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Methodologies to integrate subjective and objective information to build well-being indicators

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First of all

I would like to thank

- Stefano Tarantola for his invitation and for having encouraged me to present this work on which we are working together.
- the Joint Research Centre group for its co-operation not only in preparing this work: the idea to work on this topic was born in Ispra during an informal seminar among us one year ago.

Contents

- **Societal well-being: conceptual framework**
  - **Objective and subjective components**
  - **Relationships between the two components**
- **Methodological issues in developing indicators**
  - **Hierarchical design**
- **Applied approach to integration**
  - **Multi-stage multi-technique approach**
- **Particular aggregation issues**
  - **Construction of complex indicators**
  - **Definition of macro-units**
  - **Analytical approaches to integration**
  - **Problems in selecting indicators**
- **An Example in four stage**
- **Final remarks**

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Conceptual framework

- **Three philosophical approaches**
  - The ability to select goods and services that one desires

    → economic indices
  - Normative ideals

    → social indicators
  - Subjective experiences

    → subjective indicators

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Conceptual framework

- Conceptual framework
  - Observation approaches
    - Measures
      - Operative models
        - Methodological approaches for managing the complexity

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Conceptual framework

Societal well-being should be assessed through a multidimensional and integrated approch

Quality of Life approach (QoL)

Conceptual framework

- **Objective vs subjective components of Quality of Life (QoL)**

  Various definitions of QoL share a clear definition between

  - Objective components
  - Subjective components

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Conceptual framework

- **Objective components at micro level**
- **Objective components at macro level**
- **Subjective components**

Objective = descriptive

Subjective = evaluative

Conceptual framework

More objective — **More subjective**

- **Social structure**
- **Living conditions**
- **Evaluations of living conditions**
- **Subjective QoL, in terms of well-being**

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Conceptual framework

- It is **impossible** and undesirable **to consider one perspective separated from the others**
- **Integration** represents the **MOST valid** and complete **approach** in order to study QoL
- Interrelating and combining individual living conditions and subjective well-being by considering also values, aspirations and expectations = mixed model

Conceptual framework

- **Relationships between the two components**

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Conceptual framework

- **Two perspectives:**

1. objective QoL at macro level can be considered an antecedent with respect to subjective QoL (subjective well-being).
   - **In this case, objective indicators (input) can be interpreted in terms of contextual conditions that can explain the subjective indicators (output)**
2. objective QoL conditions at macro-level and subjective QoL (perceptions) are independent; perceptions are influenced by individual characteristics and not by the objective living conditions.
   - **In this case, subjective indicators (input) can be considered as an important component driving the improvement of objective conditions.**

Conceptual framework

- **Zapf's model:**

Level of → / ↓		Subjective well-being	
		high	low
Objective living conditions	high	*well-being*	*dissonance*
	low	*adaptation*	*deprivation*

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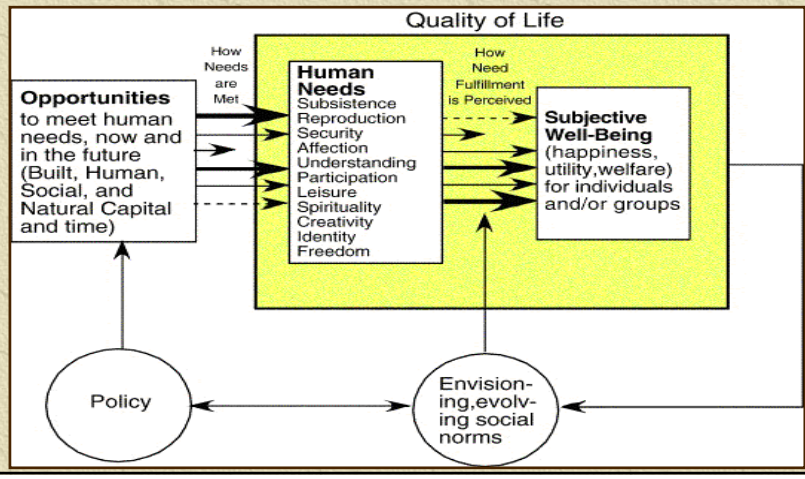
Conceptual framework

- **Costanza's model:**



Conceptual framework

- **Costanza's model → domains:**
  - **Social Capital (SC)**
    - networks and norms that facilitate cooperative action
  - **Human Capital (HC)**
    - the knowledge and information stored in our brains, as well as our labour
  - **Built Capital (BC)**
    - manufactured goods such as tools, equipment, buildings
  - **Natural Capital (NC)**
    - the renewable and non-renewable goods and services provided by ecosystems
  - **Time (T)**

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Conceptual framework

- **Social epidemiology approach:**

Epidemiology + behavioral sciences

in order to investigate

social determinants of

population distributions of

health, disease, and well-being

Methodological issues

- **Hierarchical design:**

COMPONENTS	***CONCEPTUAL MODEL***
	↓
	AREAS TO BE INVESTIGATED
	↓
	LATENT VARIABLES
	↓
	ELEMENTARY INDICATORS

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Methodological issues

- **Hierarchical design is completed by identifying the relations between:**
  - Latent variables
  - Latent variables and the corresponding indicators
  - Elementary indicators

Conceptual framework

- **A procedure aimed at integrating objective and subjective information relies on**

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Applied approach to integration

- **Definition of conceptual framework**
- **Organizational context (system of indicators)**
  - Levels:
    - micro
    - macro
- **Perspectives of analysis:**
  - Aggregation of
    - indicators (reflective or formative approach)
    - units
  - Integration of objective and subjective characteristics

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Applied approach to integration

Multi-stages multi-techniques approach

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Applied approach to integration

Conceptual framework

▼

Definition of objective and subjective components

▼

Conceptual perspective of integration (CPI)

▼

Integration process → 4 STAGES

Applied approach to integration

Stage I : Indicators aggregation

Perspective:

Creation of complex indicators by synthesizing elementary indicators

Level of analysis:

From elementary indicators to synthetic indicators

Analytical issues:

Reflective indicators → scaling models

Formative indicators → composite indicators construction

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Applied approach to integration

Stage II : Integration

Perspective:

Understanding relationships between objective and subjective characteristics

Level of analysis:

Micro level

Analytical issues:

Different solutions (consistently with CPI)

Applied approach to integration

Stage III : Units aggregation

Perspective:

Creation of macro-units by synthesizing elementary units

Level of analysis:

From micro units to macro units

Analytical issues:

Following homogeneity/functionality criteria

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Applied approach to integration

Stage IV : Integration

Perspective:

Understanding relationships between objective and subjective characteristics

Level of analysis:

Macro level

Analytical issues:

Different solutions (consistently with CPI)

Particular aggregation issues

- **Elementary indicators aggregation**
  (a) construction of complex indicators
- **Observational units aggregation**
  (b) definition of macro-units

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Particular aggregation issues

(a) Construction of complex indicators:

- **Reflective criterion** (Homogeneity)
  → Synthetic indicator
- **Formative criterion** (Heterogeneity)
  → Composite indicator
  → Comprehensive/Summary indicator

Condensation → New synthetic values

Particular aggregation issues

(b) Definition of macro units by condensation:

- **Information** → same level
- **Micro level** → aggregation → proper scale

This problem involves both objective and subjective indicators with different solutions.

		Level of observation	
		Micro	Macro
information	objective	(i) individual living conditions	(i) population information (ii) territory information
	subjective	subjective well-being	*not observable*

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Particular aggregation issues

Aggregation of objective information criteria

- **Compositional**
  - Information refers to population (observed at individual level
- **Contextual**
  - Information refers to area/territory (not observable at individual level)

Particular aggregation issues

Aggregation of subjective information

Particularly delicate (characteristics non-cumulative) → ad-hoc aggregating criteria

- Homogeneity
- Functionality

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Particular aggregation issues

Homogeneity:

- Segmentation analysis
- Partitioning analysis
- Tandem analysis
- Factorial k-means analysis

Particular aggregation issues

Functionality:

- Groups
- Areas
- Time periods

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Particular aggregation issues

Analytical approaches to integration

- Structural model approach
- Multi-level approach
- Life-course perspective
- Composite indicators

Particular aggregation issues

Problems in selecting indicators

1. Settlement/aggregation area sizes
2. Time frames
3. Population composition
4. Domains of life composition
5. Objective vs subjective indicators
6. Positive vs negative indicators
7. Input vs output indicators
8. Benefits and costs
9. Measurement scales
10. Report writers
11. Report readers
12. Quality-of-life model
13. Distributions
14. Distance impacts
15. Causal relations

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An example

- **Goal :** to illustrate the *multi-technique multi-stage* characterization of the proposed approach
- **By using:** subjective and objective data
- **Provided by:**
  - European Social Survey project
  - Joint Research Centre (JRC – European Commission)

An example

- **First stage:**
  - synthesis of basic indicators at individual level
- **Second stage:**
  - understanding relationships between objective and subjective characteristics at micro level
- **Third stage:**
  - synthesis of micro units
- **Fourth stage:**
  - understanding relationships between objective and subjective characteristics at macro level

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An example : first stage

European Social Survey – wave 1 (2002)					
Area	**Variable**	**Items**	**Item Nr**	**Scaling technique**	**Model of measurement**
Politics	Trust in	country's parliament	B7	0 (no trust at all) 10 (complete trust)	reflective
		the legal system	B8		
		the police	B9		
		politicians	B10		
		the European Parliament	B11		
		the United Nations	B12		
	Self-placement	placement on left-right scale	B28	0 (left) 10 (right)	
	How satisfied with	present state of economy in country	B30	0 (extremely dissatisfied) 10 (extremely satisfied)	reflective
		the national government	B31		
		the way democracy works in country	B32		
		state of education in country nowadays	B33		
		state of health services in country nowadays	B34		

An example : first stage

European Social Survey – wave 1 (2002)					
Area	**Variable**	**Items**	**Item Nr**	**Scaling technique**	**Model of measurement**
Subjective aspects	Happiness	how happy are you	C1	0 (extremely unhappy) 10 (extremely happy)	
	Life satisfaction	how satisfied with life as a whole	B29	0 (extremely dissatisfied) 10 (extremely satisfied)	
	Values: important in life	family	E13	0 (extremely unimportant) 10 (extremely important)	formative
		friends	E14		
		leisure time	E15		
		politics	E16		
		work	E17		
		religion	E18		
		voluntary organizations	E19		

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An example : first stage

European Social Survey – wave 1 (2002)					
Area	**Variable**	**Items**	**Item Nr**	**Scaling technique**	**Model of measurement**
Immigration and asylum issues	Acceptance of immigration: allow	many/few immigrants of same race/ethnic group as majority	D4	1. allow many 2. allow some 3. allow a few 4. allow none to come and live here	reflective
		many/few immigrants of different race/ethnic group from majority	D5		
		many/few immigrants from richer countries in Europe	D6		
		many/few immigrants from poorer countries in Europe	D7		
		many/few immigrants from richer countries outside Europe	D8		
		many/few immigrants from poorer countries outside Europe	D9		
Socio-demographic profile	Income	feeling about household's income nowadays	F31	1. living comfortably 2. coping 3. difficult 4. very difficult on present income	

An example : first stage

Synthetic indicators		Item loading	Obtained component	Variance explained (%)	Aggregated score
National politics	TRUST_NP	0.8	Public & political life	18	COMPOSITE1
Active life dimension	IMP_AL	0.6			
Satisfaction for national foundations	SAT_NF	0.8			
National security	TRUST_NS	0.8	Welfare dimension	15	COMPOSITE2
Private life dimension	IMP_PL	0.4			
Satisfaction for national social services	SAT_NSS	0.7			
Caring dimension	IMP_C	0.4	Personal life principles	12	COMPOSITE3
International institutions	TRUST_II	0.6			
Private life dimension	IMP_PL	0.4			
Work dimension	IMP_W	0.6			

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An example : second stage

	INDICATOR		min.	mean	max.	SD
CLUSTER 1 (n=7369)	B29	Life satisfaction	-3.10	-0.58	1.31	0.97
	C1	Happiness	-3.74	-0.37	1.34	0.93
	F31	Feeling about household's income nowadays	-1.14	1.10	2.46	0.85
	B28	Self-placement on left-right scale	-2.30	-0.34	2.24	0.98
	IMMIGR	Non-acceptance of immigration	-1.96	-0.47	2.17	0.79
	COMPOSITE1	Public & political life	-3.19	-0.29	3.13	0.95
	COMPOSITE2	Welfare dimension	-3.88	-0.22	3.83	0.98
	COMPOSITE3	Personal life principles	-4.86	0.27	3.44	0.97

An example : second stage

INDICATOR			min.	mean	max.	SD
CLUSTER 2 (n=14855)	B29	Life satisfaction	-3.10	0.54	1.31	0.54
	C1	Happiness	-3.74	0.48	1.34	0.59
	F31	Feeling about household's income nowadays	-1.14	-0.61	2.46	0.63
	B28	Self-placement on left-right scale	-2.30	0.26	2.24	0.92
	IMMIGR	Non-acceptance of immigration	-1.96	-0.64	2.17	0.76
	COMPOSITE1	Public & political life	-2.50	0.60	4.08	0.76
	COMPOSITE2	Welfare dimension	-4.32	0.12	2.90	0.86
	COMPOSITE3	Personal life principles	-5.03	0.10	3.15	0.91

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An example : second stage

INDICATOR			min.	mean	max.	SD
CLUSTER 3 (n=9703)	B29	Life satisfaction	-3.10	0.53	1.31	0.60
	C1	Happiness	-3.23	0.54	1.34	0.58
	F31	Feeling about household's income nowadays	-1.14	-0.40	2.46	0.68
	B28	Self-placement on left-right scale	-2.30	-0.46	2.24	0.90
	IMMIGR	Non-acceptance of immigration	-1.96	0.48	2.17	0.78
	COMPOSITE1	Public & political life	-3.85	-0.49	2.36	0.90
	COMPOSITE2	Welfare dimension	-3.83	0.48	3.85	0.94
	COMPOSITE3	Personal life principles	-5.71	-0.24	3.07	0.97

An example : second stage

INDICATOR			min.	mean	max.	SD
CLUSTER 4 (n=10418)	B29	Life satisfaction	-3.10	-0.86	1.31	1.00
	C1	Happiness	-3.74	-0.93	1.34	1.04
	F31	Feeling about household's income nowadays	-1.14	0.47	2.46	0.89
	B28	Self-placement on left-right scale	-2.30	0.30	2.24	0.99
	IMMIGR	Non-acceptance of immigration	-1.96	0.81	2.17	0.79
	COMPOSITE1	Public & political life	-3.47	-0.26	3.61	0.99
	COMPOSITE2	Welfare dimension	-4.34	-0.54	3.29	0.99
	COMPOSITE3	Personal life principles	-5.59	-0.11	3.22	1.11

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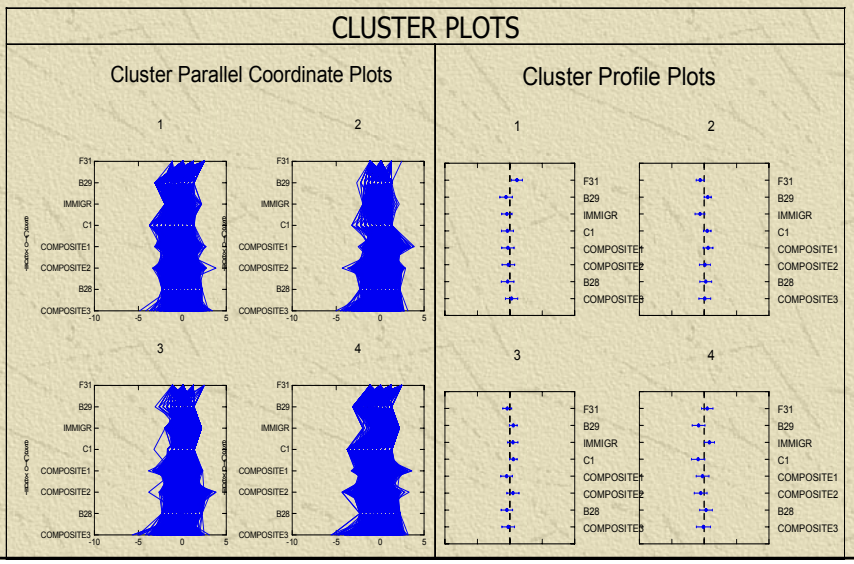
An example : second stage



An example : second stage

		CLUSTER 1	CLUSTER 2	CLUSTER 3	CLUSTER 4
B29	life satisfaction	Medium-low	Medium-high	Medium-high	Low
C1	happiness	Medium-low	Medium-high	High	Low
F31	Feeling about household's income nowadays	Many difficulties	Very comfortable	Comfortable	Some difficulties
B28	self-placement on left-right scale	Centre-left	Centre-right	Left	Right
IMMIGR	Non-acceptance of immigration	Medium-low	Low	Medium-high	High
COMPOSITE1	Public & political life	Medium-low	High	Low	Medium-low
COMPOSITE2	Welfare dimension	Medium-low	Medium-high	High	Low
COMPOSITE3	Personal life principles	High	Medium-high	Low	Medium-low

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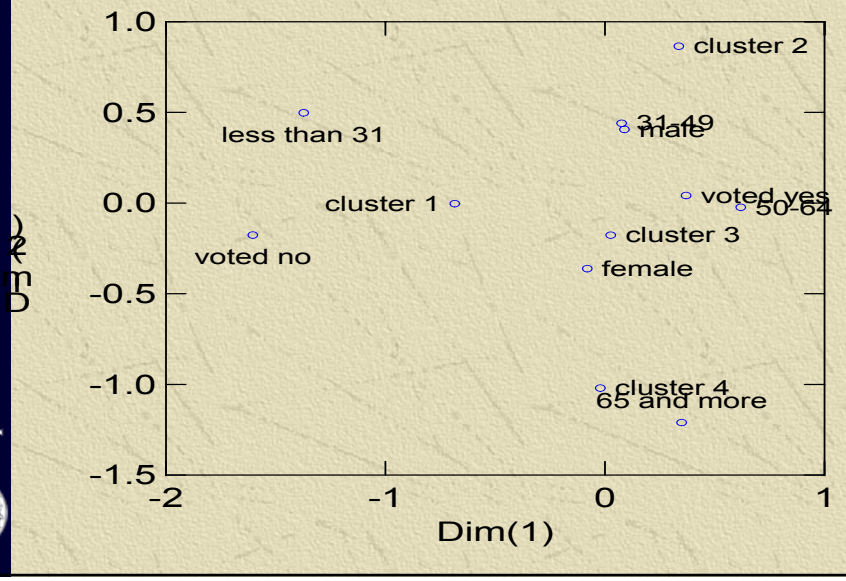
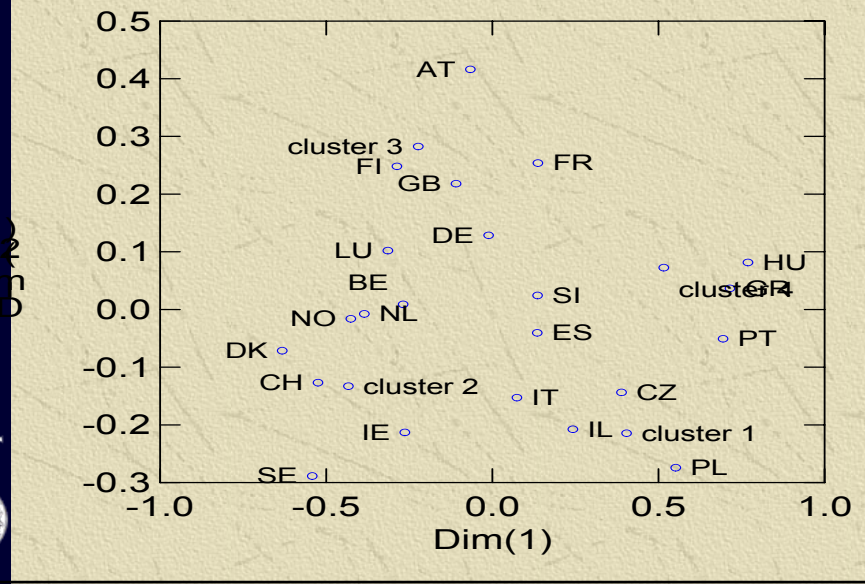
An example : second stage



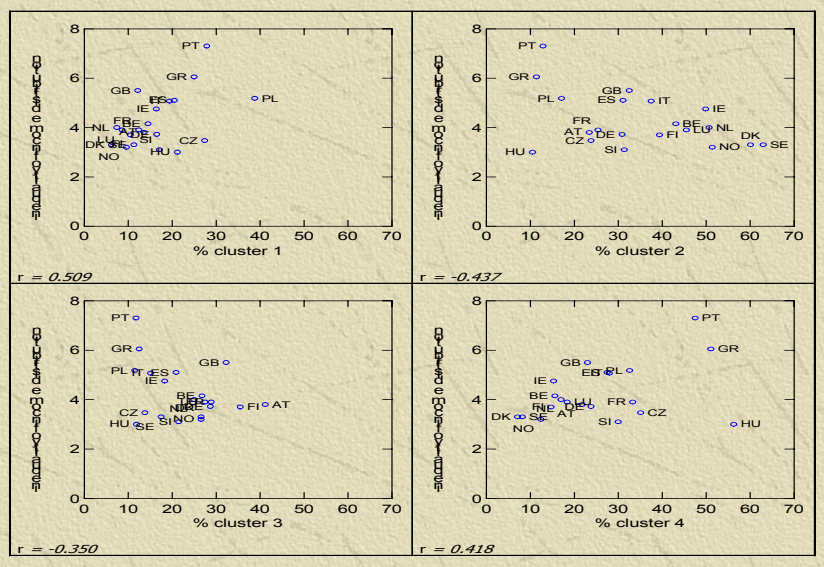
An example : third stage

		Cluster 1	Cluster 2	Cluster 3	Cluster 4	Total	N
AT	Austria	13.6	23.4	41.2	21.8	100.0	2257
BE	Belgium	14.5	43.1	26.8	15.6	100.0	1897
CH	Switzerland	10.9	57.5	22.9	8.8	100.0	2040
CZ	Czech Rep.	27.4	23.8	13.8	35.1	100.0	1360
DE	Germany	16.5	30.9	28.7	23.8	100.0	2919
DK	Denmark	6.2	60.1	26.6	7.1	100.0	1500
ES	Spain	20.5	31.1	20.9	27.5	100.0	1728
FI	Finland	10.5	39.4	35.5	14.7	100.0	2000
FR	France	12.4	25.4	28.9	33.3	100.0	1503
GB	United Kingdom	12.2	32.5	32.3	23.0	100.0	2051
GR	Greece	25.0	11.4	12.5	51.1	100.0	2566
HU	Hungary	21.2	10.5	11.9	56.3	100.0	1685
IE	Ireland	16.4	49.9	18.3	15.3	100.0	2046
IL	Israel	32.6	26.1	19.0	22.3	100.0	2497
IT	Italy	19.4	37.5	15.1	28.0	100.0	1206
LU	Luxembourg	8.6	45.5	27.5	18.4	100.0	1552
NL	Netherlands	7.4	50.7	25.0	17.0	100.0	2364
NO	Norway	9.6	51.4	26.6	12.4	100.0	2036
PL	Poland	38.8	17.1	11.5	32.6	100.0	2109
PT	Portugal	27.9	12.9	11.8	47.5	100.0	1511
SE	Sweden	11.3	63.0	17.5	8.2	100.0	1999
SI	Slovenia	17.1	31.4	21.5	30.0	100.0	1519
	Total	17.4	35.1	22.9	24.6	100.0	
	N	7369	14855	9703	10418		42345

An example : third stage



An example : fourth stage



Final remarks

- **Goal :**
  - to illustrate the composite approach through which integration between objective and subjective information **is made possible**

Final remarks

- **The soundness of the approach and its results :**
  - the defined and adopted conceptual framework assuming the correct perspective **to be identified according to different objectives**
    i. the aggregation of indicators and units
    ii. the integration of objective and subjective information
    iii. the levels at which the previous objectives have to be pursued

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Final remarks

- **Restricted Goal :**
  - to illustrate and exemplify the multi-technique multi-stage characterization of the proposed approach.
- **Thanks to:**
  - Econometrics and Applied Statistics Unit (EAS) at the Joint Research Centre of the European Commission
- **Future…**

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Final remarks

- The paper represents **only the first step** of our study.
- **Our intention** (together with EAS – JRC) **is that to continue** exploring these datasets in order to provide further results, especially in longitudinal perspective.

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That's all folks!

Thank you for your attention

Presentation designer: Marco Trapani