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OXFORD POVERTY & HUMAN DEVELOPMENT INITIATIVE

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Summer School on Multidimensional Poverty Analysis

11–23 August 2014

Oxford Department of International Development
Queen Elizabeth House, University of Oxford

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Review of the Course

Sabina Alkire

22 August 2014

Oxford University, UK

OPHI at a glance

- **Global team:**
  - 4 post-docs + 1 director + 2 outgoing (MC, AC) + part-time
  - 3 core staff (administrator, communications, project assistant)
  - 20 colleagues from many countries (India, Colombia, Mexico, Pakistan, US, S Africa, Argentina, Morocco, Portugal etc.)

- **Advisors:**
  - Sudhir Anand
  - Tony Atkinson
  - Amartya Sen
  - Frances Stewart

Purpose:
To build a multidimensional economic framework for reducing poverty grounded in people's experiences and values.

OPHI's research – two themes

- **Multidimensional Metrics**
  - Developing & publishing rigorous **new measures**
  - **Applying these** to real problems (WEAI, MPI, etc)
  - Developing **methodologies** of analysis and evaluation
- **Missing Dimensions**
  - Developing **modules** for inclusion in internationally comparable household surveys.
  - Relevant to **post-2015** discussion of potential MDGs like work, safety from violence, or empowerment.

Hi from whole the OPHI team

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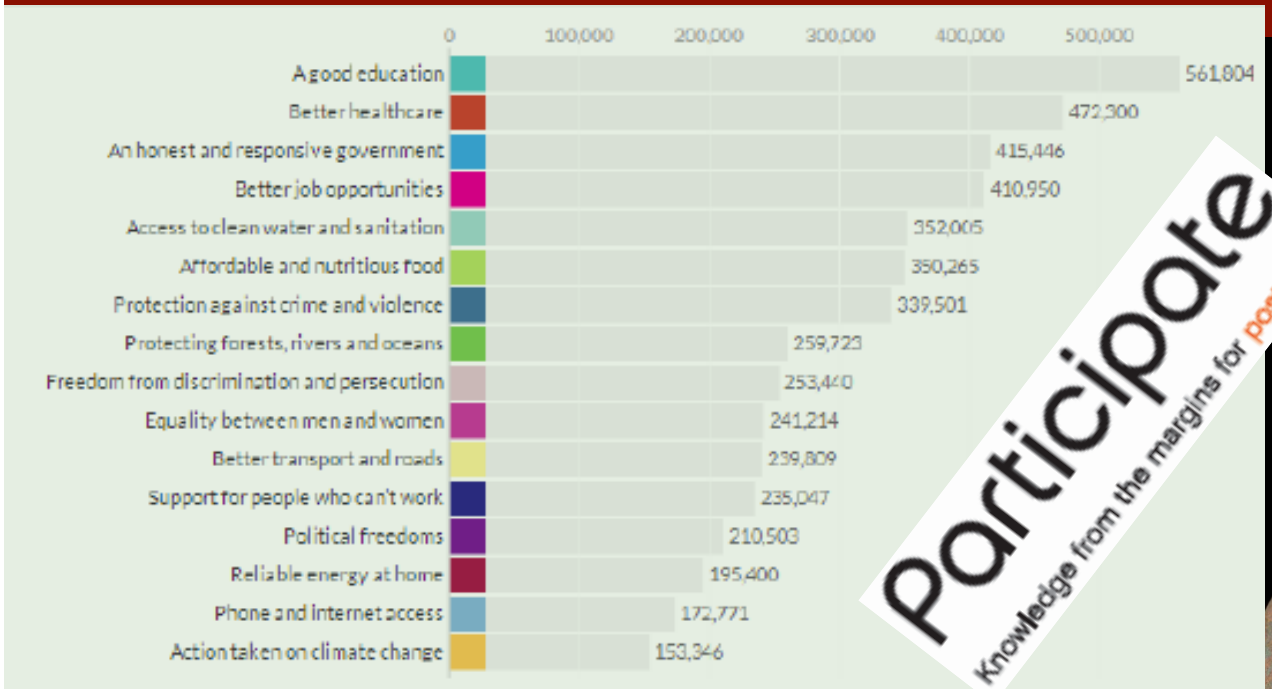
"Human lives are battered and diminished in all kinds of different ways." *Amartya Sen*

UNDP's *Million Voices*: 'The clear message is: Eradicating poverty and hunger, achieving gender equality, and improving health and education services remain foremost in people's priorities.' *Helen Clark, 23 Sept 2013*



Why the new emphasis on measurement?

We can: *Technical*

1) Data availability
2) Computational and Methodological developments

We need to: *Empirical*

3) Monetary and Non-Monetary Household Deprivation Levels
4) Income poverty trends
5) Associations across non-monetary deprivations
6) Economic Growth and Non-income Deprivations

We are willing to: *Policy*

7) National and international policy 'demand'
8) Political space for new metrics

Mismatches: Income poverty and material deprivations in Europe

Table 6 Distribution across combined income poverty and deprivation persistence variable by country

Neither persistently income poor nor deprived	Persistently income poor only	Persistently deprived only	Persistently income poor and deprived
82.8	6.9	8.9	1.4
78.8	7.1	7.3	6.8
73.0	9.3	8.8	8.9
70.8	11.6	8.5	9.0
64.8	11.4	9.7	14.0
68.8	9.2	11.3	10.7
68.8	11.2	9.9	10.1
72.7	9.2	8.7	9.4
64.5	12.0	11.3	12.2
70.7	10.4	9.2	9.7

Source: Whelan Layte Maitre 2004 Understanding the Mismatch between Income Poverty & Deprivation

In Europe, while 20% of people are persistently income poor, and 20% are persistently materially deprived, only 10% of people are both persistently income poor and materially deprived.

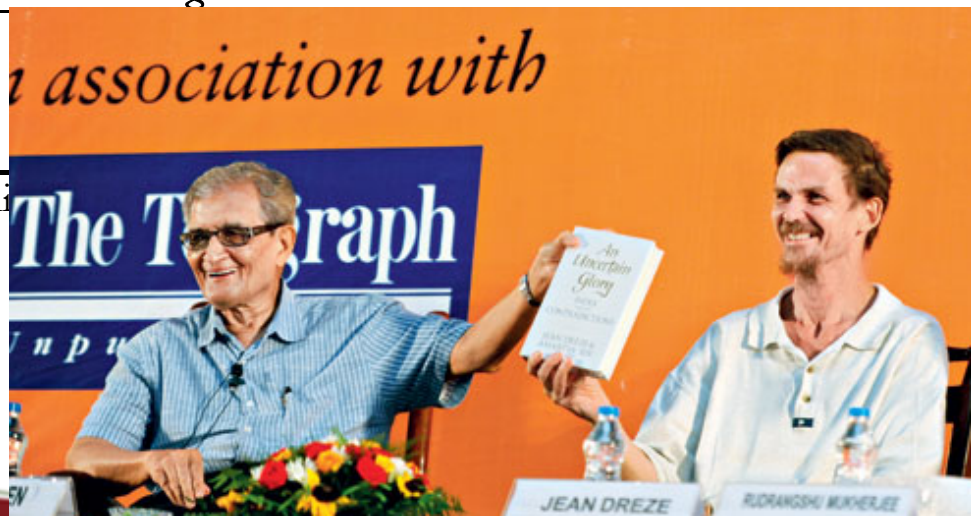
See also: Nolan and Whelan 2011

Economic Growth and Non-income Deprivations

Table 1.1 Comparison of India's Performance with Bangladesh and Nepal

	Year	India	Bangladesh	Nepal
GDP per capita (PPP, constant 2005 international $)	1990	1,193	741	716
	2011	3,203	1,569	1,106
	Growth (p.a.)	*0.7%*	*0.5%*	*0.3%*
Under-5 Mortality Rate	1990	114	139	135
	2011	61	46	48
	Change	*-53*	*-93*	*-87*
Maternal Mortality Ratio	1990	600	800	770
	2010	200	240	170
	Change	*-400*	*-560*	*-600*
Infant Immunization (DPT) (%)	1990	59	64	44
	2011	72	96	92
	Change	*13*	*32*	*48*
Female Literacy Rate, Age 15-24 Years (%)				

Source: Drèze and Sen (2013) and World Bank Data Onli



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The SSF Commission's Consensus (p 9)

"those attempting to guide the economy and our societies are like pilots trying to steering a course **without a reliable compass.** …

"**We are almost blind** when the metrics on which action is based are ill-designed or when they are not well understood. For many purposes, we need better metrics."

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Review: Unidimensional Methods

Variable – income

Identification – poverty line

Aggregation – Foster-Greer-Thorbecke (1984)

Example Incomes = (7,3,4,8) poverty line z = 5

Deprivation vector $\mathbf{g^0 = (0,1,1,0)}$

Headcount ratio $P_0 = \mu(g^0) = 2/4$

Normalized gap vector $\mathbf{g^1 = (0, 2/5, 1/5, 0)}$

Poverty gap = $P_1 = \mu(g^1) = 3/20$

Squared gap vector $\mathbf{g^2 = (0, 4/25, 1/25, 0)}$

FGT Measure = $P_2 = \mu(g^2) = 5/100$

μ is a mean operator

Axioms of Multidimensional Poverty

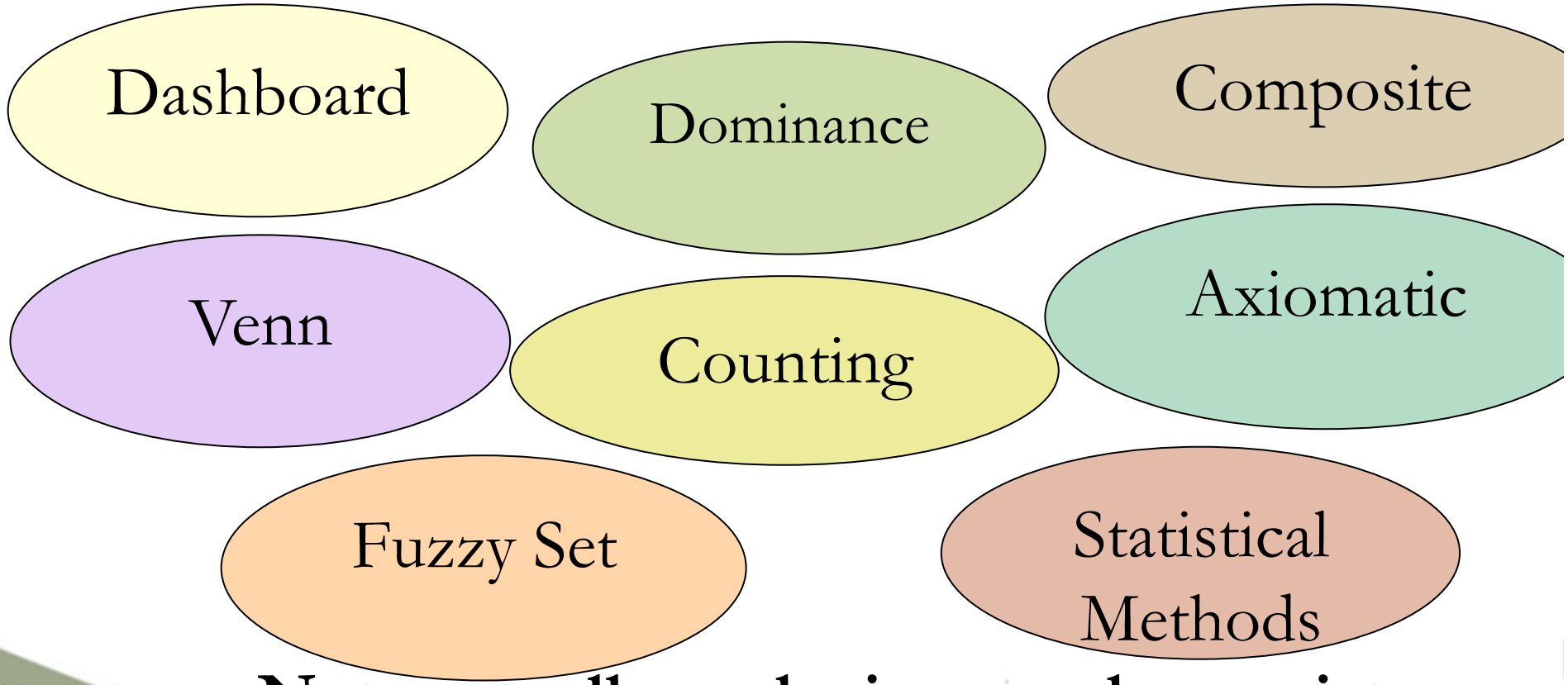
- Most are **Natural Extensions** from unidimensional axioms (i.e. symmetry, replication invariance, scale invariance, poverty focus, deprivation focus, monotonicity, dimensional monotonicity, transfer)
- In multidimensional space, axioms are **joint restrictions** on identification and aggregation methodologies.

Classification of Properties

- Invariance Properties - focus, ordinality
- Dominance Properties - dim monotonicity
- Subgroup Properties - group, dim breakdown
- Technical Properties - normalization, non-triviality

- Two types
  - Natural extensions of the unidimensional properties
  - Axioms specific to the multidimensional context

Methods of Multidimensional Poverty Measurement & Analysis



Not mutually exclusive: overlaps exist

Methods of Multidimensional Poverty Measurement

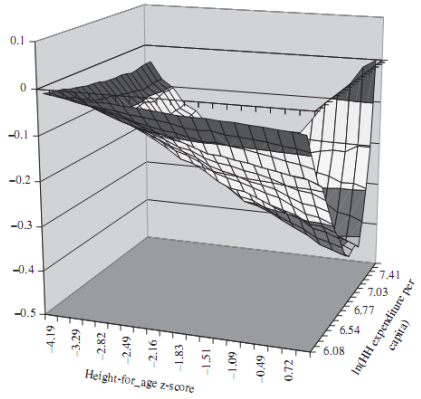
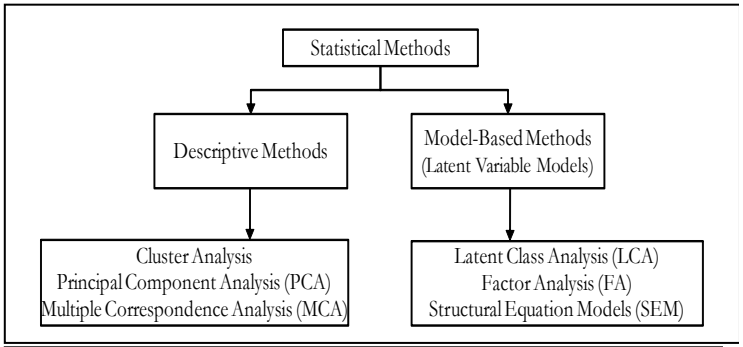
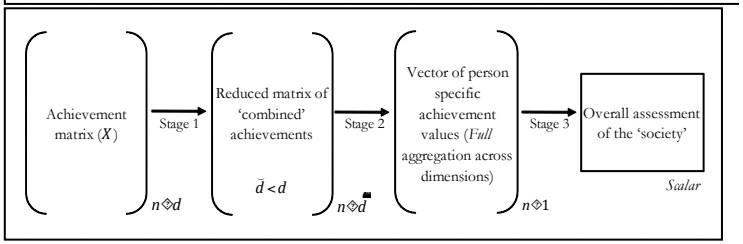
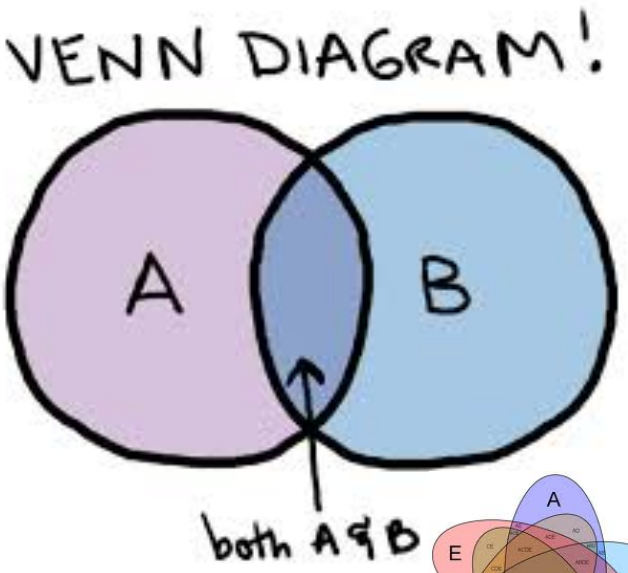
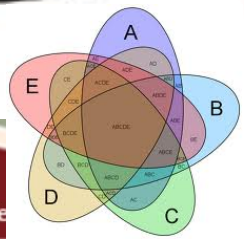


Fig. 5. *Urban Minus Rural Dominance Surface for Viet Nam*









Bourguignon & Chakravarty (2003)

$$P_{BC1}(X;Z)=\frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{d}w_j g_{ij}^{\alpha_j}\ ;\text{with } \alpha_j \geq 1. \quad P_{BC2}(X;Z)=\frac{1}{n}\sum_{i=1}^{n}\left[\sum_{j=1}^{d}w_j g_{ij}^{\theta}\right]^{\alpha/\theta}$$

Chakravarty & D'Ambrosio (2006)

$$P_{CD1}(X;Z)=\frac{1}{n}\sum_{i=1}^{n}\left[\sum_{j=1}^{d}w_j g_{ij}^{0}\right]^{\beta}$$

Bossert, Chakravarty & D'Ambrosio (2009)

$$P_{BCD}(X;Z)=\left(\frac{1}{n}\sum_{i=1}^{n}\left[\sum_{j=1}^{d}w_j g_{ij}^{0}\right]^{\beta}\right)^{1/\beta}$$

Alkire & Foster (2007, 2011)

$$M_{\alpha}(X,z)=\frac{1}{nd}\sum_{i=1}^{n}\sum_{j=1}^{d}w_j g_{ij}^{\alpha}(k) \text{ with } \alpha \geq 0$$

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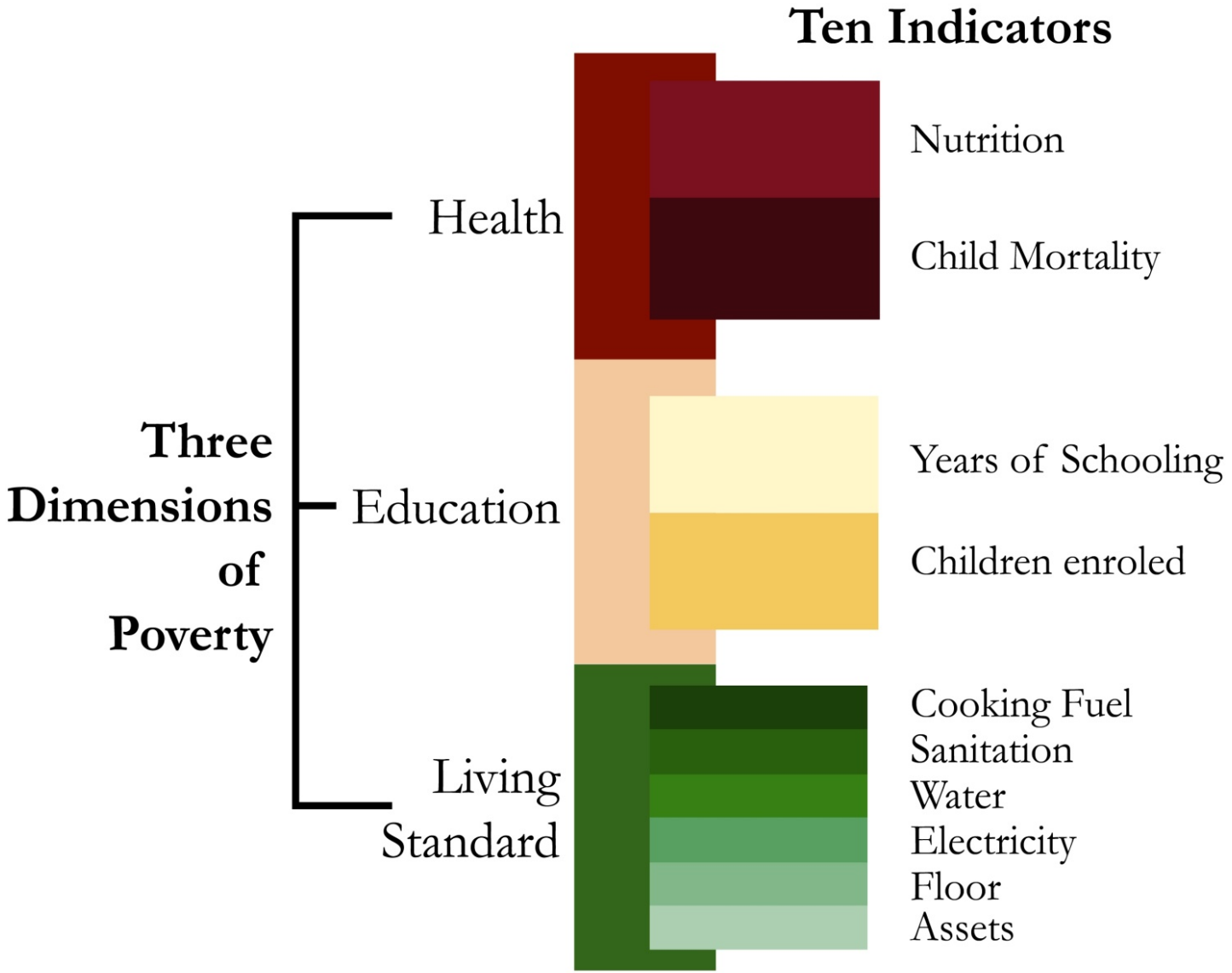
AF Example: the global MPI?

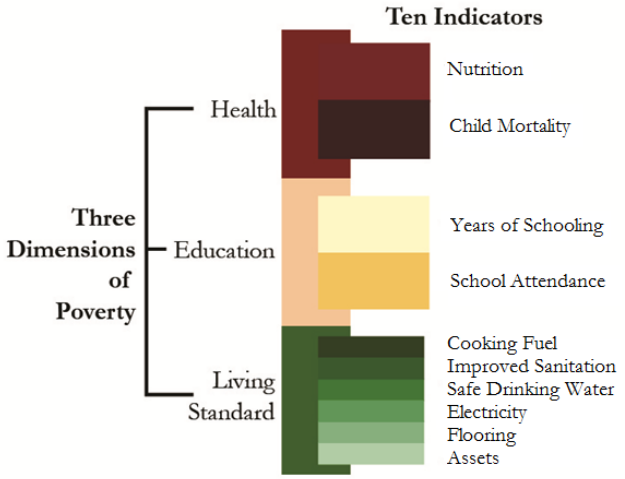
- The MPI 2014 is an internationally comparable index of poverty for 108 developing countries.
- MPI was launched in 2010 in the *Human Development Report*, and updated in each HDR.
- The MPI methodology can be adapted for national or local poverty measures – you choose your own indicators, weights and cutoffs.

MPI: Dimensions, Indicators, & Weights

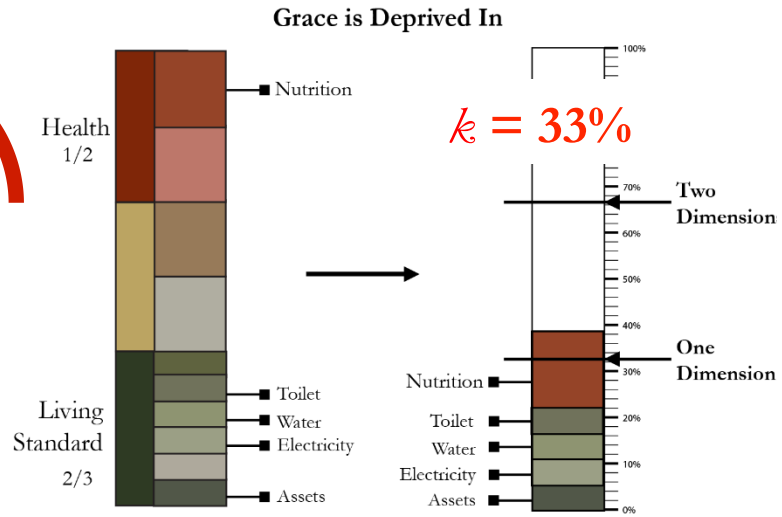


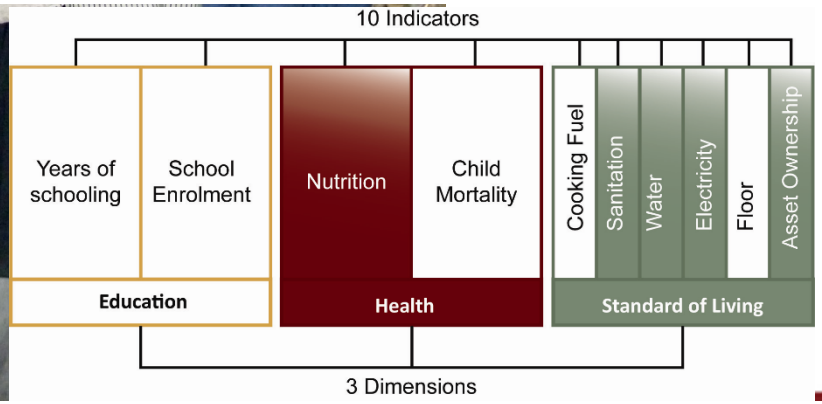
Global Multidimensional Poverty Index

UNDP *Human Development Report 2014* & Alkire Conconi and Seth 2014



Formula: MPI = $M_0 = H \times A$





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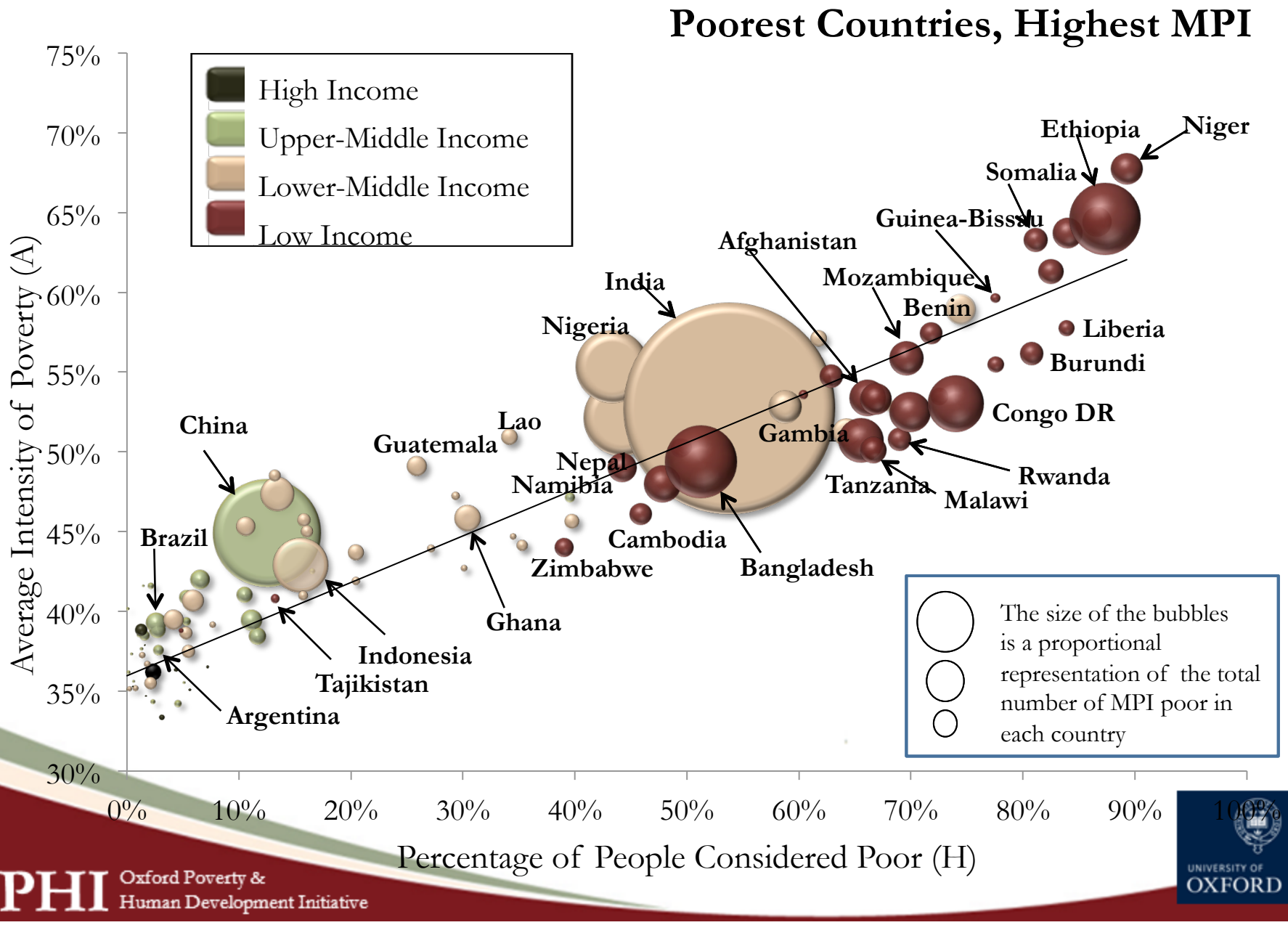
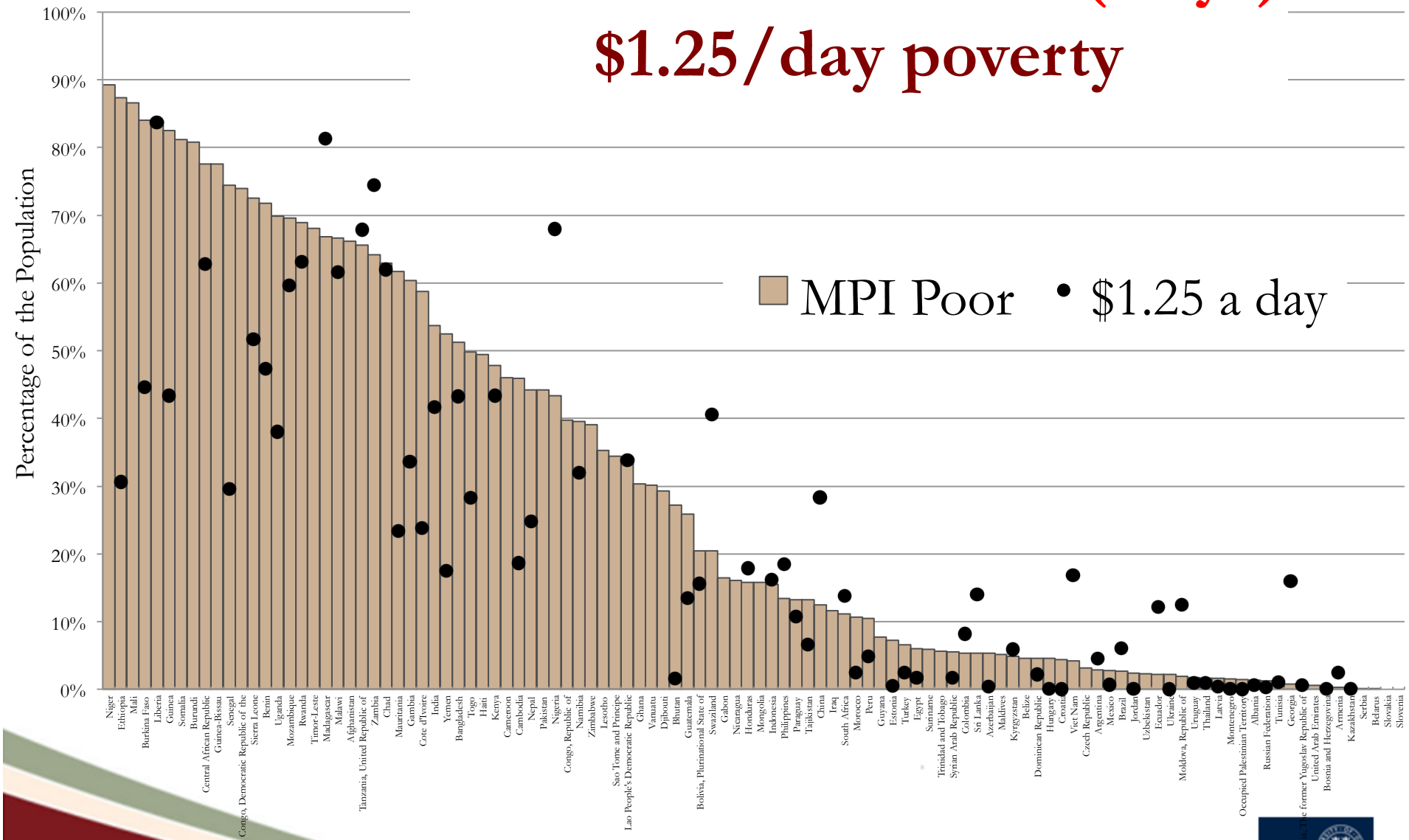
What's new? MPI has Incidence and Intensity



MPI Headcount ratio (why?)
$1.25/day poverty



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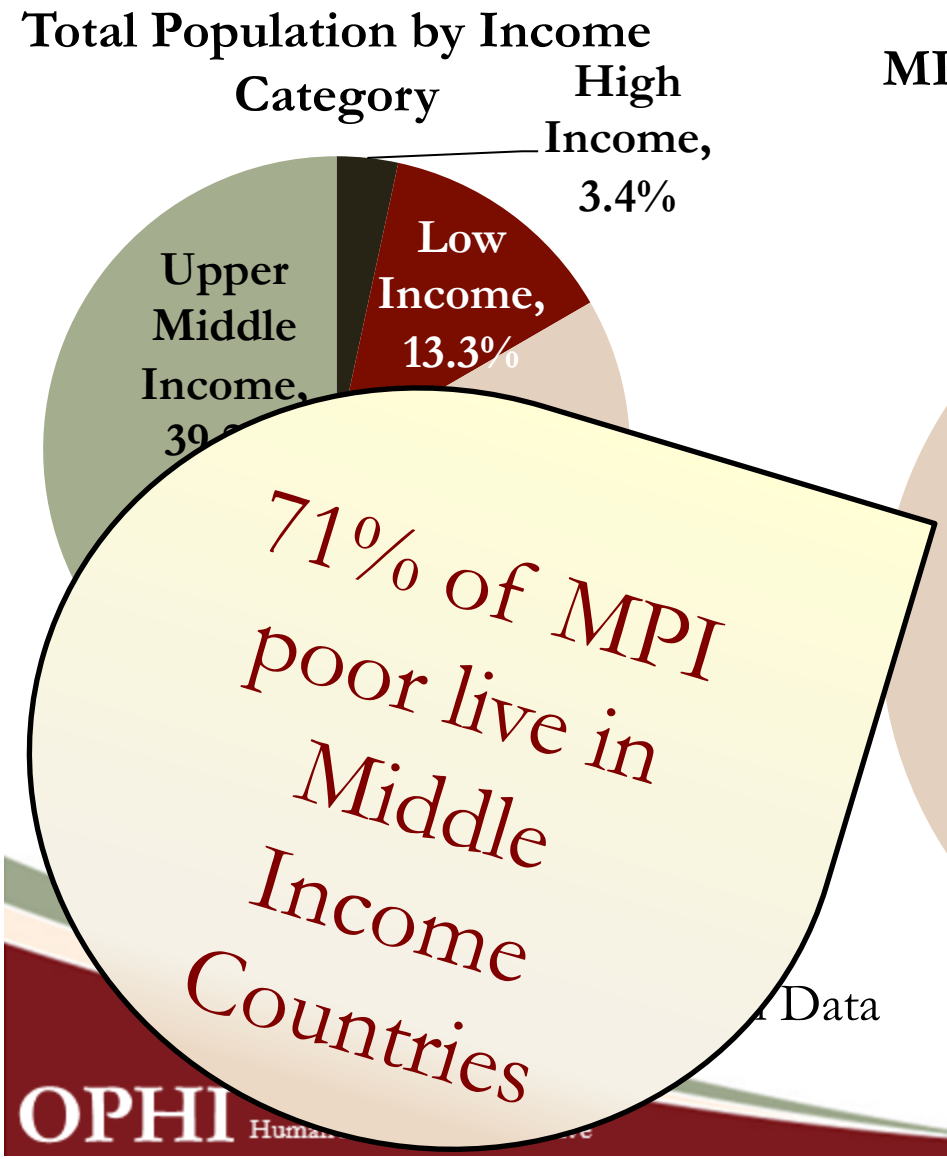
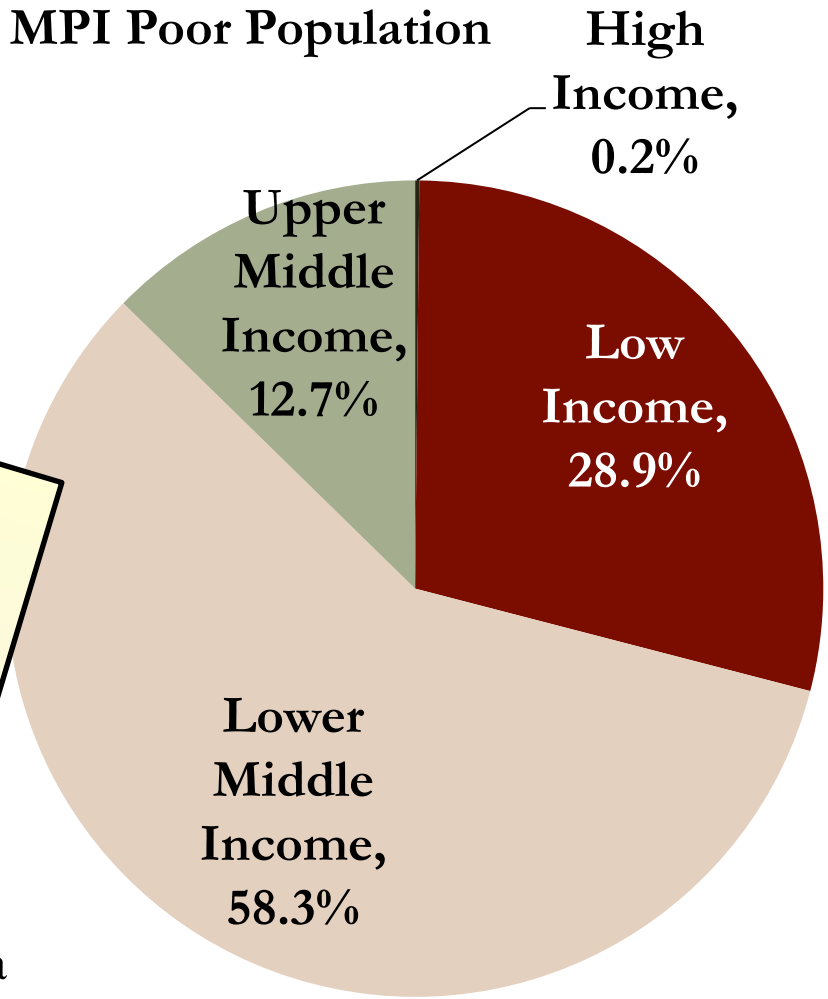
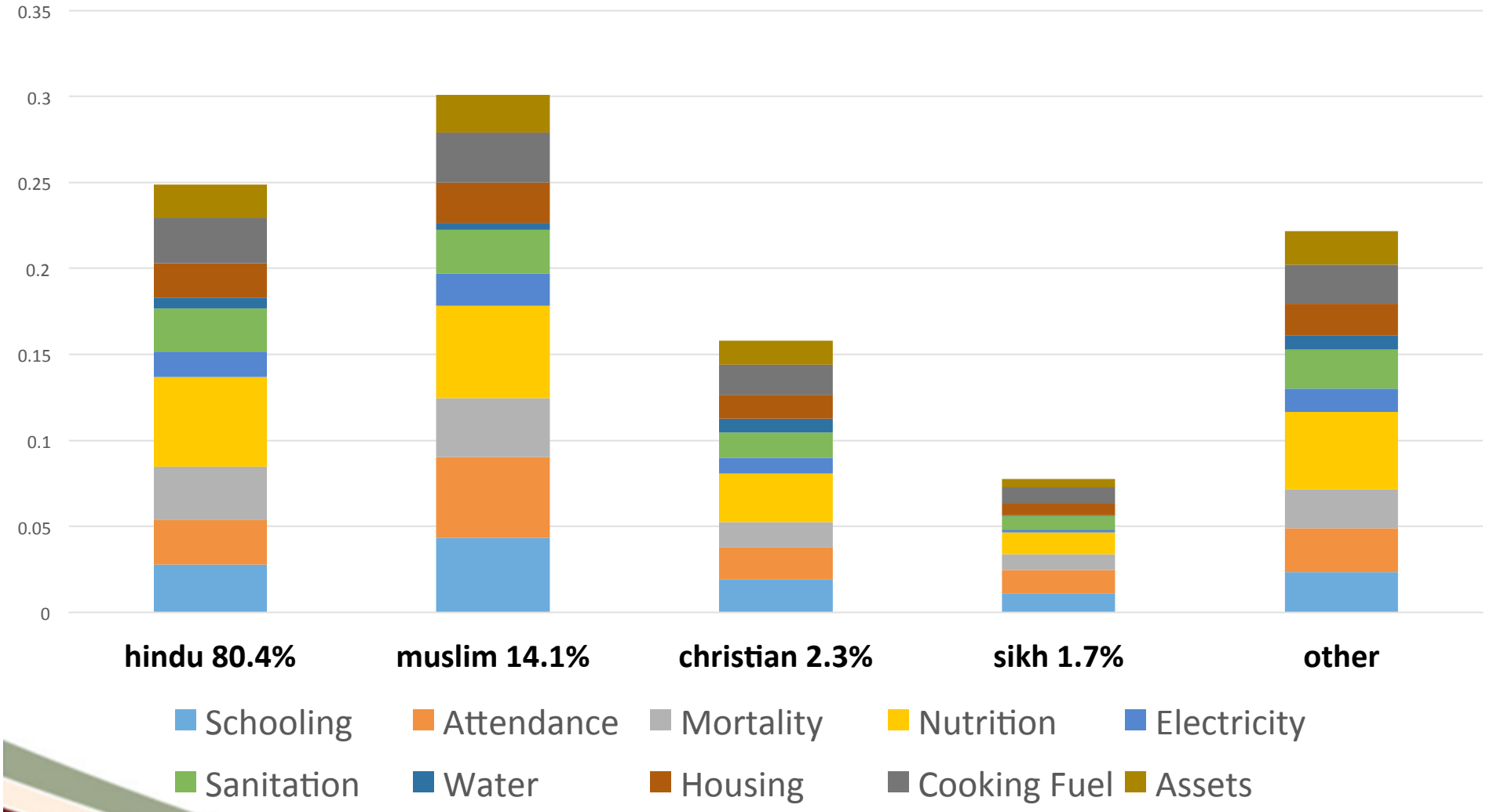
Most poor people (71%) live in middle-income countries (how?)





Data

Composition of Poverty by group (show pop)



AF Methodology: Overview

Identification of poor – Dual cutoffs

- Deprivation cutoffs - each deprivation counts
- Poverty cutoff - in terms of aggregate deprivation values

Aggregation across the poor – Adjusted FGT

- Reduces to FGT in single variable case

Key Measure: Adjusted headcount ratio $M_0 = HA$

- H is the share of the population identified as poor, or the *incidence*
- A is the average breadth of deprivations people suffer at the same time, or the *intensity*

AF Method: Achievement Matrix

$$
\begin{array}{c}
\textbf{Dimensions} \\
Y = \begin{bmatrix}
13.1 & 14 & 4 & 1 \\
15.2 & \underline{7} & 5 & \underline{0} \\
\underline{12.5} & \underline{10} & \underline{1} & \underline{0} \\
20 & \underline{11} & 3 & 1
\end{bmatrix} \quad \textbf{Persons} \\
z = \begin{pmatrix} 13 & 12 & 3 & 1 \end{pmatrix} \quad \textbf{Cutoffs}
\end{array}
$$

AF Method: Deprivation and Censored Matrix

Deprivation Matrix

$$g^0 = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \\ 0 & 1 & 0 & 0 \end{bmatrix} \quad \begin{bmatrix} 0 \\ 2 \\ 4 \\ 1 \end{bmatrix}$$

Censored Deprivation Matrix, k=2

$$g^0(k) = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix} \quad \begin{bmatrix} 0 \\ 2 \\ 4 \\ 0 \end{bmatrix}$$

Aggregation: Adjusted FGT Family

Adjusted FGT is $M_\alpha = \mu(g^\alpha(\tau))$ for $\alpha \geq 0$

Domains

$$g^\alpha(k) = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0.42^\alpha & 0 & 1^\alpha \\ 0.04^\alpha & 0.17^\alpha & 0.67^\alpha & 1^\alpha \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

Persons

Theorem 1 For any given weighting vector and cutoffs, the methodology $M_{ka} = (\rho_k, M_\alpha)$ satisfies: decomposability, replication invariance, symmetry, poverty and deprivation focus, weak and dimensional monotonicity, nontriviality, normalisation, and weak rearrangement for $\alpha \geq 0$; monotonicity for $\alpha > 0$; and weak transfer for $\alpha \geq 1$.

Informal Glossary of Terms

Deprivation: if $y_{id} < z$ person i is **deprived** in y_d
Poverty: if $c_i \geq k$ person i is poor.
Deprivation cutoffs: the z cutoffs for each dimension
Poverty cutoff: the overall cutoff k
Dimension: for AF – a column in the matrix having its own deprivation cutoff (sometimes called an 'indicator')
Joint distribution: showing the simultaneous or coupled deprivations a person/hh has

What is the Capability Approach?

- Sen's capability approach proposes that **social arrangements should be primarily evaluated according to the extent of freedom people have to promote or achieve functionings they value.**

- "The focus here is on the **freedom** that a person actually has to **do this or be that** – things that he or she may **value** doing or being." *Idea of Justice* 232

In which space will you measure?

Resources	Capability	Functionings	Utility
Bike	Able to ride around	Ride around	☺
Food	Able to be nourished	Nourished	☺

Eight Essential Choices for your own AF Measure:

1. **Purpose**
2. **Space**
3. **Unit of Identification or Analysis**
4. **Dimensions** (if helpful)
5. **Indicators** - columns in the matrix
6. **Deprivation Cutoffs** for each Indicator
7. **Weights/Values** for each Indicator
8. **Poverty cutoff** to identify the poor

Normative Choices in Setting Parameters

Considerations:

1. Purpose of Evaluative Exercise
   - Targeting
   - Evaluation
   - National Poverty Measure
2. Formal Constraints (constitution)
3. Space (capability; resources)
4. Choice Mechanisms (participatory)
5. Robustness tests (for pluralism, diversity)

Dimensions often a subset of these:

Stiglitz-Sen-Fitoussi

Health
Education
Economic security
Personal Security
Balance of Time
Political Voice & Governance
Social Connections
Environmental Conditions
Subjective measures of quality of life

Bhutan's GNH

Health
Education
Material Std of living
Time Use
Governance
Community
Environment
Culture & spirituality
Emotional Well-being

Voices of the Poor

Bodily Wellbeing
Material Wellbeing
Social Wellbeing
Security
Psychological Wellbeing

Finnis

Health & Security
Knowledge
Work & Play
Agency & empowerment
Relationships
Harmony - Art, Religion, Nature
Inner peace

On weights:

No … magic formula does, of course, exist, since the issue of weighting is one of valuation and judgment, and not one of some impersonal technology. (Sen 1999:79)

Key: make weights explicit and open to scrutiny.

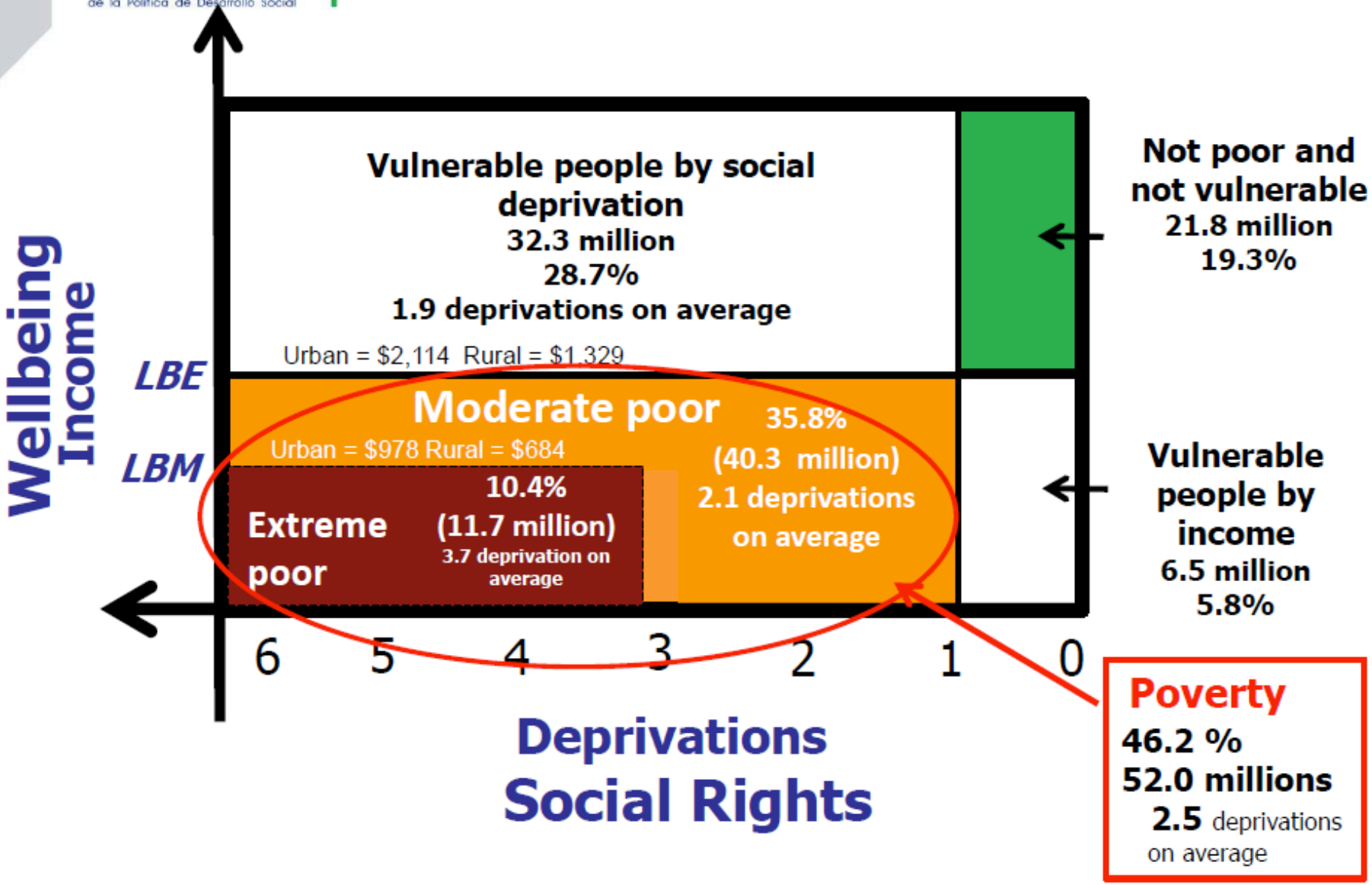
In practice…your paper or report should:

1. Write out the purpose of the measure – what evaluative exercise(s) it will serve
2. Identify the 'criteria' used to select indicators/ deprivation cutoffs / weights / poverty cutoff
3. Justify each calibration choice using normative and empirical grounds & the literature
4. Identify plausible alternatives (e.g. a range of possible weights; alternative indicators), which you will then use to test robustness
5. Identify relevant processes (consultation, participation)
6. Caveat: identify systematically the limitations and weaknesses; tests

Quality difference between two papers/reports with the same final measure & analysis but systematic vs lazy articulation of the calibration choices is very large. Why?

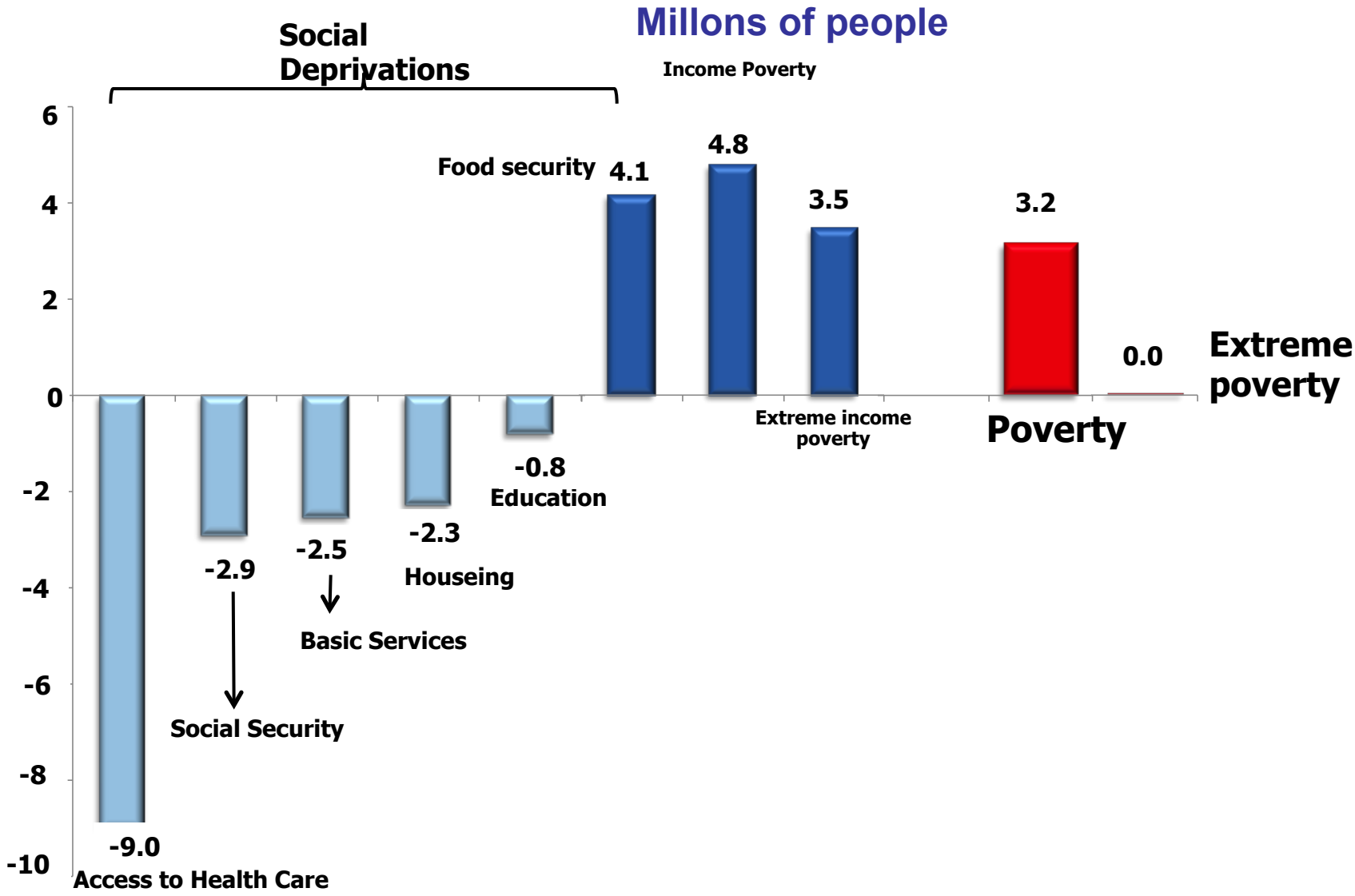
CONEVAL
Consejo Nacional de Evaluación de la Política de Desarrollo Social

Total population 2010 (112.6 millions)

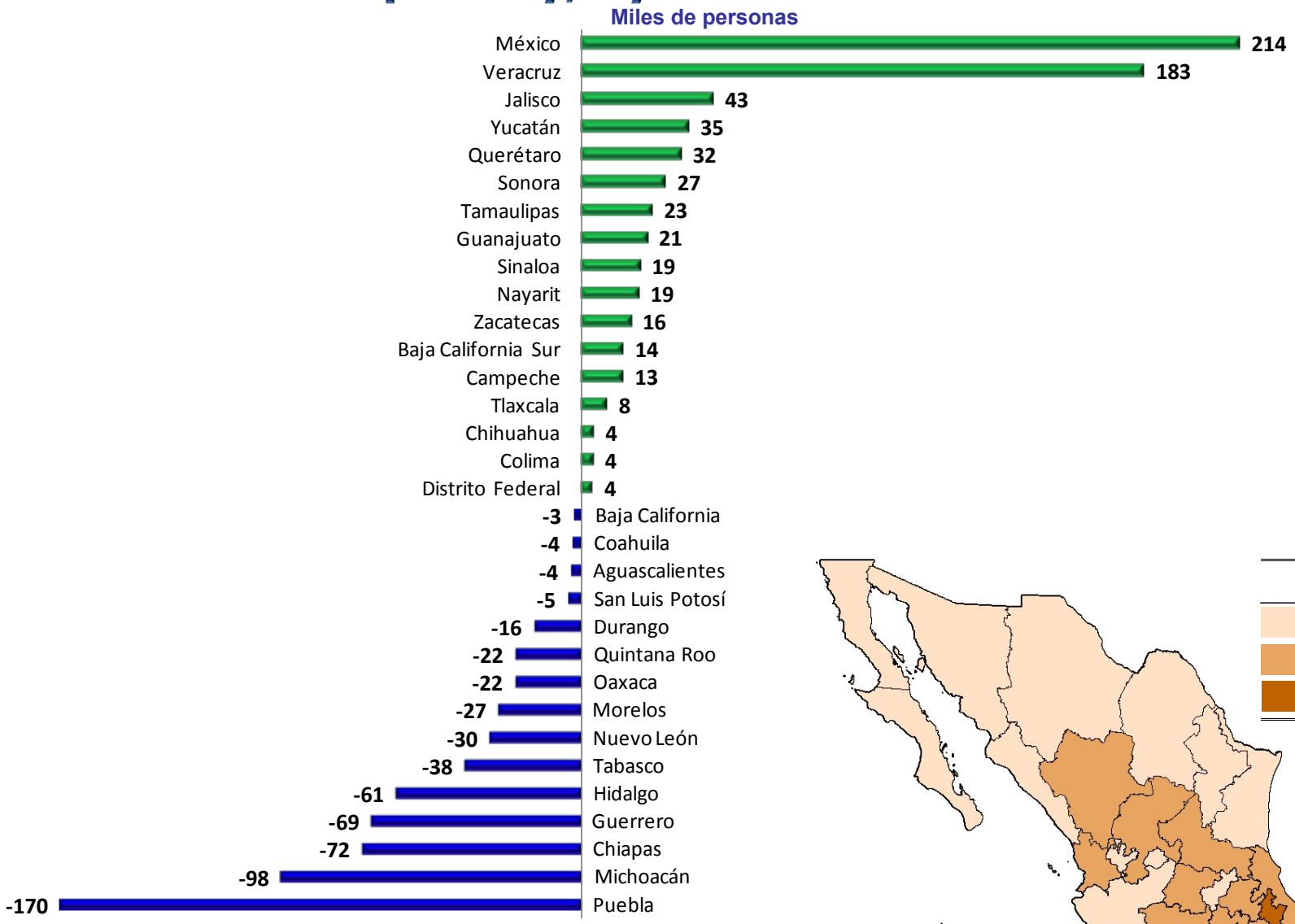


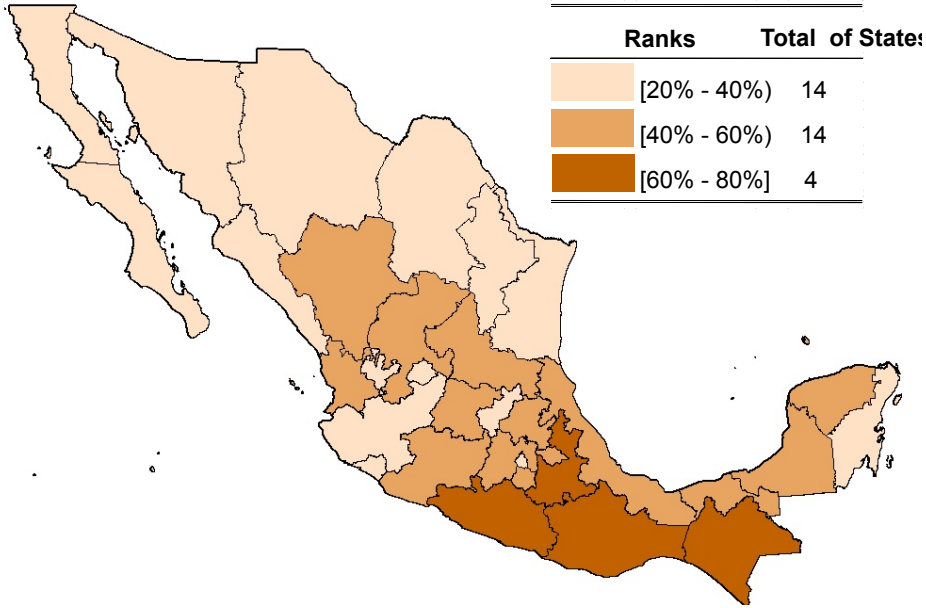
Source: estimates by CONEVAL based on MCS-ENIGH 2010.

Change in the number of poor people in Mexico, 2008-2010

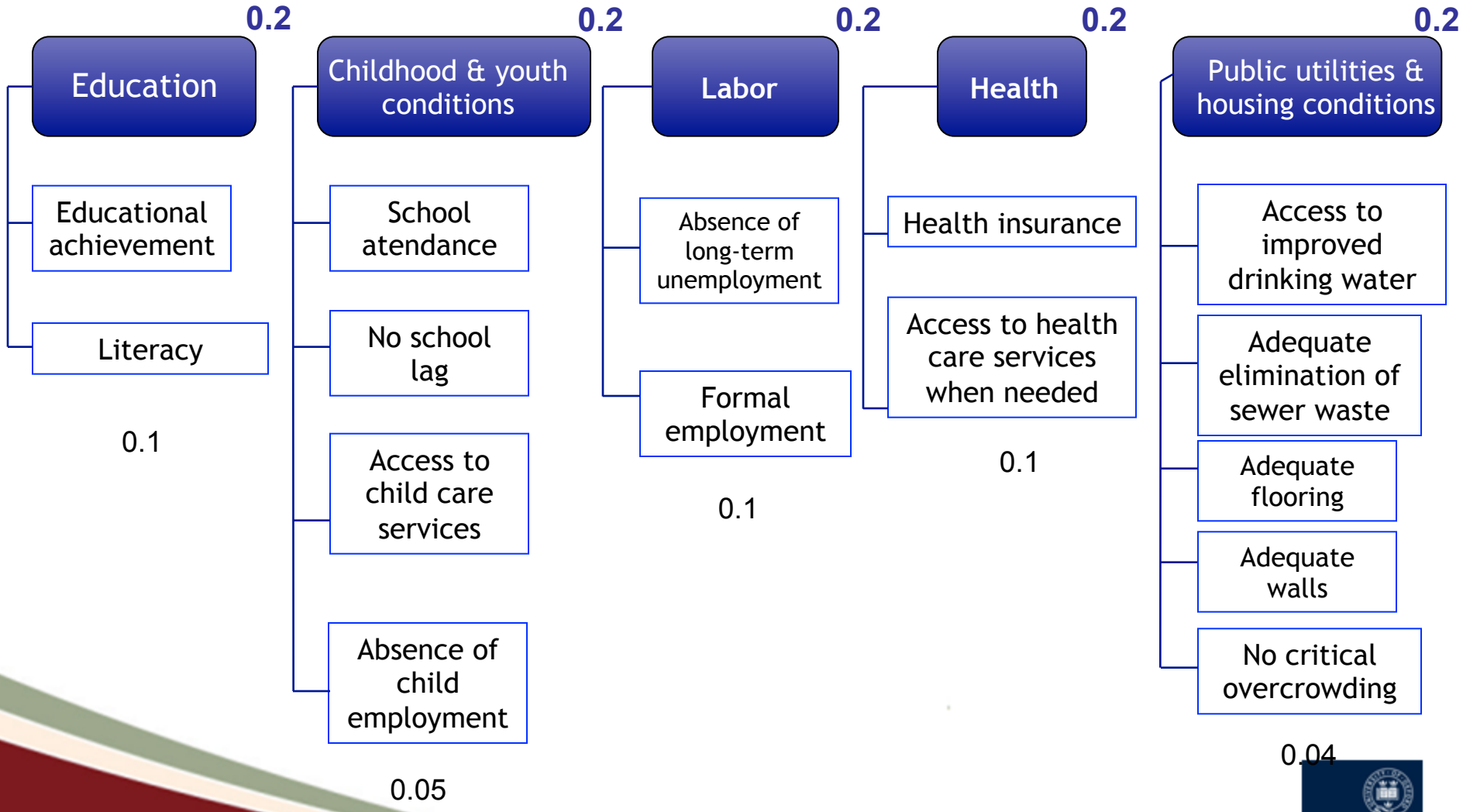


Changes in the number of people in extreme poverty, by state





Colombia: Dimensions Cutoffs Weights



Adapted from National Statistics Bureau (2014) 'Bhutan Multidimensional Poverty Index', Thimphu: NSB.

National Statistics Bureau
Royal Government of Bhutan

BHUTAN
Multidimensional Poverty Index 2012

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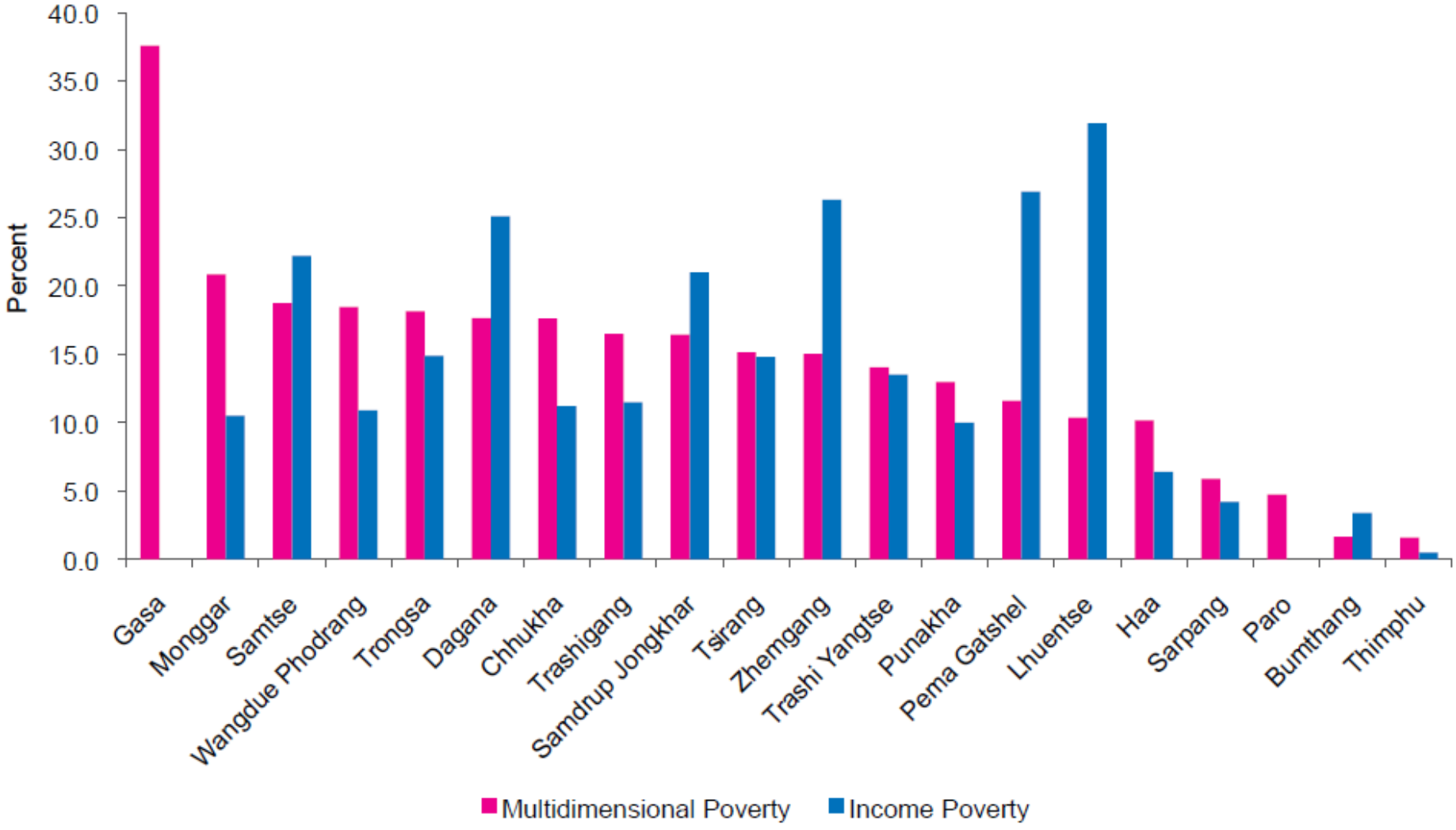
Figure 3.8 Comparison between Multidimensional Poverty and Income Poverty by *Dzongkhag*



The South African MPI

Creating a multidimensional poverty index using census data

Statistics South Africa

The South Africa I know, the home I understand

20 YEARS OF FREEDOM

Adapted from Statistics South Africa (2014) 'The South African MPI', Pretoria: Stats SA.

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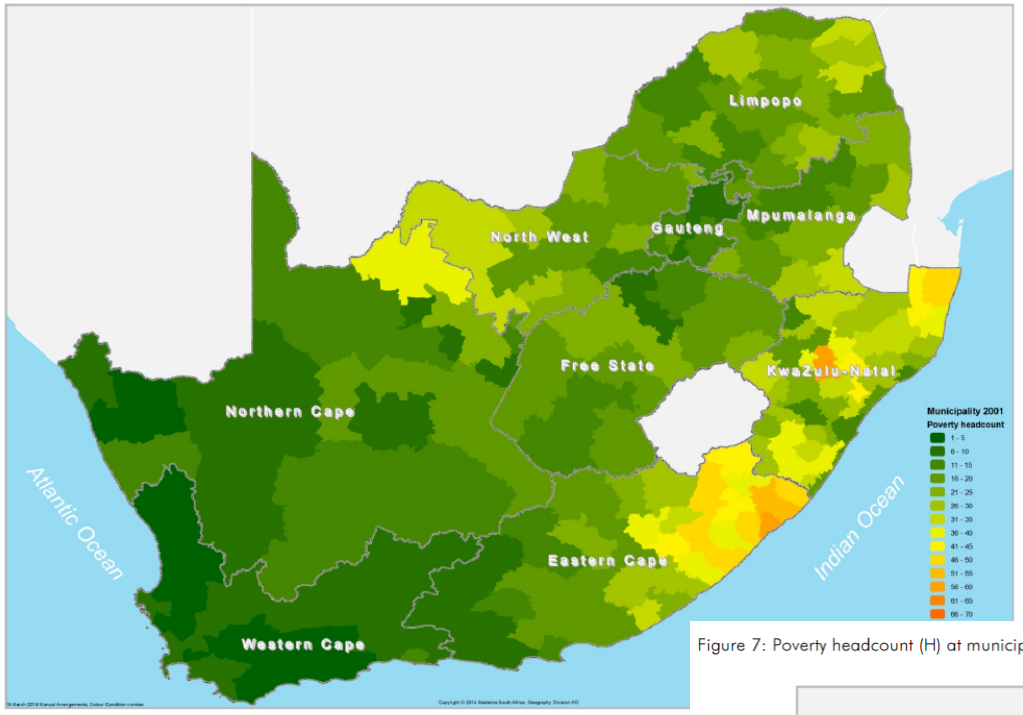
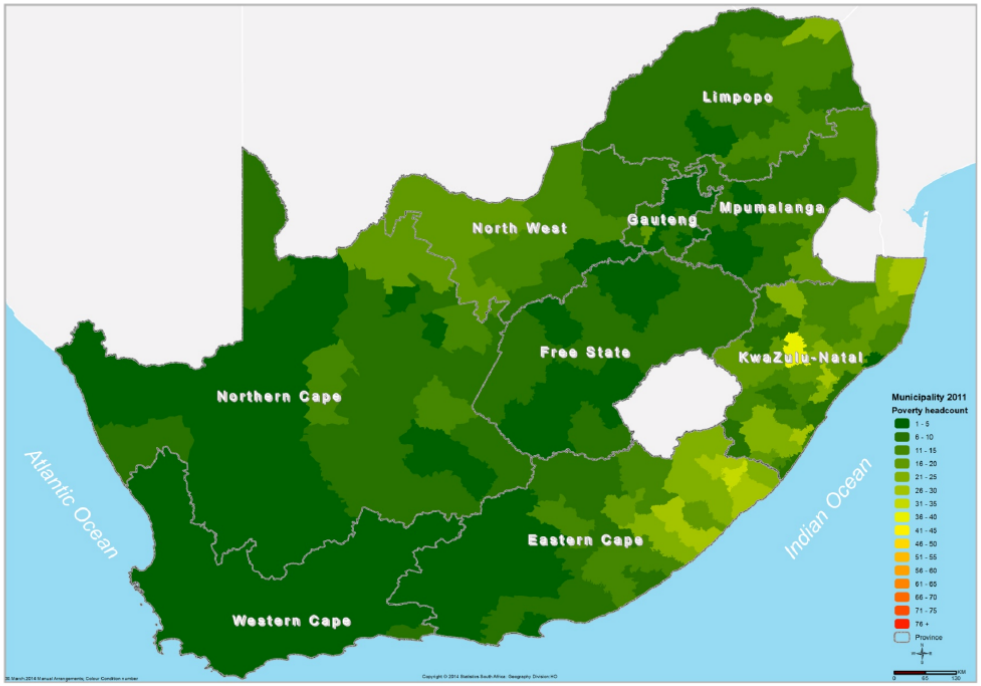
Figure 6: Poverty headcount (H) at municipal level in 2001



Improvements in every province and municipality…

Figure 7: Poverty headcount (H) at municipal level in 2011



…though gains are not uniform

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Data Issues in Multidimensional Poverty Measurement

1. Sources of multidimensional data
2. Household surveys
3. Indicators' design
4. Applicable population
5. Combined measures
6. Missing values, inconsistencies, "don't know" - Sample drop and bias analysis

Cramer's V (correlation – binary)

V uses "**entire** cross-tab"

$$V=\sqrt{n\downarrow 00\ n\downarrow 11\ -matches-n\downarrow 01\ n\downarrow 10\ -mismatches\downarrow /(\underbrace{n\downarrow 0+\ n\downarrow 1+\ n\downarrow +0\ n\downarrow +1}_{marginal}\ )-distributions\uparrow 1/2\ ,\in[-1,1]}$$

Association is affected by:

- Extent to which deprivations between variables match (key)
- Values of the headcount ratios and their difference

Dilutes insights for redundancy.

Measure of Redundancy R^0

If two deprivation/poverty indicators are not independent, and if at least one of the marginal distributions n_{1+} , n_{+1} is different from zero P is defined as:

$$R^0 = n_{11} / min[n_{1+} , n_{+1}] \in [0,1]$$

Sources of information used by R^0:

n_{11} number of people who are deprived in both indicators → Joint

n_{1+} , n_{+1} headcount ratios → Marginals

Redundancy: reflects the strength of the matches, but not the direction

Example - Bangladesh DHS

Case I

	School attendance (J)		
Years school. (I)	Non deprived= 0	Deprived= 1	Total
Non deprived=0	71.06%	9.43%	80.49%
Deprived= 1	13.76%	5.75%	19.51%
Total	84.82%	15.18%	100%

$V = n_{00}\, n_{11} - n_{01}\, n_{10} / [n_{0+}\, n_{1+}\, n_{+0}\, n_{+1}]^{1/2} = 0.196$

$R^0 = n_{11} / min[n_{1+}, n_{+1}] = 0.379$

Two different countries with **completely different** patterns of deprivation show the **same association** coefficient **V**, but **different** measures of redundancy $\mathbf{R^0}$

Decomposition

Decomposition by population subgroup

Breakdown by dimension (post-identification)

Subgroup Decomposition:

	Income	Years of Education	Housing Index	Mal-nourished	
$\mathbf{g^0}(k) =$	0	0	0	0	Person 1
	1	0	0	1	Person 2
	1	1	1	1	Person 3
	0	0	0	0	Person 4

M_0 for pink group: $H_1 \times A_1 = 2/8 = 1/4$

M_0 for green group: $H_2 \times A_2 = 4/8 = 1/2$

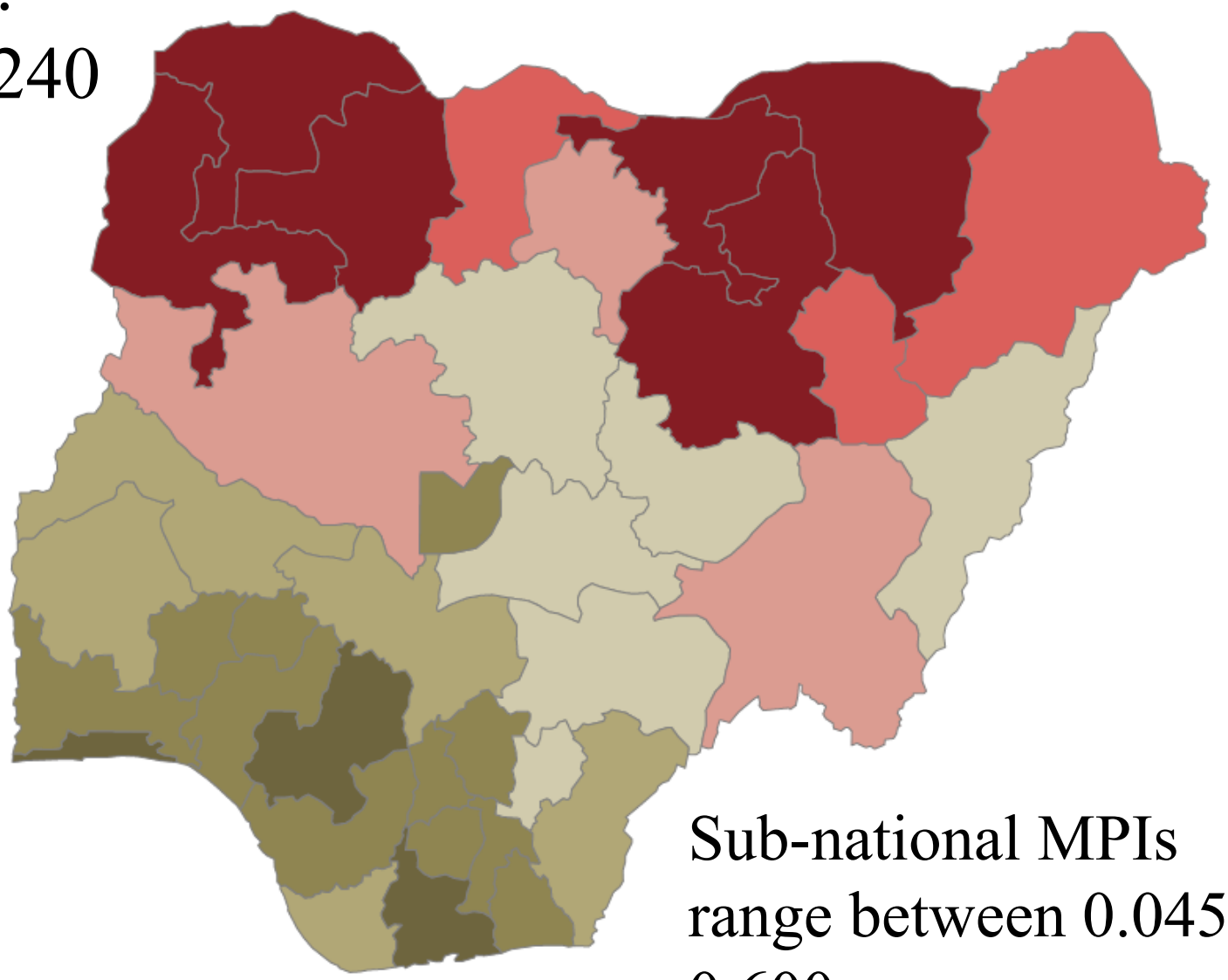
Overall $M_0 = (1/2)\times(1/2) + (1/2)\times(1/4) = 3/8 = 6/16$

Nigeria:

MPI=0.240

Nigeria:

MPI=0.240



Sub-national MPIs range between 0.045 & 0.600

Censored Headcount Ratios

$$\bar{g}^0(k) = \begin{array}{|cccc|l} \textbf{Income} & \textbf{Years of Education} & \textbf{Sanitation (Improved?)} & \textbf{Access to Electricity} & \\ \hline 0 & 0 & 0 & 0 & \textbf{Person 1} \\ 0 & 0 & 0 & 0 & \textbf{Person 2} \\ \mathbf{1} & \mathbf{2} & \mathbf{0.5} & \mathbf{0.5} & \textbf{Person 3} \\ 0 & \mathbf{2} & 0 & 0 & \textbf{Person 4} \end{array}$$

Income: 1/4

Education: 2/4

Sanitation: 1/4

Electricity: 1/4

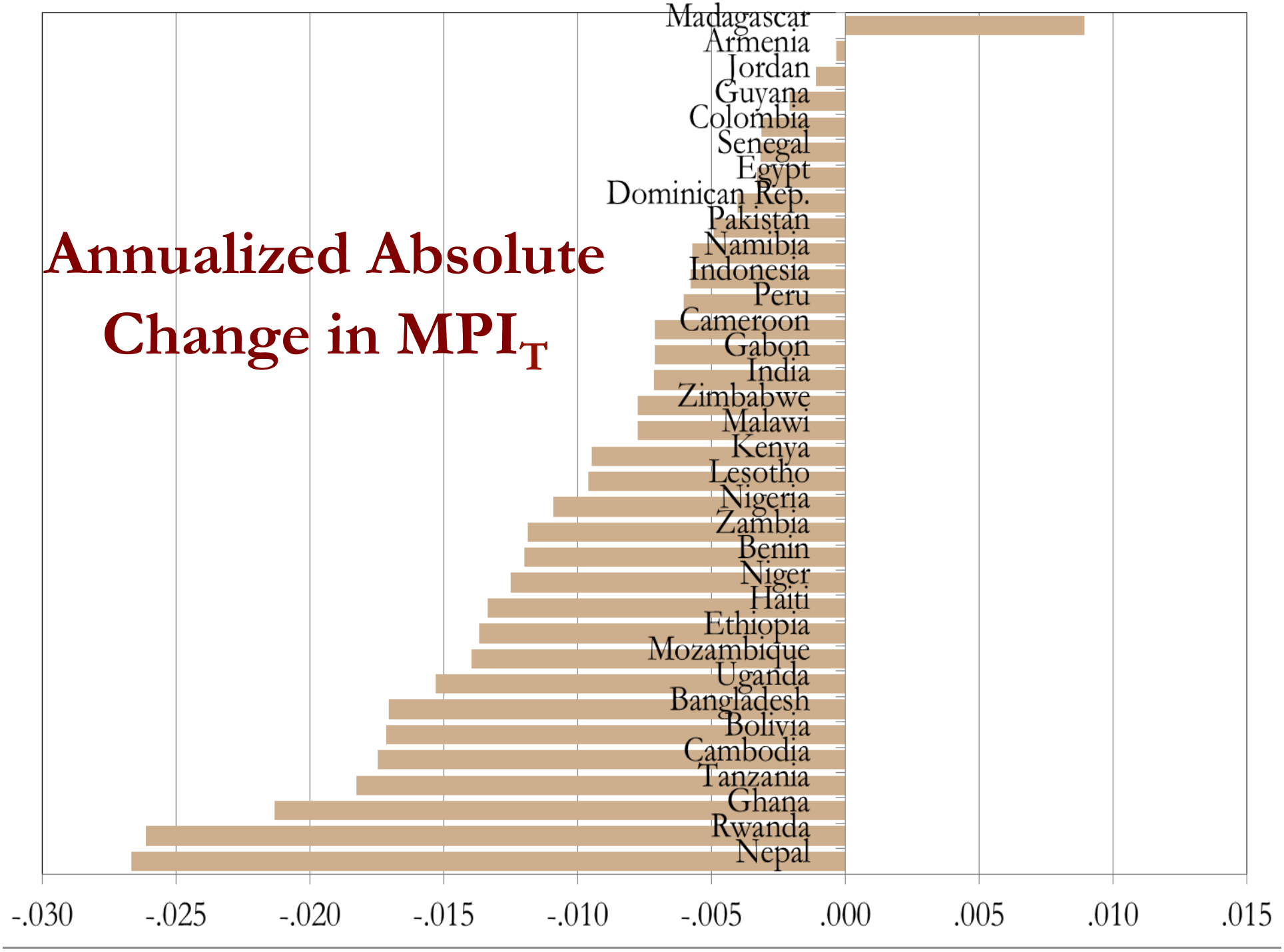
Dimensional Breakdown:

The **censored headcount** ratio of indicator d is

	Income	Years of Education	Housing Index	Mal-nourished	
$g^0(k) =$	0	0	0	0	Person 1
	1	0	0	**1**	Person 2
	1	**1**	**1**	**1**	Person 3
	0	0	0	0	Person 4
censored H	½	¼	¼	½	

Contribution of dimension d to M_0 poverty is

$$(w_d/D) \times [\underline{H}_d/M_0(x)]$$


Annualized Absolute Change in MPI$_T$
Madagascar
Armenia
Jordan
Guyana
Colombia
Senegal
Egypt
Dominican Rep.
Pakistan
Namibia
Indonesia
Peru
Cameroon
Gabon
India
Zimbabwe
Malawi
Kenya
Lesotho
Nigeria
Zambia
Benin
Niger
Haiti
Ethiopia
Mozambique
Uganda
Bangladesh
Bolivia
Cambodia
Tanzania
Ghana
Rwanda
Nepal
-.030
-.025
-.020
-.015
-.010
-.005
.000
.005
.010
.015

Changes in M_0, H and A

- Absolute Rate of Change: is the difference in levels between two periods.

$$\Delta M\downarrow 0 = M\downarrow 0\ (X\downarrow t\uparrow 2\ ) - M\downarrow 0\ (X\downarrow t\uparrow 1\ )$$

- Relative Rate of Change: is the difference in levels across two periods as a percentage of the initial period.

$$M\downarrow 0 = M\downarrow 0\ (X\downarrow t\uparrow 2\ ) - M\downarrow 0\ (X\downarrow t\uparrow 1\ ) / M\downarrow 0\ (X\downarrow t\uparrow 1\ ) \times$$

- Why use both rates?

Change in Number of Poor

- In order to reduce the absolute number of poor people, the rate of reduction in the headcount ratio needs to be faster than the population growth.
- So, don't forget to also check if the number of poor people is decreasing over time!

	Population			Total MPI Poor		
	Year 1	Year 2	Annual Growth in Population	Year1	Year2	Absolute Reductior
	(in Thousands)			(in Thousands)		
Nepal 2006-2011	25,634	27,156	1.20%	16,585	12,003	-4,582
Peru 2005-2008	27,723	28,626	0.60%	5,406	4,494	-912
Rwanda 2005-2010	9,429	10,837	2.80%	7,817	7,163	-654
Senegal 2005-2010/11	11,271	13,141	3.10%	8,036	9,304	1,267

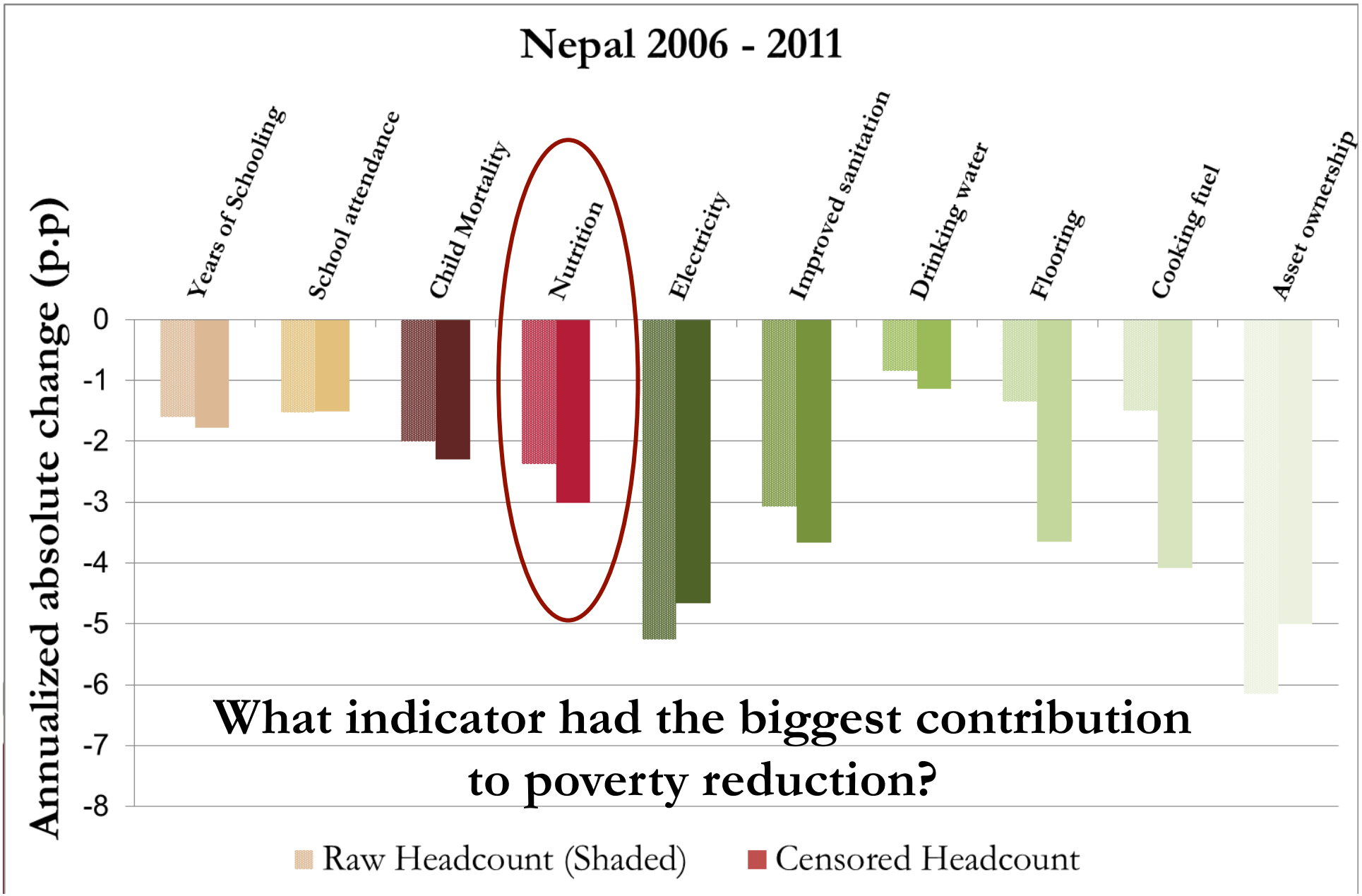
Dimensional Changes

- The (annualized) absolute rate of change in $M↓0$ can be expressed as the weighted average of the (annualized) absolute rates of change in censored headcount ratios.

$$\Delta M↓0 = \sum j=1 ↑ d ▒ w↓j \Delta h↓j (k)$$

- When different indicators have different weights, the effects of their changes on the change in $M0$ reflect these weights.

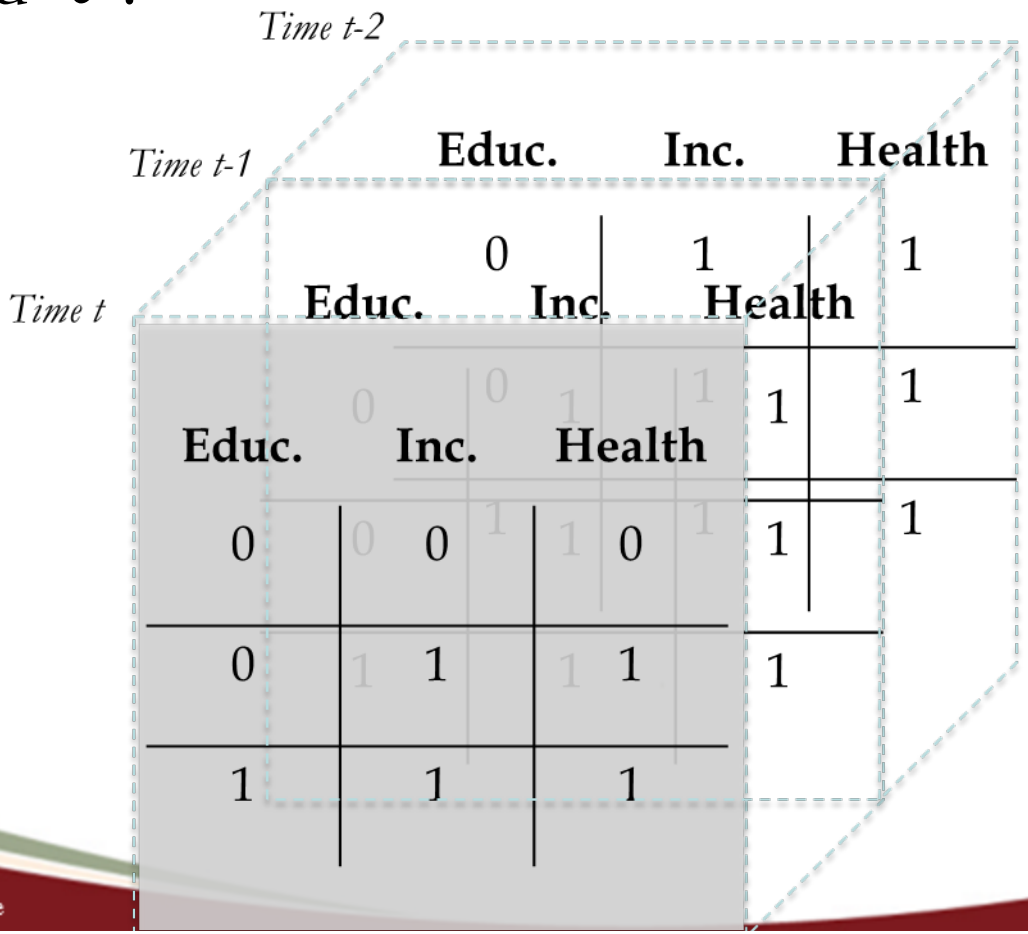
Dimensional Changes



Chronic Poverty Measurement

The Chronic Poverty Measure is the mean of the set of T deprivation matrices g0(k, τ) that have been censored by the cutoffs k and τ.

This is easy!



Chronic Poverty Measurement

The Chronic Poverty Measure is the mean of the set of T deprivation matrices g0(k, τ) that have been censored by the cutoffs k and τ .

$$M_0^C(X;z) = 1/ndT \sum_{i=1}^{n} \sum_{j=1}^{d} \sum_{t=1}^{T} w_j g_{ij}^{0,t}(k,\tau)$$

$$M_0^C(X;z) = H^C \times A^C \times D^C$$

Chronic Poverty

More intuitively, Chronic poverty is the product if H, A, D:

$$M{\downarrow}0{\uparrow}C = H{\uparrow}C \times A{\uparrow}C \times D{\uparrow}C$$

$\mathbf{H^C}$ is the % of people who are multidimensionally poor in τ or more periods.

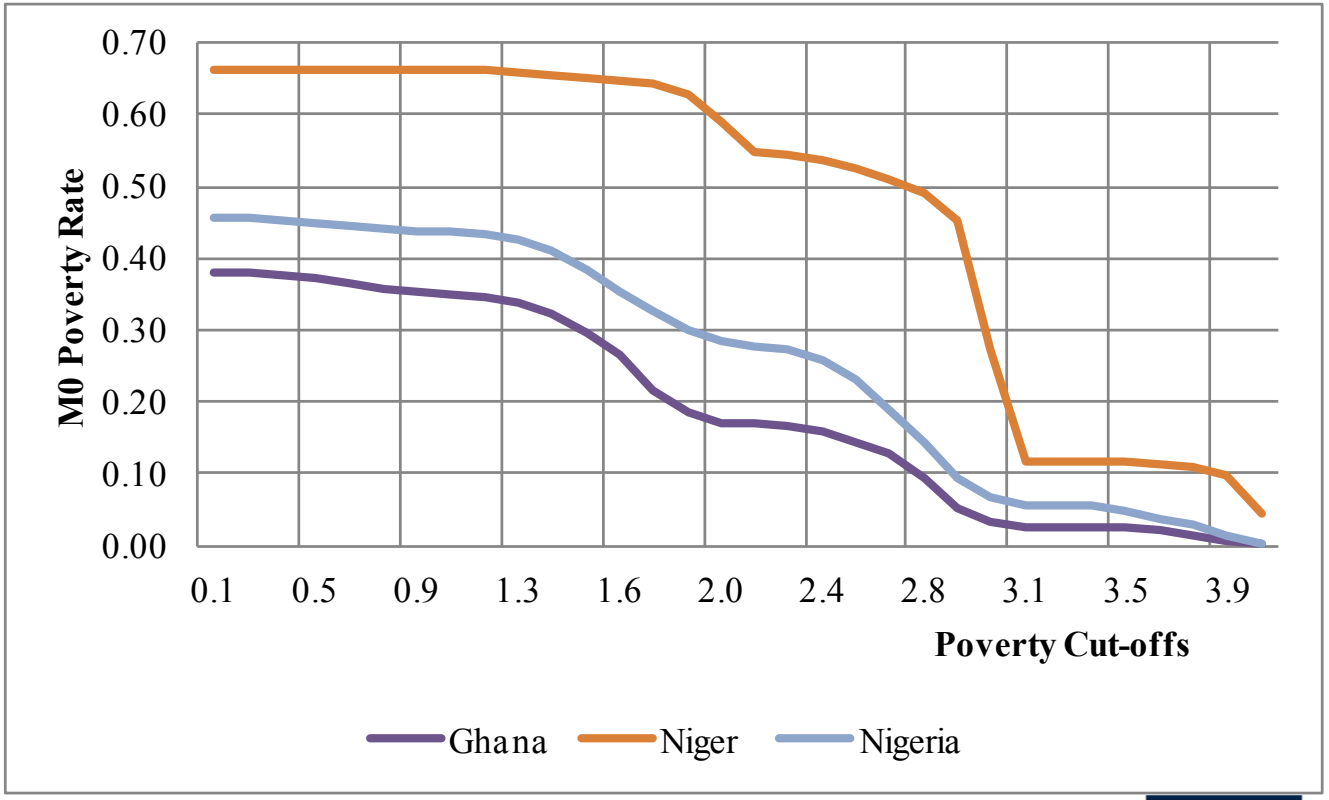
$\mathbf{A^C}$ is the average intensity among the chronically multidimensionally poor people. $k \leq A^C \leq 1$

$\mathbf{D^C}$ is the average *duration* of chronic poverty – the average % of periods in which people are in chronic poverty.

Dominance and Robustness of parameters

Dominance holds in terms of M_0 for all k

In the case of sample surveys, statistical tests are required to establish dominance



Source: Batana (2013)

MPI should be robust to range of weights

Robustness to weights

Re-weight each dimension:

– 33%	**50%**	25%	25%
– 33%	25%	**50%**	25%
– 33%	25%	25%	**50%**

Kendall tau b rank correlations

			MPI Weights 1	MPI Weights 2	MPI Weights 3
			Equal weights: 33% each **(Selected Measure)**	50% Education 25% Health 25% LS	50% Health 25% Education 25% LS
MPI Weights 2	50% Education 25% Health 25% LS	Pearson	0.992		
		Spearman	0.979		
		Kendall (Taub)	0.893		
MPI Weights 3	50% Health 25% Education 25% LS	Pearson	0.995	0.984	
		Spearman	0.987	0.954	
		Kendall (Taub)	0.918	0.829	
MPI Weights 4	50% LS 25% Education 25% Health	Pearson	0.987	0.965	0.975
		Spearman	0.985	0.973	0.968
		Kendall (Taub)	0.904	0.863	0.854
Number of countries:		**109**			

Alkire and Santos (2010, 2014).

What are the main sources of Error?

These could be categorised as: statistical & non statistical

A. Statistical: Sampling Error

B. Non Statistical:

1. Data Entry Error

2. Measurement Error: Sources

- Recall error (don't remember correctly)
- Telescoping (incorrect date recall)
- Reporting Errors (due to long surveys)
- Prestige errors (misreport due to social pressures)
- Conditioning effects (from being in the survey)
- Respondent effects (respondent identity affects answers)
- Interviewer effects (facilitator bias; mis-measuring a baby)
- Non-response rate
- Inadequate sampling frame (Source: Nestor 1970; Deaton & Grosh 2000).

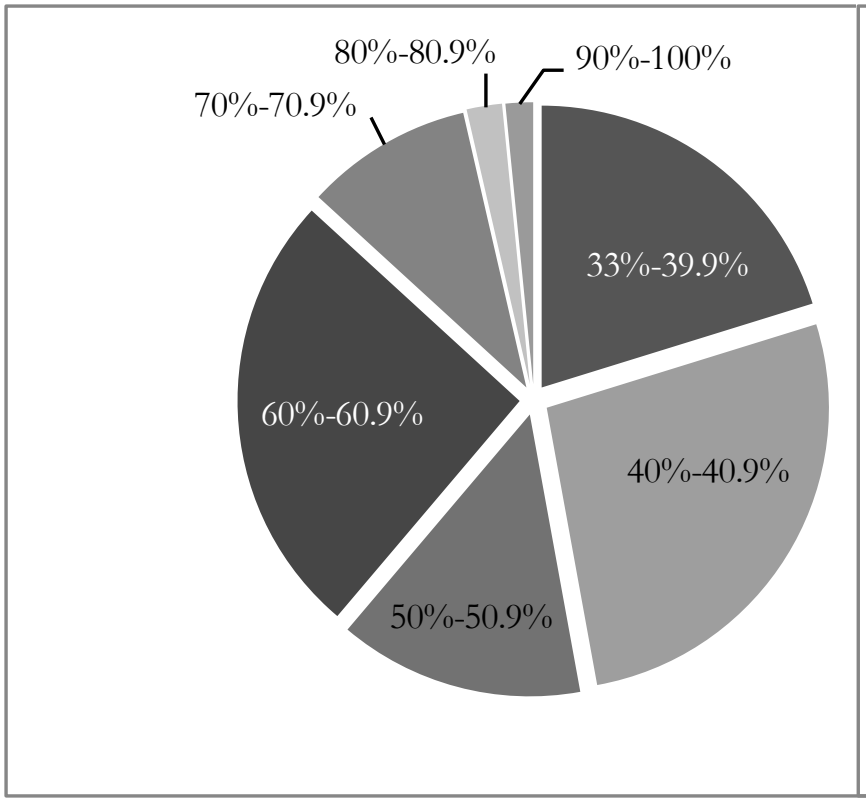
Standard Error & Confidence Interval

Standard error of a random variable is the sample estimation of its (population) standard deviation. The standard error gives us an idea of the precision of the sample estimation.

Standard deviation, intuitively, is a notion of uncertainty.

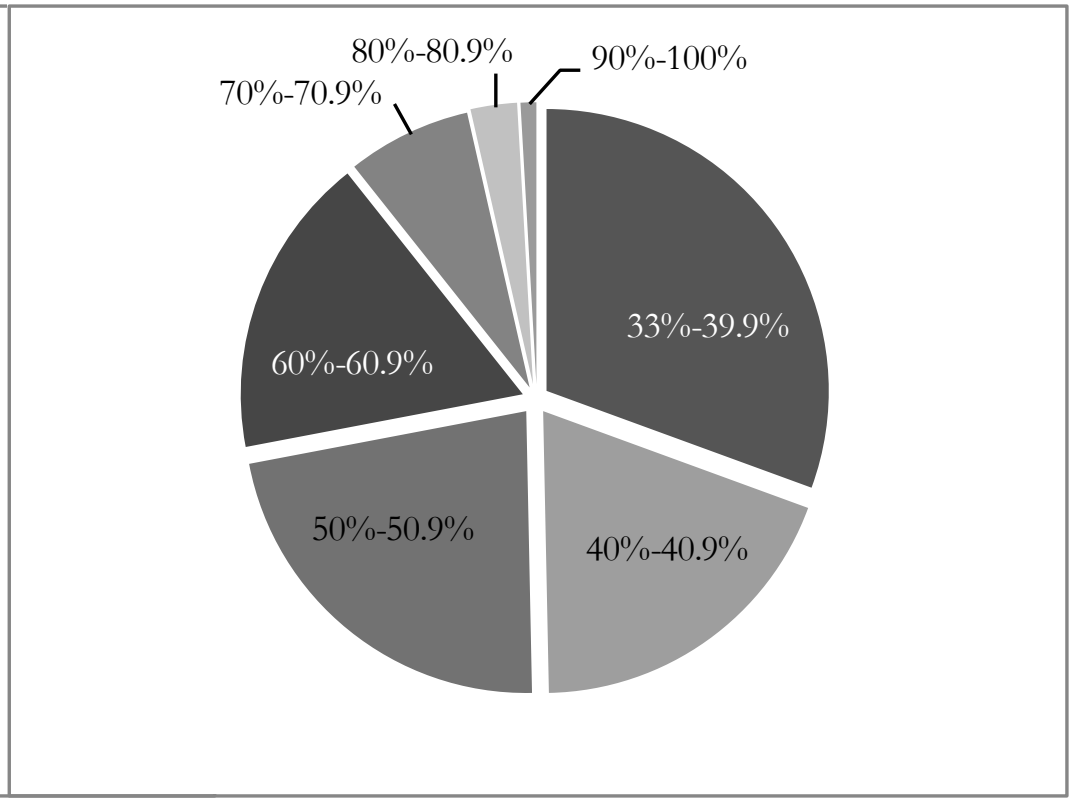
Confidence interval contains the true population parameter with some probability that is known as the confidence level. Standard errors are required to compute the confidence interval.

Inequality Among the Poor Described: Deprivation Score Values



Madagascar (2009)

MPI = 0.357, H = 67%, A = 53%



Rwanda (2010)

MPI = 0.350, H = 69% A = 50.8%

Inequality among the Poor

- Two applications:
  - Inequality among the poor

$$I^q = \frac{\tilde{\beta}}{q}\sum_{i=1}^{q}[c_i(k) - A]^2$$

  - Inequality across population subgroups (regional disparity)

$$I^n = \tilde{\beta}\sum_{\ell=1}^{m}\frac{n^\ell}{n}\left(M_0\left(X^\ell\right) - M_0\right)^2$$

What are some vital regression analysis we may wish to study with AF measures?

Micro regressions: use ci vector or 0-1 poverty status vector

a) explore the determinants of poverty at the household level

b) create poverty profiles;

Macro regressions: use level or trend of M_0 per group

a) explore the elasticity of poverty to economic growth,

b) understand how macro variables such as average income, public expenditure, decentralization, infrastructure density, information technology relate to multidimensional poverty levels or changes across time.

Probit and Logit models

The simple linear regression model is **not adequate** as it assumes that the range of the dependent variable lies in the Real line $(-\infty, +\infty)$

To **ensure** that the conditional mean stays in the unit interval we need some **function** that maps Y **to the unit interval**.

Any **cumulative distribution function** could be used for this purpose (the link function).

Often the cumulative distributions of the standard normal distribution or the logistic distribution are used to model binary responses. This leads to what is called as probit or logit models respectively.

Communicating your Results

Building blocks

Media

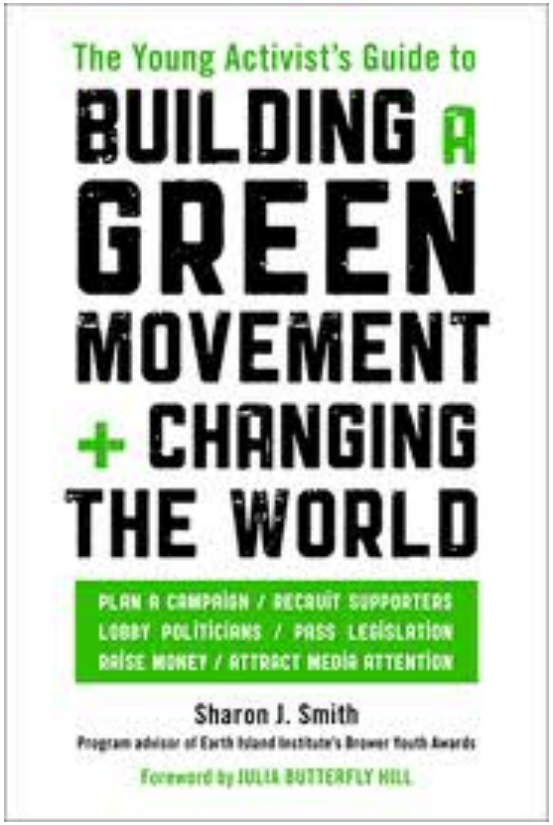
Curiosity

Audience

Outputs & channels

Clarify your aim

- ✓ **Goals**: What do we want to achieve?
  - ✓ Internally?
  - ✓ Locally, Regionally, or Nationally?
  - ✓ Internationally?
- ✓ **Audience**: Who do we need to reach ?
- ✓ **Channels**: How can we reach them?
- ✓ **Messages**: What are our messages?
- ✓ **Products:** What do we need to do to reach them?
- ✓ **Humility:** What is realistic, given our limitations?



Media tactics

Press release

Events

Interview ops

Expert comment

Letters to editor

Find 'factoids'

E.g. – The Poorest of the Poor

E.g. – India vs Africa

E.g. – MPI in Middle Income Countries

E.g. – GDP per capita vs MPI

"How do I wake them up?"

How to find ‘factoids

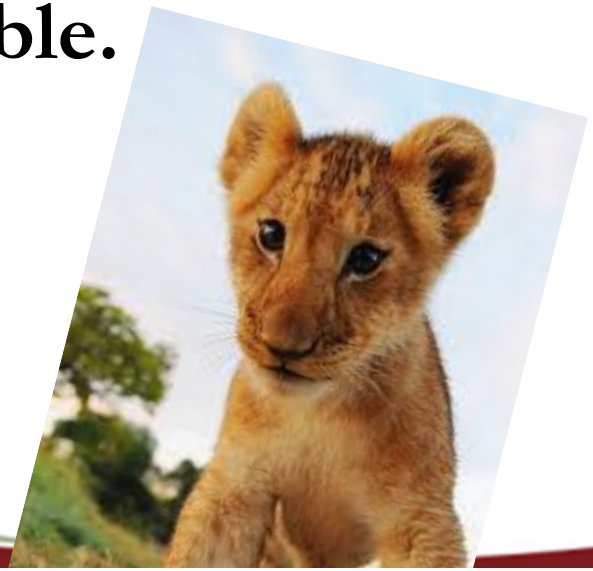
Become very Curious

about your results

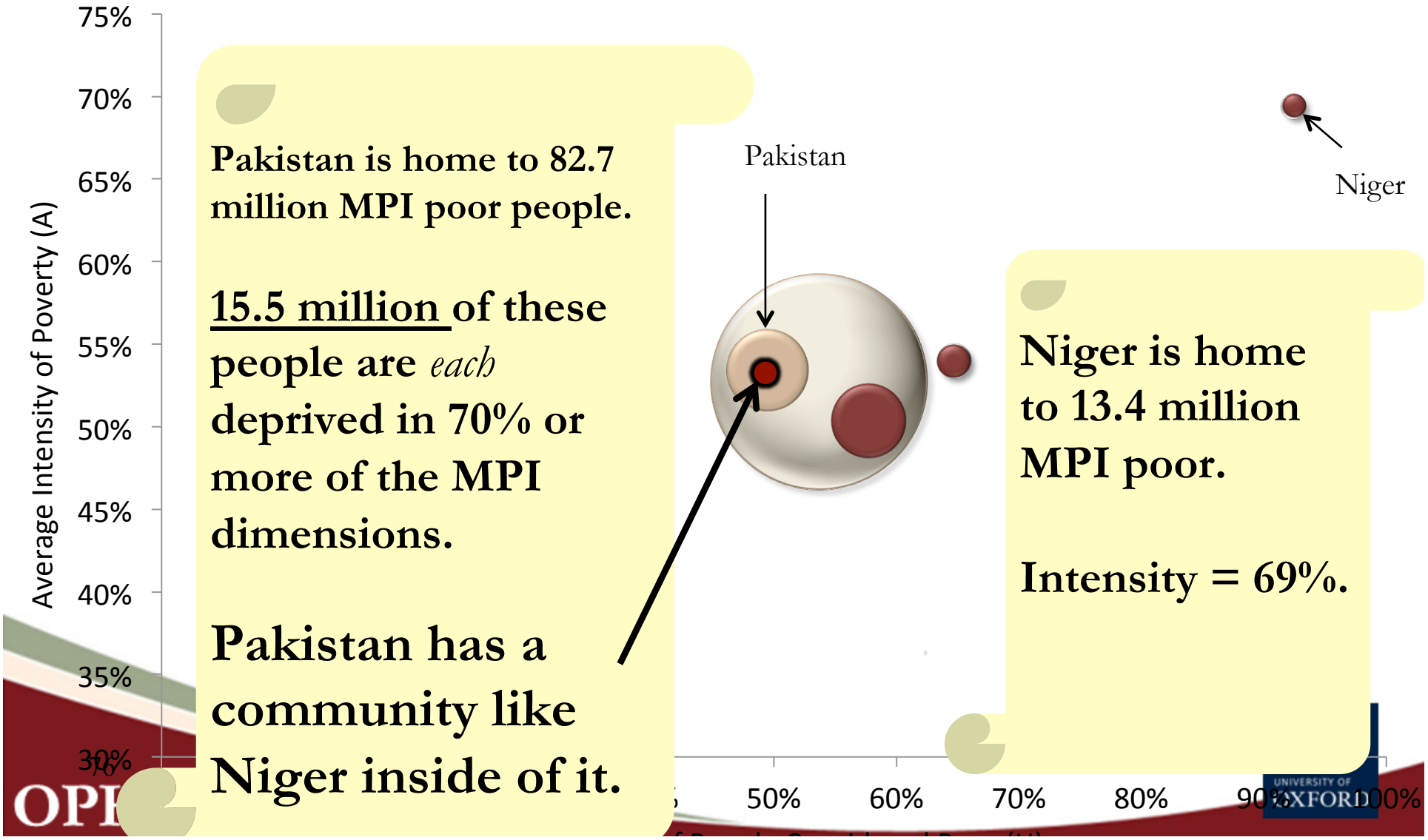
Play with your data.

Find comparisons that are striking or unexpected

Make sure factoids are 100% accurate and academically defensible.



Niger inside Pakistan?



Pakistan is home to 82.7 million MPI poor people.

<u>15.5 million</u> of these people are *each* deprived in 70% or more of the MPI dimensions.

Pakistan has a community like Niger inside of it.

Niger is home to 13.4 million MPI poor.

Intensity = 69%.

MPPN
Multidimensional Poverty Peer Network

Policy Leaders

OPHI
Oxford Poverty & Human Development Initiative
UNIVERSITY OF OXFORD

"Radical social advances are only possible if we understand, with careful observation and analysis, the deep roots of our poverty, and the many shades of inequality within our society. Hence, the urgency of implementing a multidimensional approach in our battle against poverty"

Juan Manuel Santos, President of the Republic of Colombia

MPPN

Multidimensional Poverty Peer Network

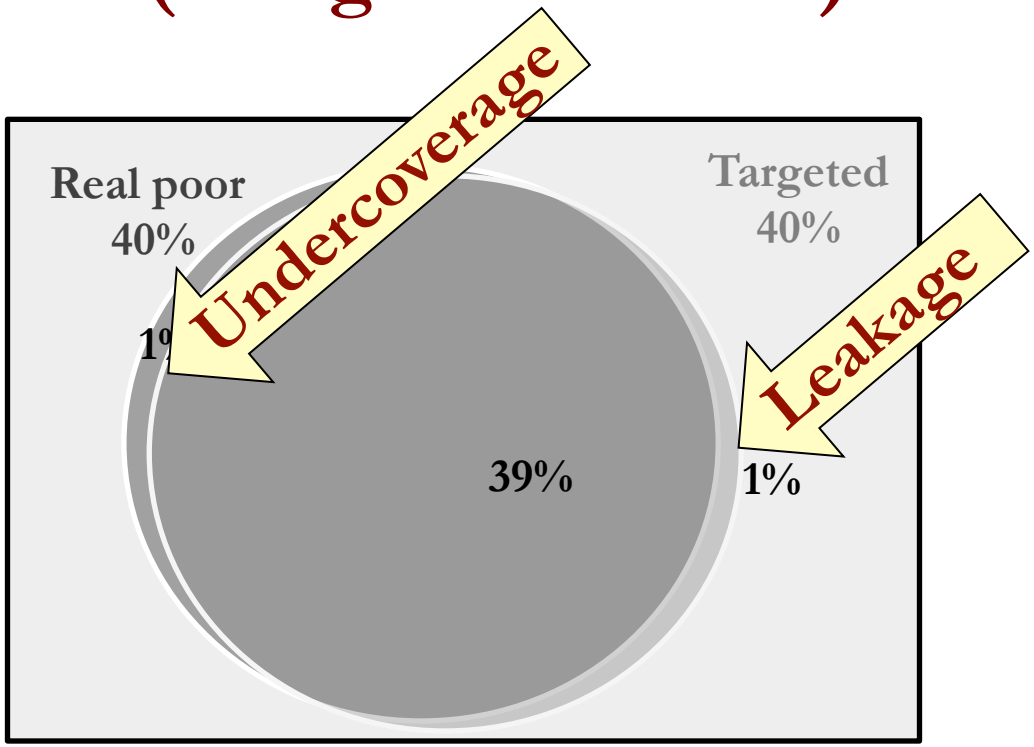
OPHI

Oxford Poverty & Human Development Initiative

UNIVERSITY OF OXFORD

High Level Meeting, Berlin, 2014

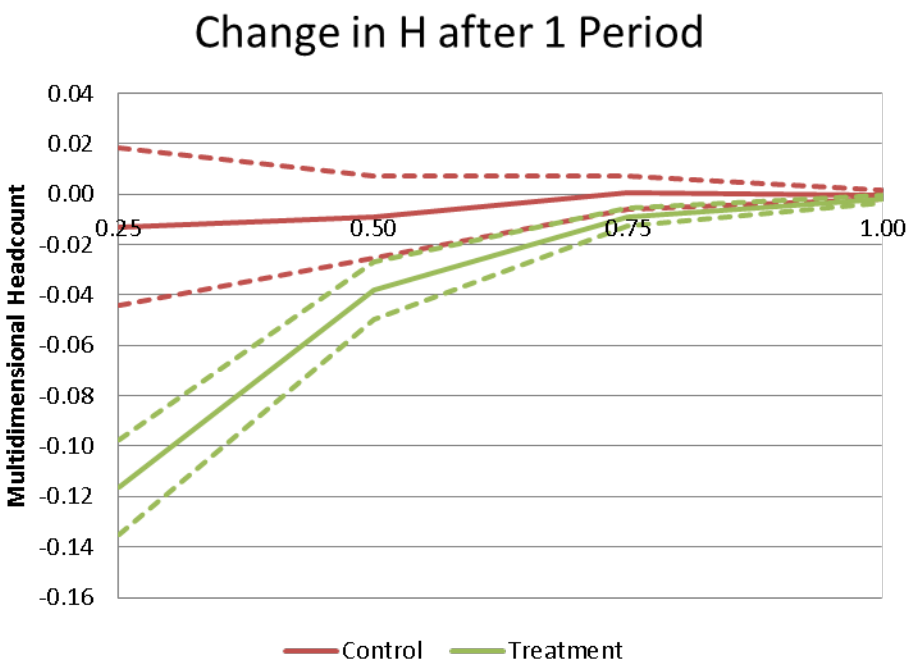
The Challenge of Targeting
(minimize undercoverage/leakage)
(using census data)

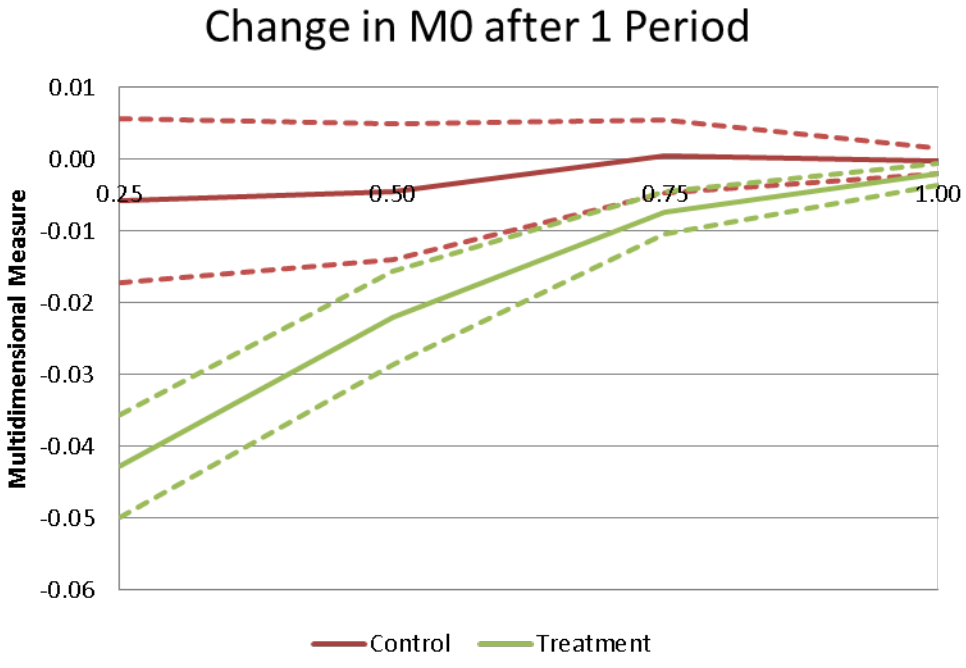


Impact Evaluation with AF methodology

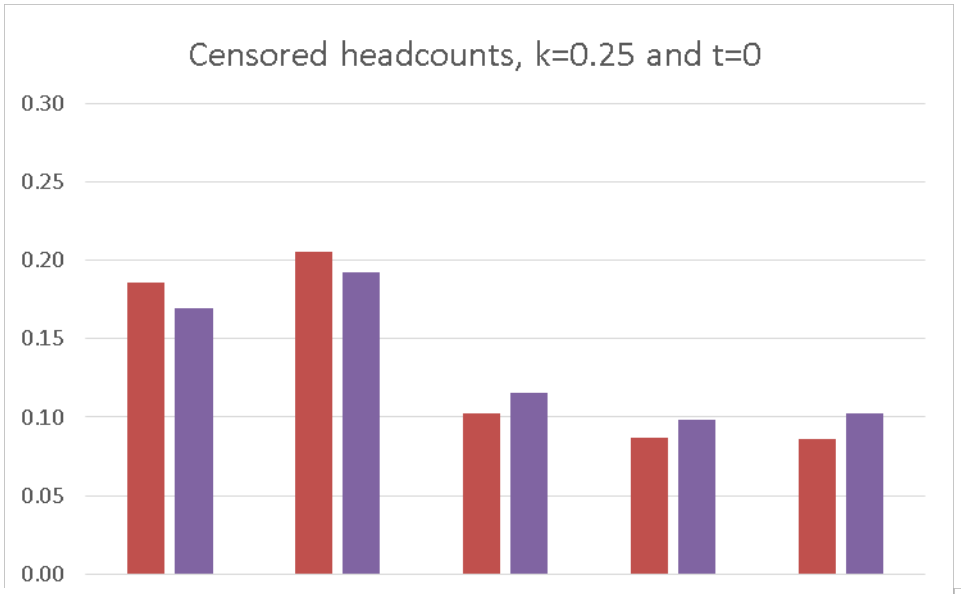
- Use M_0/H as the outcome of interest in the evaluation of the program's impact:
  - Compute the M_0/H for the treated and control groups;
  - Test whether the difference between the M_0/H of the two groups is statistically significant.
  - Test impact on the raw and censored headcounts
  - Test the impact on the weighted number of deprivations
  - If we have data for multiple points of time, we can compare the change in M_0/H (Difference-in-difference estimator).

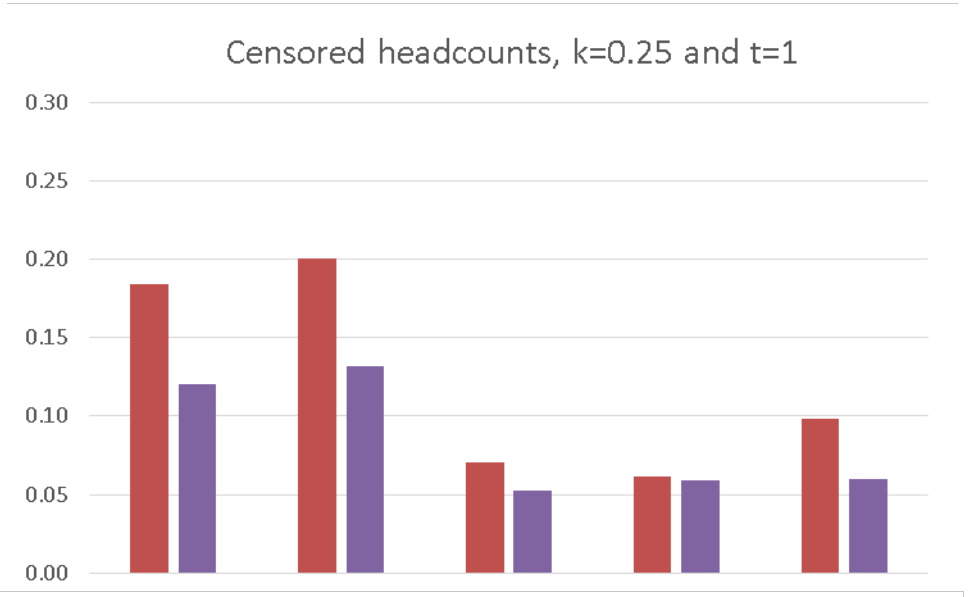
Impact – Using time series

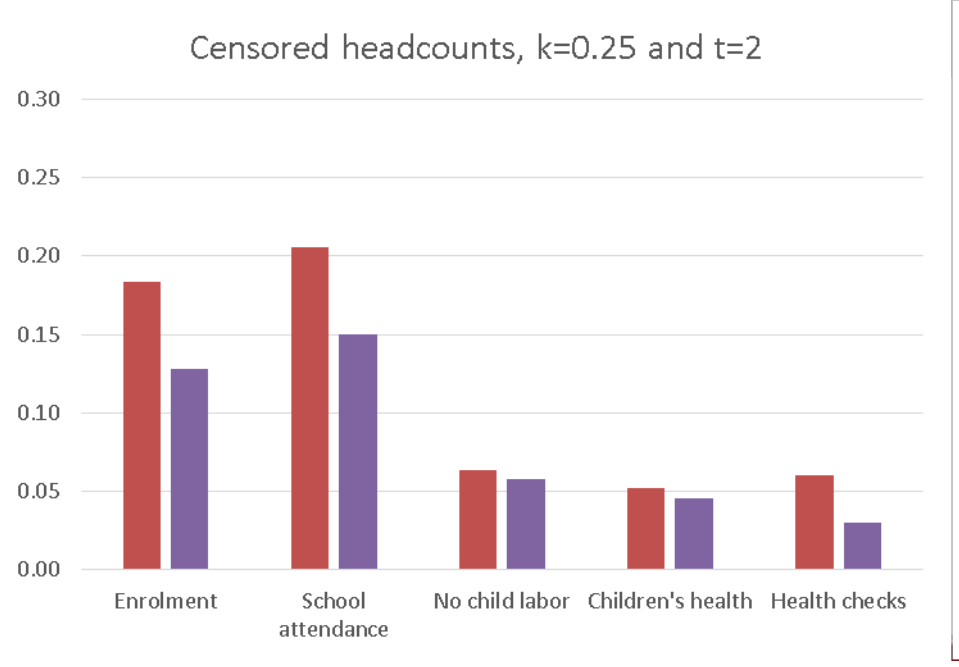


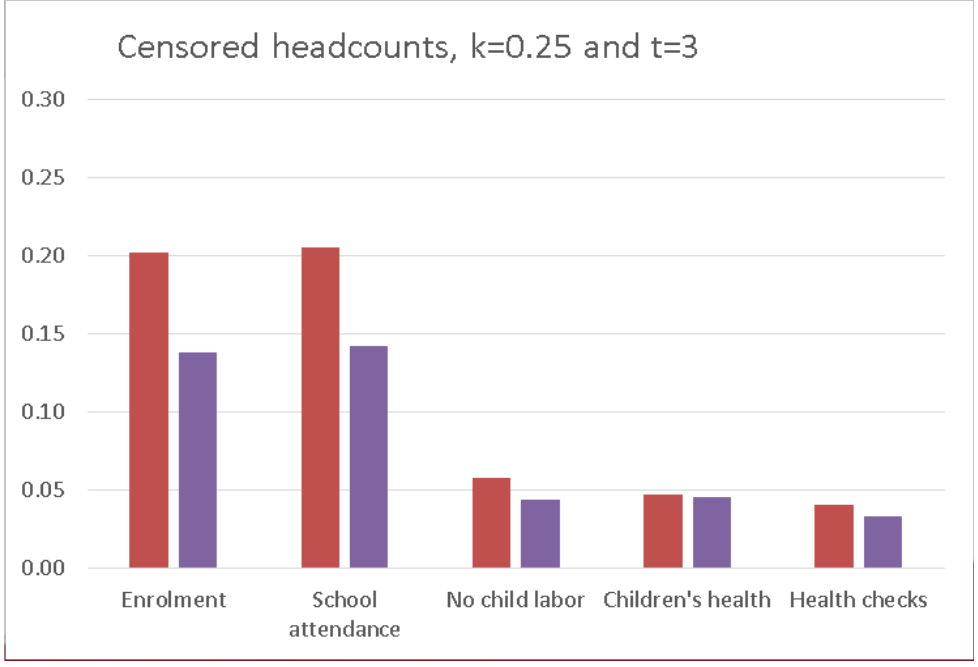


Impact – Censored headcounts







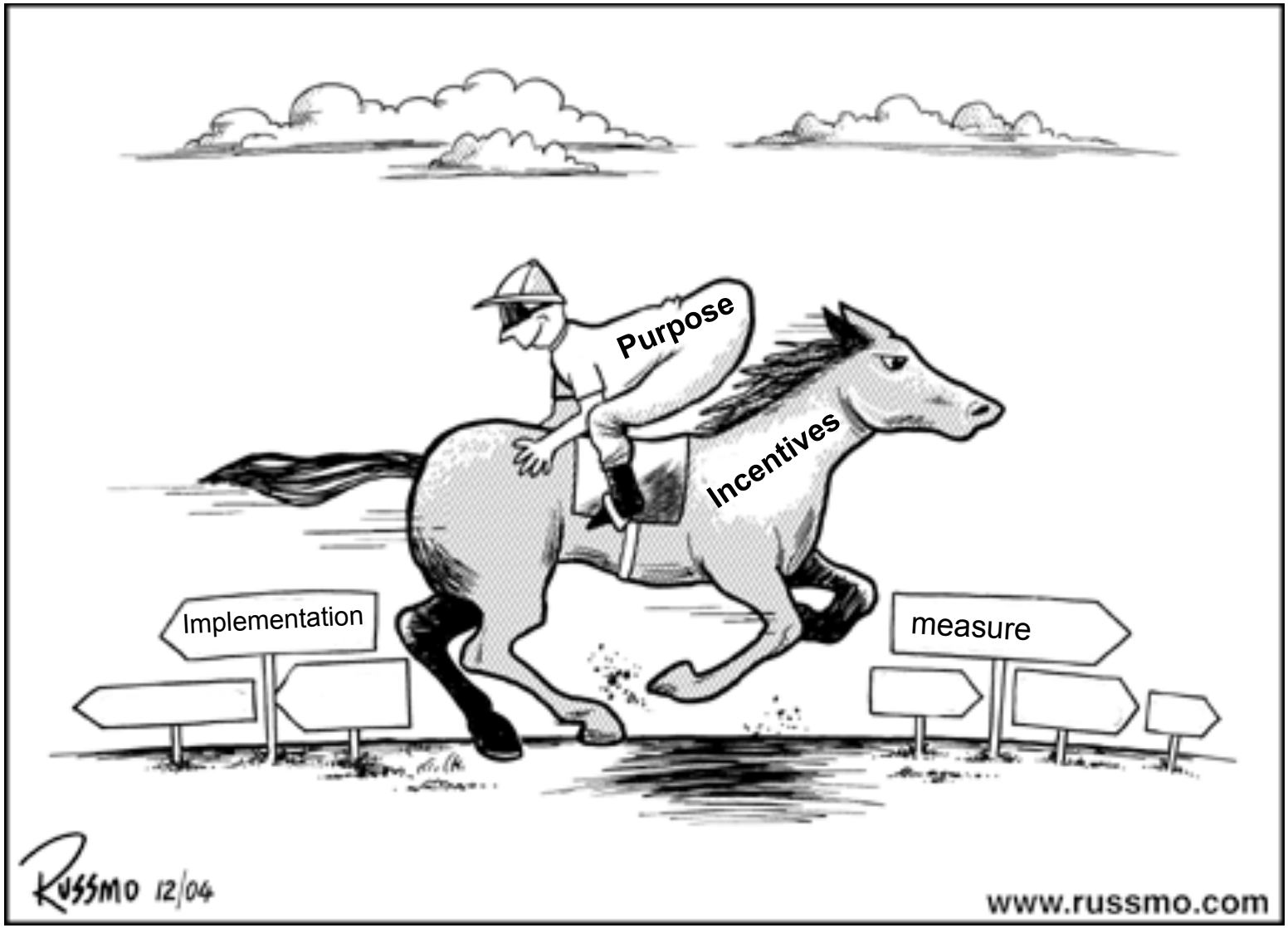


Enter Institutions (and politicians)

- If you have political support at the top → ☺
- If you do not have political support ……

"My team has created a very innovative solution, but we're still looking for a problem to go with it."

DEFINE THE PROBLEM - REQUIREMENTS!!


Purpose
Incentives
Implementation
measure
RUSSMO 12/04
www.russmo.com

Colombia's Poverty committee
Coordinating and monitoring poverty reduction

- Leaders
  - Counselor for the Presidency
  - Social Prosperity
  - National Planning Department
- Permanent members
  - Ministry of Health
  - Ministry of Labor
  - Ministry of Housing
  - Ministry of Agriculture
  - Ministry of Education
  - Ministry of Finance

MANDATORY PRESENCE
The President of Colombia

Colombia's Sectoral goals
For accomplishing the strategy

Pobreza		Línea Base PND 2008	Dato 2011	Dato 2012	Análisis	Goal	
MPI (Multidimensional Poverty)		**34.7%**	**29.4%**	**27.0%**	●	**22.5%**	
A(1)	▪ Educational achievement (≥15 yrs)	58.8%	54.6%	53.1%	●	52.8%	
	▪ Literacy (≥15 yrs)	14.2%	12.0%	12.1%	● ★	12.0%	
B(2)	▪ School attendance (6-16)	5.4%	4.8%	4.1%	●	3.5%	***
	▪ No school lag (7-17)	33.4%	34.1%	33.3%	●	33.1%	
	▪ Access to child care services (0-5)	12.1%	10.8%	9.4%	●	10.6%	***
	▪ Children not working (12-17)	5.5%	4.5%	3.7%	●	2.9%	***
C(3)	▪ Long-term unemployment	9.6%	9.1%	10.0%	● ★	9.3%	***
	▪ Formal employment	80.6%	80.4%	80.0%	●	74.7%	
D(4)	▪ Health insurance	24.2%	19.0%	17.9%	●	0.5%	
	▪ Access to health services	8.9%	8.2%	6.6%	●	2.4%	***
E(5)	▪ Access to water source	12.9%	12.0%	12.3%	● ★	10.9%	
	▪ Adequate sewage system	14.1%	14.5%	12.1%	●	11.3%	***
	▪ Adequate floors	7.5%	6.3%	5.9%	●	5.6%	
	▪ Adequate external walls	3.1%	3.2%	2.2%	●	2.1%	***
	▪ No critical overcrowding	15.7%	14.2%	13.1%	●	8.4%	***

***** Change 2011-2012 est. signitifcant**

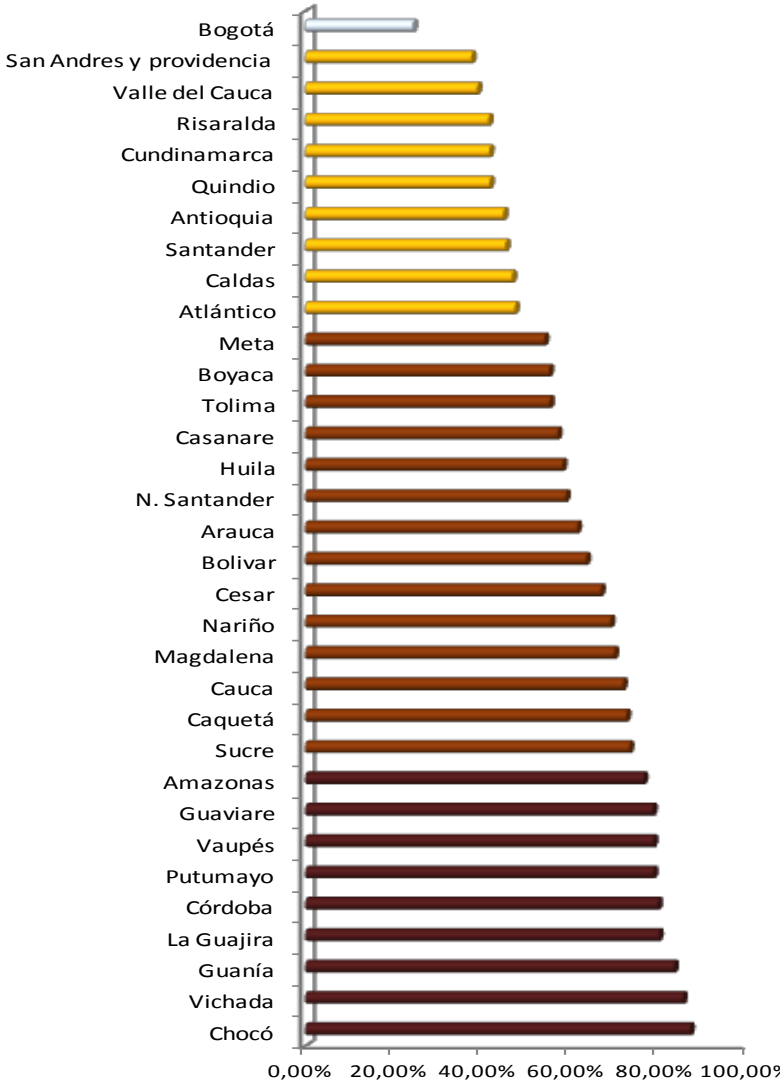
FUENTE: DANE

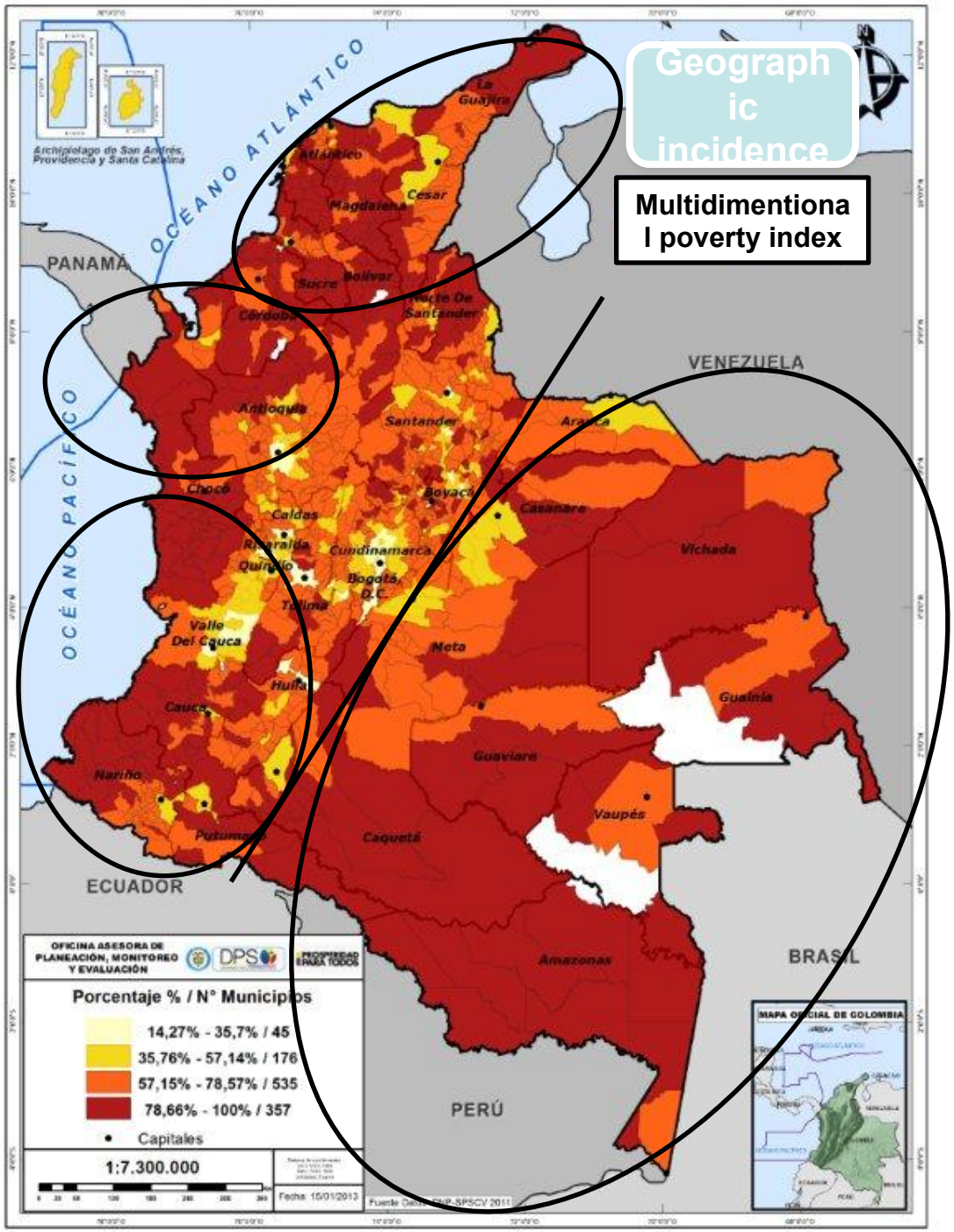
An example of geographical targeting using MPI

Colombia's Conditional Cash Transfer Program "Más Familias en Acción"

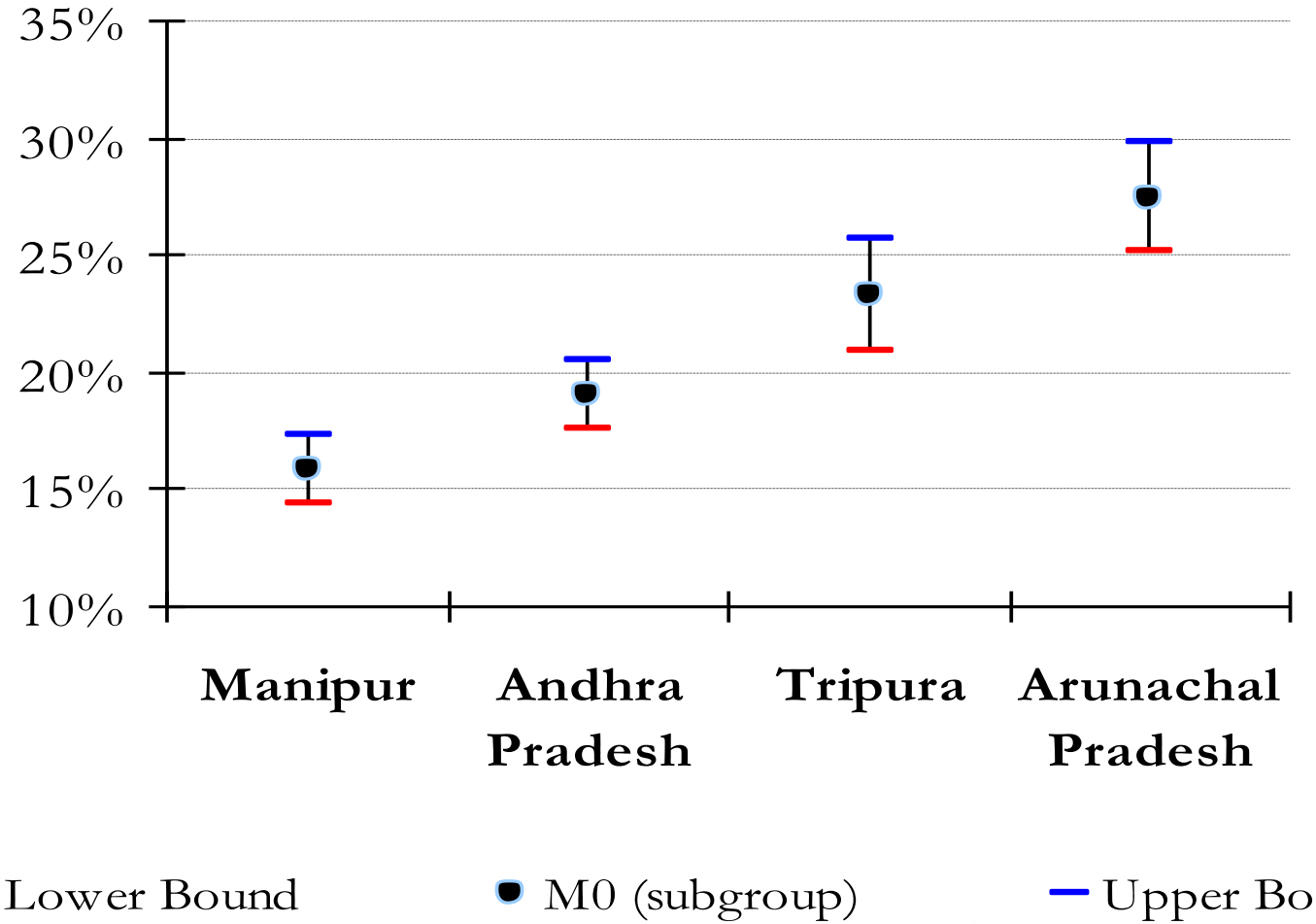
2.7 million families

Different types of social programs depending on multidimensional poverty incidence



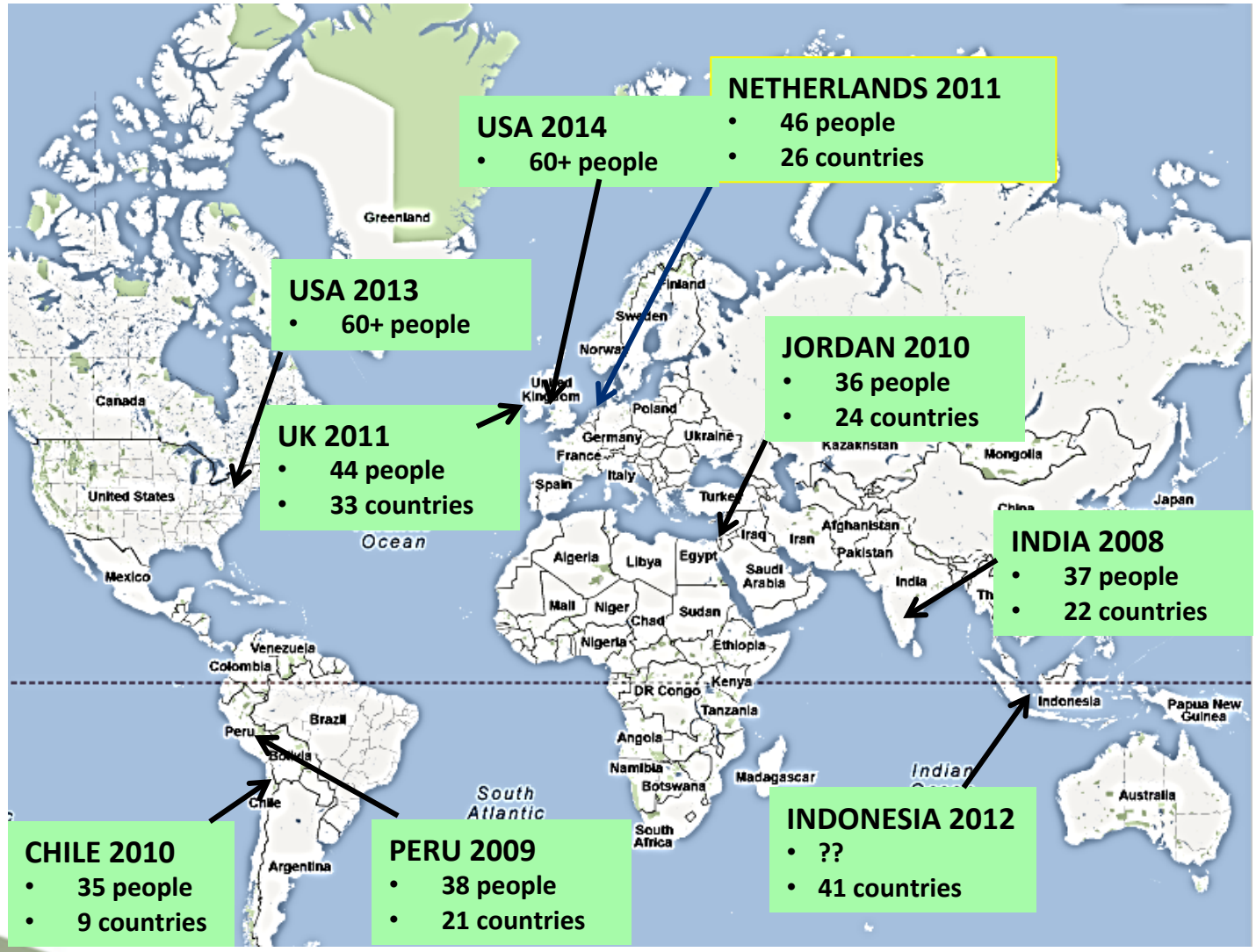


Are the M0 values different?
Standard Errors & Confidence Intervals



Source Alkire and Seth (2012)

OPHI Summer Schools



Thank you from whole the OPHI team

OPHI Oxford Poverty & Human Development Initiative