# Mapping socioeconomic well-being across EU regions

**Abstract:**

In this paper a multidimensional approach is used to map well-being across European regions. By considering the set of socioeconomic indicators provided by Eurostat for the EU 266 NUTS-2 regions, three main analyses have been performed for the year 2009: (1) The "ideal point" technique has been used to identify: *(i)* the best EU performances; *(ii)* the number and type of indicators that need to be improved in every European regions. (2) A map of well-being has been elaborated to provide a picture summarizing the regional values in comparison to the European average. (3) Gini coefficient has been calculated to identify the indicators that outline the largest inequalities across EU. The method presented in this paper is suitable to be complemented with subjective ranking of values and preference, making the proposed methodology useful to investigate well-being in a national, regional or individual scale. By providing a multidimensional description of well-being across the 266 EU regions, the methodology presented identifies the existing differences on socioeconomic performance and when used systematically could be a good auxiliary tool for policy efficacy monitory and policy implementation planning. The results provided could in fact be useful to design policies oriented to reduce inequalities and to promote socio-economic and environmental convergences across European regions.

**Keywords:** Multidimensional approach; integrated description; EU regions; EU policies; Well-being

## 1. Introduction

Well-being is a concept difficult to define and eventually harder to quantify. One of the first definitions of well-being dates back to Aristotele (1095 bc) and it is related to the concept of *eudaimonia* that summarize well-being as "doing and leaving well". The basic idea is that we all have different perceptions and therefore opinions on what well-being should be. Subjectivity, individual values and different angles of view of reality, lead people to identify different factors to be considered as elements of well-being. Further to that, the dynamic process of human adaptation makes well-being a dynamic perception. If from one side a person view's can change over time and space, on the other side, once we obtain what did not have before (be it material o immaterial), we get used to it and the sense of well-being is transformed into a state of *ordinariness* (Jackson, 2007).

Starting from these ideas, many definitions have been proposed during the centuries and still today a common agreement on how well-being should be described is lacking. Just to provide some examples different branches of knowledge have different ideas of well-being. In medicine, the concept of well-being usually refers to the physical or physiological health; in philosophy, it relates to the notion of how well a person's life is carried on, or is going compared to individual's aspirations; in economy, it is generally summarized by income and wealth; in politics, it refers to the system of welfare and in sociology it usually describes the personal satisfaction among others.

In addition, the existence of different well-being definitions that mostly depend on the context to which they refer to, makes its quantification even harder than defining it. The *hedonic* and the *eudemonic* approaches are examples of that. The first one summarizes well-being as pleasure, enjoyment satisfaction and subjective happiness. It generally underlines the utilitarian approach to well-being in economics and the subjective well-being approach of psychology (Kahnemann et al., 1999). The second one, describes well-being as realization of human potential and relates the capabilities approach of economics to the psychological well-being approach (Ryan and Deci, 2001; Hupper, 2008).

The existence of multiple perception of well-being, its multidimensionality, the subjectivity that characterizes its definitions and its variability on space and time, make well-being an ambiguous concept that lacks of a universally acceptable definition. In addition, the impossibility to provide a single description of well-being makes quantification strongly

dependent on the adopted approach (Saltelli et al., 2007). For these reasons, during the last decades a large number of metrics have been proposed and many attempts have been tried to quantify and compare well-being of individuals and societies. The largest part of those, focused on the utilitarian approach derived from John Stuart Mill and Jeremy Bentham (Bentham, 1789). Based on the idea that "more is better" derived from the standard economic hypothesis that people's utility increases with consumption, the definition of well-being has been therefore generally reduced to income and GDP. Since the '70, however, many concerns rose in relation to the environmental and social degradation and a large number of studies have been oriented to investigate the negative or the non-increasing relationships between income and well-being (Easterlin, 1974; Clark et al., 2008). From there, a large number of attempts have been done to enlarge the well-being definition with other variables, as for example the value of leisure time, the life expectancy, the investments in human capital or the depletion of natural assets (for a detailed review see Jackson and McBride, 2005 and Brainpool project, 2012 website). In recent times, the global economic crisis, and the related debate on the pros and cons of the present economic system organization, brought many governments and institutions to widen the perspective to include the state of societies from the traditional economic variables to a broader characterization of well-being (Stiglitz et al., 2009; "Better Life Initiative" - OECD website; E-Frame project website). An increasing body of literature have been then oriented to reconceptualise well-being as a combination between socio, cultural, psychological, environmental variables and aspirations and today it is widely accepted that well-being is a multidimensional concept that encompasses all the aspects of human life (McGillvray, 2007). In general terms, two main approaches, namely the *subjective* and the *objective* one have been used in the literature to define and quantify well-being.

### *1.1 The subjective v/ objective well-being approach:*

The *subjective approach* focuses on people's own evaluations of personal life. It intends to capture people's feelings on life satisfaction and it is based on subjective evaluation of past and future life experiences (Andrews and Withey, 1976; Diener and Lucas 2000; McGillivray and Clarke, 2006; van Hoorn, 2007). Since it intends to describe the extent to which an individual feels that its life is going well, it is based on subjective evaluations and it is strongly influenced by expectations, personality, circumstances, aspirations and interpersonal comparisons (Warr, 1999). The subjective well-being (SWB) measures are generally based on

questioners and interviews aiming at obtaining self-reported valuations of some aspects of individual's life or life as a whole (Diener and Seligman, 2004; Kahneman et al., 2004; Diener, 2006). The answers obtained are used to construct numerical measures to rank SWB of individuals and societies. However, by having to aggregate the different values assigned to the different aspects of life into a single subjective well-being index, the final value may be subject to distortions generated by aggregation or score attributions (Saltelli et al., 2007). In spite of these limitations, however, a large number of studies have investigated SWB, spacing from individuals and local communities to large world regions. The "World Database of Happiness" (WDH), the "World Values Survey" and the "Satisfaction with Life Index" for example, collect data, indicators and measures of happiness of nations, investigating also the main values that characterize well-being (Veenhoven, 2008). In addition, a set of "National Indicators of Subjective Well-Being" have also been proposed to evaluate subjective well-being of nations (Diener, 2005; Kahneman et al., 2004) and a plurality of measurement techniques have been elaborated to evaluate both the individual and social well-being. The experience Sampling Method, the Day Reconstruction Method, the U (unpleasant) - Index or the Brain Imaging are largely used methodologies (for a complete description and discussion see Kahnemann and Krueger, 2006). The main findings of these studies reveal the existences of some groups of factors influencing the level of subjective well-being, e.g. personality, interpersonal relationships, demographic, institutional, environmental and economic factors. The main advantage of the subjective well-being approach is that it provides a representation of well-being that closely reflects the feelings of individuals. Being based on self-reported experiences, subjective well-being avoids approximations or interpretations of external observers. However, the need for individual interviews and self-reported evaluations generally makes data collection expensive both in terms of time and of resources.

The *objective well-being approach* is based on the assumption that observable facts can be used to approximate well-being of individuals and societies. Starting from the idea that individuals derive well-being form the satisfaction of their needs, the objective approach uses different kind of indicators as proxies of well-being (Prince and Prince, 2001; Cummins et al., 2006; Andreoni and Galmarini, 2014a). Two main approaches have been generally identified in the definition of the objective well-being, namely the needs and the capital (or input) approaches. The first one is valuated in terms of gap between the desires of an individual and his present consumption satisfaction (Maslow, 1954). The second one is intended as a resources related approach and it is based on the availability of the assets needed to generate well-being (Rawls, 1971). Both of them have been largely used to quantify well-being of

individuals and societies and have been used in policy approaches for the promotion of development and socio-economic growth. The traditional measures of objective well-being have been based on composite indicators that reduce different well-being elements (as environmental, economic or social variables) into a single numerical or monetary value. In spite of a large number of concerns have been raised on the problematic and difficult assumptions that have to be made to provide price and monetary evaluation to non-market factors, the number of monetary indicators used to quantify well-being largely increased in the last decades (Gadrey and Jany-Catrice, 2007). The possibility to compare different levels of well-being and to rapidly evaluate trade-offs generated by different policy options, make monetary and other composite indicators particularly appreciated by politicians that usually prefer a single value indicator as it is easier to use and with a larger communication power. In addition, the possibility to rank well-being of individuals and societies on the base of indicators provides a useful tool for comparisons or progress accounts. For these reasons, a large variety of composite indicators of well-being have been used both in policy and economic analysis. In recent times, the use and construction of composite indicators has been largely criticized by the fact that indicators simplify the complexity and the multidimensionality of well-being evaluation. Having to reduce and combine different dimensions, measured on different scales, and having to take decisions on weighting and aggregation factors, the use and the construction of indicators could generate an oversimplification of well-being, making the final ranking largely influenced by perception and values of the peoples that participate into the indicator construction process (Martinez-Alier et al., 1998; Ivanova et al., 1999; Ogwand and Abdou, 2003; Qizalbash, 2004). In addition, the largest parts of indicators generally assume that certain issues are valuable to society but do not explain why something is valuable or not, making the process of indicator construction not particularly transparent (Nardo et al., 2005; Satelli, 2007; Costanza et al., 2007). For these reasons, an ever larger body of literature suggests to avoid the simplification generated by the use of aggregated indicators and to move toward an integrated description of well-being. The fuzzy sets theory approach or the multicriteria methods are example of recent developments oriented to consider the incommensurability of the different dimensions of well-being and to move from a compensation and linear simplification approach to a combined analysis of the objective and subjective well-being dimensions (Munda, 2005; Munda and Nardo, 2009).

Starting from this last approach, the present paper provides a multidimensional well-being description and proposes a model to combine objective indicators of well-being together with

subjective evaluations. By using different socio-economic, environmental and health indicators provided by Eurostat, an integrated and transparent methodology is proposed to summarize the beyond-national border distribution of well-being across EU regions. In addition, being based in a non-compensatory approach, the present study can be complemented with subjective preferences and values, making the proposed methodology suitable to combine objective and subjective evaluation and to analyse well-being in a national, regional or individual scale. Three main analyses have been performed:

(1) The "ideal point" technique has been used to identify: *(i)* the best EU performances; *(ii)* the number and type of indicators that needs to be improved in every EU regions*;*
(2) A map of regional well-being has been elaborated to provide a summarizing representation of the regional performance in comparison to the European average
(3) A Gini coefficient has been calculated to identify the indicators performing the largest inequalities across EU.

The regional level has been selected as a minimum domain of reference. Since well-being pertains to individuals and communities we have selected data available at the smallest possible scale where homogenous information across Europe could be found. The smaller the scale the more we hope to capture aspects of well-being that relate to the communities and to the individuals. The sub-national representation provides also an opportunity to verify to what extend well-being extends beyond national borders that being shares by communities in spite of the administrative separation and as result of also historical, cultural differences. The methodology proposed in this paper, together with the main finding of our analysis can be useful to reduce the existing gap between subjective and objective well-being measures and to evaluate policy efficacy. In particular, by providing an overview of the level of well-being across EU regions, the results of this paper can be used to investigate the effectiveness of previous EU policies and to support researches and EU institutions in the design of future well-being strategies. The paper is structured as follows: section 2 summarizes the Eurostat data used in this study. Section 3 presents the adopted methodology. In section 4 the main results are reported. Section 5 identifies the main limitations and the future research developments. Section 6 concludes

## 2. Data

Regional data provided by Eurostat have been used in this study to describe well-being across Europe. Based on NUTS 2 classification 266 European regions have been considered across the 27-MS (for a detailed list of countries and regions see Andreoni and Galmarini, 2014). For each region the available indicators describing the economic, the social, the health and the environmental situation have been used. In particular, between the different indicators available on the Eurostat regional database only those that included at least the 95% of data over the 266 European regions have been considered. As a general rules, the national average value has been used in this study to approximate the missing data. According to that operational principle, a total number of 12 indicators have been identified on the Eurostat regional database. In order to avoid an unequal weight distribution between the different dimensions and according to the multicriteria practice (Munda, 2008) 3 indicators have been selected for every one of the four dimensions considered in this paper, namely:

**1. Economic Dimension:**

- ***Gross Domestic Product*** (GDP) – Euro per inhabitant: Calculated by Eurostat according to an expenditure approach (GDP = consumption + investments + exports – imports) the GDP is the largest used indicator to describe the economic situation of a region and to summarize the economic dimension of well-being (Eurostat website – Headline indicators).

- ***Long-Term Unemployment Rate*** (12 months or more): is defined as the rate of people aged between 15-74 (in UK, IS and NO between 16 and 74) who were without work during the reference period but currently available for work. Since the long-term unemployment rate is mainly determined by economic variables, an increasing rate of this indicator summarizes a decreasing trend in the economic dimension of well-being (Di Tella et al., 2001; Frey and Stutzer, 2002)

- ***R&D Expenditure*** – Euro per inhabitant: Eurostat's statistics on R&D expenditure are compiled based on OECD guidelines (OECD, 2002). They summarize the expenditures for research and development performed in the considered region. Since the promotion of science, technology and innovation are considered as important drivers for the Europe 2020 growth strategy, increasing rate of R&D expenditure are assumed to have a positive impact on the economic dimension of well-being and in particular the medium term economic development possibilities.

**2. Social Dimension:**

- ***Fertility Rate*** – Children per woman: quantifying the average number of children per woman, the fertility rate can be considered, in developed countries, as an indicator of prosperity, confidence in the future from the socio-economic view point, sense of self security and support from institutions (Eurostat website – Headline indicators).

- ***Tertiary Education*** - % of population: indicates the percentage of population having attended a tertiary education level. Summarizing the possibilities offered by families, society and by the system of welfare state of having a high education level, and being one of the Europe 2020 headline, tertiary education is positively related to the level of social dimension of well-being. (European Commission, 2010; Stutzer and Frey, 2008)

- ***Intentional self-harm*** – per 100,000 inhabitants: since the number of suicide is largely influenced by depression, hopelessness, drugs or alcohol abuse and social isolation, the intentional self-harm is here considered as an indicator to summarize the social dimension of well-being (Eurostat, 2009)

**3. Health dimension:**

- ***Infant mortality rate*** – per 1,000 live births: It describes mortality during the first year of live and it is calculates as the ration of the number of deaths of children under one year of age during the year to the number of live births in the considered year describes mortality during the first year of life. Infant mortality rate is universally considered representative of a country's level of health, development, quality of governance and well-being. (Eurostat, 2009)

- ***Life expectancy*** *at given exact age (1 year)*: refers to the number of years still to be lived by a person if subjected throughout the rest of his live to the current mortality conditions. Since health care is recognized as one of the most important factor influencing life expectancy, this indicator can be used to describe the health dimension of well-being (Eurostat, 2009)

- ***Malignant neoplasms*** – per 100,000 inhabitants: the malignant neoplasms are a diverse group of cause of death including all the different cancer statistics collected by Eurostat. Since the environmental quality is today recognized as an important

contributory factor of the different recognized cause of cancer (e.g. smoking-related cancers, obesity or occupational hazard) the number of malignant neoplasms is considered in this study as a negative indicator of environmental well-being (Eurostat, 2009)

**4. Environmental dimension:**

- ***Generation of municipal waste*** – kg per capita: according to Eurostat definition, 'municipal waste generation' denotes the waste from consumption of household, commerce offices and public institutions. Since the EU Sustainable Development Strategies and the waste frame directive sets the target of 'avoiding the generation of waste and enhancing efficient use of natural resources by applying the concept of life-cycle thinking and promoting reuse and recycling', the quantity of municipal waste generated is a relevant indicator to summarize the efficiency of resources use and the potential impacts of waste generation and treatment on the pollution of air, groundwater and soil. For these reason, generation of municipal waste is here considered as an indicator the environmental dimension of well-being (Eurostat website – Headline indicators).

- ***Organic crop*** - % of total used agricultural area (ha): since organic agriculture is oriented to sustains the health of soil, to maintain ecosystems services, to protect biodiversity and to reduce the overall impacts on environment, the percentage of organic crop over the total used agricultural area is here considered as an indicator of environmental well-being (IFOAM website)

- ***Total nights spent by tourist***: Since tourism is higher in the areas with historical patrimony, environmental quality, landscape, art and cultural heritage, the total nights spent by tourist this statistics is considered also as an indicator of environmental quality (Eurostat website – Headline indicators). Ultimately even if the motivations for the touristic visit could go from leisure to culture, the environmental quality is a fundamental aspect normally considered by any tourist. It is only marginally so since for example not all tourist resort facility are environmentally friendly, most of the time they seem so but finally they are not. In any case we start form the consideration that in the long term a certain level of environmental sustainability has to guarantee to preserve the environment.

The year considered is 2009, that is the most recent year for which the largest quantity of data is available

## 3. Methodology

As explained earlier, the main objective of this paper is to provide an integrated and non-compensatory description of well-being across European regions. In order to do that, three main analysis have been performed:

1. According to a well-established technique in multi-criteria evaluation (Zeleny, 1982; Yu, 1985), the best values reached within the 266 EU regions in every one of the 12 indicators considered in this study have been identified in order to get a set of reference values. These values have been used as an "ideal point" to compare the specific values performed in every region and the best values performed across Europe. A detailed graphic-radar representation summarizing the distance between all the considered indicators and the "ideal point" is available for all of the considered regions in Andreoni and Galmarini (2014). The main objectives are: *(i)* to identify the best performance that could be hypothetically reached by every European region; *(ii)* to identify the number and the type of indicators that needs to be improved. A sum of the main results is reported in the following section.

2. For each one of the 12 indicators, the average European value has been calculated. The main objective is to have a term of reference to identify for which and for how many indicators every region is performing over, below or equally to the average European level. These data have been used subsequently to elaborate a map summarizing well-being across European regions, as reported in figure 1.

3. A Gini coefficient has been calculated in order to identify the indicators that show the largest inequalities across Europe. The formula used is that proposed by Angus Deaton (1997):

$$G = \frac{N+1}{N-1} - \frac{2}{N(N-1)u}(\Sigma_{i=1}^{n} P_i X_i)$$

After having ranked the different regions based on decreasing values of the considered indicator, the Gini coefficient has been calculated by considering that $u$ is the average European value of the considered indicator and $P_i$ is the value obtained for the indicator of region $i$ that occupies position $P$ in the ranking. The Gini coefficient is used in this study to identify for which indicators the largest discrepancies across European regions exist.

An integrated analysis of the results provided by the three studies performed in this paper is able to provide both an overview of the well-being distribution as well as a detailed picture of the existing differences between regions and indicators.

## 4. Results

### *4.1 Regional values v/ European best performances*

The results of "ideal point" technique, used in this paper to compare the values performed by every European region and the best values performed across EU, show that:

1. The best GDP performances pertain to regions hosting some of the most important EU capitals (the Inner London region, Luxembourg, Ile-de-France, Stockholm, Hovedstaten and the Aland region). The Hovedstaten region, together with the German regions of Oberbayern, Stuttgard and Braunschweig are also the area with the higher level of R&D expenditures, followed by the Scandinavian regions of Stockholm and Pohjois-Suomi. In terms of long term unemployment rate the better values are found in the Austrian of Salzburg and the Tirol also shared with Italy and and in Denmark and Netherlands, particularly in the regions of Midtjylland, Sjaelland and Zeeland. On the contrary, the worst economic performances, both in terms of GDP and in terms of R&D, are reported by regions located in Bulgaria, Poland and Romania (Severen tsentralen, Severozapaden, Luboskie, Opolskie, Podlaskie, Sud-Muntenia and Nord-Vest). In terms of long-term unemployment rate some Spanish and Italian regions are also performing badly (e.i. Ciudad Autonoma de Melilla y Ceuta and the Sicilia and Campania regions).

2. When considering the social variables, the lowest rate of intentional self-harm are accounted in Greece and in other Mediterranean areas (Voreio Aigario, Dytiki Makedonia, Kentriki Makedonia, Attiki, Notio Aigaio, Thessalia, and Comunidad de Madrid and Campania). The higher values, on the contrary, are found in central and eastern regions, mainly located in Hungary, Bretagne and Luxembourg.

3. Mediterranean regions as Principado de Asturia, Galicia, Canarias Molise, Sardegna, Basilicata, account for the lowest fertility rate. Finland and UK host the regions with the highest number of children per woman (Pohjois-Suomi, Dorset and Somerset, Border, Midland and Western, Outer and Inner London). Inner London is also the area with the highest tertiary education value.

4. Bulgaria, Romania and Hungarian are the countries with the largest number of regions showing the worst health variables, both in terms of infant mortality rate, life expectancy and malignant neoplasm. The best values pertain to Burgeland (Austria) for the infant mortality rate, to the Provincia Autonoma di Bolzano (Italy) for the life expectancy and to the Ciudad Autonoma de Melilla (Spain) for the malignant neoplasm.

5. The Check Republic areas of Podkarpackie, Swietokrzyskie, Lubelskie are the regions generating the lowest quantity of per capita municipal waste, after Brandenburg. The highest values, on the contrary, are accounted in the Spanish and Portuguese areas of Ciudad Autonoma de Melilla y Ceuta and Algarve.

6. The Industrial areas of Greater Manchester, South Yorkshire, West Midlands, Inner and Outer London are the region with the lowest land devoted to organic crop production. On the contrary, Praha and Salzburg accounts for the largest percentage of organic crop over the total agricultural areas.

7. In terms of tourism, Spain hosts the regions with the largest number of night spent by tourist (Canarias, Cataluña, Islas Baleares and Andalusia) followed by Provence-Alpes-Cote d'Azur and by almost all the Italian regions. Severozapaden, Aland, Dytiki Makedonia, Severen tsentralen and Opolskie are the areas with the lowers tourism variable values.

In general terms, this analysis shows that the areas with the better economic performances also have a higher tertiary education rate and among the highest fertility rate. In terms of

health variables, eastern European regions are below the EU average. Municipal wastes are higher in the areas with higher GDP per capita and lower in those with smaller consumption opportunities. The individual values obtained for every indicator in all EU regions are reported in Andreoni and Galmarini, 2014.

### *4.2 Mapping the beyond national borders distribution of well-being*

The main purpose of Figure 1 is to provide a map that summarizes the level of well-being across European regions. As explained in the methodological section, the well-being ranking has been elaborated by accounting for the number of indicators above or below the European average. A color scale moving from red to green has been used. The color red, and the related red shades, identifies the regions with the majority of indicators that are below the EU average. The yellow has been used for the regions with an equal number of indicators over and below the EU average and the green-color scale identifies the EU areas with large number of indicators above the EU average.

According to Figure 1, the eastern European regions have the largest numbers of indicators below the European average. All the Hungarian regions (except the Közép-Magyarország that is the region that hose the capital) together with the Bulgarian region of Severen Tsentralen, the German region of Sachsen-Anhalt, the Polish regions of Lódzkie Malopolskie, Lubelskie, Swietokrzyskie, Dolnoslaskie, Wielkopolskie, Kujawsko-Pomorskie, the Portugese regions of Alentejo and Região Autónoma dos Açores, the Centru Romanina region and the Slovakian region of Západné Slovensko are the region with only one or at least two indicators above the European average.

A large number of other eastern European regions, together with the French regions of Nord-pas-de-Calais, Pircardie and Champagne Ardenne are also performing below the European average, with only 3 indicators performing over the EU average.

On the contrary, the regions hosting the capital cities have the largest number of well-being indicators performing both above the EU average and above the other regions of the considered MS. Example are Berlin, Praha, Wien and Bratislava that have a colour much more greener than the regioni limitrofe.

Stockholm, Gloucestershire, Wiltshire and Bristol/Bath are the only regions with all the 12 considered indicators above the EU average, followed by Östra Mellansverige, Västsverige, Hampshire and Isle of Wight regions with 11 over 12 indicators above the EU average. Etelä-Suomi, Länsi-Suomi, Pohjois-Suomi, Berkshire, Buckinghamshire and Oxfordshire, Surrey, East and West Sussex, Stuttgart, Oberbayern and Berlin, have only 2 over 12 indicators below the EU average.

To sum up, it is possible to identify four main well-being macro-areas:

1) The eastern European countries with the largest number of indicators performing below the EU average.

2) The Scandinavian regions and the south of England performing above the EU average

3) The Mediterranean regions, together with central England and eastern France performing a bit below the EU average

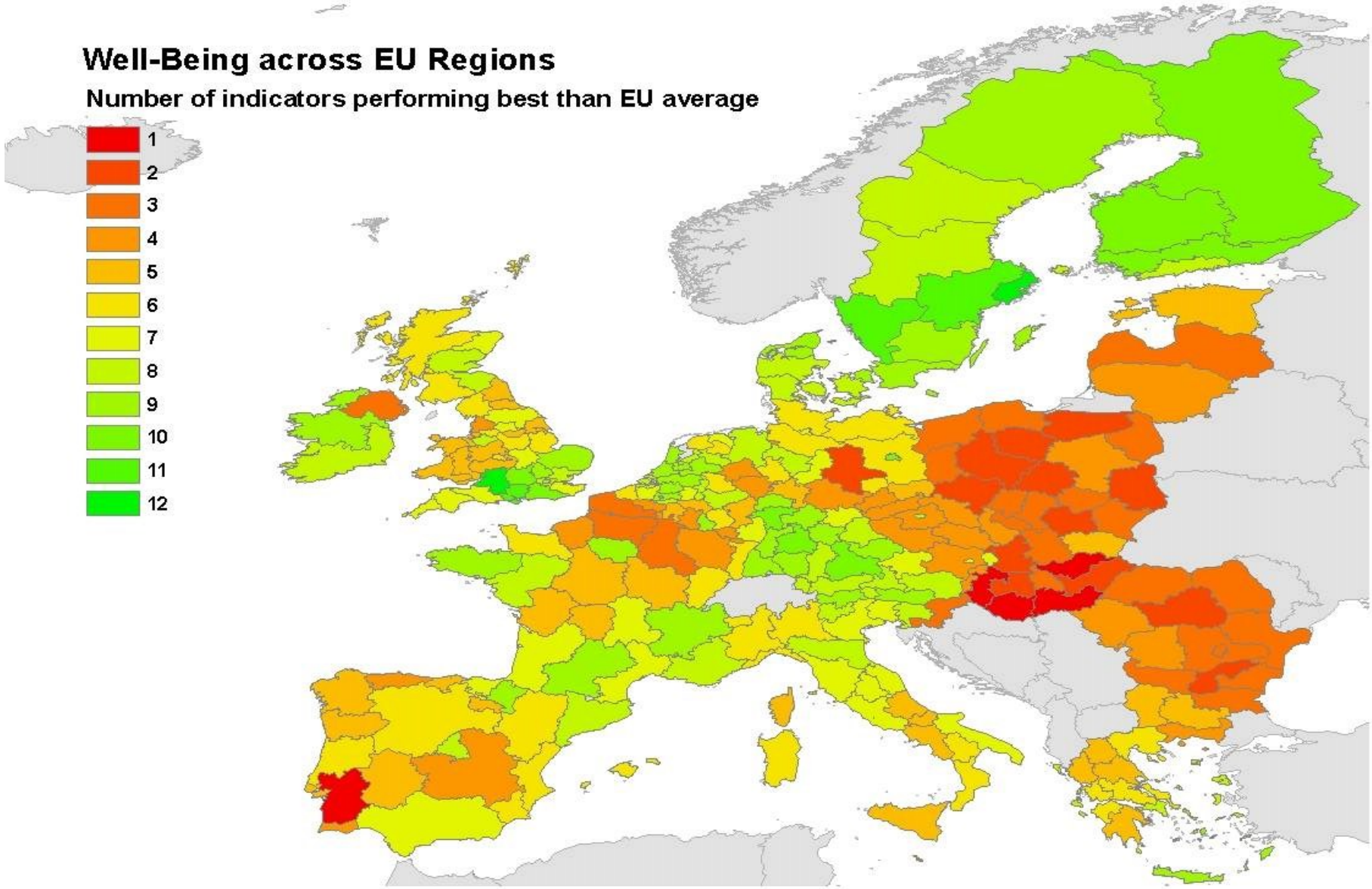
4) The central European regions, together with Ireland and Cyprus performing a bit over the EU average

In order to provide transparent and detailed information, a graphical representation on the performance of every considered region and indicator in comparisons to the EU average is reported in Andreoni and Galmarini (2014).

Originally, one of the main reasons to select regions as minimum scales was connected to the necessity of verifying to what extent comparable levels of well-being were extending beyond the national borders and could be grouped with respect to well-being criteria. Figure 1 clearly shows the presence of aggregations that go beyond the borders. As far as the lower end of the scale is concerned we see a streak of red moving from Check Republic into the German main land and all the way to the Dutch border were it stops. A detailed analysis of the breakdown of indicators reveals that that this is mainly due to economic parameters but also to those that, as demonstrated above, are related to them. There are also pockets of high well-being that go beyond borders. Examples in this respect are between Austria (Bavaria/Tirol), Italy (South-Tirol) and Slovenia that share similar levels of well-being. County capitals recognized as regions are also pockets of high well-being levels (e.g. Berlin, Madrid, London, and Paris). An exception on this is the Stockholm region which is lower than then surrounding one. Population density could be reason for this anomaly and should be further investigated. Low

levels are found across the French-Walloonie border which in particular for the French part shows ever decreasing levels. An interesting feature is represented by the similarity between Crete and the rest of Greek islands and the contrast with mainland Greece.

These results are particularly interesting from the socio/political point view as they seem to point toward possibly historical or cultural similarities of commonly shared values that guarantee for comparable levels of well being in spite of the clear and well defined administrative separation represented by a national border.


Well-Being across EU Regions
Number of indicators performing best than EU average
1
2
3
4
5
6
7
8
9
10
11
12

### *4.3 Gini coefficient for well-being indicators*

The Gini coefficient is commonly used to determine the level of non-uniformity in the distribution of income or wealth. Since it is calculated as the statistical dispersion among values of a frequency distribution, it is used in this study to identify the indicators that shows the largest discrepancies across EU regions. The Gini coefficient ranges between 0 and 1, where 0 corresponds to uniform distribution and 1 to maximum concentration in one or more elements of the distribution. Based on data provided by Eurostat and by the formula reported in the previous methodological section, the Gini coefficient has been calculated for all the indicators considered in this study. Results are reported in Table 1.

**Table 1. Gini Index for well-being indicators**

| | Indicators | Gini Index | Average for indicator category |
|---|---|---|---|
| Economic Indicators | GDP | 0.26 | 0.38 |
| | Long-term unemployment rate | 0.36 | |
| | R&D expenditure | 0.53 | |
| Social Indicators | Intentional self-harm | 0.28 | 0.20 |
| | Fertility rates | 0.11 | |
| | Tertiary Education | 0.20 | |
| Health Indicators | Infant mortality rate | 0.23 | 0.12 |
| | Life expectancy at given exact age | 0.03 | |
| | Malignant neoplasms | 0.09 | |
| Environmental Indicators | Generation of Municipal waste per Capita | 0.18 | 0.41 |
| | Organic crops | 0.51 | |
| | Total nights spent by tourist | 0.53 | |

In average, the largest discrepancies across EU regions are obtained by Environmental Indicators. The "total nights spent by tourist" and the "organic crops" have a coefficient higher than 0.50 highlighting a large deviation from a perfectly uniform distribution. On the contrary, the 0.18 coefficient value for the "per capita generation of municipal waste" summarizes that the quantity of municipal waste generated in Europe is similar across regions. Similar trend is also obtained for the "tertiary education" and social indicators with and average coefficient value of 0.20. Within that, however, differences exist between the deviation of the intentional self-harm and the deviation of the fertility rate. The first one, with a coefficient value that equals 0.28 summarizes that intentional self-harm are not equally

distributed across Europe. The second one, with a 0.11 coefficient value indicates a similar distribution. Analogous is the performance of the "life expectancy" and of "malignant neoplasms" that having a coefficient value running below 0.1 summarize an almost equal distribution across European region. The "infant mortality rate" is the health indicator performing the largest discrepancy across areas. Finally, the economic indicators with an average coefficient value of 0.38 highlight that economic differences exist across European regions. In particular the "R&D expenditure" is the economic indicator with the largest coefficient (0.53), followed by the long term unemployment rate (0.36) and by the GDP (0.26). Running over 0.25 all these indicators summarize that economic well-being is not equally distributed across European regions. Through this analysis it is clear what are the main sources of in-homogeneity producing well-being differences across Europe.

## 5. Novelty, limitations and future development

In this study a well-being overview across European region has been provided. By using an integrated approach a set of indicators has been considered to summarize the beyond-national border distribution of well-being. Economic, social, environmental and health data were used to approximate well-being at regional scale, and to develop an approach for objective analysis of well-being. However, since we completely agree with the theoretical approach that define well-being as something experienced by individuals and largely influenced by the specific social and cultural contexts, the method used in this paper is suitable to be complemented with subjective preferences and values, making the proposed study useful to analyse well-being in a national, regional or individual scale. Based on this approach, the analysis presented in this paper specifically avoided arbitrary weight attribution to the different indicators, thus assuming that all the used indicators exactly have the same importance.

Based on the idea that well-being is a matter of needs satisfaction and an individual perception, the model presented in this paper is suitable to integrate objective and subjective well-being theories. The main advantages are related to the fact that both approaches can be combined in a single methodological framework. In particular, the non-compensatory approach and the transparent and non-weighted selection of the objective well-being indicators allow integrating the present analysis with subjective elements. The results of the present study and the methodology presented in this paper are then suitable to support future researches oriented to provide a broader and more integrated description of well-being across individual or societal dimensions. Within this context, future development should be oriented to collect subjective perceptions and values across European regions and integrate the objective analysis provided in this study with more subjective evaluations.

In particular, using a participative approach, a set of interviews could be performed by asking people "what really matters for them". The attribution of weight quantifying the relative importance of the different indicators will move this analysis from a purely objective evaluation of well-being to a more subjective one. Data from the European Quality of Life Survey (EQLS) could be used to introduce subjective elements into the analysis. However, the main limitation of this database is that it is disaggregated between the 27 MS and no regional data or detailed analyses of sub-groups in individual countries are provided. Since indicators are intended to provide information about a system, his current condition and how it changes over time, it would be important to update the present research with most recent data, when collected and released by Eurostat but at the same time with an analysis of the past

situation as far back as coherent data are available. This kind of study performed over time will provide interesting elements of evaluation of the current methodology but also an overview of the path of the different regions in the progress toward well-being and the in reduction of the regional disparities. By maintaining the different indicators separated from one another and avoiding aggregating indicators into a single index, it is possible to identify which indicators and dimensions improved over time and which are activating toward a reduction of the disparities across Europe.

Indeed the list of indicators selected should be enlarged with more homogenously collected data across all regions. The problem of the scarcity of homogenous indicators, in particular the environmental ones, remains one of the main drawbacks of our analysis but also a finding, to the extent that it points to the necessity of collecting this information centrally and with respect to homogeneous indexes.

The analysis and the results provided in this paper can be useful in a framework of evidence based policy. By highlighting how close or far is any specific indicator of any specific region from the best value performed within EU, the present paper identify the main weakness of every area and provide support in the setting of policy priorities. The present results and any possible future updates could be useful to determine where policies are producing good results or where they are insufficient. It can also provide a baseline for cross-region performance comparisons useful to identify best practice and successful policy models.

## 6. Conclusion

In the present paper a multidimensional approach has been used to provide a well-being description across EU regions. The attention has been dedicated to regional scale in an attempt to identify communalities that go beyond the national borders and that adhere more to the local scale character of the perception of well-being. A set of socio-economic, environmental and health indicators have been selected from Eurostat. The year of analysis has been 2009, that is the most recent years for which the largest quantity of data is available. Starting from that, one of the first evidence produced by this paper is the necessity to collect more data at regional level, especially for the environmental dimension where a very limited number of indicators are presently available for the 266 NUTS 2 regions. In spite of this intrinsic deficiency the methodological approach proposed clearly put in evidence aspects that could become more and more meaningful when a larger collection of indicators will be available. In addition, by using a transparent and non-compensatory approach the present

paper clearly highlights the main differences and similarities existing between EU areas and allows identifying the regions and dimensions for which improvements are needed. A part form the detailed results reported in the previous sections, some of the main findings shows that:

- Eastern European regions have the largest numbers of indicators below the European average.
- All western European countries show singularities with 2 to 3 regions ranking low in the scale.
- Scandinavian regions are all above the EU average
- Regions hosting the capital cities have the largest number of well-being indicators performing both above the EU average and above the other regions considered
- The Mediterranean regions, together with central England and eastern France performing a bit below the EU average
- The central European regions, together with Ireland and Cyprus performing a bit over the EU average
- The across border concept which was one of the research questions put up for exploration was confirmed by the presence of across national bands of regions sharing the same number of indicators above and below the average.

The results and the methodological approach proposed in this paper can be useful in a context of policy support. By providing an overview of the present well-being situation and by highlighting the main gap between EU regions, a set of policy initiatives could be designed to promote convergences across EU areas. In particular, in the context of the EU 2020 strategy, where well-being promotion is considered as a priority, the main findings of this paper can be useful to scan the present situation and to design policies able to effectively address and reduce the main disparities across EU. The methodology presented in this paper can be used to monitor situation or to alert on hot spots thus triggering a closer investigations on the reasons for trends and anomaly. The procedure presented could be an initial trigger to start analysis on the actual reasons that produce comparable levels of well-being across national borders in some areas of EU that could lead to the determination of exportable models to other regions. It could be used also to monitor over the years the progress in creating more areas with high level of well-being and extending those where it already exists. A primary example of that are the metropolitan areas where sharp gradients of well being exist with

neighbouring regions. It remains to be determined whether this is connected to the independent administrative management of the information in the relatively smaller areas occupied by a metropolitan area. Different would be the case, as proven by many evidences, that outskirts regions of metropolitan areas are normally neglected areas by services, occupied by sleeping neighbourhoods affected by high levels of unemployment and social degradation. In addition, the different economic development trends and political background that characterized the western and the eastern European areas could be a possible explanation of the regional differences existing between new and old EU MS. Further analyses are needed to better investigate these hypotheses and a larger set of indicators would be helpful on that. However, in spite of the limitations related to data availability, the model presented in this paper and any further applications can be useful to support policy and to design effective well-being development strategies.

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