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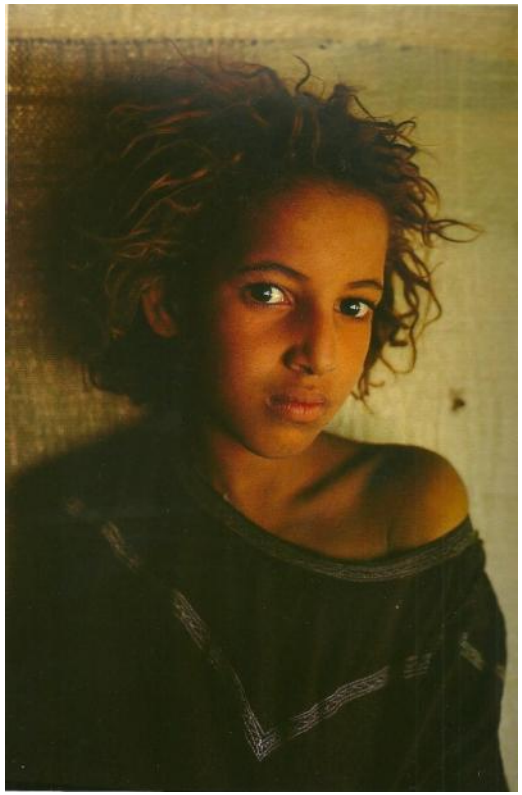

Monitoring progress in child poverty reduction: methodological insights and illustration to the case study of Bangladesh

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Motivations

- World summits and conventions

on poverty and rights of the child:
i.e. CRC 1989, WSC 1990, WFFC 2002

} *Data requirement for monitoring progress*

- More data available and a degree of consensus on multidimensionality e.g. UNICEF - MICS
- Looking for a composite measure of child poverty

  One that can inform policy makers if the overall situation is improving or worsening, and allow to identify where it is changing (i.e. in which dimension, in which particular subgroup of population)

- Range of different studies

  e.g. CDI-Save the Children, SAIMDC, Young life project, Bristol approach

Focus of the paper

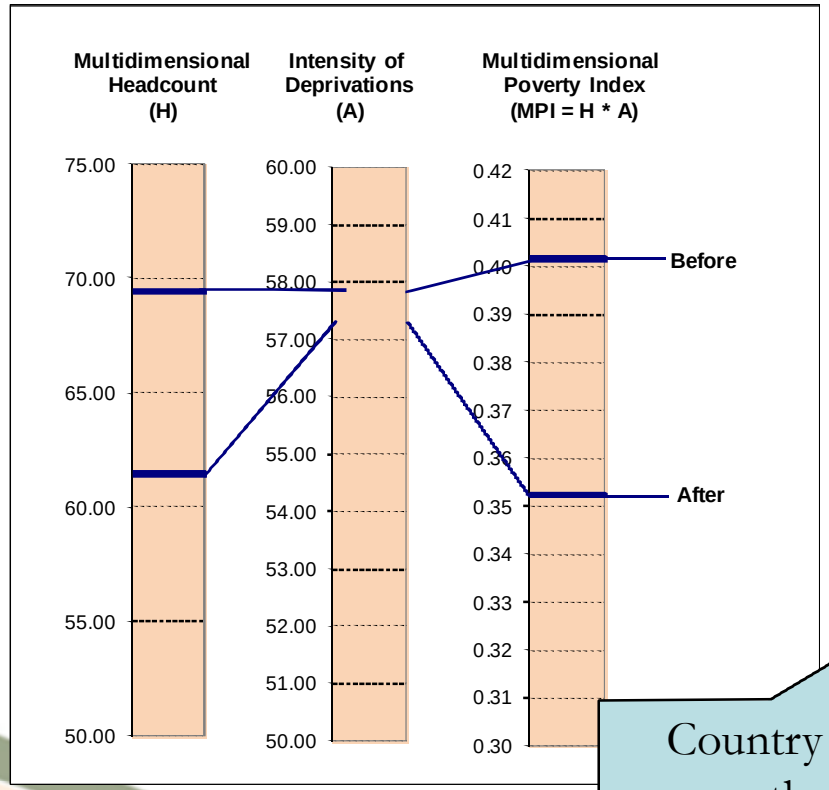
1. This paper presents a new approach to monitoring progress in child poverty reduction based on the Alkire and Foster adjusted headcount ratio and an array of complementary techniques.
2. A theoretical discussion is accompanied by an assessment of child poverty reduction in Bangladesh based on four rounds of the Demographic Household Survey (1997, 2000, 2004 and 2007).

Moving beyond headcount: policy implications

How is this relevant for policy?

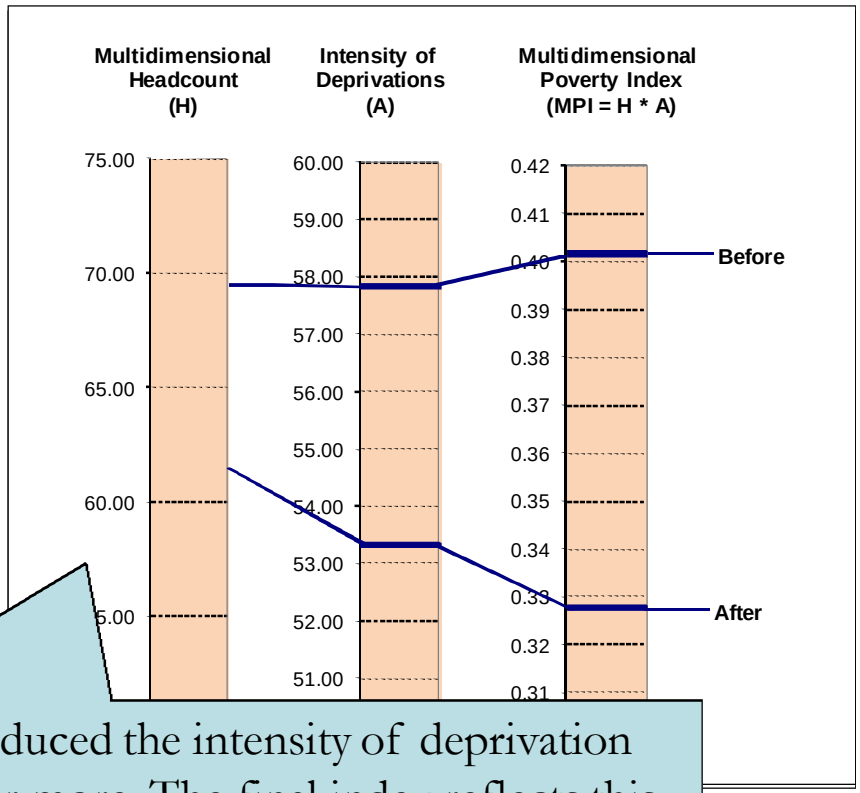
Country A:

Poverty reduction policy
(without inequaliy focus)



Country B:

Policy oriented to the poorest of the poor

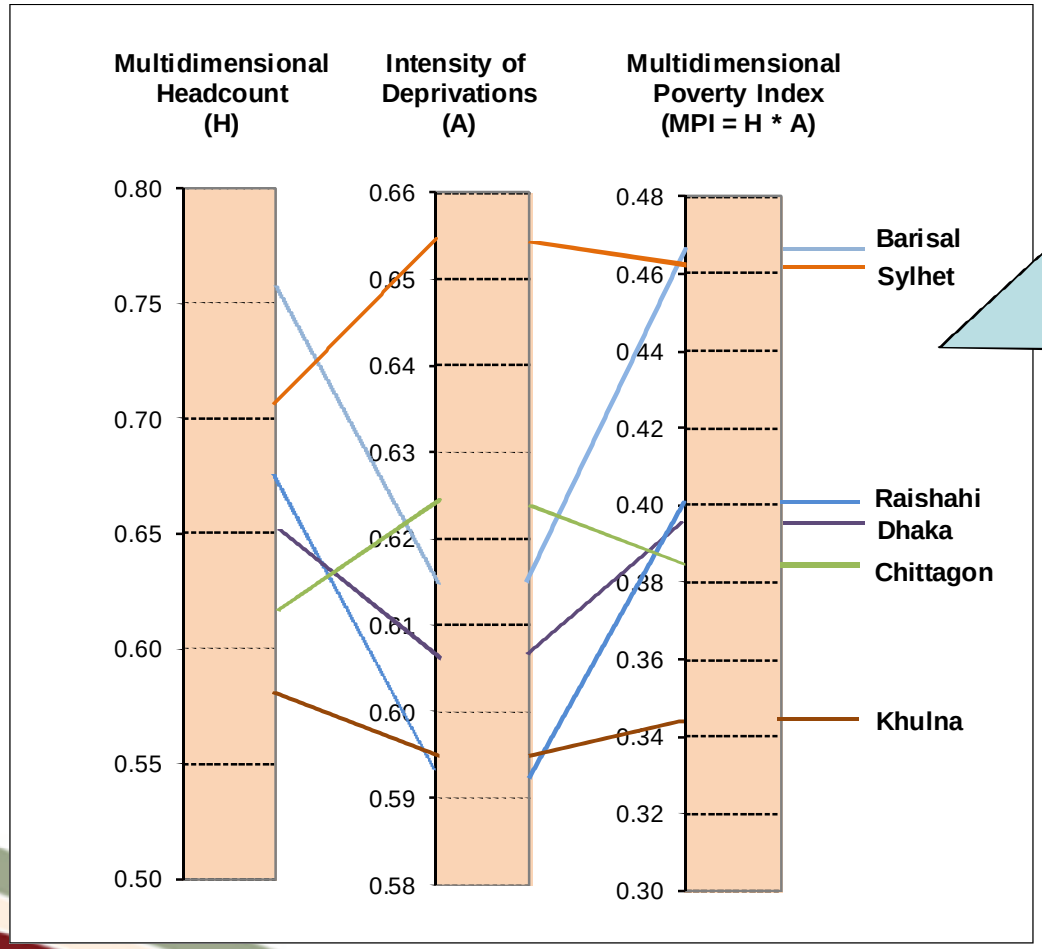


Country B reduced the intensity of deprivation among the poor more. The final index reflects this.

(M_0 satisfies **Dimensional Monotonicity**)

It maters for comparison

Ranking among regions



The poor in Syhlet and Chittagon experience considerably high intensity of poverty.

Rajshahi or Barisal have a high incidence of poverty but lower intensity.

Comparison among different measures of intensity of child poverty

					Relative Variation					
	1997	2000	2004	2007	1997-2000		2000-2004		2004-2007	
Bagladesh										
1 . Intensity for k>=1 (A&F)	61.0%	56.9%	55.9%	50.4%	-6.9%	***	-1.6%		-9.8%	***
2. Intensity for k>=2 (A&F)	62.9%	60.1%	58.5%	54.4%	-4.3%	***	-2.7%	*	-7.1%	***
3. Intensity for k>=3 (A&F)	66.9%	65.3%	63.6%	61.1%	-2.4%	***	-2.6%	***	-3.9%	***
4. Depth as % indicators (R at al)	59.9%	55.6%	54.6%	48.6%	-7.2%	***	-1.8%		-10.8%	***
5. Depth (D&M)	3.6	3.3	3.3	2.9	-7.2%	***	-1.8%		-10.8%	***
6. Severity-Weighted Depth (D&M)	14.4	12.7	12.2	10.1	-11.3%	***	-4.4%		-17.4%	***
7. Severity – standard dev. (D&M)	5.0	5.0	4.7	4.5	-1.6%	***	-4.6%		-5.9%	***

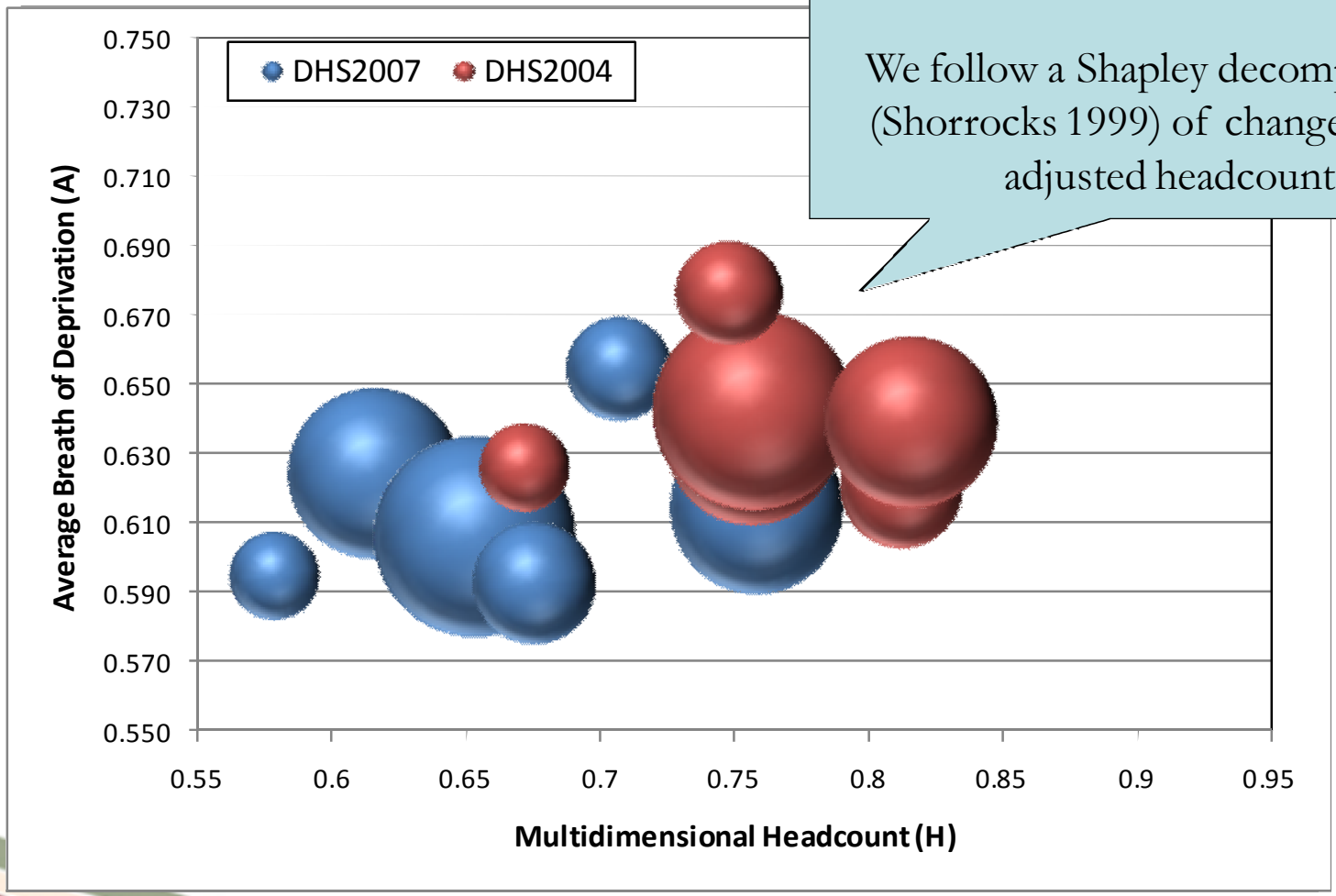
Source: Own calculations based on Demographic Health Surveys.
Note: *** statistically significant at α=0.01, ** statistically significant at α=0.05, * statistically significant at α=0.10.
A&F = Alkire and Foster (2007, 2011); M&D = Minujin & Delamonica (2007), R at al = Roelen et al (2009).

What happened at the su

We can decompose the variation in adjusted headcount by:

- ✓ **Incidence effect**
- ✓ **Intensity effect**

We follow a Shapley decomposition (Shorrocks 1999) of changes in the adjusted headcount



Decomposition by incidence and intensity

Since the adjusted headcount can be expressed as the product of the incidence of poverty times the intensity of poverty, $M_{0_t} = H_t * A_t$ one might also want to decompose variation in the adjusted headcount by changes in these two components to obtain:

1) changes due to variation in the incidence of poverty,

2) changes due to variation in the intensity of poverty, and

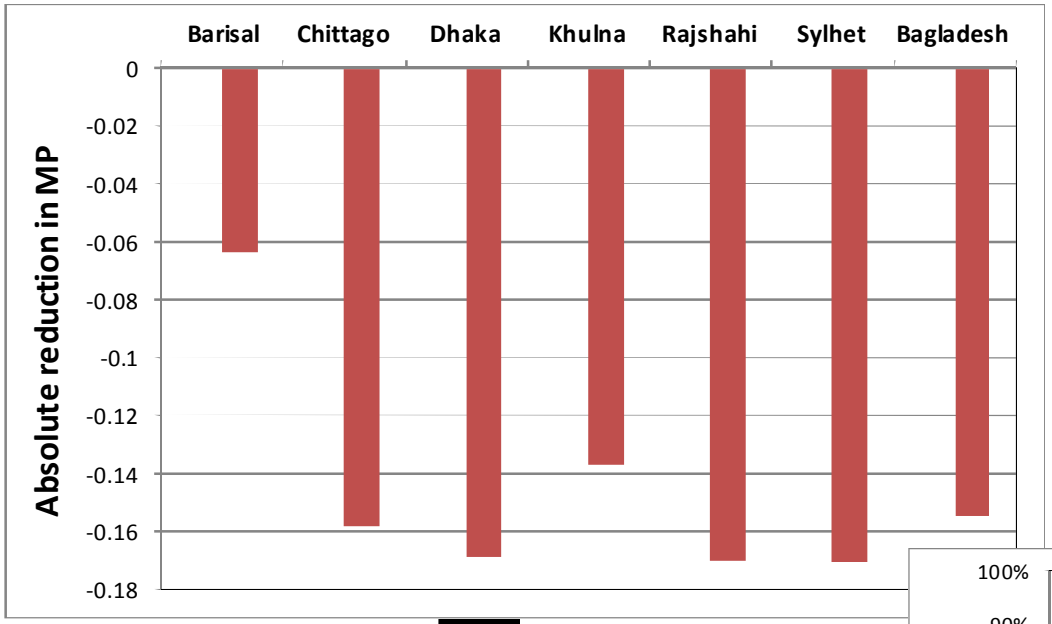
3) changes that are due to interaction effect which are changes due to the correlation between incidence and intensity.

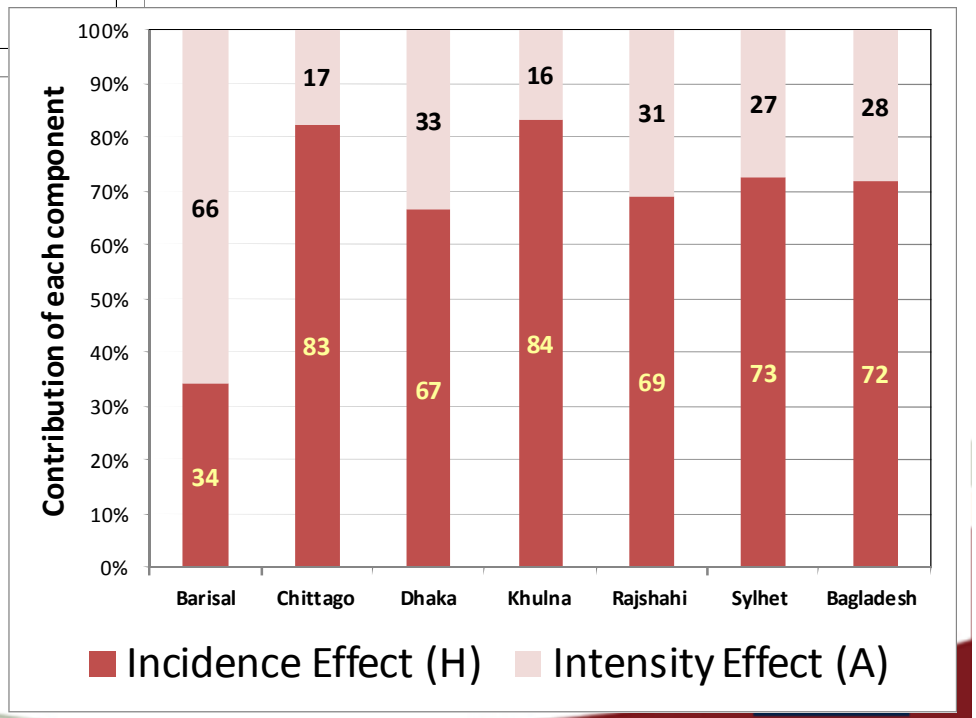
Decomposition by incidence and intensity

Closely to Apablaza and Yalonetzky (2011) and following a Shapley decomposition (Shorrocks 1999), changes in the adjusted headcount can be decompose as follows:

$$\Delta M_0 = \underbrace{\frac{(A_1 + A_2)}{2}(H_2 - H_1)}_{\text{Incidence of poverty effect}} + \underbrace{\frac{(H_1 + H_2)}{2}(A_2 - A_1)}_{\text{Intensity of poverty effect}}$$

Different path to poverty reduction



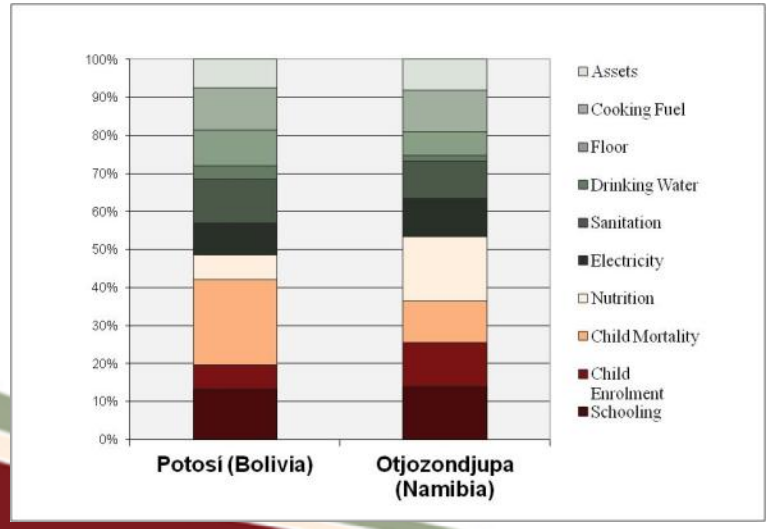


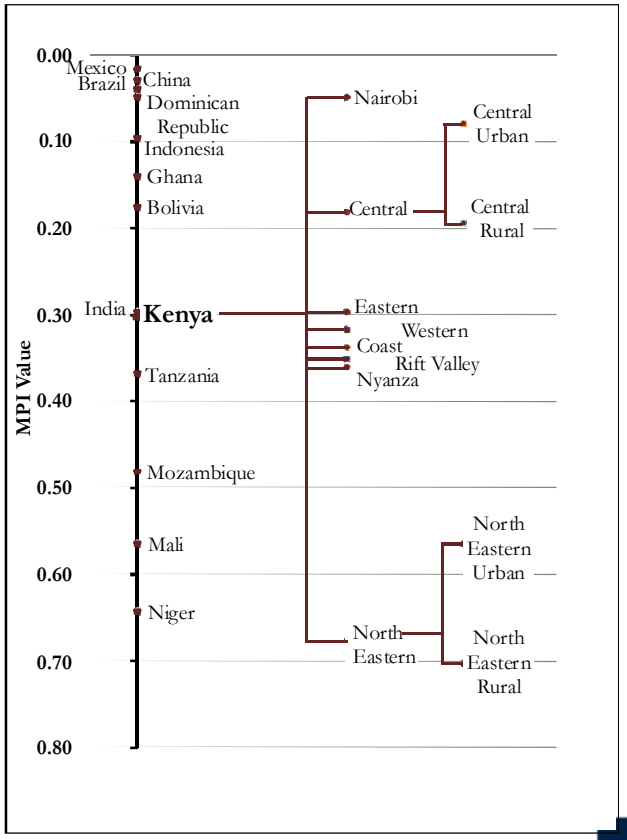
Decomposability: How does it help?

An important property of M_0: *Decomposability*

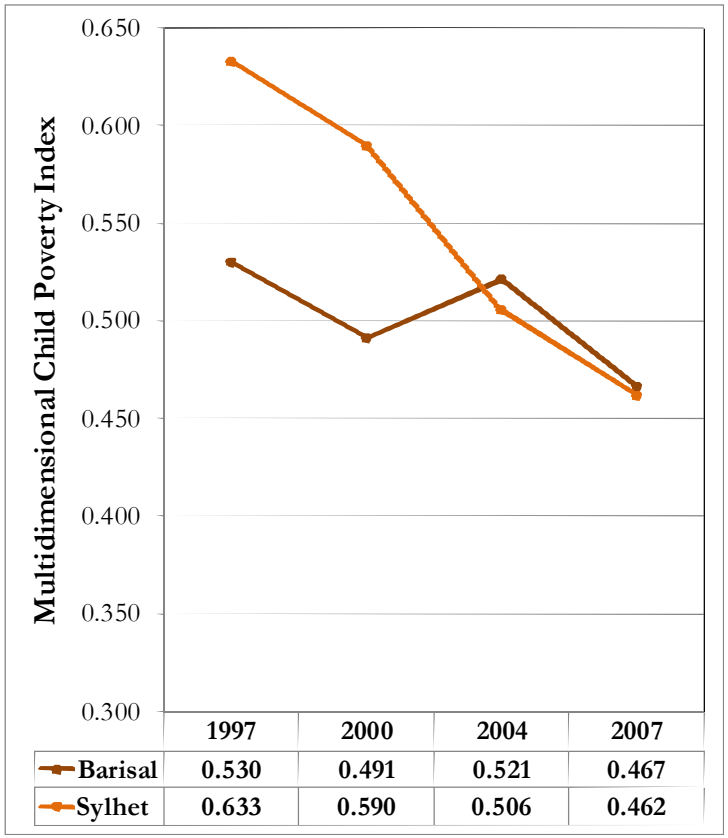
- *Subgroup Decomposability: the national measure can be 'decomposed' by age, gender, region, ethnicity, rural/ urban etc.*

- *Dimension decomposability (after identification): You can easily see what dimensions are causing greater poverty in different groups or areas.*

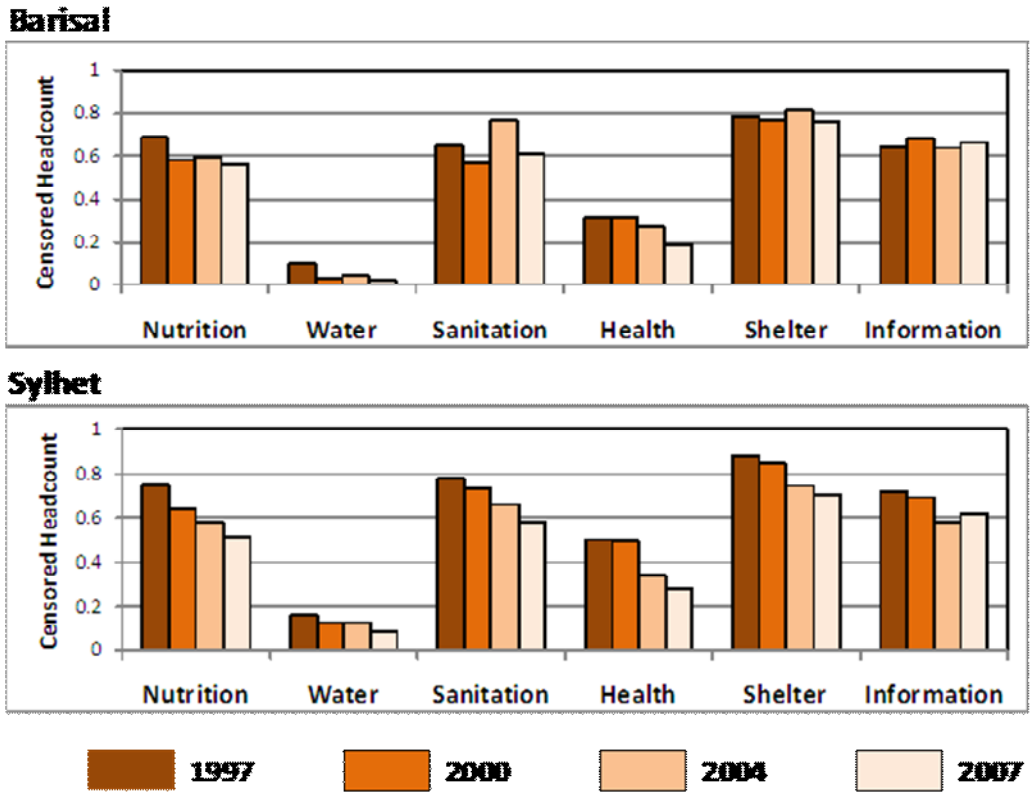




Changes over time at sub-national level



	1997	2000	2004	2007
Barisal	0.530	0.491	0.521	0.467
Sylhet	0.633	0.590	0.506	0.462



While under-five child poverty had been decreasing in the preceding decade, there was a resurgence of poverty in the low-lying coastal regions including Barisal and Chittagong between 2000-2004. Strikingly, the region of Barisal did not recover as fast as other regions.

Decomposition of the variation in intensity of poverty by dimension

Following Apablaza and Yalonetzky (2011), we know that when dimensional weight is constant across period, the absolute change in intensity can be decomposed as follows

$\Delta A = \sum_{d=1}^{D} w_d (A_{2d} - A_{1d})$ where w_{td} denotes the dimensional weight and A_{td} the shared of the poor that are deprived in dimension d at time t

Since $A_{td} = Ch_{td} / H_t$ the same decomposition can be expressed in terms of censored headcount as

$$\Delta A = \sum_{d=1}^{D} w_d \left(\frac{Ch_{2d}}{H_2} - \frac{Ch_{1d}}{H_1}\right)$$

Decomposition of the variation in intensity of poverty by dimension

This decomposition can be integrated to the decomposition of changes in M_0, such as:

$$\Delta M_0 = \underbrace{\frac{(A_1 + A_2)}{2}(H_2 - H_1)}_{\text{Incidence of poverty effect}} + \underbrace{\frac{(H_1 + H_2)}{2}\sum_{d=1}^{D} w_d \left(\frac{Ch_{2d}}{H_2} - \frac{Ch_{1d}}{H_1}\right)}_{\text{Intensity poverty effect expressed in function of the marginal effect of dimension } d}$$

Note that with panel data we would also be able to decompose the remaining effect of dimension *d* which is associated only to reduction in incidence of poverty

Integrated Shapley Decomposition of variation in MPI

	Barisal	Sylhet	Bagladesh
Multidimensional Child Poverty Index (Initial Period)	0.530	0.633	0.555
Absolute variation in multidimensional childpoverty	-6.4%	-17.1%	-15%
→ Incidence of poverty effect (H)	21%	57%	56%
→ Intensity of poverty effect (A):	40%	21%	22%
→ Health effect (in reducing intensity)	19%	10%	13%
→ Nutrition (in reducing intensity)	15%	8%	5%
→ Water (in reducing intensity)	12%	4%	1%
→ Sanitation (in reducing intensity)	2%	4%	3%
→ Shelter (in reducing intensity)	-1%	0%	0%
→ Information (in reducing intensity)	-7%	-4%	-1%

This decomposition summarizes how Multidimensional Poverty is changing and also how the profile of the poor is changing simultaneously

Group decomposition of change in poverty

Since M_0 is 'decomposable' we know that it can be obtained from the population weighted average of the subgroup poverty levels:

$$M_{0t} = \sum_{g=1}^{G} n_{gt} M_{0gt}$$

The variation of M0 can be expressed as: $\Delta M_0 = \sum_{g=1}^{G} \left(n_{g2} M_{0g2} - n_{g1} M_{0g1} \right)$

More intuitively...

	n (t-1)	n (t=2)	M0 (t=1)	M0 (t=2)
Group 1	15%	20%	0.065	0.047
Group 2	22%	30%	0.110	0.085
Group 3	30%	30%	0.205	0.189
Group 4	33%	20%	0.312	0.275
Total	100%	100%	0.198	0.147

There are changes in M_{0g} and also in the population share n_g.

Can we decompose each effect?

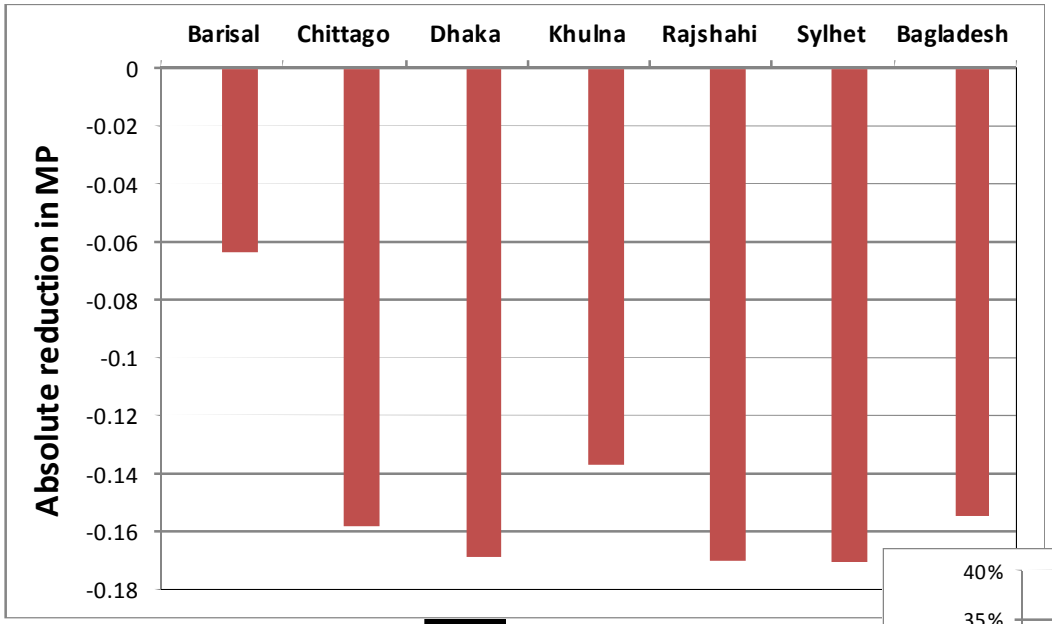
Group decomposition of change in poverty

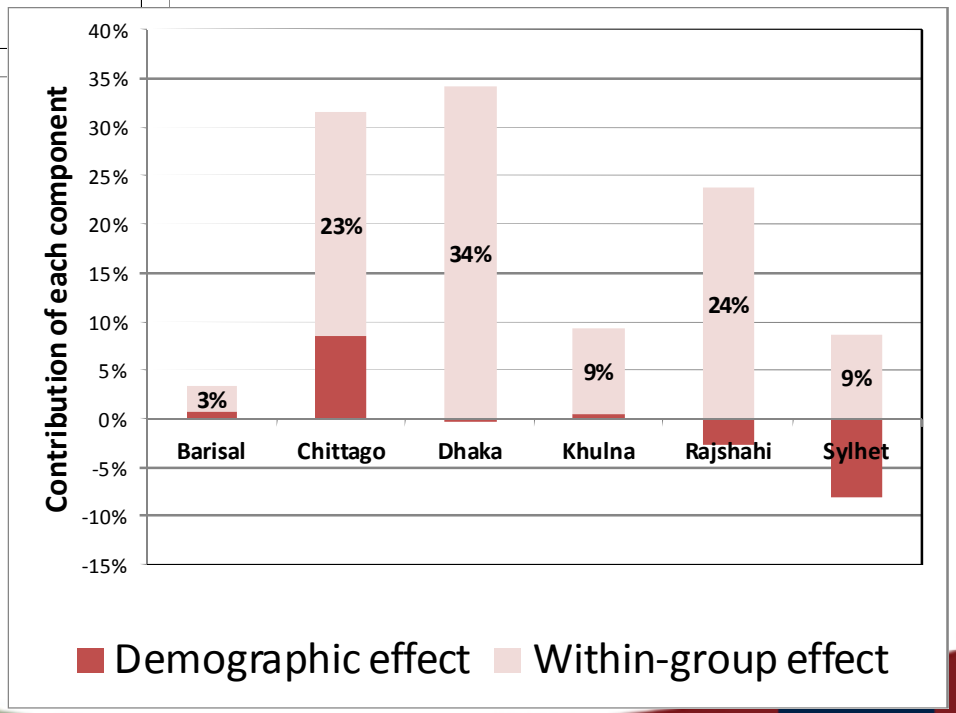
Following a similar decomposition of change in FGT income poverty measures (Ravallion and Huppi, 1991), and after applying a Shapley decomposition following Shorrocks (1999), the national variation in poverty level can be broken down in two components:

$$\Delta M_0 = \underbrace{\sum_{g=1}^{G} \frac{(n_{g1} + n_{g2})}{2}(M_{0g2} - M_{0g1})}_{\text{Within-group poverty effect}} + \underbrace{\sum_{g=1}^{G} \frac{(M_{0g1} + M_{0g2})}{2}(n_{g2} - n_{g1})}_{\text{Demographic or sectoral effect}}$$

Naturally, this analysis can be integrated with the previous decomposition for a comprehensive analysis of the marginal effects in variation in MPI

Different path to poverty reduction





Integrated Shapley decomposition of changes over time

	Barisal	Chittago	Dhaka	Khulna	Rajshahi	Sylhet	Bagladesh
Decomposition variation in Multidimensinal Child Poverty (Period 1997/2000)							
Total % contribution (ΔM0 for Bagladesh = 100)	3.5%	31.5%	34.1%	9.4%	21.0%	0.4%	100%
▸ Demographic effect	1%	8%	0%	0%	-3%	-8%	-1%
▸ Within-group effect	3%	23%	34%	9%	24%	9%	101%
▸ Incidence of poverty effect (H)	1%	19%	23%	7%	16%	6%	73%
▸ Intensity of poverty effect (A):	2%	4%	11%	1%	7%	2%	28%
▸ Health effect (in reducing intensity)	0.8%	3.6%	6.1%	1.5%	4.3%	1.1%	17.3%
▸ Nutrition (in reducing intensity)	0.7%	1.2%	1.9%	0.9%	1.2%	0.8%	6.6%
▸ Water (in reducing intensity)	0.5%	-0.7%	0.6%	-0.5%	0.8%	0.4%	1.1%
▸ Sanitation (in reducing intensity)	0.1%	0.2%	2.1%	-0.4%	1.6%	0.4%	4.0%
▸ Shelter (in reducing intensity)	0.0%	0.1%	0.0%	0.0%	-0.1%	0.0%	-0.1%
▸ Information (in reducing intensity)	-0.3%	-0.3%	0.8%	0.0%	-0.4%	-0.4%	-0.7%

Conclusions

• The choice of measure does matter, and measurement has important implications for a range of practical policy applications.

• Child poverty should not be assessed *only* according to the incidence of poverty but *also* by the **intensity** of deprivations that batter poor children's lives at the same time. AF's M_0 does so.

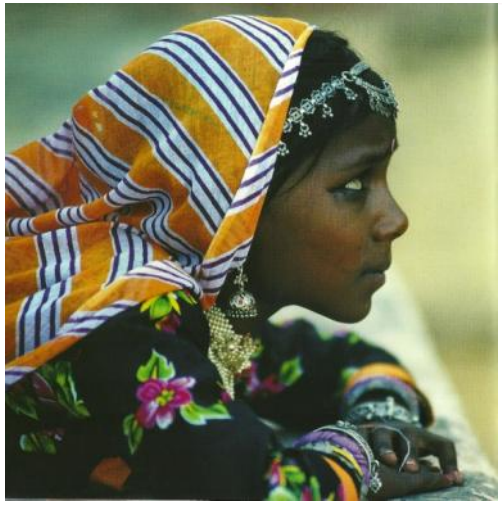
• The adjusted headcount M_0 satisfies a series of **properties** which are key for policy. It can be broken down by group & dimension.

• Shapley decomposition of changes over time allows undertaking a integrated multidimensional analysis of changes over time


Tabita, Kenya
Rabiya, India
Stephanie, Madagascar
Agatha, Madagascar
Dalma, Kenya
Ann-Sophia, Kenya
Valérie, Madagascar

Thank you

Appendix – methodological notes



Case study: Bangladesh

- Demographic Household Survey (DHS)
- Four years under study: 1997, 2000, 2004 and 2007
- Unit of analysis: under-five child poverty

  Some dimensions and indicators are age specific; long term effects of poverty during early childhood

- Sample is representative at a national and regional level

  Over 10,000 households and 20,000 children (aged 0-17) interviewed

Selected indicators

(Following Gordon et al 2003 UNICEF Report based on the Copenhagen definition)

Deprivation	Thresholds for deprivation
Shelter	Children living in a house with no flooring (i.e. a mud or dung floor) or inadequate roofing.
Improved Sanitation	Children using unimproved sanitation facilities. Unimproved sanitation facilities include: pit latrine without slab, open pit latrine, bucket toilet and hanging toilet.
Drinking Water	Children using water from an unimproved source such as open wells, open springs or surface water.
Information	Children (aged 3-17 years) with no access to a radio or television (i.e. broadcast media).
Nutrition	Children who are more than two standard deviations below the international reference population for stunting (height for age) or wasting (weight for height) or underweight (weight for age).
Health	Children who have not been immunised by 2 years of age. If the child has not received eight of the following vaccinations they are defined as deprived: bcg, dpt1, dpt2, dpt3, polio0, polio1, polio2, polio3, measles or did not receive treatment for a recent illness involving an acute respiratory infection or diarrhoea.

Not included from Bristol indicators:

Education deprivation (non relevant for children under 5)

Severe Deprivation of Access to Basic Services (non available in the datasets)

AF Methodology: What is the trick?

Alkire & Foster methodology

Alkire, S. and Foster, J. 2007. Counting and Multidimensional Poverty Measurement. OPHI Working Paper 7.

Alkire, S. and Foster, J. 2011. Counting and Multidimensional Poverty Measurement. *Journal of Public Economics.*

Applied to various contexts

- Multidimensional Poverty Index (MPI) published in the Human Development Report (estimations for 109 countries)
- National adjusted measures (México, Colombia, Bhutan, Venezuela
- Other accademic applications to various geographical contexts (e.g. Latin-America, Africa, South Asia, China) and to specific problematics (Targeting of Conditional Cash Transfers, Poverty dynamics, etc).

Alkire and Foster (2011) Methodology

- ***Identification:*** Dual cutoff. Weights variable.
  - Deprivation Cutoff for each dimension: z_j
  - One Poverty Cutoff: k Number (or weighted sum) of dimensions required to be deprived in to be considered poor
- ***Aggregation:*** FGT class : M_a
  (For this paper, Adjusted Headcount M_0 because we have mostly ordinal data)
- ***Ordinal data:*** are common.
- ***Decomposability:*** by sub-group, and (post identification) by factor, is key for policy.

Steps to creating an index:

- Choice of purpose for the index (monitor, target, etc)
- Choice of Unit of Analysis (indy, hh, cty)
- Choice of Dimensions
- Choice of Variables/Indicator(s) for dimensions
- Choice of Poverty Lines for each indicator/dimension
- Choice of Weights for indicators within dimensions
- If more than one indicator per dimension, aggregation
- Choice of Weights across dimensions
- **Identification method**
- **Aggregation method – within /across dimensions.**

Intuitive explanation!

(to simplify we assume equal weights in this example)

Children	Health		Living standard		Education	**Total count**	Intensity of deprivation
	Immunization	Nutrition	Shelter	Improved Sanitation	School attendance		
Child 1	ND	D	D	ND	D	**3**	3/5
Child 2	ND	ND	ND	D	ND	**1**	1/5
Child 3	ND	D	D	ND	ND	**2**	2/5
Child 4	D	D	D	D	D	**5**	5/5

Poverty cutoff k=3

→ Multidimensional Poverty Headcount (H)= 2/4

[50% of the children are poor]

→ Intensity of deprivation among the poor (A)= (3/5 + 5/5)/2= 8/10

[in average the children are deprived in 80% of the dimensions]

→ Multidimensional Poverty Index (M0) = H * A = 2/4 *8/10 = 16 / 40 = 0.400

Intuitive explanation!

(to simplify we assume equal weights in this example)

Children	Health		Living standard		Education	**Total count**	Intensity of deprivation
	Immunization	Nutrition	Shelter	Improved Sanitation	School attendance		
Child 1	ND	D	D	ND	D	**3**	3/5
Child 2	ND	ND	ND	D	ND	**1**	1/5
Child 3	ND	D	D	ND	ND	**2**	2/5
Child 4	ND	D	D	D	ND	**3**	3/5

Now suppose that a policy intervention reduces the intensity of deprivation of "child 4". She continues being poor but is now deprived in 3 out of 5 dimensions.

Poverty cut off k=3

→ Multidimensional Poverty Headcount (H)= 2/4

[the headcount does not change, 50% of the children are still poor]

→ Intensity of deprivation among the poor (A)= (3/5 + **3/5)/2= 6/10**

[the average deprivation among the poor reduces to 60%]

→ Multidimensional Poverty index (M0) = H * A = 2/4 ***6/10 = 12 / 40 = 0.300**