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The wealth of regions: divergence/convergence factors in "constitutional" wellbeing indicators in an empirical analysis on Italian regions

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The wealth of regions: divergence/convergence factors in "constitutional" wellbeing indicators in an empirical analysis on Italian regions

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Abstract

We test for the presence of convergence/divergence in wellbeing among Italian regions using as a reference the Italian Constitutional Law and the novel institutional taxonomy of Equitable and Sustainable Wellbeing Indicators measuring wellbeing in a multidimensional perspective. We find evidence of a weak convergence process that is however slowed down by the shock of the constitutional decentralisation reform giving more power to regional administrations. We as well document relatively more convergence in indicators depending on market forces than on regional administrations. Based on our findings, we outline policy suggestions for the optimal state-periphery mix in terms of centralization/decentralization, diffusion and convergence of the wellbeing of regions.

Keywords: wellbeing indicators, convergence, regional development.

JEL numbers: I31, R10, R11.

1. Introduction

Even though we are accustomed to resume it in synthetic indicators such as GDP levels and growth, wellbeing is inherently multidimensional and it has naturally been conceived as such in the past. In the famous series of Siena's frescoes called *The Allegory and Effects of Good and Bad Government* (1338-39) Ambrogio Lorenzetti describes the effects of good government in the city and in the country by taking simultaneously into account economic wellbeing (the city is rich being filled with clustered palaces, markets, towers, churches, streets and walls), education (a professor teaching in one of the main buildings), quality of relationships (wedding procession taking place, and maidens seen dancing), quality of services and safety[1] (see Figures 1A-1B).

The traditional attention to multidimensional wellbeing, well rooted in art and history, has been recently renewed by the creation of the Italian BES that includes 12 domains and, among them, all those allegorically considered in the Lorenzetti's frescoes. The creation of the Italian BES

[1] Safety is represented in the fresco by a winged allegorical figure hovering above the landscape. The winged figure holds a scroll explaining that safety is guaranteed to those who live under the rule of law. The text written on the scroll says: "Without fear every many may travel freely and each may till and sow, so long as this commune shall maintain this lady [Justice] sovereign, for she has stripped the wicked of all power".

(Benessere Equo e Sostenibile), a set of multidimensional (subjective and objective) wellbeing indicators, follows the recommendations of the Sen-Stiglitz commission[2] and was realized into three steps, with a participated process involving representatives of the main stakeholder groups of the Italian society. In the first step, the Italian National Statistical Institute consulted the above mentioned representative members, by asking them to indicate those regarded as being the most relevant wellbeing domains. In the second step, commissions of experts for each selected domain worked to create a set of indicators measuring wellbeing in that given domain. In the third step, indicators were presented to stakeholder groups, commented, revised and finally validated by them.

The three-step process led to the creation of 12 BES domains[3] (Health, Education and Training, Work and Life Balance, Economic Well-Being, Social Relationship, Politics and Institutions, Safety, Subjective Well-Being, Natural and Cultural Heritage, Environment, Research and Innovation, Quality of Services) and 134 indicators.

Based on the new set of wellbeing indicators, the first BES report of the Italian National Statistical Institute was issued in 2013 and, since then, every year.[4] BES data are currently available at regional and at (major) city level. The growing importance of BES, also from a policy perspective, is demonstrated by the law approved by the Italian parliament in June 2016, according to which the Italian yearly financial law (*Documento di Economia e Finanza*) has to be evaluated not just in terms of impact on GDP, but also on multidimensional wellbeing, that is, in terms of its consequences on a selected number of BES indicators. (ie. health expenditure cuts in terms of life expectancy, job reforms in terms of quality of work and work and life balance, industrial policies in terms of impact on carbon emissions).

Viewed in the perspective of the debate of relative pros and cons of subjective and objective wellbeing indicators, the BES has the desirable property of overcoming some well-known limits of both. On the one side, the three-step process that led to its creation overcomes the "paternalistic" critique to objective wellbeing indicators provided by Sugden (2008). This is because BES indicators were not created arbitrarily by a group of experts who decide what is good for the society, but are the result of a grassroot participated process with the definition of the relevant wellbeing domains by representative groups of stakeholders. On the other side, the 134 BES indicators are a mix of subjective and objective indicators and thereby overcome the well-known "happy slave" Sen's (1985) critique: subjective wellbeing indicators depend too much on expectations and the latter may be so low to lead individuals to consider acceptable also very unfavourable objective wellbeing outcomes.[5]

The present paper aims to test whether there has been convergence or divergence in wellbeing across Italian regions testing several hypotheses on factors that may contribute positively/negatively to convergence using information from wellbeing indicators related to the BES domains available at regional level for the considered sample period (1995-2014). In this respect, it provides an original contribution to two different strands of the literature. The first is the debate on GDP limits in capturing subjective wellbeing started with the Easterlin paradox (1974) documenting the

[2] Downloadable at http://www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf.

[3] The list of the 134 indicators is attached in Appendix 1, Table A1. For additional related information on the BES, see the English version of the ISTAT/BES official website http://www.misuredelbenessere.it/index.php?id=48.

[4] The last (2016) BES report is downloadable at http://www.istat.it/it/files/2016/12/BES-2016.pdf.

[5] "*The defeated and the downtrodden come to lack the courage to desire things that others more favourably treated by society desire with easy confidence"* (Sen, 1985: 15).

decoupling between the share of self-declared happy individuals and per capita GDP dynamics in the US after the 50'es. Dynamics similar to those found by Easterlin have been observed, by Frey and Stutzer (2002) for a large sample of countries using as data sources the World Database of Happiness and the U.S. Bureau of Census data, by Blanchflower and Oswald (2004) for the United States, United Kingdom, Belgium and Japan, in the period going from the early 1970s to the late 1990s and for Japan by Veenhoven (1993) in the 1958-1987 period. Strong criticism to the paradox has been provided in an empirical analysis by Stevenson and Wolfers (2008), followed by a reply of Bartolini et al. (2008) and Easterlin and Angelescu (2009).

With reference to a second well-established literature field, by using a convergence approach, the paper extends to multidimensional wellbeing indicators a methodology usually applied in the growth literature (see among others Siegel, 1956; Baumol, 1986; Barro and Sala-i-Martin, 1991; Mankiw et al., 1992; Friedman, 1992; Islam, 1995; Quah, 1996; Sala-i-Martin, 1996; Monfort, 2008; Dvorokov, 2014; Young et al., 2008; Legendre, 2005) and the specific research on *absolute convergence* (Barro and Sala-i-Martin, 2004), *conditional convergence* (Sala-i-Martin, 1996) and *convergence clubs* (Galor, 1996). By doing so, it outlines a different theoretical background since the reasons of convergence in multidimensional wellbeing are not the same as those in GDP (see section 2).

The third field of the literature to which our paper is related is that of decentralization and economic performance. This literature mainly focuses on the effects of the former on economic growth, growth convergence and income inequality. The theoretical debate in this field argues that decentralization may foster efficiency for three main reasons (Rodriguez-Pose et al., 2007). First, local administrations are more likely to interpret and match local voter preferences (Musgrave, 1959; Martínez-Vázquez and McNab, 2003). Second, devolution of powers to local administrations creates competition among them in proportion to the capacity of inhabitants to "vote with their feets", ie. to choose the regions with the best services and economic opportunities (Prud'homme, 1995; Donahue, 1997; Martínez-Vázquez and McNab 2003; Tiebout, 1956 and Oates, 1972). Third, shorter distance between citizens and politicians may increase participation, transparency and accountability, thereby reducing the costs of collective action and cooperation (Putnam, 1993; Azfar et al., 1999; Inman and Rubinfeld, 2000).

On the other side, however, this literature tells that local governments risk to be more prone to corruption due to the reduced distance from interest groups, and that local officers may have lower technical skills. For these reasons, efficiency may actually fall with decentralization (Prud'homme 1995: 208). The empirical findings on the relationship between decentralization and economic performance are however mixed. Canaleta et al. (2004) find that decentralisation increases regional convergence. Some papers find that fiscal decentralization affects economic growth negatively (e.g. Davoodi and Zou, 1998;, Zhang and Zou, 1998 and 2001), while others find a positive relationship (Lin and Liu, 2000; Akai and Sakata, 2002 and Iimi, 2005). None of these contributions however looks at the nexus between decentralization and convergence in wellbeing indicators. Our paper therefore aims to contribute originally to this literature as well.

The originality of the paper therefore stands in combining different fields of the literature with the novel creation of a set of multidimensional wellbeing indicators.

Findings from our paper document that a convergence process is in action but also show that both progress in wellbeing and the convergence process are slowed down by the shock of the constitutional decentralization reform increasing the decision power or regional administrations (see section 2.1 for details). In this respect, our results do not find a positive nexus between

decentralization and wellbeing performance. A further interesting finding is that regional convergence tends to be significantly faster for indicators depending on (more or less regulated) market forces than on action of monopolistic local administrations. As a matter of fact, we find much more progress and convergence in areas such as water, electricity, gas supply and internet access (falling into the first category), than on public transport or separate garbage collection (falling into the second category). Our investigation has several policy implications and indicates directions for similar future research on other countries and sample periods.

The paper is divided into four sections. The second section presents the research hypotheses that will be tested in the empirical analysis. The third section presents our empirical methodology, discusses descriptive findings on convergence/divergence of individual and composite indicators in the last twenty years, illustrates econometric findings on convergence tests and discusses policy implications of our findings. The fourth section concludes.

2. Definition of our research hypothesis

The theory of convergence in the growth literature has a long and established tradition (see references in the introduction) and is mainly based on the assumptions of free mobility of productive factors and decreasing marginal productivity. The logic of its extension to multidimensional wellbeing hinges on the hypothesis that progress in wellbeing indicators may depend upon: i) technological progress incorporated in goods and services for indicators depending mainly on market forces; ii) progress in government administration for wellbeing indicators under government control; iii) emergence of best practices at local government level, developed by leading policymakers in proportion to the degree of decentralization of power in the specific wellbeing domain.

Under case i) we have reduced heterogeneity and convergence, provided that there are no obstacles to the diffusion of market forces at local level. Under case ii), homogeneity and convergence is obtained by definition. The problem arises under case iii) where local policymakers' innovation generates heterogeneity and divergence in a first time with the emergence of some best practices at regional level, while convergence may be realized in a second step, provided that forces pushing the less innovative local policymakers toward the frontier are in action.

Given that cases i), ii) and iii) are not mutually exclusive - as we will explain in what follows by illustrating the areas of concurring local-national legislation after the Italian constitutional reform - we assume that the problem of heterogeneity and divergence/convergence paths arises every time a wellbeing indicator depends, for a relevant part, from the action of local policymakers. Related to it, we assume that the constitutional reform (see section 2.1) delegating some powers to regional administrations, or creating areas of overlapping national/regional power, has produced a significant shock in the convergence process, based on the different laws of motion of convergence at national and regional level.

Specifically, the hypotheses that we will test (illustrated in details in sections 3.2 and 3.3) are the following:

1 *Convergence Hypothesis*: composite (and disaggregated) wellbeing indicators display convergence patterns, exactly as GDP growth.

2 *Constitutional Reform Hypothesis*: the constitutional reform decentralised government power at local level, thereby increasing the heterogeneity of wellbeing performance across regions and negatively affecting the convergence process across regions.

3. *Market Prevalence versus Non Market Prevalence Hypothesis*. Indicators predominantly driven by market forces have relatively stronger convergence paths since market forces spread uniformly across regions, while indicators not predominantly driven by market forces (where state and especially local administrations have a crucial role) have relatively weaker convergence paths.

In what follows we explain more in detail characteristics of the shock that gave rise to our hypothesis 2 and why we believe they may have affected divergence/convergence wellbeing paths.

2.1 The constitutional reform shock and our hypothesis on wellbeing convergence

A major event that is likely to have affected wellbeing convergence/divergence paths in the period under examination is the 2001 Italian constitutional reform. The reform modifies substantially the Italian 1948 constitution, promulgated with the goal of fixing rules that can give to all members of the society equal opportunities and access to wellbeing under different dimensions. One of the first articles of the Italian constitution (art. 3) declares that "All citizens have equal social dignity and are equal before the law, without distinction of sex, race, language, religion, political opinion, personal and social conditions." It can obviously be debated whether it has to be interpreted in terms of equality of conditions or equality of opportunities but, in any case, art. 3 sets equal dignity as a constitutional goal. In Table A2 in the online Appendix we create a map that links other constitutional articles and Constitutional Court decisions to BES domains and indicators[6]. Table A2 shows that the Environment domain is covered by the combined reading of articles 9, 32, and 117s concerning the right to live in a healthy environment. The economic wellbeing domain is covered by article 36.1, also in the light of the interpretations given by the Constitutional Court (and Constitutional Court (CC) Sentence 217 of 1988, CC Sentence 119 of 1999 and CC Sentence 520 of 2000) on the rights to decent living and wage. Articles 32.2 and 34 relate to the Education domain, article 32 to the Health domain, articles 9 and 33 to the Research and Innovation domain, articles 13, 14 and 16 (and CC Sentence n. 2 del 1956) to the Safety domain.

Within this constitutional framework, the reform (Constitutional Law no. 3, October 18, 2001) amended articles 114-133 concerning rules on regional and local government and introduced a much stronger level of decentralization, even though not leading to a full-fledged federal state. The interest for this reform lies also on the fact that a very similar approach was later followed by other states such as Spain, Belgium, and Poland (Keating 2009, Rodriguez-Pose et al. 2007). The core of the reform is in the definition of three areas of legislation (see Table A3 in the Appendix). The first is represented by areas of exclusive state legislation listed at article 117.4, the second by areas of concurring state and regional legislation listed at article 117.5 (with exception of fundamental

[6] Burchi et al. (2014), following the insights of Nussbaum (2007) and using a constitutional approach - deriving from the combination of Amartya Sen's capabilities approach and John Rawls's method of constructivism - have identified a link between the Italian Constitution and multidimensional well-being. From their research seven "constitutional" dimensions of well-being emerge: decent work, political, civil and economic participation, education, health, culture, arts and science.

principle that remain to the state). All topics not listed in these two categories fall in third area of regional legislation.

The research question we pose in the paper is whether the decentralization reform has brought Italian citizens farther or closer to the goals set by art. 3.

3. Descriptive findings

We start our empirical analysis by commenting descriptive evidence that resumes the dynamics and dispersion of composite indicators. To this purpose, we create composite indicators related to each of the 11 BES domains.[7] We exclude the 12th (subjective wellbeing) domain as it is a synthesis of what happens in all other domains, plus a series of unobservable factors such as expectations (and, in this sense, it is more subject to the Sen's (1985) happy slave critique described in the introduction). The domain is therefore in part redundant and in part too noisy for our specific purpose. In order to create our composite indicators, disaggregated BES indicators are given unit weights, aggregated using a geometric mean and normalized using the Min-Max approach.[8] The overall BES composite of composites is then created by giving unit weights and aggregating with a geometric mean the composite indicators of the 11 BES domains.

In Figure 2 we measure on the vertical axis the dynamics of domain specific mean composite indicators over time and, with the diameter of the sphere, we give evidence of its inequality (Gini's index) across regions. From our analysis, with reference to the whole period considered, we can observe the following descriptive indications (see Table 1a):

i) progress with increasing divergence in the Research and Innovation, Education and in the Natural and Cultural Heritage domains,
ii) progress and convergence in the Economic Wellbeing, Health and Environment domain,
iii) regress and divergence in the Politics and Institutions domain.
iv) regress and convergence in the Social Relationship domain,
v) inverse U-shaped dynamics in the Work-Life Balance and in the Safety domains,
vi) U-shaped dynamics in the Quality of Services domain

Further light on these composite trends (and the remarkable level of variability in wellbeing indicators across regions) can be shed by looking at data on selected individual indicators within each domain (Table 1b).

[7] We consider for the considered year all single BES indicators within each domain for which we have data. Where there is no BES data, we consider similar indicators.

[8] Our approach is deliberately simple (aggregation with arithmetic mean and weighting with equal-unit weight). We rely on the fact that Becchetti et al. (2017) demonstrate that composite BES indicators, created using more elaborated statistical weighting procedures based on factor analysis or survey weighting procedures, give very similar findings vis-à-vis our elementary approach in terms of impact on life satisfaction and ranking of different regions.

As example of divergence in the Research and Innovation domain (point i) we observe that in our first sample year (1995) the most virtuous region (Emilia-Romagna) registers 95.2 patents per 1 million inhabitants at the European Patent Office (EPO) against 0.86 of Calabria (the least virtuous region). The distance gets larger in 2014, with 184.58 registered patents per 1 million inhabitant in the most virtuous region (Friuli-Venezia-Giulia) against 4.16 in the least virtuous region (still Calabria). The divergence in the Education domain is well represented by the percentage of people aged 30-34 that have completed tertiary school. This share ranged between the 8 percent of Lazio and the 3.1 percent of Basilicata in the first year of analysis (1995), while it ranged between the 18.1 percent in Lazio and the 10 percent in Sicily in our last year of inquiry (2014).

With regard to point ii) we find that per capita disposable income has grown considerably in all regions in the twenty years under observation, while the absolute distance between the most and least virtuous region has slightly grown (16,490 euros in Emilia-Romagna against 7,811 euros in Calabria in 1995, versus 21,285 euros in Trentino-Alto-Adige against 12,343 euros in Calabria in 2014). The dynamics in the Health domain is likely to have been driven by medical progress, that has been however spread not so unevenly across regions by the National Health System, and by patients' migration, in spite of the growing heterogeneity among regional health systems due to the constitutional reform and the shrinking regional budget constraints. A key indicator confirming these dynamics is life expectancy at birth, where the two and a half year difference between the top and the worst region remained almost stable, within a positive trend of growth (in the first sample year Marche had 79.5 years against Campania with 76.8 years, while in the last sample year Trentino Alto Adige was the most virtuous region with 83.6 years against Campania, the less virtuous region, with 81 years). A similar dynamics can be documented for infant mortality that was at 38.6 per 10,000 inhabitants in Friuli-Venezia-Giulia against 83.4 in Sicily in 1994, while being at 18.7 in Toscana against 47.32 in Campania in 2014.

With regard to point iii) (regress and divergence in the Politics and Institutions domain) the most indicative result confirming the increasing disaffection toward the political system in Italy relates to voters turnout that ranged between a maximum of 83.6 percent in Emilia-Romagna, against a minimum of 59.9 percent in Campania (the lowest turnout region) in our first observation year. The divergence has increased in our last observation year within a tendency of generalized decline, with Umbria (the highest turnout region) at 70.5 percent against Sardegna (the lowest turnout region) at 42 percent.

The convergence in the Social Relationship domain at point iv) is supported by data on cooperative workers that decline more in the top than in the bottom region from the beginning to the end of the sample period (8.14 percent cooperative workers on total workers in Basilicata versus 2.31 percent in Lombardia in 1994, against 6.55 percent in Basilicata versus 2.83 percent in Marche, the top and bottom regions in beginning and the end sample year).

With regard to the Work-Life Balance domain at point v), the inverse U-shaped pattern is clear-cut. Youth unemployment starts from 13.34 percent in Trentino Alto-Adige against a 51.36 percent in Sicilia in 1995, moves down to 7.17 percent in Valle d'Aosta against 46.53 percent in Sicilia at the bottom of the U-pattern (2003), while it moves up against to 18.4 percent in Trentino-Alto-Adige against 59.7 percent in Calabria in the last sample year (2014).

What is as well remarkable in the dynamics of the basic indicator is that in market (or in market regulated) areas we see progress and reduction in divergence, while in areas where wellbeing progress depends on the monopolistic action of local governments we observe increased multiplicity. To provide some examples on this point we find that the share of families not satisfied

for gas supply is 2.2 percent in the most virtuous region (Trentino-Alto-Adige), against 28.6 percent in the less virtuous region (Sardegna) in our first sample year (1994). In the last sample year the share is slightly higher in the most virtuous region (3.23 percent in Trentino-Alto-Adige), but the range has significantly narrowed since the worst region is Toscana with 13.6 percent of unsatisfied families. We find similar dynamics when looking at families denouncing irregularities in water supply (4 percent in Trentino Alto-Adige and 45.3 percent in Calabria in the first sample year, falling to 0.58 and 32.1 percent in the final sample year in the same two regions remaining the best and the worst). Another indicator dominated by market dynamics (internet access) registers obvious progresses. Very few families had internet connection in the top and in the worst region (3.9 in Lazio against 0.89 in Sicily) in 1995. After 20 years the remarkable progress in internet access has however created a gap between the top region (Trentino-Alto-Adige with 70.9 percent of families having access) and the bottom region (Basilicata with 54 percent of families having access).

As indicated above, we observe increasing differences on indicators depending on the action of local municipalities reflecting heterogeneity in their quality and efficiency. To quote some examples, separate collection of municipal waste was at 21 percent in Lombardia (the most virtuous region) and at 0.5 percent in Calabria (the less virtuous region) in 1995. The gap got larger in spite of a generalized improvement in the last sample year, with Veneto (the most virtuous region) at 67.6 percent and Campania (the least virtuous region) at 12.5 percent. Similar dynamics are found when looking at the share of population declaring problems with local public transport (19.9 percent in Sardinia and 37.7 percent in Campania in 1995, against 20.3 percent in Trentino-Alto-Adige and 44.8 percent in Campania in 2014). Note that, for indicators based on subjective evaluations and perceptions, objective factors mix up with expectations that are fuelled by inequality perceptions. Another example of the same kind with an objective indicator relates to the number of water treatment plans in operation for 100,000 inhabitants. The gap between top and bottom region here at the beginning of the sample period (164.3 in Valle d'Aosta against 4.7 in Puglia in 1994) gets larger at the end of the sample period (214.6 in Valle d'Aosta against 4.7 in Puglia in 2014).

Descriptive evidence on the top and worst region on disaggregated indicators helps us to anchor our analysis to simple descriptive data, but obviously does provide neither a complete picture nor an answer to our research questions since divergence/convergence paths need to be analysed across the overall sample period. We resume this analysis in Figure 3 that provides dynamics of sigma convergence for disaggregated indicators in each domain across the sample period.[9] These figures show that the pattern of increasing divergence is almost univocal in three domains (Education, Natural and Cultural Heritage and Research and Innovation). This is consistent with the pattern of subjects under concurring legislation after the constitutional reforms. The latter include, among others, "job protection and safety, education, subject to the autonomy of educational institutions and with the exception of vocational education and training, scientific and technological research and innovation support for productive sectors, enhancement of cultural and environmental assets, including the promotion and organisation of cultural activities" (see Table A3 in the Appendix). The situation is much less clear-cut for the other domains. An interesting case is that of the declining sigma convergence in the Health domain, where the potentially divergent effects of the constitutional reform that decentralized most of the power to regional administrations are offset by the homogeneous dissemination of medical progress and by the growing patient migration. The likely explanation is that, differently from what happens for other wellbeing indicators depending on local administrations (such as local transport, garbage collection, etc.), citizens can arbitrage

[9] Ferrara et al. (2013) used as reference period 2000-2010, building two sub-periods: 2000-2005 and 2005-2010.

quality differences by voting with their feet and moving to the region that provides the highest quality service (without permanently changing their living place).

Descriptive evidence is obviously not conclusive since the effects of factors under investigation (the constitutional reform shock, the overall convergence process and the role of market versus local administrative power) need to tested net of the impact of other concurring factors as we do in the sections that follow.

3.1 Econometric analysis: specification and hypothesis testing

We test the first two hypotheses of convergence, and shock of the constitutional reform on convergence/divergence paths on the dynamics of wellbeing indicators, with the following specification

$$\ln\left(\frac{DWI_{i,t}}{DWI_{i,0}}\right) = \alpha + \beta_1 \ln\left(DWI_{i,0}\right) + \beta_2 DConstRef + \beta_3 \ln(RegPerCapitaGDP) + \beta_4 DConstRef * \ln\left(DWI_{i,0}\right) + \sum_l \delta_l DYear_l + \sum_r \vartheta_r DRegion_r + \eta_i + u_{i,t} \quad (3.3) \quad i=1,\ldots,20. \tag{1}$$

where *DWI* is the average BES wellbeing indicator calculated at time t for the i-th region.[10] The dummy testing the impact of constitutional reform (*DconstRef*) takes value one from year 2004 (the year in which all the related regulation was completed and the reform became effective). The specification is augmented with the regional per capita GDP variable (*RegPerCapitaGDP*). Year dummies (*DYear*), regional dummies (*DRegion*) and regional fixed effects (η_i) are also included as controls. The model is estimated in consecutive two-year periods. All variables are normalized in order to make them comparable across indicators. All non dummy variables are measured in logs.

Based on this specification we formulate four null hypotheses.

The first null (*Convergence Hypothesis*) is

$H_0(1)$: $\beta_1=0$

The null of lack of a significant convergence/divergence path may be rejected in direction of convergence, if $\beta_1<0$, or divergence, if $\beta_1>0$. Convergence in growth theory hinges on the assumption of free movement of production factors and the law of marginal productivity (see among others Mankiw et al., 1992). In case of multidimensional wellbeing convergence should be stimulated by imitation of other regions attaining high or frontier levels of wellbeing in a given domain. These processes should be stimulated by the social pressure of local constituencies that adapt their expectations to wellbeing levels of the most efficient regions and therefore become more demanding toward their local political authorities.[11]

The second null (*Constitutional Reform Hypothesis*) is

[10] The Constitutional Wellbeing composite indicator is constructed with arithmetic mean and equal weighting of the 37 indicators considered in our analysis.

[11] Becchetti et al. (2013) provide econometric evidence of the negative effects on citizens' wellbeing generated by the improvement of wellbeing in foreign or neighbouring regions. An interesting anecdotal example in this respect is the protest for women's vote right in England, soon after the first country in the world, New Zealand, approved in 1893 women's vote.

$H_0(2)$: $\beta_4=0$

Rejection of $H_0(2)$ indicates that the constitutional reform described in section 2.1 generated a structural break in the convergence/divergence path (in case of rejection of the first null hypothesis), or created *ex nihilo* a divergence/convergence path (in case of non rejection of the first null hypothesis). Rejection in direction of convergence would imply that decentralization led to the emergence of a best practice (of the most efficient region in one of the disciplines subject to concurrent or shared legislation under the reform) to which all other local institutions voluntarily and effectively converge. It is however difficult to imagine that the move from a fully centralized to a partially decentralized system can increase convergence. We are therefore more inclined to believe ex ante that the null is rejected in the opposite direction (divergence). Divergence implies instead that the best practice emerges from the decentralization process, but that the less efficient regions lag behind and fail to converge. That is, it implies that some forms of institutional frictions or obstacles to the adoption of best practices at local level create persistence of regional difference and divergence paths.

In a second specification, we as well verify whether the process of convergence and the effect of the constitutional reform shock are different for wellbeing indicators where market forces are dominant In Table 2 we explain how we calculated values for these two dummies. The augmented specification is

$$\ln\left(\frac{DWI_{i,t}}{DWI_{i,0}}\right) = \alpha + \beta_1 \ln\left(DWI_{i,0}\right) + \beta_2 DConstRef + \beta_3 \ln(RegGDP) + \beta_4 DMarket * \ln\left(DWI_{i,0}\right) + \beta_5 DConstRef * \ln\left(DWI_{i,0}\right) + \sum_l \delta_l DYear_l + \sum_r \vartheta_r DRegion_r + \eta_i + u_{i,t} \quad (2)$$

i=1,…,20.

with the *DMarket* dummy taking value one for wellbeing indicators and all other regressors being defined as in (1).

The third additional null hypothesis here is

$H_0(3)$: $\beta_4=0$

Rejection of the null indicates that wellbeing indicators in which market forces are dominant have a different convergence path. The rationale is that outcomes for non-market indicators depend on the action of a multiplicity of politically and economically heterogeneous local administrations and, as such, the process of convergence is more difficult than for indicators depending on market forces. [12]

3.2 Econometric findings

[12] To make an example, convergence on the indicator of households with Internet access out of total households across Italian regions is expected to be much faster than convergence on quality of municipal waste collection.

In Table 3 we present findings of the model described by equation (1). The first line of the Table shows that the first null hypothesis of absence of convergence is rejected. The sign of the lagged dependent variable is always negative and significant documenting the presence of convergence in wellbeing indicators over time across regions.
The following lines show that the constitutional reform break (*DconstRef*) has a negative impact per se on the dependent variable, while a positive impact when interacted with the lagged dependent variable. These findings imply that the shock adversely affects progress in wellbeing indicators and reduces the convergence process. This last result leads to the rejection of hypothesis 2. The comparison of relevant coefficient magnitudes however shows that the negative effect of the shock on convergence is lower in (absolute value) magnitude than the convergence effect. Hence, the constitutional reform shock slows down regional convergence in wellbeing indicators, but does not reverse it into a process of divergence.

When choosing the estimation method for our model we must consider that our data have a hierarchical structure, with many indicators available for each region and collected each year within the sample period. The well-known problem of underestimation of the standard error for indicators belonging to the same region must be solved with a multilevel model (see among others Raudenbush and Bryk, 2002; McCulloch et al., 2008 and Rabe-Hesketh and Skrondal, 2012). In order to select the proper multilevel model we compare the estimate of a traditional fixed effect model including regional dummies, with that of a random intercept model without regional dummies. The likelihood ratio test provides evidence in favour of our first choice (while the random coefficient hypothesis on the main variable is rejected by the same test).
Our main previous findings are confirmed in the new estimate (Tables 4A and 4B). In addition to it, the negative and significant effect of the interaction between the lagged dependent variable and the market dummy ($DMarket * \ln(DWI_{i,0})$) leads as well to the rejection of the third null hypothesis. This finding shows that convergence is relatively faster for indicators whose progress depends more on market forces than on action of regional or national policymakers.
The above described results do not change when the model is estimated with/without regional dummies.

4. Conclusions

Our empirical analysis highlights some important lessons on the dynamics of convergence/divergence in multidimensional wellbeing across Italian regions. First, a convergence process is at work in the twenty years examined, but its action is weakened by the shock of the constitutional decentralization reform occurred in the period under consideration. Second, convergence is stronger for those wellbeing indicators depending on global market forces (such as Internet diffusion, access to gas and electricity) than for those mainly determined by the action of monopolistic local authorities (such as local public transport and separate waste collection). This is all the more so in domains where beneficiaries (differently for what occurs with health patients' migration) cannot vote with their feet without changing permanently their residence. Lessons drawn from the Italian constitutional reform analyzed in this paper suggest that a move from centralization to partial decentralization reduces the process of convergence, especially in those wellbeing domains where regional legislation acquires more power and autonomy. Our second main result (role of market forces versus monopolies of local authorities in promoting convergence/divergence) suggests the need of creating processes of convergence to the efficient wellbeing frontier at local

institutional level for indicators depending more on local administrations. Convergence is instead easier in presence of indicators mainly affected by market forces, given the incentive of the most efficient companies to sell at affordable price in all regions (as it naturally occurred for internet access with cellphones).

From this point of view, a policy advice stemming from our result is that of an optimal two-step process (whenever exclusion of the role of local administrations is neither possible nor advisable). In the first step, decentralization and heterogeneity at local level is advisable in order to allow competition among local institutional innovators and the emergence of best practices. After it, it is however crucial the definition of a second step where mechanisms of convergence toward the efficient frontier of the inefficient regions are created and enforced. The identification of the good practice in the multiplicity of local realizations and the definition of a time deadline for the adoption of the best practice for regions that are distant from the frontier are fundamental for this two-step process to work properly, assumed that the verification of the applicability of the best practice to other areas has been successful.

Last but not least, our paper indicates directions for future research by providing a methodological approach that extends the convergence literature from GDP to individual other wellbeing indicators. This extension is particularly interesting for policymakers whose probabilities of re-election depend on a mix of subjective and objective wellbeing factors (related to absolute and relative multidimensional wellbeing levels) that ultimately decide whether voters are satisfied or not about their action.

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Figures 1A-1B. Two of the Ambrogio Lorenzetti frescoes from the series *The Allegory and Effects of Good and Bad Government* (1338-39)

Table 1a Dynamics of progress / regress and convergence / divergence in BES domains

	year	Constitutional Wellbeing	Economic Wellbeing	Education	Environment	Health	Natural and Cultural Heritage	Politics	Quality of services	Research and Innovation	Security	Social Relationships	Work-life Balance
Composite indicators (average among Italian regions)	1995	97,020	93,994	87,514	93,890	99,157	85,277	115,850	110,753	77,506	111,689	94,495	97,099
	2003	100,438	105,255	92,447	95,377	103,992	89,144	111,730	106,563	88,615	113,042	92,678	105,977
	2014	102,443	109,665	107,282	103,816	110,264	94,369	93,266	107,182	99,361	111,870	90,023	99,777
Gini index	1995	0,027	0,069	0,028	0,044	0,033	0,035	0,050	0,035	0,049	0,052	0,045	0,070
	2003	0,025	0,050	0,036	0,042	0,023	0,036	0,040	0,029	0,055	0,038	0,036	0,074
	2014	0,029	0,046	0,037	0,041	0,024	0,054	0,081	0,032	0,060	0,037	0,030	0,070
σ-conv (Gini index)	1995-2003	-0,002	-0,019	0,007	-0,001	-0,010	0,002	-0,009	-0,006	0,005	-0,014	-0,009	0,004
	2003-2014	0,004	-0,004	0,001	-0,002	0,001	0,018	0,040	0,003	0,005	-0,001	-0,006	-0,004
	1995-2014	0,002	-0,023	0,008	-0,003	-0,009	0,019	0,031	-0,003	0,010	-0,015	-0,015	0,000

Figure 2 Dynamics of composite wellbeing indicators across Italian regions

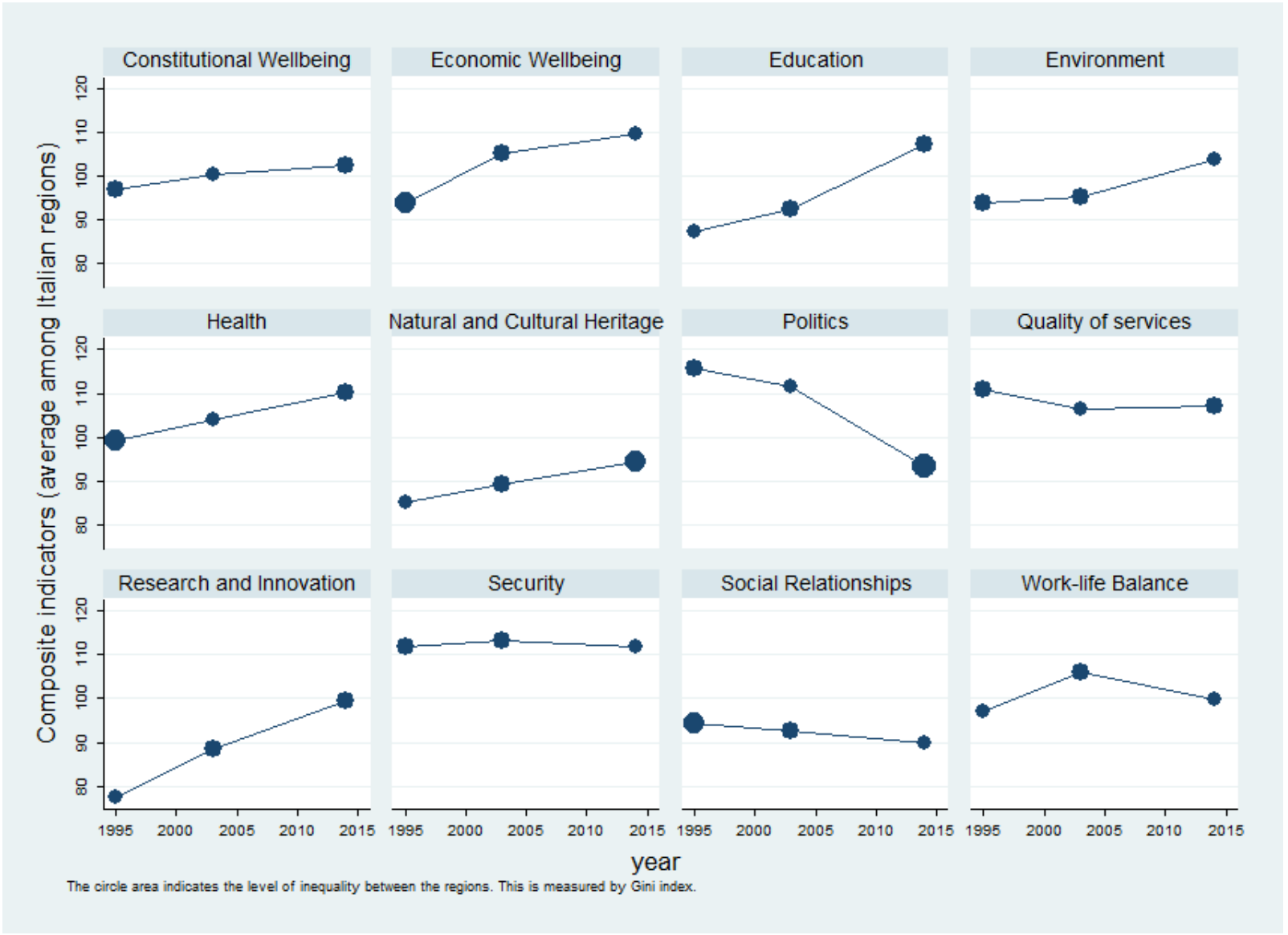

Table 1b Best-Worst regions in BES wellbeing indicators

	1995		2003		2009		2014	
Variable	Best region	Worst region	Best region	Worst region	Best region	Worst region	Best region	Worst region
Percentage of households complaining about air pollution in the area where they live	Basilicata	Lazio	Calabria	Lazio	Sardegna	Lombardia	Molise	Lombardia
	13.200	55.700	17.800	52.000	17.700	52.400	14.900	44.600
Percentage of households complaining about the presence of dirt in the streets in the area where they live	Valle d'Aosta	Lazio	Valle d'Aosta	Lazio	Trentino-Alto Adige	Lazio	Valle d'Aosta	Lazio
	9.900	46.000	10.700	51.700	15.700	46.600	11.900	46.000
Tons of CO2 equivalent per inhabitant	Basilicata	Liguria	Campania	Sardegna	Calabria	Puglia	Basilicata	Puglia
	2.623	16.523	3.884	13.389	3.381	14.071	2.934	11.865
Number of sewage treatment plants of urban waste water in the exercise on the resident population (per 100,000 inhabitants)	Valle D'Aosta	Puglia	Valle D'Aosta	Puglia	Valle D'Aosta	Puglia	Valle D'Aosta	Puglia
	164.299	4.659	164.299	4.659	190.479	4.684	214.569	4.691
Municipal waste collected separately on total municipal waste (percentage)	Lombardia	Calabria	Veneto	Molise	Trentino-Alto Adige	Sicilia	Veneto	Sicilia
	21.047	0.557	42.116	3.670	57.815	7.260	67.608	12.508
Percentage of households complaining about living in a small house	Marche	Basilicata	Marche	Campania	Liguria	Campania	Marche	Campania
	8.700	20.900	8.000	17.200	7.900	16.500	7.600	17.600
Per capita disposable income	Emilia-Romagna	Calabria	Emilia-Romagna	Calabria	Trentino-Alto Adige	Calabria	Trentino-Alto Adige	Calabria
	16489.911	7811.232	20557.545	10915.733	21715.270	12298.842	21285.281	12343.351
Percentage of population with university degree	Lazio	Basilicata	Lazio	Valle d'Aosta	Lazio	Valle d'Aosta	Lazio	Sicilia
	8.010	3.910	8.740	5.020	14.750	8.300	18.170	10.040
School drop-out rate in the first two years of upper secondary schools (percentage)	Molise	Piemonte	Umbria	Sicilia	Trentino-Alto Adige	Sardegna	Trentino-Alto Adige	Valle d'Aosta
	4.325	11.349	3.453	11.669	3.893	12.603	3.219	10.772
Absolute difference between male and female employment rate- 15-64 year age cohort	Valle d'Aosta	Sicilia	Valle d'Aosta	Sicilia	Emilia-Romagna	Puglia	Valle d'Aosta	Puglia
	18.995	37.107	12.988	32.823	13.817	31.723	10.639	25.682
People in search of employment in the 15-24 age of the labor force of the same age group (percentage)	Trentino-Alto Adige	Sicilia	Valle d'Aosta	Sicilia	Trentino-Alto Adige	Sardegna	Trentino-Alto Adige	Calabria
	13.348	51.639	7.170	46.532	10.097	44.034	18.440	59.741
Share of people looking for work for more than 12 months on the total number of people seeking employment (percentage)	Valle d'Aosta	Abruzzo	Trentino-Alto Adige	Sicilia	Trentino-Alto Adige	Sicilia	Trentino-Alto Adige	Sicilia
	13.034	62.672	17.115	61.001	23.114	60.005	33.925	71.723
Activity rate of people aged 15 years and over	Valle d'Aosta	Sicilia	Trentino-Alto Adige	Sicilia	Trentino-Alto Adige	Campania	Trentino-Alto Adige	Sicilia
	46.150	33.110	56.090	42.520	56.790	38.350	57.530	39.200
Employment rate for people aged 15 years and over	Trentino-Alto Adige	Sicilia	Trentino-Alto Adige	Sicilia	Trentino-Alto Adige	Campania	Trentino-Alto Adige	Sicilia
	51.260	31.950	54.720	33.960	54.980	33.390	54.260	30.510
Unemployment rate of people aged 15 years and over	Trentino-Alto Adige	Campania	Trentino-Alto Adige	Calabria	Trentino-Alto Adige	Sicilia	Trentino-Alto Adige	Calabria
	4.230	25.260	2.440	23.420	3.180	13.760	5.670	23.420
Percentage of people who voted in the last elections to the European Parliament	Emilia-Romagna	Campania	Emilia-Romagna	Sicilia	Umbria	Sardegna	Umbria	Sardegna

on the total of eligible voters								
	83.600	59.900	80.941	59.176	77.900	40.900	70.500	42.000
House of cultural heritage per 100,000 inhabitants (in thousands)	Molise	Trentino-Alto Adige	Molise	Trentino-Alto Adige	Molise	Piemonte	Liguria	Piemonte
	11.159	0.069	9.681	0.042	10.865	0.100	13.721	0.137
Spending for recreation and culture in the total spending on household consumption household consumption (chained index with reference year 2010)	Toscana	Liguria	Piemonte	Sicilia	Piemonte	Sicilia	Piemonte	Sicilia
	6.213	4.046	7.121	4.517	8.179	5.193	8.350	5.046
Percentage of households who say they have problems connecting with public transport	Sardegna	Campania	Sardegna	Campania	Molise	Campania	Trentino-Alto Adige	Campania
	19.900	37.700	22.000	42.200	18.600	40.900	20.300	44.800
Household unsatisfied or little satisfied about gas-delivery services (on total connected households) (percentage)	Trentino-Alto Adige	Sardegna	Trentino-Alto Adige	Calabria	Trentino-Alto Adige	Sardegna	Trentino-Alto Adige	Toscana
	2.273	28.571	1.316	8.300	2.451	13.462	3.239	13.601
Frequency of long accidental interruptions of electrical service (average number per user)	Valle d'Aosta	Calabria	Valle d'Aosta	Calabria	Friuli-Venezia Giulia	Sicilia	Valle d'Aosta	Sicilia
	1.610	7.750	1.270	4.950	1.030	5.080	0.830	4.140
Households reporting irregular supply of water (percentage)	Trentino-Alto Adige	Calabria	Trentino-Alto Adige	Calabria	Friuli-Venezia Giulia	Calabria	Trentino-Alto Adige	Calabria
	4.037	45.358	5.053	43.593	2.462	36.303	0.682	32.165
Available hospital beds per 10,000 inhabitants	Lazio	Valle d'Aosta	Molise	Campania	Molise	Sicilia	Emilia-Romagna	Campania
	81.940	43.720	50.220	29.550	44.460	29.200	40.170	26.860
Households with Internet access out of total households (percent)	Lazio	Sicilia	Lombardia	Sicilia	Marche	Puglia	Trentino-Alto Adige	Basilicata
	3.922	0.890	34.602	21.209	52.961	38.066	70.909	54.008
Expenses for research and development of public and private enterprises in GDP (percent)	Piemonte	Molise	Piemonte	Calabria	Piemonte	Calabria	Piemonte	Calabria
	1.433	0.001	1.196	0.018	1.393	0.046	1.594	0.035
Patents filed at the European Patent Office (EPO) (number per million inhabitants)	Emilia-Romagna	Calabria	Emilia-Romagna	Calabria	Emilia-Romagna	Molise	Friuli-Venezia Giulia	Calabria
	95.225	0.868	181.788	3.812	158.569	3.162	184.858	4.167
Average number of members per household	Calabria	Liguria	Campania	Liguria	Campania	Liguria	Campania	Liguria
	3.130	2.310	2.980	2.210	2.860	2.120	2.730	2.060
Employees of the cooperatives on the total number of employees the company (percentage)	Basilicata	Lombardia	Basilicata	Veneto	Basilicata	Veneto	Lazio	Marche
	8.142	2.313	7.083	2.866	6.566	2.809	6.548	2.825
People aged 14 and over who carried out voluntary work in the total population aged 14 and over (percentage)	Trentino-Alto Adige	Basilicata	Trentino-Alto Adige	Sicilia	Trentino-Alto Adige	Campania	Trentino-Alto Adige	Campania
	27.582	5.118	25.529	4.996	24.561	6.480	26.116	6.536
Percentage of people who consume vegetables at least once a day	Friuli-Venezia Giulia	Puglia	Friuli-Venezia Giulia	Basilicata	Friuli-Venezia Giulia	Basilicata	Friuli-Venezia Giulia	Basilicata
	75.910	22.220	65.040	25.370	65.410	28.660	61.700	35.760

Average life expectancy at birth	Marche	Campania	Marche	Campania	Marche	Campania	Trentino-Alto Adige	Campania
	79.478	76.828	81.169	78.633	82.664	80.137	83.567	80.988
Deaths of children by the year of life for 10,000 live births	Friuli-Venezia Giulia	Sicilia	Toscana	Valle d'Aosta	Valle d'Aosta	Sicilia	Toscana	Calabria
	38.560	83.410	23.790	60.820	15.370	49.360	18.660	47.320
Deaths due to cancer per 10,000 inhabitants	Calabria	Liguria	Calabria	Liguria	Calabria	Liguria	Calabria	Liguria
	17.650	37.460	20.560	40.030	22.870	38.610	23.470	39.100
Emigration hospital in another region for acute inpatient admissions on the total number of people hospitalized residents in the region (percentage)	Veneto	Basilicata	Veneto	Basilicata	Lombardia	Basilicata	Lombardia	Molise
	3.025	25.521	3.175	22.599	3.418	20.172	2.971	20.222
Percentage of households claiming to feel relevant risk of crime in the area where they live	Molise	Campania	Basilicata	Campania	Basilicata	Campania	Basilicata	Lombardia
	7.300	57.500	6.900	48.300	7.200	48.900	10.000	37.200
Thefts reported per 1,000 inhabitants	Molise	Lazio	Basilicata	Lazio	Basilicata	Emilia-Romagna	Basilicata	Emilia-Romagna
	6.445	35.520	6.435	35.080	6.448	29.804	8.467	35.816
Voluntary homicides per 100,000 inhabitants	Marche	Calabria	Trentino-Alto Adige	Calabria	Basilicata	Calabria	Valle d'Aosta	Calabria
	0.348	4.604	0.525	3.452	0.172	3.251	0.000	1.617

Figure 3 Dynamics of sigma convergence on disaggregated Constitutional wellbeing indicators across Italian regions

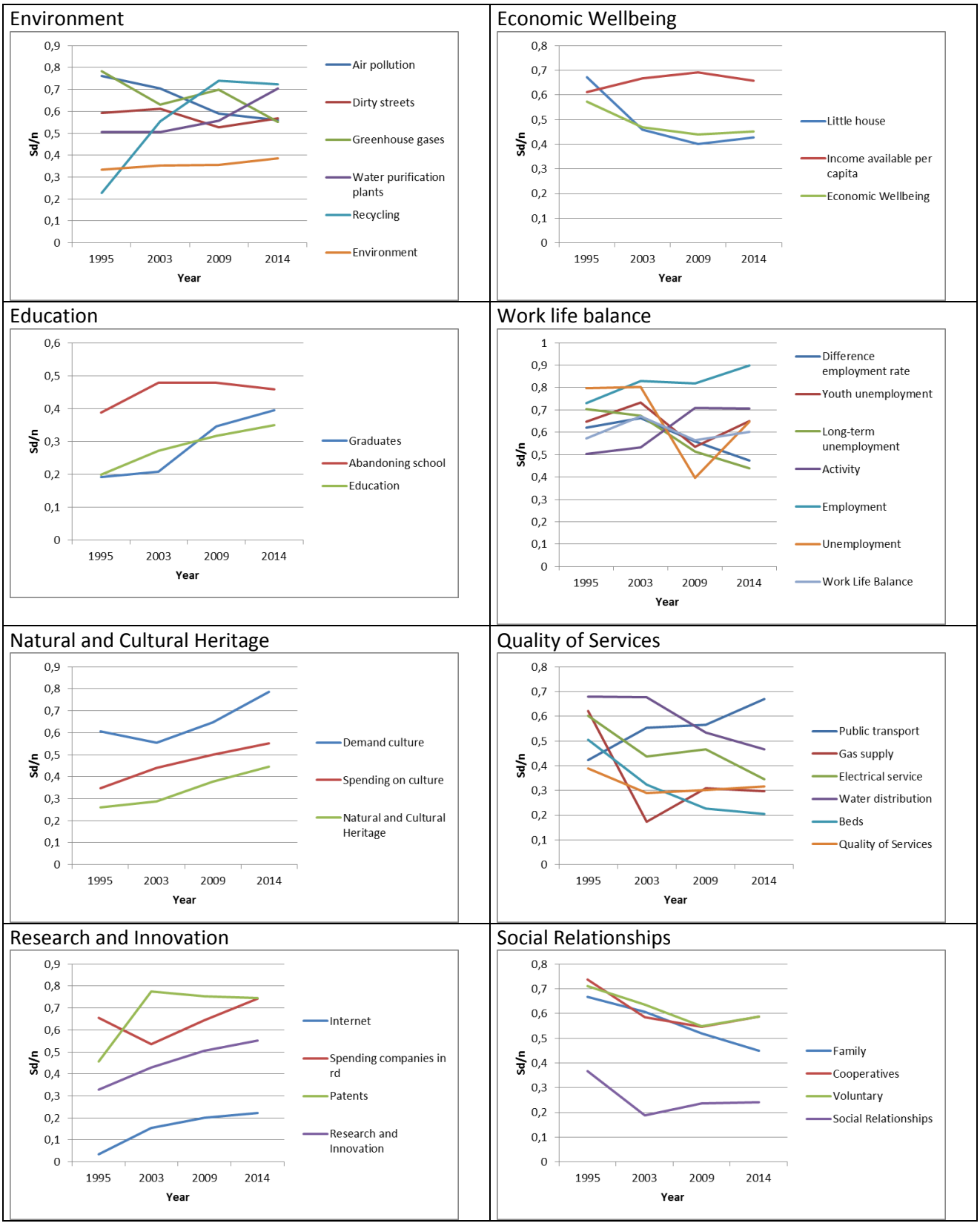

Figure 3 Dynamics of sigma convergence on disaggregated Constitutional wellbeing indicators across Italian regions

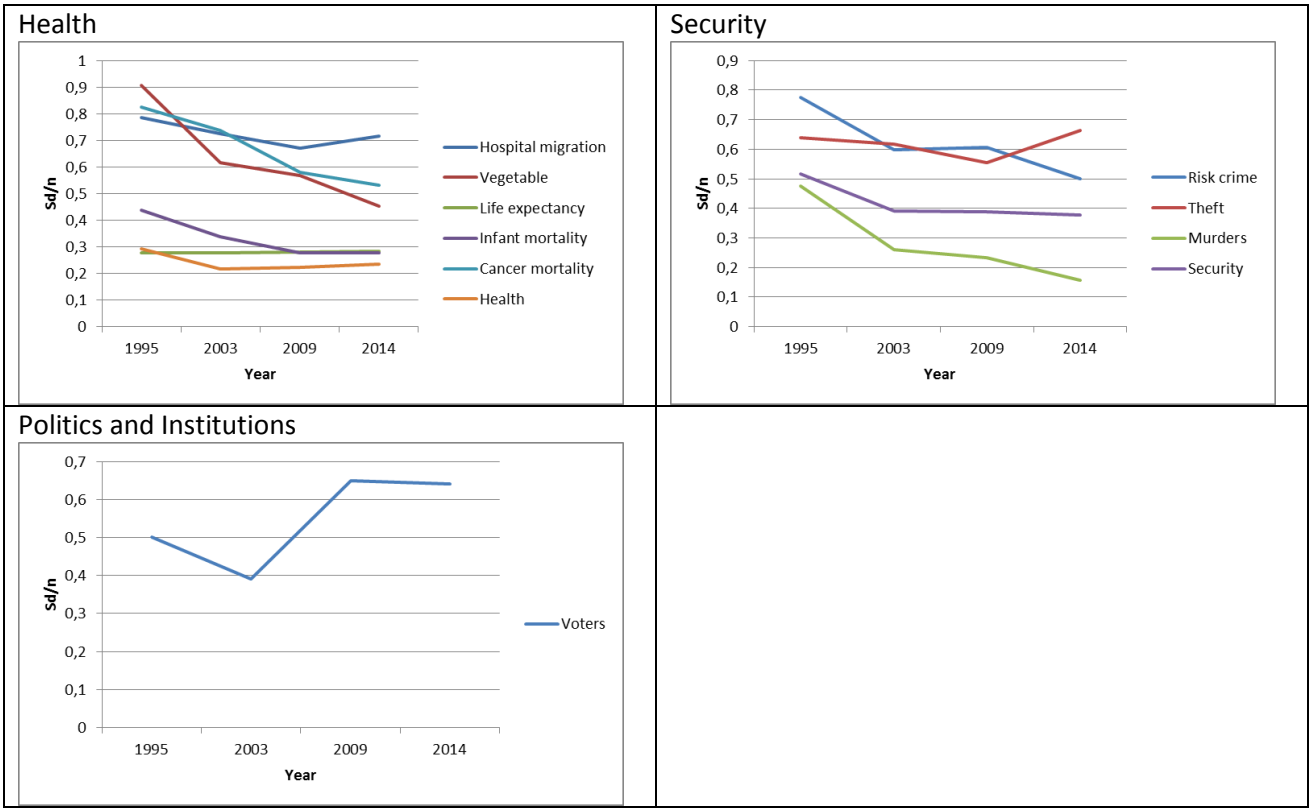

Figure 3 Legend.

ENVIRONMENT: air pollution: percentage of households complaining about air pollution in the area where they live; dirty streets: percentage of households complaining about the presence of dirt in the streets in the area where they live; greenhouse gases: tonnes of co2 equivalent per inhabitant; water purification plants: number of sewage treatment plants of urban waste water in the exercise on the resident population (per 100,000 inhabitants); recycling: municipal waste collected separately on total municipal waste (percentage); environment: composite indicator of environment domain;

ECONOMIC WELLBEING: little house: percentage of households complaining about living in a small house; income available per capita: per capita disposable income; economic wellbeing: composite indicator of economic wellbeing domain;

EDUCATION: graduates: percentage of population with university degree; abandoning school: school drop-out rate on the total enrolled in the first two years of upper secondary schools (percentage); education: composite indicator of education domain;

WORK LIFE BALANCE: difference employment rate: Absolute difference between male and female employment rate- 15-64 year age cohort; youth unemployment: people in search of employment in the 15-24 age of the labor force of the same age group (percentage); long term unemployment: share of people looking for work for more than 12 months on the total number of people seeking employment (percentage); activity: activity rate of people aged 15 years and over; employment: employment rate for people aged 15 years and over; unemployment: unemployment rate of people aged 15 years and over; composite indicator of work life balance domain;

POLITICS AND INSTITUTIONS: voters: percentage of people who voted in the last elections to the European parliament on the total of eligible voters;

NATIONAL AND CULTURAL HERITAGE: demand for culture: visitors of cultural heritage per 100,000 inhabitants (in thousands); spending on culture: spending for recreation and culture on total household consumption (chained indices with reference year 2010); natural and cultural heritage: composite indicator of natural and cultural heritage domain;

RESEARCH AND INNOVATION: internet: households by owning the internet access of total households (percent); spending companies in rd: expenses for research and development of public and private enterprises in gdp (percent); patents: patents filed at the european patent office (epo) (number per million inhabitants); research and innovation: composite indicator of research and innovation domain;

SOCIAL RELATIONSHIPS: family: average number of members per household; cooperatives: employees of the cooperatives on the total number of employees the company (percentage); voluntary: people aged 14 and over who carried out voluntary work in the total population aged 14 and over (percentage); social relationships: composite indicator of social relationships domain;

QUALITY OF SERVICES: public transport: percentage of households who say they have problems connecting with public transport; gas supply: Household unsatisfied or little satisfied about gas-delivery services (on total connected households) (percentage); electrical service: frequency of long accidental interruptions of electrical service (average number per user); water distribution: households reporting irregular supply of water (percentage); beds: positions available hospital beds per 10,000 inhabitants; quality of services : composite indicator of quality of services domain;

HEALTH: vegetable: percentage of people who consume vegetables at least once a day; hospital migration: migration hospital in another region for acute inpatient admissions on the total number of people hospitalized residents in the region (percentage); life expectancy : average life expectancy at birth; infant mortality: deaths of children by the year of life for 10,000 live births; cancer mortality: deaths due to cancer per 10,000 inhabitants; health: composite indicator of health domain;

SECURITY: risk crime: percentage of households claiming to feel severe or serious risk of crime in the area where they live; theft: thefts reported per 1,000 inhabitants (number per thousand inhabitants); murders: Voluntary homicides per 100,000 inhabitants (number per 100,000 inhabitants); security: composite indicator of security domain.

Table 2 Construction of the indicator of market/local administration prevalence

Single indicator	Variable about level decision-making competence after 2001 [local 1 art 117p.4; national 2 (art 117 p.2); local e national 3 (art 117 p.3)] – comp	Variable about level decision-making competence after 2001 [local 1 (art 117 p.3 e 4); national 0 (art 117 p.2)] – comp2	Variable about openness to the market (liberalization and privatization) [market 1, 0 otherwise] – market
GDP at market prices per inhabitant (Regional level)	3	1	1
Percentage of households complaining about air pollution in the area where they live	3	1	0
Percentage of households complaining about the presence of dirt in the streets in the area where they live	1	1	0
Tons of CO2 equivalent per inhabitant	3	1	0
Number of sewage treatment plants of urban waste water in the exercise on the resident population (per 100,000 inhabitants)	1	1	0
Municipal waste collected separately on total municipal waste (percentage)	1	1	0
Percentage of households complaining about living in a small house	1	1	1
Per capita disposable income	3	1	1
Percentage of population with university degree	3	1	0
School drop-out rate in the first two years of upper secondary schools (percentage)	3	1	0
Absolute difference between male and female employment rate- 15-64 year age cohort (percentage)	3	1	0
People in search of employment in the 15-24 age of the labor force of the same age group (percentage)	3	1	0
Share of people looking for work for more than 12 months on the total number of people seeking employment (percentage)	3	1	0
Activity rate of people aged 15 years and over	3	1	0
employment rate for people aged 15 years and over	3	1	0
Unemployment rate of people aged 15 years and over	3	1	0
Percentage of people who voted in the last elections to the European Parliament on the total of eligible voters	2	0	0
Visitors of cultural heritage per 100,000 inhabitants (in thousands)	3	1	0
Spending for recreation and culture on total household consumption (chained index- reference year 2010)	3	1	0
Households with Internet access out of total households (percent)	3	0	1
Expenses for research and development of public and private enterprises in GDP (percent)	3	1	1
Patents filed at the European Patent Office (EPO) (number per million inhabitants)	3	0	0
average number of members per household	3	1	0
Employees of the cooperatives on the total number of employees the company (percentage)	3	1	0
People aged 14 and over who carried out voluntary work in the total population aged 14 and over (percentage)			
Percentage of households who say they have problems connecting with public transport	1	1	0
Families little or not fulfilled for the gas-delivery services in the complex on the total households connected to the network (percentage)	3	0	1
Frequency of long accidental interruptions of electrical service (average number per user)	3	0	1
Households reporting irregular supply of water (percentage)	1	1	1

Positions available hospital beds per 10,000 inhabitants	1	1	0
Percentage of people who consume vegetables at least once a day	3	1	0
Emigration hospital in another region for acute inpatient admissions on the total number of people hospitalized residents in the region (percentage)	1	1	0
Average life expectancy at birth	3	1	1
Deaths of children by the year of life for 10,000 live births	3	1	0
Deaths due to cancer per 10,000 inhabitants	3	1	0
Percentage of households claiming to feel severe or serious risk of crime in the area where they live	2	0	0
Thefts reported per 1,000 inhabitants (number per thousand inhabitants)	2	0	0
Voluntary homicides per 100,000 inhabitants (number per 100,000 inhabitants)	2	0	0

Table 3 Convergence Estimate

VARIABLES	Delta_index
DWI	-0.741***
	(0.102)
DConstRef	-0.240***
	(0.088)
RegGDP	0.052**
	(0.021)
DWI DConstRef*	0.055***
	(0.018)
Constant	2.910***
	(0.410)
Dummy year	Yes
Dummy regions	Yes
Observations	380
R-squared	0.750

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4.A Multilevel estimates (regional dummies excluded)

Dependent variable: log change in regional multidimensional wellbeing

VARIABLES					
DWI	-0.038***	-0.038***	-0.040***	-0.041***	-0.045***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
DConstRef		-0.005***	-0.016***	-0.016***	-0.084***
		(0.002)	(0.002)	(0.002)	(0.010)
RegGDP			0.008***	0.008***	0.008***
			(0.001)	(0.001)	(0.001)
DMarket				0.009***	0.118***
				(0.000)	(0.015)
DWI DConstRef*					0.015***
					(0.002)
*DWI*DMarket*					-0.024***
					(0.003)
Dummy year	Y	Y	Y	Y	Y
Dummy regions	No	No	No	No	No
Random intercept	Y	Y	Y	Y	Y
Constant	0.181***	0.181***	0.120***	0.122***	0.137***
	(0.013)	(0.013)	(0.013)	(0.012)	(0.016)
Observations	14,005	14,005	13,267	12,907	12,907
Number of groups	20	20	20	20	20

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4.B Multilevel estimates (regional dummies eincluded)

Dependent variable: log change in regional multidimensional wellbeing

VARIABLES					
DWI	-0.040***	-0.040***	-0.041***	-0.042***	-0.046***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
DConstRef		-0.005**	-0.016**	-0.016**	-0.085***
		(0.002)	(0.007)	(0.007)	(0.021)
RegGDP			0.008	0.007	0.012
			(0.019)	(0.019)	(0.019)
DMarket				0.009***	0.118***
				(0.001)	(0.025)
DWI DConstRef*					0.015***
					(0.004)
*DWI*DMarket*					-0.024***
					(0.005)
Dummy year	Y	Y	Y	Y	Y
Dummy regions	Y	Y	Y	Y	Y
Random intercept	No	No	No	No	No
Constant	0.190***	0.190***	0.115	0.136	0.103
	(0.010)	(0.010)	(0.183)	(0.185)	(0.185)
Observations	14,005	14,005	13,267	12,907	12,907

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Online Appendix 1

Table A1 - BES Domains and BES Regional Indicators

BES Domains	Regional Indicators
Health	Life expectancy at birth, Healthy life expectancy at birth, Physical Component Summary (PCS), Mental Component Summary (MCS), Infant mortality rate, Traffic accidents (15-34 years old), Age-standardised cancer mortality rate (19-64 years old), Age-standardised mortality rate for dementia and related illnesses (people aged 65 and over), Life expectancy without activity limitations at 65 years of age, Age-standardized overweight or obesity - percentage of people aged 18 years and over who are overweight or obese, Age standardized smoking - people aged 14 years and over declaring to smoke, Age-standardized alcohol consumption - people aged 14 years and over with at least one risk behaviour in alcohol consumption, Age – standardized sedentariness - people aged 14 years and over who do not practice any physical activity, Age – standardized nutrition - people aged 3 years and over who consume at least 4 portions of fruit and vegetables a day
Economic well-being	Per capita adjusted disposable income, Disposable income inequality, People at risk of relative poverty, Severely materially deprived people, People suffering poor housing conditions, People living in jobless households.
Education and Training	Participation in early childhood education, Percentage of people aged 25-64 having completed at least upper secondary education, Percentage of people aged 30-34 having completed tertiary education (ISCED 5 o 6), Percentage of early leavers (aged 18-24) from education and training, Percentage of people aged 15-29 not in education, employment, or training (NEET), Percentage of people aged 25-64 participating in formal or non-formal education, Level of literacy: Scores obtained in the tests of functional literacy skills of students in the II classes of upper secondary education, Level of numeracy, Percentage of people aged 16 and over with high level of ICT competencies, Synthetic indicator of the level of cultural participation
Work and life balance	Employment rate of people 20-64 years old, Transition rate (12 months time-distance) from non-standard to standard employment, Share of employed persons with temporary jobs for at least 5 years, Share of employees with below 2/3 of median hourly earning, Share of over-qualified employed persons, Incidence rate of fatal occupational injuries or injuries leading to permanent disability, Share of employed persons not in regular occupation, Ratio of employment rate for women 25-49 years with children under compulsory school age to the employment rate of women 25-49 years without children, Share of population aged 15-64 years that work over 60 hours per week (including paid work and household work), Share of employed persons who feel satisfied with their work
Social relationships	Synthetic indicator of social participation, Generalized trust, Non-profit organizations per 10,000 inhabitants, Social co-operatives per 10,000 inhabitants, Volunteer work, Provided aids, Association funding, Satisfaction with family relationship, Satisfaction with friendship relationship, Percentage of people of 14 years and over which have relatives, friends or neighbours on which they can count, Percentage of children aged 3 to 10 years who play with their parents.
Politics and Institutions	Voter turnout, Civic and political participation, Trust in the parliament, Trust in judicial system, Trust in political parties, Trust in local institutions, Trust in other institutions, Women and political representation in Parliament, Women and political representation at regional level, Women in decision-making bodies.
Safety	Homicide rate, Burglary rate, Pick-pocketing rate, Robbery rate, Physical violence rate, Sexual violence rate, Fear of crime rate, Worries of sexual crime rate, Concrete fear rate, Social decay (or incivilities) rate, Intimate partnership violence rate.
Natural and cultural heritage	Endowment of cultural heritage items, Current expenditure of Municipalities for the management of cultural heritage (museums, libraries and art galleries), per capita, Illegal building rate, Urbanisation rate of areas subject to building restrictions by virtue of the Italian laws on landscape protection, Erosion of farmland from urban sprawl, Erosion of farmland from abandonment, Presence of historic rural landscapes, Quality assessment of Regional programmes for rural development (PSRs), with regard to the landscape protection, Presence of Historic Parks/Gardens and other Urban Parks recognised of significant public interest, Conservation of historic urban fabric, People that are not satisfied with the quality of landscape of the place where they live, Concern about landscape deterioration
Environment	Drinkable water, Quality of marine coastal waters, Quality of urban air, Urban parks and gardens, Areas with hydrogeological risks, Contaminated sites, Terrestrial parks, Marine protected areas, Areas of special naturalistic interest, Concern for biodiversity loss, Energy from renewable sources, Emissions of CO2 and other greenhouse gasses.
Research and Innovation	Research intensity, Patent propensity, Percentage of knowledge workers on total employment, Innovation rate of the national productive system, Percentage of product innovators, Productive specialization in high-tech and knowledge intensive sectors, Internet use.
Quality of Services	Index of accessibility to hospitals with emergency room, Beds in residential health care facilities, Waiting lists, Percentage of population served by natural gas, Separate collection of municipal waste, Composite index of service accessibility, Index of accessibility to transport networks, Citizens who benefit from infancy services, Elders who benefit from home assistance, Prison density per 100 places, Irregularity in water supply, Landfill of waste, Irregularity in electric power distribution, Time devoted to mobility.

The twelfth domain (subjective wellbeing) is excluded and not considered in the analysis being a purely subjective domain. Source: Becchetti, Corrado and Fiaschetti (2013).

Table A2. Links between BES indicators and the Italian constitution[13]

Domain BES	BES domain	Indicator	Constitutional topic	Constitutional article	Available period
Environment	Subjective evaluation	Percentage of households complaining about air pollution in the area where they live	Right to live in a healthy environment	Systemic reading art. 9, art. 32 and art. 117s	1995-2015 (no 2004)
		Percentage of households complaining about the presence of dirt in the streets in the area where they live			1995-2015 (no 2004)
	Air quality	Tonnes of CO2 equivalent per inhabitant			1995-2010 (every 5 years)
	Water quality	Number of sewage treatment plants of urban waste water in the exercise on the resident population (per 100,000 inhabitants)			1999-2012 (every 4 years)
	Soil and land quality	Municipal waste collected separately on total municipal waste (percentage)			1996-2014
Economic well-being	Income and Wealth	Percentage of households complaining about living in a small house	Right to remuneration	Art. 36.1	1995-2014
	Consumer spending and Conditions Materials	Ratio of gross disposable income of households and the total number of inhabitants	Right to decent housing	Constitutional Court's judgement n.217 in 1988, n.119 in 1999 and n.520 in 2000	1995-2014
Education and Training	Levels of competence	Percentage of population with university degree	Right to education	Art. 33.2 e Art. 34	1997-2014
	Formal education	School drop-out rate in the first two years of upper secondary schools (percentage)			1995-2014
Work life	Work life balance	Absolute difference between male employment rate and employment rate of women aged 15-64	Gender equality	Art. 37	1995-2014

[13] For indicators in which data are not available in 2003 and 2009, reference is made to the available data for the nearest year. For indicators in which data are not available in 1995 and 2014, reference is always made to the first and the last available.

balance		years (percentage)			
	Participation and Social Inclusion	People in search of employment in the 15-24 age of the labor force of the same age group (percentage)	Youth and family formation	Art. 31	1995-2014
	Job insecurity	Share of people looking for work for more than 12 months on the total number of people seeking employment (percentage)	Economic participation	Art. 1; art. 3; art. 4; art. 35	1995-2014
	Participation and Social Inclusion	Activity rate of people aged 15 years and over	Economic participation	Art. 1; art. 3; art. 4; art. 35	1995-2014
	Participation and Social Inclusion	Employment rate for people aged 15 years and over	Economic participation	Art. 1; art. 3; art. 4; art. 35	1995-2014
	Participation and Social Inclusion	Unemployment rate of people aged 15 years and over	Economic participation	Art. 1; art. 3; art. 4; art. 35	1995-2014
Politics and Institutions	Civic and Political Participation	Percentage of people who voted in the last elections to the European Parliament on the total of eligible voters	Political participation	Art. 48	1994-2014 (every 5 years)
Landscape and Cultural Heritage	Sensitive landscape	Number of visitors of state institutions of antiquities and art for state institute of the total resident population per 100,000 inhabitants (in thousands)	Promotion of culture and art	Art. 9; art. 33	1995-2014
		Spending for recreation and culture on total household consumption (chain values, reference year 2010)	Promotion of culture and art	Art. 9; art. 33	1995-2013
Quality of Services	Mobility	Percentage of households who say they have problems connecting with public transport	Right to essential public services	Art. 43	1995-2014 (no 2004)
	Public utilities	Household unsatisfied or little satisfied about gas-delivery services (on total connected households) (percentage)	Right to live in a decent home	Constitutional Court's judgement 217 in 1988, 119 in 1999 and 520 in 2000.	1998-2014 (no 2004)
		Frequency of long accidental interruptions of electrical service (average number per user)	Right to live in a decent home		1998-2014
		Households reporting irregular supply of water (percentage)	Right to live in a decent home		1995-2014 (no 2004)

	Social services	Positions available hospital beds per 10,000 inhabitants	Right to health and basic levels	Art. 32; Art. 117m	1996-2012
Research and Innovation	Implementing and disseminating knowledge	Households by owning the Internet access of total households (percent)	Diffusion of technology	Art. 9; art. 33	1997-2014
	Creating knowledge	Expenses for research and development of public and private enterprises in GDP (percent)	Promotion of scientific and technical research	Art. 9; art. 33	1995-2013
		Patents filed at the European Patent Office (EPO) (number per million inhabitants)	Promotion of scientific and technical research	Art. 9; art. 33	1995-2011
Social relationships	Family	Average number of members per household	Right to family	Art. 29; art. 31	1995-2014
	Social economy	Employees of the cooperatives on the total number of employees the company (percentage)	Social function of cooperation	Art. 45	1996-2013
	Civil society	People aged 14 and over who carried out voluntary work in the total population aged 14 and over (percentage)	Civil participation	Art. 17; art. 18; art. 19	1995-2014 (no 2004)
Health	Risk factors	Percentage of people who consume vegetables at least once a day	Right to health	Art. 32	1995-2014 (no 1996 e 2004)
	General	Average life expectancy at birth	Right to health and basic levels	Art. 32; Art. 117m	1995-2014
	Specific	Deaths of children by the year of life for 10,000 live births	Right to health	Art. 32	1995-2013
		Deaths due to cancer per 10,000 inhabitants	Right to health	Art. 32	1995-2013 (no 2004-2005)
		Emigration hospital in another region for acute inpatient admissions on the total number of people hospitalized residents in the region (percentage)	Right to health	Art. 32	1999-2014

Security	Fear of crime	Percentage of households claiming to feel severe or serious risk of crime in the area where they live	Right to freedom of movement	Art. 16 and Constitutional Court's judgement n.2 in 1956	1995-2014
	Crime	Thefts reported per 1,000 inhabitants (number per thousand inhabitants)	Right to inviolability of the home	Art. 14	1995-2014
	Physical violence	Voluntary homicides per 100,000 inhabitants (number per 100,000 inhabitants)	Right to physical integrity	Art. 13; art. 16	1995-2014

Table A3 Art. 117 of the Italian Constitution

Legislative powers shall be vested in the State and the Regions in compliance with the Constitution and with the constraints deriving from EU legislation and international obligations.
The State has exclusive legislative powers in the following subject matters:
a. foreign policy and international relations of the State; relations between the State and the European Union; right of asylum and legal status of non-EU citizens;
b. immigration;
c. relations between the Republic and religious denominations;
d. defence and armed forces; State security; armaments, ammunition and explosives;
e. the currency, savings protection and financial markets; competition protection; foreign exchange system; state taxation and accounting systems; equalisation of financial resources;
f. state bodies and relevant electoral laws; state referenda; elections to the European Parliament;
g. legal and administrative organisation of the State and of national public agencies;
h. public order and security, with the exception of local administrative police;
i. citizenship, civil status and register offices;
j. jurisdiction and procedural law; civil and criminal law; administrative judicial system;
k. determination of the basic level of benefits relating to civil and social entitlements to be guaranteed throughout the national territory;
l. general provisions on education;
m. social security;
n. electoral legislation, governing bodies and
fundamental functions of the Municipalities, Provinces and Metropolitan Cities;
o. customs, protection of national borders and international prophylaxis;
p. weights and measures; standard time; statistical and computerised coordination of data of state, regional and local administrations; works of the intellect;
q. protection of the environment, the ecosystem and cultural heritage.
Concurring legislation applies to the following subject matters: international and EU relations of the Regions; foreign trade; job protection and safety; education, subject to the autonomy of educational institutions and with the exception of vocational education and training; professions; scientific and technological research and innovation support for productive sectors; health protection; nutrition; sports; disaster relief; land-use planning; civil ports and airports; large transport and navigation networks; communications; national production, transport and distribution of energy; complementary and supplementary social security; harmonisation of public accounts and coordination of public finance and the taxation system; enhancement of cultural and environmental assets, including the promotion and organisation of cultural activities; savings banks, rural banks, regional credit institutions; regional land and agricultural credit institutions. In the subject matters covered by concurring legislation legislative powers are vested in the Regions, except for the determination of the fundamental principles, which are laid down in State legislation.
The Regions have legislative powers in all subject matters that are not expressly covered by State legislation.
The Regions and the autonomous provinces of Trent and Bolzano take part in preparatory decision making process of EU legislative acts in the areas that fall within their responsibilities.
They are also responsible for the implementation of international agreements and EU measures, subject to the rules set out in State law which regulate the exercise of subsidiary powers by the State in the case of non-performance by the Regions and autonomous provinces.
Regulatory powers shall be vested in the State with respect to the subject matters of exclusive legislation, subject to any delegations of such powers to the Regions. Regulatory powers shall be vested in the Regions in all other subject matters.
Municipalities, provinces and metropolitan cities have regulatory powers as to the organisation and implementation of the functions attributed to them.
Regional laws shall remove any hindrances to the full equality of men and women in social, cultural and economic life and promote equal access to elected offices for men and women.
Agreements between a Region and other Regions that aim at improving the performance of regional functions and that may also envisage the establishment of joint