The first revision of the global MPI: Empirical insights and robustness

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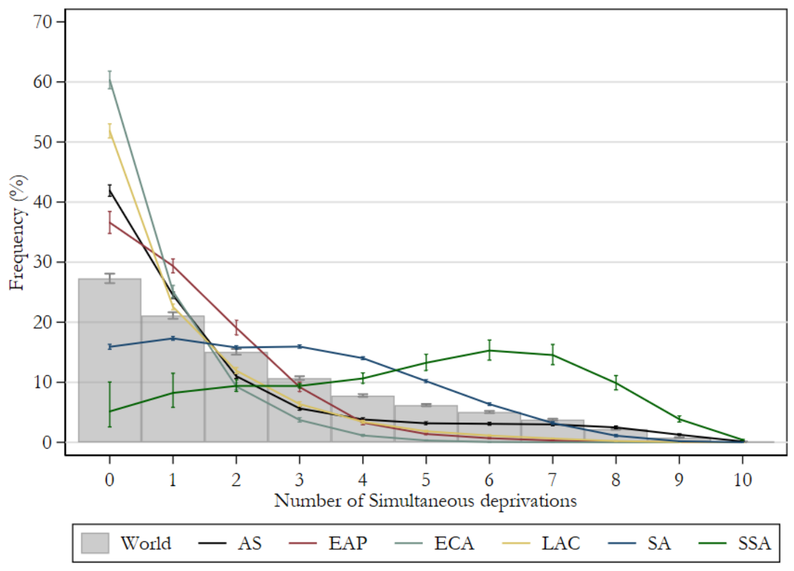
This paper

In 2018, five of the ten indicators of the global MPI were revised with the purpose of aligning the index to the SDG. This paper offers a three-fold analysis of this revision. **First**, it explores the overlap of deprivations prior to the application of the poverty cutoff. **Second**, it analyses the robustness of the revised global MPI to two alternative parameters – the poverty cutoffs and weighting structure. **Third**, it compares the revised 2018 and the original 2010 specifications of the global MPI.

The Alkire-Foster (AF) Method

The global MPI relies methodologically on the AF method. In a society with N individuals where d indicators are relevant to assess their living conditions: • A person i is deprived if they fall short of the minimum achievement level for indicator j: $g_{ij}^0 = 1$ in this case and $g_{ij}^0 = 0$ otherwise. • The deprivation score, c_i, represents the number of weighted deprivations experienced by person i: $c_i = \sum_{j=1}^{d} w_j g_{ij}^0$ where w_j represents the relative importance of indicator j and $\sum_{j=1}^{d} w_j = 1$. • A person is multidimensionally poor if they face k or more weighted deprivations: $\rho = 1$ in that case and $\rho = 0$ otherwise. • **Poverty incidence (*H*)** is the proportion of people living in multidimensional poverty: $H = \frac{1}{N}\sum_{i=1}^{N} \rho$. The **Intensity of poverty (*A*)** is the average number of weighted deprivations experienced by the poor: $A = \frac{1}{q}\sum_{i=1}^{N}(\rho \times c_i)$ where q is the number of poor people. • Then the MPI is computed as $\boldsymbol{MPI} = H \times A$.



Multidimensionality is important: 27% do not suffer any deprivation; 21% suffer 'only' one deprivation; 52% are deprived in **multiple ways**

Structure of the global MPI: the original (2010) and the revised (2018) specifications

Dimension	Weight	Indicator	Weight	2010 Specification. Deprived if…	2018 Specification. Deprived if…
Health	1/3	Nutrition	1/6	Any teenagers or adults have **low BMI** or any child under 5 is **underweight**.	Any adults have **low BMI** or any teenagers have **low BMI-for-age** or any child under 5 is **underweight** or **stunted**.
		Child mortality	1/6	Any **child** has **died** in the family.	Any **child*** has **died** in the family in the **five-year** period preceding the survey.
Education	1/3	Years of schooling	1/6	No household member aged 10 years or older has completed **five** years of schooling.	No household member aged 10 years or older has completed **six** years of schooling.
		School attendance	1/6	Any school-aged child is not attending school up to the age at which he/she would complete class 8.	
Living Standards	1/3	Cooking fuel	1/18	The household cooks with dung, wood or charcoal.	
		Sanitation	1/18	The household's sanitation facility is not improved, or it is improved but shared with other households.	
		Drinking water	1/18	The household does not have access to improved drinking water or safe drinking water is at least a 30-minute walk from home, roundtrip.	
		Electricity	1/18	The household has no electricity.	
		Housing	1/18	The household has a dirt, sand, dung or other unspecified type of **floor**.	The household has inadequate housing: the **floor** is of natural materials or the **roof** or **walls** are of rudimentary materials.
		Assets	1/18	The household does not own more than one **radio**, **TV**, **telephone**, **bike**, **motorbike** or **refrigerator** and does not own a car or truck.	The household does not own more than one of these assets: radio, TV, telephone, **computer**, **animal cart**, bicycle, motorbike, or refrigerator, and does not own a car or truck.

- The **weight structure** was preserved in the revision. Each dimensions has an equal weight and the indicators have equal weights within dimensions
- The **poverty cutoff** remains 1/3. That is, a person is identified as being multidimensionally poor if they face 1/3 or more of the weighed deprivations

Data:
- 105 countries in the developing world
- DHS, MICS, PAPFAM & some national surveys
- 8.76 million sample

With the 2018 specification:
H = 23.24%
A = 49.50%
MPI = 0.115

Robustness of the revised structure of global MPI

- A country pairwise comparison is **significant** at the baseline specification if one country is poorer than the other
- A comparison is **robust** if the country pairwise ordering at the baseline specification is preserved under an alternative specification
- We find that **the revised specification of the global MPI is at least as robust as the original specification** (Alkire & Santos, 2014)

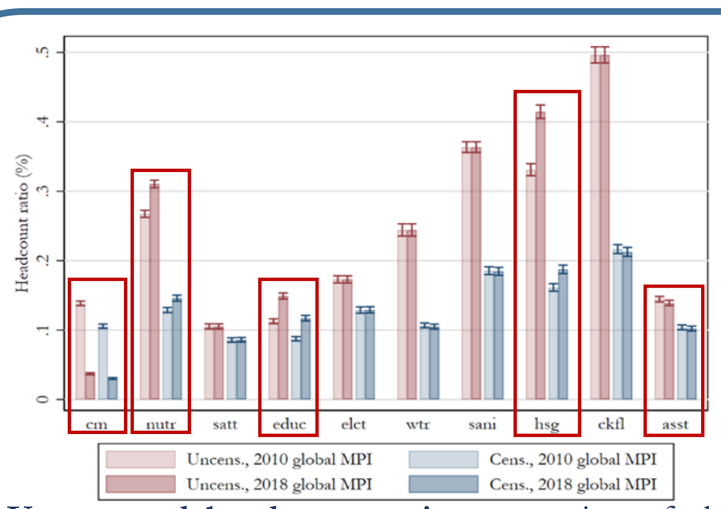
Alternative specification:
poverty cutoff between 1/5 and 1/2

Region	Countries	Possible Comparisons	Significant comparisons at baseline		Same ordering: Sig. and non-sig. at baseline		Same ordering: only sig. at baseline	
			Number	%	Number	%	Number	%
Ordering according the global MPI (adjusted headcount ratio)								
World	104	5356	4957	92.6	4922	91.9	4714	95.1
AS	13	78	71	91.0	68	87.2	67	94.4
EAP	11	55	49	89.1	47	85.5	45	91.8
ECA	14	91	65	71.4	51	56.0	41	63.1
LAC	20	190	156	82.1	172	90.5	146	93.6
SA	7	21	18	85.7	17	81.0	17	94.4
SSA	37	666	595	89.3	613	92.0	569	95.6
Ordering according H (poverty incidence)								
World	104	5356	4939	92.2	4155	77.6	4033	81.7
AS	13	78	69	88.5	66	84.6	65	94.2
EAP	11	55	48	87.3	39	70.9	39	81.3
ECA	14	91	66	72.5	31	34.1	21	31.8
LAC	20	190	154	81.1	127	66.8	106	68.8
SA	7	21	18	85.7	15	71.4	14	77.8
SSA	37	666	591	88.7	514	77.2	499	84.4

Alternative specification:
in turn, one dimension is twice as important as the others. That is, in turn, one dimension is given a 50% weight and the others 25% each

Region	Countries	Possible Comparisons	Significant comparisons at baseline		Same ordering: Sig. and non-sig. at baseline		Same ordering: only sig. at baseline	
			Number	%	Number	%	Number	%
Ordering according the global MPI (adjusted headcount ratio)								
World	104	5356	4957	92.6	4688	87.5	4569	92.2
AS	13	78	71	91.0	71	91.0	69	97.2
EAP	11	55	49	89.1	43	78.2	39	79.6
ECA	14	91	65	71.4	57	62.6	48	73.8
LAC	20	190	156	82.1	140	73.7	128	82.1
SA	7	21	18	85.7	13	61.9	13	72.2
SSA	37	666	595	89.3	549	82.4	533	89.6
Ordering according H (poverty incidence)								
World	104	5356	5090	95.0	4579	85.5	4566	89.7
AS	13	78	73	93.6	70	89.7	70	95.9
EAP	11	55	50	90.9	39	70.9	39	78.0
ECA	14	91	69	75.8	57	62.6	53	76.8
LAC	20	190	167	87.9	132	69.5	130	77.8
SA	7	21	21	100.0	14	66.7	14	66.7
SSA	37	666	622	93.4	515	77.3	514	82.6

AS: Arab States – **EAP**: East Asia & the Pacific – **ECA**: Europe & Central Asia – **LAC**: Latin America & the Caribbean – **SA**: South Asia – **SSA**: Sub-Saharan Africa



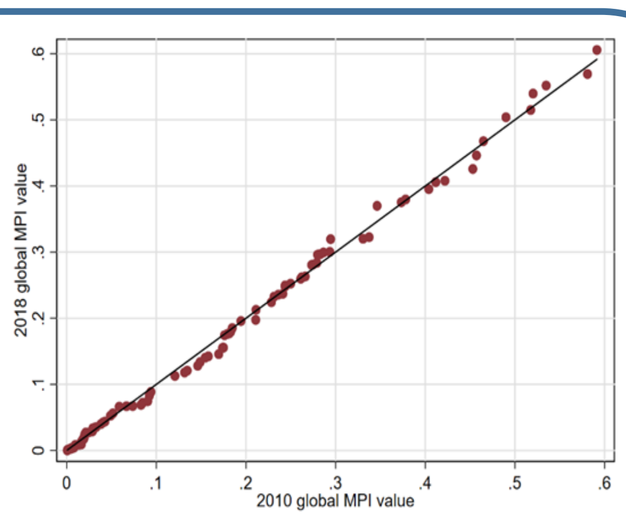
Uncensored headcount ratio: proportion of the population deprived in an indicator

Censored headcount ratio: proportion of the population that is poor **and** deprived in an indicator

Comparison of the original and the revised structures of the global MPI

Changes in *H* and *MPI* registered were small, yet statistically significant. *A* registered considerable changes:

- The new structure **avoids overlooking deprivations in nutrition, years of schooling and household**.
- The new structure **better tracks recent progress in child mortality**
- 93.02% of the possible **country pairwise comparisons are identical** in both specifications
- Taking into account only significant pairwise comparisons in the revised specification, 99.15% of them **are identical in the original specification**.



The qq-plot shows that the **distribution of H across countries is similar** in the original and the revised structures.

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