Multidimensional Well-being in Switzerland: Towards New Synthetic Measures for Social Reporting

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Presented and discussed by Yadira Díaz

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Motivation:

- Well-being is a multidimensional concept and as such cannot be reduced to a single indicator of economic performance
- There is a tradition in Switzerland to examine through the Swiss Social Report (SSR), every four years the quality of life and well-being in Switzerland.
- The SSR tracks 75 indicators across five conceptual dimensions to describe well-being and quality of life in Switzerland:
  1. Production and distribution of social goods
  2. Cultural diversity
  3. Social integration and social cohesion
  4. Political participation and integration
  5. Environment and ecological sustainability

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This paper:

- Aims to develop and compare various measures of multidimensional well-being using two different synthesizing methodologies: The Alkire and Foster (2011) method and the Fattore (2015) Partial Order Set Theory (POSET) proposed approach to multidimensional deprivation measurement.
- Looks to empirically illustrate advantages and disadvantages of these two methodologies to monitor social changes.
- Focuses on one out of the five dimensions that the Swiss Social Report traditionally follows:
  - Production and distribution of social goods.

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The AF method

- Defines individual deprivation in each indicator using a dichotomous variable of presence or absence of deprivation
- Aggregates deprivations across dimensions using the C count of jointly multiple deprivations that each individual suffers at the same time.
- Defines as multidimensionally deprived those individuals that exhibit a C-deprivation count greater or equal than a k-threshold of multidimensional poverty.
- The headcount ration of multidimensional poverty is here the proportion of people identified as multidimensionally deprived (i.e, the people satisfying $C \geq k$).

The Fattore (2015) POSET method

- Evaluation is addressed in terms of multidimensional comparisons producing profiles, rather than through attribute score aggregations.
- It does not scale ordinal attributes into numerical variables.
- It does not aggregate variables but uses a set of algebraic and combinatoric tools designed to describe and properly treat order relations and ordinal data.
- Synthesis is achieved with no attribute aggregation
- It does not dichotomize each of the categorical indicators used in the index. As such, we do not loose information in the degree of deprivation.

The Fattore (2015) POSET method

Example of an achievement Poset:
Self assessed health status = {Poor (1), Fair (2), Good (3)},
Employment status = {Unemployed (1), Employed (2)}

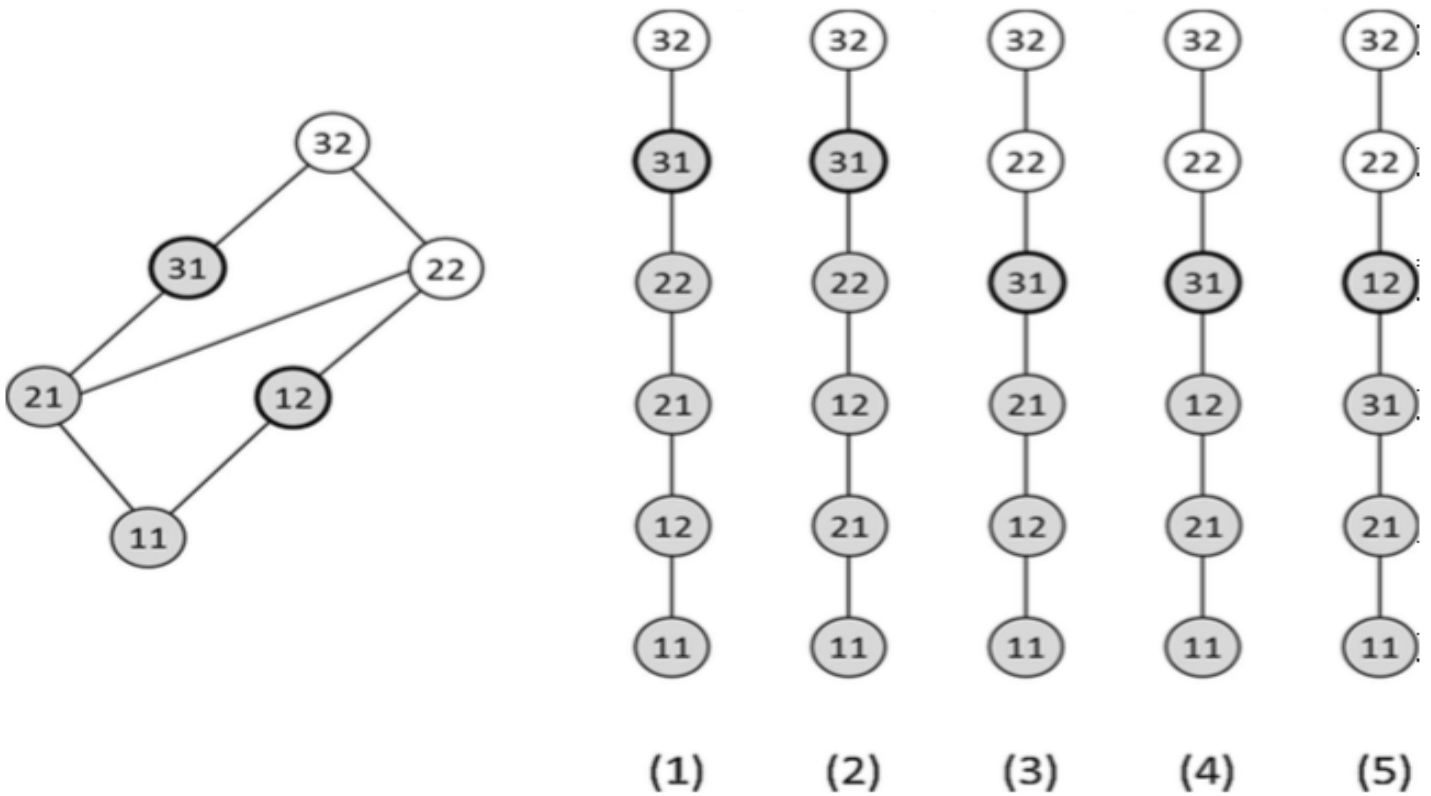

Fig. 3 Hasse diagrams of $\Pi = (1-2-3) \times (1-2)$ and of its 5 linear extensions. In *gray*, completely deprived profiles; *bold circles* represent threshold profiles

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Data

The Swiss Household Panel - SHP

It runs yearly since 1999

It is made of three samples

Year	Households sampled	Household members
SHPI - 1999	5,074	12,931 household members, from which 7,799 were interviewed
SHPII - 2004	2,538	6,569
SHPIII - 2013	4,093	9,945

Data

The sample in use

It is made of 3,823 individuals from SPHI and SPHII, aged between 18 and 65 years in the year 2013 and that have full response for the items required in the analysis.

Dimensions and Indicators

Dimension	Indicators
1. Conciliation professional/private life	1. Interference work/private activities 2. Exhausted after work 3. Difficult to disconnect from work
2. Financial situation of Household (HH)	4. Satisfaction with financial situation 5. Assessment of income and expenses 6. Arrears of payments 7. Financial situation manageable 8. Material deprivation 9. Household income

Dimensions and Indicators

Dimension	Indicators
3. Employment situation	10. Job security 11. Risk of unemployment 12. Satisfaction with work conditions
4. Educational and occupational position	13. Education 14. Swiss socio-professional category of main job (CSP).

Methodological issues

The AF method:

Dichotomizing variables

Table 1: First cutoff (for AF and POSET methodologies)

Dimensions	Variables	Deprived modalities
Dim 1	*Interference work/private activities*	6-10
	Exhausted after work	6-10
	Difficult to disconnect from work	6-10
Dim 2	*Job security*	a bit insecure or very insecure
	Risk of unemployment	5-10
	Satisfaction with work conditions	0-5
Dim 3	*Satisfaction with financial situation*	0-5
	Assessment of income and expenses	HH eats into its assets and savings, or HH gets into debts
	Arrears of payments	Yes
	Financial situation manageable	0-5
	Material Deprivation	2 and more privation
	Household income	Relative monetary poverty
Dim 4	*Educational level*	incomplete compulsory school, compulsory school, elementary vocational training, domestic science course, 1-year school of commerce, and general training school
	Occupational status	unqualified non-manual and manual workers

Use variables as interchangeable within dimensions: Test six different model specifications that vary in terms of the variables and the second cut-off point.

Methodological issues

The Poset method:

Table 2: Variables recoding for POSET models (second cutoff 2/4)

Dimensions	Variables	Regrouping modalities
Model 1		
Dim 1	*Interference work/private activities*	1) 6-10, 2) 5, and 3) 0-4
Dim 2	*Job security*	1) very insecure, 2) a bit insecure, 3) quite secure, and 4) very secure
Dim 3	*Assessment of income and expenses*	1) HH eats into its assets and savings, HH gets into debts, 2) HH spends what it earns, and 3) HH saves money
Dim 4	*Educational level*	1) incomplete compulsory school, compulsory school, elementary vocational training, domestic science course, 1 year school of commerce, and general training school, 2) apprenticeship (CFC, EFZ), full-time vocational school, bachelor-maturity, vocational high school with master certificate, federal certificate, technical or vocational school, and vocational high school ETS, HTL etc., 3) university, academic high school, HEP, PH, HES, FH
Model 2		
Dim 1	*Difficult to disconnect from work*	1) 6-10, 2) 5, and 3) 0-4
Dim 2	*Risk of unemployment*	1) 6-10, 2) 5, 3) 1-4, and 4) 0
Dim 3	*Satisfaction with financial situation*	1) 0-5, 2) 6-7, and 3) 8-10
Dim 4	*Occupational level*	1) unqualified non-manual and manual workers, 2) qualified non-manual professions and manual professions, and, 3) top management, liberal professions, other self-employed, academic professions and senior management, intermediate professions.
Model 3		
Dim 1	*Difficult to disconnect from work*	1) 6-10, 2) 5, and 3) 0-4
Dim 2	*Risk of unemployment*	1) 6-10, 2) 5, 3) 1-4, and 4) 0
Dim 3	*Household income*	1) Relative monetary poverty, 2) At risk of relative monetary poverty, and 3) middle income class and upper income class
Dim 4	*Occupational level*	1) unqualified non-manual and manual workers, 2) qualified non-manual professions and manual professions, and, 3) top management, liberal professions, other self-employed, academic professions and senior management, intermediate professions.
Model 4		
Dim 3	*Household income*	1) Relative monetary poverty, 2) At risk of relative monetary poverty, and 3) middle income class and upper income class
	Deprivation	1) 2-9, 2) 1, and 3) 0

Results

Descriptives:

Table 3: Descriptive statistics of the original data

Variables	**Median [25%;75%] or %**	**Deprived* (%)**
Interference work/private activities	4 [2; 6]	29.3
Exhausted after work	5 [3; 6]	35.4
Difficult to disconnect from work	3 [1; 5]	20.5
Job security	Quite secure [very secure; quite secure]	9.1
Risk of unemployment	1 [0; 3]	17.1
Satisfaction with work conditions	8 [7; 9]	9.0
Satisfaction with financial situation	8 [7; 9]	14.4
Assessment of income and expenses	Save money [save money; spends what it earns]	5.8
Arrears of payments (yes)	9.2%	9.2
Financial situation manageable	8 [7; 9]	16.5
Material deprivation	0 [0; 0]	6.8
Household income	3 [3; 3]	5.41
Educational level	Bachelor/maturity [apprenticeship (CFC, EFZ); vocational high school ETS, HTL]	11.0
Occupational status	intermediate professions [academic professions and senior management; qualified non-manual professions]	7.9

**Unidimensionally deprived based on the first threshold of AF and POSET approaches.*
Source: Swiss Household Panel 2013.

Results

Descriptives:

Table 4: Four dimension of well-being: CFA Results

	Well-being			
Items	**Dim 1: Conciliation professional / private life**	**Dim 2: Employment Situation**	**Dim 3: Financial situation of household**	**Dim 4: Educational and occupational position**
Interference on work cond. on private activities	0.704	--	--	--
Exhaustion after work	0.760	--	--	--
Difficulty to disconnect after work	0.634	--	--	--
Employment stability	--	0.660	--	--
Risk of unemployment	--	0.700	--	--
Satisfaction with work conditions (cond.)	--	-0.577	--	--
Satisfaction with HH financial situation	--	--	0.843	--
HH saving economic situation	--	--	-0.722	--
Financial situation manageable	--	--	0.901	--
Payment delay	--	--	0.695	--
Household income	--	--	0.464	--
Material deprivation	--	--	-0.726	--
Education level	--	--	--	0.933
Occupational status	--	--	--	-0.708
N	3823			
RMSEA	0.078			
CFI	0.951			
TLI	0.937			

RMSEA: Root Mean Square Error of Approximation, CFI: Comparative Fit Index; TLI: The Tucker Lewis index
Good Goodness of fit (GoF): RMSEA < 0.05, CFI > 0.97; TLII > 0.97; And acceptable GoF: RMSEA < 0.08, CFI > 0.95, TLI > 0.95.

Results

The AF method:

Table 5: Distribution of deprivation by models (AF)

	Deprivation degree (%)					
Levels of deprivation	Model 1	Model 2	Model 3	Model 4	Model5	Model6
Deprived	8.7	12.8	9.4	10.6	3.3	10.4

Model 1: Interference work/private activities, Job security, Assessment of income and expenses, and Educational level; Model 2: Difficult to disconnect from work, Risk of unemployment, Satisfaction with financial situation, and Occupational level; Model 3: Difficult to disconnect from work, Risk of unemployment, Household income, Occupational level; Model 4: Household income, Material deprivation; Model 5:14 variables with second cutoff defined at 7/14; Model 6: 14 variables with second cutoff defined at 5/14.

Results

The AF method:

Table 6: Contribution to deprivation by dimension

	Model 1	Model 2	Model 3	Model 4	Model5	Model6
Dim 1	80.66%	61.51%	71.31%	0%	88.19%	83.63%
Dim 2	49.55%	69.25%	78.83%	0%	77.17%	71.28%
Dim 3	35.05%	57.43%	28.41%	100%	100%	85.64%
Dim 4	45.92%	28.51%	30.92%	0%	47.24%	31.49%

Results

Poset:

Table 7: Distribution of deprivation degree (POSET)

	Deprivation degree (%)			
Levels of deprivation	Model 1	Model 2	Model 3	Model 4
0	18.47	20.80	40.78	70.57
]0 ;0.25[	30.84	42.06	28.83	16.17
[0.25 ;0.5[	22.60	14.52	13.71	0
[0.5;0.75[	0	0	0	2.64
[0.75;1[	19.30	9.34	7.01	0
1	8.79	13.29	9.68	10.62

Model 1: Interference work/private activities, Job security, Assessment of income and expenses, and Educational level; Model 2: Difficult to disconnect from work, Risk of unemployment, Satisfaction with financial situation, and Occupational level; ; Model 3: Difficult to disconnect from work, Risk of unemployment, Household income, Occupational level;
Model 4: Household income, Material deprivation;
Source: Swiss Household Panel 2013.

Results

Poset:

Table 8: Contribution to deprivation by dimension

	Model 1	Model 2	Model 3	Model 4
Dim 1	79.46%	61.61%	69.19%	0%
Dim 2	50.30%	67.72%	78.38%	0%
Dim 3	34.52%	55.51%	28.38%	100%
Dim 4	45.24%	27.95%	30.27%	0%

Results

Comparing AF and Poset:

- AF and POSET identify equivalently the maximum and minimum categories of the possible linear extensions
- The AF methodology results in an "exclusion error" of some intermediate categories that with the Poset approach get identified as multidimensionally deprived.
- The Poset approach therefore allows to better analyse the in-between groups.
- Both approaches register the same orientation

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Conclusions

- The main issue with AF is the loss of information through the system of deprivation thresholds (Fattore, 2015); loss of information that the posetic approach enables us to avoid.
- The AF methodology is easy to communicate for policy purposes, however, is not sensitive enough to the in-between population and reduces the complex information on them and ambivalent configurations to a (simplistic) either-or situation.
- The POSET approach provides the same information as the AF methodology since it is based on the same dual cutoff, but it can also identify the in-between positions.

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Questions

- The POSET methodology is based on profiles, how do you obtain the aggregated level of deprivation as a variable that varies between zero and one?
- How do you handle the weights in both methodologies?

Comments

- Building a multidimensional index is a high dimensional problem:
  1. Selection of dimensions and variables
  2. Definition of deprivation thresholds
  3. Aggregation structure / methodology
  4. Selection of multidimensional threshold
- I suggest go step by step through solid selections and avoid various different model specifications, unless you are testing one single and particular definition.
- Not necessarily all the indicators per dimension are perfect substitutes. Conceiving the different models using different combination of variables can be seen as inconvenient.
- The comparison AF vs Poset is a very interesting comparison that is worth analysing in depth. For instance, studding which profiles get identified as not multidimensionally deprived using the AF method. Who gets identified as deprived by each method?

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