Jean Monnet Chair

Small Area Methods for Monitoring of Poverty and Living conditions in EU (SAMPL-EU)

The measurement of Poverty through the synthesis of multidimensionality

Prof Vincenzo Mauro

MPI index (Alkire-Foster 2009)

The Alkire Foster (AF) method is a way of measuring multidimensional poverty developed by OPHI's Sabina Alkire and James Foster. Building on the Foster-Greer-Thorbecke poverty measures, it involves counting the different types of deprivation that individuals experience at the same time, such as a lack of education or employment, or poor health or living standards. These deprivation profiles are analysed to identify who is poor, and then used to construct a multidimensional index of poverty (MPI)

MPI index (Alkire-Foster 2009)

To identify the poor, the AF method counts the overlapping or simultaneous deprivations that a person or household experiences in different indicators of poverty. The indicators may be equally weighted or take different weights. People are identified as multidimensionally poor if the weighted sum of their deprivations is greater than or equal to a poverty cut off – such as 20%, 30% or 50% of all deprivations.

MPI index (Alkire-Foster 2009)

The most common way of measuring poverty is to calculate the percentage of the population who are poor, known as the headcount ratio (H).

Having identified who is poor, the AF method generates a class of poverty measures (M_α) that goes beyond the simple headcount ratio

MPI index (Alkire-Foster 2009)

Choose Unit of Analysis. The unit of analysis is most commonly an individual or household but could also be a community, school, clinic, firm, district, or other unit.

Choose Indicators. Indicators are chosen for each dimension on the principles of accuracy (using as many indicators as necessary so that analysis can properly guide policy) and parsimony (using as few indicators as possible to ensure ease of analysis for policy purposes and transparency). Statistical properties are often relevant—for example, when possible and reasonable, it is best to choose indicators that are not highly correlated.

MPI index (Alkire-Foster 2009)

Set Deprivation Cut-Off. A deprivation cutoff is set for each indicator. This step establishes the first cutoff in the methodology. Every person can then be identified as deprived or nondeprived with respect to each indicator. For example, if the dimension is schooling (‘How many years of schooling have you completed?’), ‘6 years or more’ might identify nondeprivation, while ‘1–5 years’ might identify deprivation in the indicator.
Poverty thresholds can be tested for robustness, or multiple sets of thresholds can be used to clarify explicitly different categories of the poor (such as deprived and extremely deprived).

MPI index (Alkire-Foster 2009)

Count the Number of Deprivations for Each Person. Equal weights among indicators are assumed for simplicity. General weights can be applied, however, in which case the weighted sum is calculated

Set the Second Cutoff. Assuming equal weights for simplicity, set a second identification cutoff, k, which gives the number of indicators in which a person must be deprived in order to be considered multidimensionally poor.

MPI index (Alkire-Foster 2009)

Apply Cutoff k to Obtain the Set of Poor Persons and Censor All Nonpoor Data. The focus is now on the profile of the poor and the dimensions in which they are deprived. All information on the nonpoor is replaced with zeros (0).

Calculate the Headcount, H. Divide the number of poor people by the total number of people. In our example, when k = 4, the headcount is merely the proportion of people who are poor in at least 4 of indicators. For example, as seen in Tables 1 and 2, two of the four people were identified as poor, so H = 2/4 = 50 per cent. The multidimensional headcount is a useful measure, but it does not increase if poor people become more deprived, nor can it be broken down by dimension to analyze how poverty differs among groups.

MPI index (Alkire-Foster 2009)

The MPI: overview of strengths and limits

MPI strengths

Positive aspects

- intuitive
- poverty focused
- quite simple
- usable with ordinal data

… but also some limits related to

MPI limits in monitoring

- The indexes are not sensitive to changes in the level but on change in the poverty status

This does not allow during monitoring to capture the changes for those who are v. poor (and also those who are v. rich), e.g. it works for those close to the thresholds and those crossing it
The index does not take into account the heterogeneity between the achievement in each dimensions

The MPI is robust but at expense of sensitivity e.g. monitoring of the single person for single dimension and at aggregate level

→ Index measures

Nature of the relationship between the defined concept and the selected indicators

Reflective vs Formative

- **Reflective** indicators are seen as **functions** of the conceptual (latent) variable (highly correlated and interchangeable)

- On the opposite, **formative** indicators are assumed as **causes** of the latent variable, so that they are not necessarily correlated to each other

Nature of the relationship between the defined concept and the selected indicators

Reflective vs Formative

Two uncorrelated indicators can both contribute to the measurement of the same conceptual variable, while two correlated indicators may turn out to be redundant in measuring the concept

The synthesis of indicators of poverty and wellbeing introduced in this work is developed assuming a formative framework

Desirable properties

Main properties

- Full sensitivity of the synthesis to any change in the data for any subgroup and in any dimension (strict monotonicity required for monitoring)
- Continuity
- A straightforward interpretation of the obtained synthetic score (not only through a comparison)
- A theoretically-coherent structure of substitutability between achievements

HDI – Human Development Index

The **Human Development Index** (**HDI**) is a composite statistic (composite index) of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development. A country scores higher HDI when the lifespan is higher, the education level is higher, and the GDP per capita is higher. The HDI was developed by Indian Economist Amartya Sen often framed in terms of whether people are able to "be" and "do" desirable things in their life, and was published by the United Nations Development Programme.

It uses a geometric mean of 3 dimensions

1) A long and healthy life: Life expectancy at birth
2) Education index: Mean years of schooling
3) A decent standard of living: GNI per capita (PPP US$)

HDI – Human Development Index

Published on 4 November 2010 (and updated on 10 June 2011), the 2010 Human Development Index (HDI) combines three dimensions:

- A long and healthy life: Life expectancy at birth
- Education index: Mean years of schooling and Expected years of schooling
- A decent standard of living: GNI per capita (PPP US$)

In its 2010 Human Development Report, the UNDP began using a new method of calculating the HDI. The following three indices are used:

1. Life Expectancy Index (LEI) $= \frac{\mathrm{LE} - 20}{85 - 20}$

   LEI is 1 when Life expectancy at birth is 85 and 0 when Life expectancy at birth is 20.

2. Education Index (EI) $= \frac{\mathrm{MYSI} + \mathrm{EYSI}}{2}$

   2.1 Mean Years of Schooling Index (MYSI) $= \frac{\mathrm{MYS}}{15}$

   Fifteen is the projected maximum of this indicator for 2025.

   2.2 Expected Years of Schooling Index (EYSI) $= \frac{\mathrm{EYS}}{18}$

   Eighteen is equivalent to achieving a master's degree in most countries.

3. Income Index (II) $= \frac{\ln(\mathrm{GNIpc}) - \ln(100)}{\ln(75,000) - \ln(100)}$

   II is 1 when GNI per capita is $75,000 and 0 when GNI per capita is $100.

Finally, the HDI is the geometric mean of the previous three normalized indices:

$\mathrm{HDI} = \sqrt[3]{\mathrm{LEI} \cdot \mathrm{EI} \cdot \mathrm{II}}.$

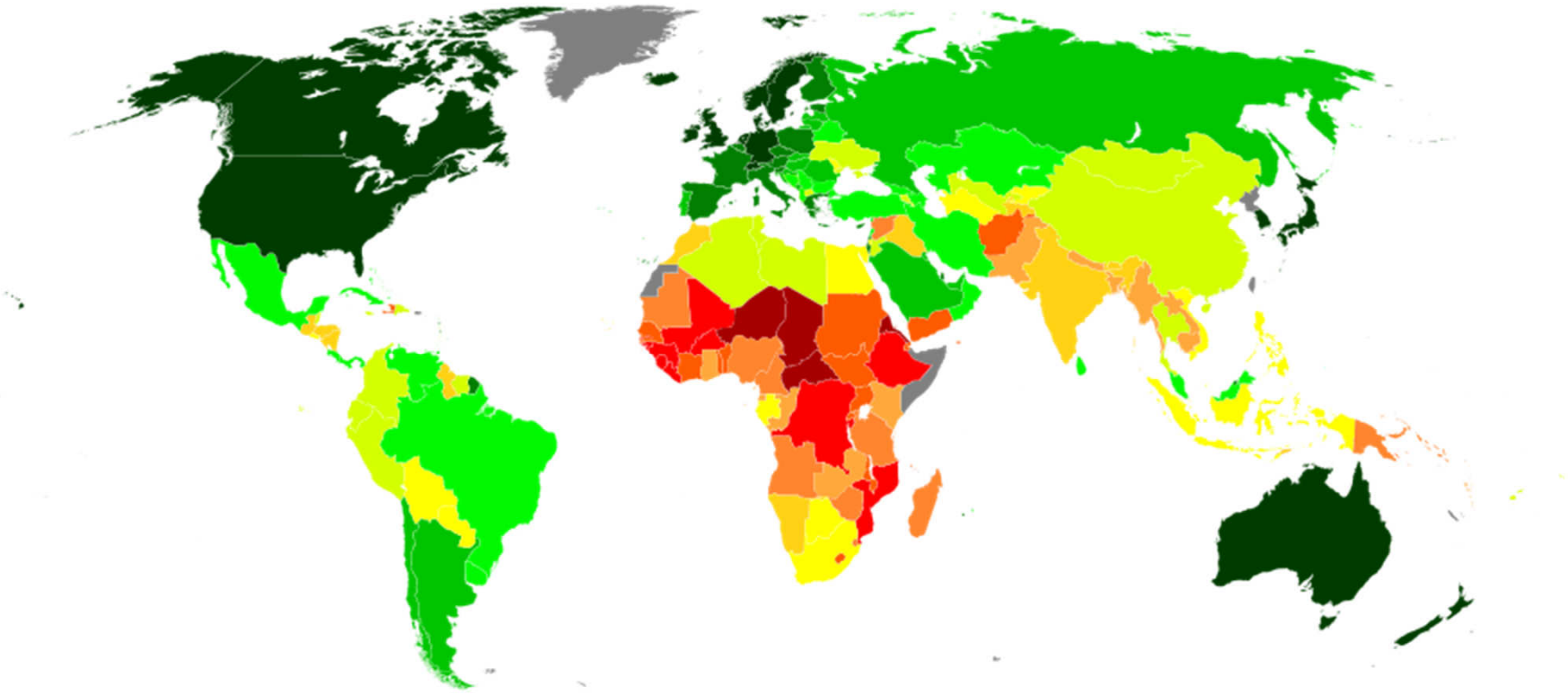
MYS: Mean years of schooling (i.e. years that a person aged 25 or older has spent in formal education)

EYS: Expected years of schooling (i.e. total expected years of schooling for children under 18 years of age)

GNIpc: Gross national income at purchasing power parity per capita

Source: wikipedia

HDI – Human Development Index



World map indicating the Human Development Index (based on 2015 and 2016 data, published on 21 March 2017).

0.900 and over	0.650–0.699	0.400–0.449
0.850–0.899	0.600–0.649	0.350–0.399 and under
0.800–0.849	0.550–0.599	Data unavailable
0.750–0.799	0.500–0.549	
0.700–0.749	0.450–0.499	