Estimating weights for the Active Ageing Index (AAI) from stated preferences: proposal for a Discrete Choice Experiment (DCE)

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A little DCE to warm up

- Imagine that the organisers of the AAI conference had to choose between different brands of mineral water
- To maximise participants' utility, the conference organisers decided to elicit participants' preferences in a *Discrete Choice Experiment* (DCE)
- Previous studies revealed that the relevant attributes for choosing mineral water are:
  - Fizziness
  - Sodium content and
  - Temperature at point of consumption

So let's find out *your* preferences

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Attributes	Water A	Water B
'Fizz'	Low	Medium
Sodium	High	Medium
Temperature	Cold	**Cold**
Your choice:	**A**	**B**

- **Individuals generally prefer lower sodium over higher sodium content**

  → *Direction of effect* of a change in attribute levels

- **The maximum sodium content should not surpass xx mg/litre**

  → *Optimal level* for a given attribute

- **'Fizz' is generally more important than temperature**

  →*Relative importance* of one attribute over another

- **For each additional mg of sodium/litre, the preferred temperature decreases by xx degrees Celsius**

  → trade-off or *marginal substitution rate* between attributes

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Background

In January 2014, the expert panel on the AAI rightly expressed their concerns about *'the arbitrary weighting of indicators and domains'* solely based on expert opinion

Rationale

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Our approach aims to address two major issues with the current weighting system:

Comparative Aspect:	***AAI results based on constant weights may underestimate the burden associated with low scores for a particular indicator in disadvantaged populations, whilst overestimating it in others***
Participatory Aspect:	***Expert based weights may be subject to bias and could be 'at odds with the valuations of a particular user'***

We therefore believe that:

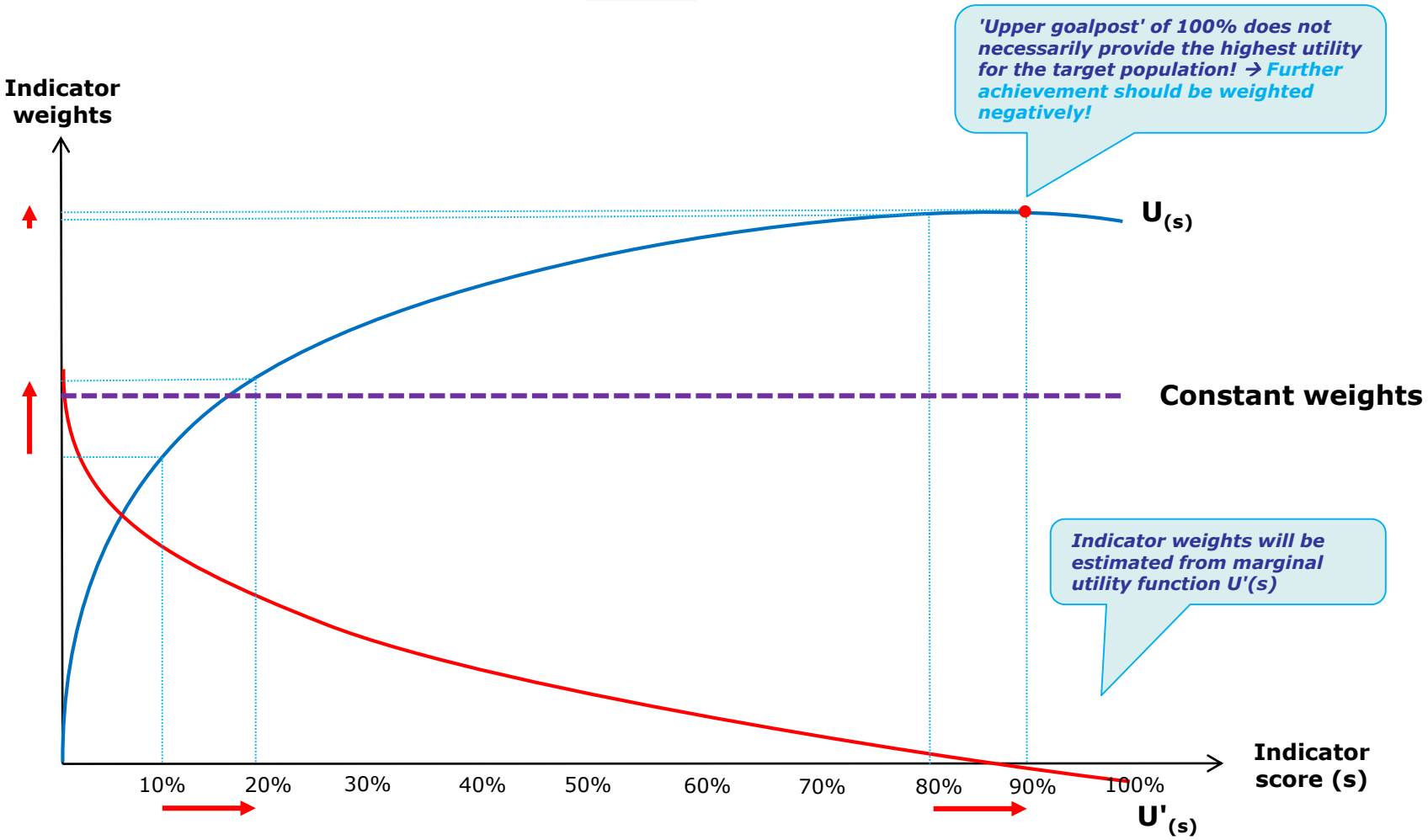
- **Indicator weights for the AAI are essentially value judgements and should reflect stated preferences!**
- **Consumer theory, and in particular random utility theory may provide the missing theoretical basis for eliciting indicator weights**
    - The marginal utility from increasing the score of an indicator should be higher if the current score of this indicator is low
    - Likewise, if the value of a particular AAI-indicator is low, compensation through other indicators should be higher

Random Utility Theory

A good per se does not give utility to the consumer but possesses characteristics which give rise to utility	***The AAI components (characteristics) contribute to the utility realised by members of the target population of active ageing policies and interventions (the good)***
The good generally possesses more than one characteristic, and many characteristics will be shared by more than one good	***The AAI consists of several component-indicators, and different active ageing policies and interventions are likely to affect different subsets of components***
Goods in combination may possess characteristics different from those pertaining to the goods separately	***Policies which impact on several AAI components may contribute to the target populations' utility in a way that is not equal to the sum of the utilities influenced by policies targeting each component separately***

Lancaster, K.J. (1966) A New Approach to Consumer Theory. Journal of Political Economy, 74(2):132-157.

Accounting for diminishing marginal utility through indicator weights



An illustrative example

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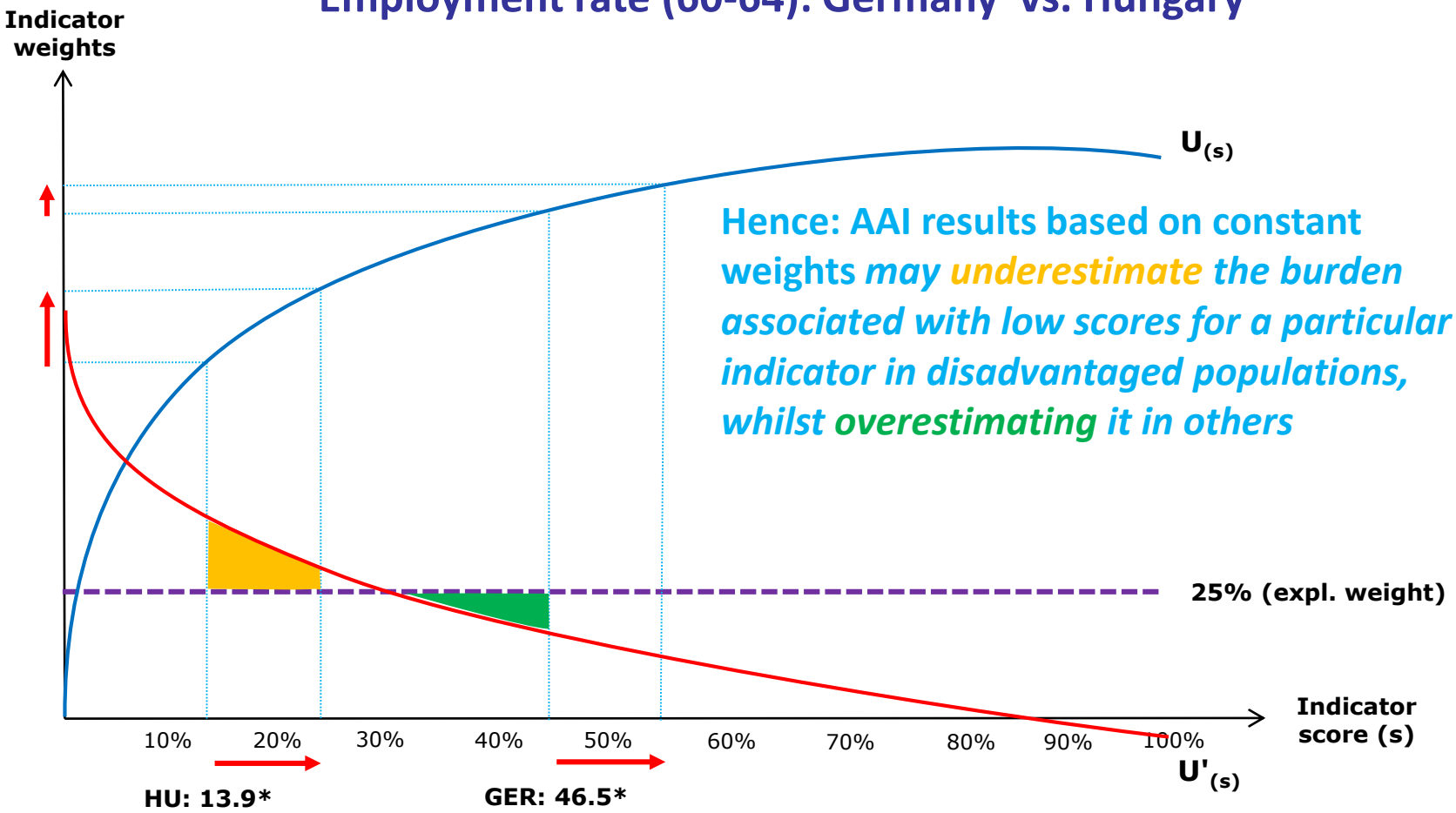
Employment rate (60-64): Germany vs. Hungary



Hence: AAI results based on constant weights *may underestimate the burden associated with low scores for a particular indicator in disadvantaged populations, whilst overestimating it in others*

* 2014 AAI results
http://www1.unece.org/stat/platform/pages/viewpage.action?pageId=76287845

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Designing a DCE to estimate AAI weights

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Customising choice questions to different settings / target populations is possible by linking attribute levels to local indicator scores

Potential *choice question* for participation in society

Below are the outcomes of two competing policy interventions to improve participation in society. Which alternative would you prefer depending on the current score of each indicator

Attributes (indicators)	Policy intervention A	Policy intervention B
Voluntary activities	10% up	unchanged
Care to children, grandchildren	5% up	5% up
Care to older adults	unchanged	unchanged
Political participation	unchanged	10% down

Attributes are derived from AAI indicators and domains

The literature suggests a maximum of six or seven attributes to minimise the burden on respondents !!!

Attribute levels may be continuous or categorical in nature, and this choice may be different for different attributes

Unlabelled alternatives allow respondents to focus on attributes and attribute levels, which is important for estimating marginal substitution rates

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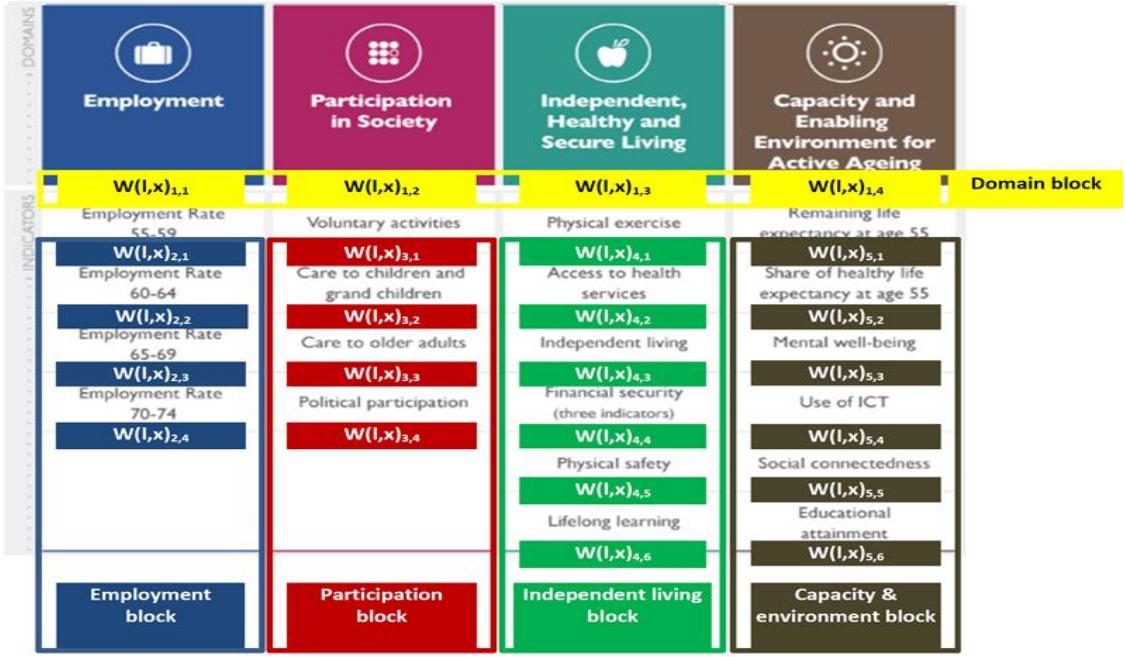
'Blocked' DCE design to estimate preference based AAI-weights



- A DCE in which respondents have to trade attributes from all AAI domains would result in a **prohibitive number** of attribute/level combinations.
- A 'blocked' design may be more adequate within which the full set of possible attribute-level combinations is divided into **smaller parts** to which respondents are then **randomly assigned**.
- The AAI structure with its four overall **domains** provides a **suitable basis** for a **blocked design**

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Whose preferences should count?

General public?	• *Their tax contributions provide funding for active ageing policies* • *Comprises all current AND future recipients of active ageing policies*
Ageing population?	• *Current recipients of active ageing policies* • *But potential bias due to adaptation effect* • *Implications for questionnaire development / mode of administration*
Other?	• *E.g. policy planners / makers who are responsible for policy setting and thus may influence future decision making processes*

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***How many* respondents should we ask?**

It is not easy to estimate ad-hoc the sample size required as the optimal number of respondents depends, amongst others, on:

- **The question format**
- **The complexity of the choice tasks**
- **The desired degree of precision**
- **Heterogeneity in the target population and**
- **The need for subgroup analyses (through covariates encoding differences across relevant subgroups)**

The mean sample size in health related DCE's between 2005 and 2009 was 259*

Sample sizes above 1000 should generally produce small CI's**

*Marshall,D.; Bridges,J.F.P.; Hauber,B. et al. (2010) Conjoint Analysis Applications in Health — How are Studies being Designed and Reported? The Patient: Patient-Centered Outcomes Research, 3(4):249-256.

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**Johnson,F.R.; Lancsar,E.; Marshall,D. et al. (2013) Constructing Experimental Designs for Discrete-Choice Experiments: Report of the ISPOR Conjoint Analysis Experimental Design Good Research Practices Task Force Value Health, 16:3-13

Conclusions

- *We believe that our proposed DCE is feasible and can enhance the suitability of the AAI as an effective evidence-based measure for policymaking*

- *Our approach may help to better reflect what people actually want in different social, cultural or geographic contexts, thus helping to define more targeted policies and also to tackle inequalities across regions and / or population subgroups*

- *Disaggregated, context-specific and preference-based weights derived from a DCE would have a stronger theoretical basis for assessing policy initiatives and should therefore receive wider acceptance from different groups of stakeholders*

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also on behalf of Timea Helter, Ibrahim-Kholilul Rohman & Fabienne Abadie

Thank you