Chapter 2
Southern Europe at a Glance: Regional Disparities and Human Capital

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2.1 Introduction

Looking at Southern Europe—Portugal, Spain, Italy and Greece—as a unique group of countries or a homogeneous area may not have an immediate justification. Maybe there are more things that keep us apart than common features that bind us together. Beyond its relative location as a large southern periphery of the European Union, there are however, some common trends and some indicators performing similarly. It is already commonplace that Southern Europe has been particularly hit by the present crisis (see also Chap. 3 in this volume), that it has an ageing population, and large regional disparities, as it is itself, as a block, a large peripheral region!

Although Greece, Portugal and Spain joined the European Union in the 1980s, creating the first great divide inside the community, Italy being one of the initial members had revealed the north-south contrast long before. In spite of this and the previous initiatives and projects for the development of Southern Italian *Mezzogiorno*, the addition of three new countries from Southern Europe led to structural changes in the community policies with a general aim of convergence. Ever since, convergence, or rather the lack of it, has dominated the European Agenda in different areas[1]. In the first years following the Southern enlargement the main focus of the European policies was convergence at the country level, and some goals have been achieved. However the strong wish for regional equilibrium has remained unattained. New policies have been designed and assessed and different

[1]Examples of some important milestones are the reform of the Structural Funds in 1989, the Sapir Report in 2004, the Lisbon Strategy for 2010 and more recently the Europe 2020 Agenda (Gardiner et al. 2005; EC 2010, 2016).

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approaches have been experimented with, but without the expected results. Research continues to focus on the underlying causes that keep regions lagging behind without upgrading, and continues to work on new ways of intervention, or, as Storper says, "change and causality" (2011, p. 334).

Studying Southern Europe is not only about analysing and testing regional development models or putting into question the regional policy of the European Union; it also allows us to question the theoretical proposals for addressing the condition of the intermediate and peripheral regions. This chapter is a presentation of Southern Europe, in a broad and comprehensive characterisation, with quite large-scale data and the most up-to-date information and attempts to bring an additional building block to the understanding of the persistence of *peripheralism*.

Why are there regions with no capacity for flourishing? Is there really an inability to upgrade?

This is a descriptive and analytical text, seeking to highlight the characteristics and profiles of the regions of the four countries in Southern Europe, keeping in mind a structural methodological doubt: are we studying the regional differences or are we analysing the available data, by the available levels of territorial breakdown? How much can our basic information influence our analysis and conclusions? This problem is out of the focus of the book and is not going to be discussed although we have to keep it in mind at every step of our work.

Both theories of endogenous growth and neoclassic with different variations have not yet definitively clarified the mechanisms that keep lagging regions from growing and upgrading (Storper 2011; Rodríguez-Pose and Fratesi 2007; Rodríguez-Pose and Fitjar 2013). Backward economic structures, poor infrastructure, R&D investment deficit, lower skills, lower labour productivity, lack of scale economies, no access to markets and inefficient policies are some of the most repeatedly charged problems in Southern European cases, even when the effects of dependencies and external control are considered (Rodríguez-Pose 2001; Balchin et al. 1999; Jarocinski 2003; Capello and Lenzi 2013).

On one topic all theories agree, innovation is a critical driver for economic growth (Simmie 2001; Meusburguer 2013). The knowledge-innovation-technology-economic growth and progress path, although intensively researched and developed at the theoretical level, is subject to many different nuances when it comes to the real regions and at present has some critical views (Capello and Lenzi 2013). The geography of agglomeration and polarisation is quite complex. Economic geography approaches are various and incorporate contributions and inputs from several scientific neighbours (Storper 2011; Scott 1988, Storper and Scott 2009; Bathelt and Glückler 2011). In the current exercise, we want to understand the spatial divisions of labour in Southern Europe and identify the main types of regional behaviour, using a multivariate analysis as a basic tool, complemented with other quantitative and qualitative data.

Regional upgrading understood as a development process, a learning and evolutionary path of economic growth and socio improvement does not occur in a social, cultural, political or economic vacuum (Meusburger 2013, p. 26). It is context sensitive and depends on local (regional) constraints, opportunities,

knowledge contexts and other socio-economic and institutional frames. In fact, some policies have failed because they followed *one size fits all* schemes, overlooking regional specificities.[2]

Bearing in mind this framework, this analysis focuses on the identification of the features of the regions of the four countries of Southern Europe, using as a main methodological tool the concept of "social filter", introduced initially by Andrés Rodríguez-Pose—also a geographer and economist from Southern Europe (Rodríguez-Pose 1999; Crescenzi and Rodríguez-Pose 2013). We adapted the concept with some subsequent developments for the specific objectives of this study, in the selection of indicators and in the analysis.

This introductory chapter presents a tentative interpretation of the current map of Southern Europe and the regional disparities of the four selected countries with a special focus on the link between human capital, space and economy.

2.2 Regional Disparities

Regional disparities are not an innocuous and objective concept nor do they correspond to an image or snapshot of an enlarged spatial reality made up of multiple smaller territorial units. They are the outcome of many factors, and need a multidisciplinary approach to be understood. They assume different shapes according to the field of analysis and the corresponding selection of variables or indicators with which they are assessed. They are scale sensitive and politically biased. In fact, there is no global theory on regional disparities (Gyuris 2014) and "a decent theoretical understanding of uneven geographical development still remains to be written" (Harvey 2004). Even the wording is not consistent: geographical, spatial or regional disparities or inequalities. Beyond the wording there are implicit judgements, like unevenness or inequity, injustice or unfairness and an idea of differentiation, "quasi as things that are 'just out there'" (Gyuris 2014, p. 2). Gyuris gathered various approaches to spatial disparities, identifying the background of the main theoreticians, the analytical focus and scale of preference of theories, the political ideologies and systems they were aimed to legitimize, and the use of science as a source of legitimacy in a comprehensive exercise that included natural sciences, philosophy, political science, economics, sociology, history and geography (2014, p. 332) under the argument that there is a political component of the concept. Gyuris selects the term "spatial disparities" and describes them as "forms of unevenness in space that can be traced back to human agency" (2014, p. 13). Venables goes further and states that "spatial inequalities in economic activity and income arise endogenously and persistently, not just as transient phenomena" (2011, p. 1). On the other hand, evolutionary economic geography—or, as Martin

[2]The metaphors of RegioTopia, RegioCopia and RegioNova, used in a little story of Harald Bathelt and Johannes Glueckler (2002, p. 14) are particularly expressive.

and Sunley defend, development evolutionary geography—offers "a more systemic and holistic understanding of spatial economic evolution, one that considers not just industrial evolutionary dynamics but also the wider economic, institutional, and socio-political structures produced by and constitutive of uneven geographical development" (Martin and Sunley 2015, p. 720). Evolutionary economic geography is focused on economic development systems and is building up a framework that includes the perspectives of other theoretical models from the institutional economic geography and the geographical political economy in a synthesis important to the understanding of regional development landscapes (Martin and Sunley 2015). However, the complexity of the regional mosaics—*the geographical world is a messy one, it does not cohere* (Thrift 2005, p. 51)—cannot be approached by methods that include the recording of every aspect of the regions or a *backward gaze* (Thrift 2005, p. 2) that aims at understanding the future as a simple projection of past trends. Regional disparities are the outcome of polarised economic growth processes, i.e., the visible outlook of the geography of agglomeration or of geographically uneven development. They are the visible face of dependencies and changes in the international division of labour and the organisation of global values chains, migrations and other flows of people, information, commodities and power, changing constantly.

Agglomeration and polarisation or regional divides are at the core of economic geography, and innovation, knowledge (and technology) and human capital became the pillars of growth and development.

The first models in economic geography were based on the explanation of production processes based on the balance between capital and labour in an aggregate way. Labour corresponded to the sum of workers. With the development of human capital theory[3] there was a shift in the former, more traditional approaches and labour started to be considered in its different components and characteristics from quality, skills and other elements (Woessmann 2003). Postfordist division of labour made human capital more relevant (Storper and Scott 2009, p. 163) and led to a broader stratification. The qualification of labour with the acquisition of knowledge, skills, competences and life-long learning generates and brings up human capital.

Knowledge is immediately related to human capital, since human capital corresponds to a complex set of personal characteristics and components that differ from individual to individual and include knowledge, skills and various competences. The growing importance of knowledge in processes of producing and servicing goods and distributing them to markets developed in economic geography research

[3]The concept of human capital first appeared in the works developed by Adam Smith (1723–1790) and Marshall (1842–1924). However, this concept was misunderstood because there was no sense in qualifying *"labor as a type of capital"* (Teixeira 2007). By the late sixties of the twentieth century, the research on human capital took off. T. W. Schultz, Jacob Mincer and Gary S. Becker developed the main contributions on human capital theory and its different approaches. Human capital has been understood differently in other contexts and scientific areas. We will focus on economic geography approaches and uses of the concept of human capital.

as well as in other fields, from economy to sociology and cultural sciences. Modern economic growth and development theories assume that "economic growth is, at least partly, a function of stocks of knowledge in the form of human capital or the outcomes of research and development (R&D) activities" (Huggins and Thompson 2014, p. 1).

Knowledge however, has several particularities that make it a special "good" or commodity and constrain the development of a knowledge economy. First of all, it is not an homogeneous "good"; there are different types of knowledge from everyday knowledge to theoretical knowledge and action knowledge or explicit and implicit (tacit) knowledge and knowledge related to skills and competences or abilities (Glückler et al. 2013). Parallel to this, there are also different levels of quality in knowledge, and prior knowledge is critical for knowledge improvement (Rodríguez-Pose 2001, p. 281). Besides, offer and demand of knowledge are uncertain and it is difficult to anticipate the price or the value of knowledge as a commodity or good, not to mention the quasi-impossibility of measuring knowledge (Thönnessen and Gundlach 2013). Knowledge can grow infinitely since it can be endlessly re-used, can be combined and recombined (Storper and Scott 2009, p. 148); it can make people more productive (Shapiro 2006). In fact, it is only possessed by people and does not exist outside people. Knowledge flows involve people flows (Fratesi 2014). Human capital corresponds to knowledgeable people and is not a fixed asset of a region, since migrations can modify the map of human capital (Shapiro 2006). Knowledge cannot be produced in isolation nor entirely transferred, since part of it is inherent to the individual (Bathelt and Glückler 2011). Knowledge is highly localised and new knowledge is always local and scarce for a certain period of time, before it spreads and gives way to new knowledge divides and new regional disparities (Meusburger 2013, p. 19). That is also why a spatial perspective is needed to capture the functioning of the knowledge economy and that is how knowledge is, in our time, the critical driver of economic change (Bathelt and Glückler 2011; Simmie 2001).

In this context, human capital turns out to be the focus of what we can consider a modern approach in the geography of agglomeration. Human capital is unquestioned as the main factor for innovation in the strategic documents for the European Union's regional development, as is the case of the Lisbon Strategy for 2010 or the Europe 2020 strategy.

The link between human capital, innovation, economic growth and regional development is usually analysed through indicators of economic performance and of the educational stock of a region (Woessmann 2003; Crescenzi et al. 2013; Thönnessen and Gundlach 2013). There are however limitations and the real effect of education institutions on the economic growth and regional development of the regions where they are located remains a statement taken for granted more than an argument empirically and theoretically demonstrated. There is some empirical evidence but almost nothing about the underlying causes of this relationship (Shapiro 2006). The mismatch between educational stock and labour market demand, over-education and brain-drain are some of the evidences of the shortfalls of the methodologies used in most of the recent studies. Human capital is relevant

but not only for the location where it is generated. Human capital stock of neighbouring regions can be used by a region, and regions with high human capital potential can underperform despite their assets. Migration and economic base and production structure or specialisation of a region as well as the polarization pattern of the main urban areas are also relevant (Storper and Scott 2009; Simmie and Martin 2010). Recently, for instance, more attention has been paid to the mismatch between higher education and the labour market at the level of the perceptions of the graduates who get frustrated and even regret having entered the university (Kucel and Vilalta-Bufí 2013a, b).

Knowledge and innovation have to be produced or generated, distributed, spread or diffused and absorbed and used by people and regions in order to enhance human capital and economic growth; it is not an automatic process. Investment or expenses in research and development are usually taken as the best proxy to assess the regional growth or upgrade potential of a region. The effects of the investment in research and development on the innovative potential of a region however, are conditioned by several factors including a minimum threshold of prior knowledge or human capital (Meusburger 2013, p. 19; Rodríguez-Pose 2001; Charlot et al. 2015). In fact, the richer regions in Europe benefit from their previous assets in terms of knowledge production and innovation while the poor regions do not have the same ability to innovate or catch up.

> For these regions [poor regions with low levels of R&D and human capital], investing marginally in such inputs [R&D] would be wasting money. In particular, the return to R&D expenditure is maximized between 2% and 3% of regional GDP, whereas HK [human capital] has a positive effect when at least 20% of the regional population has completed tertiary education (Charlot et al. 2015, p. 1250).

In spite of the lack of a strong theoretical framework, several criticisms have been made about the different strategic decisions on physical versus human capital investments, as is the case, for instance, for Southern European countries; some studies argue that policy measures have concentrated less on human capital enhancement than would be desirable:

> [Third], the Mediterranean countries do not invest enough in intangible capital. This will pose a serious threat to the economies of Italy and Spain in the coming decades (Gros and Roth 2012, p. 30).

And this remains an issue quite difficult to understand and assess.

2.3 The Social Filter Concept or the Absorptive Capacity of the Regions

The concept of social filter in the context of the geography of economic growth and regional development has been improved on by several authors in order to capture the structural preconditions of the regions that play a critical role in their successful development and has a special focus on the regional innovation systems

(Rodríguez-Pose 1999; Crescenzi et al. 2007, 2013; Crescenzi and Rodríguez-Pose 2013). The social filter corresponds to the social and institutional characteristics of a given region and the local systems of innovation that enable this region to produce and use or apply innovation and knowledge, as well as being able to learn from it and from others, and using knowledge flows from other regions (Crescenzi et al. 2013, p. 294). The social filter corresponds to a mix of characteristics that create the distinctiveness of a region (a "profile") and has to be proxied by indicators from education, economic base and demography (Crescenzi et al. 2013, p. 295). Each region has its unique Social Filter (Rodríguez-Pose 1999, p. 81).

This concept can be taken in association with the concept of absorptive capacity of the regions, i. e. "the importance of internal knowledge absorption capacity on external knowledge network development." (Storper and Scott 2009, p. 21; Meusburger 2013; Rodríguez-Pose and Fitjar 2013; Huggins and Thompson 2014). Both concepts recognize the importance of intangibles like the social or relational capital as a set of values of individuals operating within a particular local or regional milieu, to explain contributions to innovation and production through social investments in trust and reciprocity within this milieu (Storper and Scott 2009, p. 10). This social capital gradually builds up a network capital, both local and global or non-local, as Barthelt and Glücker name this relational regional asset (2011). Social and network capital are concepts associated with the institutional framework of a region, taken as broad as possible. Regional growth greatly depends on those network capital stocks that include knowledge access and calculative relations (Huggins and Thompson 2014).

Rodríguez-Pose speaks about institutional thickness and territorial capital, taking the latter as a mix of human or intellectual capital, social capital and political capital (2013). In a broader framework, empirical evidence has proved that the combination of a high human capital endowment with well-functioning institutions may lead to the formation of efficient regional systems of innovation (Rodríguez-Pose and Fitjar 2013).

"It is not a single socio-economic factor in isolation that matters for innovation: it is the combination of a set of local features—human capital, young people, favourable sector structure—that facilitates the genesis of local innovation. The relevance of these factors emerges only when they are assessed in an integrated framework able to capture their synergies and interactions." (Crescenzi and Rodríguez-Pose 2013, p. 289). The different concepts or formulations—social filter, absorptive capacity of the regions or innovation systems—converge in the importance of the institutional framework of the regions as the building blocks of growth and development.

In order to operationalise the concept of social filter and apply it to analyse the regional disparities in Southern European countries, a set of indicators from education, economic base and demography were selected, taking into account other studies and possible comparative models and situations. The most commonly used variables and indicators related to education focusing on human capital were selected; they are related to human capital theories and based on the rationale that there is a link between human capital, innovation, and economic growth (Bathelt

and Glückler 2011; Glaeser 1994; Rodriguez-Pose and Fratesi 2004; Cowan and Zinovyeva 2007).

Although the social and economic returns on investment in education have been estimated in different methods (Patrinos and Psacharopoulos 2011), there are still some limitations to applying the concept in all contexts and in an aggregate way. Among other limitations, returns to schooling decrease along the levels of the education system and it is difficult to assess accumulated cognitive skills (Woessmann 2003). It is also necessary to distinguish between individual and collective returns (De La Fuente 2003).

Human capital endowment embodies educational stock and therefore higher education and qualification at higher levels of the school system are the most relevant components of human capital. Tertiary education enrolments and indicators from human resources in science and technology as well as investments in research and development have been considered as proxies for human capital in the present study. Keeping in mind all the limitations of the different approaches already developed, it is more or less generally accepted that higher education indicators proxy for human capital. Formal education, family background, lifelong learning and other factors can, however, change human capital. We tried to take this into consideration by including indicators on population and employment by the highest level of education attained. In fact, higher education indicators show a high relevance in most of the approaches based on the analysis of educational stock related to economic growth (Rodríguez-Pose and Vilalta-Bufí 2005; Goldstein and Renault 2004; Marginson 2007).

Gross Domestic Product (GDP), employment and unemployment rates, and the qualification of the employees, by sectors of activity and gender, among other demographics, are the main indicators used in the study to characterise the economic base of the four Southern European countries at the NUTS 2 level. It is somehow less controversial to select indicators on the basis of economics than on human capital endowments. Employment in agriculture and in industry, and in the technology and knowledge-intensive sectors of these two sectors are relevant (Crescenzi and Rodríguez-Pose 2013); population and employment by the highest level of education attained was also considered; research and development (R&D) expenditure and human resources were also included although we are aware of the limitations of this indicator. Alone, R&D expenditure is not enough to capture the spatial variation of knowledge production (Crescenzi and Rodríguez-Pose 2013, p. 290) but it has been used to assess the economic effort in innovation production.

As for the demographic context, a set of general variables and indicators of the ageing process as well as the flows of immigrants from outside the region were included. Special attention was paid to the age structure and fertility rates. Population density was not considered although we were aware that it has been included in most of the studies on the social filter (Crescenzi and Rodríguez-Pose 2013, p. 297); the option was based on the argument that agglomeration should emerge as a result (output) and not as an input.

2.4 Point of Departure: Southern Europe Map of Prosperity

Gross domestic product (GDP) at current market prices—Purchasing Power Standard per inhabitant in percentage of the EU average, at country level (EU28 = 100) is the most common indicator to assess the global health of the economy of the European countries.

The four countries in Southern Europe registered a very turbulent evolution from 2001 to 2014, the last year for which there are available data both for country and NUTS2 levels (Fig. 2.1 and Annex 2.3). Italy, in 2001, almost reached 120% of EU 28 average but ever since there has been a continuous decline and recently (2014), the indicator was below 100%. Spain has been near the EU 28 average almost every year of this time period, surpassing the 100% limit between 2004 and 2009, although in 2014 it was only at 91%. Portugal presents the lowest values of the four countries throughout the time period, with 78% in 2014. Greece shows the most turbulent evolution with growth and decline since 2001; in 2009, Greece almost met the EU 28 average with 94%; by 2014, however, Greece's GDP was only 72% of that of EU 28. This value is even lower than in Portugal.

When looking at the GDP at a NUTS 2 level map for Southern Europe, we immediately tend to identify the rich and poor regions (Fig. 2.2). There are two main types of countries: Spain and Italy display a north south divide with a group of "richer" regions in the North and a vast "poor" space in the South. For instance, Italy has the highest number of regions above the EU average—11 regions, most of them located in the North of the country as is the case of Bolzano (144%) and Valle d'Aosta (133%). Those two regions in Italy presented the highest values of all four countries in 2014. Spain, like Italy, presents a North-South divide and some NUTS 2 regions like Pais Vasco (119%), Navarra (113%) or Cataluña (108%) largely surpass the EU 28 average. The capital regions of Madrid and Rome belong to the first type, the "richer". In both countries, the North corresponds to the most dynamic industrial areas.

Greece and Portugal, in turn, show different patterns, but similar to each other: the capital NUTS 2 regions of Lisboa and Athens are the richest regions opposed to the rest of their countries. This is a polarised richness pattern and is founded on a service and administrative or governance control economic model.

On the lower end of the GDP scale in Southern Europe between 2001 and 2014, are the regions that have often had the ten lowest scores: Anatoliki Makedonia, Thraki, Ipeiros, Calabria, Dytiki Ellada, Extremadura, Norte, Thessalia, Centro (PT), Voreio Aigaio and Campania. From 2011 onwards there was a downgrading of the Greek regions and in 2014, seven Greek regions registered the lowest values, all below 60% of EU 28 average: Anatoliki Makedonia, Thraki, with 50%, Ipeiros, with 51%, Dytiki Ellada, with 54%, Thessalia, with 55%, Kentriki Makedonia, with 56%, Voreio Aigaio, with 57%, and Peloponnisos with 58%.

No Greek region surpasses the 100% value. In Portugal, only Lisboa has a value over 100%.

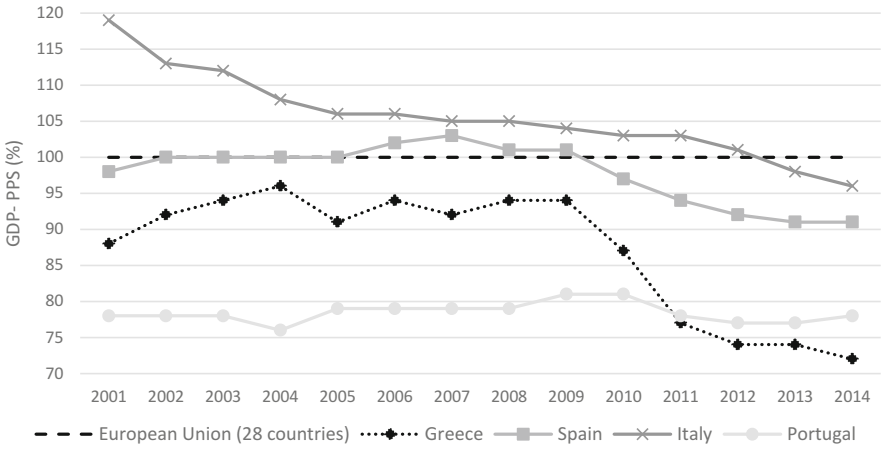


Fig. 2.1 Gross Domestic Product (GDP)—PPS per inhabitants % (EU28 = 100%). Source: Eurostat

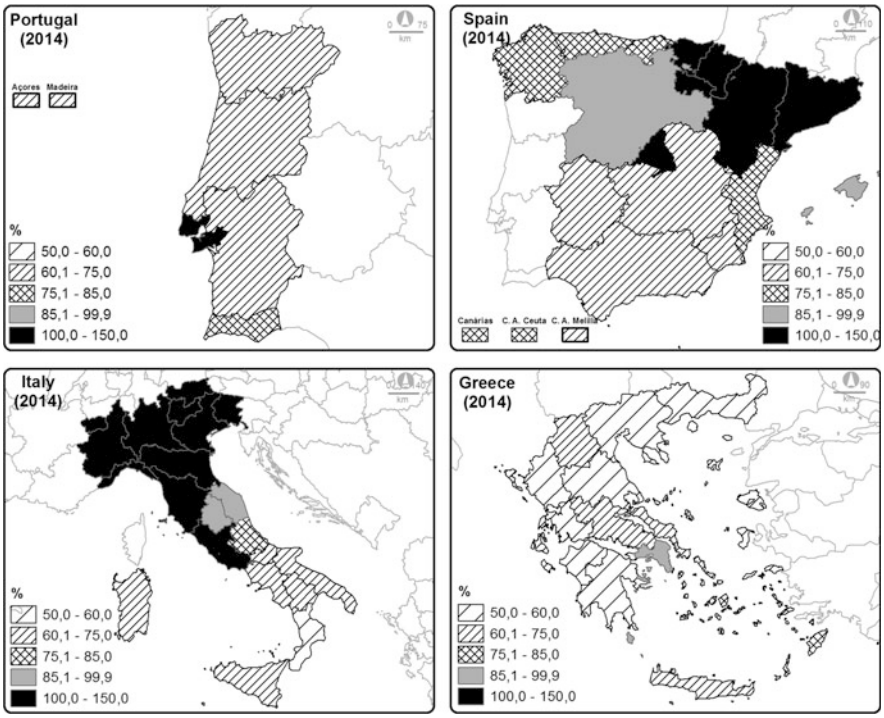


Fig. 2.2 GDP at current market prices—PPS per inhabitants % (EU28 = 100) 2014. Source: Eurostat

This is the map of regional development and prosperity in Southern Europe. The mismatch between the configurations of the disparities for different indicators, including the educational stock or other proxies for human capital, led us to the multivariate analysis that follows.

2.5 Regional Disparities Through the Lenses of the Social Filter Paradigm

The empirical exercise of analysing the regional disparities in Southern Europe with the "Social Filter" tool is based on data from Eurostat at the NUTS 2 level (or NUTS 3, in some cases), for 2014 or the most recent date for which there is data available.

The initial database included nearly 80 variables[4]. After running several rounds of an exploratory principal component analysis (PCA), we came out with a set of 31 variables[5], excluding all the absolute values and considering only percentages and ratios or indexes and covering the three main areas of the social filter, education, economic base and demography (Crescenzi et al. 2013). A principal component analysis (PCA) was again used to identify clusters of variables corresponding to the main axes of the regional "social filter" in Southern Europe. The results for the first five factors are included in Table 2.1, and Fig. 2.3. The factor loadings are presented in the Annex 2.1 for reasons of space.

Factor 1, named as *The Unemployment Rigidity Factor,* evidences how unemployment—specifically long term unemployment or structural unemployment, unemployment of females and total unemployment rates—shapes the face of Southern Europe and its regional disparities, and especially how it punishes the peripheral regions. Factor 1 gathers together nine variables with a positive loading or a positive correlation between the variables and the factor: five unemployment indicators for the year 2014, starting with the long-term unemployment rate; young people neither in employment nor in education and training; employment rate in agriculture, both total and in technology and knowledge-intensive sectors of agriculture, for the year 2013; population from 0 to 19 years as a percentage of NUTS' total population with a very weak weight. Six variables related to wealth and employment have a high negative loading or negative correlation with factor 1, including GDP per capita as a percentage of EU average (Annex 2.1) and R&D expenditure as a percentage of GDP.

This unemployment factor, the most relevant, explains nearly 30% of the variability and has an eigenvalue of 9.27.

[4]The datasets used in this chapter were all taken from Eurostat and are available in the corresponding website or delivered the author, by request.

[5]The list of those 31 variables is at the Annex 2.2.

Table 2.1 Results of the PCA analysis: Eigenvalues and variability

	F1	F2	F3	F4	F5
Eigenvalue	9.270	5.544	4.830	2.787	2.019
Variability (%)	29.902	17.885	15.581	8.990	6.513
Cumulative (%)	29.902	47.786	63.367	72.357	78.870

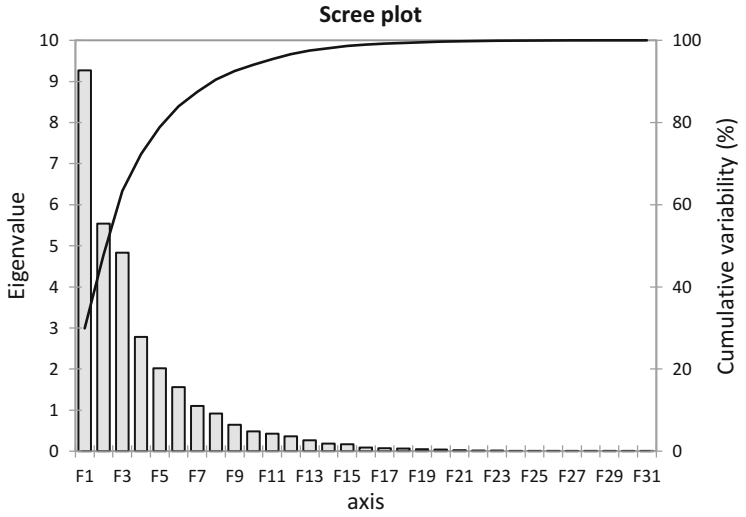


Fig. 2.3 Scree plot for PCA analysis

Factor 1 evidences the major divides in regional development of the four countries. Most of the regions in Southern Spain (Andalucia and Murcia) and in Southern Italy and almost all regions in Greece are the hardest hit regions by the negative components of Factor 1 (Fig. 2.4). These three countries present a highly contrasting pattern, with a sharp north-south divide in Spain and Italy. Continental Portugal, on the contrary, presents a smoother pattern.

The more dynamic regions (the richer regions?) with the best performance in Factor 1 correspond to the NUTS 2 regions with the lower unemployment rates and higher GDP and include almost all regions in continental Italy north of Molise; Pais Vasco and Navarra in the North of Spain; and at a slightly lower level, the three capitals, Madrid, Lisboa and Lazio where Roma is located. Attiki, the region where Athens is located is the better performing region in Greece although with a positive score in Factor 1 (0.791). All other Greek regions fall into very high scores of Factor 1 (higher than 4.31). Ceuta and Melilla however, register the highest scores.

It is however necessary to bear in mind that economic restructuring, in particular industrial evolution towards new production paradigms, always carries unemployment with it. Thus, unemployment rate can be a signal of innovation potential and on-going restructuring processes. Only the follow up of the evolution of the indicator will allow a more accurate analysis of this changing process.

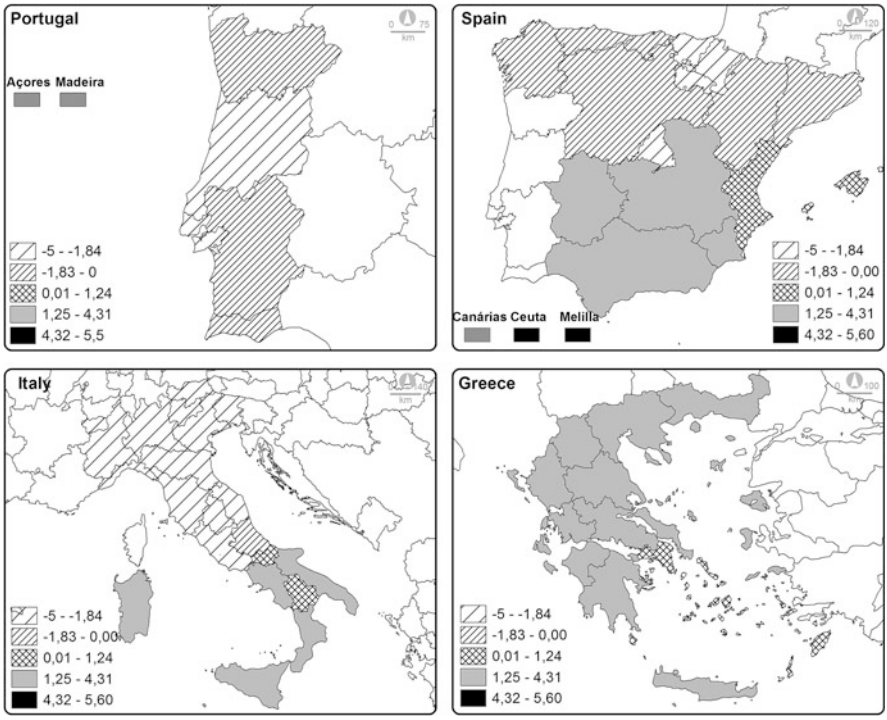


Fig. 2.4 Factor 1—The unemployment rigidity factor (Eigenvalue 9.270, variability 29.902%)

Factor 2, named as *The Human Capital and Innovation Factor* corresponds to a mix of variables. Factor 2 gathers together five variables with a positive loading or a positive correlation between the variables and the factor linked with higher education qualification population and human resources or active population and population variation. Factor 2 includes a variable with a negative loading or negative correlation corresponding to the population with a lower level of qualification: persons aged 25–64 with upper secondary education attainment, by sex and NUTS 2 regions (%).

This human capital and innovation factor explains nearly 18% of the variability and has an eigenvalue of 5.54.

Factor 2 is a complement of Factor 1 for building up the Social Filter concept; the regional disparity patterns of Factor 2 do not overlap with the former patterns of Factor 1 (Fig. 2.5).

Spain is the country that performs better; Madrid is the region with the highest score in all the four countries. Pais Vasco, Navarra and Cataluña also register high values, although lower than the value of Madrid; all the other regions in mainland Spain fall in the immediately lower values, still quite high. Opposite to this pattern, Portugal and Greece display quite contrasting situations. Both countries register high disparities with the corresponding capital regions presenting the best score, in

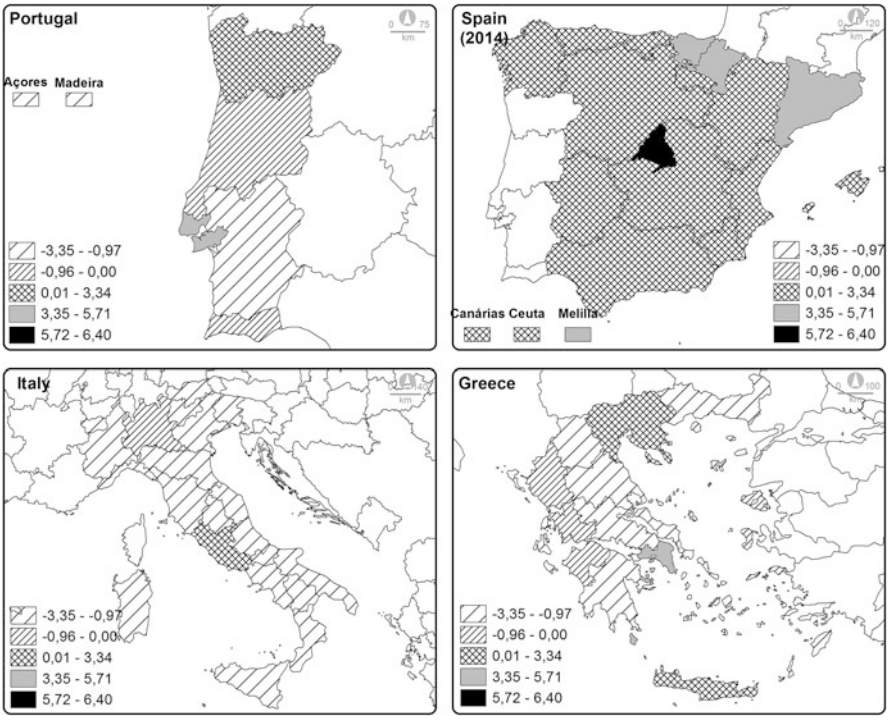


Fig. 2.5 Factor 2—The Human Capital and Innovation Factor (Eigenvalue 5.544, variability 17.885%)

both cases lower than Madrid. Italy does not display relevant disparities and presents a quite unexpected performance with low scores all over the country. Most of Italian NUTS 2 regions fall in the lower values of Factor 2. Exceptions are Lombardia with a higher score and Lazio, the region where Roma is located, with an even higher score. Lazio's score however is lower than that of Lisbon or Attiki and still lower than Madrid's. The pattern displayed by Italy in Factor 2 suggests that it is not relevant for explaining the Italian model of development.

The regional performance of Factor 2 supports the argument that human capital endowment of a region does not lead immediately to growth; it is necessary but not sufficient. Further, it is possible that Spain has implemented a formal higher education expansion policy that is already delivering results in terms of graduates but this is not a guarantee of economic growth and regional development, not to mention reduction in the regional disparities.

Factor 3, named as *The Educational Potential Factor*, is positively correlated with three variables, two of them related to higher education enrolments and students at the age of 17; the third variable positively correlated is the old age dependency. Factor 3 is negatively correlated with two variables from the education set: lower qualifications and school dropouts.

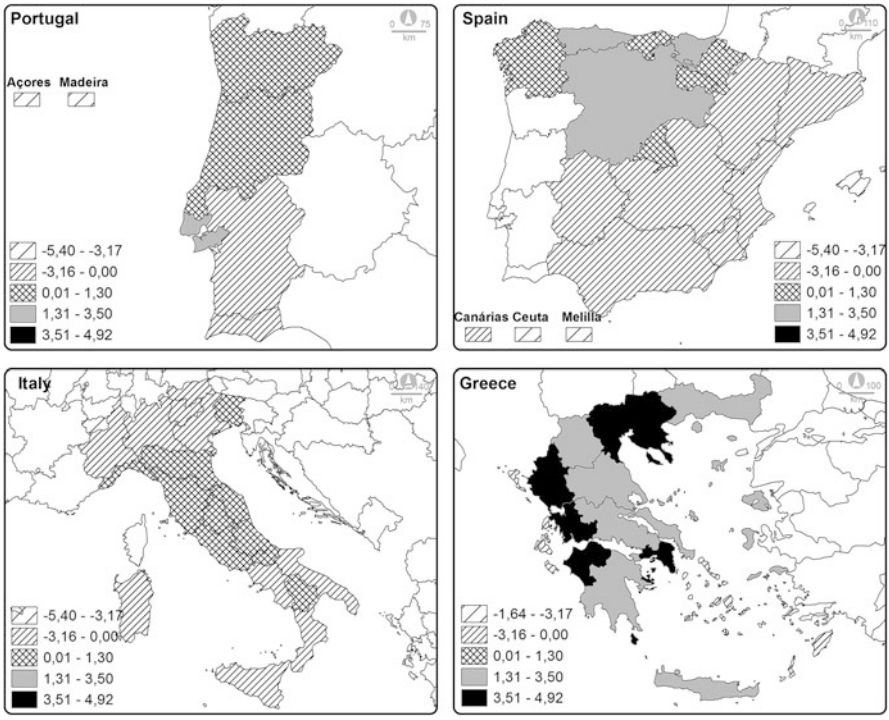


Fig. 2.6 Factor 3—Educational potential factor (Eigenvalue 4.830, variability 15.581%)

Factor 3 is much less relevant than the former two factors and accounts for explaining nearly 16% of the variability with an eigenvalue of 4.830.

The spatial pattern of the factor loadings of Factor 3 by NUTS 2 regions results in a complex landscape (Fig. 2.6). Regions with the higher scores correspond to regions with a potential growth of their human capital assets; at least apparently, those regions are benefiting from, for instance, education policies with the aim of broadening access to higher levels of the education system.

Factor 4, named as *The Population Potential Factor*, is positively correlated with two demographic variables: fertility rates and population density, and negatively correlated with school dropouts, for females.

Factor 4 is much less relevant than the former three factors and accounts for explaining nearly 9% of the variability with an eigenvalue of 2.787.

Related to this, and bearing in mind the critical level of the population ageing that Southern Europe is facing, it is understandable that this Factor only assumes real relevance in certain regions. Factor 4 reflects how quickly the population in vast hinterlands in the several countries is ageing. Noteworthy are the younger population bastions. In Portugal and Spain, Lisbon, Madrid, Pais Vasco and Navarra stand out as demographic dynamic poles. Greece has not such a contrasted pattern as the former countries but, the country still displays strong regional

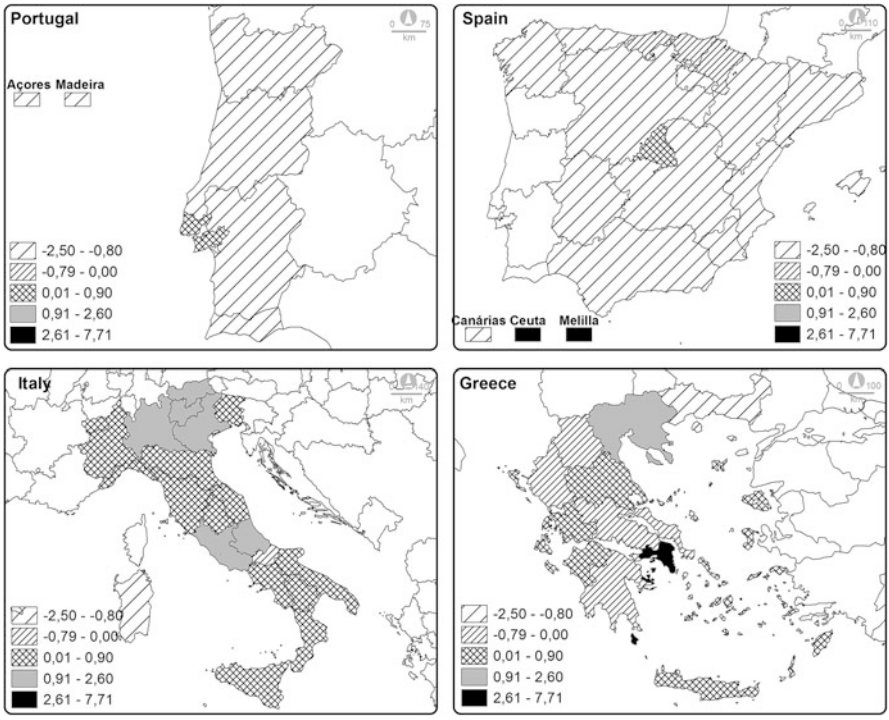


Fig. 2.7 Factor 4—Population potential factor (Eigenvalue 2.878, variability 8.990%)

contrasts. Italy is certainly the exception in the four countries. The country does not have as great contrasts as the others and most of the regions perform better, with higher scores. The spatial pattern of the factor loadings of Factor 4 by NUTS 2 regions results in a rural-urban landscape for Portugal, Spain and Greece and a more balanced scenario in Italy (Fig. 2.7). Italy has a less ageing population and a stronger and more dynamic economic base, in addition to the massive influx of immigrants from outside Europe.

Factor 5, named as *Human Capital II*, is residual; it is positively correlated with two educational variables: student distribution by region and students at the second stage of tertiary education leading to an advanced research qualification (level 6).

Factor 5 is less relevant when compared to the former four factors, explaining nearly 7% of the variability with an eigenvalue of 2.019. Still it is important to highlight the relevance in certain regions as is the case of Norte (PT) and Centro (PT) and some Italian regions spread all over the country as well as some Spanish regions in the industrial areas in the North of the country (Fig. 2.8). Factor 5 reflects both some residual demographic potential and educational policies of bringing young generations to the school and to research and development. Regions with the highest scores are those that strongly support research and development.

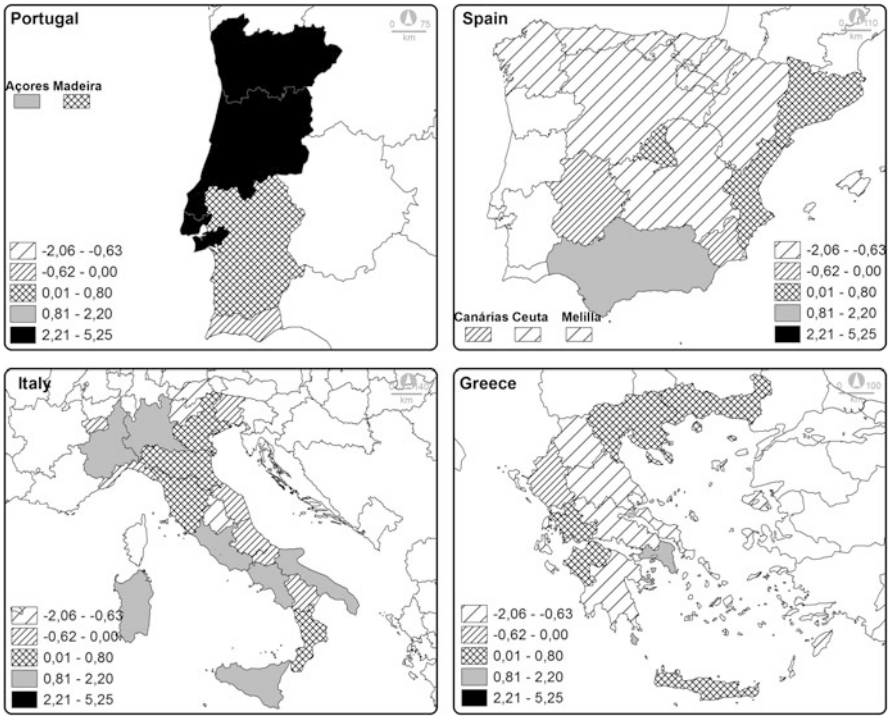


Fig. 2.8 Factor 5—Human capital II factor (Eigenvalue 2.019, variability 6.513%)

Considering the squared cosines of the observations, i.e. the NUTS 2 and for each region the factor for which the squared cosine is the highest, it is possible to infer the relevance of each factor for each region. The output can be considered a synthesis of the social filter application in the four Southern Europe countries by NUTS 2 (Fig. 2.9).

Factor 1 is again the most relevant for the major number of regions and more adequate for explaining the regional patchwork in Spain and Italy—the most economically robust countries. It is also adequate for certain Greek regions in the central part of the country. Factor 2 is particularly relevant for some of the more dynamic Spanish regions, old industrial areas, like Pais Vasco, Navarra and Cataluña as well as for Madrid and other regions; it is also important for Alentejo (PT) and some regions in Italy, but there is no clear relationship between the economic base of those regions and the scores of factor 2.

Some features must be highlighted, however. Besides the impact of factor 1, strongly conditioned by unemployment and to a lesser degree, factor 2 and the human capital and innovation potential, there are no overlapping patterns for the different maps separately. We already knew that there are larger inequalities within countries than between countries and that the national policies are not playing the main role any longer (Puga 2002). Still, there are national institutional constraints.

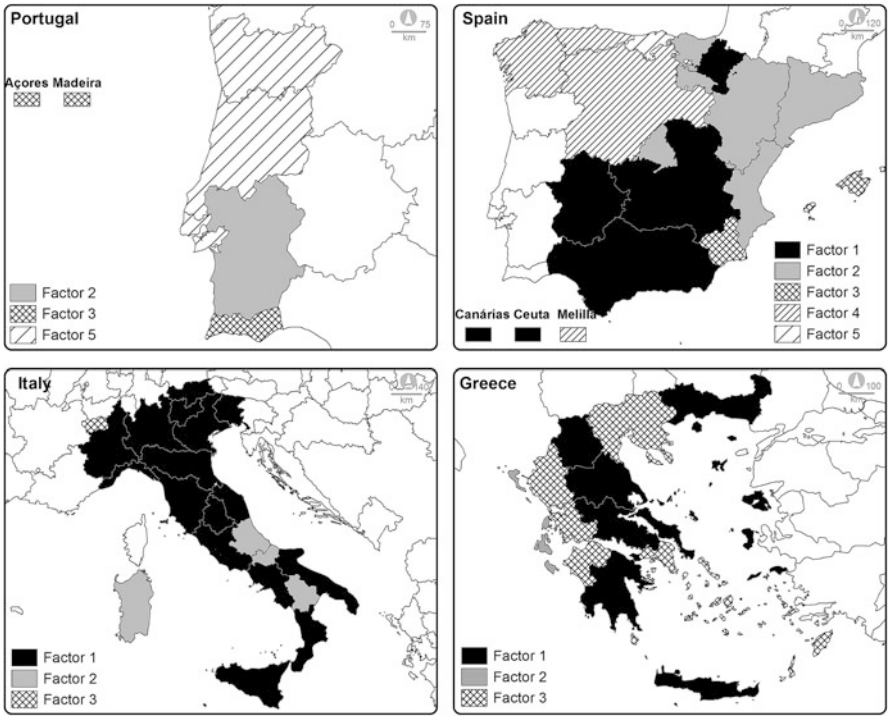


Fig. 2.9 Largest squared cosines of the NUTS 2 for the five factors (PCA)

For instance in some countries including Italy, Spain and Portugal, salaries are defined at the national level.

2.6 A Short Complementary Exercise

In order to answer the question, "Is R&D investment in lagging areas of Europe worthwhile?" Rodríguez-Pose tested the link between investment in R&D and economic growth in the European regions at the NUTS 2 level, based on the evolution of GDP per capita measured in PPS and the evolution of R&D expenditure as a percentage of GDP between 1986 and 1996 (2001). Skipping the theoretical and empirical analysis of that study at the risk of too much simplification, in short, the author concluded that "it is difficult to definitively prove that the increase in growth may be the direct result of the expansion in R&D investments." (Rodríguez-Pose 2001, p. 292). Making a comparative exercise with the same indicators, from the same source (Eurostat), for the four Southern European countries at the NUTS 2 level, for 2003 and 2013, it is again not possible to state

unequivocally that investments in R&D in the peripheral regions ensure economic growth.

Between 2003 and 2013, two NUTS 2 regions maintained the same value for the GDP per capita (PPS), while three other regions registered a positive variation. Galicia in Spain and Centro in Portugal maintained the same value of GDP per capita in 2003 and in 2013. The north of Portugal, the Azores, and Bolzano in Italy, were the three NUTS 2 regions of Southern Europe with positive changes. All other NUTS 2 regions of the four countries of Southern Europe registered a negative variation of its GDP per capita in PPS as a percentage of the UE28 average between 2003 and 2013. In contrast with this performance, only five NUTS 2 regions of the four countries recorded a negative change in R&D expenditure as a percentage of GDP. Three of these regions are special cases; Ceuta and the Canary Islands in Spain and the Azores in Portugal. Abruzzo and Lazio in Italy are the other two regions with negative variations; all the other regions registered a positive variation, ten of which were higher than 100%. Sterea Ellada, in Greece, registered an increase of 500%; Ionia Nisia and Peloponnisos, an increase of 237.5 and 225.0% respectively.

Between 2003 and 2013, only two NUTS 2 regions in Southern Europe registered an increase, both in GDP per capita (PPS) and in R&D expenditure as a percentage of GDP. Those were the regions of Norte in Portugal and Bolzano in Italy. We cannot identify a clear pattern; no correlation exists between the two variables to be possible to sustain an argument of causality, nor is there a linear direct path between innovation and economic growth, as measured by these indicators.

The regions with the higher scores of GDP per capita in PPS in 2003 are represented in Fig. 2.10. and the regions from the bottom of the same ranking, for 2003, are plotted in Fig. 2.11. Figure 2.12 is a kind of legend for the two previous figures. The intermediate regions were not represented for clearness of the graphics.

As already mentioned, only Bolzano registered an increase in GDP per capita; all other NUTS 2 regions declined in average in the 10 year time span. Nevertheless all regions registered an increase of R&D expenditure as a percentage of the GDP.

Lagging regions registered a similar performance: decrease of GDP in spite of increases in R&D expenditure. These "poorer" regions even registered the higher increase in R&D expenditure, as could be anticipated, taking into account other studies (Charlot et al. 2015, p. 1229). Nevertheless the "richer" regions have much higher values of GDP per capita than the former. Norte Portugal stands out as the exception. The region had a very small increase in its GDP and an increase in R&D. Norte Portugal was the region with the lowest score of GDP per capita, from all the four countries in Southern Europe, in 2013.

Even without clear patterns, there is however, some similarity in both graphs (Fig. 2.10. and 2.11) and it is possible to identify two main groups of regions outside the exceptions of regions that registered a growth in one or two indicators: those whose arrows are longer but with a slight slope (W–E) and those with a shorter but sharper slope (NW–SE). It is possible to include two or three NUTS 2 regions in the first group from both "richer" and "poorer" regions. Those are regions with a higher

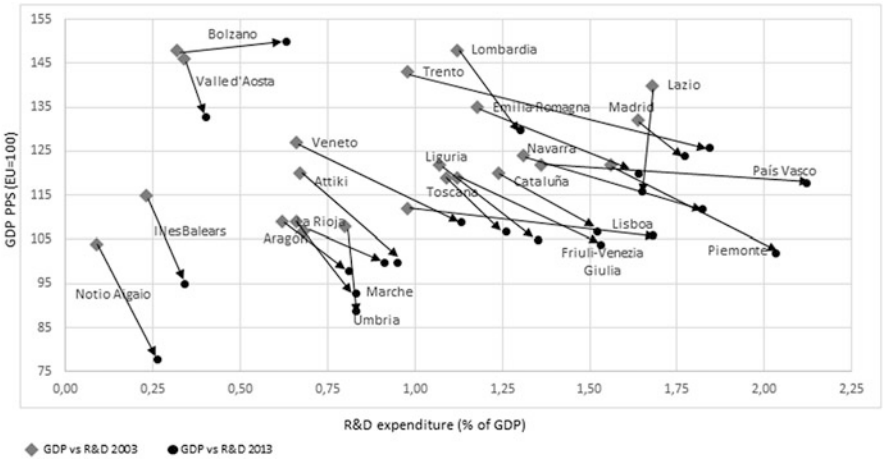


Fig. 2.10 Evolution of GDP vs R&D (2003–2013) in richer regions

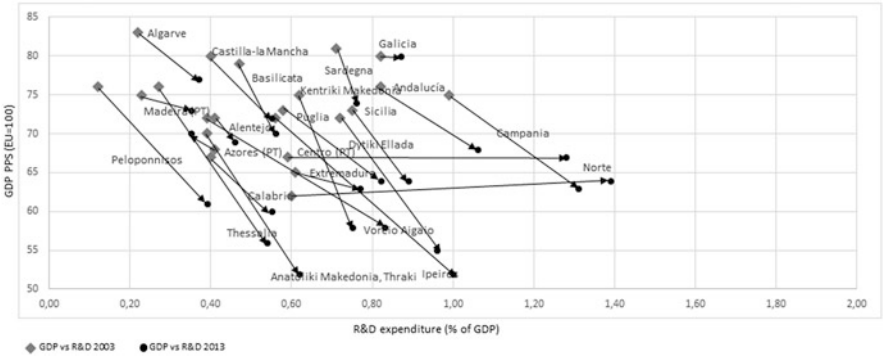


Fig. 2.11 Evolution of GDP vs R&D (2003–2013) in lagging regions

increase in R&D expenditure that lost less ground than the others in what concerns GDP per capita. We can find them in the capital regions, in industrial areas or in the most remote parts of Southern Europe, suggesting that this can be the result of localised plans or projects more than larger policies.

Once again it is not possible to infer from this data that the R&D investment (knowledge and innovation) does not lead to economic growth. Considering the above results, one reason for the underperformance of Southern European regions in the time span analysed, could be that the investment levels in R&D are not high enough; they are still far below the 3% target of the Europe 2020 strategy. Another limitation can be found on the specialisation at the regional level that has to be taken into account, as has been highlighted by the Smart Specialisation Strategy (SSS) developed by the EC.

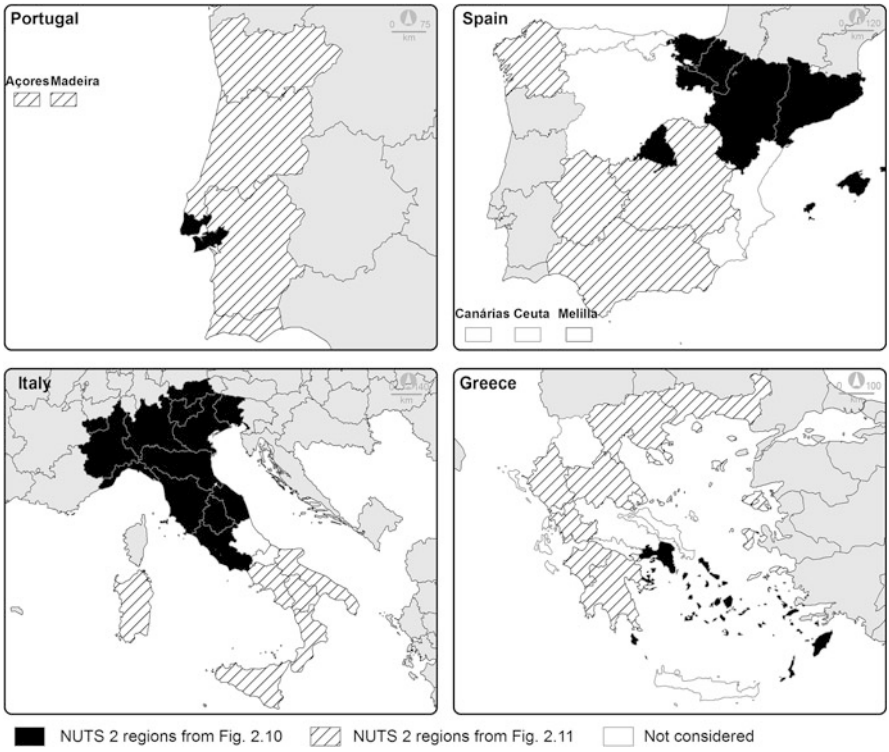


Fig. 2.12 Top and bottom regions NUTS2 (by GDP 2003) covered by Figs. 2.10 and 2.11

In fact, R&D's effects on growth and development have always been an important issue in Europe and for the European Commission. By the implementation of the Lisbon Strategy in 2005, the EC established the group of experts on Knowledge for Growth (K4G) in order to provide high-level advice on the research and innovation policy. The idea of a persistent deficit in R&D expenditures in comparison with the USA has always played an important role in the design of a European innovation policy. However, the K4G group developed a new concept, the Smart Specialisation Strategy, that should support countries and regions in identifying what they can do best in terms of science and technology and the research and innovation domains in which they can hope to be excellent. R&D expenditure should concentrate in those domains, 'the "right" S&T specialisations', in order to be efficient (Foray 2006).

The implementation of the SSS and the results of the K4G group have however, until now, been not quite disseminated.

2.7 Conclusions and Further Questions

The four countries in Southern Europe—Portugal, Spain, Italy and Greece—in 2014, displayed, at the country level, a GDP per capita below the EU 28 average. Parallel to this, at the NUTS 2 level, the four countries present huge contrasts in different configurations according to the socio-economic variables and indicators under consideration.

Regional disparities are persistent and tend to increase. A discussion on the final targets of the European Regional Policy is still open: do European regional policies aim to reduce personal rather than regional inequalities (Puga 2002)? Whatever arguments can be gathered for the possible answers, there are major structural causes and different working mechanisms across regions that prevent balance and reinforce agglomeration even with changing poles.

Polarisation shapes the face of Southern Europe's development landscape. Capital regions and old industrial regions in Spain and Italy perform better than the others. The Northern half of Italy, including Lazio; Northeast regions of Spain, including Pais Vasco, Navarra La Rioja, Aragon, Cataluña and Madrid; Lisboa and Attikki constitute the first *league* of regional performance in Southern Europe. "The large urban areas attract ever greater capital and human resources often at the expenses of intermediate and peripheral city and regions" (Rodríguez-Pose and Fitjar 2013, p. 369) and the expected spreading effects from the core areas to the peripheral ones did not occur.

Some of the regions of the four countries in Southern Europe even display similar development status and patterns of other regions in the core of the European Union and are integrated in supra national networks of knowledge, people and commodity flows. Other regions, vast areas of the four countries, are getting ever distant from the core, ageing, losing their jobs although keeping the education system working and expanding. Those regions may even keep on feeding core regions with high qualified young workers (Fratesi and Percoco 2014). Broadening access to education and particularly to higher education may be a political option in order to give some extra-support to regions lagging behind. Actually, peripheral regions can be penalised in various ways; remoteness forces higher transport costs and by consequence leaves fewer resources for the education and qualification of workers. In order to be able to compete in the global markets those regions structure their strategies in cost reduction wherever they can, suffering what Redding and Schott called the "additional penalty of remoteness" (Redding and Schott 2003, p. 516). Central governments take the initiative of offsetting such trends.

Rodrígues-Pose and Fratesi identified what they called the *sheltered economies or regions* in Southern Europe (Rodríguez-Pose and Fratesi 2007). Those are remote assisted regions, encapsulated in themselves, suffering from isolation, with low levels of employment, high unemployment, or dependence on nonmarket oriented sectors, underperforming economically and depending on transfers from the central governments and public policies. It is easier to identify some of those situations in Southern Italy and Greece in our analysis at the NUTS 2 level. In Portugal, due to the dimension of NUTS 2, those regions do not emerge so clearly but the results of the PCA for the Norte region suggest this kind of structural problem.

Education is important but not enough, even if differences in human capital endowment have been identified as barriers to convergence in the European Union (Rodríguez-Pose and Vilalta-Bufí 2005). In fact, the link between research and development, innovation and economic growth is not always an easy path; some areas are more successful than others (Rodríguez-Pose 1999). In the present case, regions outside the main poles display high scores for education indicators; they have, however, not been able to catch up in what concerns economic growth. Those regions face the risks of turning themselves into tanks or reserves of qualified (educated) young people that will be ready to migrate to the core regions feeding the already strong brain-drain flows.

The regional disparities in Southern Europe evidence the limits of the European Regional Policy that has the explicit aim of reducing them. Again the balance between physical and human capital investments has to be reworked. Ann Markusen defends a stereo vision for regional planning, arguing that a balanced mix should be carefully structured in regional policies and policy measures since prioritising physical capital investments (transport infrastructures, among others) has led to very unexpected results of new polarisations and regional disparities (Markusen 2008).

Is there inescapable path dependence for Southern Europe or do we need new policies and measures?

Annex

Annex 2.1

	Factor loadings	Correlations between variables and factors	Squared cosines of the variables	Contribution of the variables (%)	Description of the variables
Factor 1: The unemployment rigidity (Eigenvalue 9270, Variability 29,902%)					
V39_2014	0.889	0.889	**0.790**	8.528	Long-term unemployment (12 months and more) by NUTS 2 regions: Long-term unemployment rate
V38_2014	0.878	0.878	**0.772**	8.325	Unemployment rates by sex, age and NUTS 2 regions (%): Females 20–64 years
V36_2014	0.864	0.864	**0.746**	8.052	Unemployment rates by sex, age and NUTS 2 regions (%): Total, 20–64 years
V37_2014	0.821	0.821	**0.673**	7.264	Unemployment rates by sex, age and NUTS 2 regions (%): Males, 20–64 years
V102_2014	0.659	0.659	**0.434**	4.679	Young people neither in employment nor in education and training by sex and NUTS 2 regions (NEET rates)
V40_2014	0.639	0.639	**0.409**	4.407	Long-term unemployment (12 months and more) by NUTS 2 regions: Long-term unemployment as a percentage of the total unemployment
V305A_2014	0.590	0.590	**0.349**	3.761	Employment by age, economic activity and NUTS 2 regions (NACE Rev. 2) − 1000 (age 15–64). Agriculture, Forestry and Fishing

V309AB_2013	0.573	0.573	**0.328**	3.540	Employment in technology and knowledge-intensive sectors by NUTS 2 regions and sex (from 2008 onwards, NACE Rev. 2). Agriculture, Foretry, Fishing; Mining and Quarrying
V12_2014	0.478	0.478	**0.229**	2.467	Population from 0 to 19 years as a percentage of NUT's total population
V26_2012	−0.670	−0.670	**0.449**	4.842	Total intramural R&D expenditure (GERD) by sectors of performance − All sectors (Euro per inhabitant; Percentage of GDP)
V305BE_2014	−0.695	−0.695	**0.482**	5.204	Employment by age, economic activity and NUTS 2 regions (NACE Rev. 2) − 1000 (age 15–64): Industry (except construction)
V309C_2013	−0.714	−0.714	**0.510**	5.502	Employment in technology and knowledge-intensive sectors by NUTS 2 regions and sex (from 2008 onwards, NACE Rev. 2) Manufactury
V306F_2014	−0.809	−0.809	**0.654**	7.053	Employment rates by sex, age and NUTS 2 regions (%) FEMALES
V19_2013	−0.843	−0.843	**0.710**	7.663	Gross domestic product (GDP) at current market prices − Purchasing Power Standard per inhabitant in percentage of the EU average
V306_2014	−0.865	−0.865	**0.748**	8.068	Employment rates by sex, age and NUTS 2 regions (15–64 years) (%)
Factor 2: Human capital and innovation (Eigenvalue 5544, Variability 17,885%)					
V10_2014	0.868	0.868	**0.754**	13.595	Persons aged 25–64 with tertiary education attainment by sex and NUTS 2 regions (%)
V22Pc_2014	0.867	0.867	**0.751**	13.542	Economically active population by sex, age, highest level of education attained − First and second stage of tertiary education (levels 5–6)

(continued)

Annex 2.1 (continued)

	Factor loadings	Correlations between variables and factors	Squared cosines of the variables	Contribution of the variables (%)	Description of the variables
					(25–64 years) (Total), as % of economically active population (25–64) (Total)
V308_2013	0.676	0.676	**0.457**	8.250	HRST by category and NUTS 2 regions − Persons with tertiary education (ISCED) and/or employed in science and technology − Percentage of active population
V11Txv2001_2011	0.624	0.624	**0.389**	7.016	Population variation rate 2001–2014
V31_2012	0.576	0.576	**0.332**	5.987	Total R&D personnel and researchers by sectors of performance, sex − (Total R&D personnel; Researchers) (Total(M + F)) (All sectors) (Percentage of active population − numerator in head count; Percentage of total employment − numerator in head count; Head count)
V9_2014	−0.624	−0.624	**0.389**	7.024	Persons aged 25–64 with upper secondary education attainment, by sex and NUTS 2 regions (%)
Factor 3: Educational potential (Eigenvalue 4830, Variability 15,581%)					
V1_2012	0.748	0.748	**0.560**	11.591	Students in tertiary education (ISCED 5–6) – as % of the population aged 20–24 years at regional level
V4_2012	0.659	0.659	**0.434**	8.978	Students (all ISCED levels) aged 17 at regional level − as % of corresponding age population
V202_2013	0.590	0.590	**0.348**	7.210	Old age dependency ratio (Population 65+/ Population 15–64)

V8_2014	−0.552	−0.552	**0.305**	6.309	Persons aged 25–64 with lower secondary education attainment, by sex and NUTS 2 regions (%)
V101_2014	−0.733	−0.733	**0.538**	11.139	Early leavers from education and training by sex and labour status
Factor 4: Population potential (Eigenvalue 2787, Variability 8990%)					
V17_2013	0.806	0.806	**0.649**	23.292	Fertility rates by age and NUTS 2 regions
V200_2013	0.719	0.719	**0.517**	18.559	Population density
V101F_2014	−0.585	−0.585	**0.342**	12.262	Early leavers from education and training by sex and labour status (Females)
Factor 5: Human capital II (Eigenvalue 2019, Variability 6513%)					
V3_2012	0.785	0.785	**0.617**	30.552	Students (ISCED 5–6) at regional level − as % of total country level students
V7P_2012	0.710	0.710	**0.504**	24.974	No. of students − Second stage of tertiary education leading to an advanced research qualification (level 6)

Annex 2.2

	Description	Unit	Year used in PCA	Eurostat Table
Education				
V1	Students in tertiary education (ISCED 5–6) − as % of the population aged 20–24 years at regional level	% of total 20–24 population on the same region	2012	educ_regind
V3	Students (ISCED 5–6) at regional level − as % of total country level students (ISCED 5–6)	% of country level students	2012	educ_regind
V4	Students (all ISCED levels) aged 17 at regional level − as % of corresponding age population	%	2012	educ_regind
V7P	No. of students − Second stage of tertiary education leading to an advanced research qualification (level 6)	%	2012	educ_renrlrg1
V8	Persons aged 25–64 with lower secondary education attainment, by sex and NUTS 2 regions (%)	% of poopulation 25–64	2014	No longer available on Eurostat
V9	Persons aged 25–64 with upper secondary education attainment, by sex and NUTS 2 regions (%)	% of poopulation 25–64	2014	No longer available on Eurostat
V10	Persons aged 25–64 with tertiary education attainment by sex and NUTS 2 regions (%)	% of poopulation 25–64	2014	No longer available on Eurostat
V101	Early leavers from education and training by sex and labour status	% population age 18–24	2014	edat_lfse_16
V101F	Early leavers from education and training by sex and labour status FEMALES	% population age 18–24	2014	edat_lfse_16
V102	Young people neither in employment nor in education and training by sex and NUTS 2 regions (NEET rates)	% population age 15–24	2014	edat_lfse_22
Demographics				
V11Txv	Population Variation rate 2001–2014 (%)	TxVar	Var-2001–2011	demo_r_d2jan
V12	% Population from 0 to 19 years over NUT total	%	2014	demo_r_pjangroup
V17	Fertility rates by age and NUTS 2 regions	Births per woman	2013	demo_r_frate2
V200	Population density	Habitants per km^2	2013	demo_r_d3dens

V202	Old age dependency ratio (Population 65+/Population 15–64)	%	2013	demo_r_pjangroup
Economics and employment				
V19	Gross domestic product (GDP) at current market prices − Purchasing power standard per inhabitant in percentage of the EU average	%	2013	nama_10r_2gdp
V305A	Employment by age, economic activity and NUTS 2 regions (NACE Rev. 2) − 1000 (age 15–64). Agriculture, Forestry and Fishing	% of country total for each category	2014	lfst_r_lfe2en2
V305BE	Employment by age, economic activity and NUTS 2 regions (NACE Rev. 2) − 1000 (age 15–64): Industry (except construction)	% of country total for each category	2014	lfst_r_lfe2en2
V309AB	Employment in technology and knowledge-intensive sectors by NUTS 2 regions and sex (from 2008 onwards, NACE Rev. 2). Agriculture, Forestry, Fishing; Mining and Quarrying	% of country total for each category	2013	htec_emp_reg2
V309C	Employment in technology and knowledge-intensive sectors by NUTS 2 regions and sex (from 2008 onwards, NACE Rev. 2) Manufacturing	% of country total for each category	2013	htec_emp_reg2
V22Pc	Economically active population by sex, age, highest level of education attained − First and second stage of tertiary education (levels 5–6) (25–64 years) (Total), as % of Economically active population (25–64) (Total)	% active population 25–64	2014	lfst_r_lfp2acedu
V26	Total intramural R&D expenditure (GERD) by sectors of performance − All sectors (Euro per inhabitant; Percentage of GDP)	% of GDP	2012	rd_e_gerdreg
V31	Total R&D personnel and researchers by sectors of performance, sex − (Total R&D personnel; Researchers) (Total(M+F)) (All sectors) (Percentage of active population − numerator in head count; Percentage of total employment − numerator in head count; Head count)	% of employment	2013	rd_p_persreg
V36	Unemployment rates by sex, age and NUTS 2 regions (%): Total, 20–64 years	% of population 20–64	2014	lfst_r_lfu3rt
V37	Unemployment rates by sex, age and NUTS 2 regions (%): Males, 20–64 years	% of population 20–64	2014	lfst_r_lfu3rt
V38		% of population 20–64	2014	lfst_r_lfu3rt

(continued)

Annex 2.2 (continued)

	Description	Unit	Year used in PCA	Eurostat Table
	Unemployment rates by sex, age and NUTS 2 regions (%): Females 20-64 years			
V39	Long-term unemployment (12 months and more) by NUTS 2 regions: Long-term unemployment rate	% of active population	2014	lfst_r_lfu2ltu
V40	Long-term unemployment (12 months and more) by NUTS 2 regions: Long-term unemployment as a percentage of the total unemployment	% of total unemployment	2014	lfst_r_lfu2ltu
V306	Employment rates by sex, age and NUTS 2 regions (15–64) (%)	% of population 15–64	2014	lfst_r_lfe2emprt
V306F	Employment rates by sex, age and NUTS 2 regions (%) FEMALES	% of population 15–64	2014	lfst_r_lfe2emprt
V308	HRST by category and NUTS 2 regions − Persons with tertiary education (ISCED) and/or employed in science and technology − Percentage of active population	% of active population	2013	hrst_st_rcat

Annex 2.3 GDP per capita pps (EU28 = 100%) Source: Eurostat (06.04.2016)

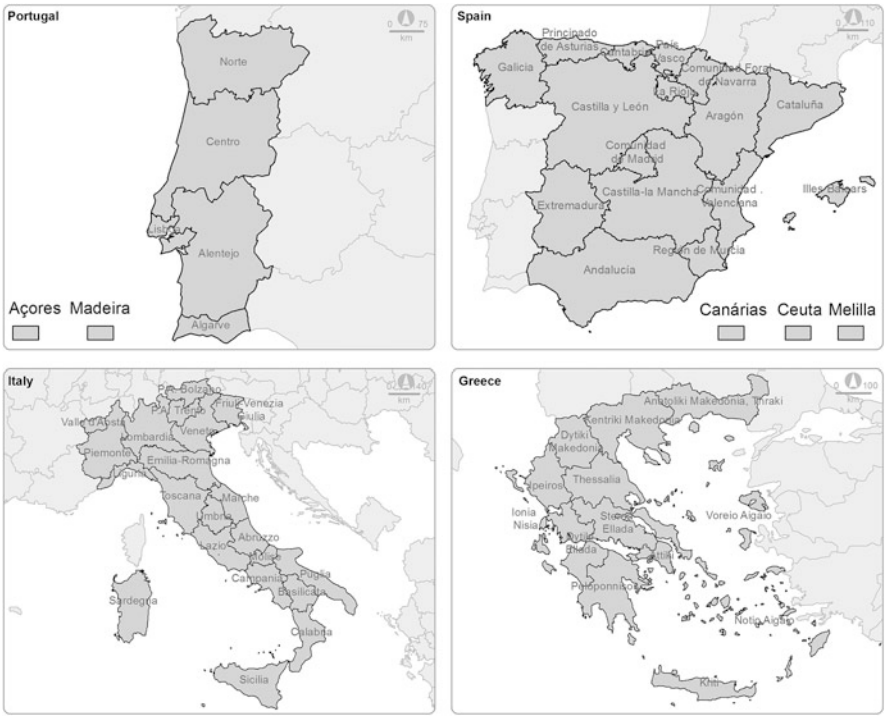
GEO	Name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EJ28	European Union (28 countries)	100	100	100	100	100	100	100	100	100	100	100	100	100	100
EL	Greece	88	92	94	96	91	94	92	94	94	87	77	74	74	72
EL11	Anatoliki Makedonia, Thraki	67	69	70	69	66	64	64	67	67	64	55	53	52	50
EL12	Kentriki Makedonia	73	75	75	77	72	74	73	75	75	68	60	58	58	56
EL13	Dytiki Makedonia	77	83	86	86	83	81	76	72	78	75	70	71	70	66
EL21	Ipeiros	67	71	72	70	66	66	64	64	64	61	55	52	52	51
EL14	Tnessalia	68	71	76	76	69	72	69	70	70	62	55	55	56	55
EL22	Ionia Nisia	89	88	94	94	92	92	90	93	89	82	69	67	66	67
EL23	Dytiki Ellada	66	70	72	73	70	73	71	70	69	66	58	56	55	54
EL24	Sterea Ellada	93	93	94	91	88	87	83	84	82	76	68	66	67	61
EL25	Peloponnisos	73	75	76	75	72	74	73	74	74	69	62	60	61	58
EL30	Attiki	111	118	120	125	120	124	122	125	128	118	105	101	100	99
EL41	Voreio Aigaio	64	65	72	72	71	73	73	76	75	68	61	57	58	57
EL42	Notio Aigaio	101	100	104	106	104	104	102	106	101	93	81	78	78	80
EL43	Kriti	81	84	85	87	82	84	80	82	82	74	64	60	63	63
ES	Spain	98	100	100	100	100	102	103	101	101	97	94	92	91	91
ES11	Galicia	76	79	80	81	83	86	88	89	89	86	83	80	80	80
ES12	Principado de Asturias	82	85	85	86	88	92	94	93	92	89	86	82	80	80
ES13	Cantabria	91	94	93	93	94	96	96	95	95	91	87	84	82	82
ES21	País Vasco	119	122	122	123	125	129	130	131	130	126	122	120	118	119
ES22	Comunidad Foral de Navarra	122	125	124	124	125	127	127	126	125	120	117	113	112	113
ES23	La Rioja	107	108	109	107	107	110	110	109	108	105	101	98	98	100
ES24	Aragón	102	106	107	107	108	110	112	111	110	107	104	100	100	100
ES30	Comunidad de Madrid	131	132	132	131	132	136	136	134	136	130	127	126	124	125
ES41	Castilla y León	88	91	91	92	92	94	95	94	95	91	89	87	85	86

(continued)

Annex 2.3 (continued)

ES42	Castilla-la Mancha	76	79	80	79	81	82	83	82	82	79	76	74	72	72
ES43	Extremadura	62	64	65	65	67	68	69	70	70	69	65	63	63	63
ES51	Cataluña	119	121	120	119	118	121	121	118	118	114	109	108	107	108
ES52	Comunidad Valenciana	94	95	94	92	92	94	93	91	90	86	83	80	79	80
ES53	Illes Balears	121	120	115	113	111	112	110	107	105	101	98	96	95	96
ES61	Andalucía	72	75	76	77	78	79	79	78	77	74	71	69	68	67
ES62	Región de Murcia	81	84	84	83	84	86	86	85	83	80	77	75	75	74
ES63	Ciudad Autónoma de Ceuta (ES)	84	86	87	87	87	88	88	87	87	83	78	76	76	76
ES64	Ciudad Autónoma de Melilla (ES)	82	84	86	87	86	86	84	82	82	77	73	69	69	68
ES70	Canarias (ES)	95	96	96	93	92	92	91	89	87	84	81	79	78	78
IT	Italy	119	113	112	108	106	106	105	105	104	103	103	101	98	96
ITC1	Piemonte	129	123	122	118	116	115	114	113	109	110	109	106	102	100
ITC2	Valle d'Aosta/Vallée d'Aoste	150	142	146	139	137	135	133	136	134	136	135	136	133	133
ITC3	Liguria	130	122	122	118	116	115	117	118	117	113	113	111	105	104
ITC4	Lombardia	156	149	148	141	138	136	135	138	136	137	136	133	130	126
ITH1	Provincia Autonoma di Bokano/Bozen	160	149	148	145	141	142	141	143	146	146	146	152	150	144
ITH2	Provincia Autonoma di Trento	154	145	143	136	132	130	130	130	131	130	128	128	126	123
ITH3	Veneto	135	126	127	123	120	119	118	116	116	114	115	113	109	108
ITH4	Friuli-Venezia Giulia	130	123	119	115	115	115	115	112	110	111	110	107	104	101
ITH5	Emilia-Romagna	146	137	135	130	127	128	128	127	124	123	124	122	120	117
ITI1	Toscana	126	120	119	114	112	111	111	110	111	109	109	108	107	104
ITI2	Umbria	117	110	108	104	101	102	101	100	97	95	93	91	89	87
ITI3	Marche	115	111	109	105	103	104	104	102	102	99	98	96	93	92
ITI4	Lazio	146	141	140	138	135	133	132	130	132	128	126	121	116	114
ITF1	Abruzzo	104	97	95	88	89	89	88	89	89	89	90	90	88	84
ITF2	Molise	91	86	85	82	81	83	83	81	82	80	78	77	75	75
ITF3	Campania	79	76	75	72	70	70	70	70	70	67	65	65	63	61

ITF4	Puglia	78	73	73	70	68	68	67	66	67	66	65	66	64	63
ITF5	Basilicata	86	81	79	76	74	75	76	75	74	72	72	72	70	69
ITF6	Calabria	72	68	67	66	66	65	65	65	66	64	64	63	60	59
ITG1	Sicilia	77	73	73	70	70	70	69	69	69	68	66	66	64	62
ITG2	Sardegna	85	80	81	79	78	78	77	78	79	77	76	76	74	72
PT	Portugal	78	78	78	76	79	79	79	79	81	81	78	77	77	78
FT11	Norte	63	63	62	60	62	62	63	63	65	65	63	64	64	65
PT15	Algarve	81	82	83	80	84	84	84	83	82	80	76	77	77	78
FT16	Centro (PT)	67	66	67	66	68	68	67	66	69	69	66	67	67	67
PT17	Área Metropolitana de Lisboa	112	112	112	110	114	113	113	112	115	114	109	106	106	106
PT18	Alentejo	71	71	72	71	73	74	73	71	72	74	71	70	69	70
PT20	Região Autónoma dos Açores (FT)	66	67	68	67	70	70	70	71	74	74	71	70	70	71
PT30	Região Autónoma da Madeira (FT)	68	74	75	76	79	79	78	78	79	78	77	73	73	73



Annex 2.4 The four countries in Southern Europe

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