

Does the choice of well-being measure matter empirically?

An illustration with German data

Koen Decancq

University of Antwerp

Dirk Neumann

Université catholique de Louvain

Winter School IT10

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Motivation

- How to measure+compare well-being is crucial to social policy making
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 - ① **Income**
 - ② **Composite well-being index** (incl. non-monetary dimensions, e.g. HDI)
 - ③ **Subjective well-being measure** (life satisfaction, happiness)
 - ④ **Equivalent income** (preference based)
 - ⑤ **Expected utility** (accounting for risk preferences)...

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⇒ Does the choice matter empirically?

This paper:

- 1 Empirical implementation of *individual* well-being measures and comparison based on a common data set (GSOEP 2010)
- 2 Comparison by means of
 - **worst off** characteristics: identification of same individuals?
 - **well-being rankings**: extent of overall re-ranking

- 1 Framework: five well-being measures
- 2 Implementation
- 3 Results
- 4 Conclusion

Framework: five well-being measures

We assume four (possible) building blocks for a well-being measure:

- ① Outcome vector (well-being dimensions) $l_i = (y_i, x_i)$
- ② Informed opinion on the good life (preference ordering) \mathcal{R}_i
- ③ Risk preferences (vNM utility function) V_i
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⇒ A well-being measure: $WB(\ell_i, \mathcal{R}_i, V_i, S_i)$

1. Income, 2. Composite index

Income:

$$WB^1(\ell_i, \mathcal{R}_i, V_i, S_i) = y_i$$

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- How to choose $f(\cdot)$, w , β ? Paternalism?

3. Subjective well-being measure

- Use what individuals state themselves?

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$$WB^3(l_i, \mathcal{R}_i, V_i, S_i) = S_i(l_i)$$

- Opinions of individuals (preferences) respected?
- Under consistency assumption

$$S_i(l_i) \geq S_i(l'_i) \text{ if and only if } l_i R_i l'_i$$

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⇒ SWB respects preferences in *intrapersonal* comparisons but not in *interpersonal* comparisons:

Individual specific scaling factors influence comparison [▶ graph](#)

4. Equivalent income, 5. vNM utility

- A possible solution: equivalent income (e.g. Fleurbaey and co-authors) = the hypothetical income that – if combined with a reference value on all non-income dimensions – would place the individual in a situation that she finds equally good as her initial situation

Equivalent income:

$$WB^4(\ell_i, \mathcal{R}_i, V_i, S_i) = y_i^* \text{ such that } (y_i, x_i) I_i(y_i^*, \tilde{x})$$

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 - Individual preferences: empirically difficult
 - Reference values: ethically demanding [▶ graph](#)

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 - Individual preferences: empirically difficult
 - Reference values: ethically demanding [▶ graph](#)
- What about risk preferences?
 - Here: a variant of vNM utility (Adler 2012, 2014 building on Harsanyi), WB^5
 - Normative choice: individuals with different risk attitudes might be treated differently [▶ details](#)

Data: GSOEP for 2010 (14,200 individuals \geq 25 years)

Outcome vectors: three dimensions in ℓ_i

- 1 **Income:** household equivalized disposable income, EUR/mth
- 2 **Health:** objective index in $[0; 100]$
(obtained from a regression of self-assessed health on a range of objective indicators, e.g. Doorslaer and Jones 2003)
- 3 **Unemployment:** yes/no

Empirical well-being indices:

- ① **Income:** household equivalized disposable income, EUR/mth
- ② **Composite index:** $f(.) \rightarrow [0; 1]$, $w = (0.41, 0.24, 0.35)$, $\beta = 1$
- ③ **Subjective well-being:**
 - Life satisfaction as a 0-10 answer to: *To what extent are you satisfied with your life in general at the present time?*
- ④ **Equivalent income:**
 - Estimation of preferences using life satisfaction ...
 - “Best values” as references
- ⑤ **vNM utility:**
 - Transformation of estimated model: utility function more concave if willingness to take risks below median

- Life satisfaction approach (Fleurbaey, Schokkaert, Decancq frth.)
- Starting point: canonical life satisfaction regression

$$s_i = \alpha + \beta y_i + \gamma x_i + \delta z_i + \epsilon_i$$

- Sophistications:
 - Heterogeneity in taste for income: $\beta = \beta_0 + \beta_1 d_i$
 - Decreasing marginal returns (income, health): $f(t) = (t^\epsilon - 1)/\epsilon$
- Estimation: maximum likelihood

Estimating preferences - ctd.

income	0.150**	(0.0563)
health	0.674*	(0.319)
unemployment	-0.575***	(0.0680)
income × partner	0.0247***	(0.00617)
income × male	-0.0178***	(0.00390)
income × “non-midlife”	0.0202***	(0.00514)
Box-Cox parameter income	0.114*	(0.0459)
Box-Cox parameter health	0.233*	(0.115)
age	-0.0344***	(0.00750)
age squared	0.000366***	(0.0000692)
higher education	0.0941**	(0.0305)
divorced	0.00629	(0.0583)
separated	-0.0371	(0.0988)
widowed	-0.0411	(0.0680)
control over life	0.144***	(0.0107)
achieved what deserved	0.0745***	(0.00815)
positive attitude	0.332***	(0.0124)
constant	-2.331*	(0.980)
<i>N</i>	14,027	
pseudo R^2	0.1007	

Regional dummies included. Clustered standard errors in parentheses.
 “non-midlife” denotes an age below 45 or above 60 years.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Who are the worst off? (bottom 9,2%)

	Full samp.	WB ¹ Income	WB ² Cp. ind.	WB ³ Satisf.	WB ⁴ Eq. inc.	WB ⁵ vNM
satisf. (0-10)	6.95	5.80	5.36	2.98	5.16	5.39
income (EUR/mth)	1,705	619	980	1,317	1,125	1,166
health (0-100)	76.15	71.00	59.04	58.26	37.20	37.18
unemployed (in %)	6.44	32.93	69.91	16.75	24.44	21.84
age (years)	54.35	53.83	52.65	55.14	62.77	63.45
married (in %)	56.54	33.45	39.72	47.09	38.32	50.38
single parent (in %)	4.89	11.92	11.27	6.78	5.36	(4.08)
low educ. (in %)	17.55	36.95	30.31	23.96	29.31	28.87
pension (in %)	32.93	(31.73)	23.55	(34.20)	56.31	58.86
disabled (in %)	16.01	18.36	32.44	29.82	59.12	57.22
risk taking (0-10)	4.11	3.88	(3.99)	3.50	3.55	(4.25)
WTP health	2,250	1,358	3,257	3,673	5,764	5,762
WTP unem.	97	350	1,050	236	317	285

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Degree of overlap

poor accord. to:	WB ¹ Income	WB ² Cp. ind.	WB ³ Satisf.	WB ⁴ Eq. inc.	WB ⁵ vNM	% Overlap
1 measure	✓					9.20
1 measure		✓				9.21
1 measure			✓			9.20
1 measure				✓		9.20
1 measure					✓	9.21
2 measures	✓	✓				3.79
2 measures	✓		✓			2.04
2 measures	✓			✓		2.77
2 measures	✓				✓	2.43
2 measures		✓	✓			2.72
2 measures		✓		✓		5.02
2 measures		✓			✓	4.78
2 measures			✓	✓		3.17
2 measures			✓		✓	2.77
2 measures				✓	✓	7.36

Degree of overlap

poor accord. to:	WB ¹ Income	WB ² Cp. ind.	WB ³ Satisf.	WB ⁴ Eq. inc.	WB ⁵ vNM	% Overlap
1 measure	✓					9.20
1 measure		✓				9.21
1 measure			✓			9.20
1 measure				✓		9.20
1 measure					✓	9.21
2 measures	✓	✓				3.79
2 measures	✓		✓			2.04
2 measures	✓			✓		2.77
2 measures	✓				✓	2.43
2 measures		✓	✓			2.72
2 measures		✓		✓		5.02
2 measures		✓			✓	4.78
2 measures			✓	✓		3.17
2 measures			✓		✓	2.77
2 measures				✓	✓	7.36

Degree of overlap - ctd.

poor accord. to:	WB ¹ Income	WB ² Cp. ind.	WB ³ Satisf.	WB ⁴ Eq. inc.	WB ⁵ vNM	% Overlap
3 measures	✓	✓	✓			1.31
3 measures	✓	✓		✓		2.26
3 measures	✓		✓	✓		1.17
3 measures	✓	✓			✓	2.02
3 measures	✓		✓		✓	1.02
3 measures	✓			✓	✓	2.15
3 measures		✓	✓	✓		2.01
3 measures		✓	✓		✓	1.90
3 measures		✓		✓	✓	4.59
3 measures			✓	✓	✓	2.54
4 measures	✓	✓	✓	✓		1.01
4 measures	✓		✓	✓	✓	1.91
4 measures	✓	✓		✓	✓	1.85
4 measures	✓	✓	✓		✓	0.94
4 measures		✓	✓	✓	✓	0.91
all measures	✓	✓	✓	✓	✓	0.87

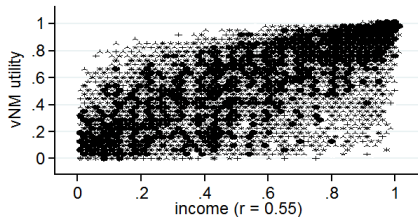
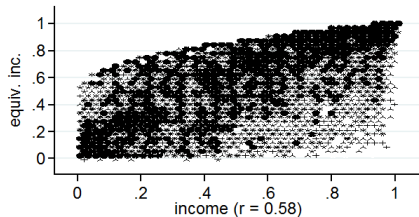
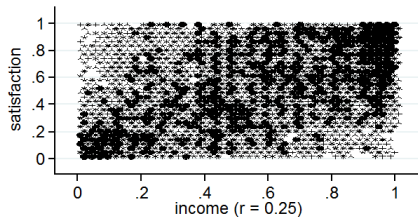
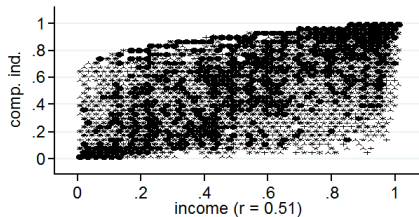
Source: Own calculations based on SOEP 2010

Degree of overlap - ctd.

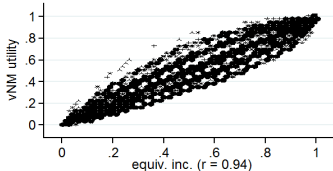
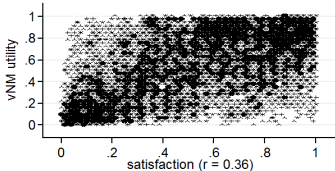
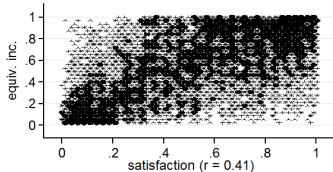
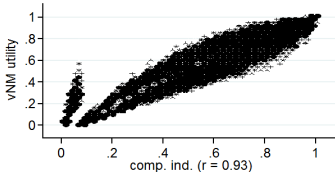
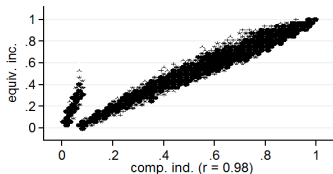
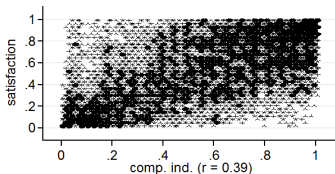
poor accord. to:	WB ¹ Income	WB ² Cp. ind.	WB ³ Satisf.	WB ⁴ Eq. inc.	WB ⁵ vNM	% Overlap
3 measures	✓	✓	✓			1.31
3 measures	✓	✓		✓		2.26
3 measures	✓		✓	✓		1.17
3 measures	✓	✓			✓	2.02
3 measures	✓		✓		✓	1.02
3 measures	✓			✓	✓	2.15
3 measures		✓	✓	✓		2.01
3 measures		✓	✓		✓	1.90
3 measures		✓		✓	✓	4.59
3 measures			✓	✓	✓	2.54
4 measures	✓	✓	✓	✓		1.01
4 measures	✓		✓	✓	✓	1.91
4 measures	✓	✓		✓	✓	1.85
4 measures	✓	✓	✓		✓	0.94
4 measures		✓	✓	✓	✓	0.91
all measures	✓	✓	✓	✓	✓	0.87

Source: Own calculations based on SOEP 2010

Re-ranking between measures

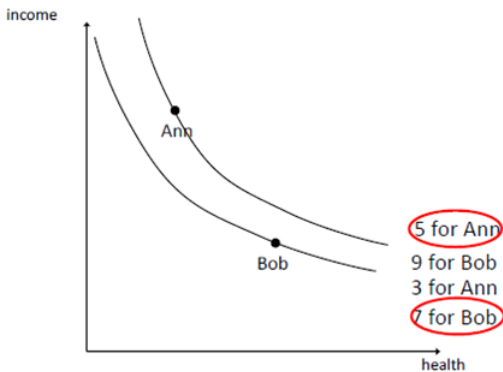


Re-ranking between measures - ctd.



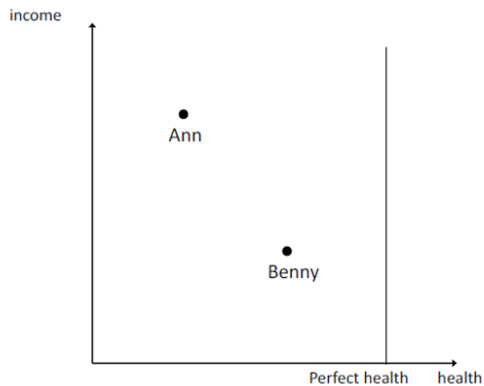
- Does the choice matter empirically? Yes!
- If conclusion that income is a too narrow measure → crucial issue = how to measure, aggregate and weight different dimensions of life
- This entails important value judgments
- It further depends on data availability and quality

Subjective well-being vs *interpersonal* comparison

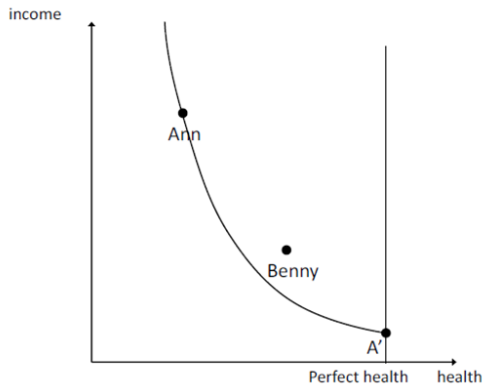


▶ back

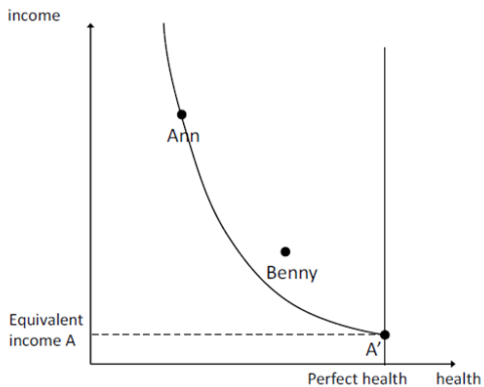
Equivalent income



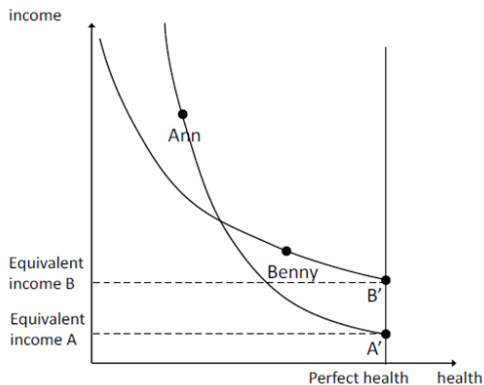
Equivalent income - ctd.



Equivalent income - ctd.



Equivalent income - ctd.



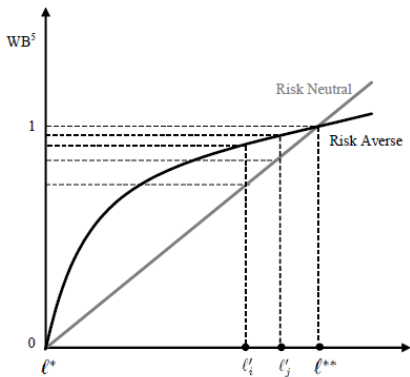
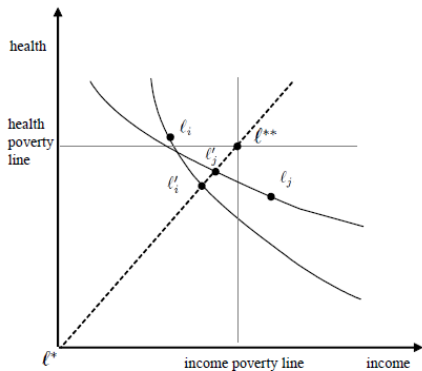
▶ back

vNM utility:

$$WB^5(\ell_i, \mathcal{R}_i, V_i, S_i) = \frac{V_i(\ell_i) - V_i(\ell^*)}{V_i(\ell^{**}) - V_i(\ell^*)}$$

- with two calibration vectors ℓ^* and ℓ^{**} to be selected

vNM utility - ctd.



▶ back

