

Does institutional quality matter for multidimensional well-being inequalities?

Evidence from Italian regions

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Literature on measuring inequality mainly focuses on income, although there is a general consensus that well-being is a multidimensional concept. This paper aims at analysing the evolution of inequality within and between Italian sub-national areas by considering ten dimensions and an overall index of well-being. Results highlight a sharp difference in the trend of inequalities when we look at progress only in its economic dimension and when we consider it from a multidimensional perspective. In terms of GDP, disparities *between* regions largely prevail and are stable over the period; conversely, in terms of multidimensional well-being, inequalities are becoming smaller over time and they are almost equally due to both the components. We investigate the determinants of these results by testing the impact of regional institutional quality and of the public expenditure related to the dimensions of well-being, and by looking at spatial auto correlation patterns. The findings of the analysis provide evidence of a link between the quality of institutions and disparities in multidimensional well-being. In particular, our estimates suggest an inverted U-shaped relationship between the two variables: improvements in institutional quality are initially associated with increasing regional disparities, yet beyond a certain threshold a negative correlation emerges.

Keywords: well-being measurement; inequality indices; Theil index decomposition; institutional quality; Italian regions

Jel Classification: I31; O18; R11; D02

1. Introduction

In economic literature, inequalities have traditionally been analysed in terms of per capita GDP or households disposable income. On the contrary, only a few papers have analysed inequalities in well-being by jointly considering social factors and economic indicators, albeit we have no reason to expect the same inequality trends when income and non-income dimensions of well-being were analysed (Bourguignon and Morris 2002, Decancq et al. 2009; Pillarisetti 1997; McGillivray and Pillarisetti 2004; McGillivray and Markova 2010).

GDP can undoubtedly be considered the most salient indicator of economic activity that economists have ever constructed¹. However, it has been increasingly recognised that many dimensions of people's quality of life outside the economic and productive spheres should be taken into account in order to understand the diverse progress performances of different countries (Stiglitz et al. 2009; Sen 2000). Moreover, it has been pointed out that a country's income and production levels cannot say anything about what people can really do with these resources, or how powerful other typologies of inequality (gender, inter-generational, territorial) between people are (UNDP 2013; Peterson 2014).

A number of studies which aim to deal with the multidimensional nature of well-being refer to HDI, the Human Development Index calculated by UNDP since 1993, which is based, as is well known, on measurements of income, education and health. This index provides comparable cross-country data for a wide time interval and this makes it highly suitable for assessing convergence and inequalities in quality of life. However, when the analysis focuses on assessing well-being within and between more industrialised countries, HDI is often "augmented" to take into account a wider spectrum of quality-of-life dimensions (Marchante and Ortega 2006). McGillivray and Markova (2010) stress the importance of a dimension-by-dimension approach, which is shown to provide very different information from the HDI index as a whole, especially with respect to diachronic trends: the longevity component exhibits increasing inequality, whereas the aggregate indicator and the other components show a decline in global inequality. Decanq et al. (2009) base their analysis on each component of the HDI by using the Atkinson index and setting different levels of inequality aversion. Their findings show that international inequality declines over time for many values of the parameter. However, when extreme weighting schemes or specific parameter values (no transformation of the income dimension, low substitutability of the dimensions and a mild inequality aversion) are assumed, results show a sharp increase in well-being

¹ Felice (2016) reviews some of the most popular alternatives to GDP focusing on their conceptual foundations. He points out that the main reason of GDP primacy is its consistency with the goals of capitalist market economies.

inequality over the last years of the period under study. This suggests that the underlying normative choices matter in assessing the evolution of well-being and inequalities.

Indeed, some recent works which consider both the old and the updated versions of HDI, set up by the UN in 2010, reach partially different results in the two frameworks². Martinez (2012) uses this new version of HDI to calculate four inequality measures (Gini's index, Theil's index, Atkinson's index and Kolm's index) across countries and analyses their evolution from 1980 to 2010 with 5 year intervals. His results show that, according to three indices out of four, the world has become significantly more equal over time. By using the same revised version of HDI, Jordà and Sarabia (2014) calculate four measures of inequality (variance, Gini, Theil and Atkinson indices). Their results confirm the presence of a global process of convergence in living standards between 1980 and 2010, mainly over the last decade; yet the degree of equalisation in well-being levels has been nonlinear for some of the indicators considered. Rodriguez-Pose and Tselios (2015) examine regional convergence in social welfare, measured by Amartya Sen's welfare index, across regions of the EU-15. Using panel-data models, their results show that welfare levels have become more equal across European regions and that this convergence has been built on institutional factors, the most relevant of which is the increasing female participation in the labour force.

The role of institutional factors in determining space inequality has been feebly investigated so far, notwithstanding the increasing attention devolved, in the last decades, both on the impact of institutions on macroeconomic factors (Guiso et al 2004; La Porta et al. 1997, 1998; Beck and Levine, 2004, among others) and a country's economic performance (Knack and Keefer 1995; Acemoglu et al. 2001, 2005, 2010; Mauro 1995; Rodríguez-Pose A 2013, to quote some). Institutions influence

² The most relevant modifications in the calculation of the HDI are: the use of the geometric instead of the arithmetic mean for aggregating the sub-indices; the use of "mean years of schooling" and "expected years of schooling" indicators in place of, respectively, "adult literacy rate" and "gross enrollment ratio" indices; the inclusion of health, education and income inequality measures into the index.

transaction costs and thereby efficiency. As North (1990: 5) wrote: ‘institutions affect the performance of the economy by their effect on the costs of exchange and production. Together with the technology employed, they determine the transaction and transformation (production) costs that make up total costs.’³

A number of studies emphasise the fact that countries with more efficient norms, impartial and non-corrupt governments exhibit a higher level of people’s well-being (Holmberg et al. 2009; Mo 2001). Other works highlight that institutional quality promotes better outcomes in specific ambits of well-being such as environmental sustainability (Morse 2006; Welsch 2004), better education and health performance (Mauro 1998), lower income inequality and poverty (Gupta et al. 1998), the capacity of regions to innovate (Rodrigues-Pose and Di Cataldo 2015). The quality of government also affects subjective happiness (Frey and Stutzer 2000; Helliwell and Huang 2008; Rodriguez-Pose and Maslauskaite 2012; Ott 2010). Anyway, to the best of our knowledge, the only papers testing the relationship between spatial inequality and institutional quality are focused on income disparities. Ezcurra and Rodriguez-Pose (2014) demonstrate that countries with better quality of government exhibit lower levels of income regional disparities. Two studies, Kyriacou and Roca-Sagales (2013) and Kyriacou et al. (2015), deal with the impact of the quality of government on regional disparities. The first one, focused on the impact of structural Funds on regional disparities within the EU countries, includes an indicator of

³ There are different meanings given to the concept ‘institutions’ in economic literature. According to North (1990), institutions are any kind of norm conceived by people to discipline their relations. A second strand of the literature sees institutions as composed by three elements: the rules in force in a given society, the specific players of the game who have the role of enforcing the rules, and the means they use to carry out this task (Nelson 1994). Closer to this latter, Hodgson (2007) defines institutions as ‘enduring systems of socially ingrained rules’ (p. 331). Another approach interpretes institutions as a point of equilibrium in a repeated game (Greif 1989, 1997; Greif, Milgrom, and Weingast 1994; Aoki 2001), such that when institutions become established, they represent a self-enforcing equilibrium.

quality of government as control variable; the second examine, for a sample of OECD countries, how quality of government influences the relationship between fiscal decentralization and spatial inequality.

The contribution of this paper is twofold. Firstly, differing from the previous literature, this paper investigates disparities “within” and “between” Italian sub-national areas both in terms of income, measured by per-capita GDP, and multidimensional well-being, taking advantage of an existing synthetic indicator constructed by combining ten dimensions of quality of life. Secondly, we test whether institutional quality, along with regional public expenditure in fields of intervention linked to dimensions of well-being, affect regional disparities in well-being. As we done for obtaining data on well-being, we resort to a recently created synthetic index also for the measurement of institutional quality. In the last section of the paper, we also explore the existence of spatial interdependencies as they might influence regional clustering in well-being.

Italian regions exhibit wide differences in per-capita GDP as well as in non-economic domains of well-being levels, with underutilisation of resources in the lagging regions, which suggests the relevance of assessing regional disparities by considering quality-of-life along with production gaps. Even though there is a strong correlation between economic and civil backwardness, the two typologies of gap do not coincide: in terms of production the internal persistent dualism between the North and the South prevails, yet, in terms of well-being, there is a regional-specific (Nuts 2 level) component of inequalities which has a greater impact. Such evidence highlights the need for attention in the implementation at a local level of national policies regarding fields of intervention in many areas of people’s quality of life where regional and local authorities play a key role in public expenditure and investment.

From a strictly economic standpoint, many indicators group Italian regions geographically into more developed areas clustered in the Centre-North of the country, while in the South, notwithstanding some important entrepreneurial successes and high-tech districts , areas of economic backwardness are still common (see Cersosimo and Viesti 2013) . As a matter of facts, the eight Mezzogiorno regions as a whole produce just 25% of national GDP and account for only 10% of total Italian exports; the South

contains one third of the overall population but two thirds of the country's poor and 45% of the unemployed; labour productivity in the South is 20% lower and the employment rate is 30% lower than that of the Centre-North. Beyond the (economic) dualism between the two macro-areas, Italian regions differ in many other aspects which influence the multifaceted phenomenon of well-being (Cersosimo and Nisticò 2013). To give a few examples, Campania and Lombardia have population densities that are eleven and seven times those of Valle d'Aosta and Basilicata, respectively; Lazio, Umbria and Marche have the highest percentage of university graduates aged 30-34, more than twice that of Sicilia and Campania; the highest percentages of children up to the age of 3 using child-care services are found in Emilia Romagna (29%) and in Umbria (28%) while the lowest percentage is that of Calabria (2.4%); 60% of people aged 14 and over have a sedentary lifestyle in Sicilia and Campania as opposed to 14% in Trentino-Alto Adige. The entity and the persistence of these and other disparities (Banca d'Italia 2010; Cannari et al. 2011; Cersosimo and Nisticò 2013) make the Italian situation an interesting case-study in the debate on regional well-being differentials in Europe. Traditionally, economists have highlighted the economic aspect of the within-countries divide, leaving aside the essential fact that people's well-being is also connected to the quality and quantity of public services, health, education, personal security, environment and many other aspects influencing quality of life. What is more, citizens subjected to the same institutional and legal order are expected to enjoy the same levels and qualities of essential public services, such as comparable quality of education and health services or analogous waiting times for legal proceedings to be concluded. Indeed, measuring well-being inequalities is at least as relevant for policy as economic performance and income disparities because it entails principles of equity and citizenship, as well as people's happiness and life satisfaction. The importance of assessing the effectiveness of policies on people's well-being, other than GDP growth, was recently remarked upon by the European Commission in the Sixth Cohesion Report, Cohesion policy funds are indeed not limited to their impact on the economic dimension of European regions, but also they contribute to the Europe 2020 strategy for

smart and inclusive growth in ambits such as environmental quality, sustainability, poverty and combating social exclusion (European Commission 2014).

This article is organised as follows. After this introduction, the second section briefly surveys the recent literature on the measurement of well-being in Italy; data and methods are described in the third section; the fourth section analyses inequalities both in each quality of life dimension and in the overall well-being index across Italian regions over time; furthermore, it focuses on the decomposition of inequality *within* and inequality *between* Italian sub-national areas; the fifth section investigates the link between well-being and regional disparities, on the one hand, and institutional quality and government expenditure, on the other; the sixth section explores the presence and the features of spatial interdependencies in levels of well-being in Italian regions over the period 2004-2010 by performing an exploratory spatial data analysis; the seventh section concludes.

2. Measuring regional well-being in Italy: where do we stand?

A number of studies dealing with quality of life in Italy adopt an historical perspective, referring quite mostly to the evolution of the HDI indicator (Crafts 1997; Brandolini and Vecchi 2011; Felice 2007; Felice and Vasta 2015; De la Escosura 2010; Vecchi 2011).

Focusing on regional disparities, Felice (2007) considers seven social indicators, including the UN Human Development Index and an “improved” Human Development Index at ten-year intervals from 1871 to 2001. He analyses the dynamics of regional disparities in each decade. What emerges is a catching-up process, interrupted during the 1980s and 1990s, of Southern Italy with the Centre-North. Felice and Vasta (2014) extend the analysis in order to consider the new HDI introduced by the UN in 2010. The interpretative hypothesis for explaining the evolution of regional imbalances relies upon the distinction between “active” and “passive” modernisation (Cafagna 1988), where the former occurs ‘when one or more political or social actors take up the challenge and engage in modernizing the country’ (p. 45); while the latter takes place when ‘a society embarks upon some sort of modernization ... without implementing a proper strategy, but rather as a result of an adaptive-sub-optimal pattern’ (ibidem).

According to the authors, Southern Italy improved in social indicators of quality of life thanks to passive modernisation, which led to a higher convergence with Northern levels of life expectancy, yet it was less successful in education and even ineffective in terms of GDP. Iuzzolino et al. (2011) analyse the convergence of Italian regions from national unification in 1861 to 2009 by focusing on the per-capita GDP flanked by indicators of human development, in particular education and health. Except for the period from the unification to the mid-1880, when both levels and growth rates of output were quite similar across regions, and the period from the 1950s until 1972, when there was a remarkable rise in the income level of the Southern regions vis-a-vis the rest of Italy, they find that there is no evidence of a catching-up trend. In the final period, from 1972 onwards, regional trends were quite varied, so the authors found neither convergence nor divergence. The authors' thesis is that government action has been crucial, for better or worse, in determining the size of the economic and social imbalance between the Mezzogiorno and the Centre-North of Italy. The evolution of the well-being of Italians over the 150 years following the country unification has also been investigated by Brandolini and Vecchi (2011). They analyse progress both from the perspective of economic growth (in terms of per-capita GDP) and other domains, such as educational attainment, life expectancy, nutrition, housing, working and leisure time, firstly separately and then as a whole, by synthesizing them into composite indices. It is shown that economic growth was accompanied by a long-run reduction in inequality which, though, reversed over the last two decades, whilst the increase in life expectancy was spectacular, placing Italians in first position in the international ranking. Educational achievements improved considerably as well, although no more impressively than in other countries. However, when the evolution of the Human Development Index is considered, a nearly linear progress emerges over time. Overall, the initial gap between Italy and the other OECD countries was larger when measured by the HDI index than GDP per capita. By using cut-off values for HDI of 0.5 and 0.8 for categorising human development in Italy during the 150 years since unification as "low", "medium" or "high", the authors depict a clear periodisation: only in the early

1930s Italy escaped the category of low human development, while it only moved into the high development area in the 1980s.

Another pioneering contribution to the measurement of well-being in Italy is QUARS, the Regional Quality of Development Index, which focuses attention on those elements of well-being that can be improved by institutional action and policies at the different levels of government (QUARS 2011). This index combines seven dimensions of well-being (Environment, Economy and Employment, Health, Rights and Citizenship, Education and Culture, Gender Equity, and Participation), by means of the simple average method, with the aim of providing a yearly ranking of Italian regions in terms of quality of life. Looking at the ranking, the Northern and Central regions occupy the top positions, with a higher level of progress, while the Southern regions are classified at the bottom.

By considering both an adjusted and the Gender-related Human Development Index for the Italian regions, Costantini and Monni (2008) find an even more remarkable lag for Southern regions in terms of well-being than in terms of income. Capriati (2011) builds a “real freedom index”, given by the weighted average of seven variables, to analyse Italian regional disparities through the dynamics of the coefficient of variation of the index at three-year intervals from 1998 to 2007. Well-being convergence across Italian regions between 1998 and 2008 is also the focus of a study by Ferrara and Nisticò (2013) carried out by using both the standard economic approach and by considering several quality of life aspects. They construct two composite indicators of well-being and find that, although large disparities persist across Italian regions as regards different aspects of well-being, there is evidence that dispersion across regions declined over the ten years considered in the analysis. Following the same methodology in constructing the synthetic indicator of well-being, Di Berardino et al. (2016) investigate the existence of a process of beta-convergence and an “industrial district” effect on growth performance. Their findings highlight the fact that provinces with an industrial district report a better performance in terms of well-being than territories where industrial districts are not present. Murias et al. (2012) calculated a composite indicator of well-being for Spanish and Italian regions by combining five variables (consumption per capita,

research and development, higher education, the Gini index and the unemployment rate) through a technique based on data envelopment analysis (DEA). Although limited to just one year and few variables, their results show that regional disparities in terms of economic well-being are less marked than those resulting from traditional per-capita income indicators.

Similarly to a number of national governments programmes which have been recently implemented in Europe, in 2012 the Italian National Institute of Statistics (Istat), in conjunction with the National Council for Economy and Labour (Cnel), founded a data base covering 12 dimensions of “Equitable and Sustainable Well-being” (whose Italian acronym, used henceforth, is BES) as described by 134 outcome indicators. They also provide a report in which well-being in Italy is examined from a multidimensional perspective, in the spirit of the recommendations proposed by the “Stiglitz Commission” (Stiglitz et al. 2009), with each chapter focusing on one specific issue. The BES report, however, does not go to the final step of generating a synthetic overall index of well-being. Starting from the insights gained from the BES projects, Ferrara and Nisticò (2015) propose a Regional Well Being Indicator (hereinafter RWBI) for Italian regions which synthetises 10 different dimensions. By applying a two-step principal component analysis, they calculate synthetic indicators for each well-being determinant and for each region, and then generate an index of overall well-being. The study looks at dispersion across regions and ranks mobility in terms of well-being over the 2004-2010 period, showing that Italian regions have become more similar over time, although the convergence process is faster in terms of well-being than GDP. The results of the analysis provide evidence that regional convergence trends in the sub-indices and the overall index of well-being are not necessarily in line with those based on per-capita GDP: well-being levels, as expressed by RWBI, are converging across Italian regions throughout the whole period in the sense of σ at a much higher rate (18%) than GDP (2%)⁴.

⁴ The concept of σ -convergence relies upon the trends in the coefficient of variation, given by the ratio of the standard deviation σ to the mean μ : as the dispersion decreases over time, the Italian regions are converging in the sense of σ or, in other words, they are becoming less unequal.

Unlike the previous literature, this paper re-examines standard measures of inequality in the different aspects of quality of life by considering the abovementioned RWBI and its components. It also deals with decomposition of Theil's inequality index applied to the well-being indices in order to explore disparities between or within Italian regions. Furthermore, the paper discusses the relevance of the quality of institutions in affecting regional well-being disparities by resorting to the Institutional Quality Index (IQI), a newly created data-set by Nifo and Vecchione (2014), as well as the existence of spatial interdependencies across Italian regions.

3. Well-being, inequality and institutional quality in a multidimensional perspective: data and methods

As mentioned above, we refer in this article to synthetic indices both for the measurement of well-being and for institutional quality⁵.

The synthetic index of well-being, the RWBI, is calculated in Ferrara and Nisticò (2015). It considers the widest spectrum of domains and variables that has, until now, been used for the construction of a synthetic well-being index for Italian regions. By covering a period of seven years (2004-2010), the RWBI allows us to discuss the dynamics of well-being as a whole and of its dimensions: Culture and free time, Education, Employment, Environment, Essential public services, Health, Material living conditions, Personal Security, Research and innovation, Social relations (figure 1). These dimensions are also contemplated in the above mentioned project of the Italian National Institute of Statistics (ISTAT) aimed at measuring "Equitable and Sustainable Well-Being", thus mitigating the problem of subjectivity in

⁵ Munda (2015) discusses the main characteristics of the multi-dimensional analysis, underlying how these techniques are becoming, in the last decades, able to provide measures of multi-dimensional phenomena suitable for different social and policy goals.

choosing variables to be included in the synthetic index⁶. RWBI is, indeed, obtained by means of a two-step principal component analysis: in the first step, 57 original variables, grouped into 10 sets each describing a well-being domain, are reduced to synthetic indicators by the PCA (figure 2); in the second step, these sub-indices are used as new variables to calculate the overall well-being indicator through the same method. Thus, the choice of relying our analysis upon the RWBI is justified by the fact that the methodology used for constructing this synthetic indicator avoid subjective weighting schemes, which is a frequent weakness in building composite indicators, and, at the same time, evaluate the internal consistency of the indicators of overall well-being and intermediate indices variables. Such methodology is also appealing because the aggregation of the original elementary indicators is data-based and the resulting summary indicators account for a large part of the variance of the original elementary indicators (Nicoletti et al. 2000). Furthermore, the RWBI data-set, enable us to carry out the analysis both at the aggregate level regarding the overall well-being indicator, and at the dimension-by-dimension ground, as it is also suggested in literature, in order to track specific dynamics and problems which could be hidden by the aggregation into a composite indicator (see, among others, Decanq et al. 2009; Felice 2016; McGillivray and Markova 2010; Ravallion 2011).

In analogy with multidimensional well-being, the measurement of institutional quality is not an easy task. Different indicators are available at country level, such as the wide-used World Governance Indicators constructed by Kaufmann et al. (1999; 2008; 2010), the Institutional Quality Dataset (Kuncic 2014) and some indicators dealing with specific features like the transparency International's Corruption Perception Index (CPI), the International Country Risk Guide (ICRG), to quote some. A newly created composite index, calculated both at national and sub-national levels in twenty-seven European Union

⁶ Compared with the BES domains, only those ambits for which variables are not available at regional level for the entire period of interest are excluded from the analysis. They are: “subjective well-being”; “politics and institutions”; and “landscape and cultural heritage”, whereas RWBI includes in addition the “culture and free time” dimension.

countries has been proposed by Charron et al (2014), the European Quality of Government Index - EQI. It is the combined average, calculated for two years (2010 and 2013), of four pillars (control of corruption, rule of law, government effectiveness, voice and accountability) extracted from the World Governance Indicators. It has been shown that within-country regional variation in Quality of Government is at times equal to or more important than cross-country variation: from our point of view, it is worth noting that the difference between the two Italian regions of Trentino-Alto Adige and Campania is greater than the gap between Denmark and Portugal (Charron et al. 2014). High-performing Italian regions, such as Trentino-Alto Adige, rank amongst the top European Union regions, but other regions exhibit levels of EQI that are well below the EU average. As regard Italy, a novel data-set, also inspired to the World Governance Indicator proposed by Kaufmann et al. (2010), is available at sub-national (for both regions and provinces) level, for the whole period 2004-2012 (Nifo and Vecchione 2014, 2015), the Institutional Quality Index (IQI). It considers five dimensions (voice and accountability, government effectiveness, regulatory quality, rule of law, corruption) and has a scheme similar to that of World Governance Indicator, for which each lower rank indicator considered in each dimension are aggregated in a synthetic index (Figures 1 and 3). For the purpose of our analysis, conducted at Italian regional level and for a time span of seven years, we found that IQI is the most suitable source on which to explore the link between multidimensional well-being inequalities and institutional quality. Thus, in the following sections, we resort to the synthetic index proposed by Nifo and Vecchione (2014) ⁷.

We investigate regional well-being inequalities by computing both the Gini and Theil's Entropy indices for GDP, RWBI and each of its intermediate indices over the period 2004-2010.

⁷ For more details on the methodology used for computing RWBI and on that used for IQI, see, respectively, Ferrara and Nisticò (2015), and Nifo and Vecchione (2014). Data on RWBI are available from authors on request; data on IQI are freely available at: <https://sites.google.com/site/institutionalqualityindex/home>

The Gini index measures the extent to which the distribution of a variable (in our case the overall and partial well-being indicators) among individuals or regions within a country deviates from a perfectly equal distribution. Formally:

$$G^{(t)} = \frac{1}{2n^2\mu(I^{(t)})} \sum_{i=1}^n \sum_{j=1}^n |I_i^{(t)} - I_j^{(t)}|$$

Where $I_i^{(t)}$ and $I_j^{(t)}$ denote the overall or the partial well-being indicator for the region i and the region j , respectively, at time t ; μ is the arithmetic mean of the indicator under study; n is the number of regions. A Gini index of zero represents perfect equality, while a value of 1 indicates perfect inequality.

The Theil index is a special case of the generalised entropy measure for which the sensitivity parameter – the parameter which determines the weight assigned to the upper tail – is set to 1. For the Theil index, all the regions have the same weight independently of their level of well-being (Cowell 2011):

$$T^{(t)} = \frac{1}{n} \sum_{i=1}^n \frac{I_i^{(t)}}{\mu(I^{(t)})} \log \left(\frac{I_i^{(t)}}{\mu(I^{(t)})} \right)$$

What is more, our analysis aims to shed light on the evolution of well-being disparities by investigating whether the convergence process has brought about a greater similarity of regions within each sub-national area (North, Centre and Mezzogiorno) or between them. To this end, we take advantage of the additively decomposable property of the Theil Index in order to isolate two components: inequality within-area and inequality between-areas. The inequality *within* (T^W) is the weighted average of the inequality within each area, whereas the inequality *between* (T^B) represents the level of inequality there would be if there were no differences within areas. Formally:

$$T^B = \sum_{r=1}^3 s_r \left(\frac{\mu_r}{\mu_T} \right) \log \left(\frac{\mu_r}{\mu_T} \right)$$

$$T^W = \sum_{r=1}^3 s_r \left(\frac{\mu_r}{\mu_T} \right) T_r$$

Where s_r is the proportion of regions included in the sub-national area r , μ_r is the mean of the sub-national area r and μ_T is the global mean of the variable under study. Finally, T_r is the Theil index of the sub-national area.

In the following section, we describe regional disparities throughout the entire 2004-2010 period and two sub-periods (2004-2007; 2008-2010) as they emerge from the trend of the inequality indices⁸. We illustrate these for the per-capita GDP, the RWBI index and its sub-indices in order to capture the dynamics underpinning the overall trend. Furthermore, we show how inequalities vary within and between Italian sub-national areas, i.e. North, Centre and Mezzogiorno, by means of the decomposition of the Theil index.

In the last part of the empirical analysis, we investigate the causal relation between regional inequalities in well-being and the IQI index. To this end a measure of well-being inequality is defined by computing the deviation between the Italian mean value of RWBI and the regional value. The higher is this difference, the wider are inequalities. We come up with a strongly balanced panel dataset of 20 regions for seven years.

Afterwards, we estimate different specifications of the following regression equation, by applying a panel fixed effects model:

$$IneqRWBI_{i,t} = \alpha + \beta IQI_{i,t} + \gamma Expenditure_{i,t} + t + ti + +i + \varepsilon_{i,t}$$

Where $IneqRWBI_{i,t}$ is the above defined well-being inequality measure for region i at time t ; $Expenditure_{i,t}$ is the logarithm of the regional expenditure at time t in well-being related domains (education, environment, security, health, justice and other public services, labour market, research

⁸ The concept of σ -convergence relies upon the trends in the coefficient of variation, given by the ratio of the standard deviation σ to the mean μ : as the dispersion decreases over time, the Italian regions are converging in the sense of σ or, in other words, they are becoming less unequal.

and innovation, culture and material conditions); t identifies the year fixed effects, ti are the regional linear time trend and i are the regional fixed effects. Our aim is to investigate to what extent institutional quality and regional government expenditure affect well-being inequalities among Italian regions. The regional, time and time by region fixed effects allow us to isolate the effect of the quality and size of government from any other factors related to the structural characteristics along with specific events that took place in a region in a certain point in time. The results are estimated with clustered robust standard errors.

4. Results: dispersion and inequalities within and between Italian subnational areas

The evolution over time of the income and non-income dimensions of well-being may not necessarily be the same (Bourguignon and Morrisson 2002). Our results confirm this statement given that, looking at the different inequality measures, we find that inequality in well-being decreased by about 13% according to the Gini index and 18% for the Theil index (Table 1), whereas the reduction of disparities in GDP are remarkably lower (1.55% for the Gini index and 7.55% for the Theil index).

What is more, for the overall well-being index, the reduction of inequalities slows down in correspondence with the advent of the 2007-2008 crisis. On the other hand, as regards GDP, the interruption of the decreasing trend of regional disparities which happens in the same years at the beginning of the economic crisis, triggers an increasing inequality process among Italian regions in terms of the Gini index between 2007 and 2010.

Analogous results come from a study of European regions which finds a progressive reduction of economic disparities up until 2007 and an opposing trend thereafter (European Commission 2013). Thus, results in terms of multidimensional well-being do not simply repeat those in terms of productive performance; the reaction to exogenous shocks seems rather different in the two cases, in line with studies which find a more complex interaction between well-being and economic development than a simple cause-and-effect relationship (Sylos Labini 1989; Corsi and Guarini 2011).

However, the introduction of an overall index of well-being could hide the variety of dynamics which characterise the intermediate indices and, consequently, sweep the multidimensional nature of well-being under the carpet (Decanq et al. 2009). In fact, the different well-being dimensions show no homogeneous patterns.

A continuous decrease in inequalities is observed for the dispersion of Employment and Social relations, as showed by the negative change in the Gini and Theil indices (-12,9% and -21,4%, respectively, for Employment, and -19,8% and -34,9% for Social relations); whilst a divergence trend is found for Personal security (60%) and Material living conditions (3,3%), characterized by the growth in the inequality measures (by 72,3% according to Gini and by 131,6% according to Theil when considering Personal security; 2% and 11% for Culture and free time). Initially increasing disparity patterns followed by a partial recovery in the second sub-period, albeit not large enough to invert the divergent trend over the entire analysed period, occur for Culture and free time and Health domains. Education, Environment and Essential services dimensions indicate opposing dynamics, characterised by reductions in disparities in the first sub-period and then slowing down in the aftermath of the crisis.

To sum up, taking the study period as a whole, we observe that inequality increases in four ambits out of ten: Culture and free time (16,7% for the Gini index and 42,7% for the Theil measure), Health (3,64% by Gini index and 1,82% by Theil index), Material living conditions (2,05% for Gini index and 10,92% for Theil), Personal security (72,3% by the Gini index and 131,6% by the Theil index); the remaining domains experienced an overall convergent pattern (table 1).

Some interesting results emerge from the decomposition of the Theil index for the overall well-being, per-capita GDP and each intermediate dimension indices (Figure 4). First, it is worth noting the sharp difference in the trend of inequalities when we look at development simply in its economic dimension (per-capita GDP) or when we adopt a multidimensional perspective (RWBI). Indeed, disparities in terms of GDP, both within and between the sub-national macro-areas (North, Centre and Mezzogiorno), are stable over the whole period, as shown by the flat lines depicting the respective

patterns. On the other hand, the overall Theil index shows a decreasing trend when the analysis moves to the multidimensional well-being indicator, meaning that inequalities across Italian regions are diminishing over time, whereas the within and the between components present different patterns: the former exhibits a decreasing trend from 2006 onwards, whilst the latter is characterised by peaks and troughs.

Furthermore, the decomposition clearly highlights that inequalities in GDP are entirely determined by disparities between sub-national macro-areas, as differences within the three areas approach zero. Conversely, the downward sloped pattern of the Theil index in terms of RWBI is mainly due to the *within* component of inequality, which shows a smooth decreasing trend, while the *between* component exhibits a fluctuating tendency. By looking at the evolution of inequalities dimension-by-dimension, we can summarise the results by identifying three different patterns as regards the components of the Theil Index.

We find a first sub-set of well-being domains which confirm the existence of a sharp divide between Northern, Central and Southern regions, as shown by a prominence of the between-groups component of the Theil index: Culture and free time, Employment, Material conditions, Research and innovation, Social relations and Health (this latter, except for 2007). What is more, the between-groups component is increasing over time for Culture and free time and Research and innovation, whereas it decreases over time for Social relations and Employment. Last, it should be noted that the Material conditions dynamic of the between component of the Theil index is the same at the beginning as at the end of the period.

Conversely, for a second sub-set of dimensions, i.e. Education, Environment and Personal security, the prevailing component is within-group inequality. This means that regions which fall into each sub-national macro-area are very dissimilar in terms of these well-being dimensions. To be more precise, Personal security inequalities are entirely due to the within component, as the between component approaches zero over the entire period; for Education, an initially decreasing trend up until 2006 is followed by rising disparities, although inequalities within are definitely lower at the end of the

period than at the beginning whilst the between group component is decreasing throughout the period. On the other hand, Environment differences within and between groups decrease over time.

Finally, for just one dimension, i.e. Essential public services, the two components of the Theil Index follow a fuzzier pattern, as the within-group inequality fluctuates during the study period, while the between-group component decreases, with the result of an alternating prevalence of the former and the latter factors.

When we consider each sub-national macro-area separately, the higher level of inequalities for both GDP and RWBI indices is experienced by the Mezzogiorno area, where the Theil index is on average five times higher for RWBI and fifty times higher for per-capita GDP than it is in the North (table 2). Moreover, it should be noted that the evolution of inequalities over time follows different patterns in the Italian sub-national macro-areas if we consider the economic or the multidimensional well-being indicator. The North experiences an increasing trend in the Theil index when it is calculated for GDP, yet a decrease when applied to the RWBI; conversely, the opposite trend, decreasing for GDP and increasing for RWBI, occurs for the Mezzogiorno. By contrast, we find quite a stable trend for GDP and a decreasing pattern for the RWBI in the Central area.

Furthermore, similar to the findings obtained for RWBI and GDP, the Theil Index underpins higher inequalities in the Mezzogiorno area than in the rest of Italy when we are looking at each intermediate index of well-being.

All subnational macro-areas share decreasing inequality trends for just two well-being dimensions, i.e. Labour and Social relations. Conversely, only the Northern regions reduced disparities in terms of Essential services and Research and innovation; whilst only Southern regions experienced an inequalities' downgrading for the Health domain.

5. Explaining “within” and “between” well-being inequalities across Italian regions: the role of institutional quality

The different patterns in the multifaceted dimensions of well-being exhibited at the sub-national level suggest that territorial-specific factors may be at work.

Undoubtedly, when disparities are investigated in terms of GDP, the historical Italian divide between the more industrialised and economically advanced North and the South of Italy overshadows differences at the local level within these sub-national areas, so that inequalities “between” prevail over inequalities “within”. The North-South productive gap is indeed the most macroscopic and highly debated problem in Italian national history. Recent studies (Iuzzolino et al. 2011) state that the creation of the enormous GDP divide between the two areas dates back to the end of the XIX and the beginning of the XX century, with the growth of the so-called “industrial triangle” between Milan, Turin and Genoa and its adjacent area. Although there have been some periods of recovery over time, this historical economic divide still persists. The twenty years following the Second World War were the longest period of convergence between the two areas, with a remarkable rise in income levels in Southern regions vis-a-vis the rest of Italy. The reduction of this gap was halted by the oil crisis of the 1970s. Since then, overall inequality between the two sub-national areas has remained substantially unaltered, with ups and downs in convergence trends that have been too modest to change pace or direction more than temporarily. According to Iuzzolino et al. (2011), national government policy has played a central role in exacerbating or attenuating the divide between the two sub-national areas. Focusing on recent decades, the interruption of the trend of North-South convergence in GDP was due to a number of factors: industrial investments after the oil shock of the mid 1970s privileged restructuring rather than expansion of the existing apparatus, determining *de facto* an interruption to the industrialisation of the South from outside; new industrial strategies involved a decentralisation of production and gains in productivity by small firms in industrial districts located mainly in the Centre and North-East of Italy; whilst the end of special investment programmes for the South in 1992 and the rise of the labour costs, until then lower than in the rest of Italy due to the existence of “wage cages”, have hit the competitiveness of the South hard.

Moreover, a long period of stagnation, with a restrictive fiscal policy, has had an especially marked impact on the economy of the South, which was more dependent than the rest of the country on public resources. Thus, the South has fallen further behind in terms of per-capita GDP over the last twenty years, giving rise to a slowdown in the convergence process as confirmed by the weak reduction in the inequality indices (table 1). Our results are also in line with those of Vecchi (2011), who analyses income inequalities, measured by the Gini index, from national unification until 2011 showing a persistent higher value of income concentration in the South than in the North. Moreover, when the Gini index is analysed in relation to the average per-capita income by Nuts 2 regions, a negative correlation emerges between income inequality and standards of living which mirrors the historical North-South divide.

On the other hand, when inequalities are measured in terms of well-being, our results show that not only has the process of convergence between the subnational areas (Centre-North and South) not been restrained, but also that inequalities “within” are as relevant as inequalities “between” areas. This exercise of decomposition has the merit of highlighting the fact that, in terms of well-being, there are regional specificities at work. This point is important as well-being is inherent to people’s quality of life and this is very uneven in different regions within the same country, albeit there is political, fiscal and administrative homogeneity. In other words, the results of the decomposition of the Theil index presented in the paper suggest that there might be different territorial effects produced by central government policies whose effectiveness varies from region to region. Many of the well-being ambits considered in the analysis (environment, health, education, essential public services, security) are indeed regulated by national policy programmes, yet the quality of services provided to citizens is ultimately uneven at regional level. Moreover, regional and local authorities have played a key role in delivering public policies over the last few decades and the share of total national government spending accounted for by sub-national expenditure has grown (European Commission 2014). In Italy, regions and local authorities are responsible for around 30% of total public expenditure, higher than the EU-27 average for a number of public services linked to dimensions of well-being (Figure 5). The percentage of total government

expenditure delivered by regional or local institutions in Italy increased by 5 percentage points over the 1995-2013 period, against a rise of only 1% in the EU-27 average (Ibidem). All in all, for each function of sub-national government expenditure, the efficiency of regional and local authorities may affect the effectiveness public expenditure has in enhancing the structural conditions in the respective fields of intervention and, hence, the different ambits of the quality of life. In other words, the quality of local institutional frameworks and efficiency in implementing national and regional policies probably have a role in determining the incidence of inequalities “between” and “within” macro-areas. As pointed by Ezcurra and Rodriguez-Pose (2014, p. 1733), ‘[...] it needs, however, to be taken into consideration that the degree of effectiveness of regional development strategies is closely related to the quality of institutions and to the way in which authority is exercised by governments (European Commission, 2010; Rodriguez-Pose, 2013). Countries with weak institutions and low quality of government are characterized by the presence of persistent corruption, pervasive rent seeking, self-serving decision-makers, and low quality of bureaucracy. This set of problems often gives rise to imperfectly functioning markets and institutional and government failure, which, in turn, reduces the capacity of the public sector to design and implement effective policies that contribute to promote regional convergence’.

In order to investigate in depth the relationship between well-being inequalities and the quality of regional government and authorities, we test whether there is a significant causal relationship between regional well-being disparities, on one side, and the amount of regional expenditure in fields of intervention linked to well-being dimensions and the quality of institutions, on the other. To this end, we use regional accounts data from the Italian National Institute of Statistics (ISTAT) data-base over the 2004-2010 period in order to calculate per-capita regional expenditure and the IQI index for quality of institutions, proposed by Nifo and Vecchione (2014), as a gauge of ‘the extent to which a government delivers its policies – irrespective of their nature and degree or provision – in an *effective* and *impartial* way and without *corruption*’ (Charron et al. 2014, p. 69, emphasis in original). As our interest is to investigate the causal relation between regional inequalities in well-being and the IQI index, a measure of

well-being inequality is defined by computing the deviation between the Italian mean value of RWBI and the regional value: higher this measure, wider regional inequalities are. As specified in section 3, IQI is a newly created composite index based on five pillars: Corruption, rule of law, government effectiveness, voice and accountability, regulatory quality calculated at the Italian regional and provincial levels. The resulting ranking confirms that the provinces with the poorest institutional quality performance are clustered in the Southern regions, highlighting the existence of “*between*” disparities, yet there is a greater difference between the highest and the lowest values in the Southern (0,7) than the Northern provinces (0,6), thus confirming the presence of not trivial “*within*” inequalities given that the IQI index only ranges between 0 and 1. The North-South divide in Italy in terms of regional institutional quality is well-known from the seminal work of Putnam et al. (1993) on social capital. According to Putnam, institutional quality is better in highly-endowed social capital regions and these are clustered in Northern regions⁹.

Figure 6 shows the within (macro-area) regional variations in well-being (panel A), IQI (panel B) and per-capita GDP (panel C) using a box-plot graph. It highlights the existence of marked “*between*” divergences as the maximum regional score in the Mezzogiorno area is slightly lower than the minimum value of the North for the IQI index, but considerable below the lowest Northern threshold for per-capita GDP and below the Northern regions’ median value for the RWBI. Moreover, the length of the segment between the minimum and the maximum score per area, which measures the “*within*” differences, is much larger in the South than in the North and in the Centre as regards both the overall well-being index and the quality of institutions. On the other hand, “*within differences*” are wider in the North than in the South when the normalised per capita GDP is considered.

The bivariate scatterplot of the relationship between well-being and the quality of government clearly shows a positive relationship between well-being levels and the quality of government index (fig. 7). Only four Southern regions (Calabria, Campania, Sicilia and Puglia) are located on the low-left side

⁹ The relationship between institutions and social capital is discussed in Cersosimo and Nisticò (2008).

of the graph, far apart from the others (Abruzzo, Basilicata, Molise and Sardegna), which are closer to the group of the Centre-Northern regions. These latter are clustered in the upper-right side of the scatterplot, albeit there are two stand-alone regions (Valle d'Aosta and Trentino-Alto Adige) in the upper-right corner of the graph.

In order to examine in greater detail the relationship between regional inequalities in well-being and institutional quality, we estimate different versions of the model presented above, in section 3. The first model in table 3 shows the results of a panel fixed effects estimation with year dummies and regional linear time trends (in order to account for yearly regional dynamics). Results highlight a positive and statistically significant coefficient associated to the institutional quality indicator, meaning that a higher level of quality of government at time t seems to have a negative impact on our measure of well-being inequalities; whilst, the quantity of government (level of expenditure) has a negative but not statistically significant coefficient. In model (2), a one-period lag of the expenditure has been added. The coefficients are jointly statistically significant at 5% ($F=3.04$), and their linear combination is statistically significant as well. In order to make the relationship between well-being inequalities and regional expenditure more flexible, model (3) has been specified as a cubic function. The results are robust to this specification and highlight that the current expenditure has a positive effect in reducing well-being inequalities¹⁰.

When adding a one-period lag of the IQI index to the previous models, the results are slightly similar but highly statistically significant (Table 4). Improvements in the quality of regional government may lead to an initial increase in spatial well-being inequality, as regions with more efficient institutions could have an initial advantage, followed by a decline in the ensuing stages of institutional progress, as better institutions and governance positively impact on the economic and social progress, both in leading and lagging regions. Consequently, the trend in well-being inequality should conform to a concave

¹⁰ The same results, but with an opposite sign, are confirmed when considering regional well-being levels as a dependent variable.

function. We thus test for the possible existence of a nonlinear relationship between well-being inequalities and institutional quality, by considering in the list of regressors the synthetic index of institutional quality and its square (Table 5). Our estimates seem to confirm the existence of an inverted U-shaped relationship between well-being inequalities and institutional quality: improvements in institutional quality are initially associated with increasing regional disparities, yet beyond a certain threshold a negative correlation emerges between the two variables. Albeit, in model 1, the respective coefficients show statistically insignificant t scores, they are indeed jointly significant at 1% ($F= 5.78$); the same holds true for their linear combination. Furthermore, it comes out that the lagged regional institutional quality has a positive impact in reducing inequalities, even though the relative coefficient is only jointly statistically significant (more than 1% in models 4 to 6).

In order to disentangle the effects of the IQI sub-indices on well-being inequalities, we estimate the previous models by considering the five dimensions instead of the composite indicator. Results are presented in table 6. By looking at their current values, we found a positive and statistically significant relationship between inequalities and rule of law and a negative coefficient for corruption. For the other components, the current values' coefficients are only jointly significant. In model (10), the one-period lagged indicators have also been added. Higher values in $[t-1]$ of rule of laws, regulatory and corruption indices seem to reduce inequalities on well-being.

Overall the results suggest that institutional quality affects well-being inequalities; in particular, a better quality of government reduces well-being inequalities in the following period, whilst it seems to increase inequalities in the current period. Conversely, the size of government reduces inequalities in the current period and has a positive sign later on. By breaking down the effect due to the overall IQI into the effects of its components, it emerges that lower corruption fosters the reduction of well-being inequalities, whereas rule of law indicator has this effect only one year after; a lagged positive effect on the reduction of inequalities is detected also for the government effectiveness.

The quality of government appears to be more important than the size of government in fostering long-term reduction of well-being inequalities, in line with the literature stressing the importance of how a government implements its policies instead of to consider just the amount of public expenditure (Charron et al. 2014; Holmberg et al. 2009; Ott 2010).

6. Exploratory Spatial Data Analysis

As a final check over the analysis on Italian regional well-being dynamics, we also assess the presence and the features of spatial interdependencies in the well-being levels of Italian regions over the 2004-2010 period, by performing an exploratory spatial data analysis. In general, spatial correlation implies that two or more regions that are spatially close tend to be more similar to each other in terms of the attribute of interest than are spatially distant regions (Anselin et al. 2000). Spatial association allows us to detect the existence of territorial clusters that do not necessarily overlap with the aggregations at the sub-national macro-areas level.

We perform the test for the presence of spatial correlation at both global and local level by considering the full sample and the three sub-national macro-areas sub-samples contemplated in the previous sections (North, Centre and Mezzogiorno of Italy).

Thus, we adopt the following global Moran Index (Moran 1950):

$$I = \frac{1}{s^2} \frac{\sum_i \sum_j (y_i - \bar{y})(y_j - \bar{y})}{\sum_i \sum_j w_{ij}}$$

Where $s^2 = \frac{\sum_i (y_i - \bar{y})^2}{n}$ is the sample variance, y_i is the value of the variable of interest in area i (either RWBI or per-capita GDP in our case); \bar{y} is the overall mean; w_{ij} is the weight which defines proximity between i and j , with $i \neq j$, and n is the number of areal units considered.

When we calculate the Moran index for all Italian regions, we find evidence of a positive global spatial autocorrelation. The dynamics show that the index rises from 0.158 in 2004 to 0.235 in 2010 for overall well-being, whereas it does not change significantly for GDP. A Moran scatterplot is displayed in figure 8. Each quadrant in the scatterplot represents a different type of spatial autocorrelation (Anselin

2005), whilst the slope of the line is Moran's I coefficient. By comparing panels (a) and (b) of figure 8, a greater spatial association emerges over time between the Centre-Northern regions clustered in quadrant I of the scatterplot, where the units reporting high levels of well-being associated with high levels of neighbours' well-being are grouped. In particular, two Northern regions, Trentino-Alto Adige and Friuli-Venezia Giulia, experienced higher spatial autocorrelation in 2010 as the Moran index became statistically significant (table 7). In the specular section, we find regions that also have high levels of spatial association, yet they present low levels of well-being. It should be noted that regions in this quadrant are all from the South of Italy, but some of them (Campania, Calabria and Sicilia) are very strictly connected with each other in terms of both low levels of their own and their neighbours' well-being, whilst others (Molise, Basilicata, Sardegna and Abruzzo) do not exhibit evidence of spatial autocorrelation as the hypothesis of spatial independence is not rejected.

As regards GDP, local spatial autocorrelation measurements depict a greater separation between Northern and Southern regions. These latter lie closely in a cluster, which includes the Italian "less developed regions" as classified by the EU-Cohesion Policy 2014-2020 (Sicilia, Campania, Calabria, Puglia and Basilicata), both at the beginning and at the end of the study period (figure 9).

The results of the Local Indicator Spatial Association (LISA analysis) carried out in each of the three subnational areas (North, Centre and Mezzogiorno) show evidence of local spatial independence for RWBI, thus confirming that neighbouring regions may experience different patterns of well-being, which confirm the relevance of "within" disparities¹¹. On the other hand, our findings for GDP show a significant global spatial autocorrelation for the Mezzogiorno regions, underlining the predominance of "between" inequalities.

7. Conclusions

¹¹ See the appendix for more details on the LISA methodology.

This paper assesses well-being inequalities across Italian regions and their dynamics over the period 2004-2010 by using an existing synthetic index of well-being (RWBI) and ten intermediate indices regarding the dimensions of quality of life. Unlike previous research on the subject, this paper investigates multidimensional well-being inequalities both “within” and “between” sub-national macro-areas by considering each component of the synthetic index and well-being as a whole, and by referring to two measures of inequality (the Gini and Theil indices). Furthermore, it tests the effects of regional institutional quality on well-being disparities resorting on a novel data-set (IQI) and, finally, it explores spatial interdependencies across regions.

Results confirm that well-being is not simply a matter of GDP dynamics and that much more may be learned from ambits other than GDP, especially regarding the nature, entity and evolution of territorial disparities. Moreover, explaining inequalities in well-being is even more complex than interpreting the historical productive divide in Italy, given that quality-of-life sub-indices move in conflicting ways.

Decomposition of the Theil index shows that inequalities in GDP are almost entirely determined by disparities *between* subnational macro-areas, as the *within* component is close to zero, confirming the historical North-South productive gap, the most highly debated problem in Italian national history. On the other hand, between and within inequalities have equal importance in terms of RWBI. Moreover, the decreasing trend of the overall Theil index for RWBI is mainly due to the dynamics of its within component. Moreover, exploratory spatial analysis highlighted that regional performances are not significantly due to spatial proximity. This is especially true for well-being, as the Moran coefficient is low and not significant, whereas, when considering GDP, there is global spatial autocorrelation for Southern regions.

These patterns suggest that there are regional specificities at work which affect inequalities in well-being along with a sharp demarcation between the Centre-North and the South of the country. This insight is confirmed when assessing the impact of the institutional quality index and the regional expenditure on well-being inequalities. In a static model, a better institutional context seems to sharpen

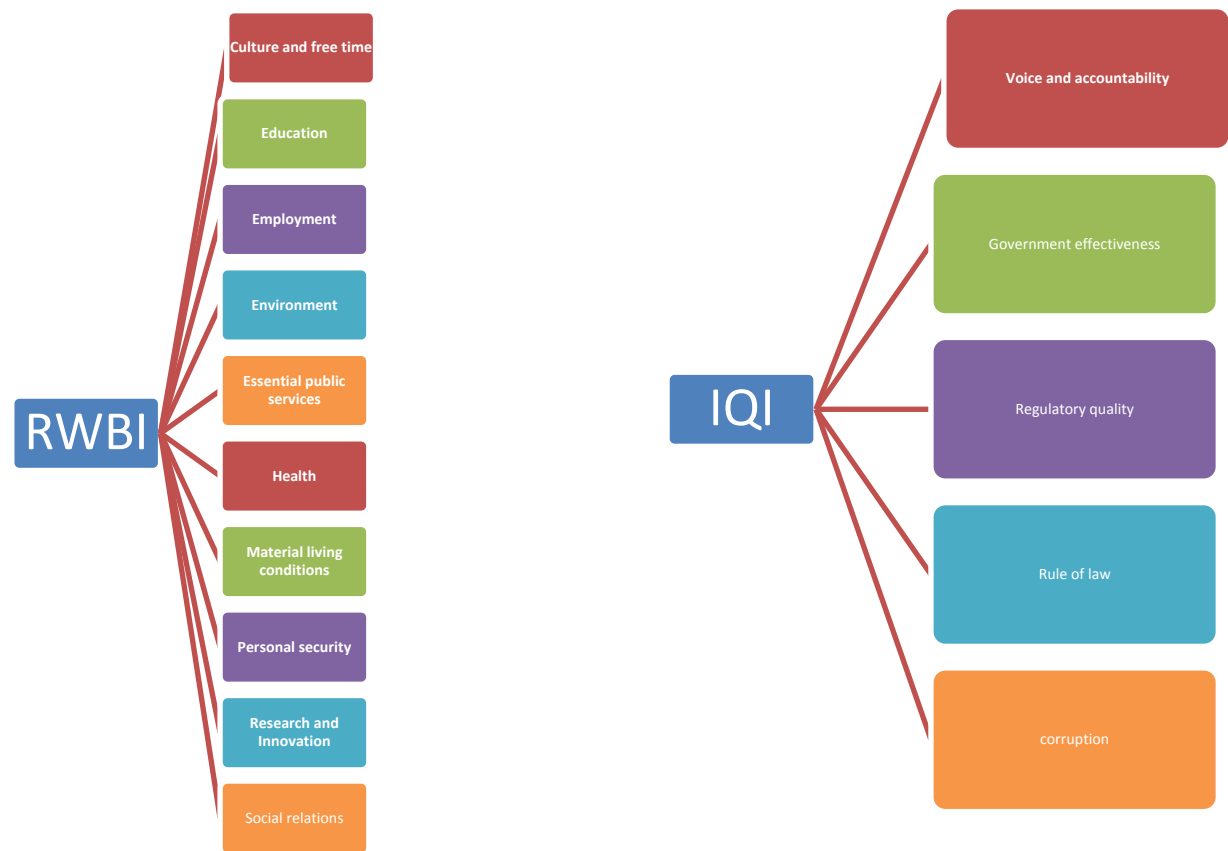
well-being inequalities. However, when a more dynamic structure has been considered, it comes out that institutional quality plays a more marked and durable role in reducing regional inequalities in well-being than the regional expenditure.

Such results are relevant because they mirror heterogeneous levels of people's quality of life in different regions inside the same country, albeit there is political, fiscal and administrative homogeneity. As well-being ambits are affected by central policies relating to "civil rights" (i.e. those rights that people enjoy by virtue of their citizenship of a particular nation) whose implementation is widely decentralised at local government level, *within* inequalities might be due to differing levels of regional institutional quality. In other words, given the different levels of local government efficiency and effectiveness, citizens who are legal members of the same sovereign state might find themselves experiencing differing possibilities to enjoy public goods as a consequence of the region where they live. This is connected to matters of equality of opportunity and citizenship rights.

To sum up, this study shows that some degree of equalisation in well-being levels has taken place over the last decade across Italian regions and that this has assumed differing shape and traits from the reduction in disparities in per-capita GDP. However, this process hides different dynamics at sub-national level, both between the Northern, Central and Southern regions, and within them. On the level of policy implications, these results emphasise the relevance of institutional quality and the importance of designing policies targeted at local capabilities, opportunities and constraints, with particular attention to both spatial interaction and the different convergence trends which each territory and each well-being dimension have.

Figures

Figure 1. The Regional Well-Being Index and Institutional Quality Index



Source: Ferrara and Nisticò (2015); Nifo and Vecchione (2014)

Figure 2. Well-being dimensions and indicators

Culture and free time <ul style="list-style-type: none"> • Newspaper reading • Theatre performances • Live classical music concerts • Sport events • Book reading • Museum visits • Sport
Education <ul style="list-style-type: none"> • People with tertiary education • Rate of early leavers from education and training • Rate of upper secondary school leavers • Participation in life-long learning • People with at least upper secondary education
Employment <ul style="list-style-type: none"> • Employment rate • Non-participation rate • Share of employed persons with temporary jobs for at least 5 years • Share of workers in an irregular occupation • Ratio between the employment rate of women aged 25-49 with at least one child of compulsory school age (6-13) and the employment rate of women aged 25-49 without children • Ratio of female employment rate to male employment rate • Incidence of long term unemployment • Youth unemployment rate
Environment <ul style="list-style-type: none"> • Fertilisers used in agriculture • Monitoring of air quality • Air pollution • Energy consumption provided by renewable sources • Special Protection Areas • Population density
Essential public services <ul style="list-style-type: none"> • Waiting lists for treatment • Differentiated urban waste collection • Child care services • Elderly assisted at home • Irregularities in electric power provision • Irregularities in water supply
Health <ul style="list-style-type: none"> • Life expectancy • Infant mortality rate • Overweight or obesity • Sedentary lifestyle • Nutrition
Material living conditions <ul style="list-style-type: none"> • Disposable household income per inhabitant • Disposable income inequality • People at risk of relative poverty • People living in jobless households • People suffering poor housing conditions
Personal security <ul style="list-style-type: none"> • Burglary rate • Pick-pocketing rate • Robbery rate • Homicide rate • Perception of crime risk
Research and innovation <ul style="list-style-type: none"> • R&D expenditure • Capacity to export • Patents • R&D workers • Graduates in Science and Technology
Social relations <ul style="list-style-type: none"> • Satisfaction with family relations • Satisfaction with friendship relations • Synthetic indicator of social participation • Volunteer work • Share of population that finances associations

Source: Ferrara and Nisticò (2015)

Figure 3. Institutional Quality Index dimensions and indicators

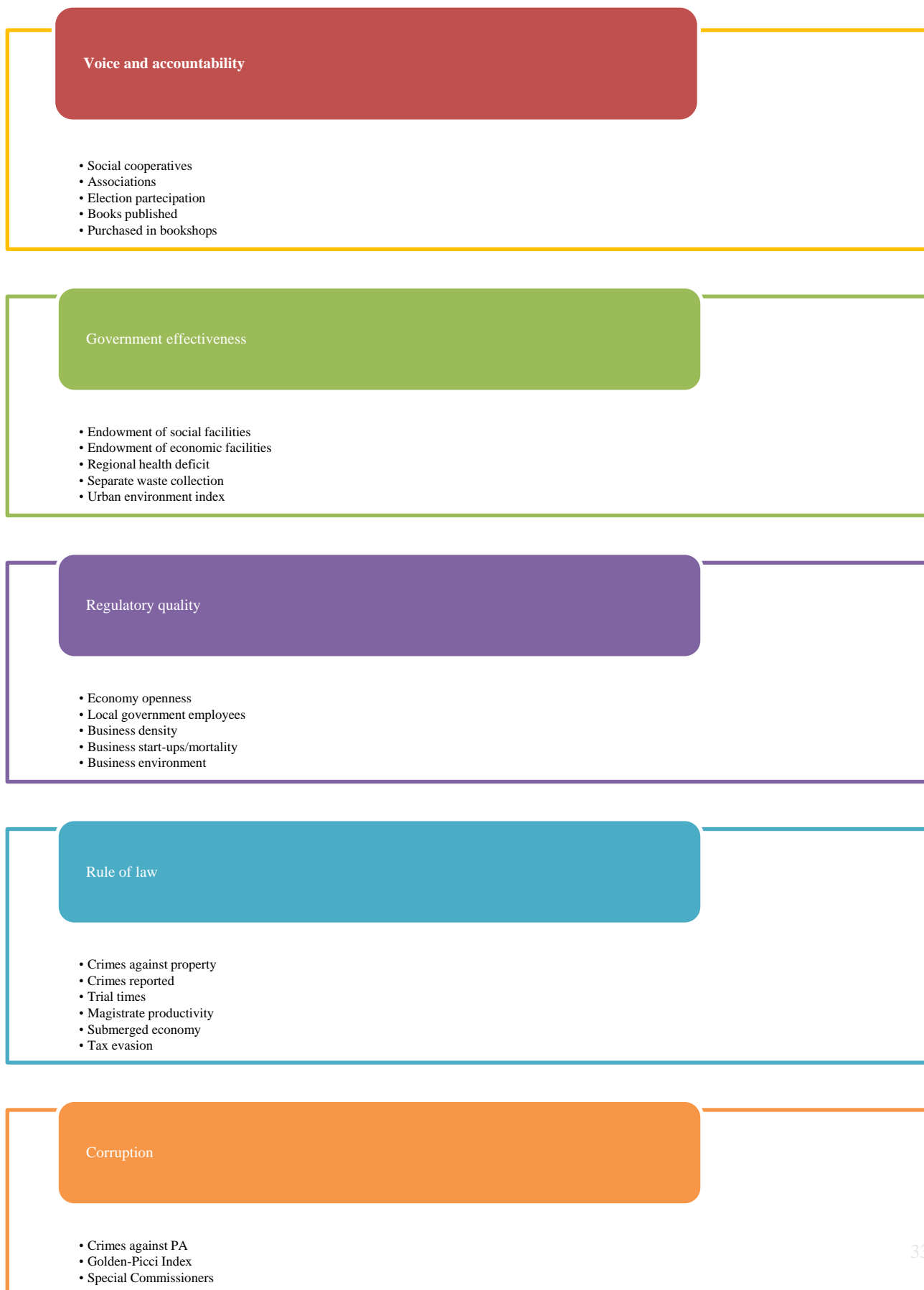
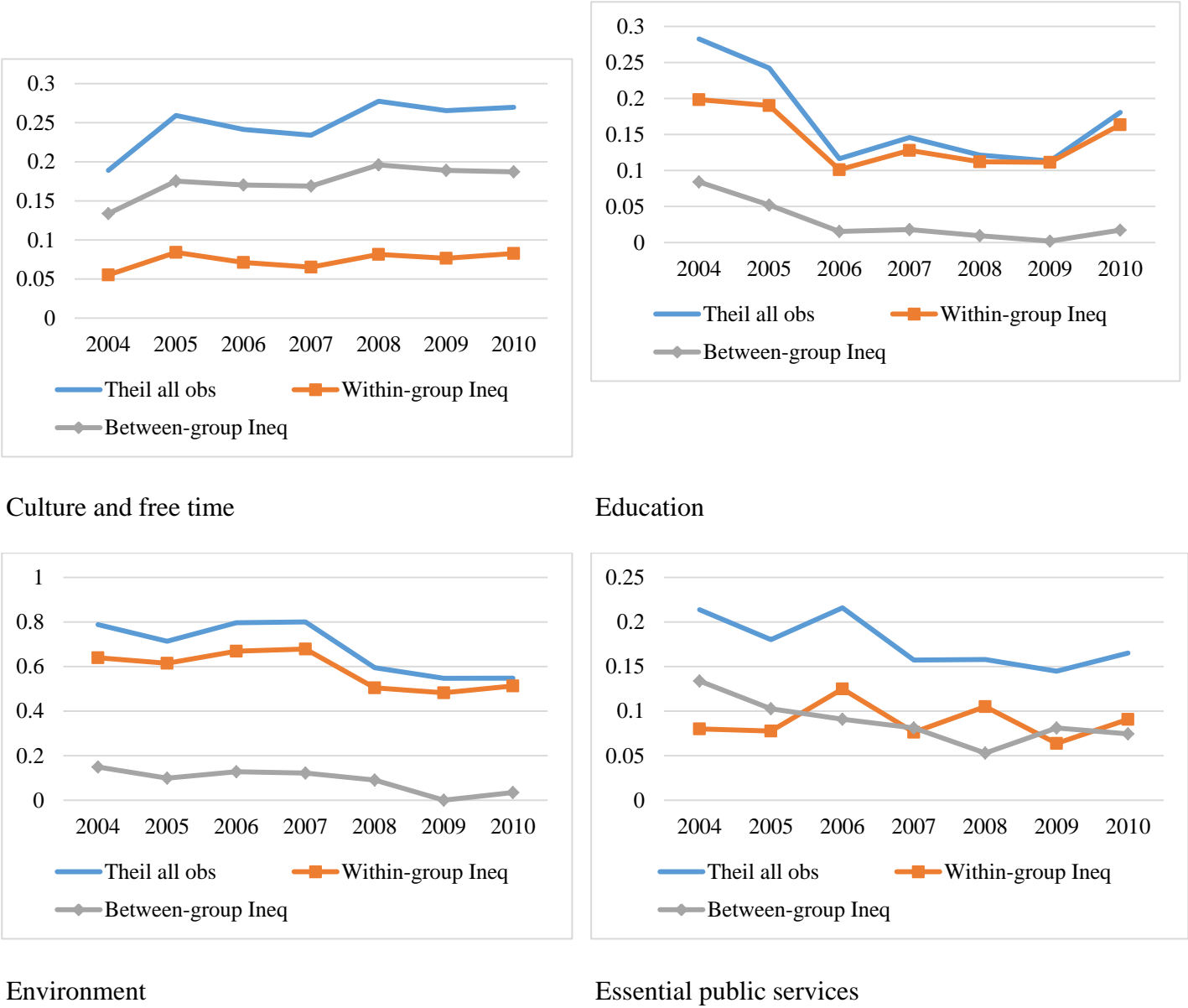
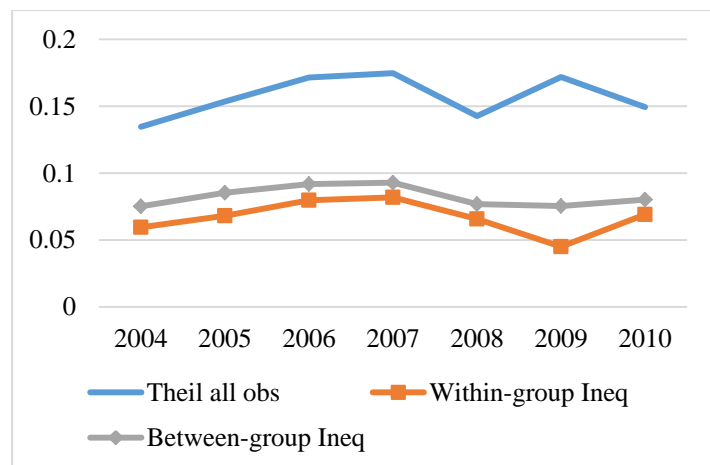
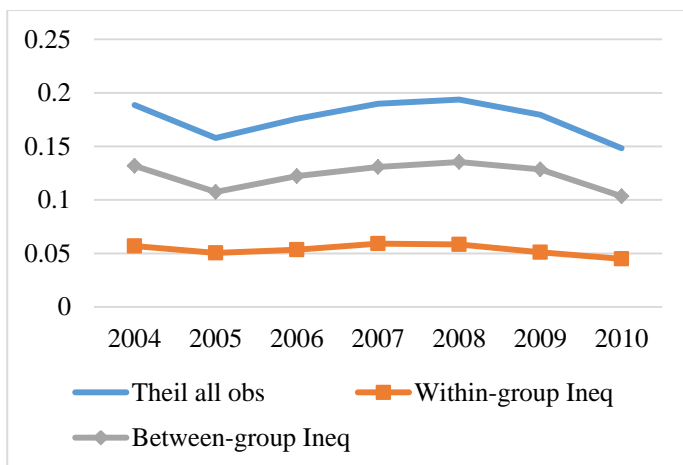
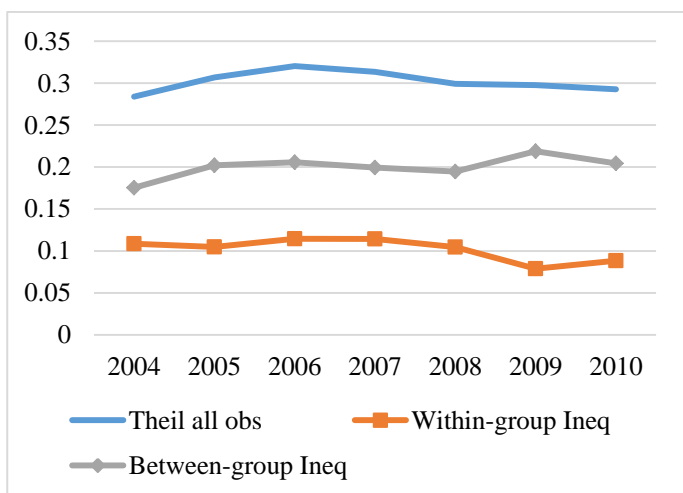


Figure 4. Decomposition of the Theil index: between and within inequality

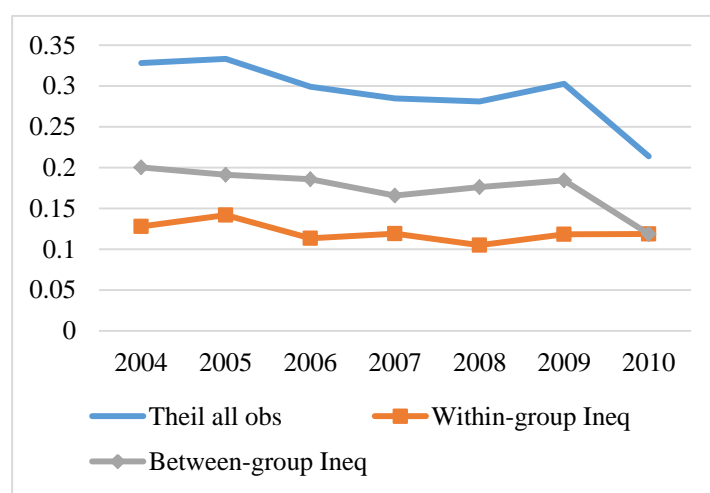




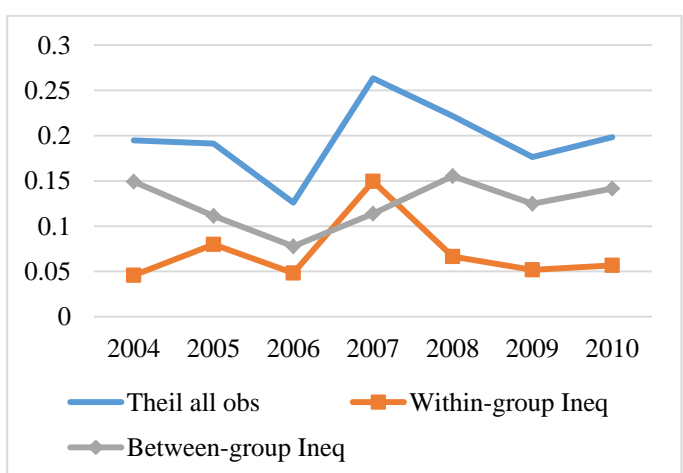
Employment



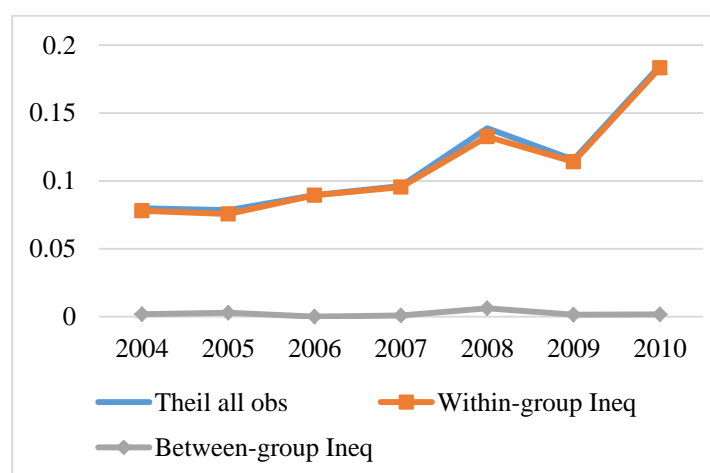
Material living conditions



Research and innovation

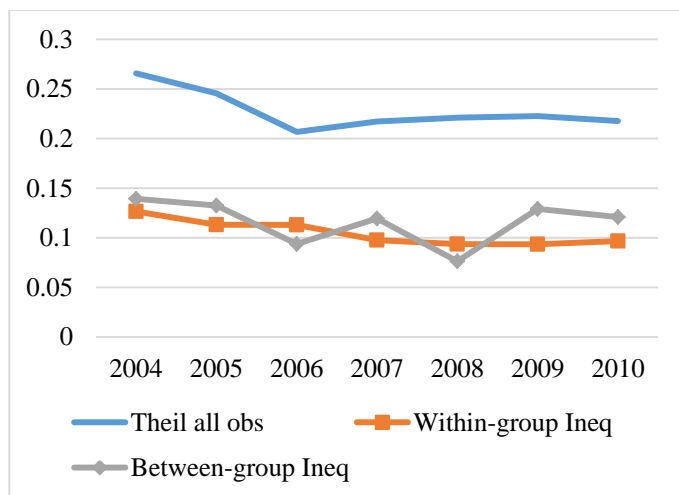


Social relations

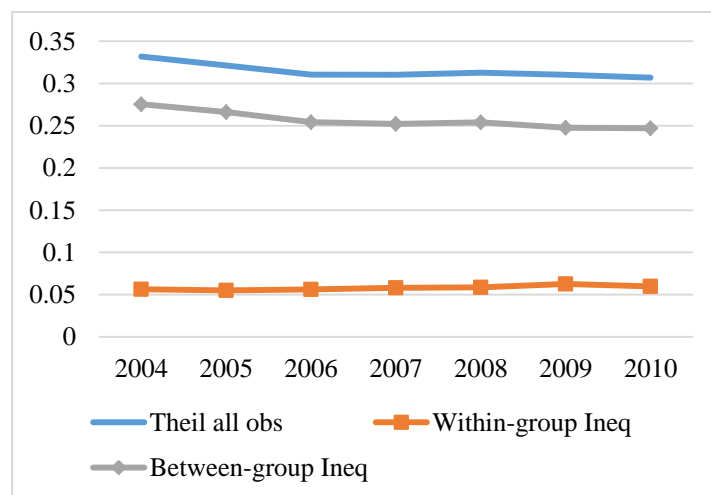


Health

Personal security



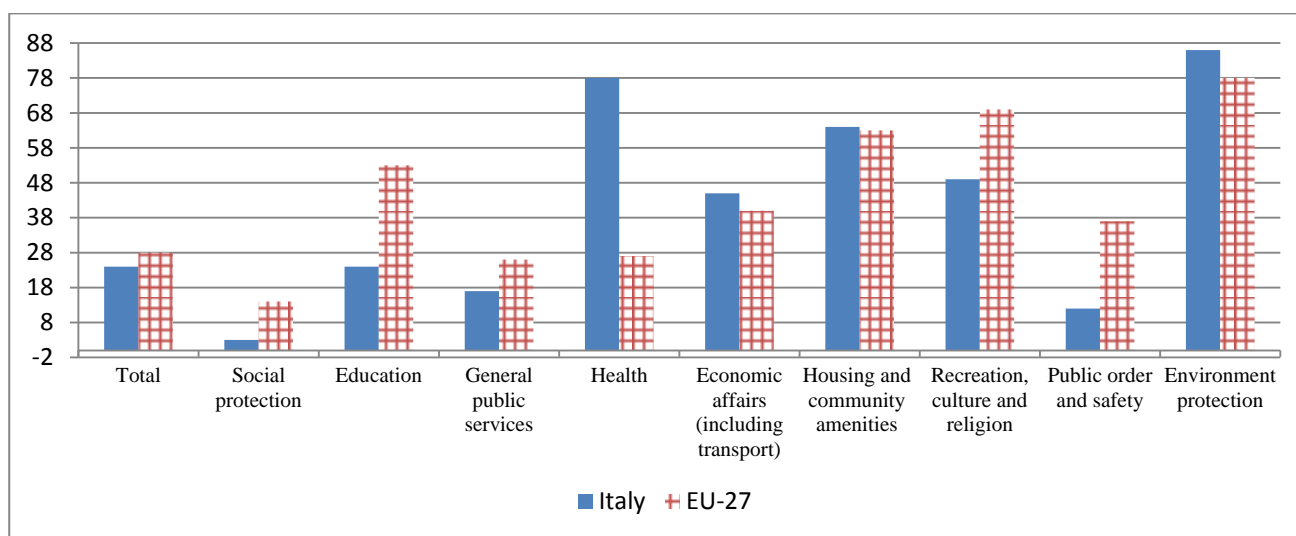
RWBI



Per-capita GDP

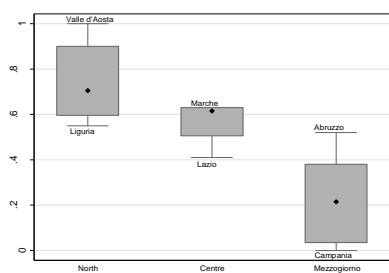
Source: our elaborations on Istat data

Figure 5. Subnational government expenditure by function (% of total general government expenditure), 2013

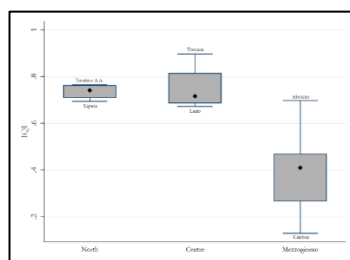


Source: our elaboration on Eurostat data

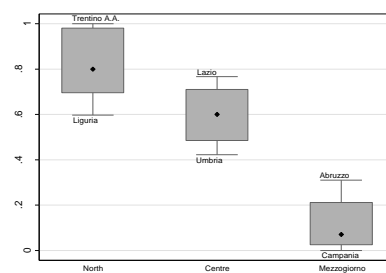
Figure 6 – Minimum, maximum and median values for per-capita GDP, the IQI and RWBI indices by Italian subnational macro-areas (North, Centre and Mezzogiorno)



(a)



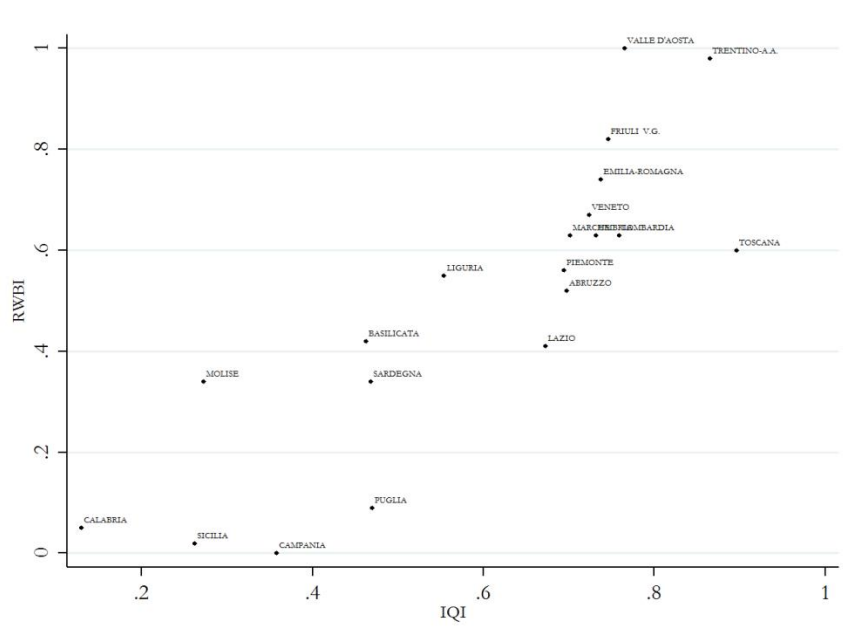
(b)



(c)

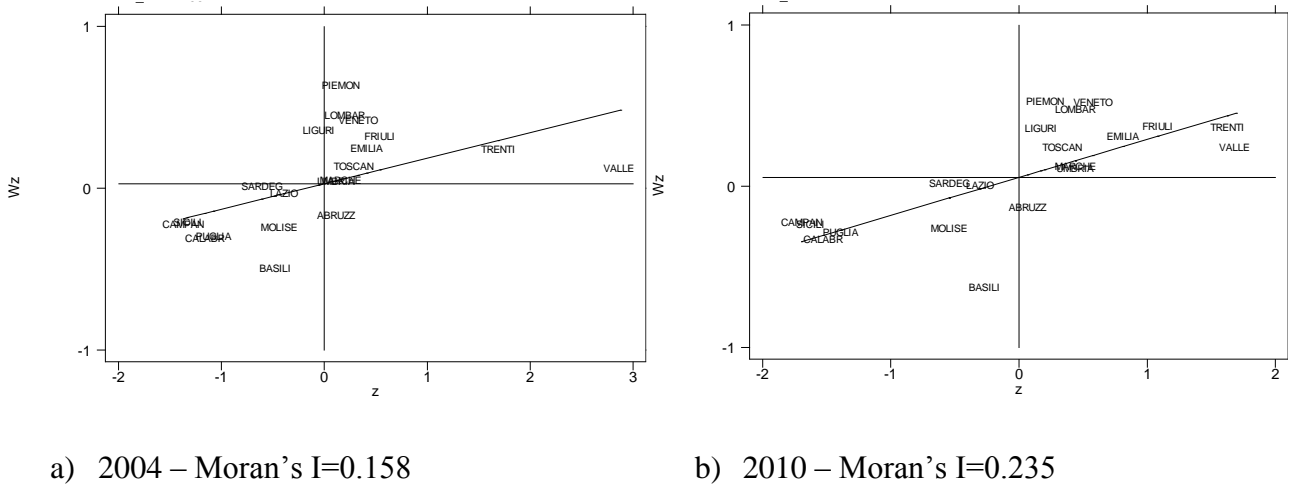
Source: our elaborations on Istat and IQI data

Figure 7 – Well-being and institutional quality index by region



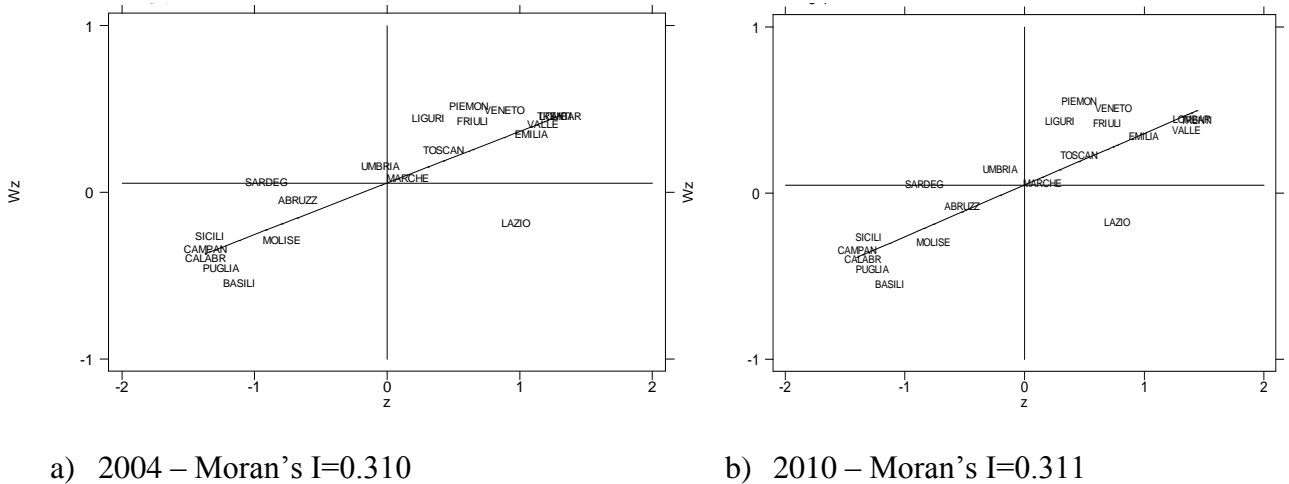
Source: our elaborations on Istat and IQI data

Figure 8- Moran Index Scatterplot for RWBI by Italian Regions, years 2004, 2010



Source: our elaborations

Figure 9 – Moran Index scatterplot for per-capita GDP by Italian regions, years 2004 and 2010



Source: our elaborations

Tables

Table 1. Inequality measures over time (2004-2010)

Year	RWBI		per-capita GDP		Culture and free time		Education		Employment		Environment	
	Gini	Theil	Gini	Theil	Gini	Theil	Gini	Theil	Gini	Theil	Gini	Theil
2004	0,37	0,27	0,40	0,33	0,32	0,19	0,39	0,28	0,30	0,19	0,62	0,79
2005	0,35	0,25	0,40	0,32	0,37	0,26	0,34	0,24	0,27	0,16	0,59	0,71
2006	0,32	0,21	0,39	0,31	0,35	0,24	0,24	0,12	0,29	0,18	0,62	0,80
2007	0,32	0,22	0,39	0,31	0,35	0,23	0,27	0,15	0,30	0,19	0,62	0,80
2004-2007	-12,08	-18,31	-3,48	-6,50	11,48	23,79	-30,05	-48,41	-1,13	0,64	-0,10	1,51
2008	0,32	0,22	0,40	0,31	0,38	0,28	0,24	0,12	0,30	0,19	0,54	0,60
2009	0,34	0,22	0,40	0,31	0,37	0,27	0,22	0,11	0,29	0,18	0,53	0,55
2010	0,32	0,22	0,40	0,31	0,37	0,27	0,32	0,18	0,26	0,15	0,54	0,55
2007-2010	-0,91	-1,56	0,54	-1,93	-3,10	-2,80	33,67	48,81	-12,14	-23,44	0,41	-7,96
2004-2010	-12,57	-18,12	-1,55	-7,55	16,73	42,67	-18,90	-36,06	-12,89	-21,38	-12,39	-30,55

Year	Essential public services		Health		Material living conditions		Personal security		Research and innovation		Social relations	
	Gini	Theil	Gini	Theil	Gini	Theil	Gini	Theil	Gini	Theil	Gini	Theil
2004	0,34	0,21	0,31	0,19	0,23	0,13	0,17	0,08	0,41	0,28	0,43	0,33
2005	0,30	0,18	0,29	0,19	0,25	0,15	0,17	0,08	0,42	0,31	0,43	0,33
2006	0,31	0,22	0,25	0,13	0,26	0,17	0,19	0,09	0,43	0,32	0,41	0,30
2007	0,27	0,16	0,37	0,26	0,26	0,17	0,20	0,10	0,42	0,31	0,40	0,28
2004-2007	-20,60	-26,41	17,11	35,18	10,22	29,79	18,59	20,63	2,70	10,44	-6,74	-13,22
2008	0,26	0,16	0,34	0,22	0,23	0,14	0,24	0,14	0,41	0,30	0,39	0,28
2009	0,26	0,14	0,30	0,18	0,26	0,17	0,23	0,12	0,41	0,30	0,41	0,30
2010	0,28	0,17	0,32	0,20	0,24	0,15	0,30	0,18	0,41	0,29	0,34	0,21
2007-2010	8,46	4,53	-4,72	-10,49	1,54	4,72	21,46	33,20	-1,18	-2,19	-12,88	-23,95
2004-2010	-16,31	-22,73	3,64	1,82	2,05	10,92	72,26	131,62	-0,56	3,09	-19,78	-34,86

Source: our elaborations on Istat data

Table 2. Theil index by subnational areas

	2004	2005	2006	2007	2008	2009	2010
RWBI							
North	0,08	0,05	0,08	0,03	0,06	0,04	0,02
Centre	0,02	0,02	0,02	0,01	0,01	0,01	0,01
Mezzogiorno	0,42	0,46	0,29	0,44	0,41	0,39	0,45
GDP							
North	0,01	0,01	0,01	0,01	0,01	0,02	0,02
Centre	0,02	0,02	0,02	0,02	0,02	0,03	0,02
Mezzogiorno	0,55	0,51	0,50	0,53	0,52	0,49	0,46
Culture and free time							
North	0,02	0,04	0,03	0,02	0,03	0,03	0,02
Centre	0,01	0,02	0,01	0,02	0,03	0,01	0,03
Mezzogiorno	0,24	0,39	0,36	0,33	0,46	0,42	0,49
Education							
North	0,19	0,18	0,18	0,10	0,11	0,17	0,14
Centre	0,03	0,01	0,02	0,06	0,02	0,01	0,06
Mezzogiorno	0,46	0,40	0,06	0,23	0,18	0,10	0,27
Environment							
North	0,85	0,90	0,92	0,96	0,71	0,72	0,81
Centre	0,08	0,11	0,17	0,26	0,09	0,08	0,14
Mezzogiorno	0,27	0,16	0,23	0,13	0,21	0,20	0,21
Essential public services							
North	0,04	0,01	0,01	0,01	0,01	0,01	0,01
Centre	0,04	0,03	0,04	0,01	0,05	0,02	0,05
Mezzogiorno	0,27	0,33	0,53	0,31	0,35	0,26	0,34
Employment							
North	0,004	0,002	0,003	0,004	0,003	0,003	0,003
Centre	0,01	0,01	0,01	0,01	0,01	0,01	0,01
Mezzogiorno	0,31	0,25	0,28	0,32	0,33	0,28	0,22
Health							
North	0,00	0,01	0,00	0,05	0,03	0,01	0,01
Centre	0,01	0,01	0,01	0,02	0,01	0,01	0,03
Mezzogiorno	0,27	0,40	0,20	0,61	0,32	0,26	0,26
Material living conditions							
North	0,001	0,003	0,002	0,002	0,001	0,001	0,001
Centre	0,004	0,005	0,006	0,004	0,003	0,004	0,001
Mezzogiorno	0,26	0,32	0,38	0,40	0,30	0,36	0,32
Personal security							
North	0,02	0,02	0,05	0,05	0,05	0,05	0,12
Centre	0,02	0,02	0,04	0,04	0,03	0,03	0,07
Mezzogiorno	0,18	0,17	0,16	0,18	0,30	0,23	0,32
Research and innovation							
North	0,09	0,09	0,09	0,10	0,09	0,05	0,07
Centre	0,01	0,02	0,02	0,01	0,02	0,03	0,03
Mezzogiorno	0,32	0,38	0,42	0,38	0,33	0,35	0,32
Social relations							
North	0,09	0,11	0,07	0,05	0,05	0,07	0,05
Centre	0,05	0,05	0,05	0,11	0,04	0,05	0,04
Mezzogiorno	0,45	0,47	0,43	0,43	0,42	0,48	0,30

Source: our elaborations on Istat data

Table 3 – The impact of institutional quality on regional well-being inequalities:
baseline model

	(1)	(2)	(3)
IQI	0.291** (0.0361)	0.491** (0.0285)	0.547** (0.0124)
Expenditure (ln)	-0.101 (0.135)	-0.124 (0.121)	-1.911** (0.0169)
Expenditure (ln) [t-1]		0.0554 (0.484)	0.0315 (0.698)
Expenditure (ln)^2			2.569*** (0.00832)
Expenditure (ln)^3			-1.187*** (0.000761)
Constant	-3.962 (0.305)	-5.209 (0.346)	-18.24*** (0.00662)
Year dummies	Yes	Yes	Yes
Regional linear time trend	Yes	Yes	Yes
Observations	140	120	120
R-squared	0.432	0.373	0.416

Robust pval in parentheses

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

Source: our elaborations

Table 4 - The impact of institutional quality on regional well-being inequalities: model
with lags

	(1)	(2)	(3)
IQI	0.467** (0.0268)	0.472** (0.0226)	0.536*** (0.00612)
IQI[t-1]	-0.236 (0.228)	-0.228 (0.248)	-0.277 (0.180)
Expenditure (ln)	-0.119 (0.120)	-0.115 (0.125)	-2.205*** (0.00396)
Expenditure (ln) [t-1]		0.0473 (0.542)	0.0193 (0.810)
Expenditure (ln)^2			2.916*** (0.00179)
Expenditure (ln)^3			-1.300*** (0.000135)
Constant	-8.858 (0.108)	-5.418 (0.367)	-19.68*** (0.00297)
Year dummies	Yes	Yes	Yes
Regional linear time trend	Yes	Yes	Yes

Observations	120	120	120
R-squared	0.383	0.385	0.434

Robust pval in parentheses

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

Source: our elaborations

Table 5 - The impact of institutional quality on regional well-being inequalities: a quadratic function

	(1)	(2)	(3)	(4)	(5)	(6)
IQI	1.083 (0.131)	1.891** (0.0309)	1.970** (0.0195)	1.864* (0.0533)	1.919** (0.0345)	1.978** (0.0256)
IQI^2	-0.624 (0.178)	-1.118* (0.0525)	-1.149** (0.0349)	-1.118* (0.0854)	-1.156* (0.0609)	-1.164* (0.0514)
IQI [t-1]				-0.259 (0.107)	-0.250 (0.124)	-0.285 (0.112)
Expenditure (ln)	-0.0688 (0.391)	-0.0483 (0.647)	-1.470*** (0.00902)	-0.0448 (0.665)	-0.0355 (0.719)	-1.765*** (0.00123)
Expenditure (ln) [t-1]		0.0749 (0.359)	0.0535 (0.518)		0.0666 (0.410)	0.0412 (0.616)
Expenditure (ln)^2			2.203*** (0.00305)			2.554*** (0.000547)
Expenditure (ln)^3			-1.098*** (0.000155)			-1.213*** (2.89e-05)
Constant	-3.003 (0.450)	-1.743 (0.733)	-13.80** (0.0243)	-6.774 (0.206)	-1.854 (0.741)	-15.22*** (0.00678)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Regional linear time trends	Yes	Yes	Yes	Yes	Yes	Yes
Observations	140	120	120	120	120	120
R-squared	0.447	0.410	0.454	0.420	0.425	0.473

Robust pval in parentheses

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

Source: our elaborations

Table 6 - The impact of IQI components on regional well-being inequalities

	(1)	(2)	(3)	(4)
Voice and accountability	-0.124 (0.509)	-0.444 (0.265)	-0.473 (0.215)	-0.366 (0.370)
Rule of law	0.258*** (0.000781)	0.379*** (0.000228)	0.424*** (4.37e-05)	0.347** (0.0148)
Regulatory quality	0.106 (0.159)	0.140 (0.202)	0.137 (0.223)	0.200 (0.123)
Government effectiveness	-0.104 (0.103)	-0.0620 (0.513)	-0.0270 (0.787)	-0.143 (0.247)
Corruption	-0.161** (0.0282)	-0.223 (0.268)	-0.204 (0.301)	-0.360* (0.0724)
Voice and accountability[t-1]				0.147 (0.492)
Rule of law[t-1]				-0.271** (0.0116)
Regulatory quality[t-1]				-0.161* (0.0954)
Government effectiveness[t-1]				-0.0178 (0.777)
Corruption[t-1]				-0.153* (0.0616)
Expenditure (ln)	-0.125* (0.0784)	-0.0985 (0.190)	-1.920** (0.0209)	-0.0887 (0.266)
Expenditure (ln) [t-1]		0.134 (0.169)	0.115 (0.255)	
Expenditure (ln)^2			2.563** (0.0140)	
Expenditure (ln)^3			-1.149*** (0.00340)	
Constant	-12.35* (0.0942)	7.328 (0.484)	-2.569 (0.823)	-24.92** (0.0497)
Year dummies	Yes	Yes	Yes	Yes
Regional year time trend	Yes	Yes	Yes	Yes
Observations	140	120	120	120
R-squared	0.491	0.440	0.478	0.526

Robust pval in parentheses

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

Source: our elaborations

Table 7 - Local Moran Index in Italian regions

Region	Normalised RWBI				Per-capita GDP			
	I _i	p-value*	I _i	p-value *	I _i	p-value*	I _i	p-value*
	2010		2004		2010		2004	
Piemonte	0.108	0.222	0.102	0.232	0.253	0.072	0.319	0.038
ValleD'aosta	0.388	0.020	0.299	0.051	0.507	0.004	0.482	0.006
Lombardia	0.208	0.043	0.091	0.192	0.618	0.000	0.591	0.000
Trentino-AltoAdige	0.580	0.000	0.385	0.010	0.628	0.000	0.580	0.000
Veneto	0.301	0.021	0.137	0.150	0.382	0.006	0.433	0.002
FriuliVenezia-Giulia	0.398	0.004	0.169	0.106	0.288	0.020	0.275	0.024
Liguria	0.060	0.237	- 0.018	0.420	0.127	0.121	0.137	0.108
Emilia-Romagna	0.242	0.015	0.095	0.165	0.335	0.002	0.367	0.001
Toscana	0.077	0.168	0.034	0.284	0.098	0.122	0.104	0.111
Umbria	0.038	0.309	0.002	0.386	- 0.026	0.441	- 0.006	0.399
Marche	0.046	0.291	0.004	0.381	0.005	0.372	0.010	0.361
Lazio	0.006	0.358	0.023	0.329	- 0.164	0.238	- 0.214	0.151
Abruzzo	- 0.011	0.407	- 0.024	0.438	0.059	0.260	0.051	0.274
Molise	0.162	0.118	0.123	0.175	0.255	0.044	0.263	0.039
Campania	0.442	0.003	0.356	0.014	0.540	0.000	0.527	0.001
Puglia	0.454	0.012	0.365	0.032	0.645	0.001	0.629	0.001
Basilicata	0.186	0.145	0.264	0.080	0.684	0.001	0.669	0.001
Calabria	0.573	0.000	0.411	0.003	0.606	0.000	0.607	0.000
Sicilia	0.446	0.000	0.331	0.003	0.401	0.000	0.404	0.000
Sardegna	0.004	0.221	0.010	0.284	- 0.023	0.313	- 0.037	0.391

*1-tail test

Source: our elaborations

Appendix

Description of the Local Indicator Spatial Association (LISA) methodology

At the local level, autocorrelation in well-being is detected by using LISA (Local Indicator Spatial Association), which is the decomposition of the global indicator into the contribution of each region. We thus consider the local Moran Index (I_i):

I_i is calculated for each areal unit:

$$I_i = \frac{y_i - \bar{y}}{s} \sum_j^n W_{ij} \frac{(y_j - \bar{y})}{s}$$

When neighbouring regions have similar values, I_i will be positive; conversely, when they have different values, I_i will be negative.

Both at local and global level, when there is no correlation between neighboring values,

$$E(I) = - \frac{1}{n-1}$$

When n tends to ∞ , the expected value of I , $E(I)$, approaches 0.

I is asymptotically normally distributed, where:

$$\frac{I + \frac{1}{n-1}}{\sqrt{\text{Var}(I)}} \sim N(0, 1)$$

We test the null hypothesis of absence of spatial association (i.e. y_i iid), by calculating the z-score:

$$z = \frac{I - E(I)}{\sqrt{\text{Var}(I)}}$$

We compare the z-score to a standard normal distribution.

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