2015 Poverty Methodology
Part 1
The Welfare Indicator
Requirements for poverty analysis

Outline
- Selecting the indicator
- Consumption
- Cost-of-living differences
  - Temporal
  - Spatial
- Adjustment for household composition and size
  - Household composition
  - Household size
- Summary

What do we need?

- A welfare indicator that can be measured in order to rank all the population
- An appropriate poverty line to be compared against the chosen indicator in order to classify individuals as poor or nonpoor
- A set of indicators to describe the aggregate level of poverty
Outline

Part 1
The Welfare Indicator

1. Selecting the welfare indicator
2. Estimating the consumption aggregate
3. Adjusting for cost-of-living differences
   - Temporal
   - Spatial
4. Adjusting for household composition and size
   - Household composition
   - Household size
5. Summary
Welfare can be measured using various indicators, mainly:

- Monetary indicators, e.g., wealth, income, expenditure or consumption
- Non-monetary indicators, e.g., literacy rates, nutritional status, access to safe drinking water, etc.
- Subjective perceptions, e.g. Self-Assessed Poverty
Part 1
The Welfare Indicator

Outline
- Selecting the indicator
  - Consumption
  - Cost-of-living differences
    - Temporal
    - Spatial
- Adjustment for household composition and size
  - Household composition
  - Household size
- Summary

The choice is generally between income and consumption.
Which one reflects better the household’s usual standard of living?
Over which period will the indicator be measured?
There are theoretical and practical considerations to be made both in the short- and in the long-term.
Over a lifetime and if well measured, both should be similar. Consumption though is more stable than income.
Over a year, both may be influenced by seasonality (growing and harvest) and various events (unemployment, transfers received, illness, etc.). Consumption though is more stable than income.
Comparing income and consumption

Part 1
The Welfare Indicator

Outline
Selecting the indicator
Consumption
Cost-of-living differences
Temporal
Spatial
Adjustment for household composition and size
Household composition
Household size
Summary

Income measures the degree of command households have over resources (households are free to exert that command as they like), whereas consumption shows current standard of living (utility is assumed to depend on consumption).

Income may have fewer components compared to consumption, but it is more likely to be measured with errors, it is much more affected by short-term fluctuations and it has some components that are complicated to estimate.

Households feel more comfortable to report expenditure than income.

Both income and consumption-based indicators have advantages and disadvantages. The use of one or another may be appropriate for specific policy decisions.
**Estimating Consumption**

**Part 1**  
The Welfare Indicator

<table>
<thead>
<tr>
<th>Outline</th>
<th>Selecting the indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost-of-living differences</td>
<td></td>
</tr>
<tr>
<td>Temporal</td>
<td>Spatial</td>
</tr>
<tr>
<td>Adjustment for household composition and size</td>
<td>Household composition</td>
</tr>
<tr>
<td>Household size</td>
<td></td>
</tr>
</tbody>
</table>

Consumption-based measures are preferred because they provide a stable or steady picture of welfare levels, especially in low and middle income countries.

The goal will be to estimate the individual consumption aggregate over the last year.

Three main steps:

1. Construct the total nominal consumption aggregate of the household
2. Adjust for cost-of-living differences
3. Adjust for household composition and household size
Components of Consumption

The consumption aggregate comprises basically four components: food, nonfood, durable goods and housing.

- Includes all possible sources: purchases, own production, in-kind gifts, in-kind remittances and in-kind payments received from employers.
- Excludes taxes; capital transactions such as purchases of assets, debt and interest payments; large and infrequent expenditures such as dowries, births, funerals, etc.; remittances to other households and to organisations.
Components of Consumption

Monetary measure of the flow of services that the household obtains from owning durable goods and from occupying its dwelling. In other words, the portion of the value of the durable goods that the household has consumed over the reference period.

These assets last for several years; thus the need to account for both the loss in value and the cost of having the durable good and not investing in something else.

In the case of durable goods, current purchases are not considered.

For free or Owner-occupiers and consumers of utilities (Water and Electricity), a Hedonic model is used to make consumption imputations.

In the case of housing, use the actual rent if the household rents the dwelling or the imputed rent if the household owns the dwelling or lives there free of charge.
The model adopted the following specification:

\[ \ln RWE_{i} = \beta \chi_i + \epsilon_i, \quad (i=1,2,\ldots,n) \]

Where \( \ln RWE_{i} \) is the log of monthly expenditure on Rent or Water or Electricity for household \( i \), \( \chi_i \) is a vector of housing and household characteristics (i.e. building materials used, access to piped water, good sanitation, electricity, ownership of relevant household assets, location dummies, etc.), \( \beta \) is a vector of parameter estimates and \( \epsilon_i \) is the error term.
Two price adjustments are required:

- **Temporal (Over time adjustment)**
  - Needed because of the duration of the fieldwork and the different recall periods
  - Less of a problem if the survey is conducted in a short period of time, say, 1 or 2 months
  - More relevant if the survey is carried out over a longer period of time, say, 1 year
  - Data sources: cpi and/or the own survey
  - Likely to include food and nonfood inflation
Spatial (Over space adjustments)

- Correction based on geographical areas, e.g., urban and rural areas, regions, districts, etc.
- Price differences because markets are not well integrated, transportation problems
- Data sources: cpi and/or the own survey
- Should take into account food and nonfood price differences
Households differ in composition and size, thus some normalization is required for welfare comparisons. For instance, in order to reach a certain welfare level,

- Do two households with the same number of members but different composition (e.g., one with 5 male adults, and the other with 1 female adult and 4 children) need the same amount?
- Does a household of 4 members need twice as much as a household of 2 members?
Equivalence scales are factors that convert the consumption of every member into the consumption of an “adult equivalent”, usually a prime-age male adult.

- Household members have different consumption needs, say, based on their age and sex
- Some are based on nutritional grounds, in which children typically consume less than adults and male adults generally more than female adults
- Not clear why the scales should not be extended to nonfood consumption
Say there is a household with:

- 5 members: 1 male adult, 1 female adult and 3 children
- The equivalence scale is 1 for each male adult, 0.8 for each female adult and 0.5 for each child
- The number of adult equivalents would be 3.3, which is the result of $1 \times 1 + 1 \times 0.8 + 3 \times 0.5$
- If the total household consumption is ZKW100, the consumption per person will be ZKW 20 (=100/5) and the consumption per adult equivalent will be ZKW 30 (=100/3.3)
The adjustment can be made by dividing the total household consumption aggregate by $N^\alpha$, where $N$ is the number of people or adult equivalents in the household and $\alpha$ takes a value between 0 and 1.

$$\text{Individual Consumption} = \frac{\text{Household Consumption}}{N^\alpha}$$

If $\alpha = 0$, all goods consumed are public; and if $\alpha = 1$, none of the goods consumed are public.
Part 1
The Welfare Indicator

Adjusting for household size

Outline
Selecting the indicator
Consumption
Cost-of-living differences
Temporal Spatial
Adjustment for household composition and size
Household composition

Say there is a household with:

- 5 members or 3.3 adult equivalents
  - \( \alpha \) takes the value of 0.9
- If the total household consumption is ZKW 100, the consumption per person adjusted for economies of scale will be ZKW 23.5 (= 100/5^{0.9}) and the consumption per adult equivalent will be ZKW 34.1 (= 100/3.3^{0.9})
Notice that if a per capita adjustment were implemented, the assumptions would be that:

- There are no differences in consumption between household members
- There are no economies of scale in consumption (no consumption comes from “public goods”)
- Welfare might be underestimated in large households and overestimated in small households
### Adjusting for household composition and size

#### An example

<table>
<thead>
<tr>
<th>Household consumption (ZKW)</th>
<th>Per capita</th>
<th>Per adult equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Adjusting for composition

<table>
<thead>
<tr>
<th>Equivalent scale (MA, FA, Ch)</th>
<th>(1,1,3)</th>
<th>(1,0.8,0.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household size</td>
<td>5</td>
<td>3.3</td>
</tr>
<tr>
<td>Individual consumption (ZKW)</td>
<td>20</td>
<td>30.3</td>
</tr>
</tbody>
</table>

And further adjusting for size

<table>
<thead>
<tr>
<th>Economies of scale</th>
<th>$\alpha = 1$</th>
<th>$\alpha = 0.9$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household size</td>
<td>5</td>
<td>2.9</td>
</tr>
<tr>
<td>Individual consumption (ZKW)</td>
<td>20</td>
<td>34.1</td>
</tr>
</tbody>
</table>

#### Part 1

The Welfare Indicator

Outline

- Selecting the indicator
- Consumption
- Cost-of-living differences
- Temporal
  - Spatial

- Adjusting for household composition and size
- Household composition

Summary
The construction of the individual consumption aggregate as the welfare indicator requires three main steps:

- Aggregating all nominal values to a common reference period, say, over the last year
- Adjusting for temporal and spatial price differences
- Adjusting for household composition and household size
Part 2 Poverty Lines and Estimation
What do we need?

- A welfare indicator that can be measured in order to rank all the population
- An appropriate poverty line to be compared against the chosen indicator in order to classify individuals as poor or nonpoor
- A set of indicators to describe the aggregate level of poverty
Part 2—Poverty Lines

1 Types of poverty lines
2 Relative poverty lines
3 Absolute poverty lines
4 The preferred poverty line
5 The Cost of Basic Needs Method
   - The food component
   - The nonfood component
6 A Price updated food bundle (Basket) for 2015
Three main types:

- Relative poverty lines are defined in proportion to some measure of the welfare distribution of the entire population, say, the mean, the median or any particular percentile.
- Absolute poverty lines are defined in absolute terms as the minimum cost of a reference living standard.
- Subjective poverty lines are defined as the minimum amount that each person deems necessary to make ends meet.
Relative poverty lines

They are set in relation to the overall distribution of income or consumption. A common example is to set the poverty line at 50 percent of the median (or mean) income or consumption of the population.

The procedure is simple and transparent, yet arbitrary.

Comparisons across countries or over time are not possible because the poverty lines do not represent the same welfare level.

Relative poverty lines are typically used in developed countries because deprivation is minimal, which is not the case in low or middle income countries.
Disadvantages of relative poverty lines

Relative poverty lines depend only on the distribution of consumption and not on the level of consumption.

<table>
<thead>
<tr>
<th></th>
<th>Population A</th>
<th>Population B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual</td>
<td>Consumption</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>630</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>550</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>460</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>300</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>150</td>
</tr>
</tbody>
</table>

Poverty line: 230
Number of poor: One person

Poverty line: 46
Number of poor: One person
If the consumption of all individuals doubled, poverty would remain unchanged.

<table>
<thead>
<tr>
<th></th>
<th>Population A</th>
<th></th>
<th>Population B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual</td>
<td>Consumption</td>
<td>Individual</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>63</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>55</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>46</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>15</td>
<td>5</td>
</tr>
</tbody>
</table>

Poverty line: 23
Number of poor: One person

Poverty line: 46
Number of poor: One person
Disadvantages of relative poverty lines

Example 2

If those with lower consumption are getting worse (all things equal for the others), the mean or median consumption falls, the poverty line decreases, and so is the poverty measures, despite the drop in absolute living standards of those with lower consumption.

<table>
<thead>
<tr>
<th>Population A</th>
<th>Population B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Consumption</td>
</tr>
<tr>
<td>1</td>
<td>63</td>
</tr>
<tr>
<td>2</td>
<td>55</td>
</tr>
<tr>
<td>3</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

Poverty Estimator

Population A:
- Poverty line: 23
- Number of poor: Two people

Population B:
- Poverty line: 18
- Number of poor: One person
Disadvantages of relative poverty lines

Example

If those with higher consumption are improving (all things equal for the others), the mean or median consumption increases, the poverty line rises, and so is the poverty measures, despite no change in absolute living standards of those with lower consumption.

<table>
<thead>
<tr>
<th>Population A</th>
<th>Population B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Individual</td>
</tr>
<tr>
<td>1</td>
<td>63</td>
</tr>
<tr>
<td>2</td>
<td>55</td>
</tr>
<tr>
<td>3</td>
<td>36</td>
</tr>
<tr>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

Poverty Estimator

Population A: Poverty line: 18
Number of poor: One person

Population B: Poverty line: 23
Number of poor: Two people
Absolute poverty lines

- They are set as the level below which consumption is considered to be too low to meet the minimum acceptable welfare level.
- They are absolute because a standard of living is fixed over time and space, i.e., two individuals with an equal level of welfare will be treated in the same way.
- They are objective because the standard of living is anchored to the attainment of certain capabilities such as meeting nutritional requirements.
- Absolute poverty lines are typically used in low or middle income countries because significant deprivation is more prevalent. In developed countries it might hardly provide useful information.
An absolute poverty line.

It represents the monetary value of the minimum level of standard of living that a person should achieve in order not to be considered poor.

It will possess two characteristics: to be absolute and to be objective.

An absolute poverty line is essential for poverty comparisons across countries or over time because it can ensure that similar standards are used.

Two main issues:

- How to set the minimum welfare level that is acceptable (reference problem).
- How to estimate the minimum amount to achieve that level (identification problem).
What is the ‘minimum’ level of well-being?
The minimum level of welfare implied by the poverty line will be assumed to be one that should enable the individual to achieve certain capabilities, which include a healthy and active life and a full participation in society.

How to estimate the minimum amount to achieve that level?
The Cost of Basic Needs Method
The Cost of Basic Needs Method

Estimates the cost of a consumption bundle deemed to be adequate to satisfy basic consumption needs.

Allows scope for defining how basic the consumption needs may be.

Does not require getting the specified bundle but having the means to do so.

Outline
Relative
Absolute
The preferred poverty line
CBS
Food
Nonfood
Poverty Estimator
There are basically two components: food and nonfood.

Both could be normative or based on actual consumption patterns.

A poverty line based on actual consumption patterns is preferred. However, in these cases the poverty line will depend on the composition of consumption from which it is drawn, that is, the more comprehensive the consumption aggregate is, the more inclusive the poverty line is.
Steps of the Cost of Basic Needs Method

Part 2: Poverty Lines

Outline
Relative
Absolute
The preferred poverty line
CBN
Food
Nonfood
Poverty Estimator

1. Select the nutritional requirements.
2. Choose the basket of food items to attain these requirements.
3. Estimate the cost of acquiring this food basket, which represents the food poverty line.
4. Add a nonfood component.
What are the requirements?

- Caloric information
- Quantities consumed
- Price information

First, a food-energy requirement must be set, say, 2,100 kilocalories per person per day. Minimum standard for different activity levels and body weight.
Second, based on that information, the quantities consumed of each food item and the corresponding number of kilocalories consumed are estimated per person per day.

Some items require special attention:

- Other or residual categories
- Meals taken outside the household
- Alcohol
- Tobacco
Third, a reference group, representative of the poor, should be chosen, e.g., the bottom 30% or 40% or 50% of the population ranked in terms of the welfare indicator.

The average number of kilocalories consumed per person per day in the reference group is estimated. Then the cost of achieving that intake for that group is calculated. Last, that cost is scaled to achieve 2,100 kilocalories per person per day.
For example, say, the bottom 40% of the population consumed on average 1,330 kilocalories per person per day at a cost of $0.67 per person per day.

The food poverty line will be the necessary amount to achieve 2,100 kilocalories, in other words, $1.06 per person per day, value that comes from calculating 0.67*2100/1330.
## The food poverty line

### Part 2: Poverty Lines

<table>
<thead>
<tr>
<th>Outline</th>
<th>Bundle</th>
<th>kcals per kg</th>
<th>kg</th>
<th>daily kcals</th>
<th>price per kg</th>
<th>total cost</th>
<th>kcals (%)</th>
<th>cost (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Relative</strong></td>
<td>Consumed</td>
<td>1,330</td>
<td></td>
<td></td>
<td></td>
<td>0.67</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Nshima</td>
<td>3,614</td>
<td>0.28</td>
<td>994</td>
<td>1.0</td>
<td>0.28</td>
<td>75</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Beef</td>
<td>2,070</td>
<td>0.07</td>
<td>145</td>
<td>5.0</td>
<td>0.35</td>
<td>11</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Spinach</td>
<td>635</td>
<td>0.09</td>
<td>57</td>
<td>0.4</td>
<td>0.04</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Gnuts</td>
<td>3,363</td>
<td>0.04</td>
<td>135</td>
<td>0.2</td>
<td>0.01</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td><strong>Absolute</strong></td>
<td>Required</td>
<td>2,100</td>
<td></td>
<td></td>
<td></td>
<td>1.06</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Nshima</td>
<td>3,614</td>
<td>0.43</td>
<td>1,569</td>
<td>1.0</td>
<td>0.43</td>
<td>75</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Beef</td>
<td>2,070</td>
<td>0.11</td>
<td>229</td>
<td>5.0</td>
<td>0.55</td>
<td>11</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Spinach</td>
<td>635</td>
<td>0.14</td>
<td>90</td>
<td>0.4</td>
<td>0.06</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Gnuts</td>
<td>3,363</td>
<td>0.06</td>
<td>212</td>
<td>0.2</td>
<td>0.01</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

### Notes:

- **CBN**: Poverty Estimator
- **Nonfood**
The nonfood poverty line

More scope for disagreement.

The rationale for allowing a nonfood component is closely tied to the normative judgment involved in choosing the food component. The caloric intake requires determining an activity level, which in turn implies participating in society, and according to prevalent norms, a minimum level of consumption of clothing, housing, etc.
Two nonfood allowances can be defined:

- An upper nonfood poverty line. Represents the average nonfood consumption of those individuals whose total food consumption is close to the food poverty line.

- A lower nonfood poverty line. Represents the average nonfood consumption of those individuals whose total consumption is close to the food poverty line.

The intuition is that if these people are spending less on food than what they should have consumed in order to satisfy some nonfood needs, this nonfood consumption could be considered a minimum nonfood allowance.
Notice that the food poverty line is the same in both cases. The difference between the two total poverty lines comes through the nonfood component.
Even when the analyst is sure that the poverty line has been correctly estimated, it is absolutely essential to test the sensitivity of the findings to the choice of the poverty line because no single poverty line is perfect.

- To the chosen food reference group
- To the level of the poverty line
- To the household composition adjustment
The literature on poverty measurement is extensive, but the focus will be on the class of poverty measures proposed by Foster, Greer and Thorbecke. This family of measures can be summarized by the following equation:

\[ P_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left( \frac{z - y_i}{z} \right)^\alpha \]

where \( \alpha \) is some non-negative parameter, \( z \) is the poverty line, \( y \) denotes consumption, \( i \) represents individuals, \( n \) is the total number of individuals in the population, and \( q \) is the number of individuals with consumption below the poverty line.
THANK YOU FOR YOUR ATTENTION