Setting a poverty line

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Outline

Relative poverty lines
Absolute poverty lines
Conclusion
Objectives

- Understand the normative distinctions between absolute and relative approaches to the measurement of poverty;
- Discuss the links between inequality and poverty;
- Assess the challenges in setting an absolute poverty line;
- Examine procedures for estimating food and non-food poverty lines.
Relative poverty lines

Definition
Arguments for relativity
Implications for poverty assessment
Comparing relative inequality across groups
The relative approach to assessing and comparing poverty defines the poverty line in relation to a social “norm” that is context specific; practically, this involves setting the poverty line to a fraction $\lambda$ of the mean or the median (or some other quantile) of the distribution of well-being that is assessed (income, expenditure, consumption, functionings, etc.) within a population. In the popular case of choosing the mean, we have:

$$z = \lambda \mu.$$  \hspace{1cm} (1)
“We maintain that if a state is to avoid the greatest plague of all (...), extreme poverty and wealth must not be allowed to arise in any section of the citizen-body. That is why the legislator must now announce the acceptable limits of wealth and poverty. The lower limit of poverty must be the value of the holding. The legislator will use the holding as his unit of measure and allow a man to possess twice, thrice, and up to four times its value.” (Plato, *The Laws*, Book V, quoted in Cowell, 1995, p. 21–22).

“By necessaries I understand, not only the commodities which are indispensably necessary for the support of life, but whatever the custom of the country renders it indecent for creditable people, even of the lowest order, to be without.” (Adam Smith, *The Wealth of Nations*)

“I would like to say that poverty is an absolute notion in the space of capabilities but very often it will take a relative form in the space of commodities and characteristics.” (Sen (1985), p.335).
Relative poverty measures fulfil *the scale invariance principle*, which states that poverty should be invariant to any uniform proportional change of individuals’ income.

Because of this, relative poverty measures resemble *inequality* measures since these also obey the *scale invariance principle*.

Thus:

- A growth pattern that raises the incomes of all, but proportionally more those of the non-poor, will worsen poverty, albeit the absolute income of the poor increases.
- Conversely, a recession that decreases everyone’s income but proportionally more that of the non-poor, will reduce poverty, although the absolute income of the poor falls.
To contrast relative poverty across two groups, $l$ and $m$ say:

1. should we use the same relative poverty line $z = \lambda \mu$ for the two groups? or,

2. should we use a specific relative poverty line for each group, i.e., $z^l = \lambda \mu^l$ for $l$ and $z^m = \lambda \mu^m$ for $m$?
Table 1: Relative poverty across Uganda’s regions, 1999

<table>
<thead>
<tr>
<th>Region</th>
<th>$P^l(0; 0.4\mu)$</th>
<th>$P^l(0; 0.4\mu^l)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>4.76 (1)</td>
<td>14.9 (2)</td>
</tr>
<tr>
<td>Eastern</td>
<td>12.3 (1.3)</td>
<td>8.5 (1)</td>
</tr>
<tr>
<td>Northern</td>
<td>37.3 (3.4)</td>
<td>11.2 (1.3)</td>
</tr>
<tr>
<td>Western</td>
<td>6.85 (1.2)</td>
<td>7.1 (0.8)</td>
</tr>
<tr>
<td>Uganda</td>
<td>13.5 (1.1)</td>
<td>13.5 (1.1)</td>
</tr>
</tbody>
</table>
Absolute poverty lines

Outline
Objectives
Relative poverty lines

Absolute poverty lines
Definition
Example: The World Bank poverty line
Two-step estimation strategy
Determination of a food poverty line
Determination of a lower total poverty line
Estimation procedures
Determination of an upper poverty line
Lower and upper poverty lines

Conclusion
The minimum standard, under which a person would not be able to “make both ends meet” if he enjoyed less, is a fixed cut-off level that is applied across the distribution of income.

In making comparisons across distributions (over time or space), the standard is unchanged in *real* or *purchasing power* terms, even in the presence of changes in the income distribution (through economic growth for instance).

Two main reasons have usually guided this choice:

1. to obtain “consistent” poverty profiles, in that any two individuals with the same real living standards should be treated identically in terms of poverty assessment;
2. to avoid situations in which differences in assessed poverty could come from variants in poverty assessment methods instead of genuine difference in living standards — analogous to “moving the goalposts”.
For the purpose of international comparisons of poverty, the World Bank has until recently been promoting a poverty line set to approximately 1.08 dollar a day per person in 1993 purchasing power parity (PPP).

When initially set, this line corresponded to the median of the national poverty lines of 10 developing countries (Bangladesh, China, India, Indonesia, Nepal, Pakistan, Thailand, Tanzania, Tunisia, and Zambia).

Note: PPP adjusts for cost-of-living differences between countries.

Should also adjust for cost-of-living within countries, though this has been rare in international comparisons.
A common approach that is used in developing countries to construct a poverty line uses the relationship between calorie requirements and food expenditures as well as some minimum non-food expenditures.

Actual procedures vary but often follow two steps:

1. The determination of a food poverty line;
2. The determination of a non-food poverty line.
The most common technique is the so-called the *cost-of-basic-needs* approach.

Household surveys typically provide information on food expenditure and consumption by households.

Let $q_{i,k}$ be the consumption of food commodity $k$ made by individual $i$ and let $\varsigma_k$ be the calorie content of food item $k$. Food quantities can be converted into calories $c_i$ as:

$$c_i = \sum_{k=1}^{K} \varsigma_k q_{i,k}.$$  \hspace{1cm} (2)
We can think of a lower poverty line ($z^{lower}$) using the idea that if a person’s income is just enough to reach the food threshold ($y_i = z^{food}$), then anything (say $z^{lower}_{non-food}$) that the person spends on non-food items at $z^{food}$ has to be considered as essential as food. This $z^{lower}_{non-food}$ can thus be thought of as a lower non-food threshold.

A lower poverty line can then be given by:

$$z^{lower} = z^{food} + z^{lower}_{non-food} = z^{food} + (1 - w^{food})z^{food} = (2 - w^{food})z^{food}$$  \hspace{1cm} (3)

where $w^{food}$ is the budget share devoted to food consumption.

It is also possible to set an upper poverty line, $z^{upper}$, by estimating the level of total expenditures that would be needed for an individual who actually spends $z^{food}$ on food. This is $z^{upper} = E(y|y^{food} = z^{food})$. $z^{upper}$ would enable households to meet their food needs without sacrificing essential non-food items.
Ravallion (1998) suggested to estimate the parameter $\omega^\text{food}$ using a food-share Engel equation:

$$w_{i}^\text{food} = \omega^\text{food} + \beta_1 \ln \frac{y_i}{z_f} + \beta_2 \left( \ln \frac{y_i}{z_f} \right)^2 + \epsilon_i$$

(4)

Using equations (3) and (4), the lower poverty line is given by (the “$\omega^\text{food}$” is a parameter estimate)

$$z^l = (2 - \omega^\text{food})z^\text{food}$$

(5)

As before, this procedure would normally be applied after the distribution of food and non-food expenditures has been adjusted for price variability and household composition heterogeneity.
To estimate the upper poverty line $z^{upper}$ requires computing the food share of households whose food spending corresponds exactly to $z^{food}$:

$$w^* = \frac{z^{food}}{z^{upper}}$$  \hspace{1cm} (6)

Using (4), $z^{upper}$ can be inferred as

$$w^* = \hat{\omega}^{food} + \hat{\beta}_1 \log \left( \frac{z^{upper}}{z^{food}} \right) + \hat{\beta}_2 \left( \log \frac{z^u}{z_f} \right)^2$$

$$= \hat{\omega}^{food} + \hat{\beta}_1 \log \left( \frac{1}{w^*} \right) + \hat{\beta}_2 \left( \log \left( \frac{1}{w^*} \right) \right)^2$$  \hspace{1cm} (7)
Lower and upper poverty lines

The graph illustrates the relationship between income and food spending. It shows two lines: one for food spending and another for income. The lines intersect at different points, indicating different poverty lines. The graph highlights the concept of lower and upper poverty lines, with points labeled A, B, C, and D representing various income and food spending thresholds.
Conclusion
The relative approach to assessing and comparing poverty defines the poverty line in relation to a social “norm” that is valid at a particular time period.

Relative poverty measures resemble *inequality* measures since they obey the *scale invariance principle*.

An absolute poverty line is unchanged in real in purchasing power terms even in the presence of changes in the income distribution.

A common absolute-line approach uses the relationship between calorie requirements and food expenditures as well as some minimum non-food expenditures.
- Relative and absolute FGT poverty indices (ifgt).
- Difference between relative and absolute FGT poverty indices (difgt).
Part I: Exercises 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8
The material from this presentation draws largely from Ravallion (1998) and Duclos and Araar (2006).

Greer and Thorbecke (1986) has been influential in promoting the use of the food-energy-intake method for estimating poverty lines.

Also see Pradhan and Ravallion (2000) for a method to estimate subjective poverty lines.


