

Tracking Poverty Reduction in Bhutan:

Income deprivation alongside deprivation in other sources of happiness

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Tabita, Kenya

Rabiya, India

Stéphanie, Madagascar

Agathe, Madagascar

Dalma, Kenya

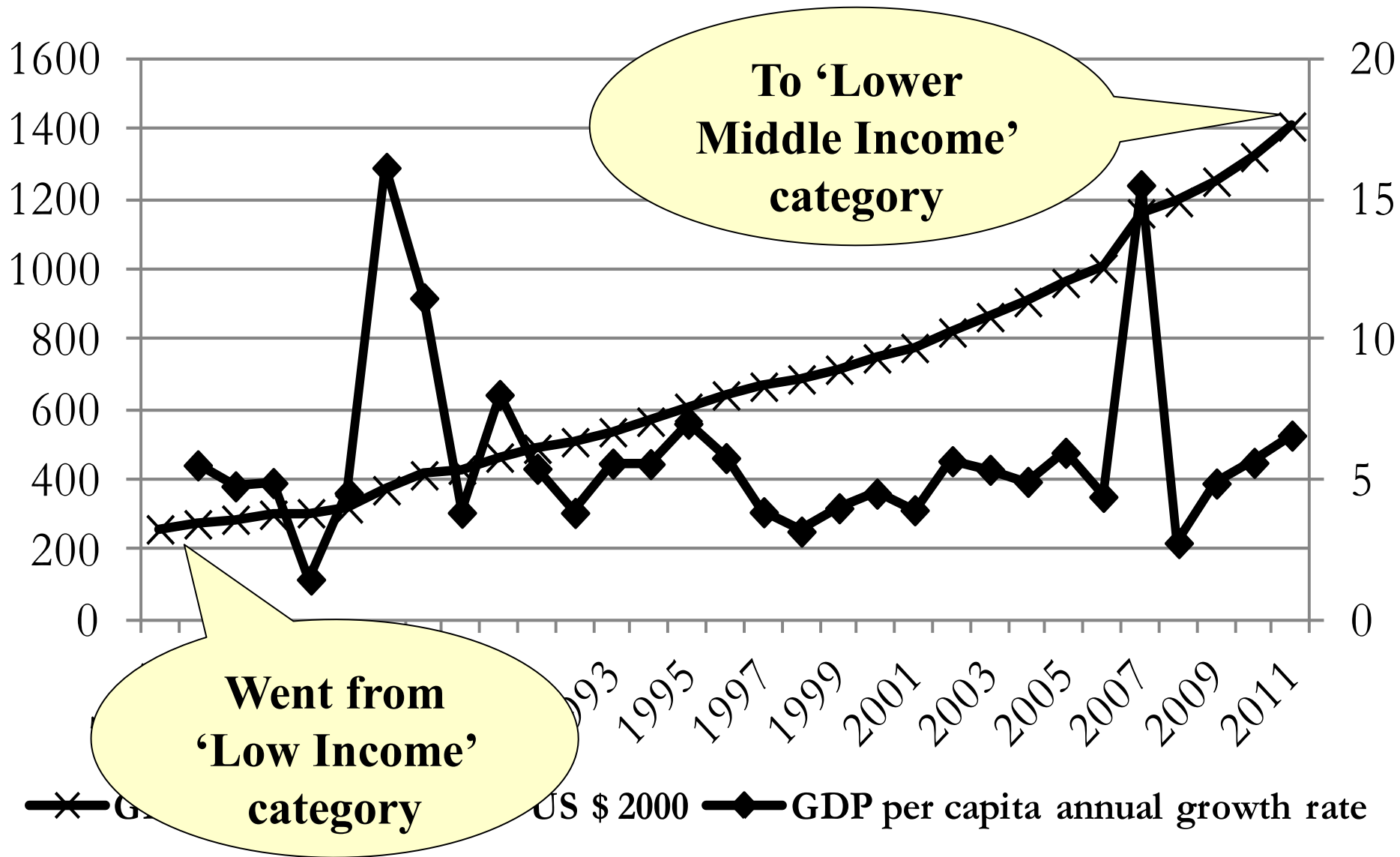
Ann-Sophie, Kenya

Valérie, Madagascar



Why Bhutan?

- Remarkable growth performance: average annual growth rate: 5.8% between 1981-2011.

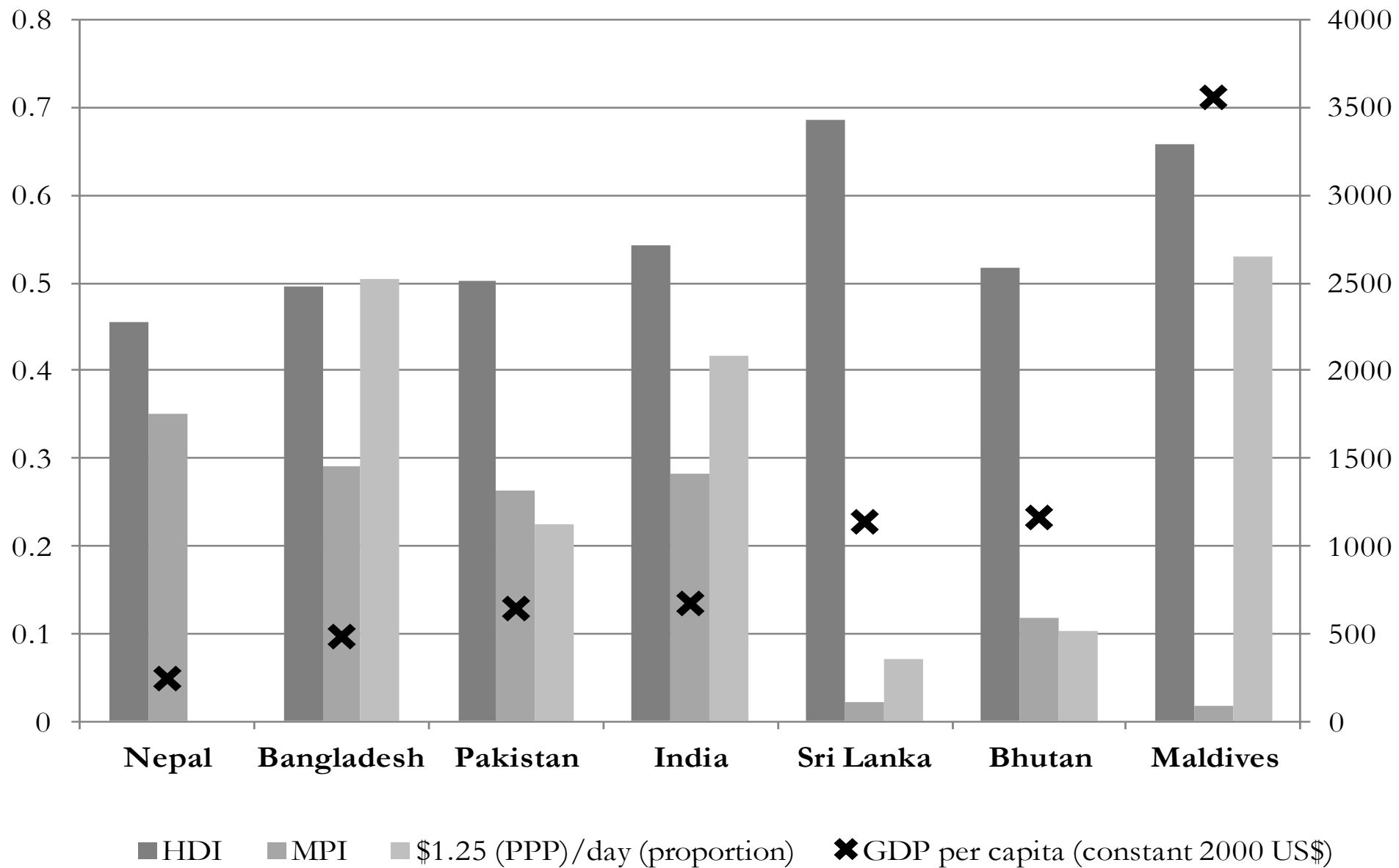


Why Bhutan?

- Also made remarkable progress in non-economic dimensions.
- Goal of promoting Gross National Happiness (GNH). Quality of life is understood holistically:
 1. Sustainable development
 2. Preservation and promotion of culture
 3. Conservation of the environment
 4. Good Governance

MDGs: core development priorities

Bhutan in its region



About 700,000 people in both
Sikkim's MPI= 0.150
Bhutan's MPI=0.119



Datasets

- 2003 and 2007 Bhutan Living Standard Surveys (National Statistics Bureau).
- Both are nationally representative and at urban and rural areas.
- They are not perfectly comparable because of:
 - Sampling frame (broader coverage in 2007). Only the 2007 one is representative at the district level.
 - Consumption module (more comprehensive in 2007).

Datasets: Monetary variable

- Consumption module: information on household expenditure: goods and services purchased, consumed from own production and received as gifts.
- Sample size
 - in 2003: 19,248
 - In 2007: 49,165

Estimated Measure

- M_0 measure from the AF family.
- $M_0 = H \times A$ (incidence times intensity)

Indicators & Deprivation Cutoffs (I)

Related to	Indicator	MDG Cutoffs (Baseline)	More demanding cutoffs
MDG1	Consumption	Official Food Poverty Line	Official Total Poverty Line
MDG2	Education	At least one literate hh member and all children 6-12 in school	At least one literate hh member and all children 6-16 in school
MDG7	Water	Safe source within 30 min.	Safe source within 15 min.
	Sanitation	Flush toilet or pit latrine with or without septic tank and not shared.	Flush toilet or pit latrine with septic tank and not shared.
	Electricity	Access	Access
	Room Availability	Less than 4 people per room.	3 or less people per room.
MDG 4,5&6	Health	Not having been sick or injured in past 4 weeks such that this prevented usual activities for more than 7 days.	Not having been sick or injured in past 4 weeks such that this prevented usual activities for more than 3 days.

Indicators & Deprivation Cutoffs (II)

Additional indicators for rural areas only

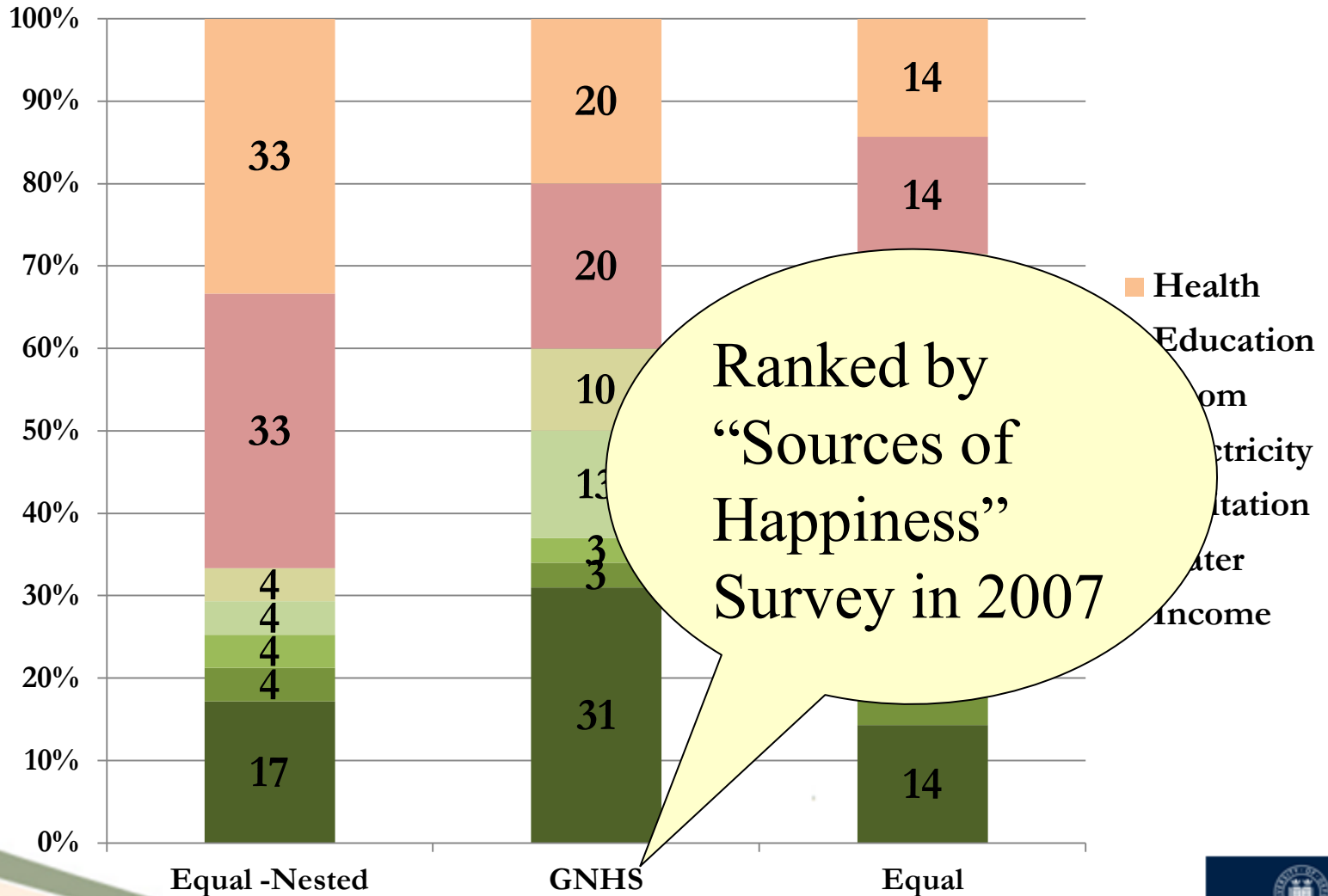
Related to	Indicator	MDG Cutoffs (Baseline)	More demanding cutoffs
MDG1	Roads	Access within 30 mins.	Access within 15 min.
MDG1	Land	Own at least 1 acre of any kind of land.	Own at least 1.5 acres of any kind of land.

Spearman correlations betw. deprivations

- No coeff. exceeds 0.41, which corresponds (in 2003) to:
 - electricity & sanitation
 - electricity & expenditure
 - people per room & expenditure

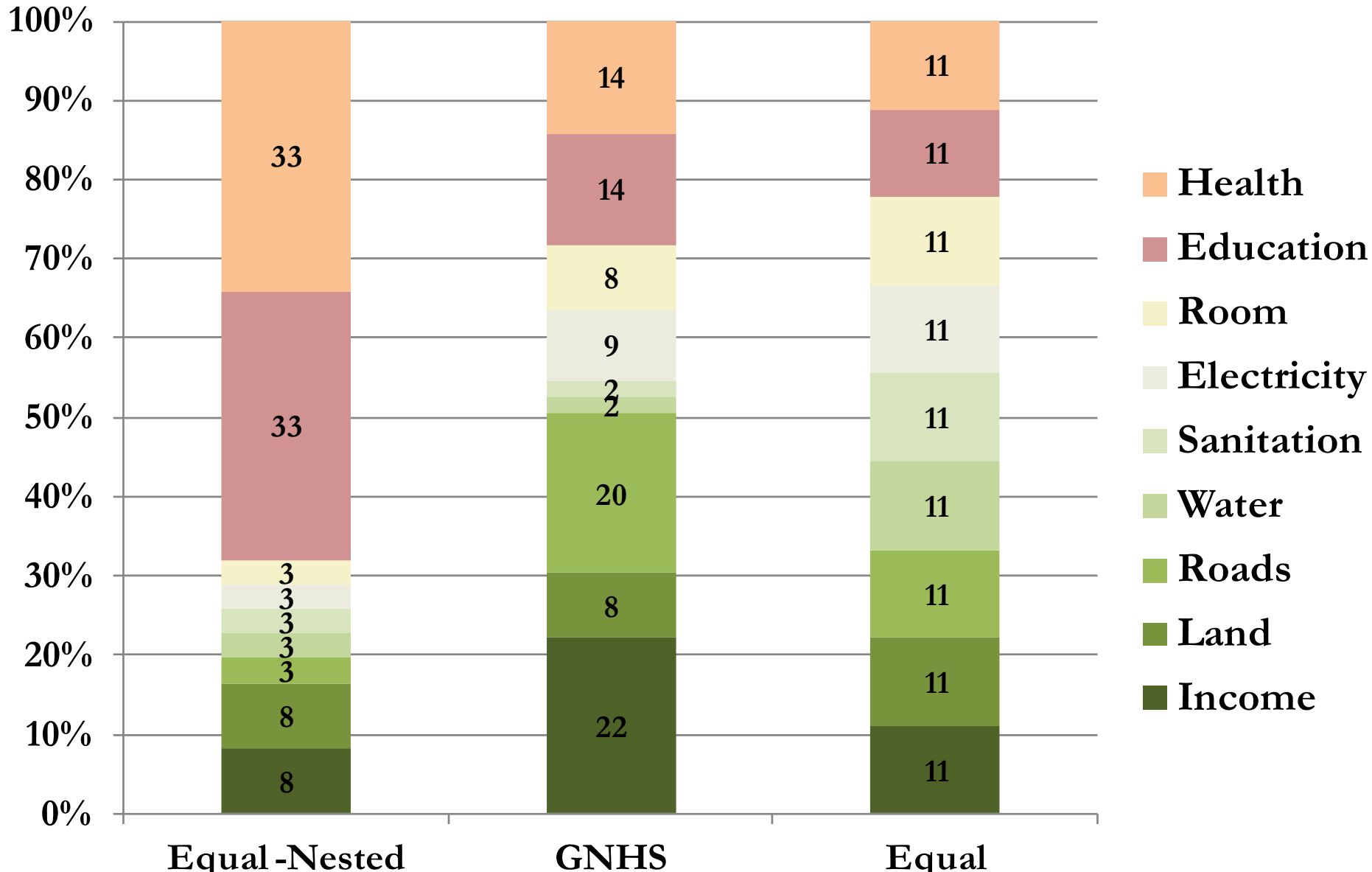
Weighting: 3 Alternatives

Urban & Rural Areas, 7 indicators



Weighting: 3 Alternatives

Rural Areas, 9 indicators



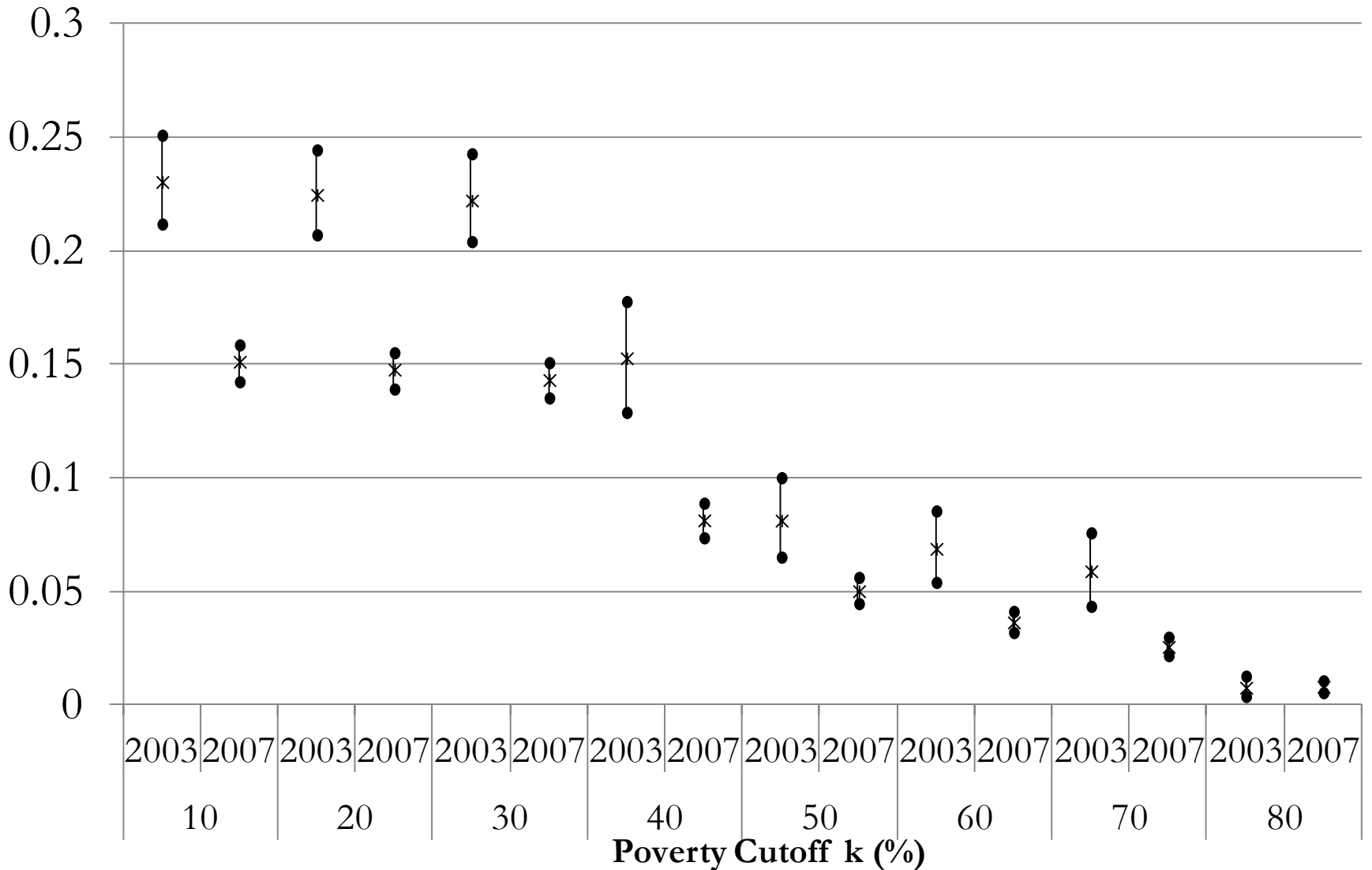
Robustness-Sensitivity

Estimated Measures

- 7 Indicators (Urban & Rural)
 - 9 Indicators (Rural Only)
- x 2 Sets of Cutoffs
- x 3 Weighting Structures
- = **12 Measures in each point in time and**
across a range of k values (10% to 100%)

Main Results

Poverty (M_0) over time



• **M0 Lower Bound**

• **M0 Upper Bound**

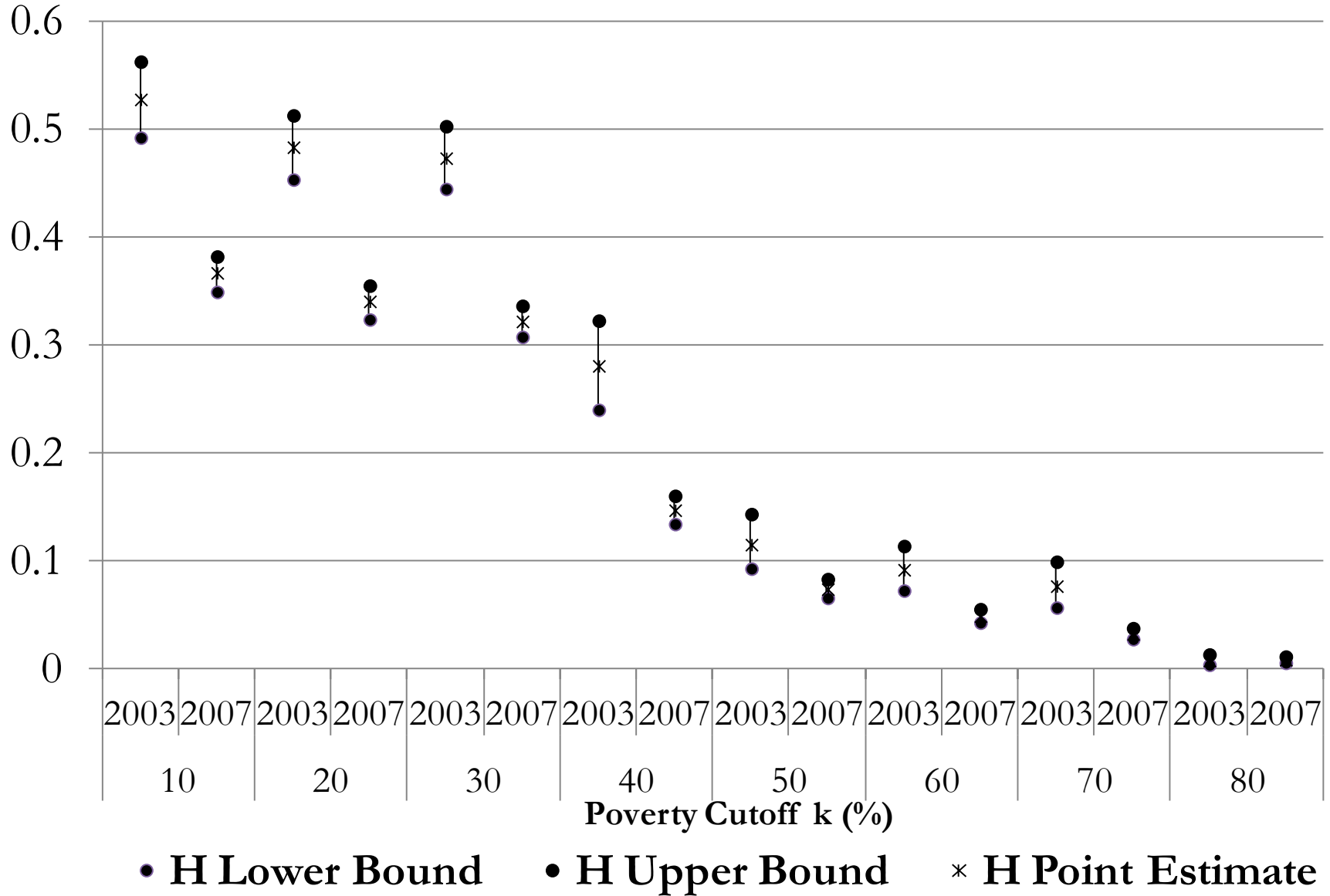
* **M0 Point Estimate**

Poverty (M_0) over time

- Unambiguous decrease of M_0 between 2003 & 2007:
 - Across number of indicators (7 and 9)
 - Across k values
 - Across weights
 - Across deprivation cutoffs

What about its components?

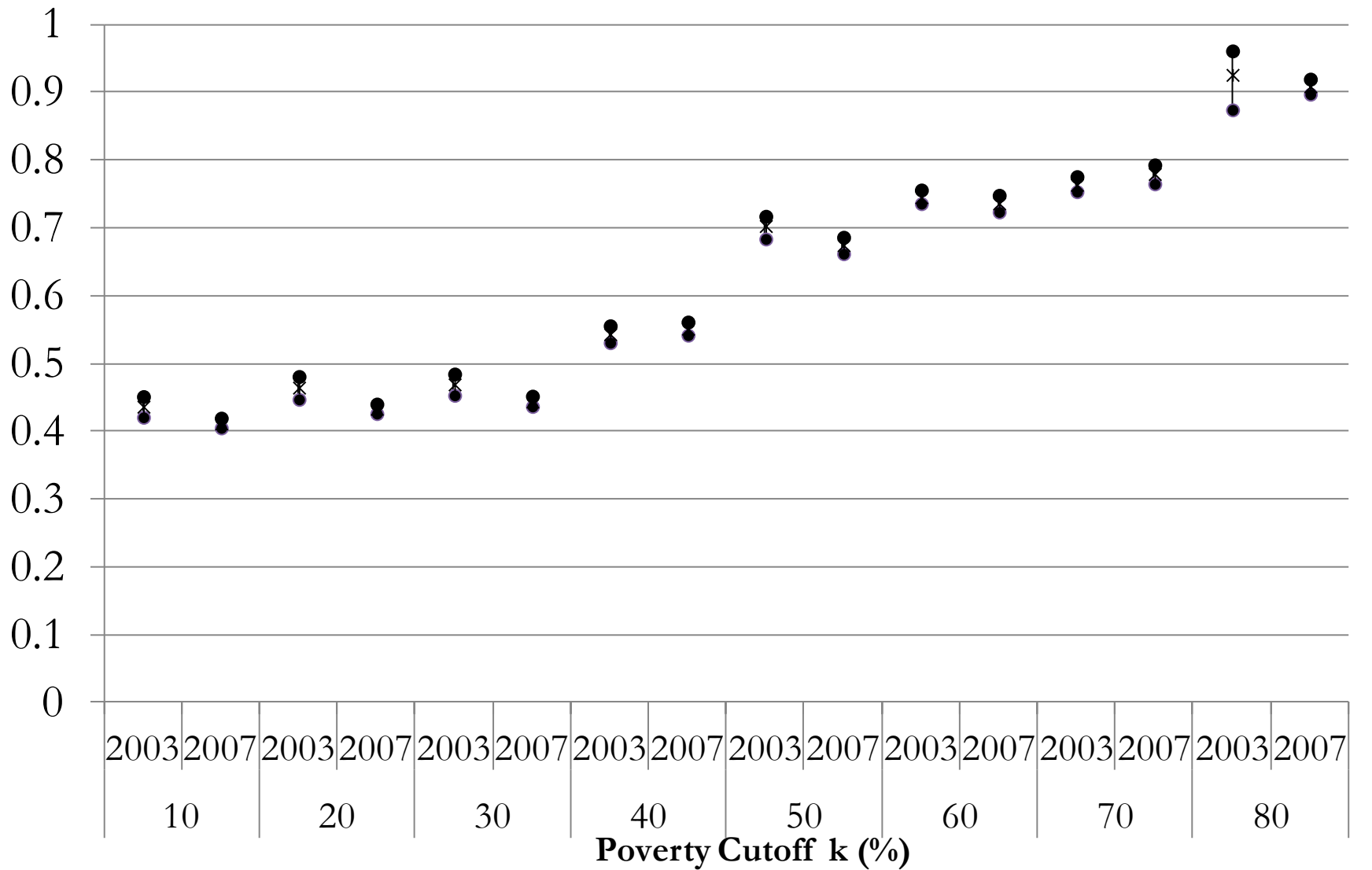
Incidence over time



Incidence over time

- Unambiguous decrease of H between 2003 & 2007:
 - Across number of indicators (7 and 9)
 - Across k values
 - Across Weights
 - Across deprivation cutoffs

Intensity over time



• A Lower Bound

• A Upper Bound

* A Point Estimate

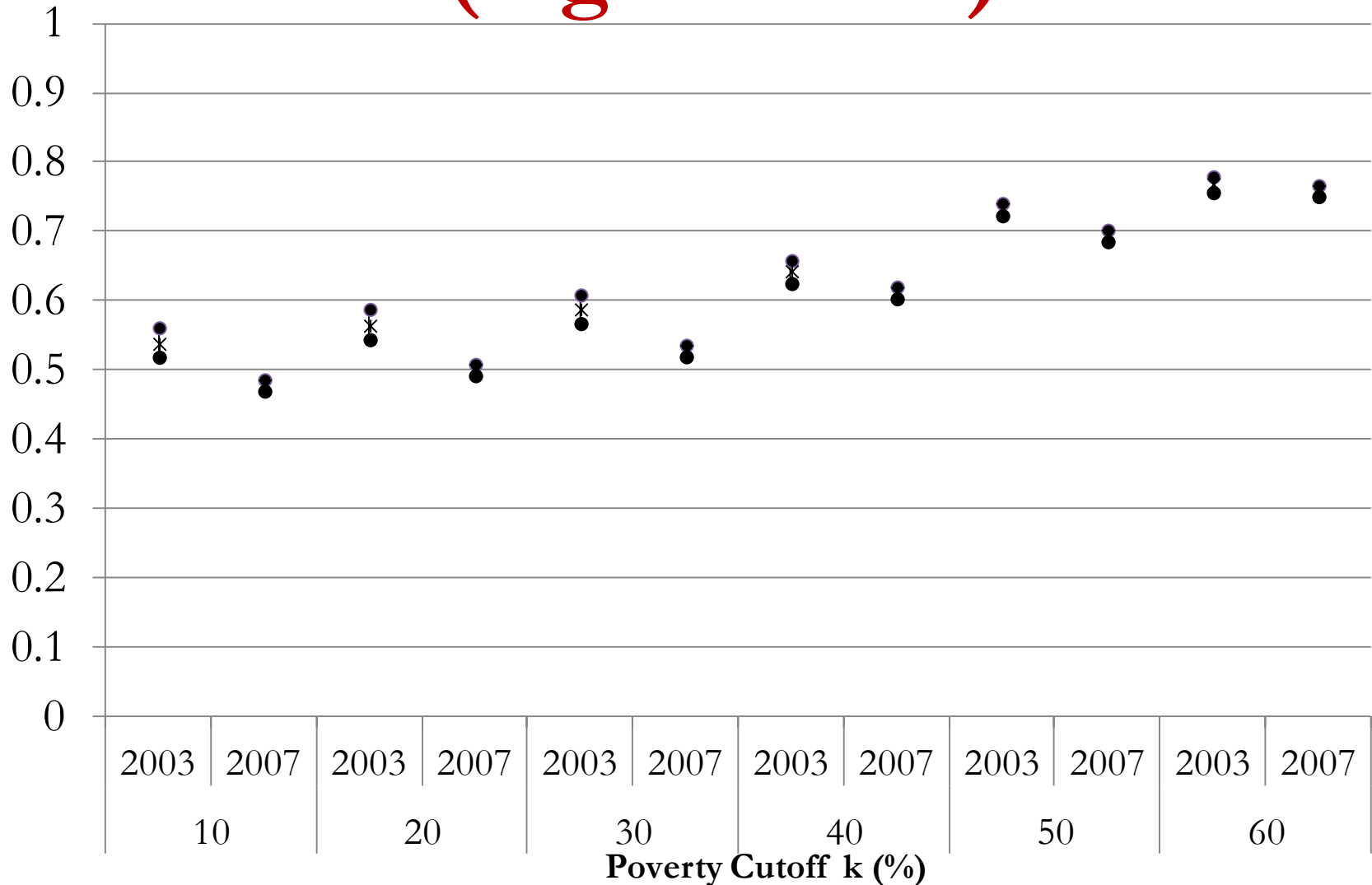
Intensity over time

- Decrease of A between 2003 & 2007:
 - Across number of indicators (7 and 9)
 - Across weights

Only up to $k=30\%$. For higher k there is no significant change.

However, for higher deprivation cutoffs, there is an unambiguous decrease in A across indicators, weights and k s.

Intensity over time (high cutoffs)



• A Upper Bound • A Lower Bound * A Point Estimate

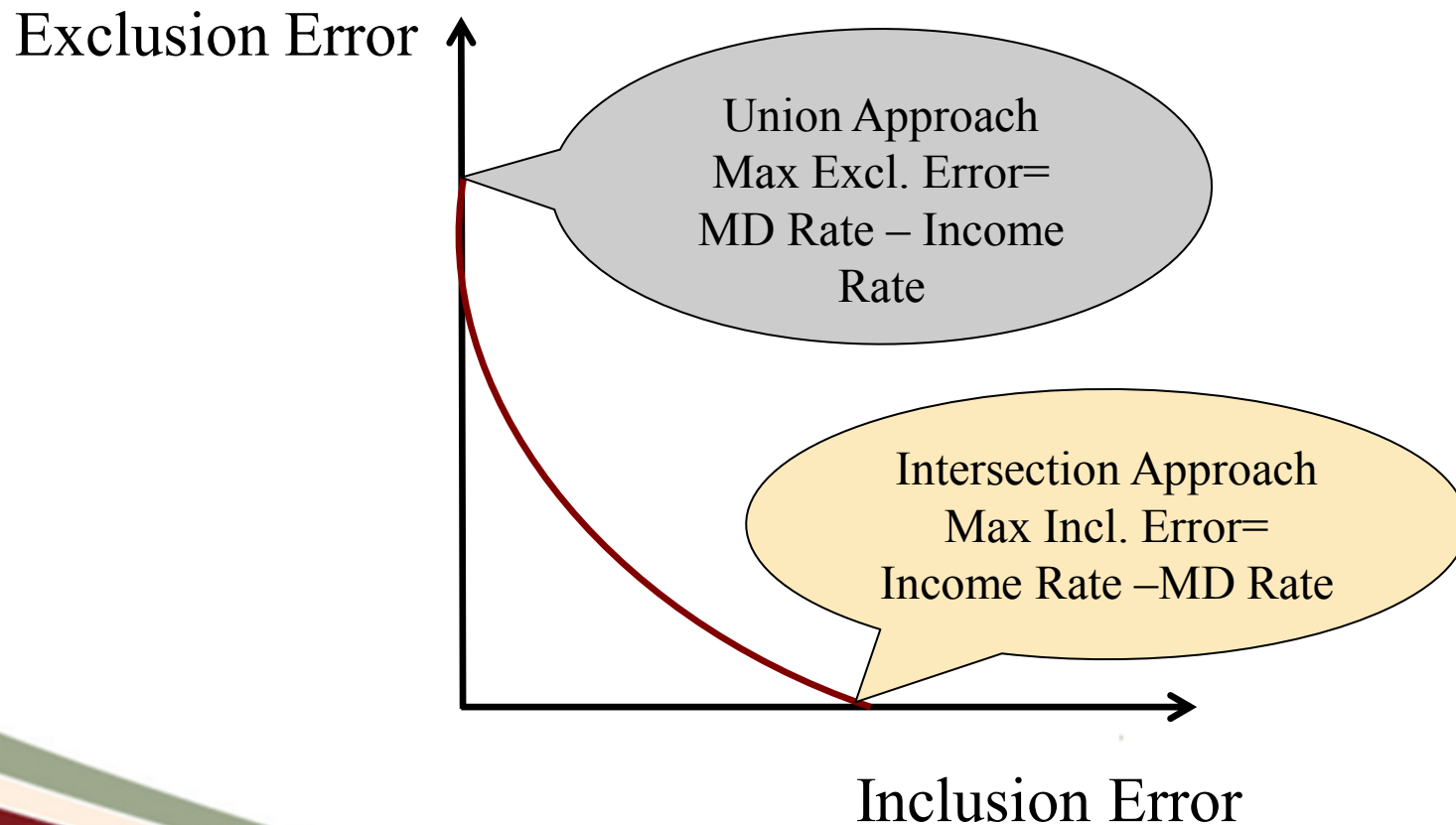
Income vs. MD-Poverty

- **Key question:**

1. To what extent does identification by income poverty overlaps with that of MD poverty and to what extent do they differ?
2. **EXCLUSION ERROR:** what % of the population is multidimensionally poor and overlooked when the income approach is used?
3. **INCLUSION ERROR:** what % of the population is not multidimensionally poor yet counted as poor when the income approach is used?

Income vs. MD-Poverty

By definition, when income is included as one of the indicators in a MD-measure...



Income vs. MD-Poverty

In practice,

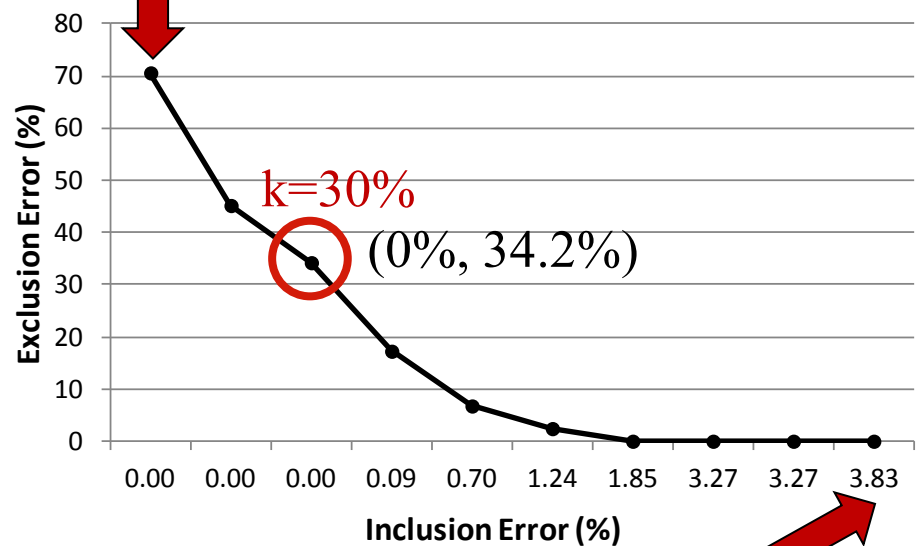
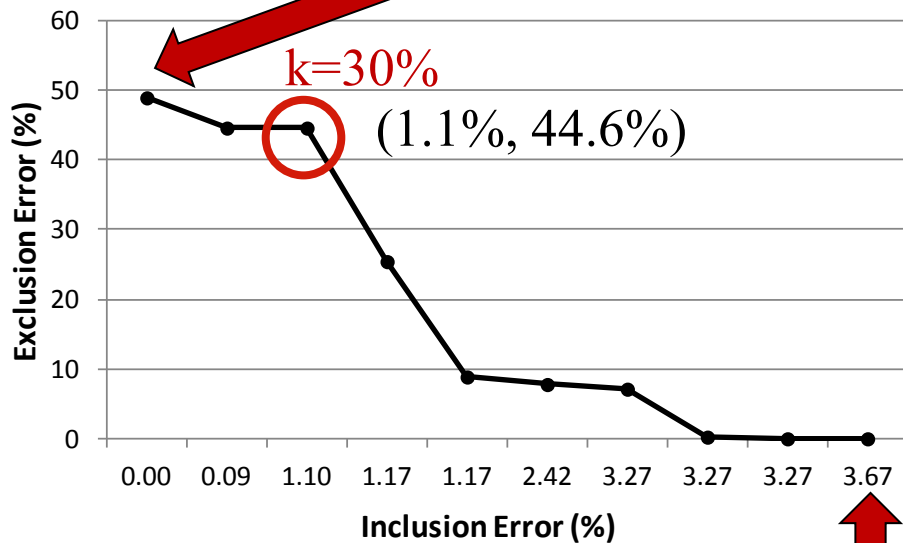
these errors?

Max exclusion error (union id.) equals the MD poverty rate – income poverty rate.

Ex: $52.8 - 3.8 = 49\%$

7 Indicators - Equal Weighted

Indicators - GNHS Weights-2003



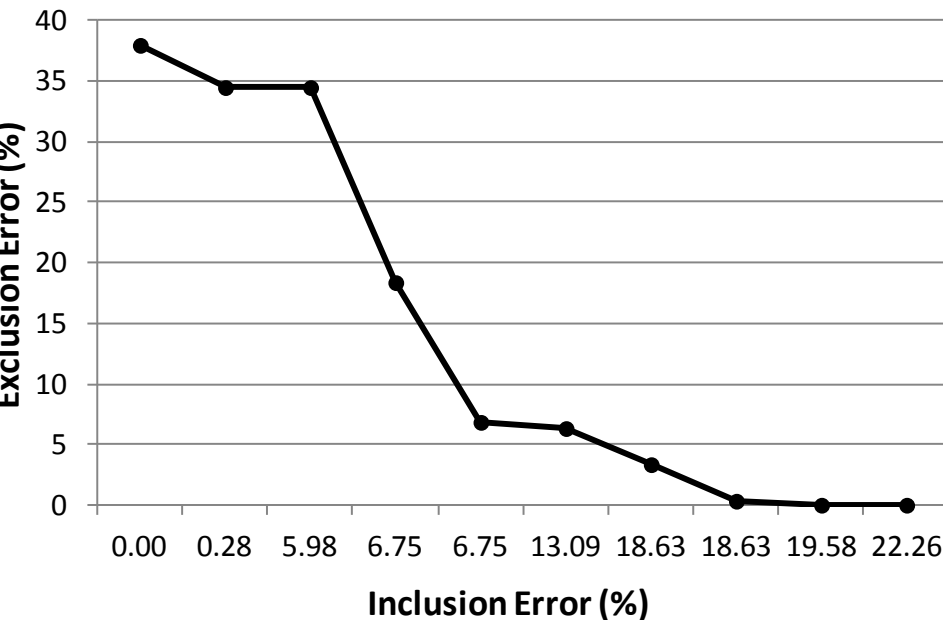
Max inclusion error (intersection id.) equals the income poverty rate – the MD headcount. As virtually no one is MD poor in intersection, the error equals the poverty rate.

Income vs. MD-Poverty

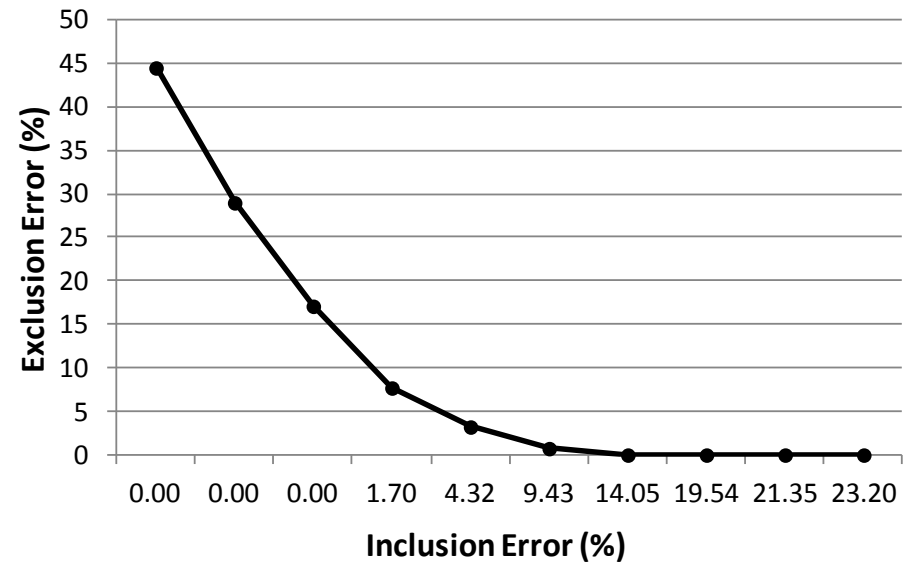
In practice, how sizeable are these errors?

High deprivation cutoffs

7 Indicators - Equal-Nested- 2007



7 Indicators - GNHS - 2007



Income vs. MD-Poverty

In practice, how sizeable are these errors?

2003		MD Poor		Total	2007		MD Poor		Total
Equal-Nested W. k=30% Baseline cutoffs		Poor	Non-Poor		Poor	Non-Poor			
Income Poor	Poor	2.7	1.1	3.8	Income Poor	Poor	5.9	0	5.9
	Non-Poor	44.6	51.5	96.2		Non-Poor	28.4	65.7	94.1
Total		47.4	52.6	100	Total		34.3	65.7	100

2003		MD Poor		Total	2007		MD Poor		Total
Equal-Nested W. k=30% High cutoffs		Poor	Non-Poor		Poor	Non-Poor			
Income Poor	Poor	26.2	5.5	31.7	Income Poor	Poor	17.2	6	23.2
	Non-Poor	39	29.3	68.3		Non-Poor	34.5	42.3	76.8
Total		65.3	34.7	100	Total		51.7	48.3	100

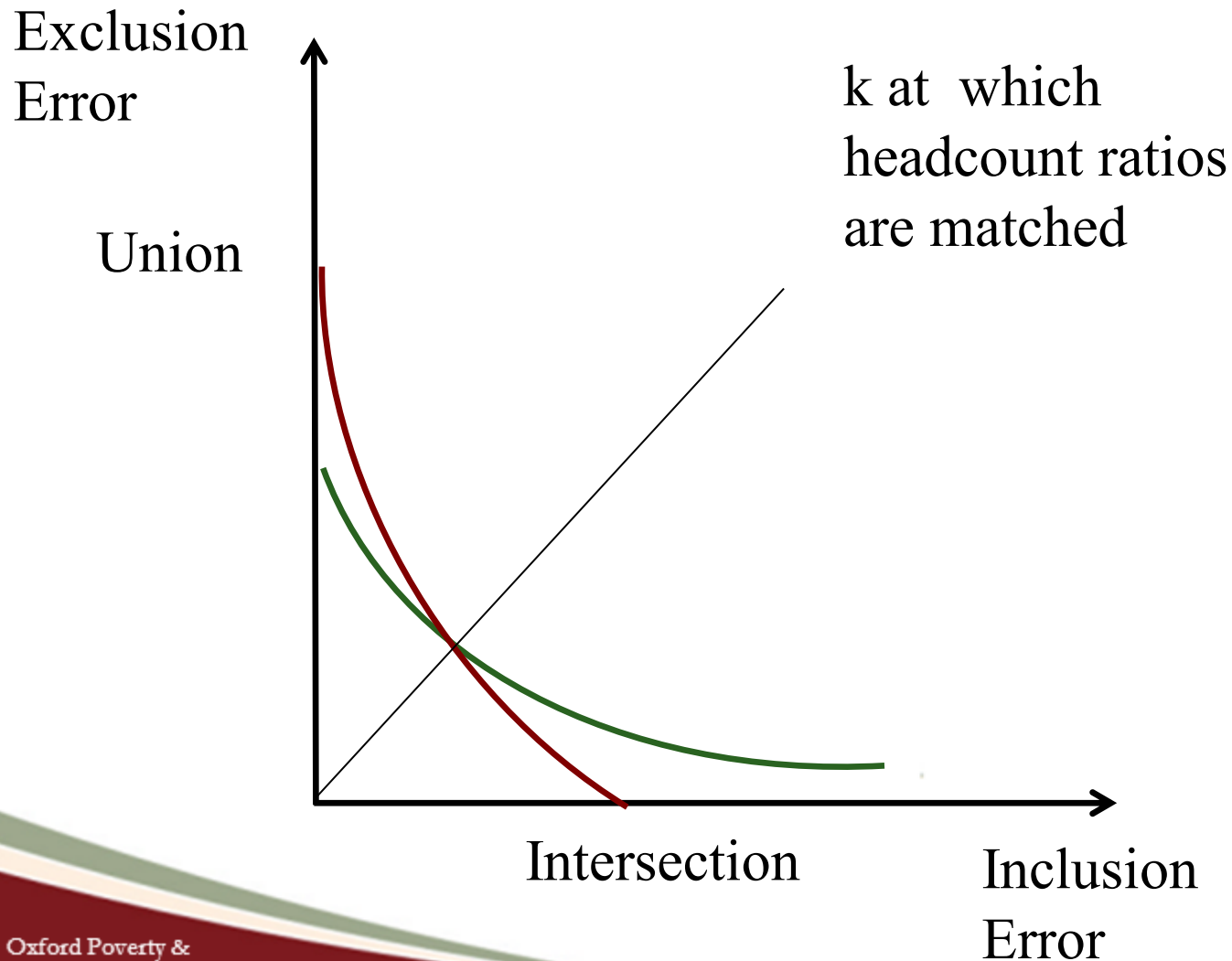
Income vs. MD Poverty

When Income and MD Headcount Ratios are matched...

- Income H = Poor by both + Inclusion Error
- MD H = Poor by both + Exclusion Error
- If Income H = MD H, then
- Inclusion Error = Exclusion Error

Income vs. MD-Poverty

Matching headcount ratios, matching errors...



How sizeable are these errors when income & MD headcounts are matched?

2003		MD Poor		Total	2007		MD Poor		Total
Equal-Nested W. k=80% Baseline cutoffs		Poor	Non-Poor		Equal-Nested W. k=60% Baseline cutoffs		Poor	Non-Poor	
Income Poor	Poor	0.6	3.3	3.9	Income Poor	Poor	1.6	4.4	6
	Non-Poor	0.2	95.9	96.1		Non-Poor	3.4	90.6	94
Total		0.8	99.2	100	Total		5	95	100

2003		MD Poor		Total	2007		MD Poor		Total
Equal-Nested W. k=60% High cutoffs		Poor	Non-Poor		Equal-Nested W. k=50% High cutoffs		Poor	Non-Poor	
Income Poor	Poor	20.9	10.8	31.7	Income Poor	Poor	16.4	6.8	23.2
	Non-Poor	9.9	58.4	68.3		Non-Poor	6.8	70	76.8
Total		30.8	69.2	100	Total		23.2	76.8	100

Income vs. MD-Poverty in Bhutan

- Exclusion errors higher than inclusion ones. Why?
- Bhutan is a rural country with a significant share of subsistence agriculture.
- Markets are still incipient
- Limited access to basic services
- Thus, income poverty is likely to under-estimate poverty.
- When the more demanding cutoffs are used, income poverty identifies a bigger number, hence, exclusion error decreases.

Raw vs. Censored Headcounts: *pro-poor* growth?

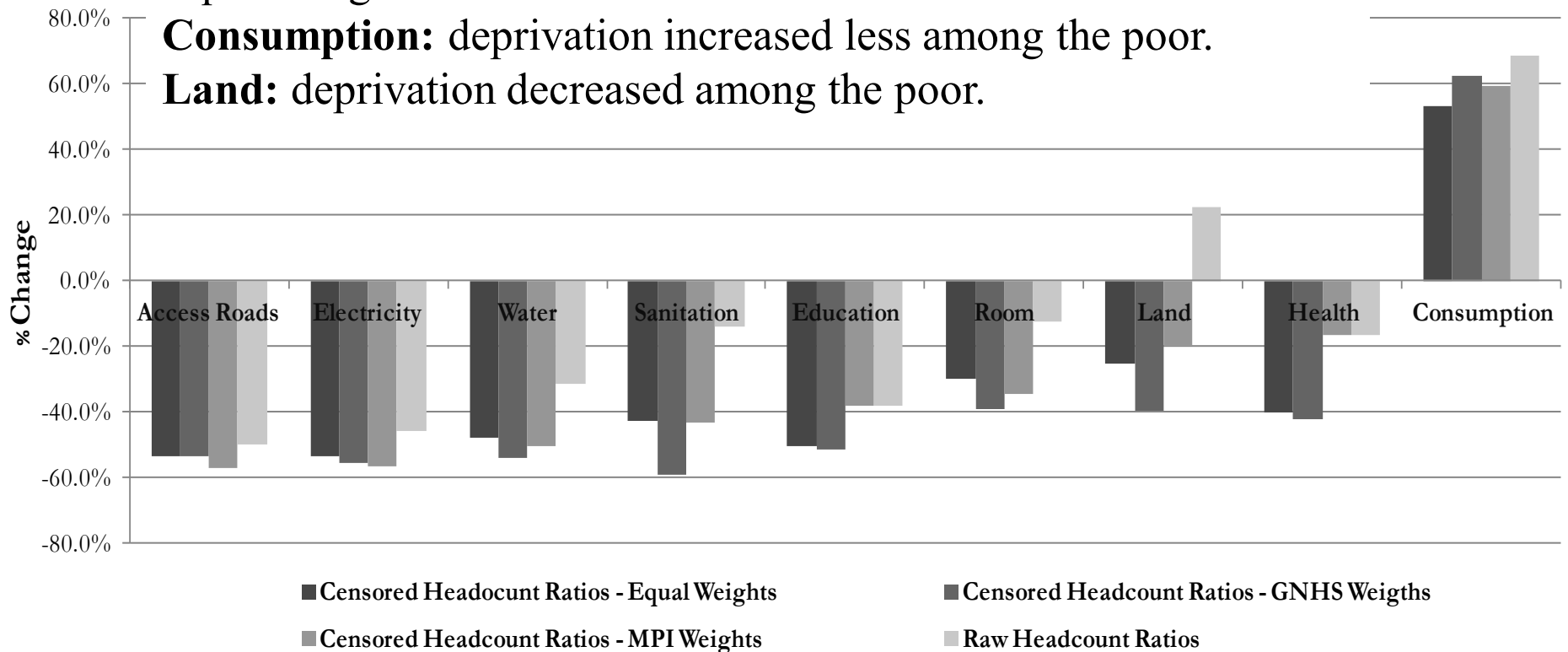
Water, Sanitation, Room: deprivation decreased significantly more among the poor than among the whole population.

Roads and Electricity: slightly more among the poor.

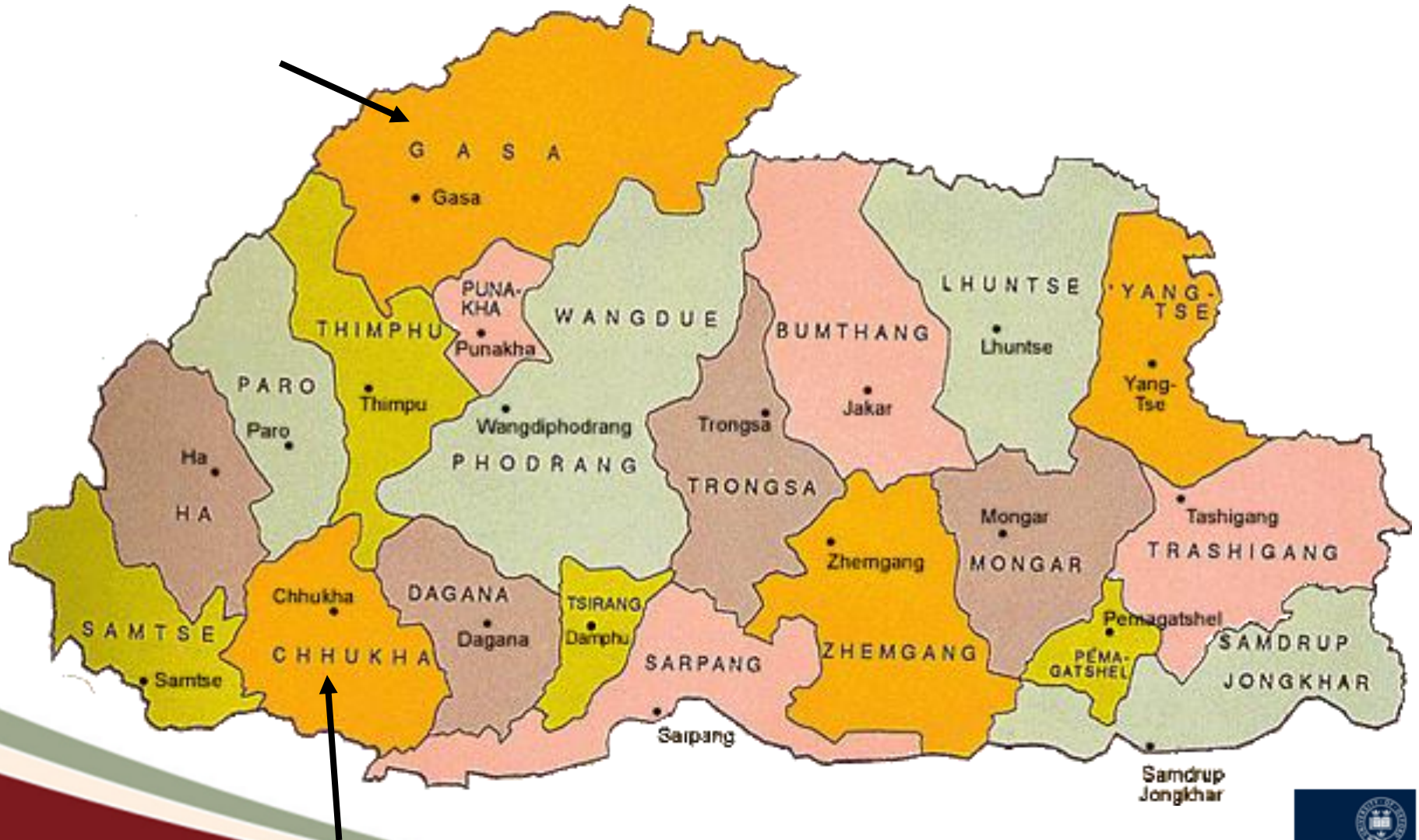
Health and education: more among the poor with GNHS and Equal Weights.

Consumption: deprivation increased less among the poor.

Land: deprivation decreased among the poor.

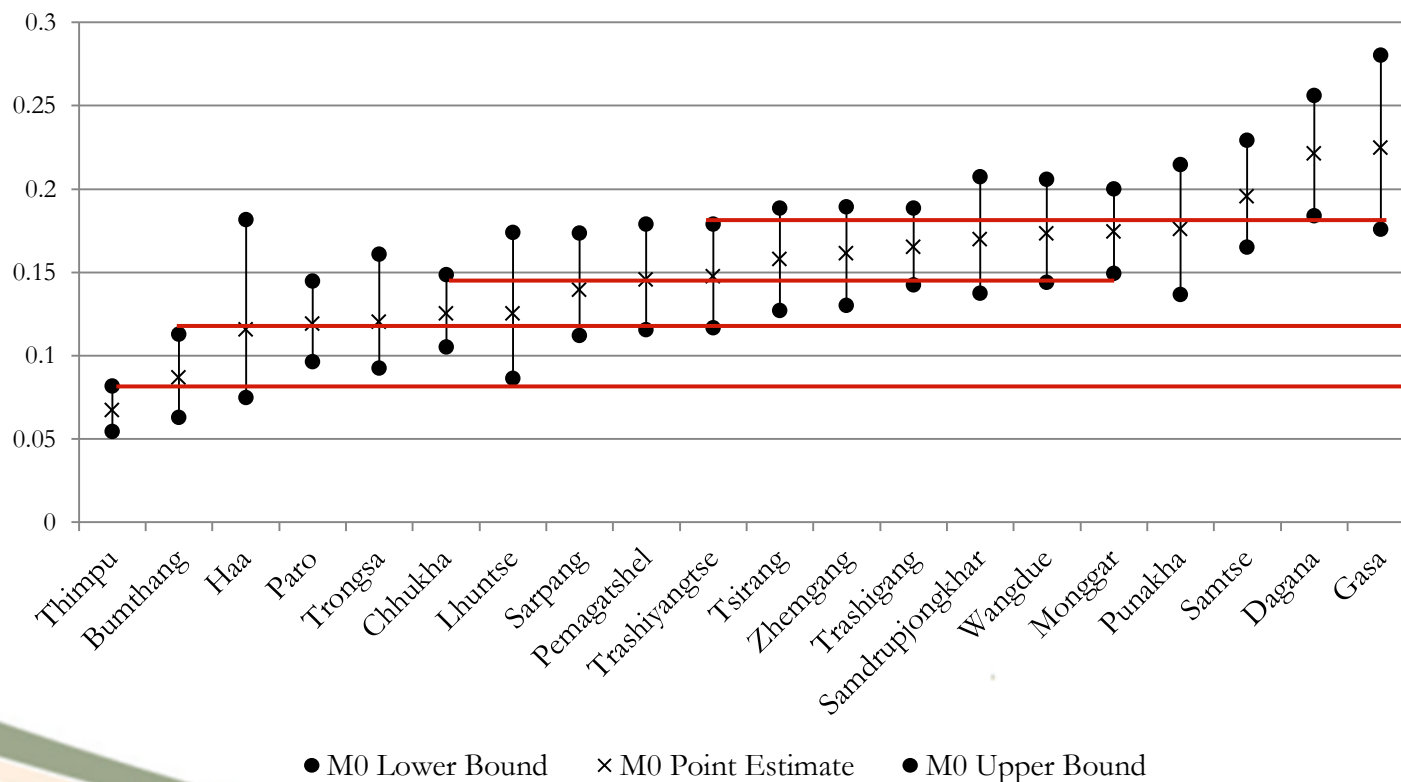


Bhutan's 20 Districts

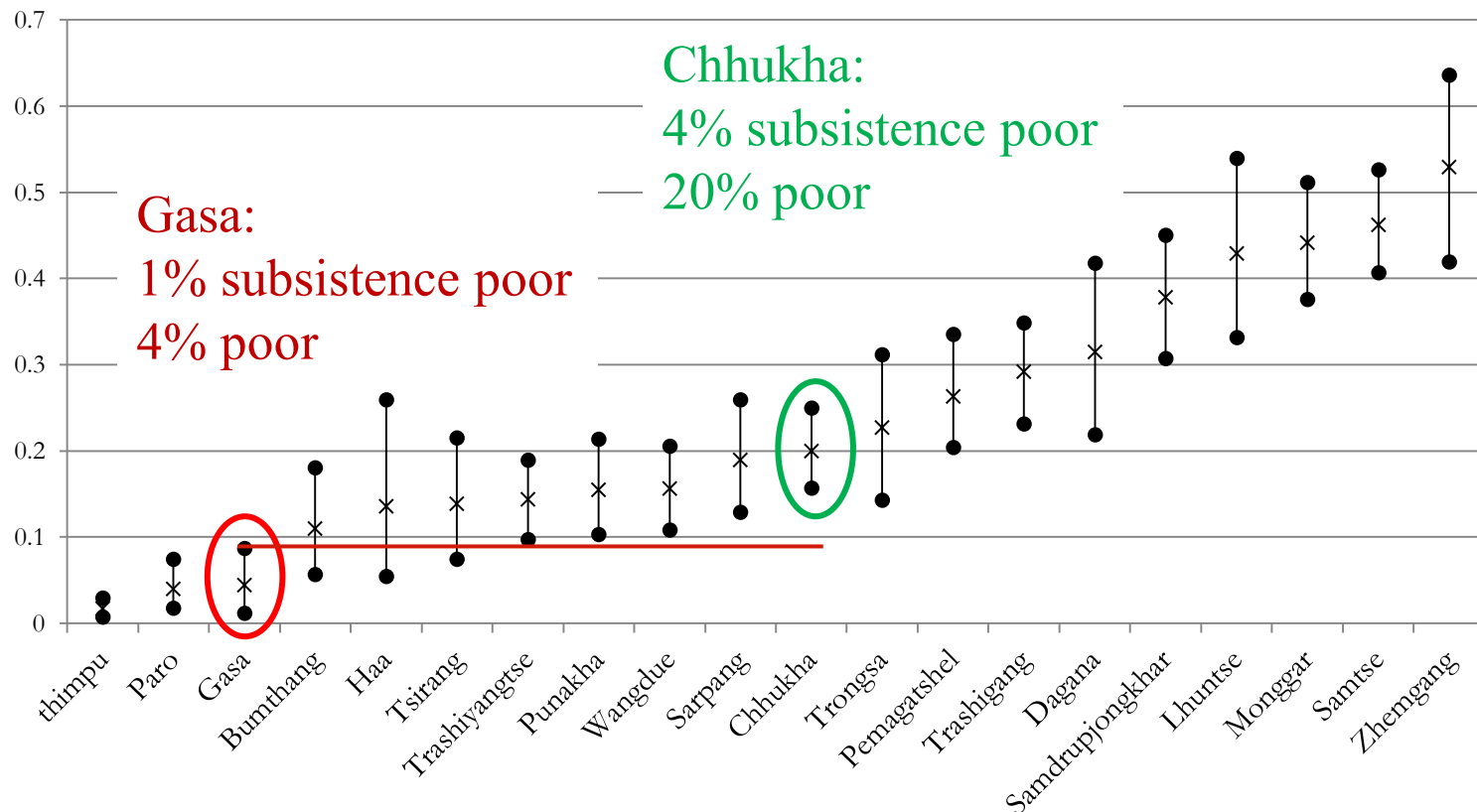


District Ranking MD Poverty 2007

Baseline cutoffs, Equal-Nested W, 30% poverty cutoff



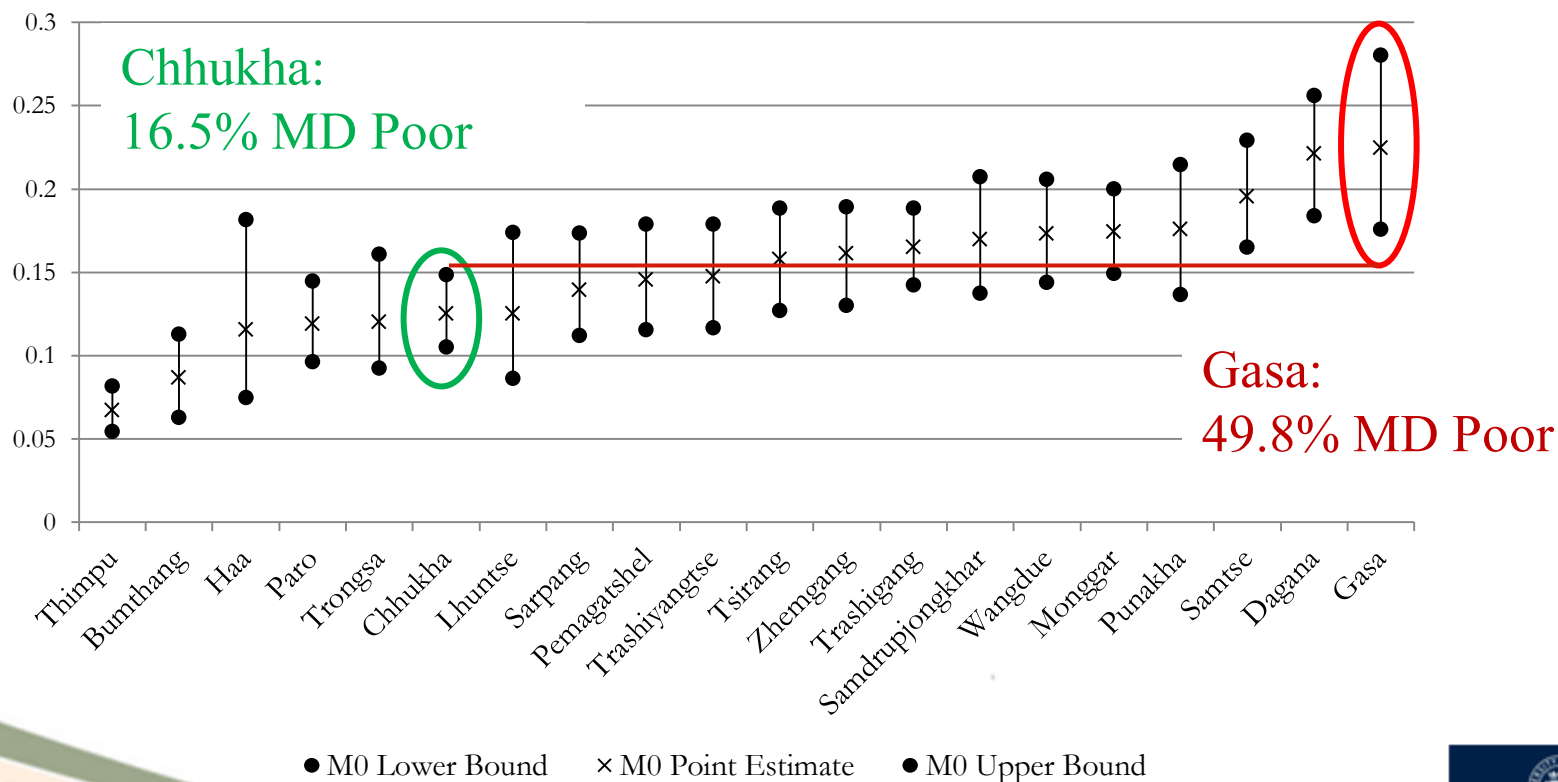
District Ranking Income Poverty 2007



● Income Headcount Lower Bound ● Income Headcount Upper Bound × Income Headcount Point Estimate

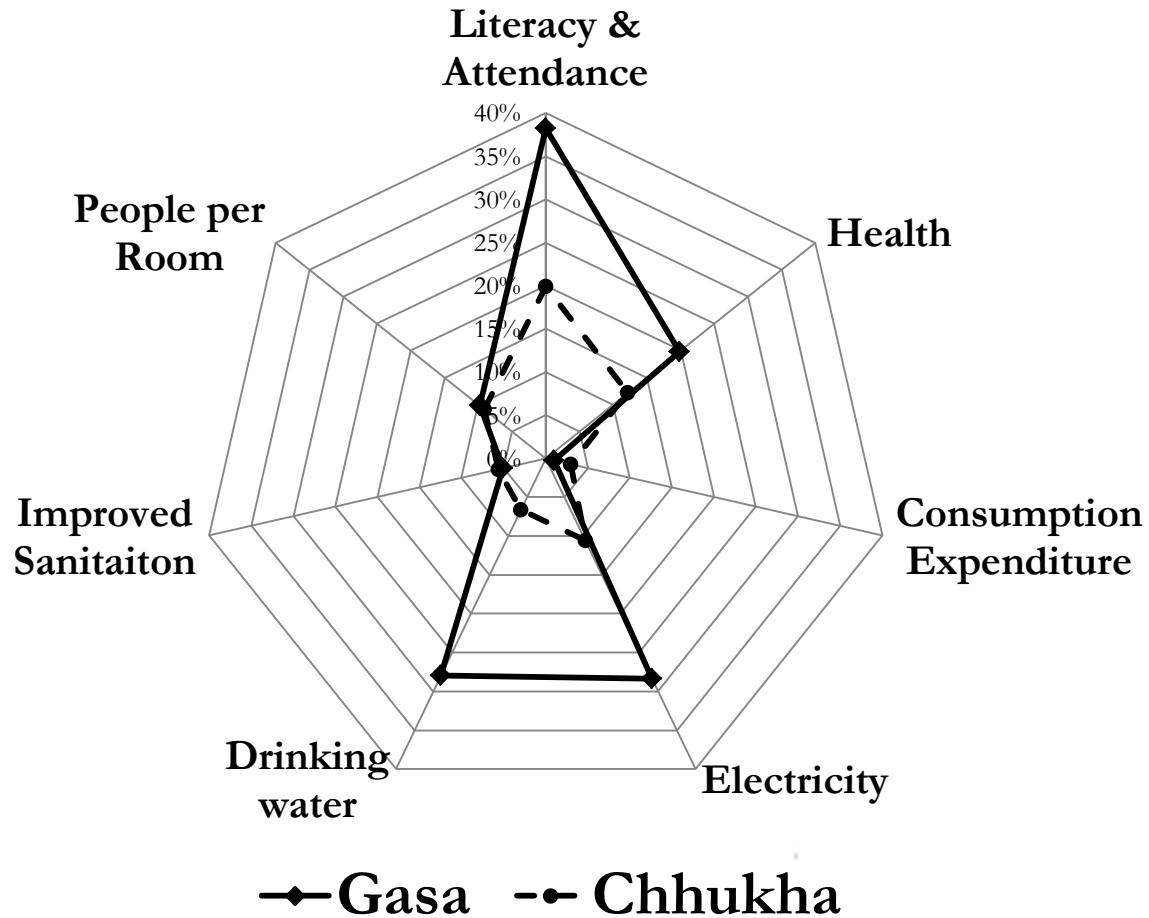
District Ranking MD Poverty 2007

Baseline cutoffs, Equal-Nested W, 30% poverty cutoff



Composition of Poverty

Gasa vs. Chhukha



Matches & Mismatches Income vs. MD Poverty in Gasa & Chhukha

GASA 2007 Equal-Nested W. k=30% Baseline cutoffs		MD Poor		Total	CHHUKHA 2007 Equal-Nested W. k=30% Baseline cutoffs		MD Poor		Total
		Poor	Non-Poor				Poor	Non-Poor	
Income Poor	Poor	1	0	1	Income Poor	Poor	3	1	4
	Non-Poor	49	50	99		Non-Poor	26%	70	96
Total		50	50	100	Total		29	71	100

Conclusions

- Unambiguous reduction in MD poverty. Robust to different specifications of indicators, weights, deprivation cutoffs and poverty cutoffs.
- Led by a reduction in incidence.
- Intensity was reduced but only among the least poor.
- Improvements were done in several dimensions simultaneously: roads, electricity, water, sanitation, education.

Conclusions

- There is some hint of pro-poor growth: reductions in censored headcounts were proportionally higher than reductions in raw headcounts.
- Income vs. MD-poverty: negligible inclusion error but sizeable exclusion error. Intuitive finding for a rural-developing country.

Future Challenges

- Poverty is still widespread in the country, esp. in rural areas.
- Intensity needs to be reduced. There is need to reach the poorest poor.
- An MD measure of this type can help to:
 - Target
 - Monitor
 - Evaluate upon investment

Thank you!