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Abstract

The work of the Stiglitz's Commission (2009) has renewed the attention on well-being as a multidimensional phenomenon and on beyond-GDP measures, fostering the gradual inclusion of well-being indicators in the policy agenda.

This debate calls for a new phase in the measurement of well-being. The exploitation of new data sources, hence new and more punctual indicators; a new metric apt to take into account interactions between the well-being dimensions; an explicit inclusion of well-being indicators in the policy cycle are part of a process leading to the 2.0 version of well-being.

The Italian experience on the measure of equitable and sustainable well-being (Bes) is a good example to illustrate this evolution. The current Bes framework are fully analyzed together with three emerging issues: the use of administrative data; the definition of composite indices as a useful synthesis for well-being; the implementation of well-being indicators in the policy cycle.

JEL classification codes: I38, C43

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[*]Corresponding author: Fabio Bacchini, bacchini@istat.it.Even if the paper is the result of the combined effort of all the authors, Sects. 1 and 6 can be mostly attributed to F. Bacchini, Sect. 2 can be mostly attributed to A. Tinto, B. Baldazzi and M. Savioli, Sect. 3 can be mostly attributed to R. De Carli, Sect. 4 can be mostly attributed to L. Di Biagio, Sect. 5 can be mostly attributed to F. Bacchini and M.P. Sorvillo.

1 Introduction

As reported by M. Wolf (Financial Times, 30 May 2019) in March 1809, Thomas Jefferson wrote, on his departure from the US presidency, that "the care of human life and happiness, and not their destruction, is the first and only legitimate object of good government".

Echo of this brilliant intuition are scattered across history[1] but only in recent years it has been translated into a comprehensive framework that should be able to specify dimensions and indicators aiming to capture well-being.

The work of the Stiglitz's Commission (Stiglitz et al. 2009) has represented a milestone on this research activity proposing well-being as a multidimensional phenomenon. It means that different dimensions are to be measured on a micro or macro population (i.e., households, regions, countries) across time. However, a switch of attention towards well-being and SDG claims for new data and new metrics as recently pointed out also by OECD (Stiglitz et al. 2018b).

In line with the proposal presented by the Stiglitz's Commission, the OECD first developed its framework for measuring well-being in 2011, as part of its broader Better Life Initiative (OECD 2013). The OECD's initiative has also been related to the work of "several national statistical offices (NSOs), government departments and international organizations that have been collecting and disseminating a variety of social, environmental and economic data since well before 2011". A comprehensive analysis of these initiatives recently proposed by OECD considers 15 countries providing reporting on well-being and its policy application. However, while NSOs are mainly involved in measurement, monitoring and reporting of well-being and sustainability indicators, their relationship with policy applications are often led by Ministries of Finance, or other central bodies such as the Prime Minister's Office.

The importance of the relationship between well-being and policy is also recognized by the European Commission that in 2017 has funded the project MAKSWELL (MAKing Sustainable development and WELL-being frameworks work for policy, see Bacchini et al. 2018) that aims to improve data and methodologies to relate policy analysis and well-being.

The aforementioned debate calls for a new phase in the measurement of well-being. The exploitation of new data sources, hence new and more punctual indicators; a new metric apt to take into account interactions between the well-being dimensions; an explicit inclusion of well-being indicators in the policy cycle are part of a process leading to the 2.0 version of well-being. The Italian experience is a good example to discuss this evolution.

The Italian initiative on a multi-dimensional framework to measure "equitable and sustainable well-being" (Bes is the acronym in Italian) is among the experiences quoted by OECD. It was developed by the Italian National Institute of Statistics (Istat), together with the National Council for Economics and Labor (CNEL). In 2018 Istat published the 6th edition of the

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[1]Remember the Bob Kennedy' famous speech "GDP measures everything except that which is worthwhile"

Annual report on well-being (Istat 2018) that contains information at national and regional level on 130 indicators that are considered to be able to represent this complex phenomenon.

The activities carried out in Istat are also related to the implementation of well-being indicators in the policy cycle. In 2016, the revision of the budget law (163/2016, see G.U. 2016) established that well-being indicators have to be considered in the economic policy process. Istat was one of the institutions that contributed for the selection of the subset of Bes indicators to be used to monitor the policy cycle, participating to an ad hoc Committee headed by the Ministry of Economy and Finance.

Strong experience in monitoring well-being indicators, both at national and regional level, together with activities related to their inclusion in the Italian policy cycle, makes Italian Bes a good example to be considered, also at international level. Besides, the Bes project has developed an extensive evaluation framework for the use of composite indices in well-being research.

Indeed, the use of a multidimensional framework requires also a metric that makes it easy to compute a comprehensive measure of the progress/decline in well-being over time. But the identification of such a metric, similar to the integrated system currently adopted to produce GDP measures, is a hard task (Durand and Exton 2019). Meanwhile, a number of composite indices have been introduced both by international organizations (see for example UNDP 2016 and OECD 2017) and by national Institutes of Statistics (Quality of Life Spain (INE - Spain 2018), Bes Italy (Istat 2015) and WBI Portugal (INE - Portugal 2017)) using different methodologies.

The paper aims to illustrate the main characteristics of the Italian Bes together with the three main challenges that are related to the emerging themes: improving the territorial representation, discuss the properties of the composite indices currently in use and design and reinforce the connection with the policy cycle. In particular, Section 2 will review the current framework for measuring well-being in Italy. Sections 3, 4 and 5, will analyze three future challenges: the use of administrative data; the methodology presently used to produce composite indices together with some drawbacks and possible improvements; the use of well-being indicators for policy evaluation. Section 6 will present some conclusions.

2 The current framework for measuring well-being in Italy

The Italian National Institute of Statistics (Istat), together with the National Council for Economics and Labor (CNEL), launched in December 2010 an inter-institutional initiative aimed at developing a multi-dimensional approach for the measurement of "equitable and sustainable well-being" (Bes - benessere equo e sostenibile), in line with the recommendations

issued by the OECD and the Stiglitz Commission (see Stiglitz et al. 2009)[2].

In the context of recent international initiatives, the approach adopted with the Bes has been characterized by a participative process, involving civil society and national experts in the definition of the framework and in the selection of indicators.

Since the preliminary steps, Bes has had the ambition to measure not only the level of well-being, through the analysis of all relevant aspects of quality of life of the population, but also its equity amid social groups and geographic areas of the Country, and sustainability for future generations. This approach increases the complexity of the measurement but allows a more accurate analysis of the evolution of well-being in Italy.

The involvement of civil society and national experts in the definition of the framework of Bes comes from the consideration that measuring well-being can be seen as a three steps process. The first step concerns the development of a shared definition of progress in the Italian society, by identifying the most relevant dimensions of well-being; the second step relates to the selection of a set of high-quality statistical indicators that are representative of the different domains; the third step consists in communicating the results of this process, informing citizens of indicator values, trends and differences among different groups of population. The set of indicators defined is in fact intended for a broad public audience as well as for policy users.

In order to identify the domains of well-being which are relevant in the Italian context, a joint "Steering Group on the Measurement of Progress in Italian Society" was set up. The Steering Group included representatives from entrepreneurs, professional associations, trade unions, environmental groups such as WWF and Legambiente, Italian cultural heritage groups, women groups, consumer protection groups and the civil society network.

At the same time, Italian citizens expressed their opinions on the dimensions of well-being through a dedicated website, which offered two major consultation tools: a short questionnaire and a blog. Between October 2011 and February 2012, citizens were invited to respond online to a questionnaire to express their views on a list of dimensions of well-being proposed by the Steering Committee, having also the opportunity to report additional dimensions. The questionnaire was filled by 2,518 people, however since the participation was voluntary the sample cannot be considered representative of the population.

Through the blog a more in-depth discussion was possible, opening a national debate among experts and anyone interested in the issue who could in this way contribute to defining relevant dimensions to monitor progress and well-being in Italy.

A further consultation stream was represented by the inclusion of a specific question in the Multipurpose Survey, *Aspects of daily life* in 2011, which tried to assess the importance attributed by citizens to different dimensions of well-being. Respondents were required to give a score from 0 to 10 to a list of 15 dimensions of well-being. This survey, conducted on

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[2]This paragraph aims to extend and to actualize the contribution by Sabbadini and Maggino (2018)

a sample of 45,000 people aged 14 years and over, representative of the population resident in Italy, allowed to gather views of different groups of population on important dimensions of well-being, representing a unique case in the international scenario.

The results of the consultations, together with the evidences coming from international experiences, supported the Steering Group that identified a total of 12 domains.

The 12 selected domains are divided into 2 typologies, 9 of them are defined as outcome domains and are those related to dimensions which have a direct impact on human and environmental well-being (Alkire 2002); the remaining 3 domains are defined as drivers of well-being, measuring functional elements to improve the well-being of the community and the surrounding environment. The domains are:

- Outcome: health; education and training; work and life balance; economic well-being; social relationship; security; landscape and cultural heritage; environment; subjective well-being;

- Driver: politics and institutions; innovation, research and creativity; quality of services.

In 2018 the importance attributed by citizens to each of the 12 domains of Bes in the individual perception of well-being was tested by a qualitative survey, which is an ideal update of that carried out in 2011 in the definition phase of the Bes domains.
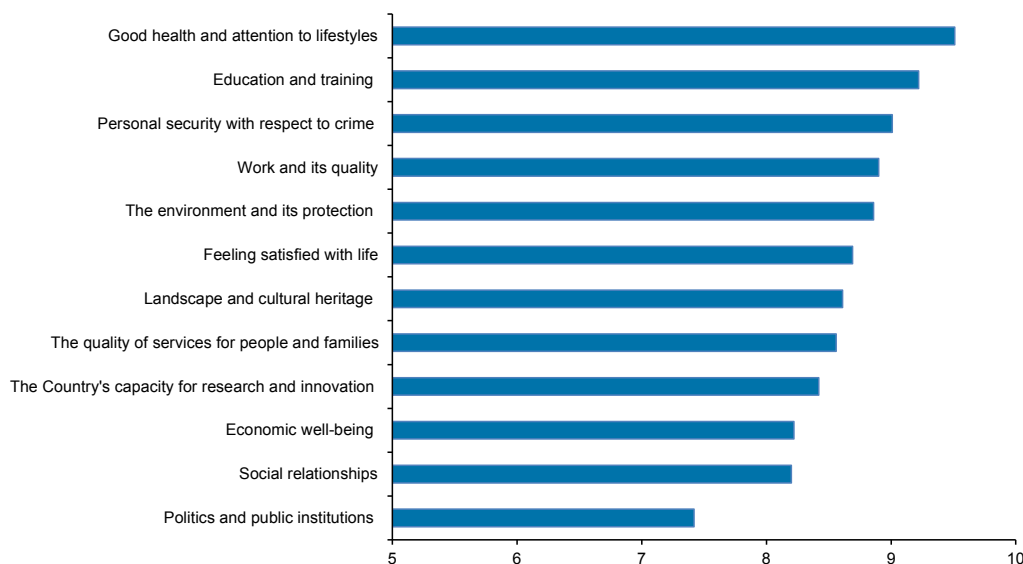

Figure 1: Average score attributed to the Bes domains (between 0 and 10). Italy. Year 2018.

In general, the 12 domains are confirmed relevant in defining the concept of well-being. Almost all of them receive an average rating of more than 8 (out of 10, Fig. 1). The only exception is the domain of Politics and institutions which received an average rating of 7.4, testifying a lower consideration from part of the citizens towards the different expressions of the public

thing.

Very high scores, at least 9, are attributed to health, education and training, and personal safety, three cornerstones of individual well-being. The other Bes domains receive scores between 8 and 9, first of all the domain on work and quality of work, then gradually the others to end with economic well-being and social relationships (both 8.2).

The variability of the scores is however quite limited, with a substantial homogeneity of the evaluations expressed by different population groups.

For the second step of the process, aimed at identifying a set of high quality statistical indicators that are representative of the different domains, in Istat a Scientific Committee was set up, involving more than 80 experts in the different domains of well-being, both within Istat and from the scientific community. The main output of this Committee was the definition of a set of indicators to measure each of the 12 dimensions of well-being. The selection of these indicators is a crucial step, in the sense that "what we measure" affects "what we do".

The selection of the indicators took into account the following considerations:

- the preferable data sources were within Official Statistics;

- data with available time trends (since 2004) were used when available;

- data with available sub-national detail were preferably used;

- indicators were selected only when they had a clear meaning with respect to well-being;

- both objective and subjective measures were be considered;

- the criteria of parsimony was taken into account.

Indicators used in international initiatives have been generally preferred. Through this process 134 indicators were originally identified to represent the 12 domains of well-being. However, the framework is considered as an open lab, and the set of indicators is reviewed annually to consider emerging information needs and methodologies. The Bes initiative has also been an important input to stimulate the production of new data on well-being. New questions were included in pre-existing surveys to be able to answer these needs. For instance, questions on trust in institutions and questions on perception of landscape and environment were added in the annual multipurpose survey on *Aspects of daily life*. Also the communication of results is an important step to be considered, with the aim of making the Country more aware of its strengths and of difficulties to overcome in order to improve the quality of life of citizens, placing this concept at the basis of public policies and individual choices. Proposed indicators are presented, analyzed and commented yearly in a report on *Equitable and Sustainable Well-being in Italy* (Bes reports — six reports published so far).

Together with the improving attention on the multidimensionality of well-being the research agenda was each year enriched with some innovations. Particularly in 2017, in addition to the

calculation of composite indices for all Bes domains, a wide revision of the set of indicators was carried out to improve timeliness and the structure of some domain, in particular Landscape and Cultural Heritage, Environment, Innovation, Research and Creativity and Quality of services. In the same report, to enrich the information available to analyze regional differences in well-being, regional boards based on composite indices were introduced (see Istat 2017).

In 2018 a new section was added in the report containing insights on the analysis of well-being, based mainly on the analysis of cross-cutting issues (see Istat 2018). In particular two in-depth studies were presented. The first concerns an analysis of the determinants of subjective well-being, identified within the Bes domains, analyzing their evolution in recent years (2011, 2013, 2017). The second analysis explores vertical inequalities in well-being, presenting measures of the gap, with respect to different phenomena, between people at the top of the distribution and people at the bottom of the distribution.

The annual Bes reports, therefore propose a systematic update of the indicators beyond GDP, by providing further elements necessary for the overall measurement of well-being of the Italian society.

3 Challenge 1: use of administrative data for territorial well-being

Most of Italian well-being indicators (Bes) make use of survey data (58%) instead of administrative or census data. As already been discussed elsewhere (Cookson et al. 2012), the main advantage in using survey data is that they allow to trace the inequality analysis among individuals, as they collect information referring to the whole population, just like census data do. However, new alternative data sources have become available in recent decades. Examples are administrative data like tax registers, or other large data sets — so called big data — that are generated as a byproduct of processes not directly related to statistical production purposes.

These new sources could be extremely useful to improve the territorial representation of the indicators that is limited when based on sample survey[3].

But new sources could be limited too. For example administrative archives often do not related to a specific statistical framework referring on specific subgroups related to the administrative action, for which they are implemented. For instance, the Italian social security system regularly collects information about employees and self-employed persons enrolled in a tax register, excluding people in a different status even though they did at least one hour of work in the reference week (e.g., unpaid family work), leading to an undercoverage of the total phenomenon. Unfortunately, the latter are particularly important for estimating the total number of employees, according to the official definition of the total employed population [4].

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[3]This issue is addressed inside the project MAKSWELL, in the workpackage 2, see Bacchini et al. 2018

[4]Cfr. Eurostat, EU labour force survey - methodology: `https://ec.europa.eu/eurostat/`

For these reasons, territorial well-being indicators could be a fertile ground for addressing pragmatic issues related to the integration of various sources of data, survey data, census data and administrative records that are increasingly accessible in recent years also for national statistical offices (NSOs). Since 2013, an effort has been made in this field by Istat, which has proposed a measurement of well-being indicators for Italian provinces (Bes-P), which from 2018 supplemented the regional indicators regularly elaborated for the national Bes project. Moreover, a multi source system of indicators at municipal level was recently implemented by Istat within the experimental statistic (Bes-C). Bes-C is heavily based on administrative data available also at municipality level.

In general, especially when the territorial dimension remains within a relatively large size, as in the case of Italian Provinces, there are no particular difficulties in the transition from the higher territorial levels, namely regions. In fact, provincial well-being indicators can be directly computed from the same data sources used for the national Bes. This is the case, for example, for the employment rate, defined for regions, provinces and largest municipalities, as the percentage of occupied people aged between 20 and 64 as estimated by Istat's Labour Force survey.

However, the choice of an administrative source to produce an indicator at municipality level could create a mixture in the source for the same indicator according to the territorial level, moving from survey to administrative data. In turn, this mixture could generate incoherence for the territorial level where it is feasible to elaborate the same indicator with the two different sources.

For example with reference to the *Work and Life balance*, the Istat Labor Force Survey collects extremely up to date data to estimate at provincial level some indicators, as the *Employment Rate* and *Young people not in education, employment, or training (NEET)'* [5].

Survey data are not designed for providing robust estimates at sub-provincial level. To overcome this issue, a recent experiment involving the municipalities of Basilicata and Emilia Romagna has used administrative data from the Social Security System (SSS) (Bianchino and Ricci 2017).

The phenomena to which these aggregates relate are often very close and partially overlap with those estimated by the survey. In particular, comparing the numerical values obtained from the use of these different data sources, small differences in estimation have been found, related to the different definitions of the units under analysis. For example, while the survey data are collected based on the statistical definition of employment, thus including irregular workers, the administrative archives refer only to regular employment signals (see Figures 2) [6].

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statistics-explained/index.php/EU_labour_force_survey_-_methodology

[5]Information on the questionnaire used for data collection and the methodology implemented in this Survey can be found on the website link: http://www.istat.it/it/archivio/8263.

[6]According to the Istat Labor Force Survey, the *Employed People* include persons over the age of 15 that, during the reference week: have spent at least one hour of work in any activity that provides for a salary;
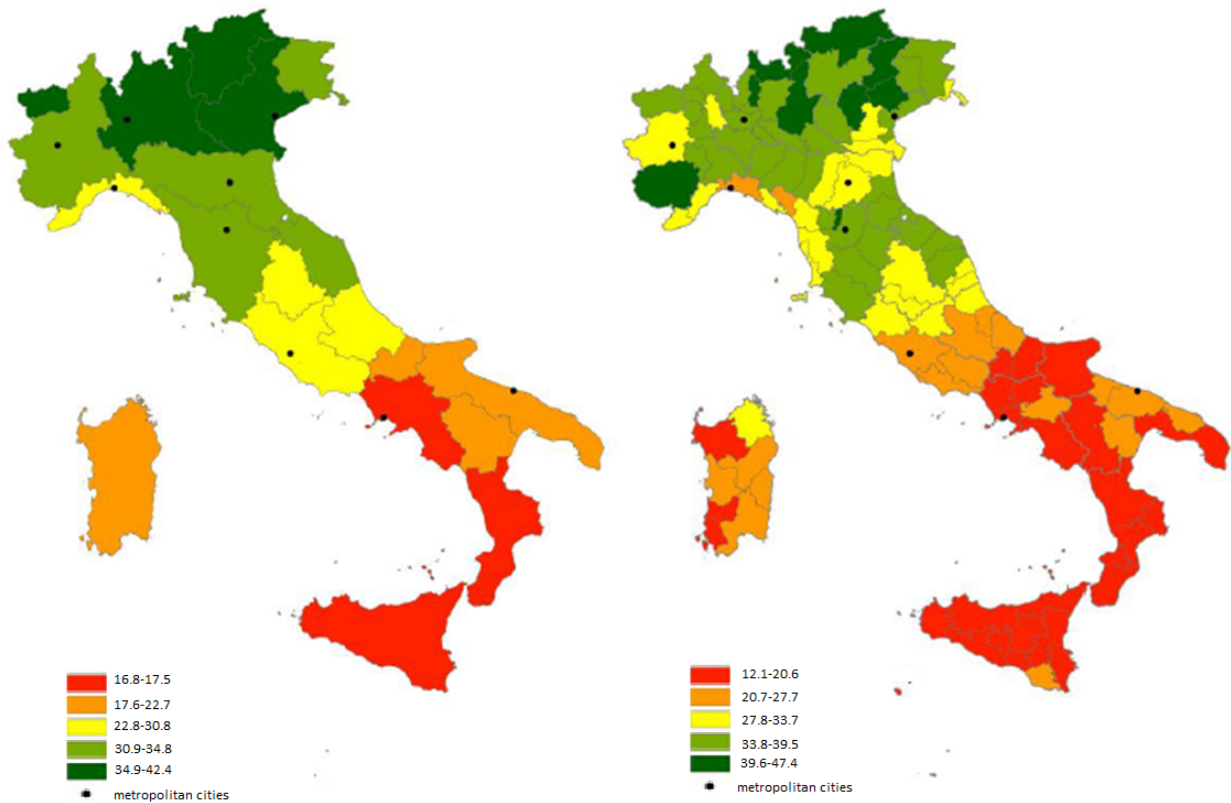
Figure 2: Youth employment rate (15-29 years old). Percentage points. Italian regions and provinces. Year 2014.

Considering the NEETs, the SSS provides information about the working situation, and the administrative records informations on students can highlight their attendance (or not) to any school program. Also in this case, administrative data are partial, as vocational training courses are not included, which are, in turn, covered by the survey responses (see Figures 3)[7].

When we move at regional level where it is feasible a comparison of the estimate provided by the survey and the administrative source, the differences seem strictly related to the amount of under-coverage in the administrative databases. Regardless of the magnitude of these differences, potentially justified by the incomplete overlapping of analytic units in the two data sources, the increasingly widespread use of administrative sources for estimating a wide range of socioeconomic territorial indicators is particularly interesting and it is a new challenge for the NSOs, as it allows to collect timely and low-cost information.

Especially in the more developed countries, the rapid growth of computerized systems for the collection of individual data in the administrative services requires, above all, reflections on the techniques of investigation and data processing, both related to confidentiality issue and

have spent at least one hour of unpaid work in the family business where they usually work; are absent from work (for example, for leave or illness).

[7]In particular, administrative records do not take into account persons enrolled in AFAM instructional classes and education and training classes managed by the Regions.
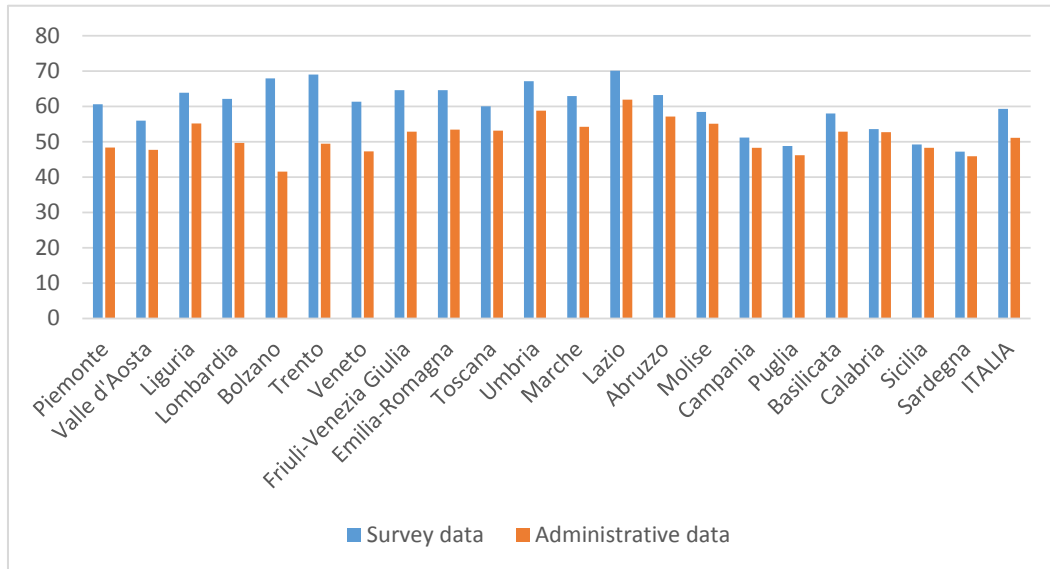
Figure 3: Bes indicator: 25-64 year olds with at least a higher secondary school degree. Percentage points. Italian regions. Year 2014.

the flexibility of its use for statistical purposes. Therefore, the process of realizing tools for collecting and processing administrative data and integrating them with survey data, together with the exploitation of the informative opportunities related to the availability of Big Data is gaining new impetus and will probably be at the center of NSOs activities in the next future. Data integration could also represent for the NSOs an opportunity to improve the timeliness and reduce the cost of reliable statistics, but also to limit the phenomenon known as the "statistical burden" (see Bacchini et al. 2018).

Nevertheless some problems remain in the elaboration of the indicators for a granular territorial representation. For example in the construction of some indicators derived exclusively from survey data, it is not possible to obtain reliable estimates under a certain minimum territorial level. This is the case of the *Subjective well-being* indicators, calculated as the percentage of 14 years and older persons who have expressed an high score (8 to 10) of satisfaction for their own life, or some of its aspects. In these cases, the sample size does not allow to estimate the indicators for sub-regional aggregates and it is also impossible to use other data, such as registers data. Here the research field is open to new solutions, through the exploration of the pioneering potential of using the latest generation of Big Data (Di Bella et al. 2018). Administrative sources and big data could then be tested to support the collection of individual data across the territory. Real example inside NSOs are either based on scanner data for prices or mobile phone for tourism.

4 Challenge 2: from individual indicators to composite indices

Since 2015, the Italian Institute of Statistics (Istat), after careful analyses and experimentations, has decided to include the computation of composite indices for the domains of well-being in its Bes annual reports.

The main reason for this choice is that composite indices can be very useful for policy analysis and for the dissemination of findings. Even if composite indices could send misleading policy messages if they are poorly built or interpreted, however then they can be productively used to stimulate public interest if they are carefully constructed and not analyzed in a simplistic way. In fact they allow measuring multidimensional concepts in a way that is usually easier to interpret than finding common trends in many separate indicators and they provide an easy tool to compare complex dimensions effectively, also over time, and thus they facilitate the communication with the general public and promote accountability (see OECD and JRC 2008). This is even more true now that, following a beyond-GDP approach, well-being indicators will be also officially used for the evaluation of fiscal policies (see Sect. 5).

From a general point of view composite indices for well-being should provide, in a consistent way, both spatial and temporal comparisons. Cardinal measures are usually more appropriate than counting measures for the measurement of well-being (Mauro et al. 2018), but there is not a well-established methodology to produce composite indices, and researchers have to deal with potentially difficult and problematic issues, such as standardization of variables, implicit weighting, management of substitutability rates. Actually composite indices could "differ in the dimensions and indicators selected, the transformations applied to the indicators, the assumed substitutability between indicators and the relative weights given to them" (Decancq and Lugo 2013).

To emphasize the role of weights, time and substitutability we can use the notation proposed by Decancq and Lugo 2013:

$$I(x) = \begin{cases} [w_1 I_1(x_1)^\beta + \ldots + w_m I_m(x_m)^\beta]^{\frac{1}{\beta}}, & \text{for } \beta \neq 0. \\ I_1(x_1)^{w_1} \cdot \ldots \cdot I_m(x_m)^{w_m} & \text{for } \beta = 0. \end{cases} \tag{1}$$

The composite index $I(x)$ for a given statistical unit is defined as a weighted mean of order β and weights w_j of the transformed individual indicators $I_j(x_j)$ measured on the same statistical unit (in fact, before being sensibly aggregated, individual indicators need to be transformed to a common basis). The parameter β is directly related to the elasticity of substitution between the transformed indicators. The smaller the value of β, the smaller the allowed substitutability between indicators. For $\beta = 1$ we have the standard weighted arithmetic mean and the elasticity of substitution is infinite (i.e., the indicators are perfect substitutes, that is: there is a fixed rate at which one achievement can be exchanged with another one). Because of that, the arithmetic mean is not always desirable. For $\beta = -\infty$, $I(x)$ is just the

minimum of the transformed indicators, and the elasticity of substitution is 0; for $\beta = 0$, $I(x)$ is the weighted geometric mean, with a unit elasticity of substitution (a one percent increase in an indicator can be compensated by a one percent increase in another).

Let us make some examples of the variety of normalization (I_j) and aggregation (β, w_j) methods found in the literature: the renowned *Human Development Index*, developed by the UN (UNDP 2016), uses a min-max normalization (with fixed goalposts) and an aggregation based on a simple geometric mean; both the *Well Being Index* by the Portuguese Institute of Statistics (INE - Portugal 2017) and *The Canadian Index of Well-being* by the University of Waterloo (University of Waterloo 2016) adopt a normalization based on index numbers and an aggregation based on a (weighted) arithmetic mean; the *Better life index* by OECD (OECD 2017) applies a simple min-max normalization and an aggregation based on a weighted arithmetic mean, in which the weights are subjectively chosen; the *Quality of Life 2016* by the Spanish Institute of Statistics (INE - Spain 2018) standardizes individual indicators with z-scores and aggregates them with a simple arithmetic mean minus a penalty directly related to the heterogeneity among indicators. The latter aggregation function does not belong to the framework of Eq. 1.

In the following, let us analyze in more detail the composite indices included in the Bes reports. As already explained (see Sect. 2), for each domain of well-being a group of individual indicators has been selected and computed for several years and all the Italian regions; afterwards in order to aggregate these individual indicators into composite indices, Istat has adopted a strategy specifically developed by Mazziotta and Pareto (see Mazziotta and Pareto 2016 and Istat 2015, p. 49) that provides the so-called composite AMPI (*Adjusted Mazziotta–Pareto Index*). According to the authors, AMPI is transparent, easy to compute and to interpret; it allows spatial and temporal comparisons; it is robust and, as the geometric mean, it purposely prevents compensation between individual indicators, so that a deficit in one component cannot be completely offset by a surplus in another one. The underlying principle is that the individual indicators have all equal importance and then a perfect substitutability among factors might not be desirable; on the contrary, a good composite index should penalize heterogeneity so that, in order to obtain a high value of the composite index, all the individual indicators must assume high values (see Mauro et al. 2018). In other words, AMPI is an unbalanced-adjusted function (see Casadio Tarabusi and Guarini 2013).

The Mazziotta–Pareto's methodology consists of two steps:

1. **normalization** of each individual indicator between 70 and 130, according to two "goalposts", i.e., a minimum and maximum value for all time periods (years) and all units (regions) which represent the possible range of the indicator; to facilitate the interpretation of results, the two goalposts are chosen so that 100 corresponds to a reference value (e.g, in *Rapporto Bes* Italy, for the base year, is assigned 100). See Mazziotta and Pareto 2016, par. 3.3 and Bacchini et al. 2019, par. 4.2 .

2. **aggregation** (for each domain) of individual indicators into the composite index AMPI

by computing the arithmetic mean of the normalized indicators and then penalizing the result with respect to the horizontal variability between individual indicators. More specifically, the arithmetic mean is reduced by an amount equal to the standard deviation times the coefficient of variation. See Mazziotta and Pareto 2016, par. 3.1 and Bacchini et al. 2019, par. 5.2.

The penalization has been introduced in order to address the issue of the perfect substitutability of the (simpler) arithmetic mean. In this regard AMPI reaches the goal, but, on the other side, the proposed index is not theoretically monotone, a property that every index should satisfy (see Bacchini et al. 2019, app. A).

Moreover the time dimension appears not to have been properly dealt with. In fact, in the normalization step the search for the minimum and maximum is performed along all the time series. Then a constraint on the so-called base year is introduced. These two ways of considering the time dimension could conflict with each other, as we are going to see (for other examples and comments on this aspect refer to Bacchini et al. 2019, par. 5.2.1).

In fact, on the one hand AMPI aims to penalize those statistical units for which individual indicators, observed at a certain time, are unbalanced. But on the other hand, because of the reference value in a given year, AMPI is considering an artificial notion of equilibrium, and the aggregation would penalize the distance from that artificial equilibrium and not a disequilibrium measured against minima and maxima (as for Better life index, OECD 2017) or against average values (as for Quality of life Spain 2016, INE - Spain 2018) or defined a-priori (as for HDI, UNDP 2016). In this respect AMPI, by construction, defines equilibrium as the situation for Italy in 2010. Therefore if we aggregate two Italian indicators, one already at its best in 2010, and stable over time, and another one that steadily improves from 2010 onwards, then AMPI would unduly impose more and more burdensome penalties at the composite index as time goes by. As a further and more specific example consider the raw indicators *POL3 - Trust in the judicial system* and *POL12 - Overcrowding of correctional facilities* for Italy from the domain *politics and institutions* (Istat 2017). The Italian average of POL3, along the time span 2010-2016, is 4.3. The Italian average of POL12, in the same time span, is 127.2. From 2010 to 2015 POL3 goes down from 4.6 to 4; in the same period POL12 — that is negatively polarized — goes up from 151 to 105.2. Considering POL3 and POL12, with respect to their average values, the situation for Italy is almost exactly symmetric in the two years. But, again, in 2010 AMPI does not impose any penalization, while in 2016 AMPI imposes a penalization of 4.6 points, as if the first indicator (that got worse) is much more important than the second (that has improved).
Moreover it should be considered that when the reference year or/and the goalposts are updated the actual range of the normalized indicators can change, possibly resulting in opposite trends in the composite index, or different spatial rankings.

All these characteristics make it difficult to comment on the evolution of the composite indices of well-being year after year, and that is even more true considering that the growth rate of the composite index cannot be easily decomposed in the temporal dynamics of the

individual indicators. For example consider the composite index *health*, elaborated for the period 2009-2016 (Istat 2017). The index is made up of five individual indicators: *SAL1 - life expectancy at birth, SAL2 - healthy life expectancy at birth, SAL3 - physical status index, SAL4 - psychological status index, SAL9 - disability-free life expectancy at 65.*

In Fig. 4 the composite index for Italy is presented in two variants that combine different choices for normalization and aggregation: AMPN + AMPI and index numbers + geometric mean.

The main deviations of the two trends are actually due to the normalization process rather than the aggregation method. Between 2012 and 2013 AMPN + AMPI improves by 0.4%, while index numbers + geometric mean worsens by 0.8%. In fact the raw indicator SAL9 decrease by 4.2%, while the other raw indicators move very little. But even if the raw indicator SAL1 increases just by 0.4%, AMPN makes it acquire much more variability and the normalized indicator improves by 4.4%, overcompensating the change in SAL9 and dragging the composite up. On the contrary, index numbers completely respect percentage changes but do not control for variability. A similar case can be made for SAL4.
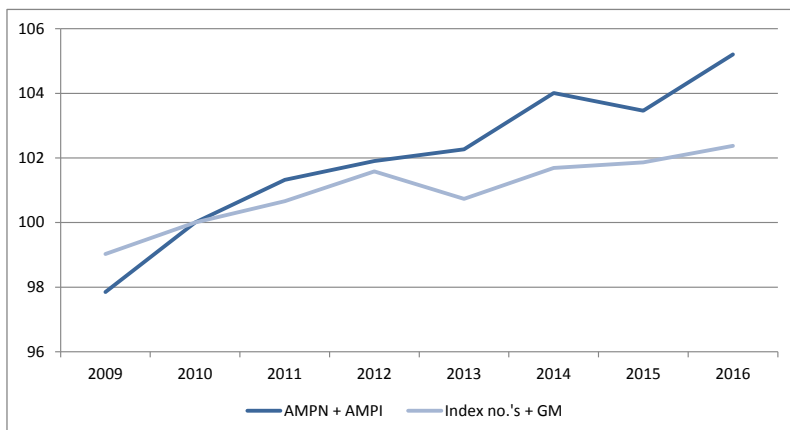

Figure 4: Composite index *health* computed with two different normalization and aggregation techniques (AMPN and AMPI; index numbers and geometric mean). Italy. Years 2009-2016.

This example clearly shows the impact of the choice of normalization and aggregation techniques and the trade-off amid the control of variability and the preservation of the annual growth rate (see also Bacchini et al. 2019, par. 5.3).

These and other drawbacks of AMPI (see Bacchini et al. 2019 for a thorough discussion) prompt us to reconsider the current normalization and aggregation techniques, especially now that well-being indicators are related to the policy agenda, and there is a new pressure for clarity and simplicity in the communication. Facing these challenges inside the AMPI paradigm could be an important step forward. Meanwhile, the composite index used in the Italian Bes could be related to the introduction of different normalization procedures (based on fixed ranges or index numbers), and then an aggregation (for each domain) based on the geometric mean. This approach will be similar to some of the main international experiences (see for example UNDP 2016, University of Waterloo 2016, INE - Portugal 2017).

5 Challenge 3: well-being and policy making

As pointed out in Stiglitz et al. (2018a) "well-being indicators could be used in the different stages of the policy cycle, from identifying priorities for action, to assessing the pros and cons of different strategies to achieve policy goals, to allocate the resources (budgetary, human, political) needed to implement the selected strategy, to monitor interventions in real time as they are implemented, and to assess the results achieved and take decisions on how to change policies in the future".

The Italian framework represents an example of the implementation, established by law, of a policy cycle taking into account also well-being indicators. The selection process has been completed in 2017 and the first application has been tested in the planning Document of Economy and Finance (DEF) in the same year. Concerning the policy cycle (see Figure 5) the Italian initiative has implemented a reference to well-being indicators in all the phases from *Agenda setting* to *Monitoring* but, due to its recent introduction, more work has to be done to refine the *Evaluation* phase.
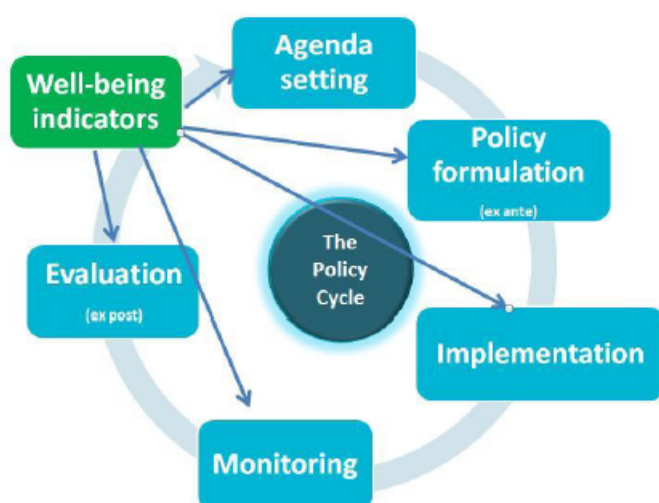

Figure 5: The policy cycle (from Stiglitz et al. 2018a)

5.1 The new budget law including well-being indicators

In 2016, a favorable opportunity arose to introduce in a structural way the concept of well-being in the policy making process in Italy. It was initially brought forward in the Budget Committee of the Parliament: the shift from an "illustrative" use of the Bes to an explicit link to its indicators in the policy cycle, including also the possibility to tune and evaluate policy measures taking into consideration their effects on well-being, was considered a relevant improvement and gained a general consensus. The innovation was included in the Law reforming the budget law (163/2016), establishing that well-being indicators have to be considered in the economic policy process. In particular, the law indicates that an analysis of the

recent trend has to be performed, together with ad-hoc simulations of the expected evolution in two scenarios, one just projecting past trends (trend scenario), the other one taking into consideration the impact of new policy measures on well-being (policy scenario) (see G.U. 2016).

The new law's requirements lead to two annual reports. The first one, in April, corresponds to the presentation of the Planning Document on Economic and Financial Policy (DEF–Documento di Economia e Finanza), where the Government outlines the policy actions to be undertaken in the subsequent three-years period. In an annex, also the indicators measuring equitable and sustainable well-being are analyzed and projected in the trend and in the policy scenario. In February, following the approval of the Budget law for the current year, a second report is presented to the Parliament, updating findings and forecasts presented in the DEF in light of the specific measures set out in the Budget law in force (usually approved by the end of the previous year).

The addition of these documents to the usual materials accompanying the definition of the Budget law adds new perspectives to the process of economic policy, but it brings also some issues, some of which already highlighted by Istat (Istat 2016) and the Parliamentary Budget Office (UPB 2016) during the hearings in preparation of the final draft of the law. First of all, it was remarked that the implementation of new econometric models, necessary to forecast in a consistent way the macro economic variables and well-being indicators, was expected to be a great challenge, the greater the more indicators taken into account. Hence, an important point would have been to limit the number of indicators to make the whole exercise sustainable and feasible (reminding that the full Bes framework includes 130 indicators), without prejudice to the need for a measurement of well-being in all its dimensions. The choice of indicators was pointed out as an extremely sensitive step, also in light of the well-known statement "what we measure affects what we do" (Stiglitz et al. 2009).

In addition to that, the timing of the two reports, especially the annex to the DEF, could introduce some extra difficulties in the process of forecasting the effects of policy measures on well-being. In fact, the policy scenario would be better grounded if based on detailed policy measures, which are not usually already available in the DEF. Finally, some issues could also be related to the timeliness of data on which analysis and forecasts should be based, as the timing required for the reports is not necessarily aligned with the timing of data production by the National Statistical System and by Istat.

These considerations clearly indicated that the process set up by the new law would have needed a strong investment, a period of test and possibly some adjustments before fully displaying its potential as a mean to actually evaluate economic policy also in light of their effects on well-being.

Following the law's approval, part of these issues have been addressed and possible solutions have been proposed, as described below; further remarks about usability and interpretation of results can be made on the basis of the first cycle of implementation.

5.2 The selection of indicators

Considerations to be taken into account when setting up a system of indicators to inform policy making have been discussed in several publications (see Martinuzzi et al. 2013, Swiss Federal Statistical Office 2012, UN 2014, Eurostat 2014b, Eurostat 2014a, EU DGINS 2015), especially in relation with the issue of sustainability and well-being measurements.

In the Italian case, a high level commission was set up in order to carry out the sensitive task to propose a suitable list of well-being indicators to be included in the policy process, a proposal to be discussed and approved by the relevant parliamentary committees.
The process aimed at ensuring both democratic legitimacy and technical soundness: the scientific, methodological and operational expertise was entrusted to the members of the Commission, while the Parliament — as representative body — remained responsible for the final choice.

The final list of indicators was approved unanimously by the parliamentary committees, with a general appreciation from media and opinion makers, but the choice not to involve directly representatives of the civil society was also criticized by some experts, reckoning that any lack of participation in such a sensitive decision could weaken the positive impact of that innovation (Gawronski 2017 and Olini 2017).

The Commission was fully aware that every choice would imply some discontent, so it was considered crucial to put forward criteria followed in the decision making process. To this aim, the Commission was quite attentive in stating clearly why it was chosen to consider as starting point the Bes indicators, which selection criteria were applied to select the final list of indicators among the 130 Bes measures, and the reasons for the final choice. The full report is available (Comitato per gli indicatori di benessere equo e sostenibile 2017) so that the whole process is public and transparent (see also Bacchini et al. 2018).

The final result of the Commission's work is a selection of 12 indicators out of the 130 included in the Bes framework, namely:

1. Mean adjusted income (per capita)

2. Income inequality (quintile ratio)

3. Incidence of Absolute poverty;

4. Life expectancy in good health at birth

5. Overweight and obesity

6. Early school leavers

7. Non-participation in employment

8. Employment rate of women aged 25-49 with preschool children vs women without children

9. Victims of predatory crime

10. Mean length of civil justice trials

11. CO_2 and other greenhouse gas emissions (tons x inhab.)

12. Illegal Building

One of the points debated inside the Commission is especially worth mentioning here: whether or not to include in the final selection subjective indicators, in particular the indicator on life satisfaction. It can be argued that to increase the subjective well-being, as expressed by the individual perception of the level of satisfaction for his/her own life or by a measure of happiness, should be considered the ultimate goal of policy (Layard 2011). The Commission followed a different approach: considering that subjective well-being cannot be easily linked to single policy measures, and that it depends on a number of different factors that are out of the sphere of policies included in the Budget law, they opted for the exclusion of a measure of life satisfaction, even if it is present in the Bes framework.

5.3 The policy cycle in practice

A preliminary selection of well-being indicators was included for the first time in the 2017 DEF, drafted by the Ministry of Economy and Finance (MEF). This first exercise was carried out on four indicators: mean adjusted income (per capita); non-participation in employment (rate); income inequality index (quintile ratio); CO_2 and other greenhouse gas emissions (tons per inhabitant). For those indicators, provided by Istat, the trend evolution in the next three years was simulated and compared with the evolution forecasted in the policy scenario. In February 2018, the same exercise was repeated for the Report presented to the Parliament in the light of the actual policy measures included in the last Budget law, leading to some adjustments in the policy scenario, and again in April 2018 in the DEF, which included also an analysis of the whole set of 12 indicators.

In order to examine results and possible weak points, an example is taken with reference to one of the four indicators, namely *Non-participation in the labour market*. Figure 6 shows the indicator and the four evolution paths presented by the Government in the three documents produced between April 2017 and April 2018.

Some considerations can be drawn by comparing the subsequent forecasts of the indicator. The issue of the starting year for simulations is a sensitive one: the 2017 point forecasted in the first DEF was 0.5 p.p. higher than the observed one (included by the 2018 DEF) implying an overall overestimation for the whole forecasting period. The estimate used for the Report
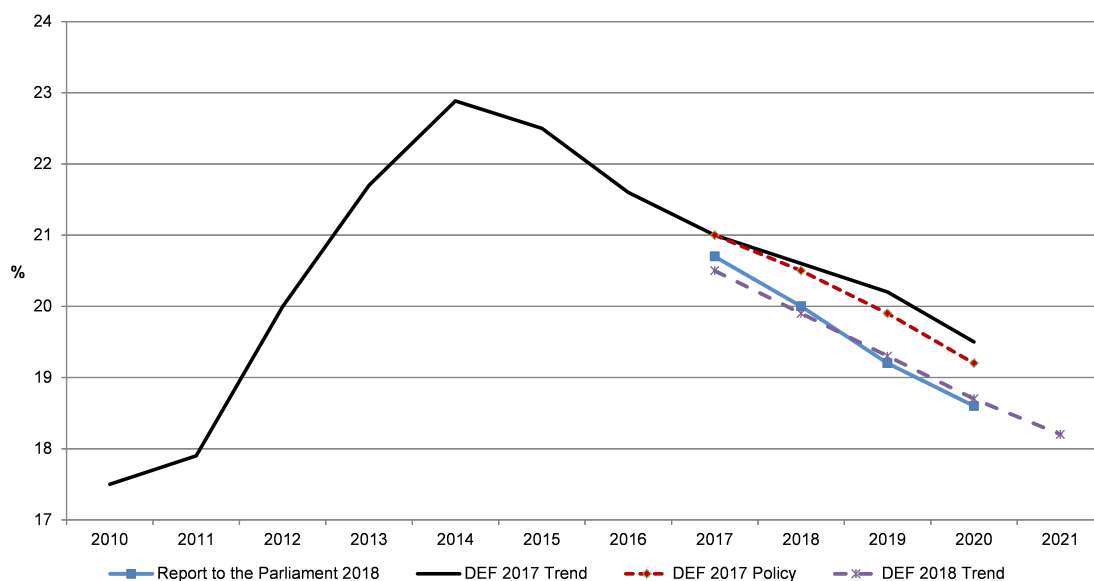
Figure 6: Non-participation in the labour market - observed and forecasted rates (2010-2021) – Italy

to Parliament (RP) was not yet the final one but surely more accurate, as it could already benefit of data published by Istat for the first three quarters of 2017.

The decrease in the estimated rate highlights that all the MEF scenarios are optimistic. The same applies to the other indicators with the exception of the indicator CO_2 *and other greenhouse gas emissions* that should slightly increase.

The 2017 DEF policy scenario is more conservative than the one presented in RP, where the effect of specific measures aimed to foster the labour market participation included in the 2018 Budget Law can be taken into consideration giving an higher informative value. In the latter the total decrease is -3 percentage points in the period 2017-2020, whereas in the former it is -2.4 p.p., much closer to the trend scenario (-2.1 p.p.).

Finally, the 2018 DEF trend scenario (the only one produced by MEF as the government was outgoing) starts from an observed value for 2017 which is slightly lower than the 2018 RP, but it presents a more moderate evolution, even though the normative framework is the same (the 2018 Budget Law) possibly due to changes in the macroeconomic scenario (e.g. on the overall evolution of the labour market).

In order to carry out this exercise, some of the issues highlighted before were coped with.

First of all, new econometric models were implemented by the MEF, necessary to forecast in a consistent way macro-economic variables and the four initial well-being indicators. Each indicator was forecasted with reference to a specific approach (Zoppoli et al. 2018).

As an example, the forecast of the mean adjusted income was based on proxies already forecasted in the Macro-economic framework included in the DEF, namely the gross available income for consumer households, the income of employees in Public Administration (PA) and

Table 1: Number of indicators updated with 3-months time lag, by method

No.	Method	Source
7	Currently available	Istat, Ministry of Justice, Cresme
3	Ad hoc estimates on provisional data	Istat, Ministry of Interiors
2	Models for flash estimates	Istat and Istat based on Ispra data

intermediate consumptions in PA.

A second challenge was to align the timing of data production to the law's provision. That required an effort from the whole National Statistical System, called upon to fasten the production process, to provide flash estimates based on provisional data, or even to implement forecasting models for those indicators whose data would be too late.
Table 1 shows the solutions adopted for the twelve indicators and the responsible body: the effort was a collective one, even though a great part of activities were borne by Istat, that had also a coordination role.

The models for flash estimates deserve a special attention, in particular the one implemented to provide updated data on the income inequality index, which is the ratio between the total income of the richest part of the population (first quintile: Q1) and the total income of the poorest one (fifth quintile: Q5).

Concerning the production process, the income inequality index is currently compted using the microdata drawn from the European survey on *income and living conditions* (EU-SILC). Due to the data to be acquired, results are not available as timely as required by the policy evaluation cycle. For example at the end of 2018, the last available update was the 2016 one but, by the end of January 2019, Istat should provide the estimation of 2017 data[8].

However, this delay is common across European countries. Infact, providing timelier statistics on income poverty and inequality is a priority for the Commission and the European Statistical System.

To overcome this issue a new methodology based on microsimulation and macro-economic models has been put in place by Eurostat[9].

Istat has faced this new challenge adopting for the first round, referring to the preliminary estimation of 2015, a micro approach based on the microsimulation model developed by Istat (Cozzolino et al. 2015). Starting from the estimation for 2016, Istat switched to a macro approach using as covariates the timelier information on the poverty rate and the saving rate.

For example, to estimate the 2017 data of the first quintile (Q1) the strategy has been to regress Q1 with the absolute poverty rate that is available 6 months after the end of the

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[8] And the end of March the estimation should be provided also for 2018

[9] See the website related to th eexperimental statistics https://ec.europa.eu/eurostat/web/experimental-statistics/income-inequality-and-poverty-indicators

reference period.

Results are presented in the following equation, where $d15$ represents a dummy variable for the year 2015 that has been characterized by a very low level of Q1 compared to the average of previous years.

$$\widehat{\text{q1\_perc}} = \underset{(0.099)}{7.79} - \underset{(0.139)}{0.369}\,\text{d15} - \underset{(0.0184)}{0.14}\,\text{pov\_ass}$$

$$T = 13 \quad \bar{R}^2 = 0.8799 \quad F(2,10) = 44.947 \quad \hat{\sigma} = 0.11949$$

$$\text{(standard errors in parentheses)}$$

The estimation performance is reported in Figure 7

Figure 7: Q1 estimation based on poverty rate. Percentage points. Italy. Years 2007-2018

A similar approach has been followed for the estimation of Q5 using the saving rate (sav) drawn from the annual national accounts that are available 2 months after the reference year. In this case the equation started from 2007.

Here the results of the estimation:

$$\widehat{\text{q5\_perc}} = \underset{(0.29)}{40.97} - \underset{(0.031)}{0.18}\,\text{sav}$$

$$T = 11 \quad \bar{R}^2 = 0.76 \quad F(1,9) = 33.081 \quad \hat{\sigma} = 0.15637$$

$$\text{(standard errors in parentheses)}$$

while Figure 8 reports the graph for the real and the estimated values.

Figure 8: Q5 estimation based on saving rate. Percentage points. Italy. Years 2007-2018

6   Conclusions

Attention towards well-being indicators has been growing in the recent years, driven by both the updated work by Stiglitz et al. (2018a) and the higher number of national and international frameworks developed. In turn, this has implied a more frequent presence in the policy debate of themes *beyond GDP* that is expected to fill the gap "that separates policy-makers and ordinary people today".

However new attention and more data call for both the definition of a metric for well-being and, more importantly, the definition of a policy cycle able to connect the evolution of well-being indicators to the selected policies.

This new phase, that we have labelled 2.0, is extremely important because it is expected to produce a more comprehensive debate about the purposes of public policies.

The Italian experience could be useful to exemplify this evolution, illustrating at the same time some difficulties that can arise.

Firstly, it is fundamental to invest in the timeliness of the selected indicators reinforcing the current production process, exploiting new sources of data (i.e big data) and developing new methodologies, such as for example small area estimators.

Secondly a discussion on the micro and macro models able to design the policy scenario for the middle-term is necessary. This discussion is expected to be shared among the researchers in a way to ensure that the models selected are agreed upon and constitute a common background.

Finally, the policy cycle requires a fine-tuning of the evaluation phase that, due to the recent introduction of the well-being indicators in the policy cycle, is not clearly defined yet (Well-being 3.0?).

Together with the implementation of these steps, the crucial point will be to enlarge the debate on public policies with the aim of monitoring the process toward a more equitable and sustainable growth.

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