The evolution of composite indices of well-being: an application to the Italian Well-being

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Index

1. The BES project

2. From elementary indicators to composite indices

3. International examples

4. Composite indices in 'Rapporto BES'. State of the art and future developments

B=Benessere - Well-being
E= Equo - Equitable
S= Sostenibile - Sustainable

The project started in 2010 (first publication in 2013)

Aim: to produce a set of indicators to provide a shared view of the progress of Italian society

12 DOMAINS

To define the most relevant domains of well-being.

130 INDICATORS

To select a set of high-quality statistical indicators that are representative of the different domains.

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The individual sphere

1 HEALTH

2 EDUCATION AND TRAINING

3 WORK AND LIFE BALANCE

4 ECONOMIC WELL-BEING

5 SOCIAL RELATIONSHIPS

6 POLITICS AND INSTITUTIONS

7 SAFETY

8 SUBJECTIVE WELL-BEING

The context

9 LANDSCAPE AND CULTURAL HERITAGE

10 ENVIRONMENT

11 RESEARCH AND INNOVATION

12 QUALITY OF SERVICES

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Developments in the BES Project

The growing attention to the beyond-GDP measures has led to progressively include **well-being indicators in the policy agenda.**

Italy: the Ministry of Treasury has started to **use well-being indicators in the evaluation of fiscal policies**

EU: has funded a **MAKSWELL project (MAKing Sustainable development and WELL-being frameworks work for policy)** that aims to improve data and methodologies to relate policy analysis and well-being.

EU: has funded a **GROWINPRO project (GROwth Welfare INnovation PROductivity)** that aims at providing a novel, integrated set of policies to push Europe towards a balanced, innovation-fuelled and inclusive trajectory of development.

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From elementary indicators to composite indices

An **elementary indicator** is a quantitative or qualitative measure of a phenomenon that can
-    reveal the relative position of a country (or a region) in a given geographical area;
-    point out the direction of changes across units and through time.
Elementary indicators are useful in identifying trends, drawing attention to particular issues, monitoring performance

A **composite index** is formed when elementary indicators are aggregated.
A **composite index** should measure multidimensional concepts and can assess progress over time.
Composite index is useful tool in policy analysis and especially in public communication (for the general public it is easier to interpret composite index than to identify common trends across many separate indicators).

Warning: composite indices may send misleading policy messages if poorly constructed or misinterpreted.

Developments in the BES Project

Using a multidimensional framework requires also a metric that makes it easy to compute the **progress/decline in well-being over time**. **But the identification of a metric**, similar to the integrated system currently adopted to produce GDP measures, is a **hard task**.

Meanwhile, a number of composite indices have been introduced both by international organizations (UNDP, OECD) and by national Institutes of Statistics (Spain, Italy, Portugal).

The introduction of composite indices could require the definition of a framework to assess if they have improved between two different periods. This is the traditional approach for which GDP measure is useful, allowing comparisons both over time and countries.

Although **there is not a common standard to measure well-being across countries**, the various experiences share some common characteristics such as the definition of domains and of the individual indicators.

International examples

Name	Indicators	Domains	Composite Index	Method of standardization	Method of synthesis	Year	Developer
HDI	4	3	yes	Min-Max with goalpost	geometric mean	1990-2015	UNDP
Better life index	24	11	graphic representation	Min-Max	weighted arithmetic mean (with subjective weight)	2013-2017	Oecd
Quality of life	92	9	no			last year available	Eurostat
SDG Index	83 / 99	17	yes	Min-Max with goalpost	geometric mean / arithmetic mean	2017	Bertelsmann Stiftung and SDSN
Quality of life Spain	26	9	yes - only for each domains	normalization	arithmetic mean with penalty	2016	Instituto Nacional de Estadistica
BES	129	12	yes - only for each domains	Min-Max	arithmetic mean with penalty	2010-2017	Istat - Italian National Statistical Institute
WBI Portogallo	79	10	yes	fixed base index 2004=100	weighted arithmetic mean (with number of domains)	2004-2016	Statistics Portugal
CIW	64	8	yes	fixed base index 1994=100	arithmetic mean	1994-2014	Univ. Waterloo

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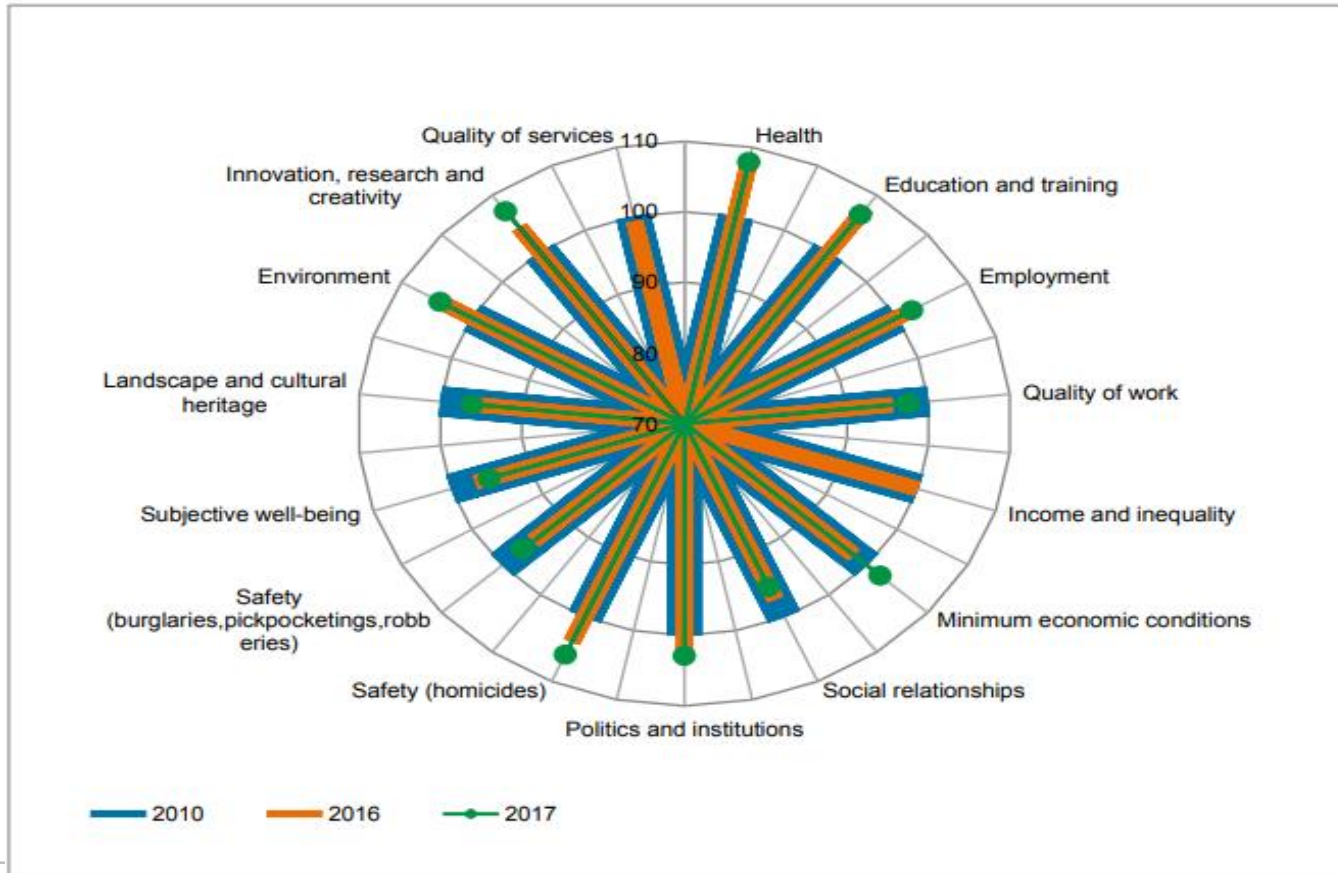
Composite indices in BES project

From 2015 the Italian National Institute of Statistics has decided to include the computation of composite indices (at national and regional level) in the BES project

These composite indices provide an easy tool to compare complex dimensions, also over time. **They facilitate the communication with the general public and promote accountability**.

15 composite indices for 12 domains of well-being: a **group of relevant indicators** for each domain has been chosen by experts, and then **normalized and aggregated with equal weights**.

Composite indices can be used to assess temporal changes in a given period and domain, but also to compare different periods and domains under review.

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Composite indices in BES project

Elementary indicators are normalized and aggregated using a **non-compensatory approach** suggested by Mazziotta and Pareto (AMPI index).

- Elementary indicators are **normalized between 70 and 130** considering their values for every year and every region.

  Minimum value of elementary indicators = 70
  Maximum value of elementary indicators = 130

- **A reference geographical domain and year (Italy, 2010)** is also used, and normalized to 100.

- After normalization, the indicators are **aggregated with arithmetic mean but the variability among indicators is penalized.**

- The penalty is a **function of indicators' variability (with respect to the average value of Italy at 2010 – the balanced situation)**

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This approach has some advantages… :

1)   Easy to compute and to reproduce, avoids arbitrary choices.

2)   Allows temporal and spatial comparisons.

3)   Reduce the variability of the elementary indicators, so that the most variable indicators do not weight more than the others in the aggregation.

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... but also some drawbacks:

1) The normalization procedure does not respect the intensity of the year-to-year growth rates of the elementary indicators (and so temporal comparisons are less informative).
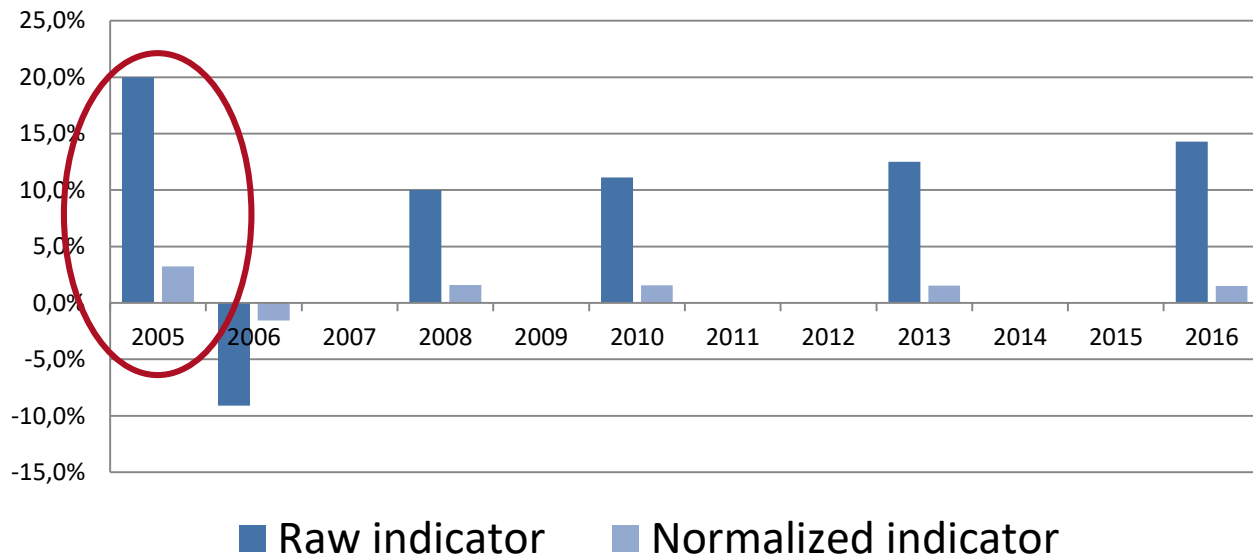

Indicator 'Reduction of homicides', raw and normalized. Italy. Years 2005-2016. Annual percentage changes.

■ Raw indicator   ■ Normalized indicator

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… but also some drawbacks:

2) Combining the normalization in a given range and non-compensatory approaches might give different results in terms of the direction of the trend of the composite index, depending on the chosen range.
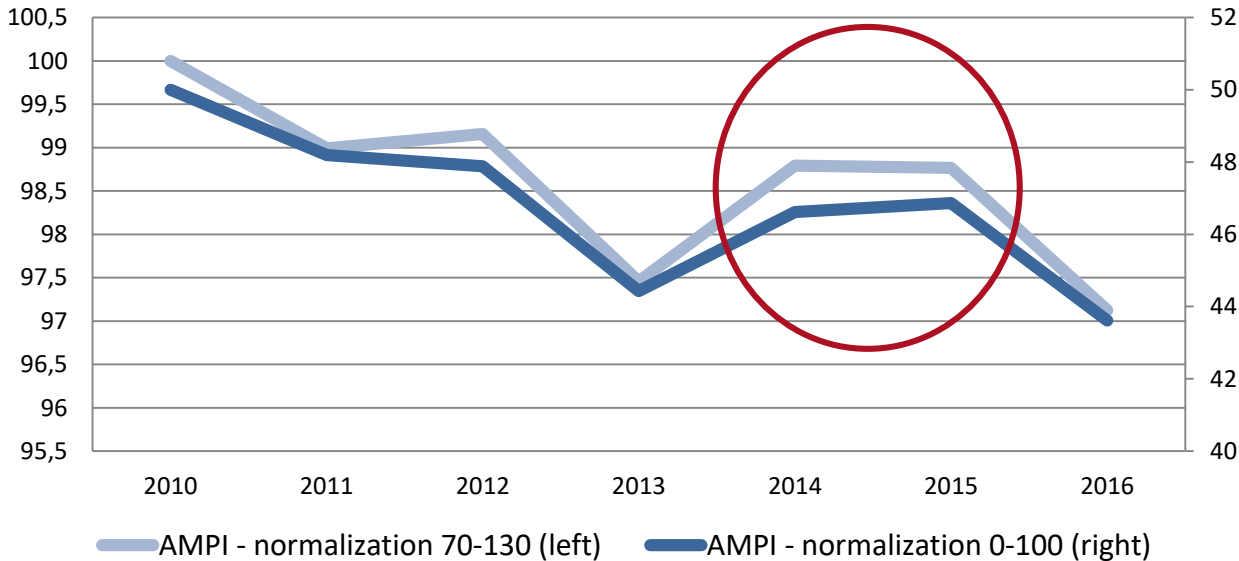

Index 'Social relationships'. Normalization between 70-130 or 0-100. AMPI aggregation. Italy. Years 2010- 2016.

AMPI - normalization 70-130 (left)   AMPI - normalization 0-100 (right)

… but also some drawbacks:

3) Using a reference year, in which all the elementary indicators are balanced by construction, makes the concept of penalization almost unjustified.
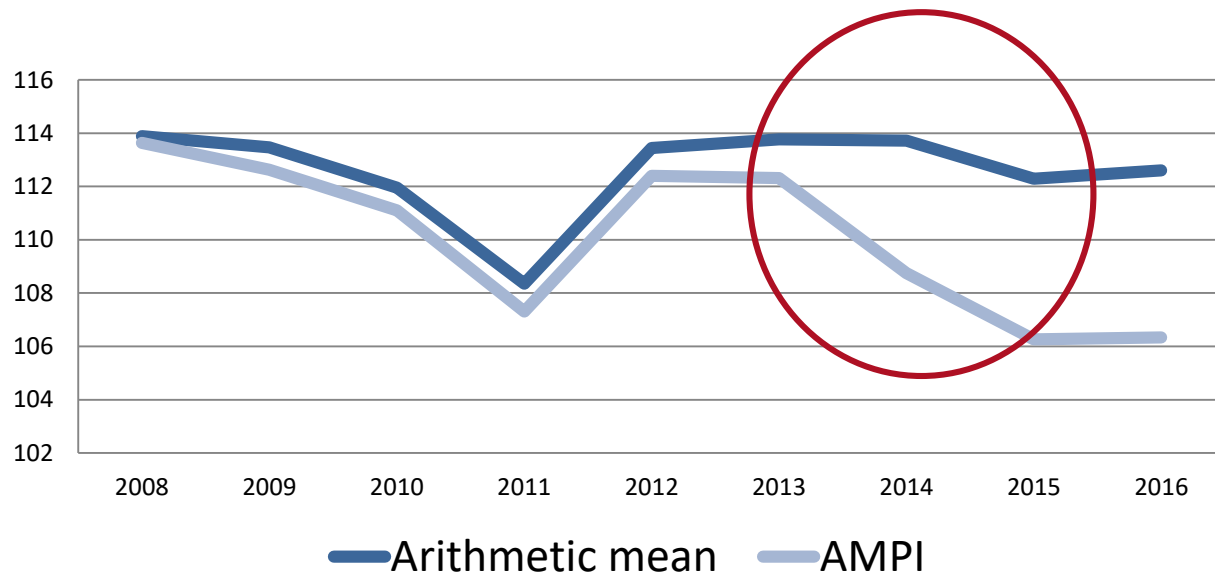
Raw indicators IST1 'participation in kindergartens' and IST7 'participation in lifelong learning'. Italy. Relative position of the indicators with respect to the minimum and the maximum of their values.

2010

	86,7	94,7	98,9
IST1			
IST7			
	3,9	6,2	13,4

2016

	86,7	92	98,9
IST1			
IST7			
	3,9	8,3	13,4
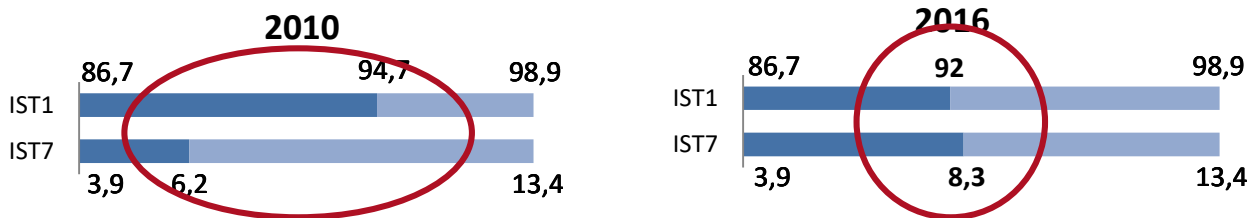
... but also some drawbacks:

4) The penalization could be too strong

Composite index 'Education and Training'. Normalization between 70-130. Aggregation by arithmetic mean and AMPI. Years 2008-2016. Lazio.

We **are studying alternative normalization and aggregation procedures**.

Using index numbers and the arithmetic mean (as for CWI, WBI) might be a solution.

Or using UNDP approach with Min-Max standardization and geometric mean

Or ……..

Thank you for your attention

1) Istat – Audizione parlamentare per l'esame della legge di bilancio 2018 – https://www.istat.it/it/archivio/205326
2) Istat – Rapporto BES 2017 – https://www.istat.it/it/archivio/207259
3) Istat – Rapporto sulla competitività dei settori produttivi 2018 – http://www.istat.it/it/archivio/210049
4) Mazziotta, M. and Pareto, A. (2016). On a generalized non-compensatory composite index for measuring socio-economic phenomena. Social Indicators research, 127(3):983-1003.
5) OECD – Better Life Index – http://www.oecdbetterlifeindex.org
6) OECD (2008) and JRC. Handbook on constructing composite indicators: methodology and user guide. http://www.oecd.org/els/soc/handbookonconstructingcompositeindicatorsmethodologyanduserguide.htm
7) Statistics Portugal – Well-being Index – https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_indbemestar
8) UNDP – Human Development Reports – http://hdr.undp.org/en
9) University of Waterloo (Ontario, Canada) – Canadian Index of Well-being – https://uwaterloo.ca/canadian-index-wellbeing/