MEASURING MATERIAL DEPRIVATION IN THE EU

INDICATORS FOR THE WHOLE POPULATION AND CHILD-SPECIFIC INDICATORS

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This paper is an independent contribution prepared by Net-SILC2, an EU-funded Network consisting of 16 European partners – EU-SILC data producers (primarily NSIs) and EU-SILC data users (research bodies).

Objective:
- to present an analytical framework for developing robust aggregate indicators that could be used for analytical and monitoring purposes at national and EU levels; and
- to propose one material deprivation (MD) indicator for the whole EU population (0+) and one child-specific MD indicator - as a result of the application of this framework to EU-SILC data collected in 2009.

In our analysis, we have:

- looked at all MD items available in the 2009 wave of EU-SILC: core variables + items included in 2009 MD module

    → 50 items in total, collected at household or individual level. 17 items focused on the situation of children [but collected in household Qaire]

- carried out a systematic item by item analysis at both EU and country levels

    → Thousands of tables, charts, regressions, etc. summarised in the paper.

Our paper explains and discusses the concepts and methods we have used, and the methodological options we have opted for.

All our results are still preliminary.

Purpose of today's presentation: to collect comments and suggestions from ISG delegates before producing a revised version of the paper that we will present to the Eurostat TF on MD (19 March).

EU-SILC: 50 potential indicators of MD (M=module)

Child Deprivations
Some new clothes (M)
Two pairs of shoes (M)
Fresh fruits & vegetables daily (M)
Three meals a day (M)
Meat, chicken, fish daily (M)
Suitable books (M)
Outdoor leisure equipment (M)
Indoor games (M)
Place to do homework (M)
Dentist when needed (M - optional)
GP when needed (M - optional)
Leisure activities (M)
Celebrations (M)
To invite friends (M)
School trips (M)
Outdoor space to play (M)
Holiday (M - optional)

Housing Deprivations
No hot running water (M)
Shortage of space
Darkness
Leaky roof, damp, etc.
No toilet
No bath
Overcrowding
High housing costs
Home warmth

Local Environment Deprivations
Litter lying around (M)
Vandalism (M)
Diff access to public transport (M)
Diff access to post, banks (M)
Noise
Pollution
Crime

Adult Deprivations (enforced lack)
Some new Clothes (M)
Two pairs of shoes (M)
Some money for oneself (M)
Mobile phone (M)
Drink/meal monthly (M)
Leisure activities (M)

Household Deprivations
Worn-out furniture (M)
Arrears
Incapacity to face unexp. expenses
Lack of meat, chicken, fish
Lack of Holiday
        Enforced lack of :
Telephone
Colour TV
Computer
Washing machine
Car
Internet (M)

Adult items (16+)

1. Adult items are gathered at individual level for people aged 16 or over
   ➜ They provide rich information to partly open up the "black box" of the household unit.

2. Items included in the proposed MD indicator for 0+ have to be defined for the whole population; not just for 16+
   ➜ Option chosen: the adult information is assigned to all household members: All hhd members (0+) are deprived if at least half the adults (with available info) are deprived.

Children population

1. Info collected at household level. For a given child MD item, a child is deprived if they live in a household where at least 1 child is deprived.

2. Most children items gathered only for children aged between 1 and 15 ➜ In our analysis: children: **1-15**, not 0-17.

3. 2 children MD items collected only for children attending school (school trips and place to do homework) ➜ children living in households where no child attends school are considered not deprived for these 2 items.

Step by step, we have looked at…

1. The **dimensional structure** of the whole set of items

2. The **suitability** of MD items for individual **EU countries** and for **population sub-groups within countries**, by looking at the extent to which people want/do not want a given item.

3. The **validity** of each MD item, by ensuring that they all exhibit statistically significant relation with variables known to be correlated with MD (AROP, subjective poverty, health).

4. The **additivity** of MD items, by checking that someone say with a MD index score of 2 is in reality suffering from more severe MD than someone with a score of 1, i.e. that the MD index components add up.

5. The **reliability** of the scale (Cronbach's alpha) and of the retained items (IRT).

Not too few… not too many…

Main criticism regarding the current MD indicators: too small number of items they are based on:

➔ this number needs to be increased; **and**

➔ the robustness needs to be improved.

But the total number of items has to be reasonable so that all items required (and not yet collected in the core part of EU-SILC) can be included in the future (revised EU-SILC).

1. Exploratory analysis of the dimensional structure of the full set of items (module and core part)

Dimensional structure of the items

On the MD information available for the EU as a whole, we have run:

1. Exploratory factor analysis (EFA)

2. Multiple correspondence analysis (MCA)

3. Non-linear canonical correlations

We have first focused on the total population: 33 items (core survey plus module, incl. environment, housing...).

We have then included the children's MD items ➔ 33+17= 50 items.

Exploratory factor analysis

1. Exploratory factor analysis (EFA): to explore the underlying structure to the data on all the available MD information:

- Based on tetrachoric correlations

- Oblique rotation (correlation between factors allowed)

- Number of factors? Kaiser's criterion (Eigen-values over 1), Scree-plot.

Scree plot
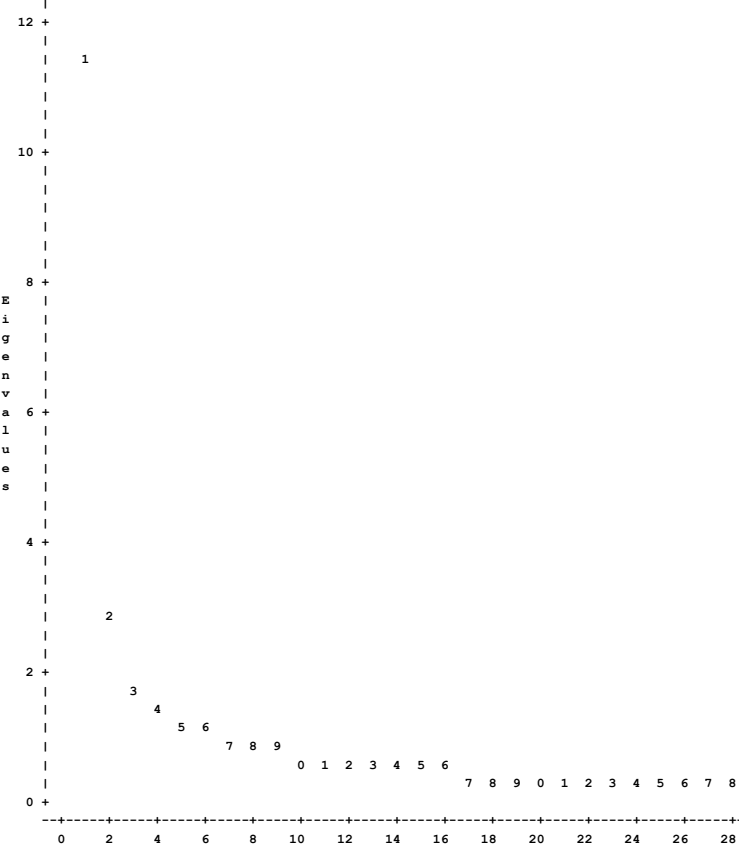
EFA: Whole population

Factor 1: **Material deprivation :** Adults items + most of the MD current items (holidays, meat/chicken, arrears, dwelling not warm, car, unexpected expenses) + replacing household furniture + internet/computer and high housing costs (weakly)

Factor 2: **Basic durables, basic amenities** and **housing**

Factor 3: **Local environment**

Factor 4: **Accessibility**

EFA – Correlations between factors

	Factor 1 Material Deprivation	Factor 2 Basic amenities	Factor 3 Local environment	Factor 4 Accessibility
Factor 1	1.00	0.51	0.12	0.21
Factor 2	0.51	1.00	0.09	0.16
Factor 3	0.12	0.09	1.00	-0.05
Factor 4	0.21	0.16	-0.05	1.00

EFA: CHILDREN POPULATION

Factor 1: **Material deprivation :** Adults items + most of the MD current items + replacing household furniture + internet/computer and high housing costs (weakly) **+ most children items**

Factor 2: **Basic durables, basic amenities** and **housing.**

Factor 3: **Local environment** + **Children outdoor space**

Factor 4: **Accessibility**

Factor 5: **Children's unmet medical and dental needs**

2. SUITABILITY OF MD ITEMS FOR THE WHOLE EU

Suitability of MD items

The **EU Council of Ministers** agreed back in **1985** that the poor are "the persons whose resources (material, cultural and social) are so limited as to exclude them from the minimum acceptable way of life in the Member State to which they belong".

➔ This definition includes both <u>outcome elements</u> ('the exclusion of minimum acceptable way of life', which covers **material, cultural and social aspects**) and <u>input elements</u> ('...**due to a lack of resources**').

Two conditions to define socially perceived necessity (Mack and Lansley, 1985):

- social consensus (majority) criterion: >50% consider the item necessary
- homogeneity of preferences

2007 EUROBAROMETER CONSENSUS SURVEY ON "POVERTY AND MATERIAL DEPRIVATION"

EU citizens were asked which items (out of 74) they consider "(absolutely) necessary" for people to have a decent/ acceptable standard of living in the country where they live.

Dickes et al. (2010) show that there is "*a* ***high level of agreement*** *among countries about what constitutes necessities of life*" ➔ This supports the idea that the same set of items could be used to analyse MD in the EU.

BUT there are differences between what people consider necessary for the whole society compared to their own needs and priority ➔ We need to test **the same hypotheses on the actual behaviour of people**, using EU-SILC data.

Heat Map of the 2007 Eurobarometer Perception of Necessities Results

	EU27	EU15	NMS12	EL	CY	RO	BG	HU	PT	HR	LV	SK	EE	SI	LU	MT	IE	AT	PL	D-E	FI	UK	DE	FR	D-W	SE	ES	CZ	BE	IT	LT	DK	NL
Medical Care when needed	77%	77%	78%	92%	92%	77%	82%	85%	81%	82%	75%	77%	81%	85%	80%	81%	63%	84%	75%	87%	80%	78%	83%	72%	82%	87%	73%	79%	76%	68%	60%	85%	78%
An indoor flushing toilet for sole use of the household	69%	70%	66%	87%	90%	65%	58%	75%	74%	75%	62%	69%	66%	82%	78%	73%	69%	77%	65%	69%	59%	75%	69%	71%	69%	60%	64%	70%	67%	69%	42%	48%	69%
No leaking roof, damp walls, floors, foundation	68%	68%	67%	81%	74%	76%	74%	54%	69%	71%	71%	70%	78%	75%	68%	68%	68%	75%	65%	80%	75%	72%	74%	69%	73%	78%	56%	64%	69%	62%	55%	61%	62%
Buying medicine when needed	74%	74%	76%	91%	91%	79%	81%	83%	82%	77%	73%	69%	75%	87%	82%	78%	64%	80%	72%	83%	77%	71%	80%	70%	79%	82%	72%	76%	75%	70%	58%	78%	68%
A place to live with hot, running water	67%	67%	65%	86%	82%	74%	51%	73%	74%	72%	55%	68%	52%	81%	71%	62%	62%	80%	62%	63%	60%	71%	66%	74%	67%	65%	59%	64%	62%	64%	41%	49%	59%
A place to live with its own bath or shower	63%	63%	63%	87%	90%	66%	58%	72%	71%	71%	59%	66%	58%	80%	72%	66%	65%	75%	61%	59%	50%	69%	59%	63%	59%	53%	62%	65%	57%	66%	42%	35%	49%
Bed + bedding for everyone	68%	67%	70%	86%	85%	71%	80%	80%	79%	72%	70%	73%	74%	71%	81%	83%	62%	68%	65%	82%	69%	66%	75%	69%	73%	78%	53%	72%	65%	64%	56%	64%	58%
To be able to keep one's home adequately warm	62%	62%	61%	83%	70%	58%	64%	78%	59%	68%	68%	59%	64%	75%	70%	39%	62%	81%	61%	73%	69%	64%	68%	64%	67%	55%	53%	50%	61%	58%	45%	55%	54%
Buying medical equipment when needed	66%	66%	66%	83%	81%	70%	73%	72%	74%	70%	67%	65%	69%	79%	77%	72%	60%	77%	62%	75%	67%	63%	70%	66%	68%	79%	66%	66%	64%	57%	49%	73%	59%
Regular medical and dental checkups	62%	62%	65%	81%	79%	69%	70%	68%	73%	68%	64%	65%	63%	78%	68%	66%	58%	72%	63%	72%	56%	62%	67%	59%	66%	61%	61%	63%	55%	57%	46%	68%	43%
A warm winter coat	65%	63%	71%	88%	67%	80%	84%	77%	71%	70%	61%	76%	73%	63%	79%	32%	64%	71%	68%	69%	73%	58%	68%	66%	67%	71%	60%	63%	61%	56%	46%	64%	45%
A place to live where one doesn't risk being forced to leave	57%	55%	64%	71%	68%	79%	66%	73%	61%	67%	60%	54%	75%	61%	63%	55%	62%	63%	59%	50%	63%	58%	47%	59%	47%	42%	61%	50%	55%	57%	44%	38%	39%
No crime violence or vandalism in the area	49%	48%	51%	75%	70%	60%	52%	68%	61%	51%	60%	57%	61%	42%	41%	66%	62%	51%	44%	48%	50%	56%	44%	47%	42%	41%	44%	32%	52%	45%	47%	37%	43%
Fresh fruit and vegetables once a day	49%	48%	52%	74%	61%	66%	54%	54%	78%	57%	50%	57%	40%	59%	51%	49%	58%	47%	49%	52%	38%	50%	44%	41%	42%	41%	61%	27%	43%	44%	34%	35%	41%
Not too much pollution or other environmental problems	42%	41%	47%	70%	68%	54%	50%	61%	54%	52%	50%	52%	59%	42%	35%	57%	53%	46%	40%	39%	37%	33%	34%	47%	40%	39%	38%	39%					
2 pairs of shoes suitable to the climate	58%	55%	68%	88%	79%	77%	79%	71%	67%	68%	67%	73%	64%	63%	74%	43%	61%	67%	65%	66%	58%	44%	63%	58%	62%	70%	55%	59%	49%	49%	46%	60%	35%
Refrigerator	58%	56%	66%	87%	89%	71%	75%	69%	78%	70%	60%	72%	60%	77%	75%	84%	54%	72%	62%	65%	61%	43%	64%	55%	63%	70%	58%	62%	50%	48%	50%	54%	35%
Well-maintained and kept in a decent state of repair	42%	41%	48%	69%	51%	58%	50%	59%	47%	60%	49%	49%	46%	41%	40%	48%	52%	52%	42%	40%	34%	43%	35%	42%	34%	27%	49%	34%	38%	41%	35%	30%	22%
Cooker big enough for HH	42%	39%	53%	82%	64%	69%	75%	57%	75%	58%	45%	52%	45%	71%	71%	75%	53%	58%	39%	58%	34%	41%	54%	37%	53%	66%	18%	48%	36%	17%	52%	43%	29%
A place to live with well maintained public amenities	34%	32%	42%	58%	47%	54%	45%	54%	48%	42%	48%	40%	43%	30%	28%	39%	48%	36%	37%	21%	26%	41%	23%	28%	23%	20%	31%	28%	28%	35%	35%	18%	26%
Access to local public transport	38%	36%	43%	62%	44%	52%	53%	50%	59%	45%	44%	41%	43%	35%	49%	36%	42%	33%	39%	41%	36%	40%	35%	37%	33%	30%	40%	29%	37%	30%	28%	21%	25%
Meat, chicken or fish at least once every two days	43%	42%	46%	53%	29%	62%	54%	39%	76%	50%	52%	38%	43%	30%	35%	39%	56%	36%	47%	34%	46%	36%	29%	41%	28%	39%	58%	22%	47%	44%	32%	37%	35%
A place to live that is not too dark, with enough natural light	39%	36%	48%	77%	57%	55%	55%	61%	61%	59%	53%	45%	51%	47%	46%	38%	49%	52%	55%	43%	38%	30%	36%	35%	29%	35%	28%	31%	34%	32%	39%	33%	27%
Repairing or replacing major electrical goods	40%	39%	42%	65%	49%	39%	59%	60%	54%	51%	45%	43%	37%	50%	63%	56%	46%	44%	35%	43%	39%	35%	35%	48%	33%	31%	43%	42%	40%	34%	34%	30%	27%
Washing machine	48%	45%	59%	74%	85%	56%	67%	66%	65%	61%	48%	68%	52%	77%	71%	74%	45%	60%	56%	61%	46%	34%	55%	41%	53%	37%	51%	59%	38%	39%	39%	21%	33%
A place to live without too much noise	28%	26%	36%	59%	51%	46%	41%	41%	49%	37%	40%	37%	39%	25%	23%	39%	46%	36%	33%	18%	22%	34%	19%	23%	19%	15%	25%	20%	21%	27%	30%	15%	18%
Being able to get basic banking services	29%	29%	28%	34%	38%	37%	35%	21%	36%	38%	32%	33%	37%	39%	41%	30%	36%	31%	23%	44%	41%	33%	32%	36%	29%	26%	25%	21%	36%	16%	24%	24%	25%
A place to live with enough space and privacy for everybody	31%	28%	42%	55%	44%	48%	46%	46%	42%	41%	46%	36%	51%	40%	31%	36%	45%	34%	42%	26%	32%	24%	32%	24%	16%	25%	26%	25%	24%	32%	18%	18%	
A place to live with enough space to invite friends and family	25%	23%	33%	40%	39%	41%	46%	40%	37%	35%	35%	29%	31%	29%	24%	20%	41%	27%	31%	18%	20%	26%	21%	21%	22%	14%	22%	17%	20%	22%	28%	15%	15%
Smart clothes	24%	19%	39%	43%	44%	53%	38%	37%	22%	26%	50%	56%	34%	18%	16%	33%	43%	41%	34%	21%	33%	23%	13%	14%	12%	20%	30%	26%	16%	12%	20%	9%	15%
Some new, not 2nd hand clothes	30%	26%	44%	75%	67%	62%	49%	44%	39%	39%	45%	52%	31%	33%	36%	37%	45%	36%	40%	24%	23%	21%	25%	21%	26%	38%	21%	14%	21%	27%	14%	11%	
Replacing worn out or broken furniture	21%	20%	27%	57%	40%	34%	44%	30%	40%	33%	37%	26%	19%	24%	28%	15%	33%	19%	23%	19%	12%	19%	16%	18%	15%	13%	28%	17%	15%	16%	23%	10%	10%
Buying presents for family or friends at least once a year	17%	14%	29%	26%	24%	34%	28%	41%	14%	16%	41%	32%	33%	13%	16%	7%	17%	13%	23%	23%	18%	18%	16%	14%	14%	20%	7%	31%	16%	10%	21%	17%	12%
Fixed telephone	18%	18%	22%	53%	35%	35%	41%	18%	12%	37%	13%	16%	13%	24%	28%	53%	19%	12%	18%	26%	8%	16%	25%	18%	25%	22%	12%	4%	12%	13%	9%	12%	12%
Spending a small amount of money each week on oneself	14%	13%	22%	23%	20%	28%	27%	19%	15%	19%	28%	18%	24%	10%	15%	11%	21%	14%	23%	16%	16%	14%	16%	9%	15%	6%	11%	9%	10%	10%	17%	8%	9%
Colour TV	19%	14%	39%	45%	55%	53%	61%	47%	35%	35%	36%	34%	28%	24%	19%	35%	16%	14%	31%	25%	15%	13%	17%	9%	15%	14%	9%	23%	10%	11%	34%	11%	5%
Being able to decorate one's home	13%	10%	23%	16%	9%	22%	20%	21%	16%	31%	16%	24%	30%	12%	10%	5%	17%	11%	29%	13%	9%	13%	11%	8%	10%	5%	7%	11%	10%	9%	12%	6%	7%
Paying for one week annual holiday away from home	15%	13%	25%	44%	27%	35%	33%	29%	17%	19%	22%	20%	23%	22%	13%	4%	16%	13%	23%	12%	11%	12%	9%	16%	8%	17%	8%	10%	12%	14%	8%	10%	
Participating in a regular leisure or sports activity	13%	12%	16%	17%	15%	19%	19%	22%	17%	19%	17%	16%	23%	32%	23%	15%	18%	11%	13%	11%	13%	11%	10%	11%	10%	13%	15%	13%	15%	9%	11%	13%	13%
Inviting friends or family for dinner at home once a month	12%	10%	20%	22%	17%	23%	26%	24%	13%	19%	22%	16%	17%	8%	10%	5%	14%	10%	20%	7%	9%	10%	8%	9%	9%	9%	7%	8%	8%	10%	13%	8%	9%
Going out once a month (restaurant, cinema, disco or concert, etc.)	11%	9%	18%	29%	21%	27%	26%	20%	13%	18%	27%	20%	19%	10%	14%	10%	14%	7%	11%	14%	7%	10%	7%	8%	7%	6%	9%	9%	13%	4%	5%		
Car	17%	17%	20%	50%	84%	26%	32%	13%	29%	34%	20%	23%	21%	31%	32%	42%	23%	10%	14%	15%	13%	9%	10%	30%	9%	19%	16%	13%	14%	18%	19%	7%	4%
Buying newspapers, magazines and books	13%	10%	22%	19%	14%	29%	30%	27%	14%	14%	29%	27%	23%	13%	16%	12%	18%	12%	19%	16%	14%	8%	15%	7%	15%	13%	8%	13%	9%	10%	17%	7%	10%
Mobile phone	12%	9%	24%	26%	41%	35%	34%	21%	22%	15%	38%	25%	33%	14%	20%	32%	17%	12%	16%	8%	21%	7%	5%	6%	4%	9%	10%	20%	8%	9%	22%	10%	4%
Going to the hairdresser regularly	11%	9%	20%	12%	4%	33%	27%	21%	13%	14%	28%	21%	25%	9%	12%	15%	19%	10%	15%	15%	10%	7%	10%	9%	8%	8%	8%	22%	5%	9%			
Computer	9%	6%	17%	10%	18%	26%	22%	12%	13%	18%	20%	17%	19%	11%	11%	20%	9%	6%	14%	7%	8%	6%	6%	5%	5%	8%	5%	9%	6%	8%	13%	10%	6%
Internet connection	7%	5%	14%	8%	12%	20%	19%	10%	11%	15%	19%	13%	19%	8%	11%	18%	8%	6%	12%	5%	8%	5%	4%	4%	4%	9%	4%	7%	6%	6%	11%	9%	5%

CAN MATERIAL DEPRIVATION BE MEASURED USING THE SAME SET OF ITEMS IN ALL EU MEMBERS STATES ? – EU-SILC DATA

In what follows:

Those who want the item are those who have the item AND those who would like it but cannot afford it.

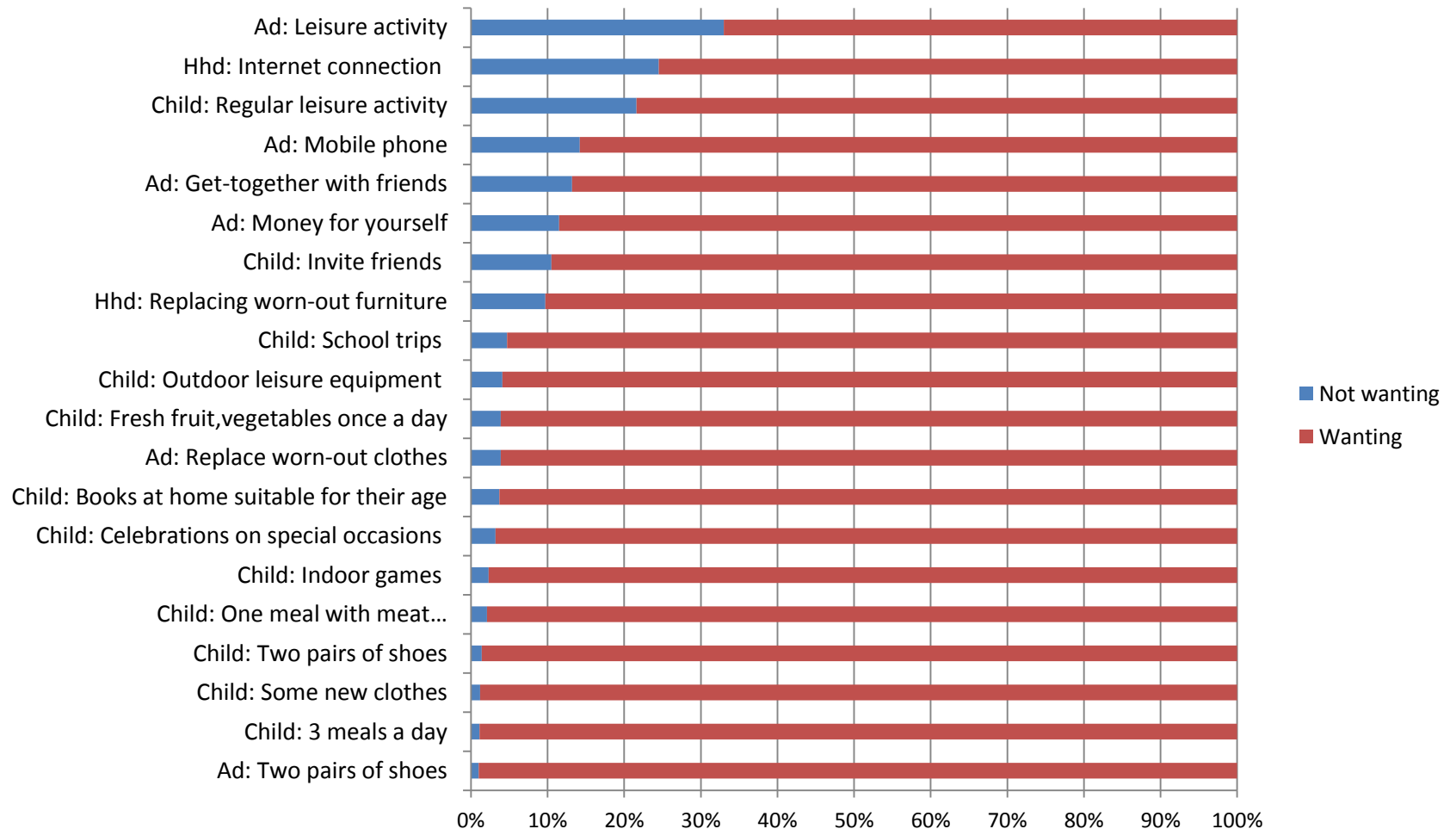Those who do not want the item are those who do not have it but for other reasons than financial stress.

Only items with the three answer possibilities (yes, no because can't afford, no for other reasons) are analysed.

WANTING – NOT WANTING

Goals:

1. **Assess the degree of "importance" of each item at EU and country level;**

2. test the homogeneity of preferences across countries (national preferences);

3. test the homogeneity of preferences between groups, within each country.

% OF PERSONS LIVING IN HOUSEHOLDS (NOT) WANTING THE ITEM, EU27

Suitability test for leisure items have to be interpreted cautiously

Those who do not do leisure for "other reasons" include people who do want but are prevented from doing so (lack of time due to caring responsibilities, work, poor health, no access etc.).

➔ Better to have four rather than three answer categories for the EU-SILC social participation deprivation questions in the next data collection (as in the UK PSE):

1) Do
2) Do not do but don't want to do
3) Do not do and can't afford
4) Do not do for any other reason.

Goals:

1. Assess the degree of "importance" of each item at the EU and country level

   ➔OK, all items wanted by more than 75% (except adult leisure, 68% but caution [as already explained]).

2. **test the homogeneity of preferences across countries (national preferences);**

3. test the homogeneity of preferences between groups, within each country.

CHILDREN FRESH FRUITS & VEGETABLES
% NOT WANTING – VARIATION BY COUNTRIES – ILLUSTRATIONS (95% CI)
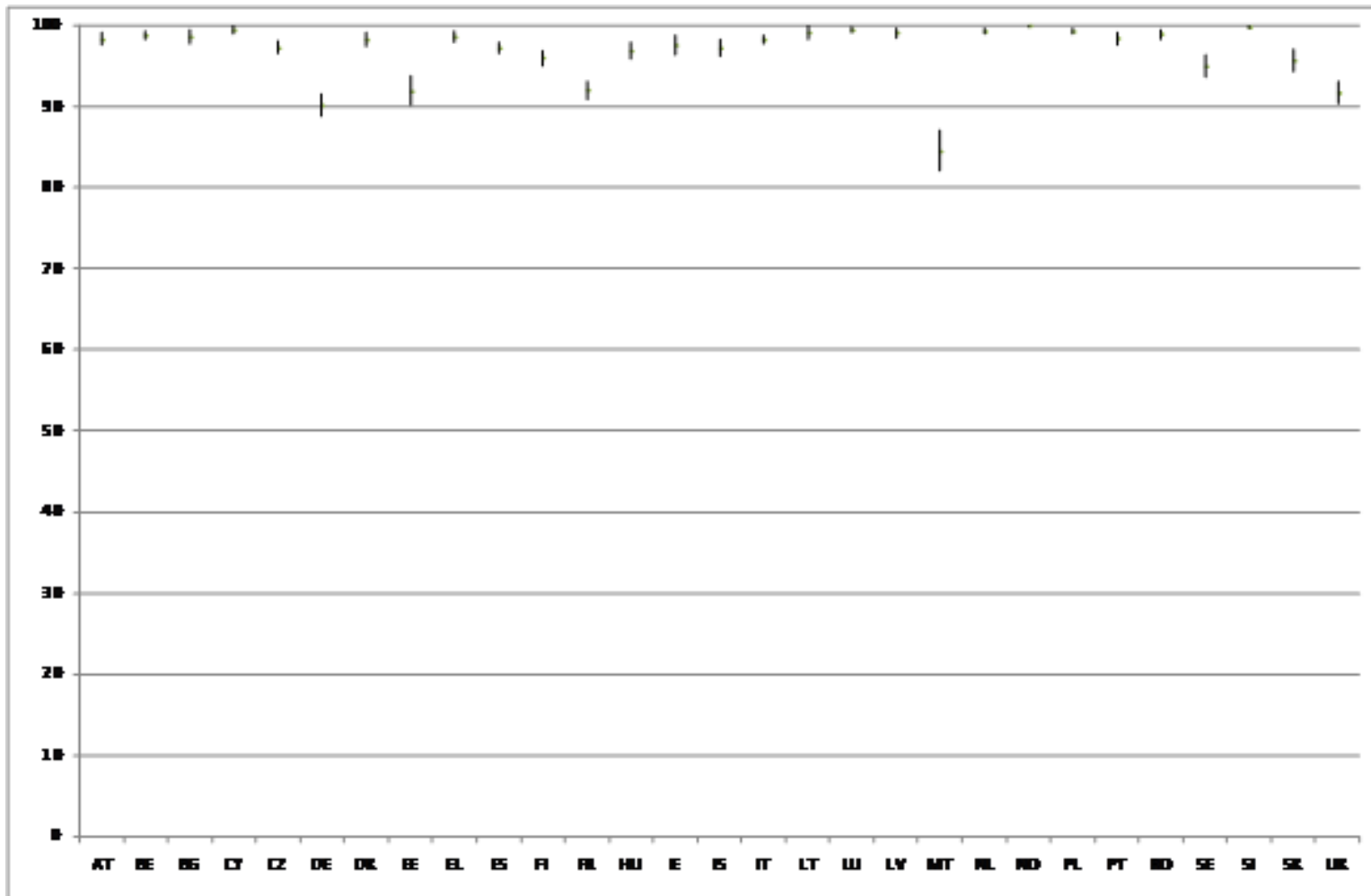
HOUSEHOLD INTERNET
% NOT WANTING – VARIATION BY COUNTRIES – ILLUSTRATIONS (95% CI)
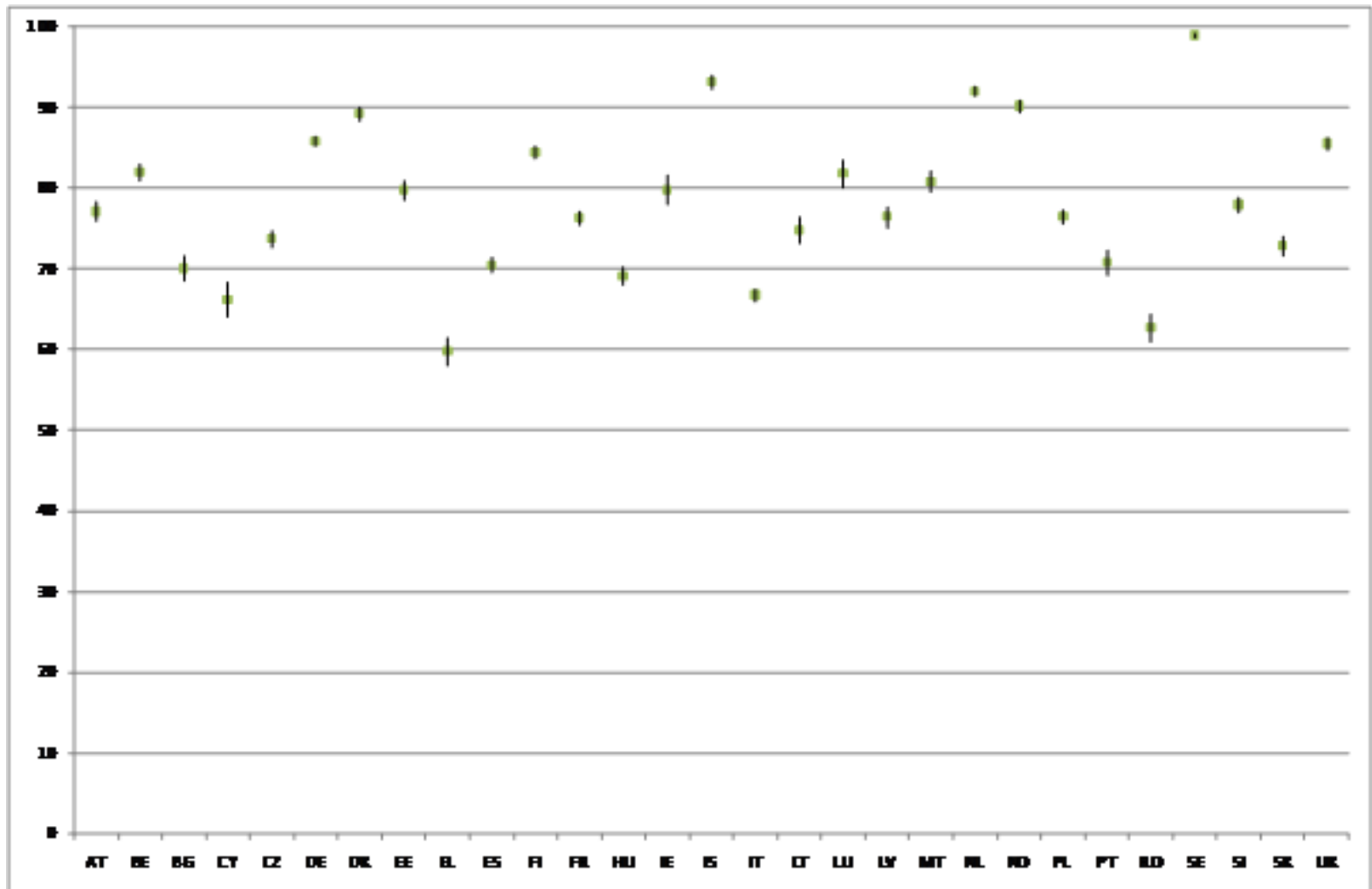
Wanting – Not wanting

Goals:

1. Assess the degree of "importance" of each items at the EU and country level

   ➔ OK, all items > 75% (except adult leisure, 68%; see above).

2. test the homogeneity of preferences across countries (national preferences)

   ➔ OK except internet connections (9 MSs less than 75%)➔ ➔ regroup internet with computer (also to avoid redundancy). (Adult leisure (12 MSs), children leisure (7 MSs) but caution)

3. **test the homogeneity of preferences between groups, within each country.**

HOMOGENEITY OF PREFERENCES : (NOT) WANTING BY SUB-GROUPS

Characteristics tested:

- Age
- Sex
- Household type
- Density of population
- Country of birth
- Education
- MD
- Income poverty

For each **item**
    BY **country**

AGE PATTERN FOR SOME ITEMS

EU-27 % of not wanting

Scatter plot with axis "65+" (vertical) and "18-64" (horizontal). Data points:
- Internet (~18, 65.5)
- Leisures (~27, 56.5)
- Mobile phone (~7, 43.5)
- Get together with friends (~9.5, 27)
- Pocket money (~9, 21)
- Furnitures (~9.5, 13.5)
- Clothes (~2.5, 10)
- (~1, 2)
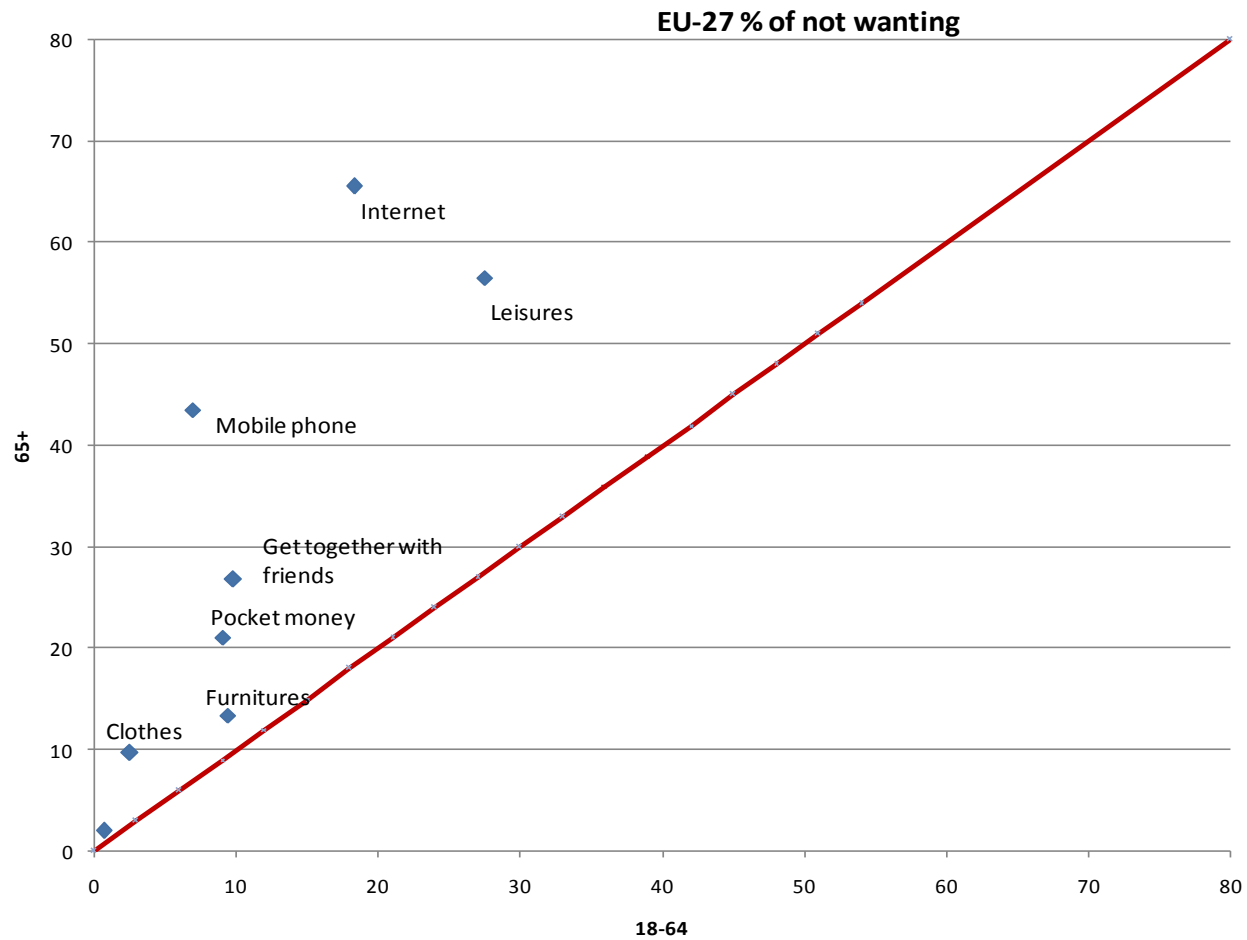
SHOULD MD INDICATORS BE BASED ON THE SAME SET OF ITEMS FOR THE WHOLE POPULATION OR DIFFER BETWEEN AGE GROUPS ?

- Use of enforced lack helps to correct for the difference of wanting between age groups

- Elderly who do not want = not always "true" not wanting but inability to participate in leisure/sport etc.

- Penetration rates of some items like mobile phones etc. will increase among the elderly in the near future

- A common MD measure for the whole population desirable in Europe 2020 context + coherence with the current EU MD indic.

- Respondents' income levels have an influence on the difference between age groups

➔ Common set, but useful to complement info with thematic module on elderly?

Trace Function Checks: Mobile Phone Possession
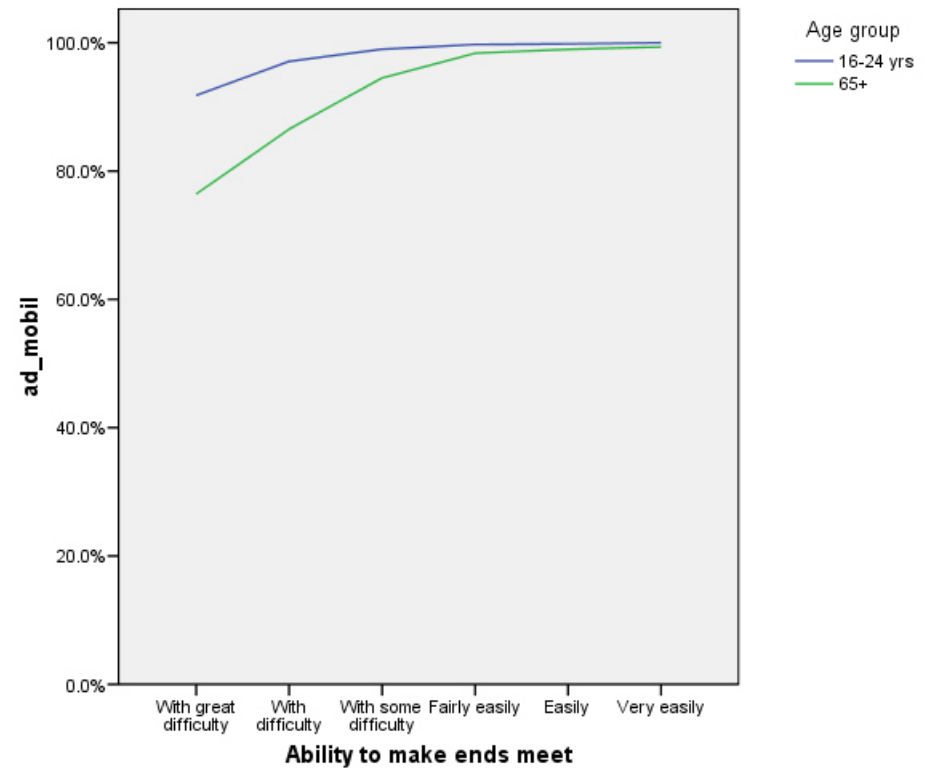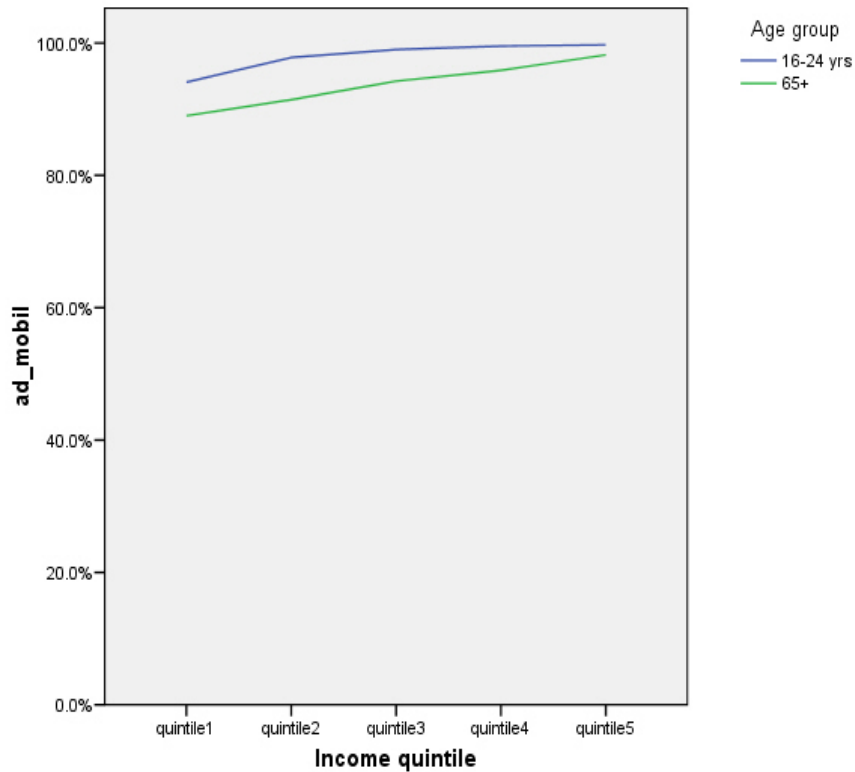
Both 'rich' older people and 'rich' young people have very high possession rates for mobile phones. The possession differences are amongst the 'poor' on these two groups.

3. Validity of MD items

VALIDITY

- Validity tests aim at checking whether or not an individual MD item exhibits statistically significant relative risk ratios with a set of independent variables known to be correlated with MD:
  - at-risk-of-poverty;
  - subjective poverty; and
  - health status (controlling for age and gender).

- Logit regressions.

- Successful if validity problems observed for max. 2 countries.

- Illustration…

VALIDITY — HOLIDAYS / DIFFICULTIES IN MAKING ENDS MEET
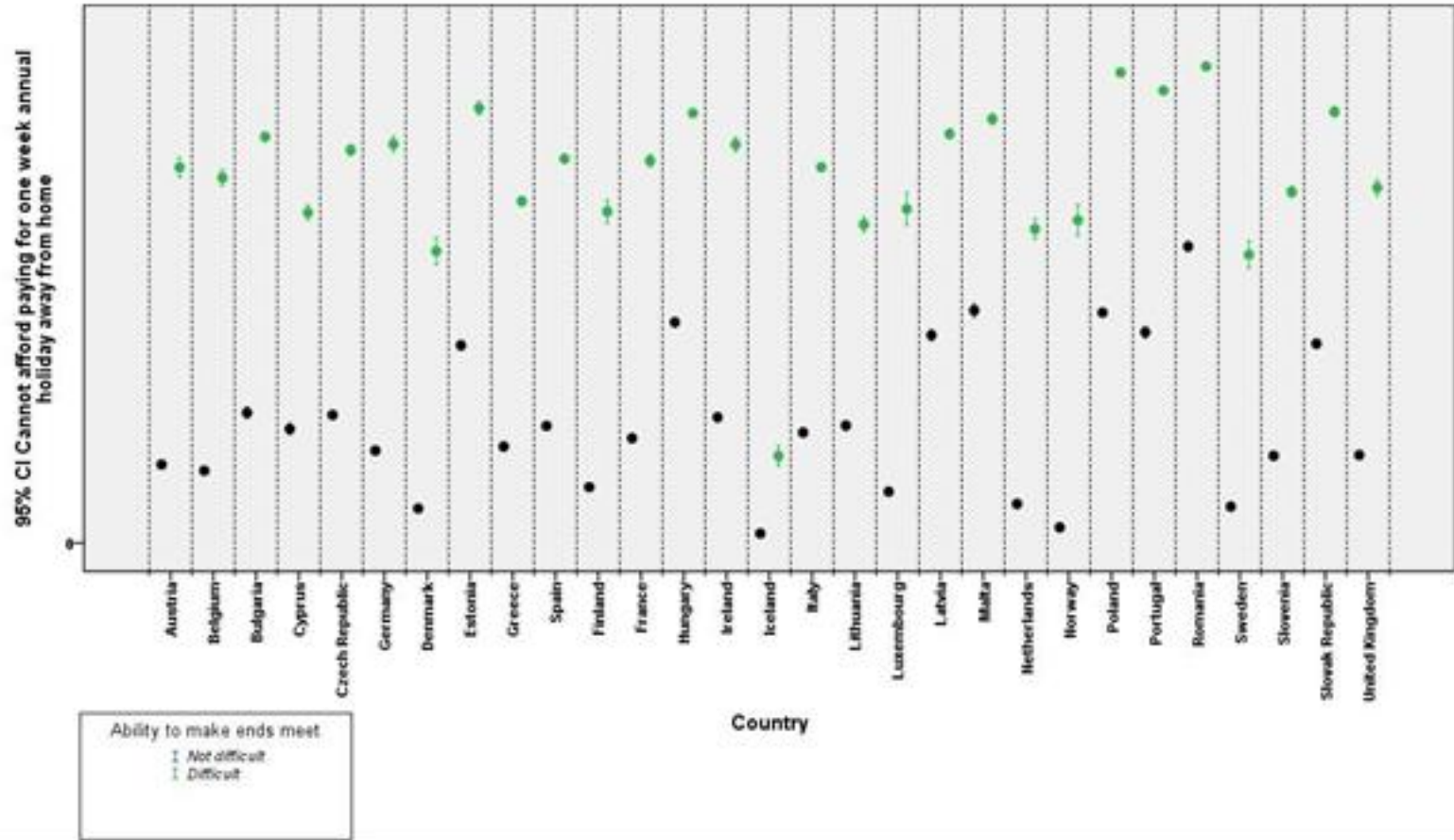
Validity – Problematic items

- Basic amenities
- Shortage of space, Overcrowding
- Local environnent, Darkness
- High housing costs
- Washing machine, TV, telephone (enforced lack)
- Accessibility (Public transport, Postal/banking services)

+ some children items (but in less than 5 MSs).

4. Additivity of MD items

ADDITIVITY

- Additivity tests aim at ensuring that MD indicator's components add up.

- This was checked using the ANOVA model (second order interactions of MD items by level of equivalised disposable household income).

- Illustrations...

Main Effects Plot: EU-SILC Sample at Household Level

Adult & Household Deprivations by Equivalised Income
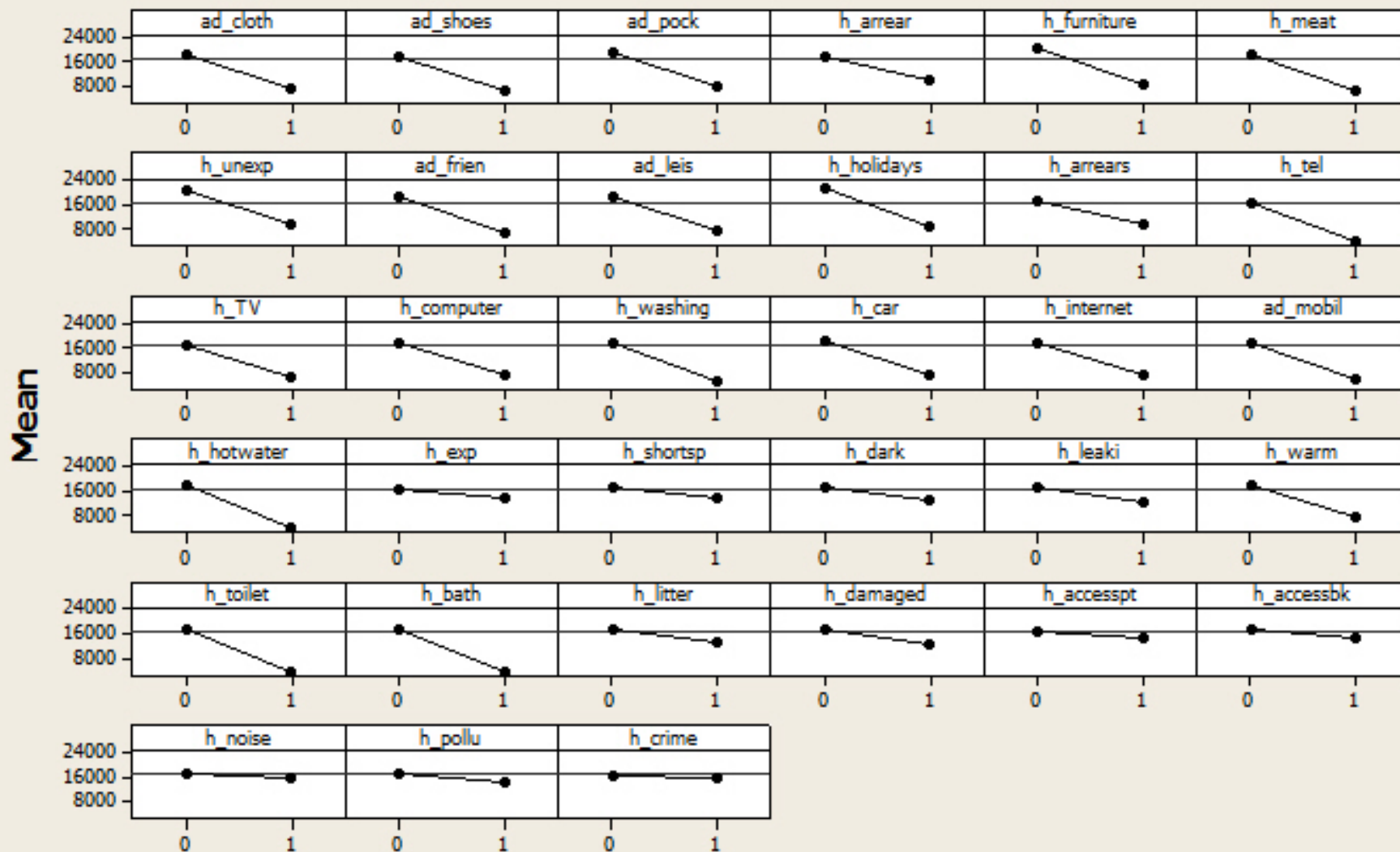
Additivity Checks – ANOVA 2nd Order Interaction Plots

Interaction Plot Adult-Household Deprivation (All)
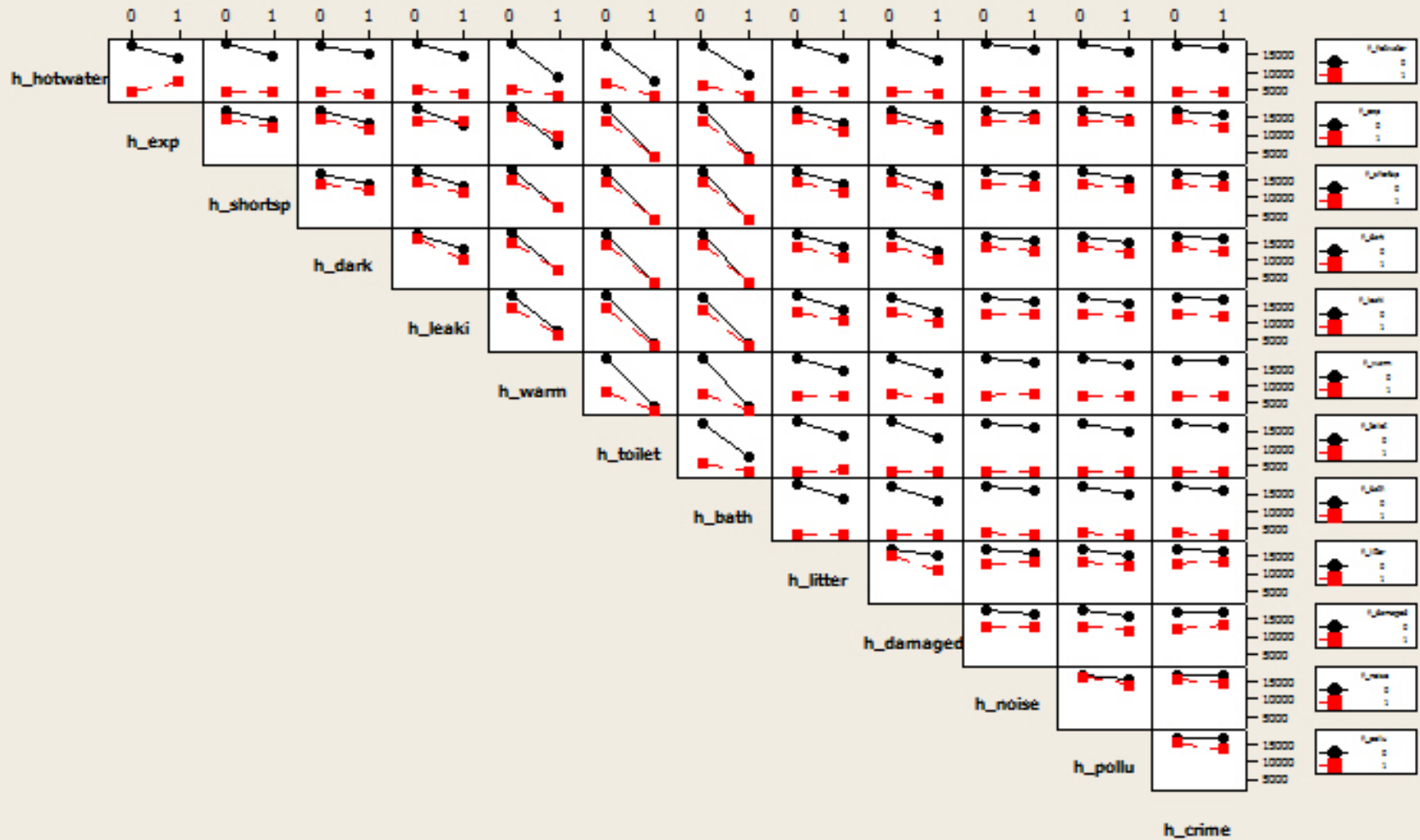
Both the black and red lines should slope from Top Left to Bottom Right

Additivity

Problematic items are:

1. Local environment problems items;

2. Basic amenities (children population only).

5. Reliability of the scale (Cronbach's Alpha)

Cronbach's Alpha – Whole population

If omitted (one by one), some items increase the Alpha (decrease the reliability). Analysis performed at both country and EU levels.

Problematic items are:
1. Basic durables and basic commodities;
2. the two accessibility items;
3. local environment problems items;
4. high housing cost, dwelling too dark and overcrowding.

This pattern is very consistent across countries: reliability problems tend to be concentrated on the same items.

ITEMS WHICH PASSED THE TESTS (WHOLE POPULATION): 14 ITEMS

Adult: Some new clothes

Adult: Two pairs of shoes

Adult: Some money for oneself

Adult: leisure activities

Adult: Drink/meal monthly

Household: Replace worn-out furniture

Household: Meat, chicken, fish (veg)

Household: Financial expenses

Household: Damp etc.

Household: Holiday

Household: Arrears

Household: Computer & Internet

Household: Car

Household: Inadequate warmth

Alpha 0.84 at EU level

Cronbach's Alpha by country, whole population
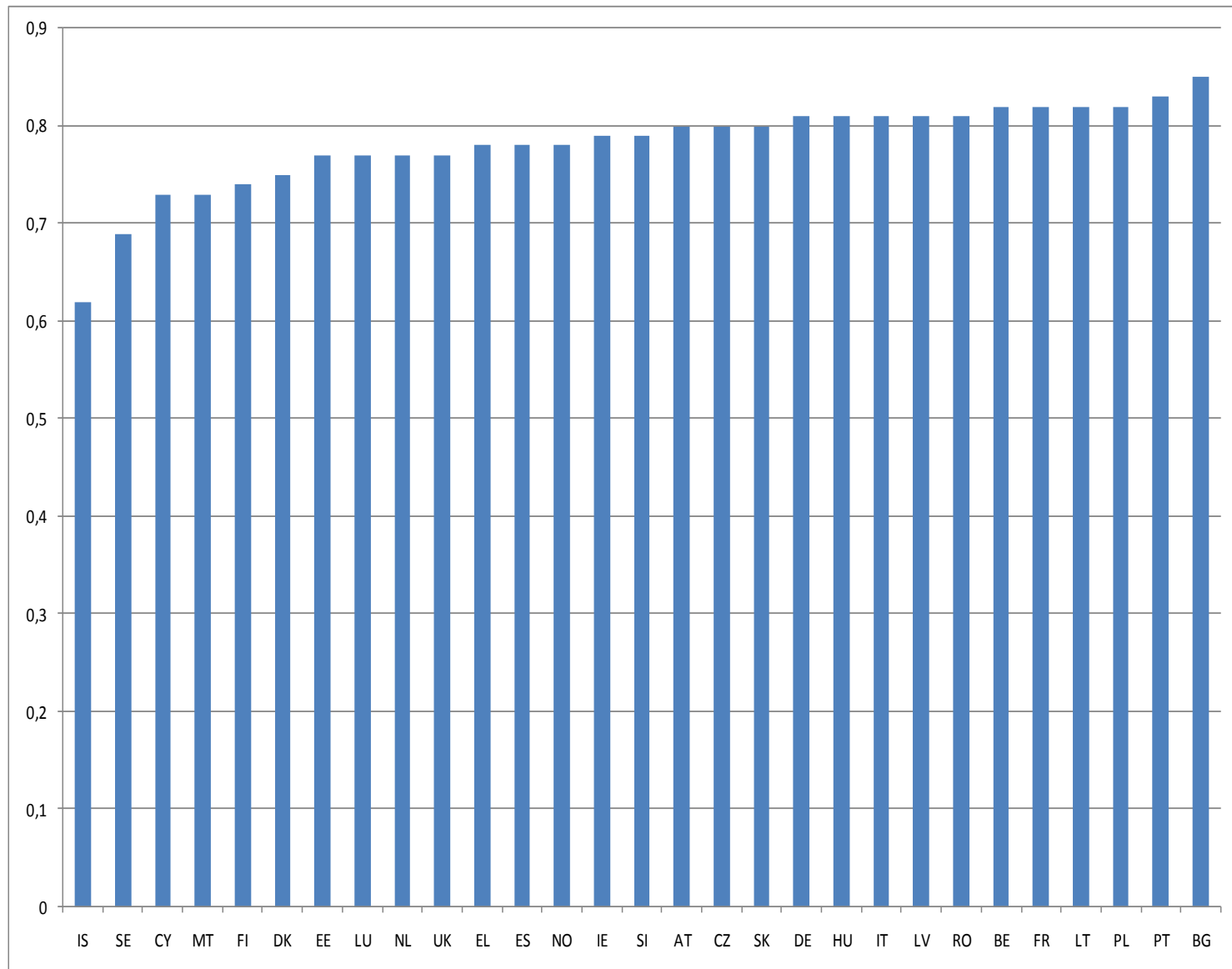
Cronbach's Alpha – Children population

If omitted (one by one), some items increase the Alpha (analysis performed at both country <u>and</u> EU levels).

The problematic items are:
- Basic durables and basic commodities;
- the two accessibility items;
- local environment problems items;
- high housing cost, dwelling too dark;
- children 3 meals/day and outdoor place to play;
- mobile phone.

BUT overcrowding <u>passes the test </u>on children population.

Child indicator: a holistic view

For properly assessing children MD one needs to look not only at MD that solely affects children, but also at MD that affects the whole household in which they live.

➔ The whole set of items affecting children's living conditions should therefore be included in a child MD indicator, regardless of the statistical unit it refers to.

➔ Particularly where there is scientific evidence that these deprivations have worse or different effects on children than on adults.

➔ But also items which may have an indirect or future impact on their well-being (incapacity to face unexpected expenses...).

➔ ➔ include a summary measure of MD of adults living with the children?

CHILD INDICATOR: INCLUDE ADULT ITEMS?

1. On the one hand : adult items do not impact on children as directly as the MD household/children items;
2. on the other hand : children are likely to suffer from the adults' bad financial/ living conditions, to feel "deprived" or "ashamed" if their parents are MD.

➔ Discussion: what is the best option ?

➔ At this preliminary stage: 2 children MD indicators (with and without a "summary" measure of the degree of deprivation of adults living with the child(ren)).

CHILD INDICATOR: INCLUDE ADULT ITEMS ?

If at least 2 adult MD items are lacked by the household (out of 5), then the children living in this hhd are deprived for the combined "adult" item..

➜ This procedure takes into account both the well-being of children themselves, as well as their well-being as members of a household whose adult member(s) may be in a less favourable situation. It also puts a greater weight on children deprivations than on adults' deprivation.

CHILDREN POPULATION: ITEMS WHICH PASSED THE TESTS - 22 (21) ITEMS

Child: Some new clothes

Child: Two pairs of shoes

Child: Fresh fruits & vegetables daily

Child: Meat, chicken, fish daily

Child: Suitable books

Child: Outdoor leisure equipment

Child: Indoor games

Child: Place to do homework

Child: Leisure activities

Child: Celebrations

Child: To invite friends

Child: School trips

Child: Holiday

(Combined adult deprivations)

Household: Worn-out furniture (enforced lack)

Household: Unexpected expenses

Household: Home adequately warm

Household: Arrears

Household: Computer/internet (enforced lack)

Household: Car (enforced lack)

Household: Leaking roof, damp etc.

Household: Overcrowding

Alpha at EU level: 0.91. From 0.71 in Finland to 0.93 in Bulgaria

6. Reliability of the items
(Item response theory [IRT])

ITEM RESPONSE THEORY (IRT)

- Provides additional information on the reliability of each individual indicator in the scale/index.

- Describes the relationship between a person's response to questionnaire items and an unobserved latent trait such as knowledge of biology, poverty or deprivation.

- We have used a 2-parameter model.

Item Characteristic Curves

Legend:
- Annual holiday
- Unexpected financial expenses
- Replace worn-out furniture
- Leisure activity eg sport, cinema, concert
- Spend a small amount of money each week on yourself
- Friends/family for a drink/meal once a month
- Some new clothes (not second-hand)
- Meat, chicken, fish (or vegetarian equivalent) every second day
- Keep home adequately warm
- Computer and Internet Access deprivation
- Car
- Unable to avoid arrears
- Two pairs of properly fitting shoes (including a pair of all-weather shoes)
- Leaking roof, etc

Y-axis: P(u=1 | q)
X-axis: Deprivation (q)

Ideally a "good" deprivation index would be illustrated by a series of fairly vertical 'S' shaped curves spread out along the X-axis. With the exception of "leaky roof", the graph shows that the items included in the all person deprivation index conform to the pattern expected for a "good" index.

All Person Deprivation Index: IRT Severity & Discrimination Results

Items	2 parameter IRT	
	Severity	Discrimination
Annual holiday	0.4	2.8
Unexpected financial expenses	0.5	2.4
Replace worn-out furniture	0.7	2.4
Leisure activity e.g. sport, cinema, concert	1.1	3.2
Spend a small amount of money each week on yourself	1.2	3.0
Friends/family for a drink/meal once a month	1.3	3.2
Some new clothes (not second-hand)	1.3	3.6
Meat, chicken, fish (or vegetarian equivalent) every second day	1.5	2.4
Inadequate warmth in home	1.7	1.9
Computer and internet access deprivation	1.8	1.8
Car	1.8	1.7
Unable to avoid arrears	2.0	1.4
Two pairs of properly fitting shoes (including a pair of all-weather shoes)	2.3	2.7
Leaking roof	2.5	0.7

IRT Test Information Function for the 22 item Child Deprivation Index
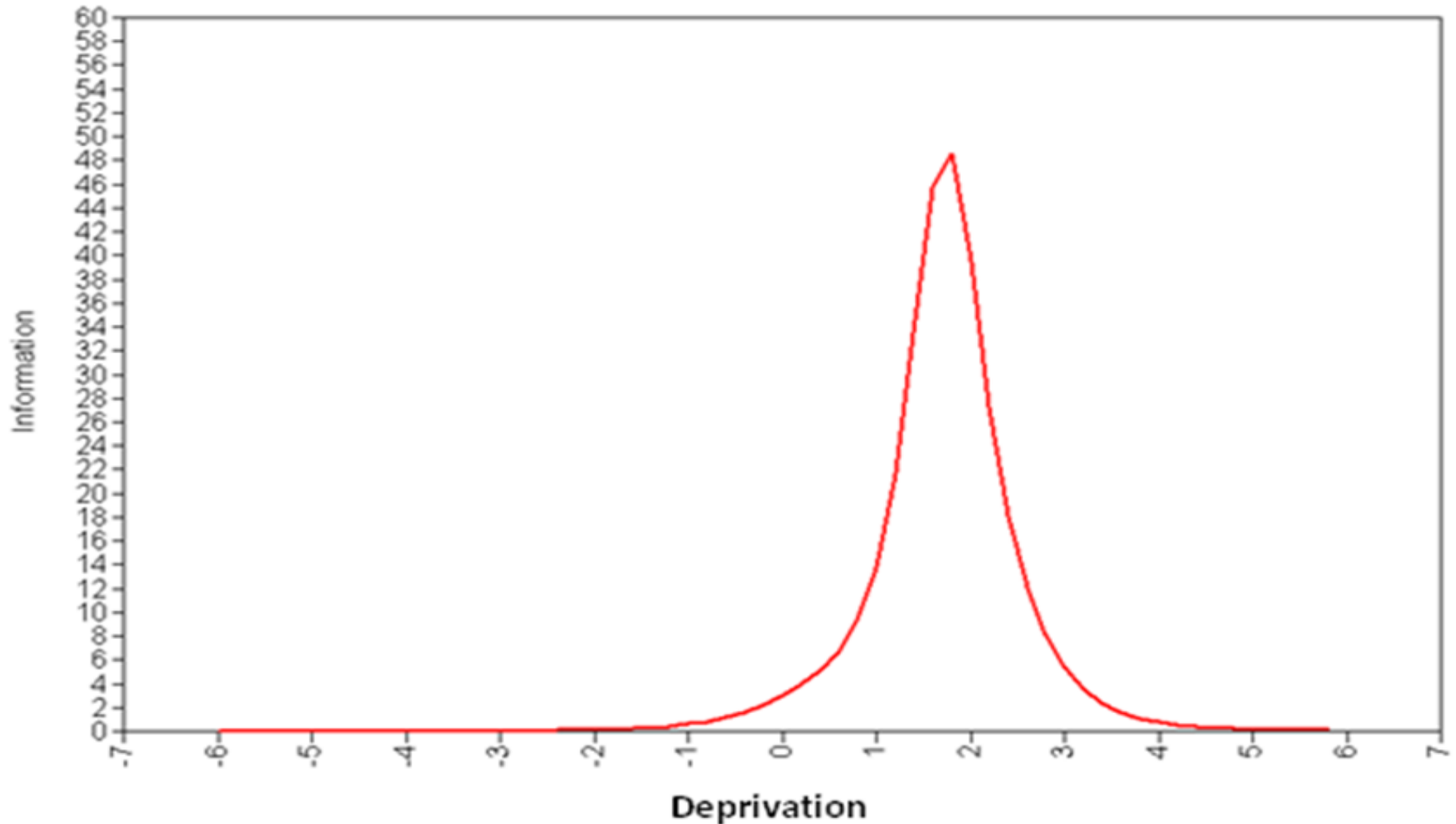
The Child Deprivation Index provides a lot of information about the living conditions of children approximately minus two (-2) standard deviations below the average
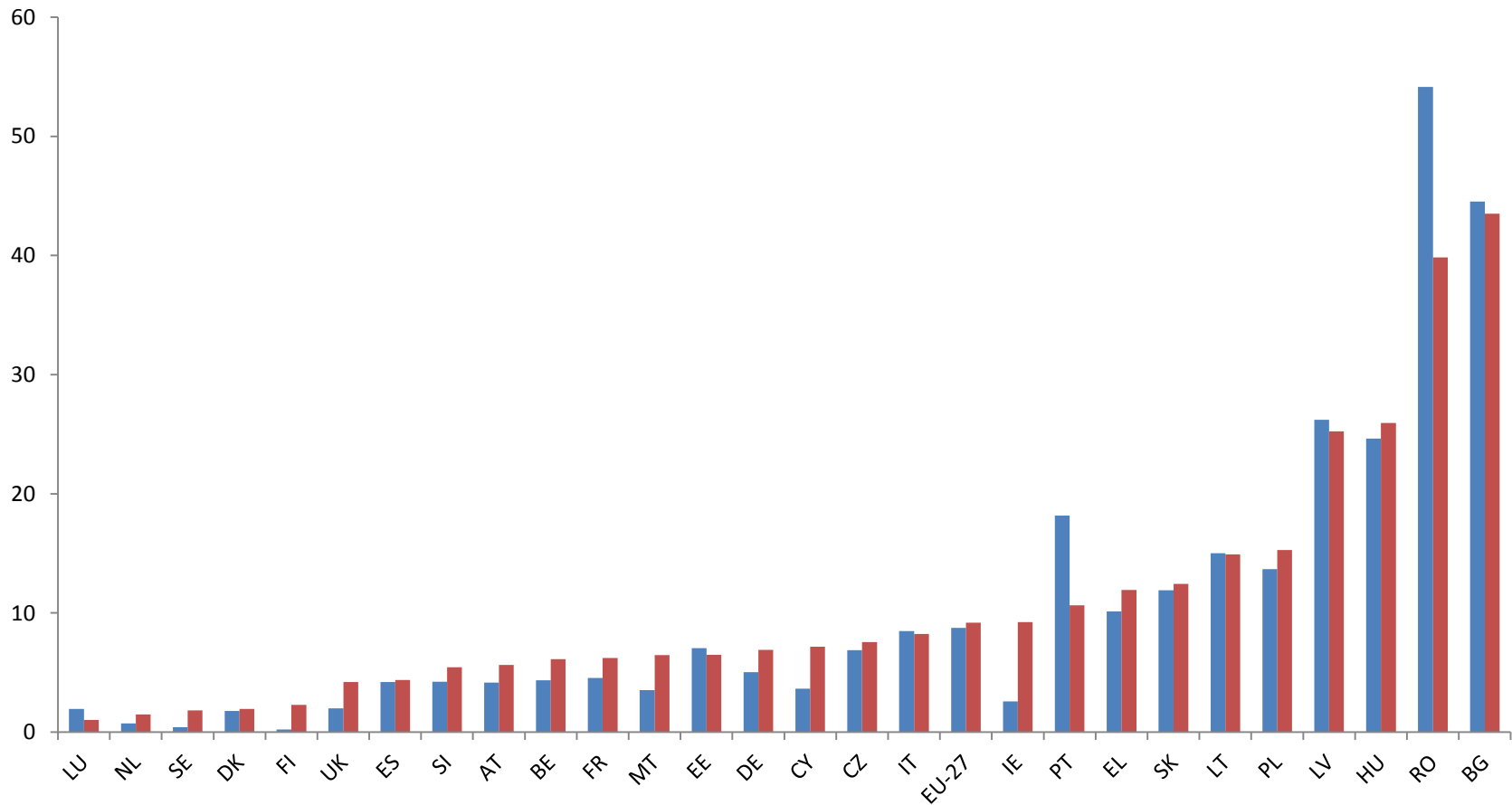
7. Aggregation

WHOLE POPULATION – MD RATE ACCORDING TO THE 14-ITEM INDICATOR (7+ AND 8+ ITEMS LACKED) AND TO THE CURRENT EU SEVERE INDICATOR
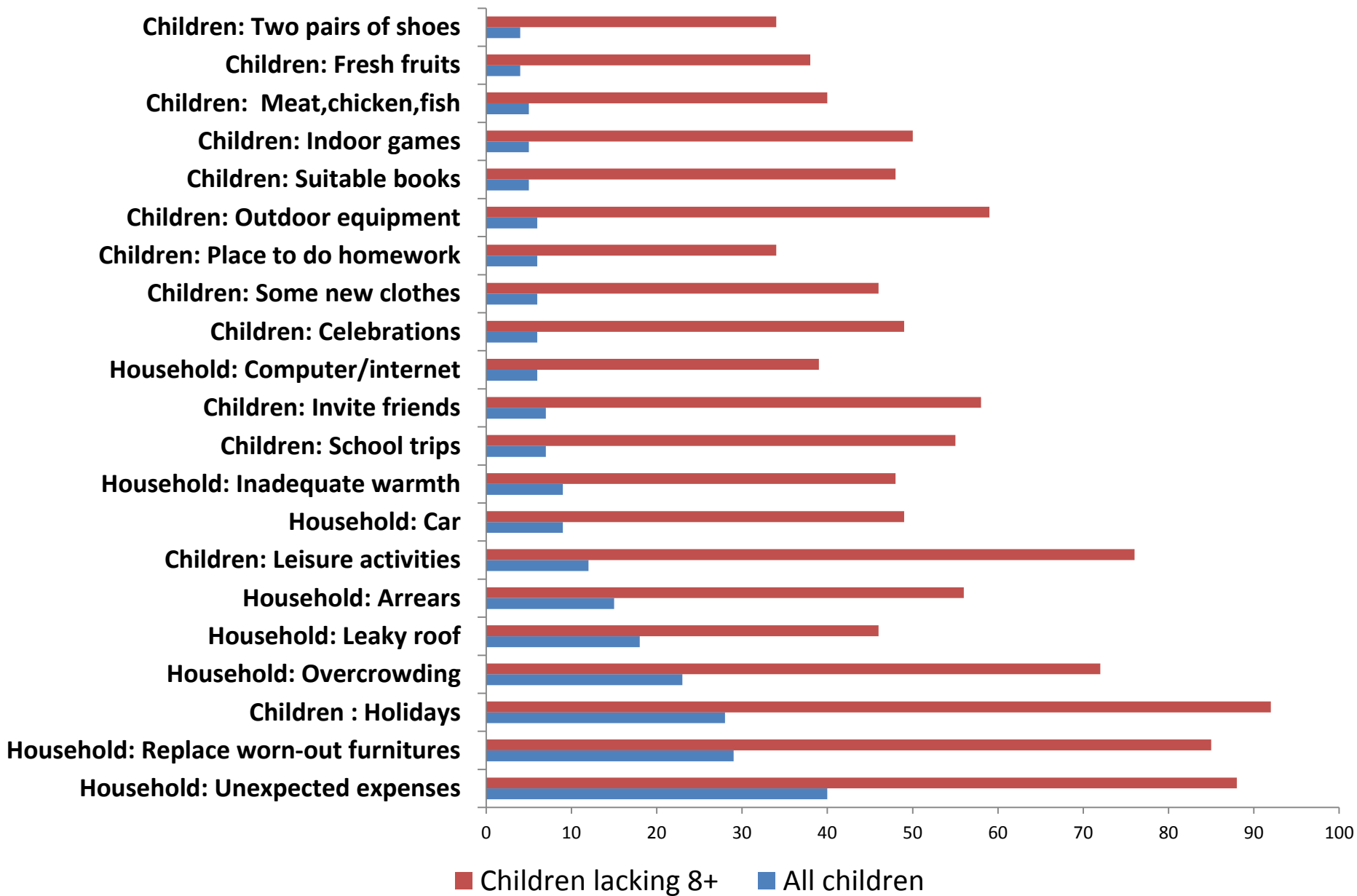

Legend: ■ MD 7+   ■ Severe MD   ■ MD 8+

Category	Population lacking 8+ items	Whole population
Adults: Shoes	28	3
Household: computer & internet	37	5
Household: Meat, chicken, fish	59	9
Household: Inadequate warmth	55	9
Household: Car	49	9
Adults: Clothes	76	10
Household: Arrears	52	11
Adults: drink/meal monthly	81	15
Household: Leaky roof	46	16
Adults: pocket money	86	18
Adults: leisure	90	19
Household: Replace worn-out furnitures	90	27
Household: Unexpected expenses	94	35
Household: Holiday	98	37

Legend: Population lacking 8+ items / Whole population

CHILDREN POPULATION – MD RATE ACCORDING TO THE 21-ITEM INDICATOR (8+ ITEMS LACKED) AND TO THE CURRENT EU SEVERE INDICATOR

Category	Children lacking 8+	All children
Children: Two pairs of shoes	34	4
Children: Fresh fruits	38	4
Children: Meat,chicken,fish	40	5
Children: Indoor games	50	5
Children: Suitable books	48	5
Children: Outdoor equipment	59	6
Children: Place to do homework	34	6
Children: Some new clothes	46	6
Children: Celebrations	49	6
Household: Computer/internet	39	6
Children: Invite friends	58	7
Children: School trips	55	7
Household: Inadequate warmth	48	9
Household: Car	49	9
Children: Leisure activities	76	12
Household: Arrears	56	15
Household: Leaky roof	46	18
Household: Overcrowding	72	23
Children : Holidays	92	28
Household: Replace worn-out furnitures	85	29
Household: Unexpected expenses	88	40

■ Children lacking 8+   ■ All children

POSSIBLE NEXT STEPS...

- Threshold sensitivity

- In-depth analysis of the proposed indicators

- Overlap between current MD and revised list

- Overlap between specific child indicator and revised 0+ MD indicator broken down for children

- Treatment of missing values

8. ELEMENTS FOR DISCUSSION (NOT EXHAUSTIVE!)

INTRODUCING 1+ ADULT ITEM(S) IN THE CHILD INDICATOR?

Number of adult items lacked in the hhd

Child not deprived (<5) ■ Child deprived (>=5)
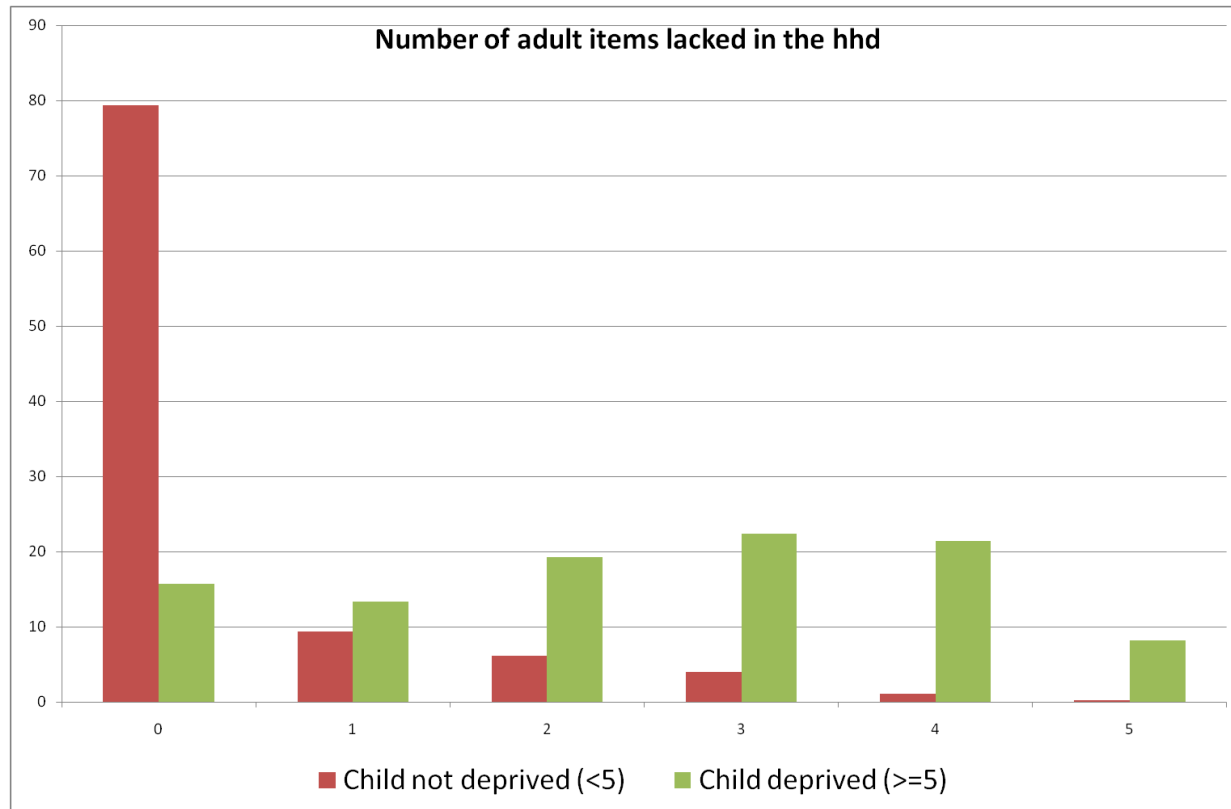
Introducing 1+ adult item(s) in the child indicator?

Among those deprived (child indicator 21 items):
- 70% lack at least 2 adult items;
- 50% lack at least 3 adult items;
- 30 lack at least 4 adult items.

Among those living in household lacking at least:
- 2 items: 58% are deprived according to the child indicator (5+ out off 21 items).
- 3 items: 68% are deprived according to the child indicator.
- 4 items: 83% are deprived according to the child indicator.
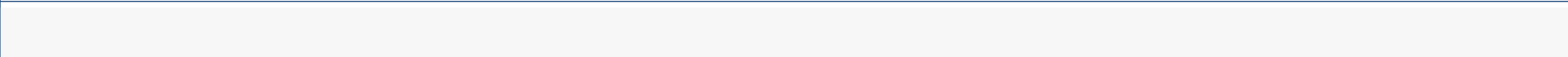
Differential weighting of Deprivation Indicators

*'While much effort goes into discussing and determining differential item weights, Ghiselli, Campbell, and Zedek (1981) are persuasive in arguing that differential item weighting has virtually no effect on the reliability and validity of the overall total scores. Specifically, they say that "**empirical evidence indicates that reliability and validity are usually not increased when nominal differential weights are used**" (p. 438). The reason for this is that differential weighting has its greatest impact when there (a) is a wide variation in the weighting values, (b) is little inter-correlation between the items, and (c) are only a few items. All three are usually the opposite of what is likely to occur in test development. That is, if the test is developed to assess a single construct, then if the developer has done the job properly, items will be intercorrelated. As a result, the weights assigned to one item over another are likely to be relatively small. In addition, tests are often 15 or more items in length, thus rendering the effects of differential weighting to be minimized. Finally, the correlation between weighted and unit-weighted test scores is almost 1.0. **Thus, the take-home message is pretty simple—don't bother to differentially weight items. It is not worth the effort.**'*(Kline, T.J.B. (2005) *Psychological Testing: A Practical Approach to Design and Evaluation.* London, Sage. Page 105.)

Ghiselli, E.E., Campbell, J.P. and Zedek, S. (1981) *Measurement theory for the behavioral sciences* San Francisco: W.H. Freeman and Company.

Why would differential weighting make little difference the deprivation index results?

It is intuitively obvious that some kinds of deprivation are worst/more severe than others i.e. it is worse not to be able to afford to feed you children than not to be able to have a computer. So should differential weights be applied to the individual deprivation items to reflect their different severities? The surprising answer is this is not necessary ! Classical Test Theory assumes that there are an infinite (or very large number) of measures of deprivation. If you could have answers to this infinite number of deprivation questions then you would have perfect knowledge (know everything) about each person's deprivation. No set of weights could add any additional information as you would already know everything i.e. the infinite deprivation index is self-weighting.

The square root of the Cronbach's Alpha statistic can be considered to be the correlation between the index you have and the 'perfect' index made from the answers to the infinite set of deprivation questions. The Cronbach's Alpha for the pooled EU-SILC All-person-Indicator at household level is 0.845, and for the Child indicator at household level it is 0.869. Therefore the correlations with the perfect infinite deprivation indicators are respectively 0.92 and 0.93, so there is little additional information that any differential weights could add

In 2009, we stated that "the introduction of new items in the EU-SILC module should normally increase the reliability of the indicator and decrease the need of weighting" (Guio (2009), p.17). The degree to which this has proven true has exceeded our expectations.