

# Section Chapter 5: Poverty

## 1 Measurement

### 1.1 Measurement Issues

**Consumption vs. Income as a measure of well-being:** Consumption is easier to measure and more likely to be constant across time

**Household vs. Individual well being:** Because of data limitations, consumption is frequently measured at the household level rather than the individual level. To calculate per capita consumption, we need to adjust for differences in household demographics.

$n^*$  is the number of “equivalent adults” in the household. For each category ( $k$ ), the number of individuals is multiplied by a relative weight for that category ( $w_k$ ). For example, in OECD scale, women are given weight of 0.7, children are given weight of 0.5.

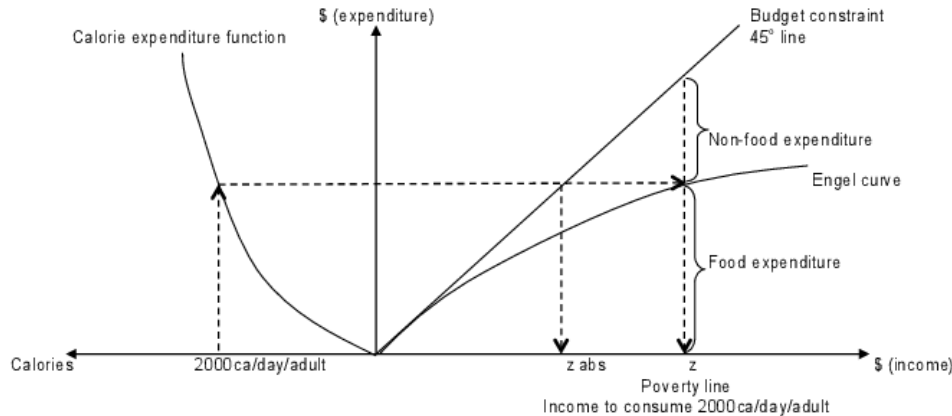
$$n^* = \sum_k w_k n_k$$

Household consumption consists of both **private goods** that need to be scaled by number of equivalent adults and **household public goods** that benefit all members of the household simultaneously. Let  $C_f$  be amount of private goods consumed by the household,  $C_h$  be the amount of public goods consumed,  $p_h$  be the relative price of the public goods compared to private goods, and  $\beta$  be a measure of “privateness” of the public goods consumed, where  $\beta = 0$  is a pure public good, and  $\beta = 1$  is a pure private good.

$$y_{pc} = \frac{C_f}{n^*} + p_h \frac{C_h}{(n^*)^\beta}$$

**Poverty Lines** Recall from previous chapters that poverty measurements only have meaning with respect to a poverty line ( $z$ ), which may be chosen for a variety of reasons.

The **nutrition based poverty line** is the level of income necessary to have a sufficient diet.



The graph above shows how calories can be mapped first to food expenditure (left hand quadrant) and then to total expenditure (right hand quadrant). The transformation from calories (negative x-axis) to food expenditure (y-axis) needs to take account of quality as well as quantity of food demanded, while the transformation from food expenditure to total expenditure needs to take account of the increasing share of non-food expenditure as incomes rise (Engel curve).

Other possible poverty lines are a **relative poverty line** based on the mean income in a population, a **subjective poverty line** based on stated preferences, or the **poverty line for international comparisons** (\$1.25 or \$2.50 per day).

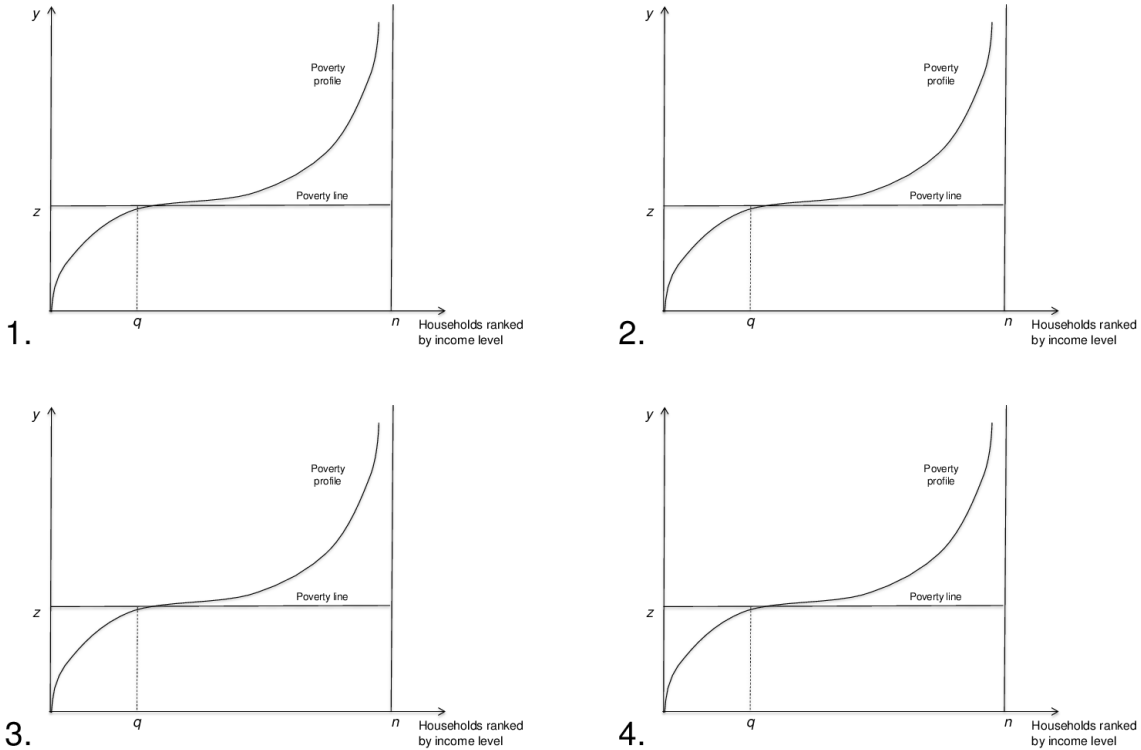
## 1.2 Poverty Profile and Poverty Indicators

- **Headcount Ratio:**  $P^0 = \frac{q}{n}$
- **Poverty Gap Index (Depth of Poverty):**  $P^1 = \frac{1}{n} \sum_{i=1}^q \left( \frac{z - y_i}{z} \right)$
- **Severity of Poverty Index:**  $P^2 = \frac{1}{n} \sum_{i=1}^q \left( \frac{z - y_i}{z} \right)^2$

Interventions designed to target  $P^0$ ,  $P^1$ , and  $P^2$  will lead us to prioritize different subgroups of the population. These are all members of  $P^\alpha$  class of indicators proposed by Foster, Greer and Thorbecke (FGT) defined as

$$P^\alpha = \frac{1}{n} \sum_{i=1}^q \left( \frac{z - y_i}{z} \right)^\alpha$$

*Activity:* In the following poverty profiles, show (1) a change in the poverty profile that reduces  $P^0$ ; (2) a change in the poverty profile that reduces  $P^1$  but does not affect  $P^0$ ; (3) a change in the poverty profile that reduces  $P^2$  but does not affect  $P^1$ ; (4) how budget would be allocated if the target was  $P^0$  vs. how budget would be allocated if the target was  $P^2$ .



**Decomposition of poverty** One of the main advantages of the FGT types of poverty measures is that they are **decomposable** across subgroups. This allows us to be precise when we want to make statements like: “World poverty is primarily rural; however, it is becoming increasingly urban.”

For an economy with  $k$  subgroups indexed by  $j$ , the total poverty measure is the sum of the poverty measures of each subgroup, weighted by the share of the subgroup in the total population:

$$P^\alpha = \sum_{j=1}^k m_j P_j^\alpha, \quad \text{where } m_j = \frac{n_j}{n}$$

Focusing on a single group, the **contribution of group  $j$  to the total poverty index** is

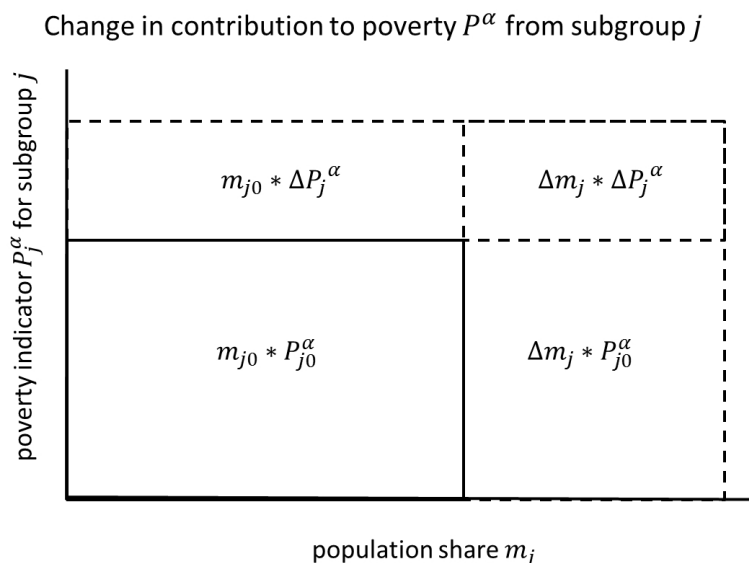
$$100 \times \frac{m_j P_j^\alpha}{P^\alpha}$$

- For  $P_j^0$ , the contribution of poverty is given by  $100 \times \frac{q_j}{q}$ : this tells us what percentage of the total poor are in group  $j$ , e.g., urban or rural.
- For  $P_j^1$ , the contribution of poverty is given by  $100 \times \frac{\sum_{i=1}^{q_j} (z - y_{j,i})}{\sum_{i=1}^q (z - y_i)}$ : this tells us what percentage of the total poverty gap would have to be spent on group  $j$  in order to lift them out of poverty

Notice that group  $j$ 's contribution to poverty can change if: 1) its level of poverty,  $P_j^\alpha$ , changes; 2) its share of the population,  $m_j$ , changes; or 3) the level of poverty in *some other group* changes.

Similarly, we can decompose changes in the overall poverty indicator into changes in poverty within groups ( $\sum_j (m_{j0} \Delta P_j^\alpha)$ ), changes in the relative size of groups ( $\sum_j (\Delta m_j P_{j0}^\alpha)$ ), and a cross effect ( $\sum_j (\Delta m_j \Delta P_j^\alpha)$ ). This allows us to make statements like "Poverty indicator  $P^\alpha$  has fallen over the last five years. Decomposing by regions, this has been primarily due to population changes across regions rather than changes in poverty within regions. Decomposing by gender of household head, this has been primarily due to changes in poverty within subgroups."

$$\Delta P^\alpha = P_t^\alpha - P_0^\alpha = \underbrace{\sum_j (m_{j0} \Delta P_j^\alpha)}_{\text{Within group}} + \underbrace{\sum_j (\Delta m_j P_{j0}^\alpha)}_{\text{Relative sizes}} + \underbrace{\sum_j (\Delta m_j \Delta P_j^\alpha)}_{\text{Cross-effects}}$$



*Study questions:*

1. Is it possible for  $P^0$  to fall while the number of poor rises?

*Yes. Mathematically, if  $q$  increases by a small amount, but  $n$  rises by a large amount, then the headcount ratio  $P^0 = \frac{q}{n}$  will fall even though  $q$  has increased. Intuitively, you might imagine that there is a large migration of labor into a country. Perhaps most attain well-paying jobs, but a few will fail and fall into poverty. So  $q$  rises slightly while  $n$  rises substantially.*

2. Suppose we break an economy into two regions, urban and rural. Let  $u$  = urban and  $r$  = rural.  $P_u^0$  and  $P_r^0$  stay the same, but there is migration from the rural to the urban sector. What happens to the contribution to poverty of the urban sector? In the rural sector? What happens to  $P^0$ ?

The contribution to poverty of the urban sector rises; the contribution of the rural sector falls. What happens to  $P^0$  depends on whether urban poverty or rural poverty is more intense—for example, if urban poverty  $P_u^0$  is less than rural poverty  $P_r^0$ , then  $P^0$  falls.

3. Suppose that  $m_u$  and  $P_u^0$  both increase. Does this tell us that poverty is becoming more urbanized (as defined by the urban sector’s contribution to poverty)? What else do we need to know before we can answer this question?

We need to know what happens to  $P_r^0$ . We know that the absolute number of poor in the urban sector has increased, and that the total population of the rural sector has gotten smaller. But if poverty in the rural sector becomes much worse, then the absolute number of poor in the rural sector could increase more than in the urban sector. So it is still possible that the urban sector’s contribution to overall poverty might fall.

### 1.3 Vulnerability

Vulnerability to poverty is a probabilistic statement about the future: What is the likelihood that my future expenditures will fall below the poverty line?

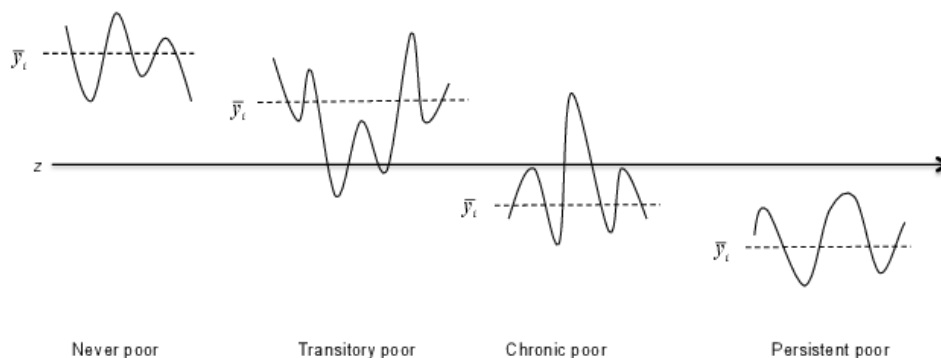
- HH  $i$ ’s vulnerability:  $v_{it} = \Pr(y_{i,t+1} < z)$

A household is **vulnerable** if its level of vulnerability,  $v_{it}$ , is greater than a given **vulnerability line**,  $\alpha$ . Important vulnerability thresholds are  $\alpha = 0.5$  and  $\alpha = P^0$ .

- **Vulnerable** households:  $v_{it} \geq \alpha$
- **Highly vulnerable** households:  $v_{it} \geq 0.5$
- **Moderately vulnerable** households:  $v_{it} \geq P^0$

We use a regression-based approach to measure vulnerability (see lecture handout).

**Types of poverty:** The **transitory poor** have expenditures that are on average above the poverty line, but sometimes fall below it. The **chronic poor** have expenditures that are on average below the poverty line, but sometimes exceed it. The **persistent poor** are those who are always below the poverty line.



## 2 Policy Instruments

**Reducing persistent and chronic poverty: Raise the average level of expenditures (cargo nets)** These policies attempt to improve households’ asset positions, to improve the quality of the context where it uses its assets and transforms income into consumption, and/or to provide permanent transfers (social assistance programs for chronic poverty such as conditional cash transfers). A key component is to produce overall economic growth that creates new and better employment and investment opportunities for the poor.

**Reducing transitory poverty: Raise expenditures, and/or reduce risk (safety nets)** 1) Reduce exposure to shocks, 2) help manage risk, and 3) cope with risk.

<i>Ex ante</i> Risk management	<i>Ex post</i> Risk coping
<ul style="list-style-type: none"> <li>-Precautionary savings</li> <li>-Insurance</li> <li>-Income diversification</li> </ul>	<ul style="list-style-type: none"> <li>-Emergency credit</li> <li>-Social assistance programs for vulnerable households (guaranteed employment, workfare)</li> <li>-Transfers (food aid, cash transfers to avoid irreversibilities)</li> </ul>