, contd.

- Income or consumption both exclude important dimensions of well-being: health, nutrition, environment, vulnerability (India example)
- Should the unit of observation be the household, or further broken down by gender and age?
- Inequality of what? Income/Consumption or Opportunity?
- Inequality or Mobility?
Reliable measures of income are very difficult to get, especially in LDCs, owing to:
- weak/nonexistent accounting systems, esp. in rural or informal sector
- large underground economy
- problems in valuing assets such as land or real estate

An added reason for using consumption rather than income
Some countries use nutrition-based measures instead for measuring poverty.

Recall problems in household surveys, esp. for nondurable (food or service) items.

Comparability problems across countries: role of standardization of surveys and measures (e.g., World Bank LSMS).
Measures of Poverty

- Usual approach: proportion of households below some *poverty line*
- What should the poverty line be? Nutrition-based? Consumption-based?
- International comparability issues: standard approach is consumption of $1/1.25$ or $2$ per day (PPP adjusted)
- Arbitrary? Corresponds to lowest pci
Head-Count Ratio (HCR) Measure of Poverty

- Head-count ratio is the simplest and most common
- But subject to the Micawber problem in *David Copperfield*
- Provides governments with perverse incentives
Alternative Poverty Measures

- Problem with HCR: ignores *depth* of poverty of the poor
- **Poverty Gap Ratio (PGR):** mean shortfall from the poverty line (counting the nonpoor as having zero shortfall), expressed as a percentage of the poverty line
- Fancier measures: Foster-Greer-Thorbecke (FGT) family of poverty measures (one of which is HCR*PGR)
Measuring Inequality

- More challenging: measuring inequality
- Usually have data from surveys organized into a household frequency distribution of consumption:
  - Use different consumption classes: $0-100, 101-200, 201-300...$ etc and provide corresponding frequencies: $n_0, n_1, n_2...$
- How can this entire distribution be reduced to a summary measure of inequality?
Common Measures of Inequality

- **Kuznets ratio**: consumption share of richest 20% of population to that of bottom 20%
- **Coefficient of Variation**: standard deviation of consumption, divided by average consumption
- **Gini Coefficient**: mean pairwise differences of consumption, divided by twice average consumption
- Can get different results, depending on which method is used
Which Inequality Measure to Use?

- Need for some underlying principles to guide choice of inequality measure

Axioms of Inequality Measurement:
- Anonymity (depends only on frequency distribution)
- Invariance to Population Size
- Invariance to Units
- Dalton Principle

Dalton Principle: a redistributive transfer between any pair of households should reduce the inequality measure
Lorenz Curves

- **Fundamental Theorem of Inequality Measurement**: If you believe in these four axioms (and nothing else), you should construct Lorenz curves corresponding to two distributions A and B, say.

- Then check if one (A) lies uniformly within the other (B).

- If so you can say that A involves less inequality.

- But if the Lorenz curves cross, you cannot compare them.
What is the Lorenz Curve?

- It (the y-axis) gives the proportion of aggregate consumption that goes to the poorest $x\%$ of the population.

- Then if the Lorenz curve of distribution $A$ is uniformly higher (irrespective of $x$), it means the poor have a higher share under $A$ no matter how you define the poor.

- If the Lorenz curves cross, it means that one definition of the poor you get one result, and for another definition you get another result.
Table: Example with Four Households and Three Distributions

<table>
<thead>
<tr>
<th>Household</th>
<th>Dist. A</th>
<th>Dist. B</th>
<th>Dist. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>125</td>
<td>75</td>
<td>25</td>
</tr>
<tr>
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<td>125</td>
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</tr>
<tr>
<td>4</td>
<td>400</td>
<td>600</td>
<td>400</td>
</tr>
</tbody>
</table>
Connection between Lorenz Curve and Gini Coefficient

- *Area of concentration of a Lorenz curve* is the area between the curve and the diagonal (the line of Perfect Equality).
- Gini coefficient equals the ratio of the area of concentration to the area under the diagonal.
- Hence if the Lorenz curve of A lies within that of B, the Gini coefficient is smaller in A: here the two ways of assessing inequality match.
- But they diverge when the Lorenz curves cross: the Gini coefficients can always be compared, but the Lorenz curves cannot.
Partial and Complete Orderings of Inequality

- The requirement of non-crossing Lorenz curves is a conservative way of comparing inequality: a *partial ordering*
- But statistical measures of inequality (KR, CV, Gini) always rank inequality between different distributions: a *complete ordering*
- Kuznets ratio does not satisfy the Dalton Principle, so is not consistent with Lorenz-comparisons
- CV and Gini both satisfy the Dalton Principle, and are both consistent with Lorenz-comparisons
Partial and Complete Orderings of Inequality, contd.

- When the Lorenz curves don’t cross, CV and Gini always give the same ranking (text: India, Egypt versus Brazil)
- When Lorenz curves do cross, CV and Gini may give different rankings and then you have a problem (Puerto Rico 1953, 1963: shares of the richest 5% and poorest 40% fell, while middle class gained)
- In practice you may just be using one measure, without being aware of this ‘problem’